Natural Gas Avoided Cost Meeting

10 a.m. – 12 p.m.

May 12, 2017

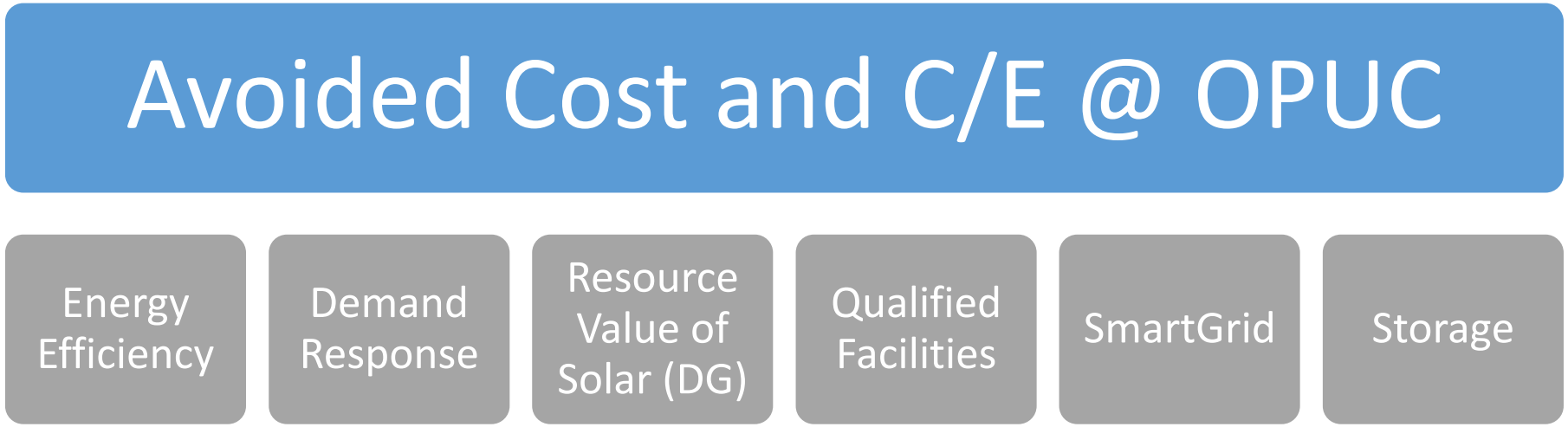
Energy Trust of Oregon

Agenda

- Introduction
  - OPUC
  - Energy Trust
  - Schedule for updates
- Overview of Process to Update Avoided Costs
- Proposed Updates for 2017
- Possible Future Updates
- Overview of Inputs
- Q&A

Introduction from OPUC

- OPUC recommended that Energy Trust host this meeting
- OPUC exploring avoided cost across many dockets and as part of many forums



Introduction from Energy Trust

- Purpose of the meeting
  - To describe and get input on the process of assembling avoided costs
- Energy Trust uses avoided costs to value energy savings for planning and reporting
  - Prescriptive and custom measures
  - Programs

Schedule

- Already received inputs from utilities
- Avoided cost meetings May 12
  - Natural gas avoided costs
  - Electric avoided costs
- Updates completed for 2018 planning and implementation June 30

Avoided Costs

- Assign economic value to energy savings based on utility system benefits
- The “benefit” in benefit-cost ratios, along with non-energy benefits
- Used for reporting and testing for measures and programs

Avoided Cost Update Process

- Happen every two years for electric and gas
- Key inputs come from utilities and Power Council
- Energy Trust is largely a “taker” of inputs, i.e., we make the stew but don’t grow the vegetables
- We blend values from each utility by share of revenue

Current Formula

$$\frac{Benefit}{Cost}\,Ratio = \frac{(Avoided\ Costs + Non\ Energy\ Benefits)}{Costs}$$

$$Avoided\ Cost =$$
$$(Gas\ Price\ Forecast) \cdot (1 + 10\%\ Power\ Act\ Credit)$$
$$+ Risk\ Reduction\ Value$$

Gas Price Forecast

- Forecasts of marginal supply costs from each utility
  - By year
  - Includes:
    - The long term gas price forecast (includes embedded forecasted cost of carbon compliance)
    - Gas storage carrying costs
    - Upstream variable costs
    - Carbon compliance is included in commodity pricing to extent it is known
- Weighted for each load shape for each measure to account for seasonal price variation

$$Avoided\ Cost = (Gas\ Price\ Forecast) \cdot (1 + 10\%\ Power\ Act\ Credit) + Risk\ Reduction\ Value$$

NW Power Act Credit

- NW Power Act: Gives energy efficiency a 10% cost advantage
  - OPUC directs Energy Trust to apply to natural gas avoided costs
- 839a(4)(D): For purposes of this paragraph, the "estimated incremental system cost" of any conservation measure or resource shall not be treated as greater than that of any non-conservation measure or resource unless the incremental system cost of such conservation measure or resource is in excess of 110 per centum of the incremental system cost of the nonconservation measure or resource.
- *[Northwest Power Act, §3(4)(0), 94 Stat. 2699.]*

