NW Natural's 2018 IRP Presentation to the Public Utility Commission of Oregon

October 9, 2018

NW Natural®

FORWARD LOOKING STATEMENT

This and other presentations made by NW Natural from time to time, may contain forward-looking statements within the meaning of the U.S. Private Securities Litigation Reform Act of 1995. Forward-looking statements can be identified by words such as “anticipates,” “intends,” “plans,” “seeks,” “believes,” “estimates,” “expects” and similar references to future periods. Examples of forward-looking statements include, but are not limited to, statements regarding the following: including regional third-party projects, storage, pipeline and other infrastructure investments, commodity costs, competitive advantage, customer service, customer and business growth, conversion potential, multifamily development, business risk, efficiency of business operations, regulatory recovery, business development and new business initiatives, environmental policy and social trends, environmental remediation recoveries, gas storage markets and business opportunities, gas storage development, costs, timing or returns related thereto, financial positions and performance, economic and housing market trends and performance shareholder return and value, capital expenditures, liquidity, strategic goals, carbon savings, supplies and characteristics of the same, avoided costs, resource options, renewable natural gas, power to gas, carbon reductions, gas reserves and investments and regulatory recoveries related thereto, hedge efficacy, cash flows and adequacy thereof, return on equity, capital structure, return on invested capital, revenues and earnings and timing thereof, margins, operations and maintenance expense, dividends, credit ratings and profile, the regulatory environment, effects of regulatory disallowance, timing or effects of future regulatory proceedings or future regulatory approvals, regulatory prudence reviews, effects of regulatory mechanisms, including, but not limited to, SRRM and the Company’s infrastructure investments, effects of legislation, including but not limited to bonus depreciation and PHMSA regulations, and other statements that are other than statements of historical facts.

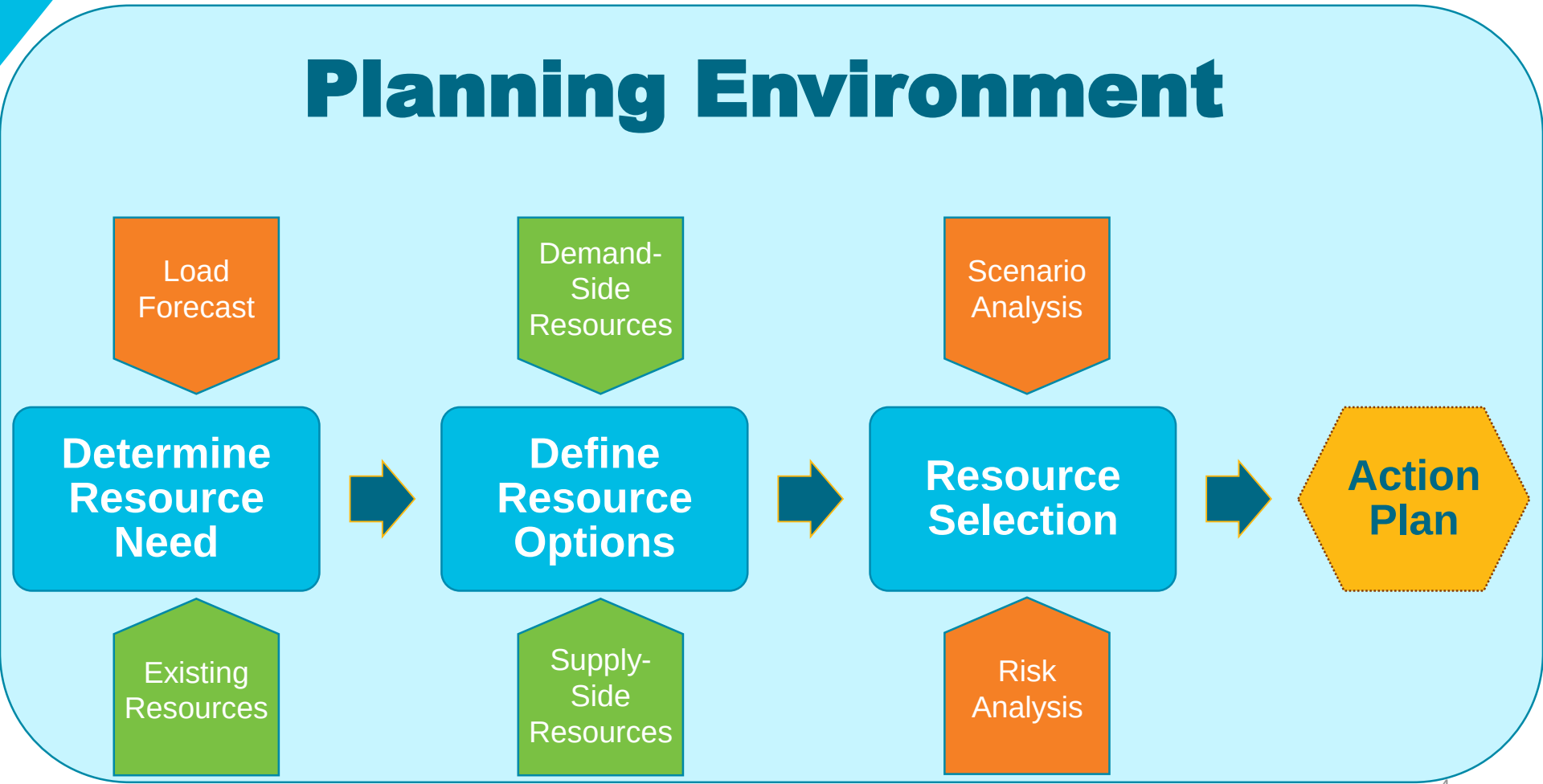
Forward-looking statements are based on our current expectations and assumptions regarding our business, the economy and other future conditions. Because forward-looking statements relate to the future, they are subject to inherent uncertainties, risks and changes in circumstances that are difficult to predict. Our actual results may differ materially from those contemplated by the forward-looking statements, so we caution you against relying on any of these forward-looking statements. They are neither statements of historical fact nor guarantees or assurances of future performance. Important factors that could cause actual results to differ materially from those in the forward-looking statements are discussed by reference to the factors described in Part I, Item 1A “Risk Factors,” and Part II, Item 7 and Item 7A “Management’s Discussion and Analysis of Financial Condition and Results of Operations,” and “Quantitative and Qualitative Disclosure about Market Risk” in the Company’s most recent Annual Report on Form 10-K, and in Part I, Items 2 and 3 “Management’s Discussion and Analysis of Financial Condition and Results of Operations” and “Quantitative and Qualitative Disclosures About Market Risk”, and Part II, Item 1A, “Risk Factors”, in the Company’s quarterly reports filed thereafter.

All forward-looking statements made in this presentation and all subsequent forward-looking statements, whether written or oral and whether made by or on behalf of the Company, are expressly qualified by these cautionary statements. Any forward-looking statement speaks only as of the date on which such statement is made, and we undertake no obligation to publicly update any forward-looking statement, whether as a result of new information, future developments or otherwise, except as may be required by law.