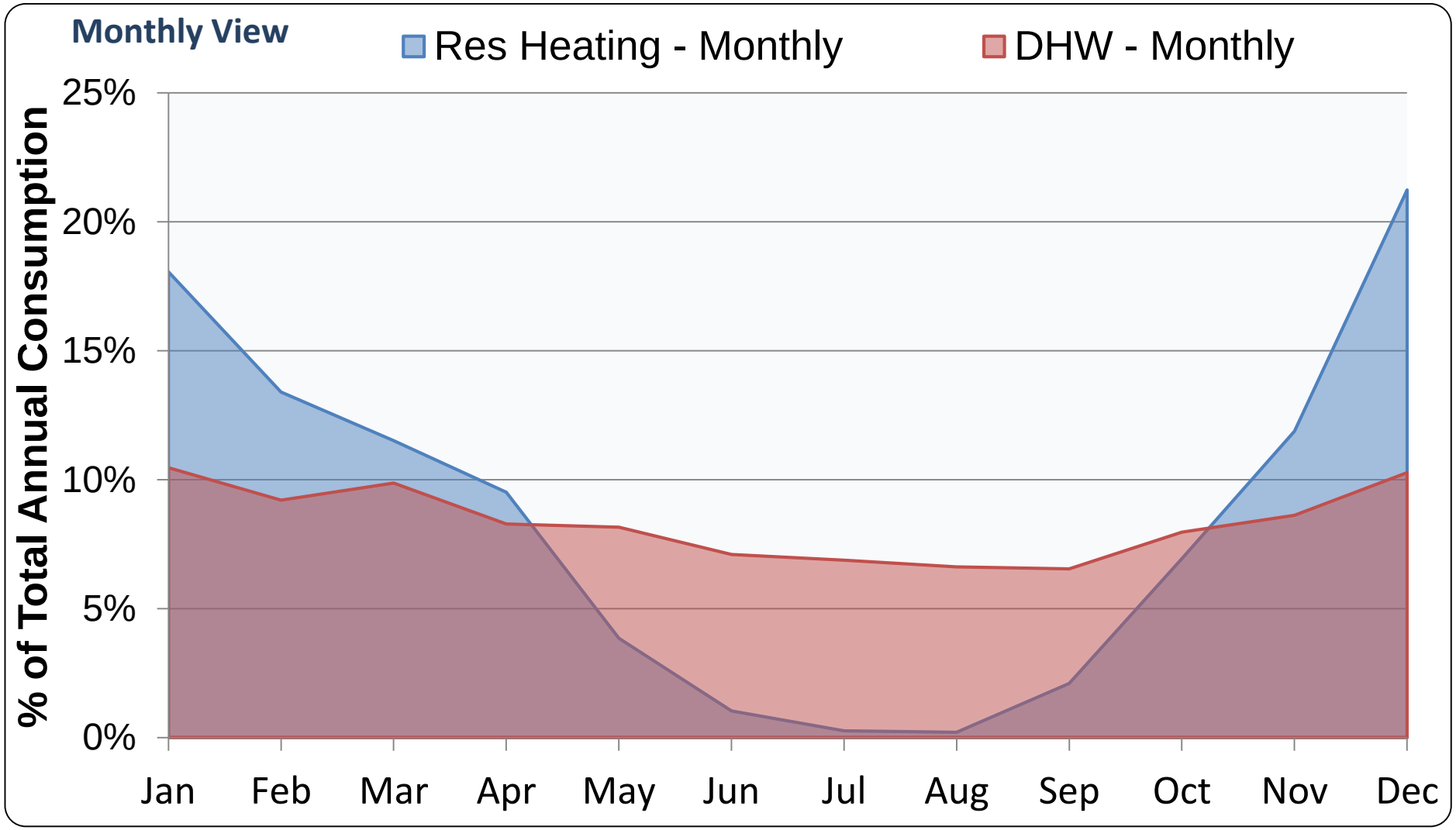
$$Avoided\ Cost = (Gas\ Price\ Forecast) \cdot (1 + 10\%\ Power\ Act\ Credit) + Risk\ Reduction\ Value$$