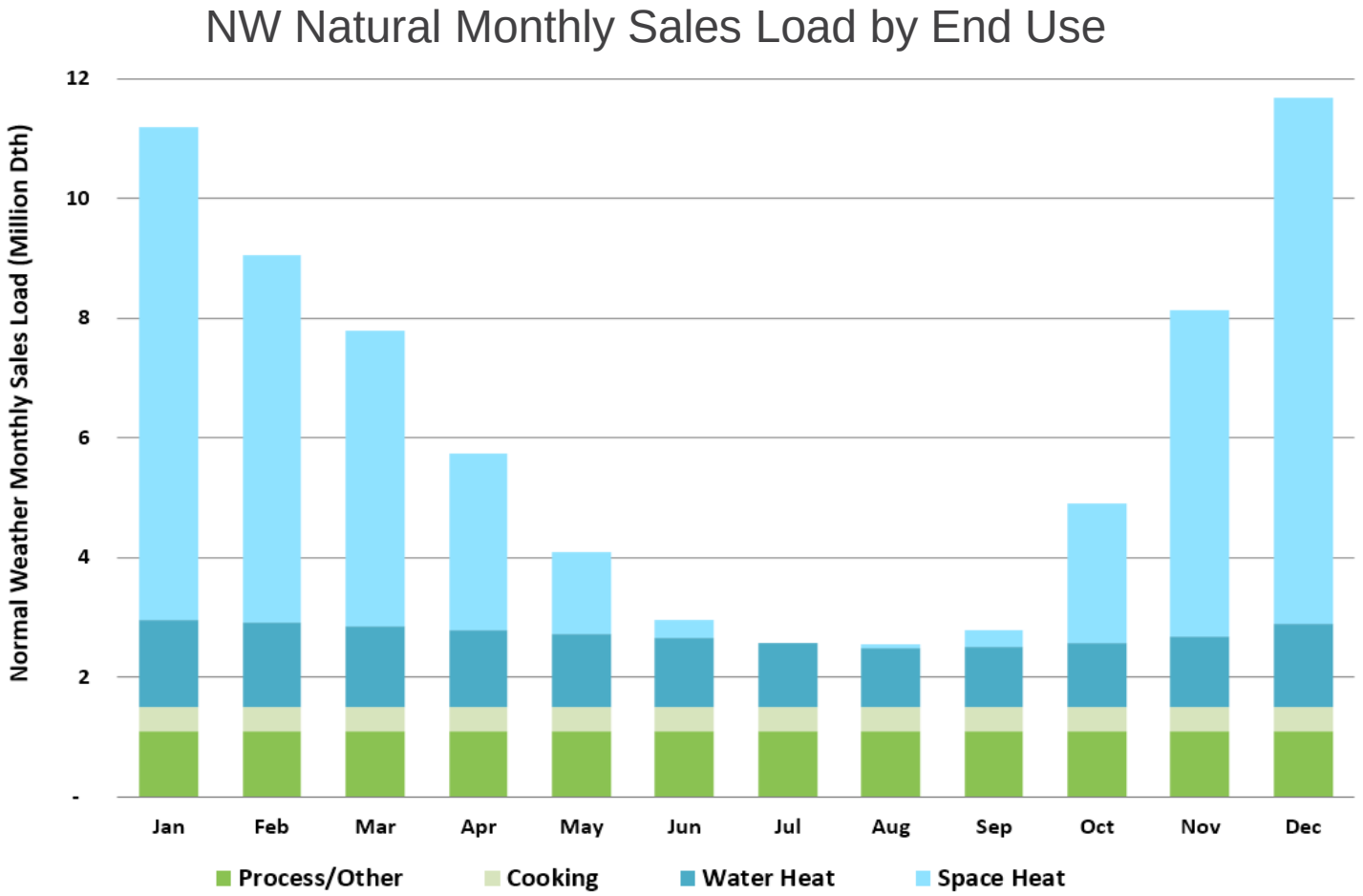
Agenda

1. Planning Environment
2. Load Forecast
3. Potential Resource Options
4. Portfolio Analysis Results
5. Distribution System Planning
6. Action Plan Items

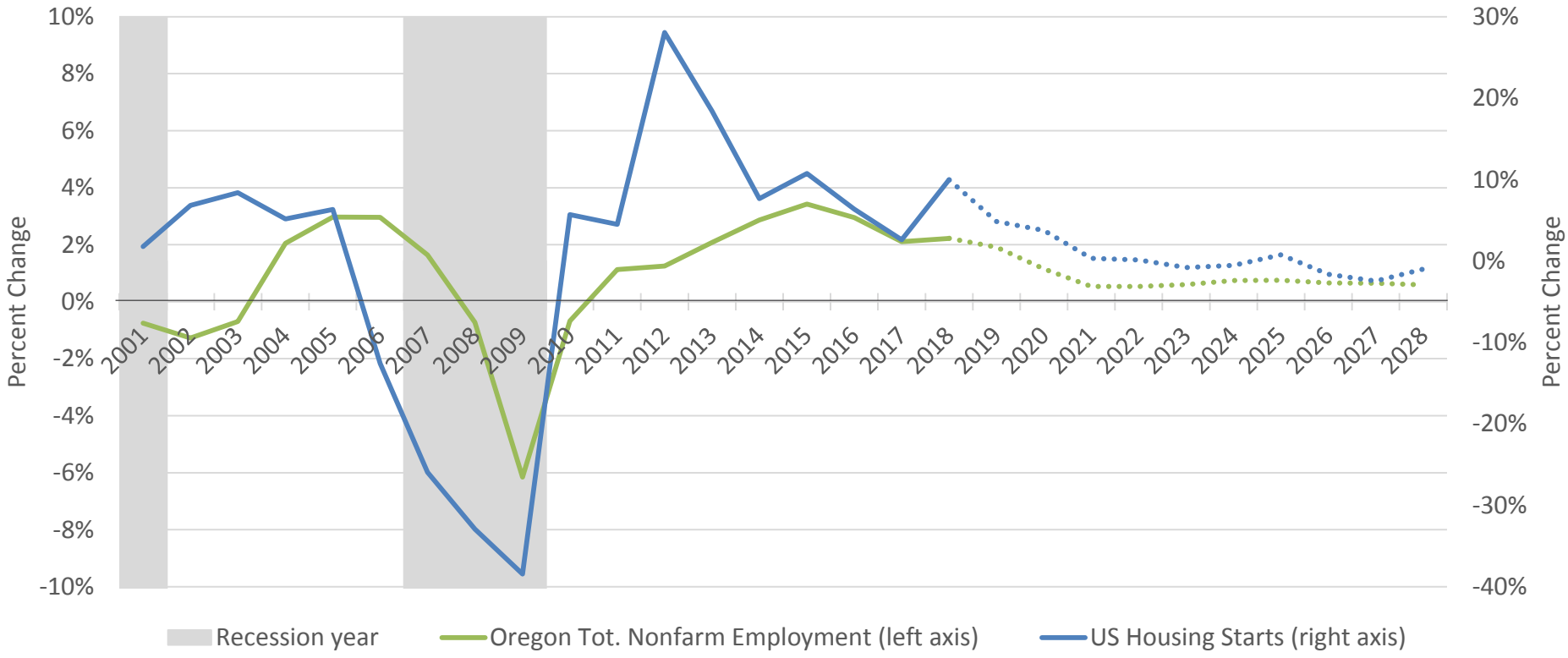
IRP PROCESS


Planning Environment
Load Forecast
Demand-Side Resources
Scenario Analysis
Determine Resource Need
Define Resource Options
Resource Selection
Action Plan
Existing Resources
Supply-Side Resources
Risk Analysis