Risk Reduction Credit

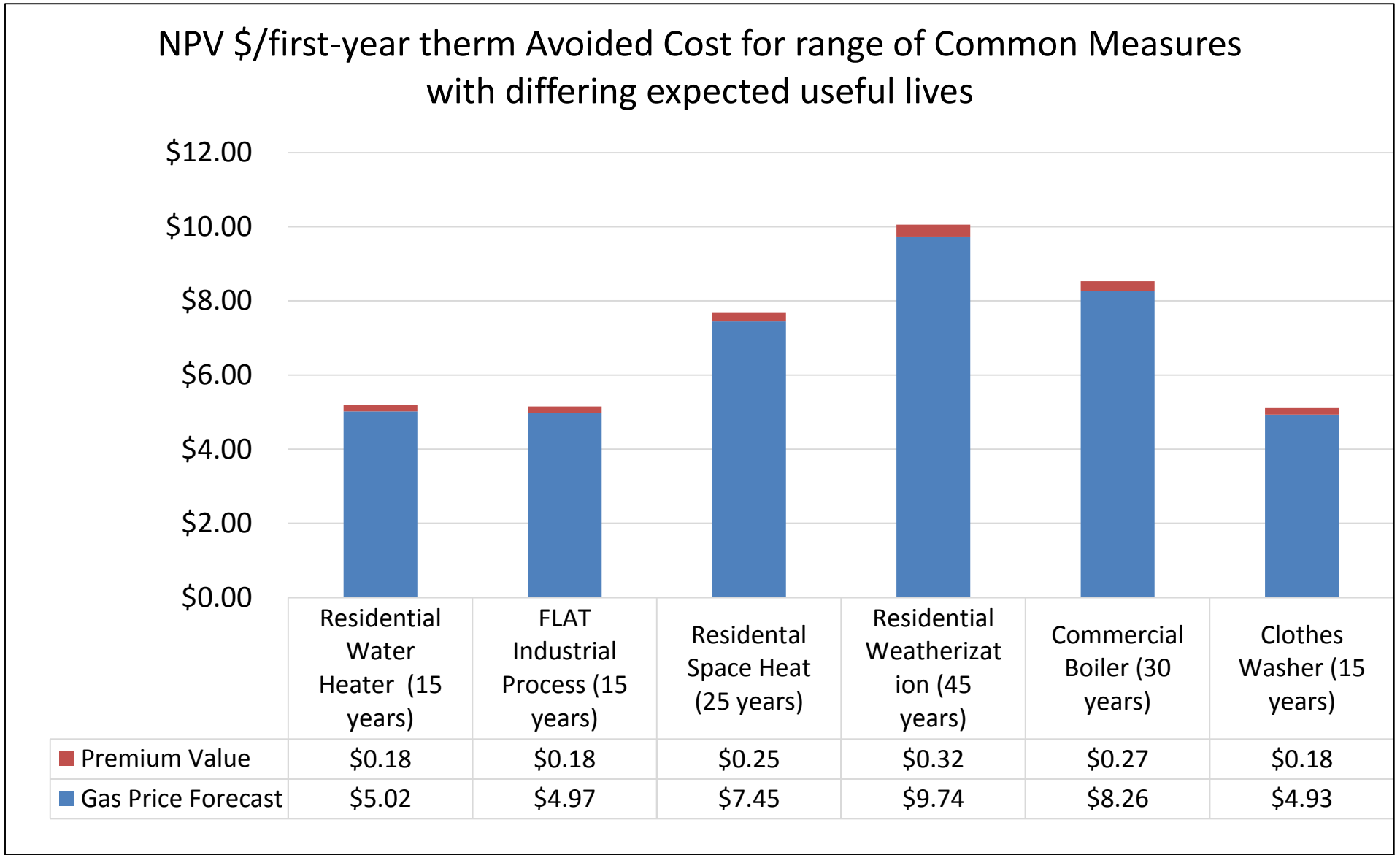
- Pursuing energy efficiency instead of other resources reduces risk:
  - Cost-effective energy efficiency is purchased in smaller increments
  - Protects from price risk/volatility

$$Avoided\ Cost = (Gas\ Price\ Forecast) \cdot (1 + 10\%\ Power\ Act\ Credit) + Risk\ Reduction\ Value$$