NW Natural Load is Seasonal

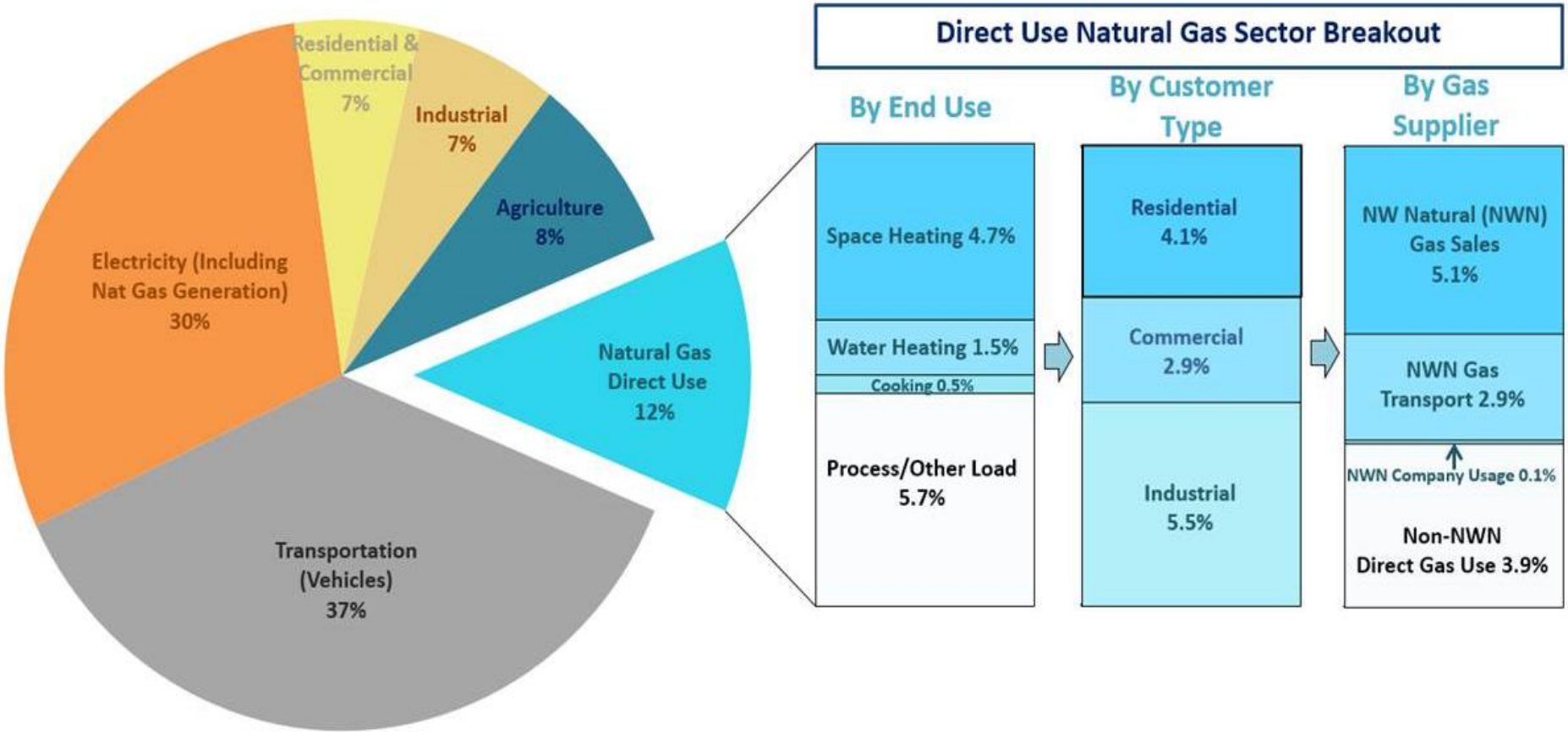


Economic Outlook

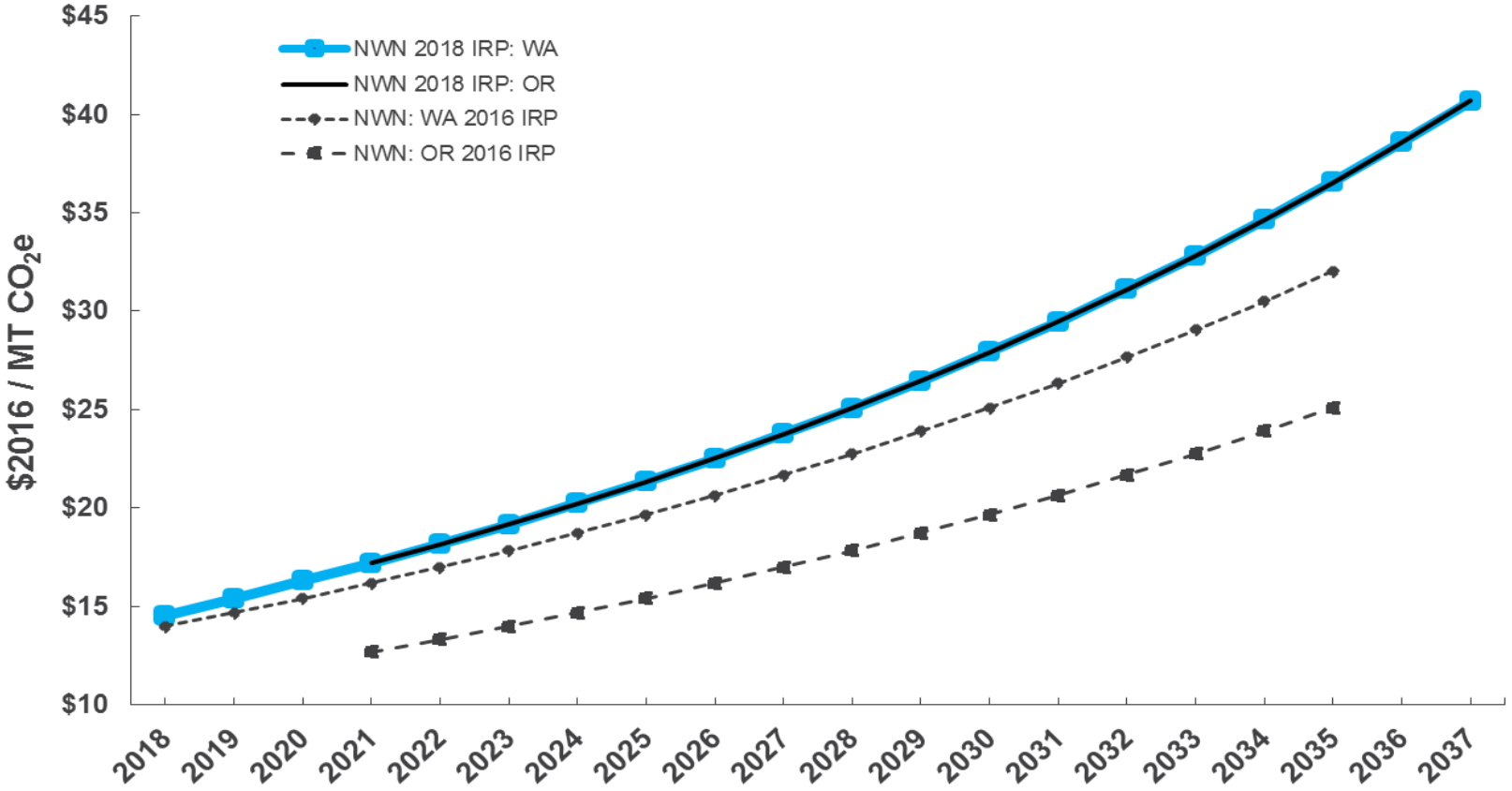


Source: Oregon Office of Economic Analysis, Oregon Economic and Revenue Forecast, Sept. 2018

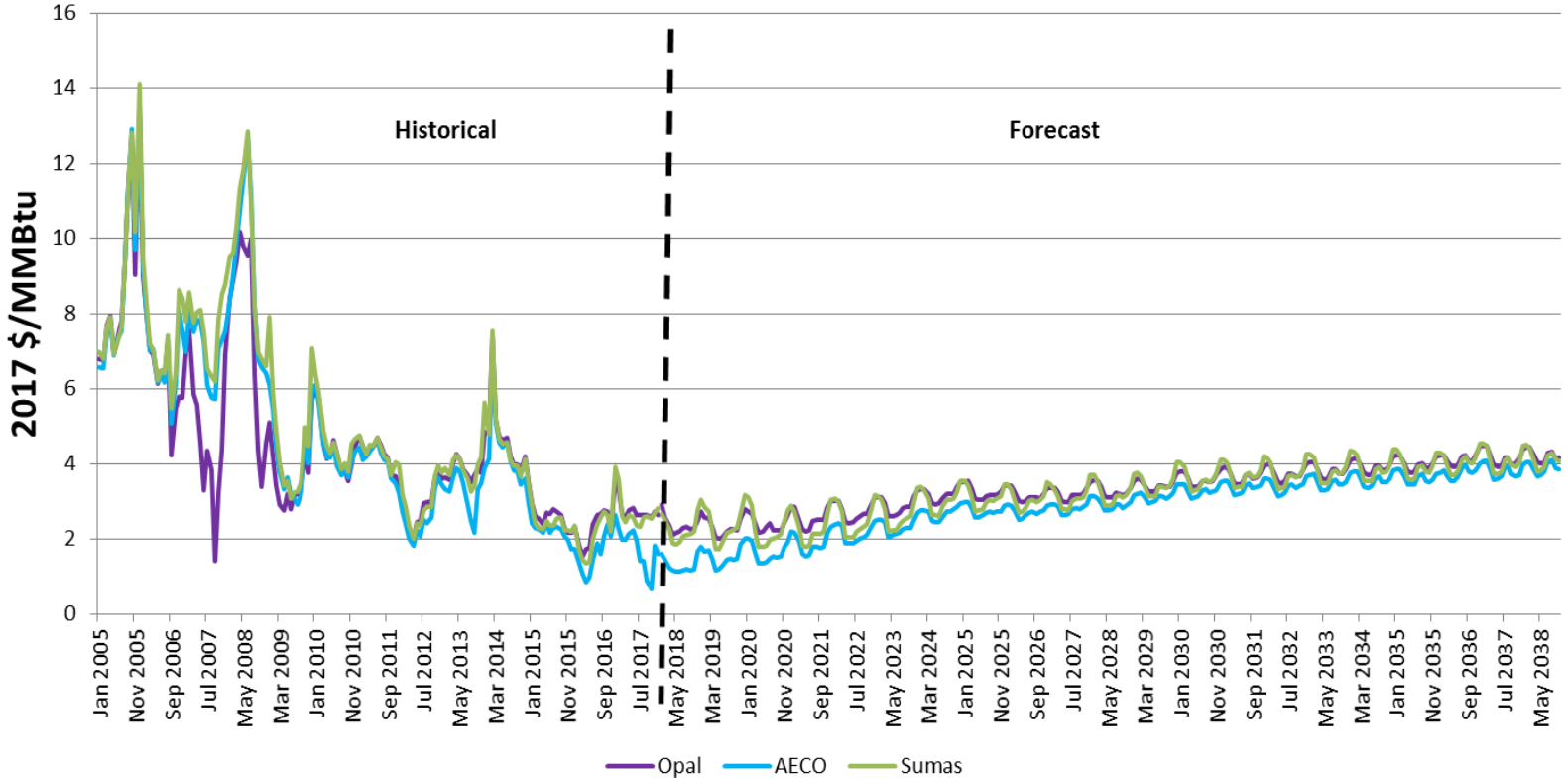
2015 Oregon Greenhouse Emissions



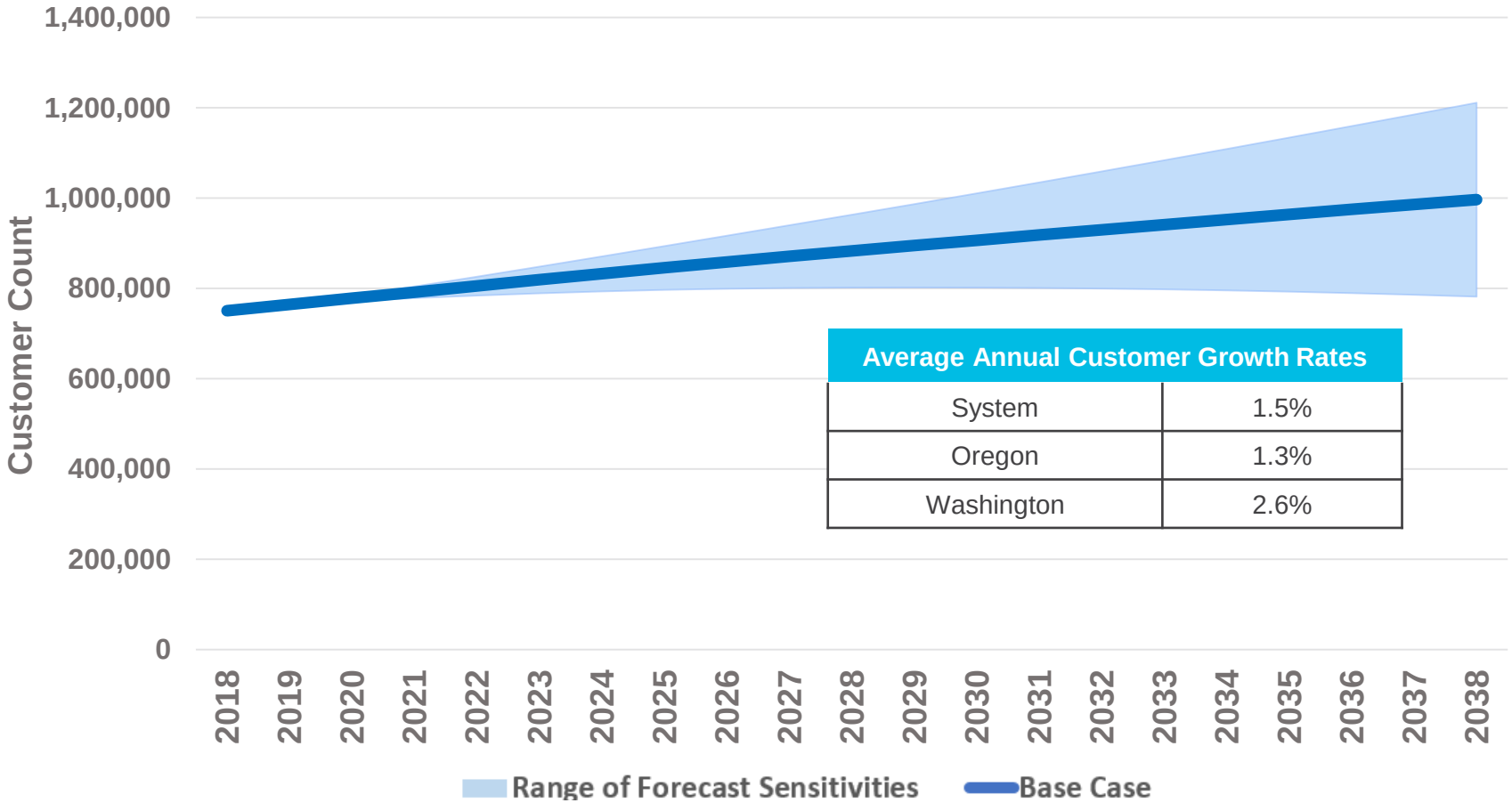
Emission Forecast
Expected GHG Compliance Cost



Gas Price Outlook

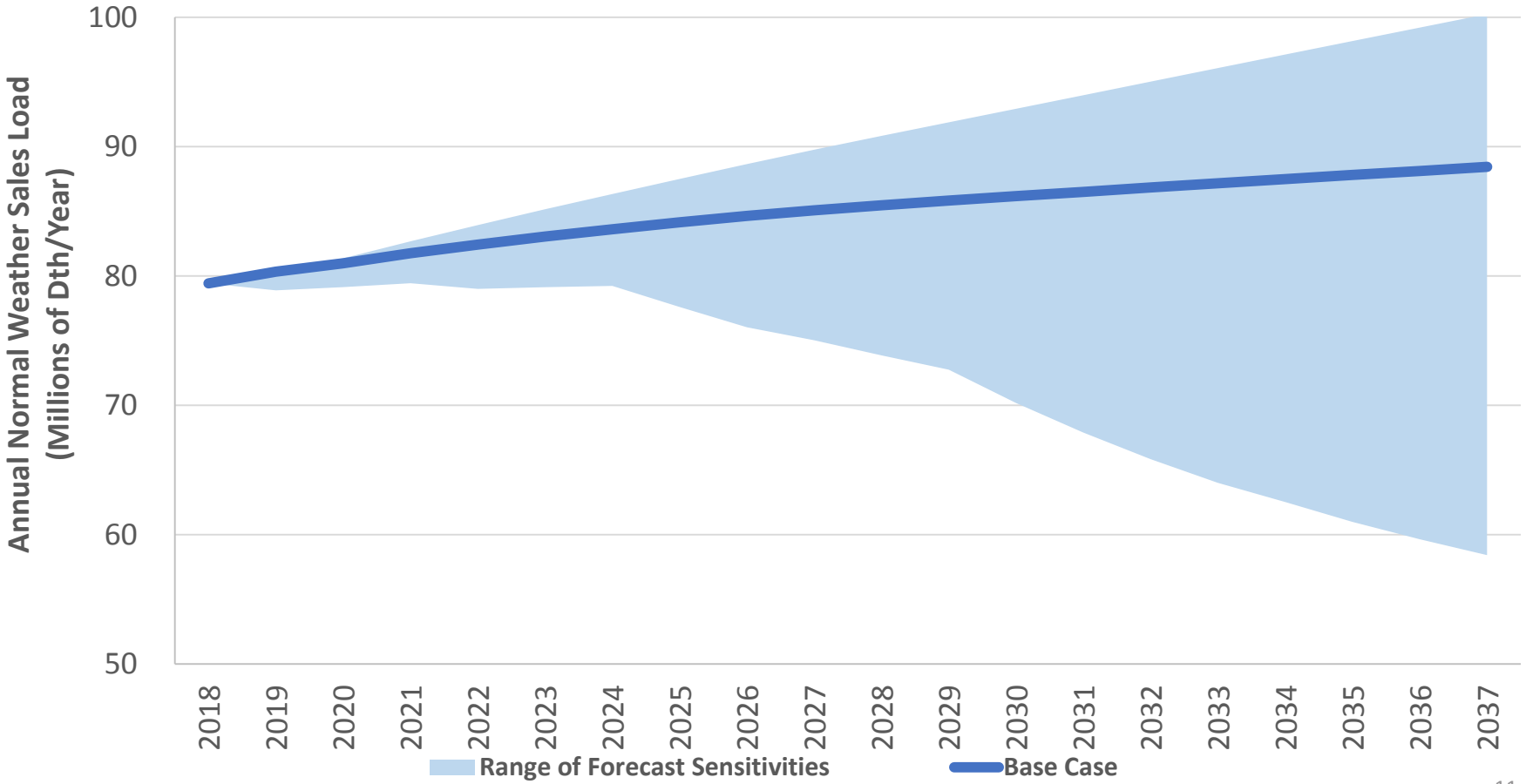


Customer Growth Forecast



Average Annual Customer Growth Rates	
System	1.5%
Oregon	1.3%
Washington	2.6%

Annual Load Forecast



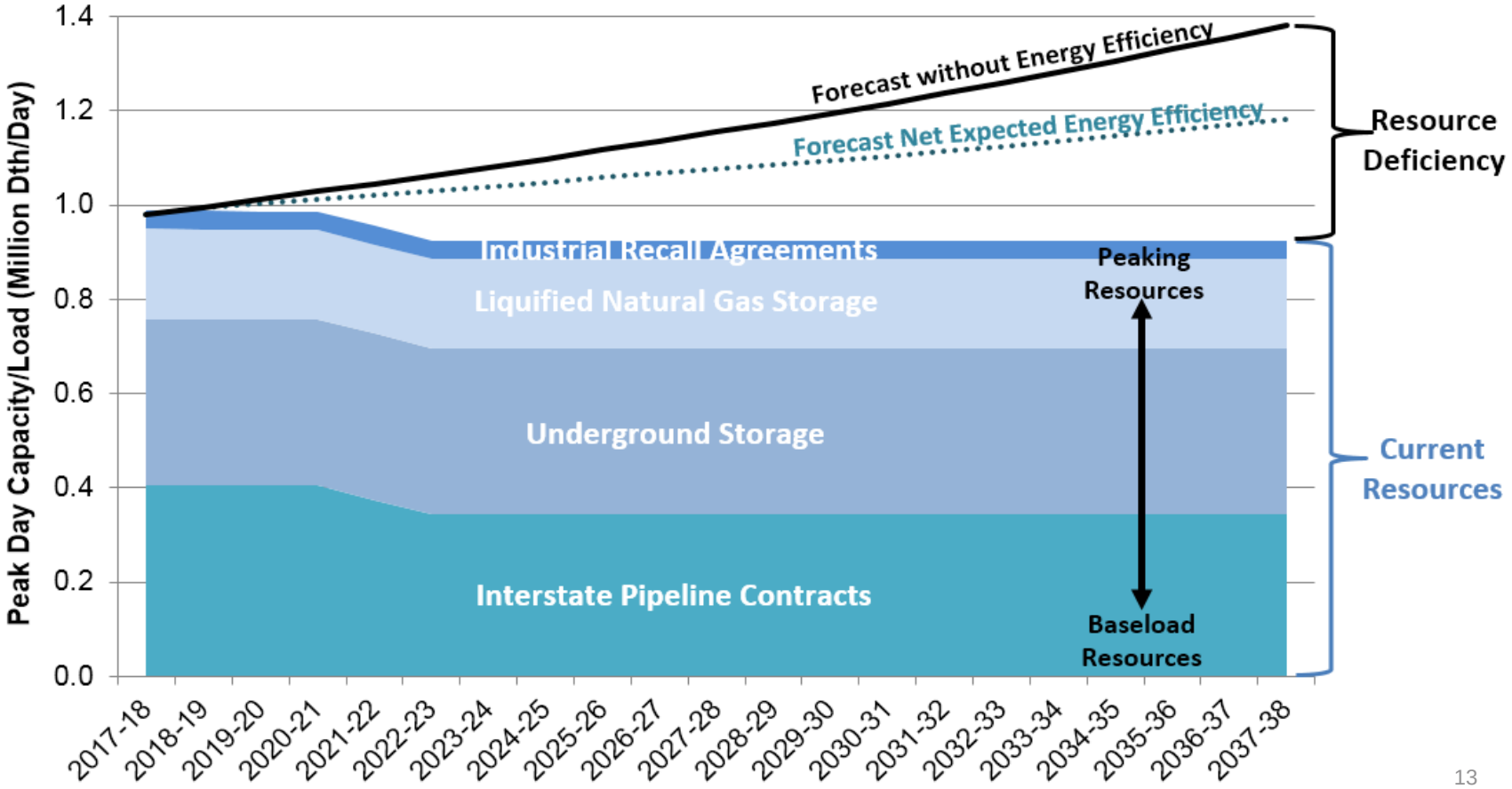
Capacity Planning Standard

NW Natural has chosen to use a peak day planning standard where there is a 99% chance of firm supply resources being able to meet the highest firm sales demand day in a gas year