Shape to NWPCC Load Profiles

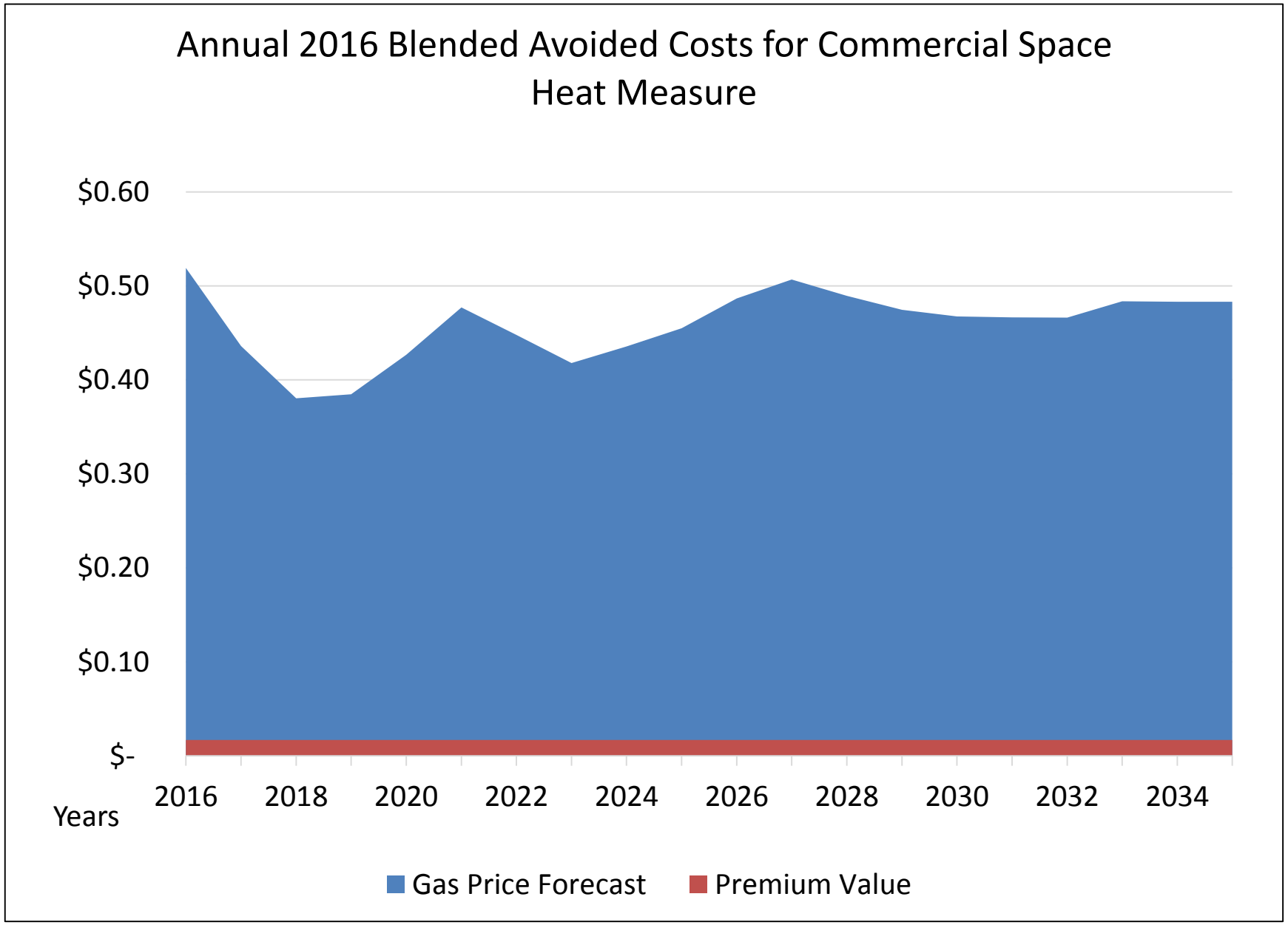


Differences in Value by End Use

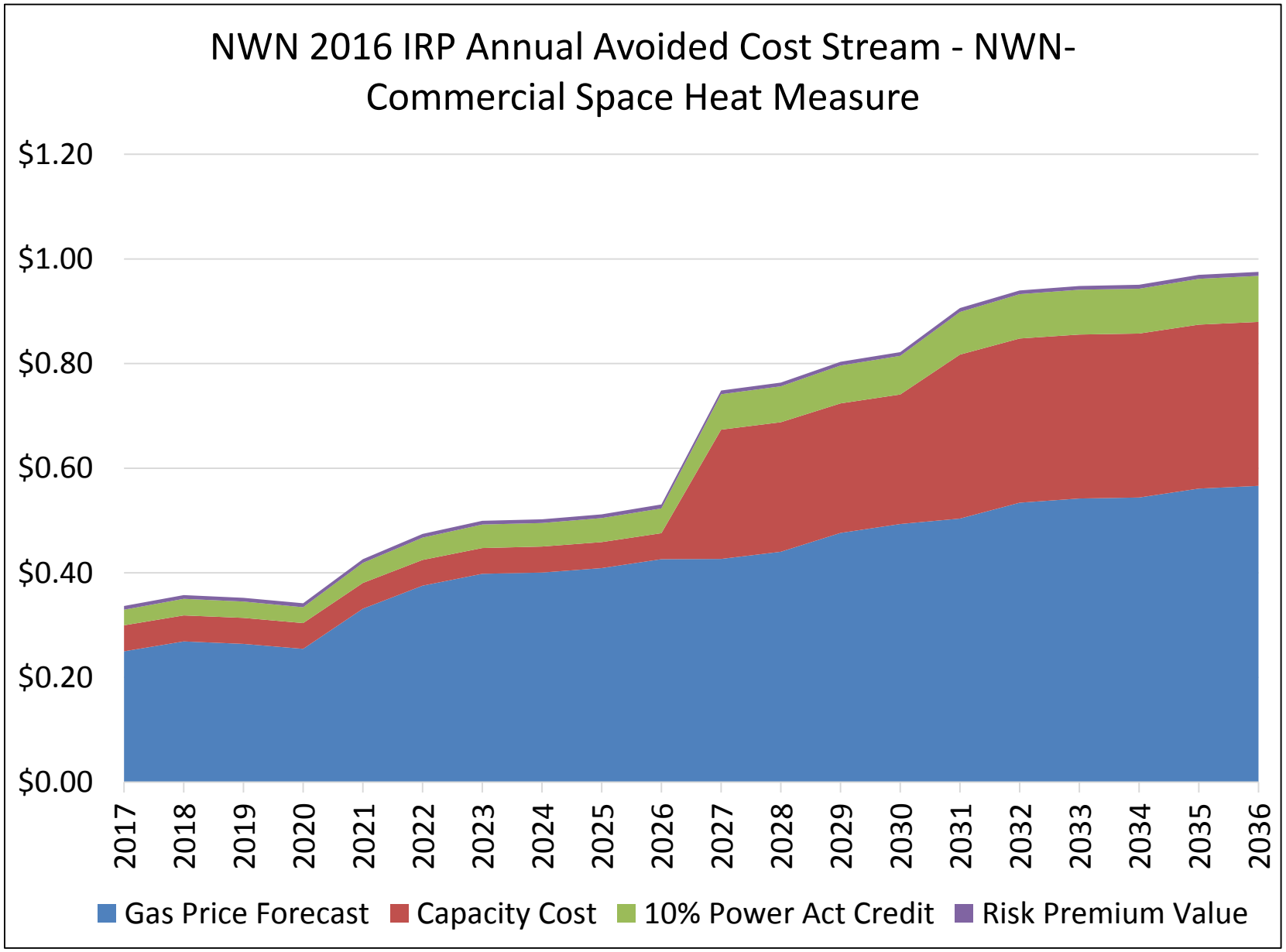


	Residential Water Heater (15 years)	FLAT Industrial Process (15 years)	Residental Space Heat (25 years)	Residential Weatherization (45 years)	Commercial Boiler (30 years)	Clothes Washer (15 years)
Premium Value	$0.18	$0.18	$0.25	$0.32	$0.27	$0.18
Gas Price Forecast	$5.02	$4.97	$7.45	$9.74	$8.26	$4.93

Gas Avoided Cost Buildup



Gas Avoided Cost Buildup



Proposed Changes to Gas Avoided Cost Methodology

- Incorporate as many years of future forecasts that utilities have available.
- Make improvements to the method for how avoided costs between 10-year periods are being calculated.
- Enhance Avoided Cost Formula
  - For NW Natural incorporate Supply and Distribution Deferral by load shape and include 10% conservation adder.
  - For NW Natural incorporate fixed transmission costs
  - For NW Natural incorporate forecasted utility cost of Oregon State carbon policy compliance

$$Avoided\ Cost =$$
$$(Gas\ Price\ Forecast) \cdot (1 + 10\%\ Power\ Act\ Credit)$$
$$+ (Supply\ and\ Distribution\ Capacity\ Cost \cdot peak\ day/annual\ load\ factor) \cdot (1 + 10\%\ Power\ Act\ Credit)$$
$$+ Risk\ Reduction\ Value$$

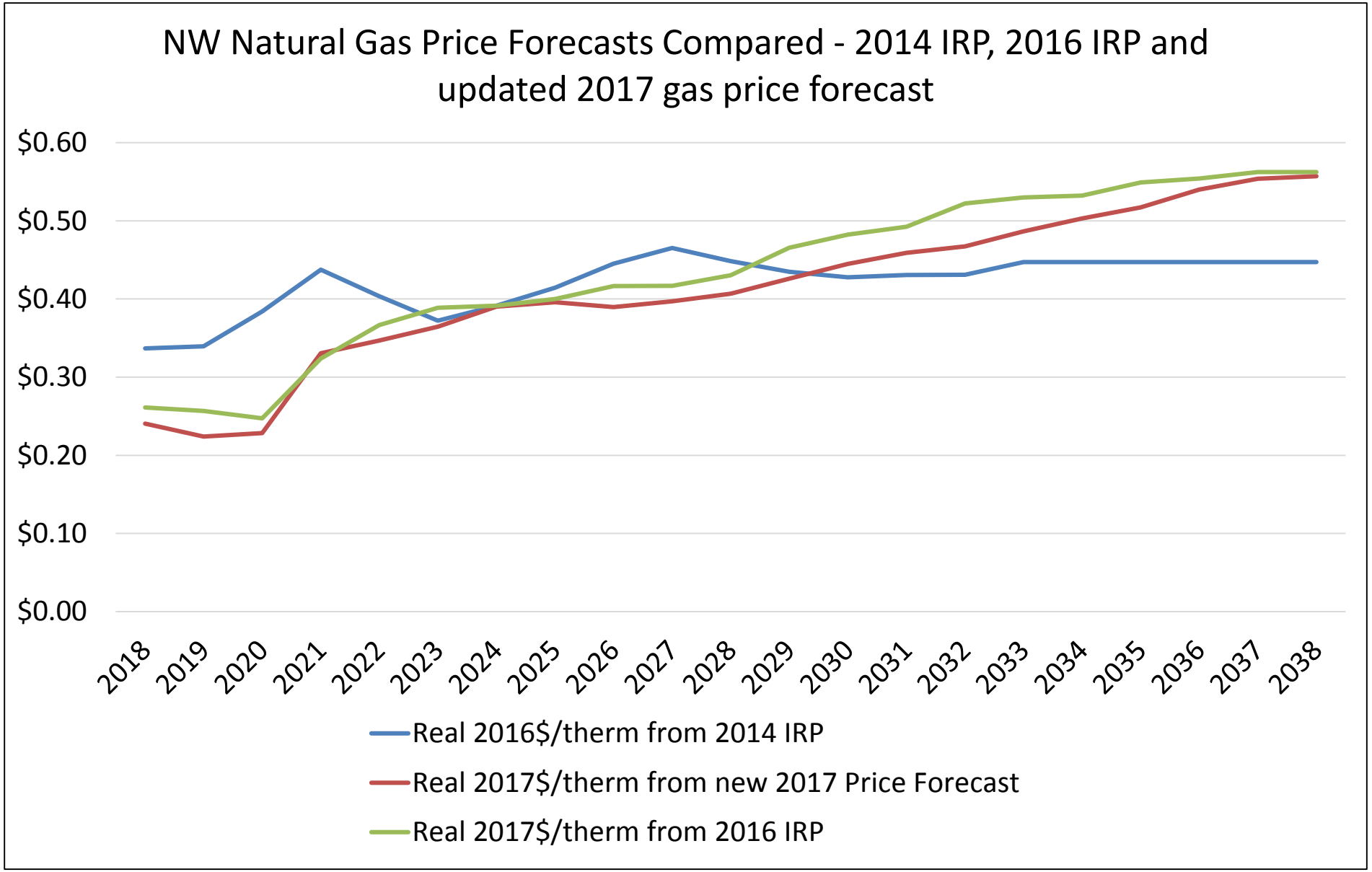
Updated NW Natural—Oregon Inputs

Year	Commodity	Capital		Commodity Adder	
	Gas Price and Transport Costs + Oregon CO2 Policy 1 adder (2017$/Therm)	Supply Capacity Value (2017$/Therm)	OR Distribution Capacity Value (2017$/Therm)	Calculated Risk Premium (2017$/Therm)	Levelized Risk Premium to Use (2017$/Therm)
2018	$0.24	$1.32	$1.38	$0.02	$0.00
2019	$0.22	$1.32	$1.38	$0.01	$0.00
2020	$0.23	$1.32	$1.38	$0.00	$0.00
2021	$0.33	$1.32	$1.38	-$0.03	$0.00
2022	$0.35	$1.32	$1.38	-$0.04	$0.00
2023	$0.36	$1.32	$1.38	-$0.05	$0.00
2024	$0.39	$1.32	$1.38	-$0.08	$0.00
2025	$0.40	$1.32	$1.38	-$0.09	$0.00
2026	$0.39	$1.32	$1.38	-$0.08	$0.00
2027	$0.40	$12.09	$1.38	-$0.09	$0.00
2028	$0.41	$12.09	$1.38	-$0.10	$0.00
2029	$0.43	$12.09	$1.38	-$0.11	$0.00
2030	$0.44	$12.09	$1.38	-$0.13	$0.00
2031	$0.46	$15.69	$1.38	-$0.13	$0.00
2032	$0.47	$15.69	$1.38	-$0.14	$0.00
2033	$0.49	$15.69	$1.38	-$0.15	$0.00
2034	$0.50	$15.69	$1.38	-$0.16	$0.00
2035	$0.52	$15.69	$1.38	-$0.17	$0.00
2036	$0.54	$15.69	$1.38	-$0.19	$0.00
2037	$0.55	$15.69	$1.38	-$0.19	$0.00
2038	$0.56	$15.69	$1.38	-$0.21	$0.00

Previous NW Natural Oregon Gas Price Forecast

Gas Price Forecast	
Year	**Real 2016$/ therm**
2016	$0.48
2017	$0.39
2018	$0.34
2019	$0.34
2020	$0.38
2021	$0.44
2022	$0.40
2023	$0.37
2024	$0.39
2025	$0.41
2026	$0.45
2027	$0.47
2028	$0.45
2029	$0.43
2030	$0.43
2031	$0.43
2032	$0.43
2033	$0.45
2034	$0.45
2035	$0.45