Reasonable given

- Increased stability in planning
- Our previous 1 in 30 peak day planning standard was equivalent to a 99.2% probability of meeting highest firm sales demand
- Assumes our resources are always available

Peak Day Load Forecast and Load Resource Balance

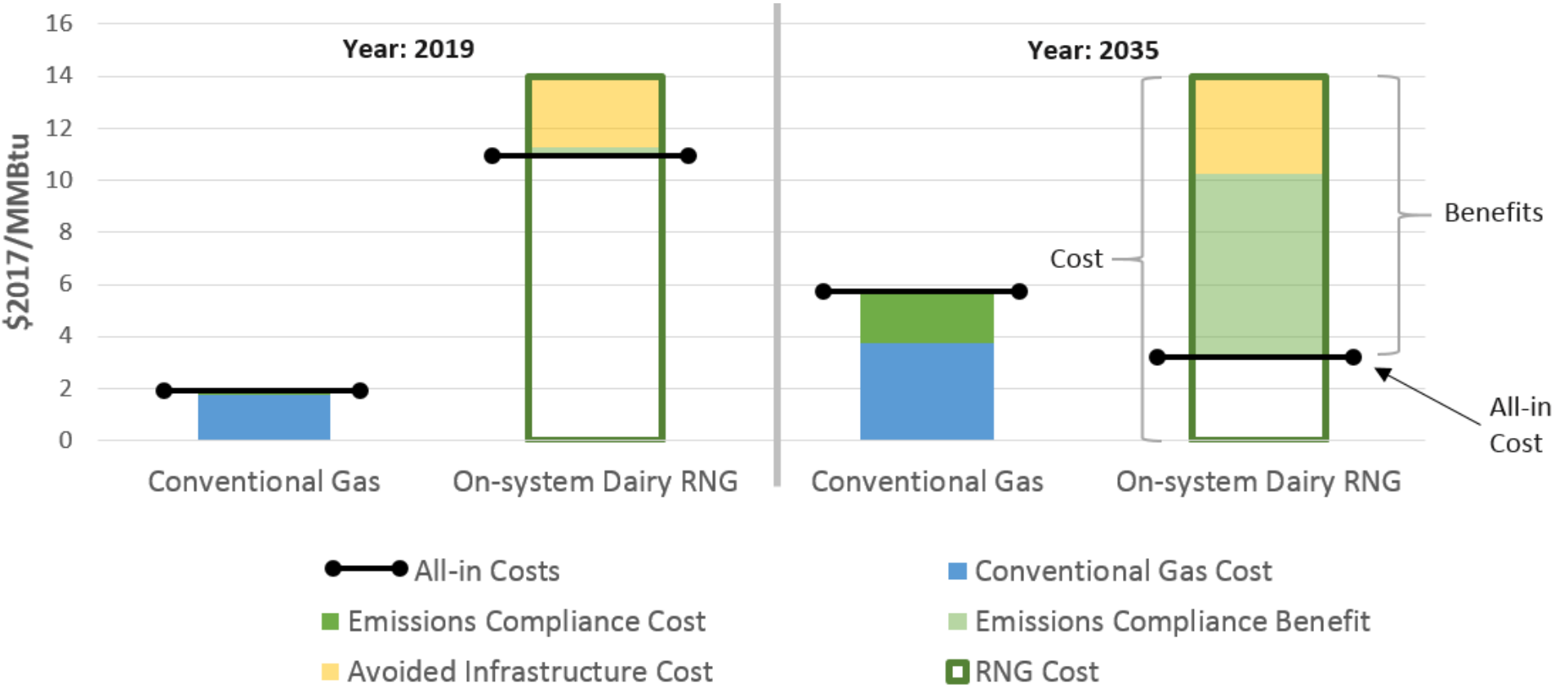


Future Supply Side Options

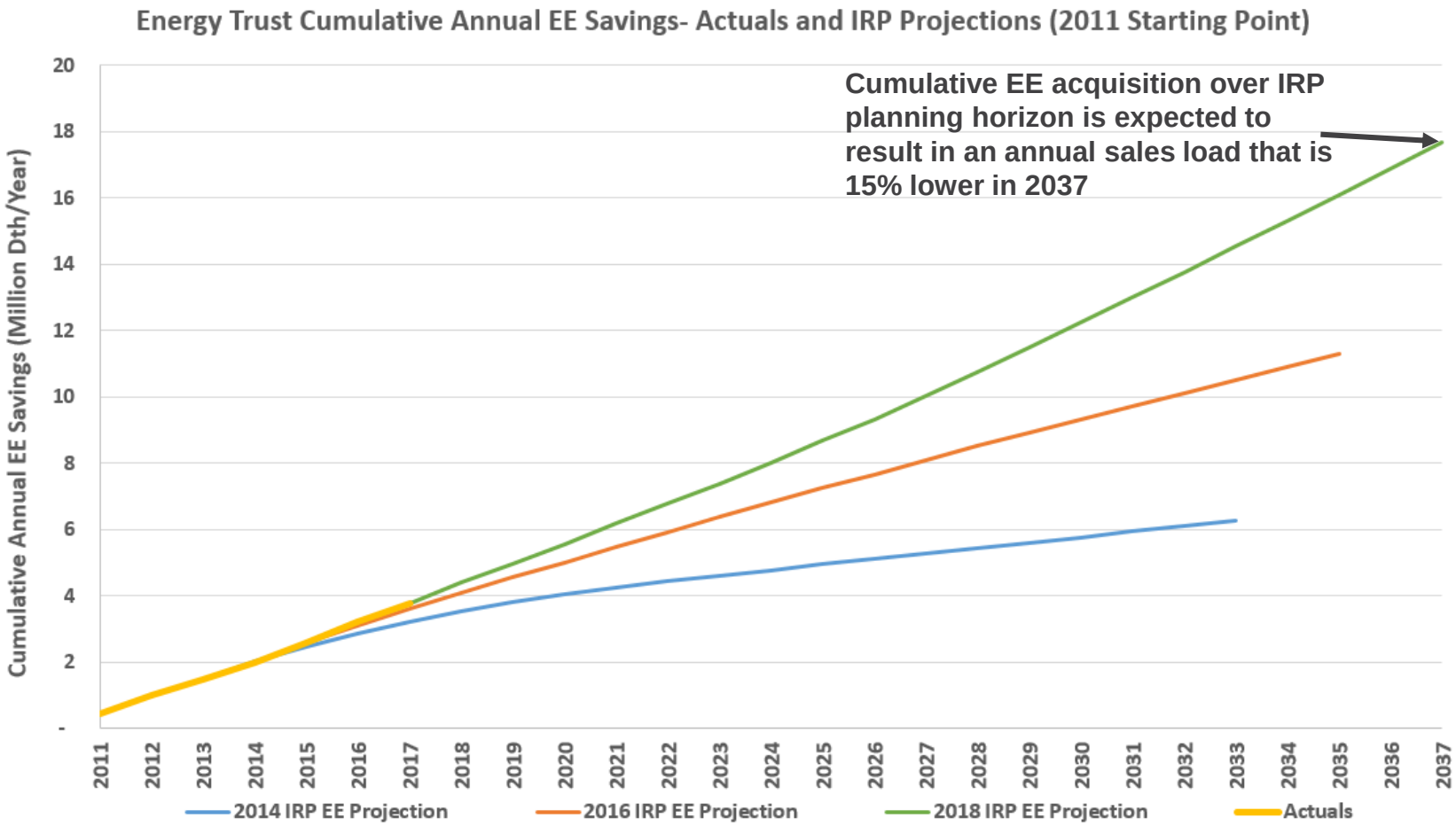
	Resource	Description
Traditional Resources	Mist Recall	Transferring existing Mist storage capacity from interstate storage customers to utility customers
	North Mist II and III	Completing new storage wells, installing more surface facilities, and building takeaway pipeline capacity to serve utility customers
	Central Coast Feeder Upgrades	Three projects that de-bottleneck the pipeline system to incrementally increase Newport LNG's delivery capacity
	Local Pipeline Expansions	A pipeline expansion specifically for NW Natural needs
	Regional Pipeline Expansions	Regional pipeline expansions for multiple shippers, so economies of scale but timing not likely to be optimal for NW Natural
New Resources	RNG Options	Representative renewable natural gas projects from landfills, waste water treatment plants, or dairy farms
	Power-to-Gas	A power-to-gas facility using renewable energy to produce hydrogen which is blended into natural gas

Renewable Natural Gas (RNG)

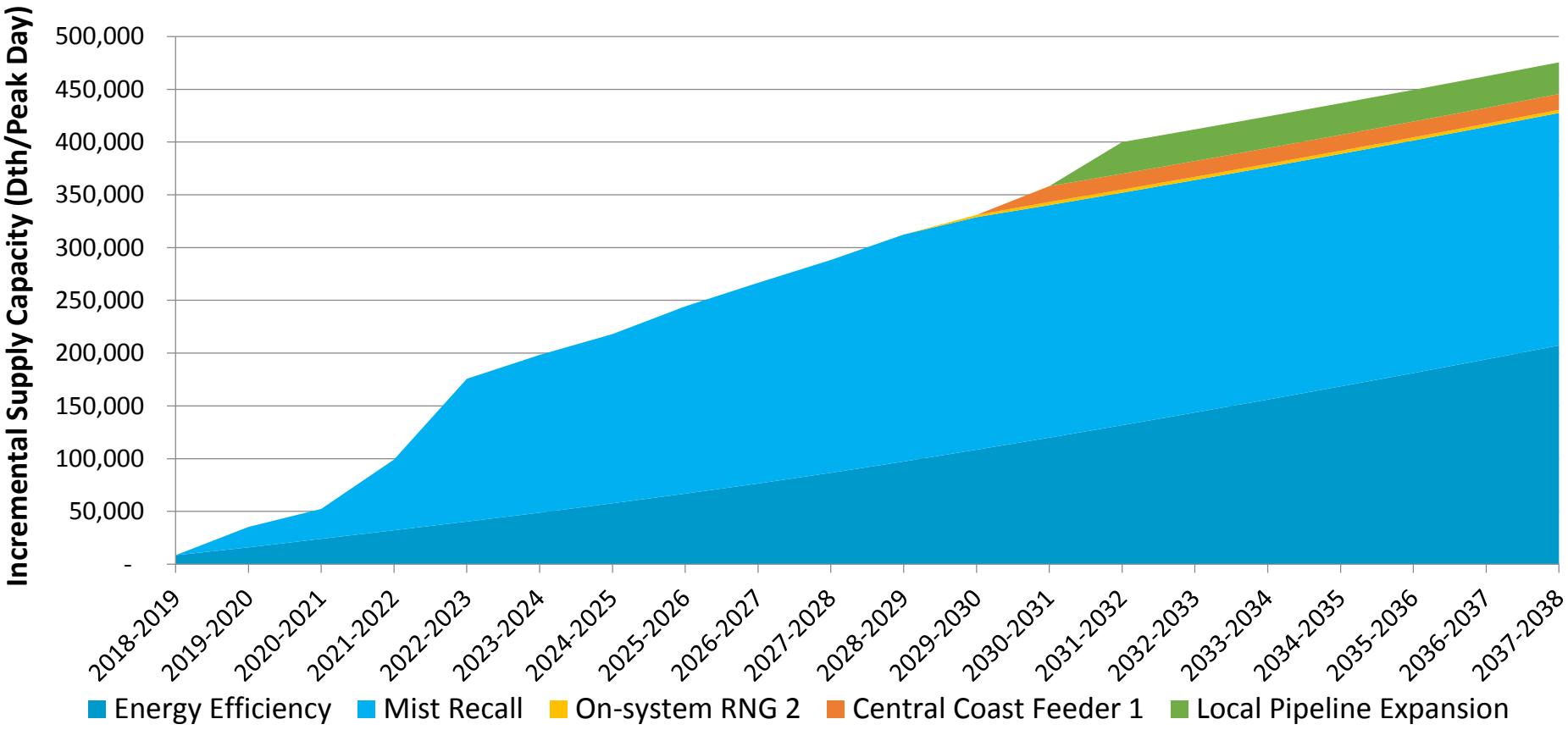
RNG As a Resource – All-In Costs
Conventional Gas vs. On-system Dairy RNG



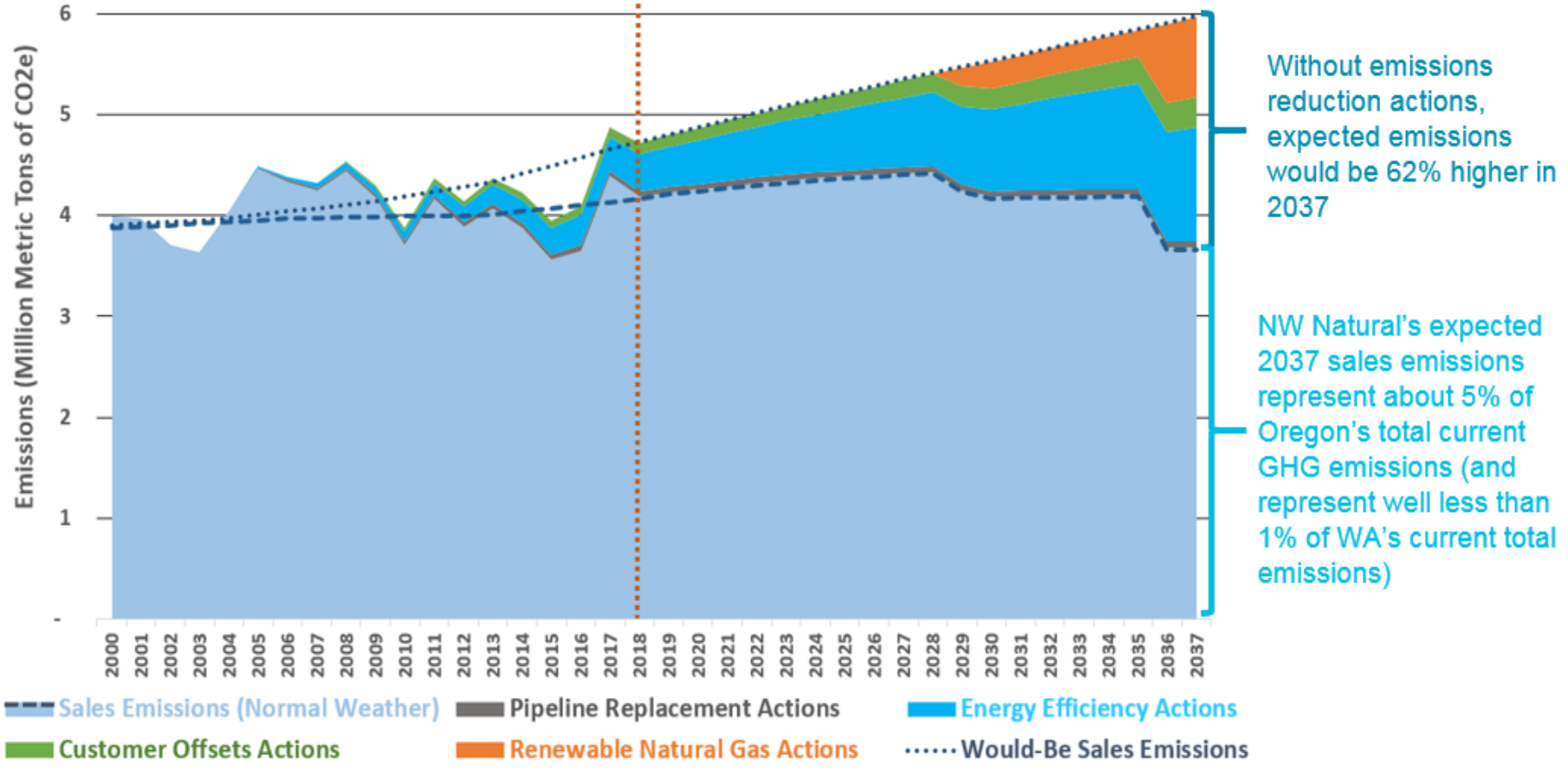
Energy Efficiency Resources



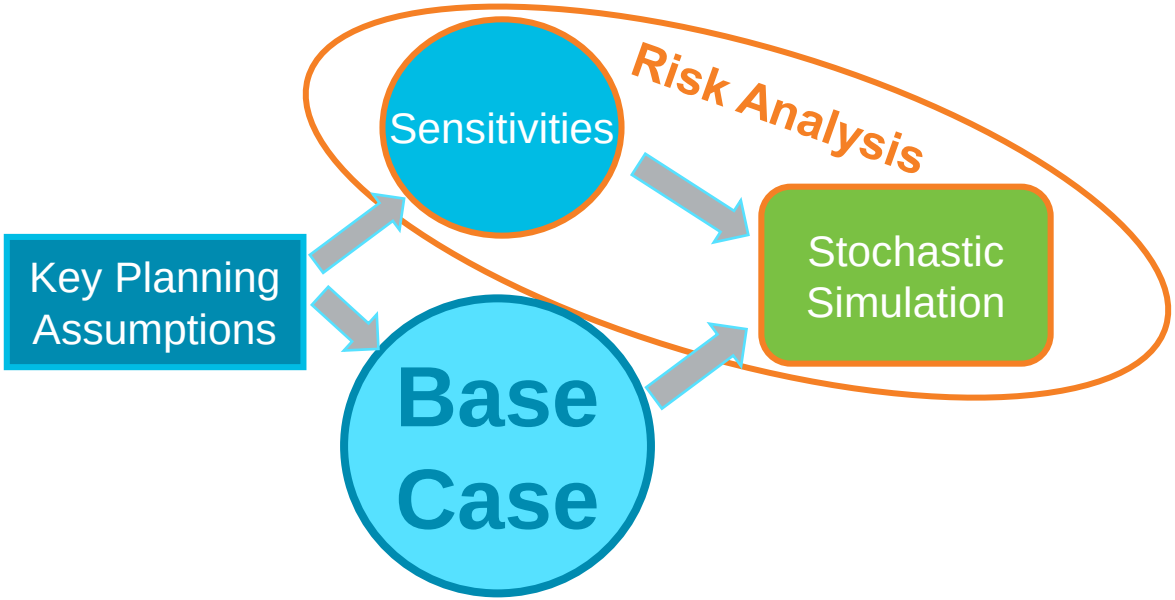
Base Case Peak Capacity Additions Without Regional Pipeline Expansion