NW Natural Avoided Costs Compared



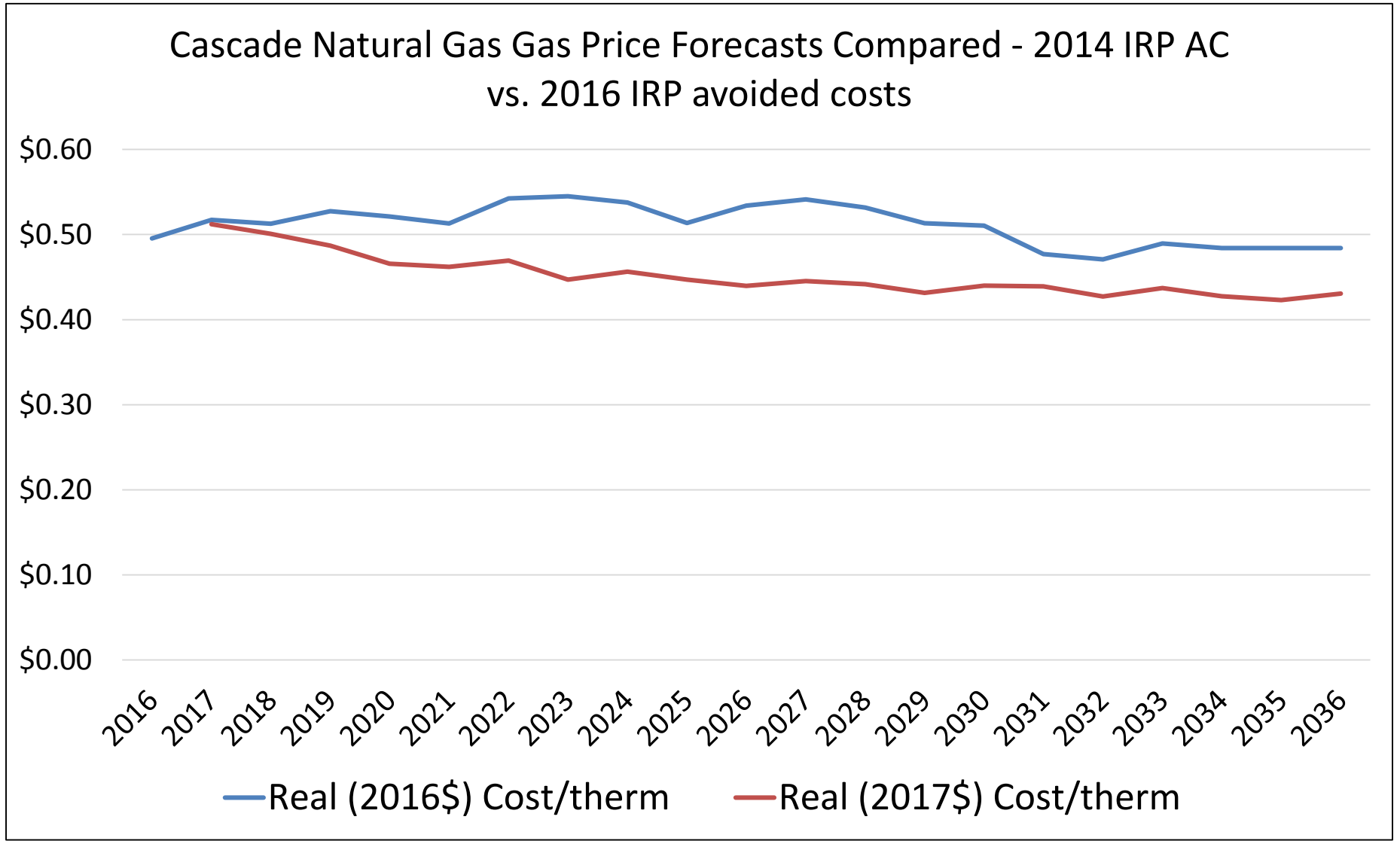
Updated Cascade Natural Gas Inputs

Year	Total Avoided Cost	Commodity	Transport Fixed	Transport Commodity	Storage Fixed	Storage Commodity
2017	$0.51220	$0.34317	$0.16375	$0.00315	$0.00060	$0.00154
2018	$0.51090	$0.34230	$0.16333	$0.00314	$0.00059	$0.00153
2019	$0.50670	$0.33949	$0.16199	$0.00312	$0.00059	$0.00152
2020	$0.49430	$0.33118	$0.15802	$0.00304	$0.00057	$0.00148
2021	$0.50000	$0.33500	$0.15985	$0.00307	$0.00058	$0.00150
2022	$0.51820	$0.34719	$0.16566	$0.00319	$0.00060	$0.00156
2023	$0.50330	$0.33721	$0.16090	$0.00309	$0.00059	$0.00151
2024	$0.52430	$0.35128	$0.16761	$0.00322	$0.00061	$0.00157
2025	$0.52390	$0.35101	$0.16749	$0.00322	$0.00061	$0.00157
2026	$0.52560	$0.35215	$0.16803	$0.00323	$0.00061	$0.00158
2027	$0.53400	$0.35778	$0.17071	$0.00328	$0.00062	$0.00160
2028	$0.54900	$0.36783	$0.17551	$0.00338	$0.00064	$0.00165
2029	$0.54710	$0.36655	$0.17490	$0.00336	$0.00064	$0.00164
2030	$0.56900	$0.38123	$0.18190	$0.00350	$0.00066	$0.00171
2031	$0.57920	$0.38806	$0.18516	$0.00356	$0.00067	$0.00174
2032	$0.57500	$0.38525	$0.18382	$0.00354	$0.00067	$0.00173
2033	$0.59990	$0.40193	$0.19178	$0.00369	$0.00070	$0.00180
2034	$0.59840	$0.40093	$0.19130	$0.00368	$0.00070	$0.00180
2035	$0.60410	$0.40474	$0.19312	$0.00371	$0.00070	$0.00181
2036	$0.62730	$0.42029	$0.20054	$0.00386	$0.00073	$0.00188

Previous Cascade Natural Gas Inputs

Gas Price Forecast	
Year	**Real (2016$) Cost/therm**
2016	$0.50
2017	$0.52
2018	$0.51
2019	$0.53
2020	$0.52
2021	$0.51
2022	$0.54
2023	$0.55
2024	$0.54
2025	$0.51
2026	$0.53
2027	$0.54
2028	$0.53
2029	$0.51
2030	$0.51
2031	$0.48
2032	$0.47
2033	$0.49
2034	$0.48
2035	$0.48