Emission Forecast – Base Case Emissions Forecast

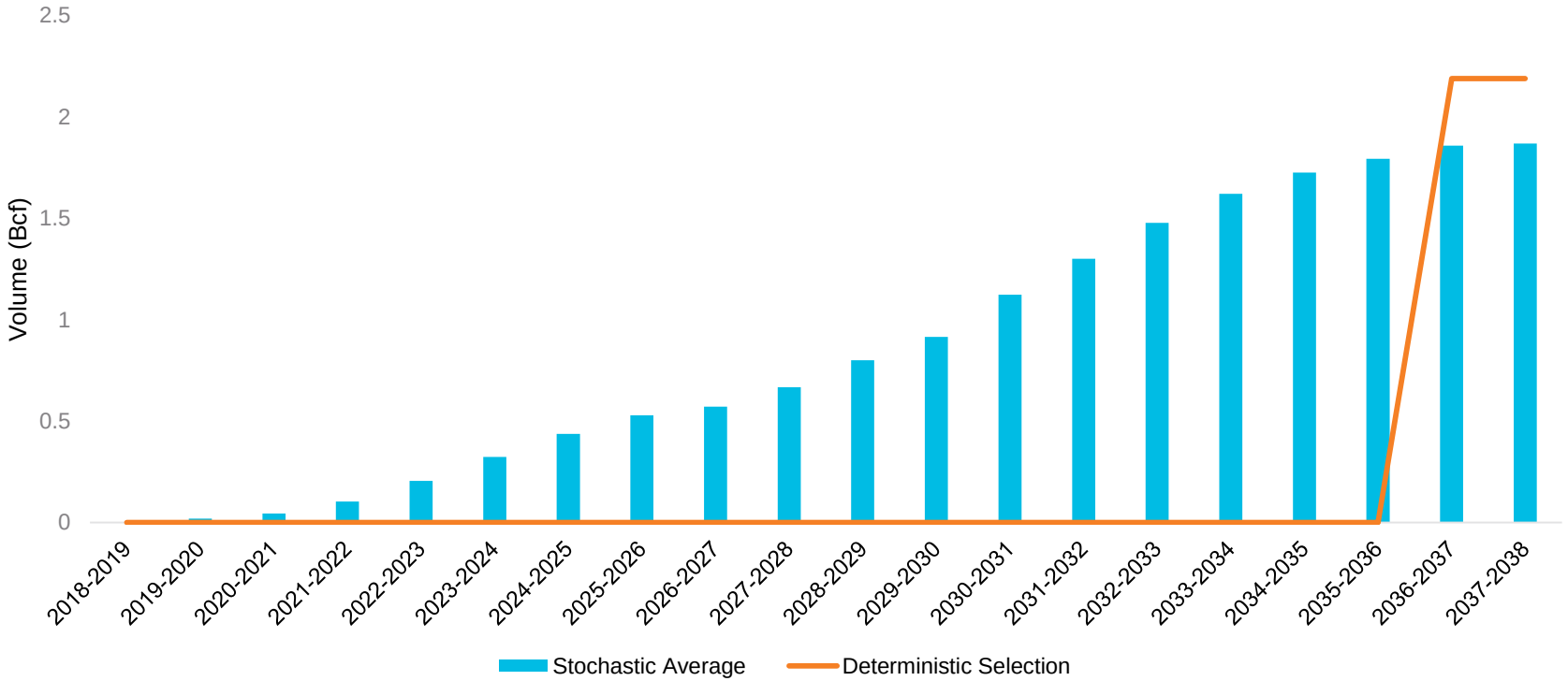


Risk Analysis



Variables in Risk Analyses
Environmental Policy
Commodity Price
Economic Growth
Supply Infrastructure
Resource Costs
Technological Change
Weather

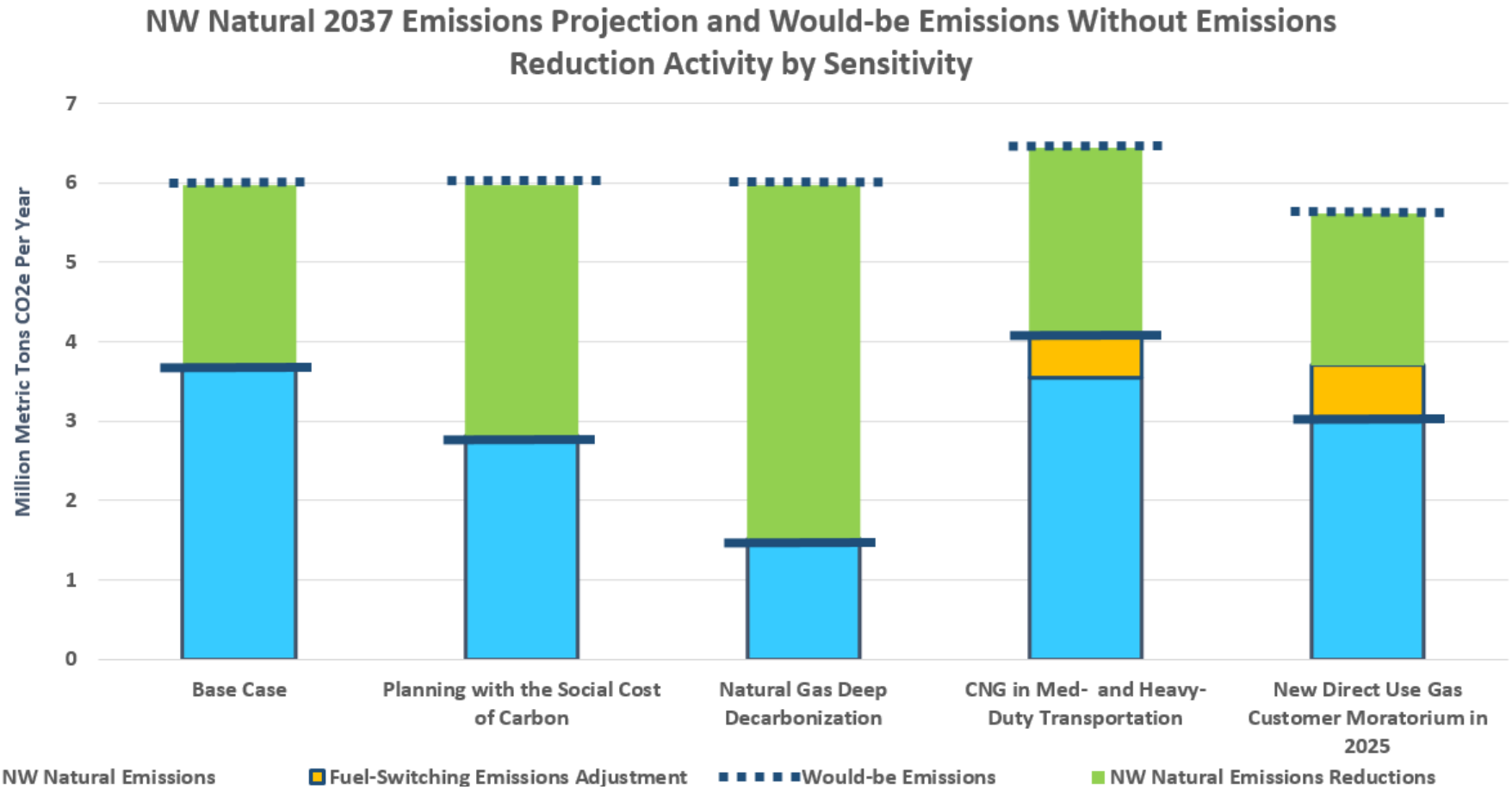
Stochastic Analysis
Annual Off-System RNG Volume