Cascade Natural Gas Avoided Costs Compared



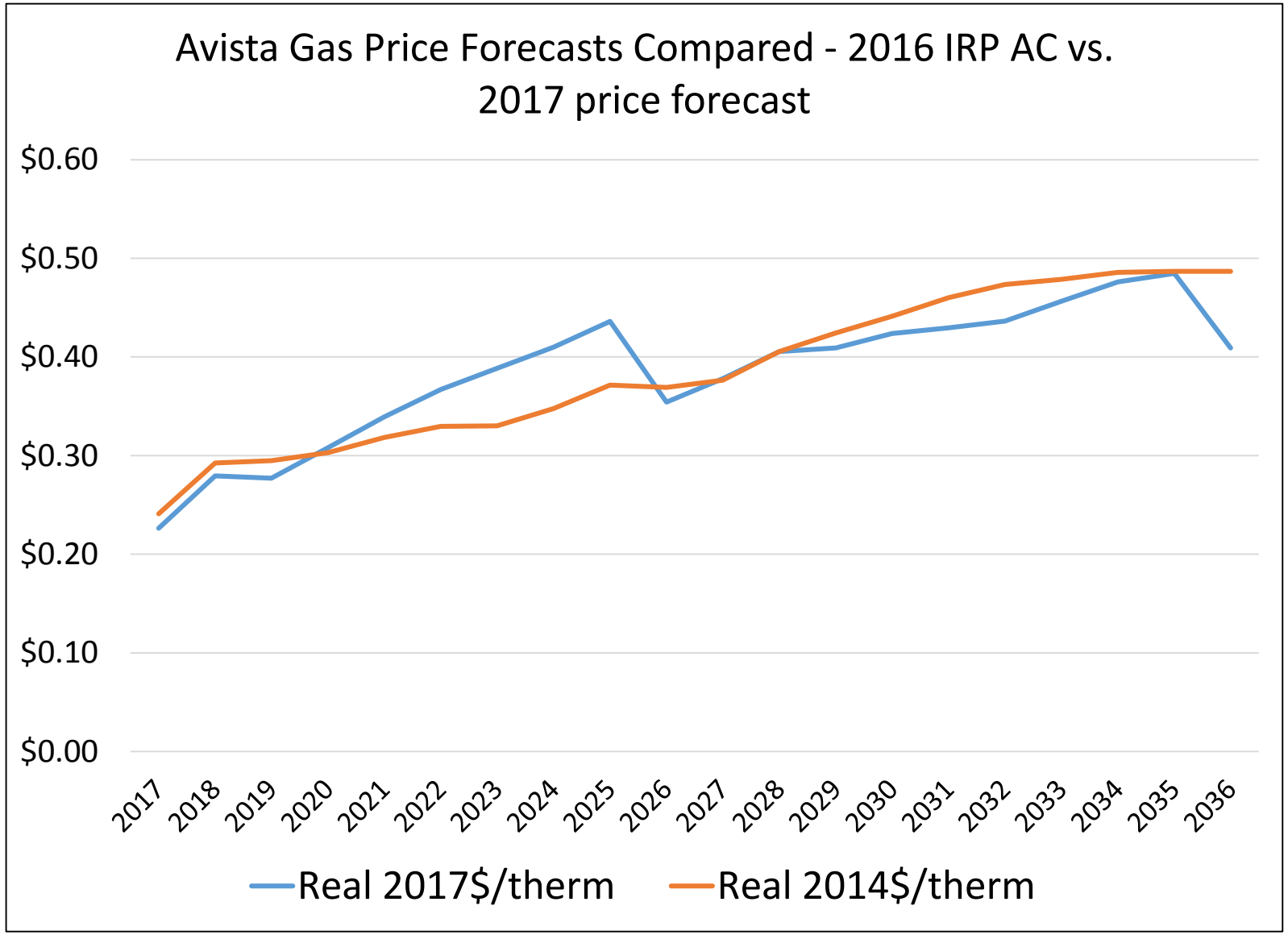
Updated Avista Inputs

Gas Price Forecast (Fuel and Carbon Only)	
Year	**Real 2017$/therm**
2017	$0.23
2018	$0.28
2019	$0.28
2020	$0.31
2021	$0.34
2022	$0.37
2023	$0.39
2024	$0.41
2025	$0.44
2026	$0.35
2027	$0.38
2028	$0.41
2029	$0.41
2030	$0.42
2031	$0.43
2032	$0.44
2033	$0.46
2034	$0.48
2035	$0.48
2036	$0.41

Previous Avista Inputs

Gas Price Forecast	
Year	Real 2014$/therm
2016	$0.19
2017	$0.24
2018	$0.29
2019	$0.29
2020	$0.30
2021	$0.32
2022	$0.33
2023	$0.33
2024	$0.35
2025	$0.37
2026	$0.37
2027	$0.38
2028	$0.41
2029	$0.42
2030	$0.44
2031	$0.46
2032	$0.47
2033	$0.48
2034	$0.49
2035	$0.49

Avista Avoided Costs Compared



Q & A

Thank You

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EnergyTrust of Oregon