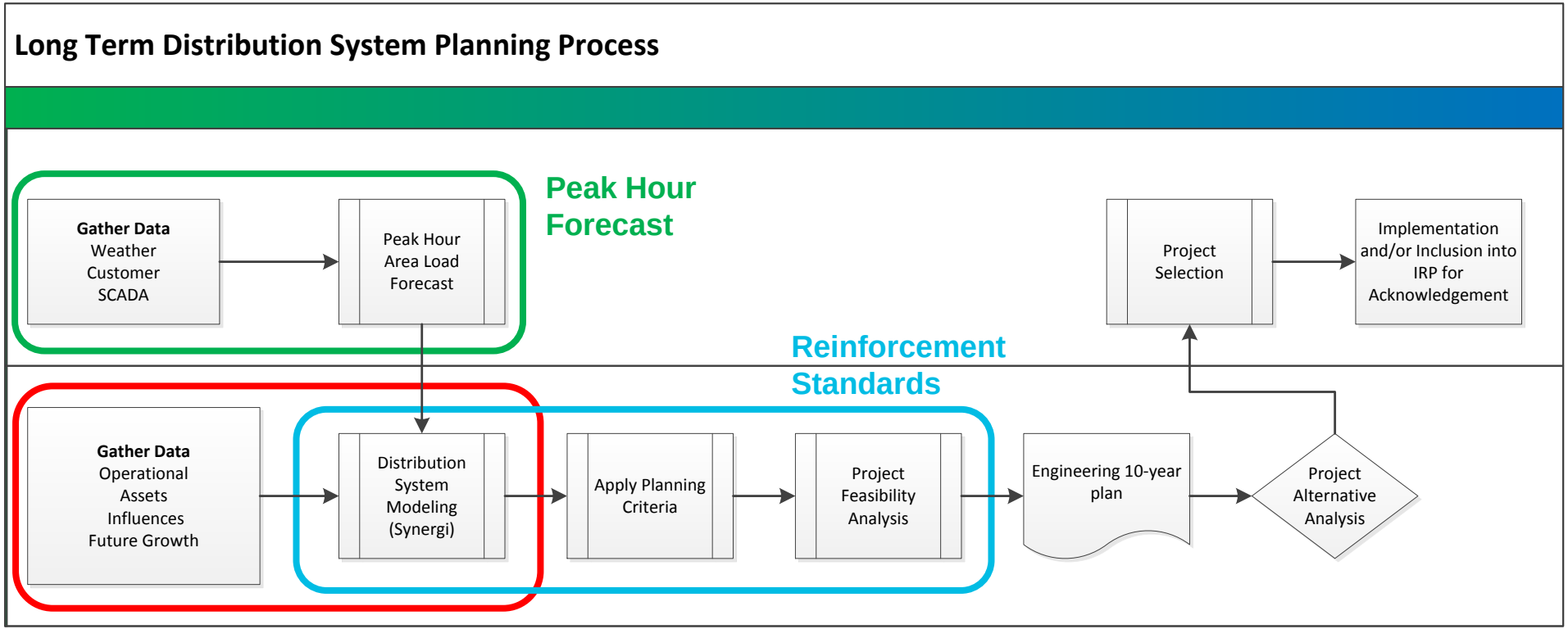
Sensitivities in the 2018 IRP

Supply Infrastructure Sensitivities	1. Base Case – No New Regional Pipeline 2. New Regional Pipeline in 2025 – Fully Subscribed 3. New Regional Pipeline in 2025 – Excess Capacity
Economic Growth Sensitivities	4. High Customer Growth 5. Low Customer Growth
Environmental Policy Sensitivities	6. Social Cost of Carbon Used in Resource Planning 7. Natural Gas Deep Decarbonization 8. Compressed Natural Gas in Medium- and Heavy-Duty Transportation 9. New Direct Use Gas Customer Moratorium in 2025

Emissions Forecast by Sensitivity



Distribution System Planning Process



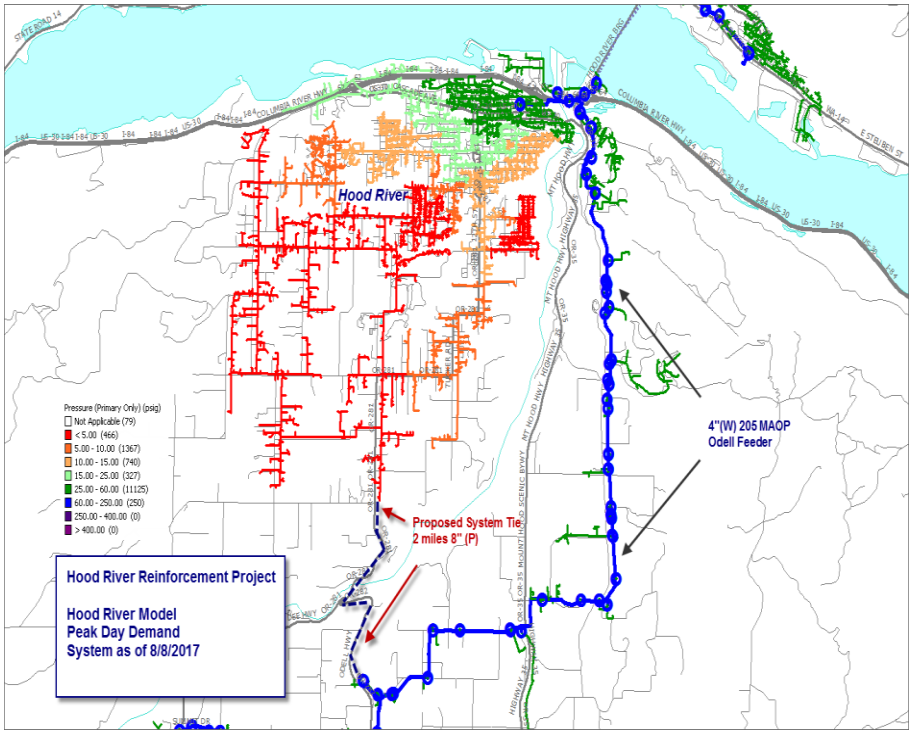
System Reinforcement Standards

Standard pressure distribution systems criteria with design parameters set to peak hour load requirements

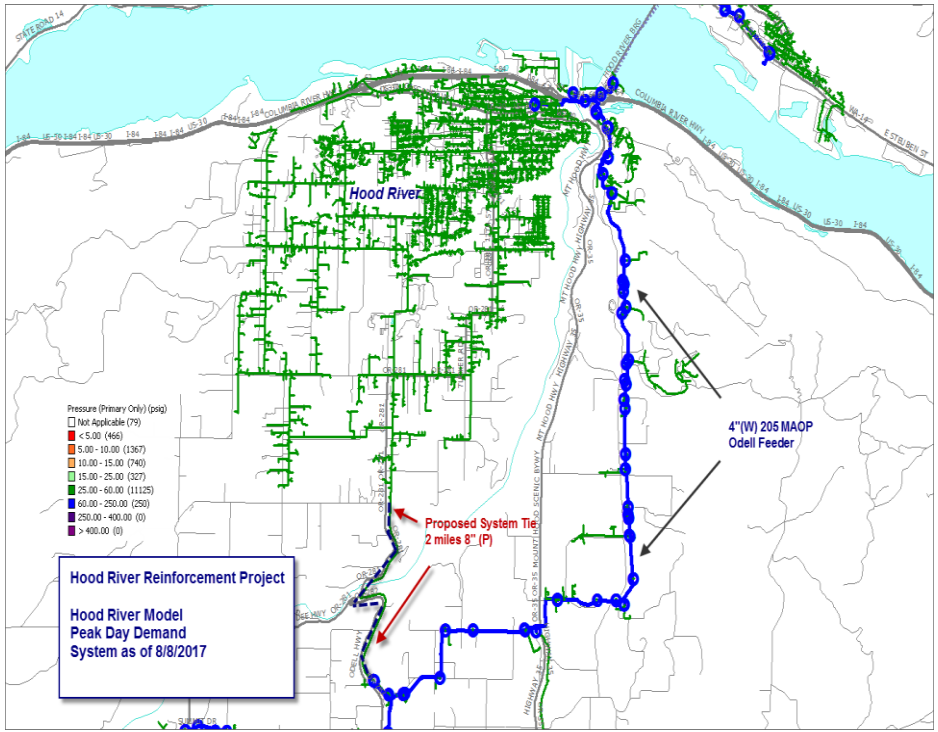
- Experience a minimum distribution pressure of 15 pounds per square inch gauge (psig) indicates an investigation will be initiated
- Experience or model a minimum distribution pressure of 10 psig indicates that reinforcement is critical
- Near term growth identified by one or more leading indicators (e.g., new road construction, subdivision or planned industrial development). This may require reinforcing a system that has satisfactory performance prior to the growth occurring
- Firm service customer delivery requirements (flow or pressure)

System Reinforcement Modeling

Existing Hood River System
Peak Hour Demand



Existing Hood River System
Peak Hour Demand with Proposed Investment



Oregon Distribution System Reinforcement Projects

1	Hood River
2	Happy Valley
3	Sandy
4	Eugene
5	Oregon City
6	Salem

Action Plan Items

Supply Resource Investments

1) Recall 10,000 Dth/day of Mist storage capacity for the 2020-21 gas year. Recall 35,000 Dth/day of Mist storage capacity for the 2021-22 gas year.

2) Use the methodology detailed in Appendix H to evaluate renewable natural gas resources against conventional sources based on all-in costs, where all-in costs are defined as:

*All-in costs = Net Present Value ([cost for delivered gas] + [net GHG emissions intensity*Cost of GHG Emissions Compliance] – [avoided supply capacity costs] – [avoided distribution capacity costs])*

Demand-side Resources

9) Working through Energy Trust, NW Natural will acquire therm savings of 5.2 million therms in 2019 and 5.4 million therms in 2020, or the amount identified and approved by the Energy Trust board.

Oregon Distribution System Projects In 2018 IRP Action Plan

Project	Schedule	Estimated Cost (Millions of $2017)
Hood River Reinforcement	2019	$3.5 - $7.1
Happy Valley Reinforcement	2019	$2.9 - $4.7
Sandy Feeder Reinforcement	2020	$15.2 - $21.1
North Eugene Reinforcement	2020	$5.3 - $10.6
South Oregon City Reinforcement	2020	$4.1 - $6.2
Salem Reinforcement	2020 - 2021	$14.1 - $19.7
Total		$45.1 - $69.4

Questions?