



# 2014 Natural Gas Integrated Resource Plan Appendices

August 31, 2014



## Safe Harbor Statement

This document contains forward-looking statements. Such statements are subject to a variety of risks, uncertainties and other factors, most of which are beyond the Company's control, and many of which could have a significant impact on the Company's operations, results of operations and financial condition, and could cause actual results to differ materially from those anticipated.

For a further discussion of these factors and other important factors, please refer to the Company's reports filed with the Securities and Exchange Commission. The forward-looking statements contained in this document speak only as of the date hereof. The Company undertakes no obligation to update any forward-looking statement or statements to reflect events or circumstances that occur after the date on which such statement is made or to reflect the occurrence of unanticipated events. New factors emerge from time to time, and it is not possible for management to predict all of such factors, nor can it assess the impact of each such factor on the Company's business or the extent to which any such factor, or combination of factors, may cause actual results to differ materially from those contained in any forward-looking statement.

## TABLE OF CONTENTS: APPENDICES

Appendix	0.1	TAC Member List.....	Page 1
	0.2	Comments and Responses to the 2014 IRP .....	2
Appendix	1.1	Avista Corporation 2014 Natural Gas IRP Work Plan.....	7
	1.2	IRP Guideline Compliance Summaries .....	10
Appendix	2.1	Economic Outlook and Customer Count Forecast.....	25
	2.2	Customer Forecasts by Region .....	34
	2.3	Demand Coefficient Calculations .....	64
	2.4	Heating Degree Day Data .....	70
	2.5	Demand Sensitivities and Demand Scenarios.....	75
	2.6	Demand Forecast Sensitivities and Scenarios Descriptions .....	77
	2.7	Annual Demand, Avg Day Demand & Peak Day Demand (Net of DSM) .	80
	2.8	Demand Before and After DSM.....	84
	2.9	Detailed Demand Data.....	88
Appendix	3.1	Avista Gas CPA Report Final 4/23/2014 .....	99
	3.2	Environmental Externalities.....	127
Appendix	4.1	Current Transportation/Storage Rates and Assumptions .....	131
	4.2	Alternate Supply Scenarios .....	132
Appendix	5.1	Monthly Price Data by Basin .....	133
	5.2	Weighted Average Cost of Capital .....	139
	5.3	Supply Side Resource Options .....	140
	5.4	Avoided Costs Detail.....	141
Appendix	6.1	High Case Demand and Resources Selected Graphs.....	157
	6.2	Other Scenario Peak Day Demand Table .....	159
Appendix	7.1	Distribution System Modeling .....	163
Appendix	8.1	TAC Meeting #1 .....	169

8.2	TAC Meeting #2 .....	256
8.3	TAC Meeting #3 .....	324
8.4	TAC Meeting #4 .....	426

**APPENDIX 0.1: TAC MEMBER LIST**

ORGANIZATION	REPRESENTATIVES	
<b>Avista</b>	John Lyons Jon Powell Jason Thackston Kerry Shroy Terrence Brown Annette Brandon Shawn Bonfield Laura Pendergraft	Linda Gervais Lori Hermanson Pat Ehrbar Grant Forsyth Tom Pardee Mike Diedesch Clint Kalich
<b>Cascade Natural Gas Company</b>	Brian Robertson	Jon Whiting
<b>Fortis BC</b>	Dana Wong	Ken Ross
<b>Intermountain Gas</b>	Mike McGrath	Shelli Chase
<b>Idaho Public Utility Commission</b>	Matt Elam	Rick Sterling Terri Carlock
<b>Northwest Gas Association</b>	Ben Hemson	Dan Kirschner
<b>Northwest Industrial Gas Users</b>	Ed Finklea	
<b>Northwest Natural Gas</b>	Tammy Linver	Mark Thompson
<b>Northwest Pipeline</b>	Teresa Hagins	Ray Warner
<b>Oregon Public Utility Commission</b>	Ryan Bracken Erik Colville	Lisa Gorsuch
<b>Oregon CUB</b>	Nadine Hanhan	
<b>Puget Sound Energy</b>	Gurvinder Singh	Phillip Popoff
<b>TransCanada</b>	David White	Jay Story
<b>Washington Attorney General's Office</b>	Lea Daeschel	Mary Kimball
<b>Washington Utility and Transportation Commission</b>	David Nightingale Brad Cebulko	Chris McGuire
<b>WA Department of Commerce</b>	Greg Nothstein	

## APPENDIX 0.2: COMMENTS AND RESPONSES TO 2014 DRAFT INTEGRATED RESOURCE PLAN

The following table summarizes the significant comments on our DRAFT as submitted by TAC members and Avista's responses. These comments are those not directly incorporated into the primary document. The planning environment in this IRP cycle was especially challenging given some of the most challenging economic volatility seen in decades coupled with industry changing dynamics in natural gas production. We continued our robust, flexible demand forecasting methodology that captured a broad range of demand forecasts fully vetted with our TAC. This IRP produced reduced forecasted demand scenarios and no near term resource needs even in our most robust demand scenario. We appreciate the time and effort invested by all our TAC members throughout the IRP process. Many good suggestions have been made and we have incorporated those that enhance the document.

Document Reference[1]	Comment/Question	Avista Response
3 – DEMAND SIDE MANAGEMENT	Avista has a DSM preference adder, but does not quantify many natural gas non-energy benefits (NEBs). In chapter 9 the company has committed to analyzing "non-natural gas benefits" as an action item. Perhaps this is an area the company could work with the Energy Trust of Oregon, the advisory group and other regional actors to quantify NEBs. The Commission's Policy Statement on the Evaluation of the Cost-Effectiveness of Natural Gas Conservation Programs in Docket UG-121207 has a preference for a fully developed Total Resource Cost test, and staff would like to see the company works towards that end.	It is Avista's policy to include all non-natural gas impacts that can be quantified in a manner that is sufficiently rigorous and reasonable to defend to a critical but reasonable audience. Where such degrees of rigor cannot be met the Company is committed to measuring the presence of non-natural gas impacts to the extent possible so as to facilitate the discussion of non-quantifiable non-natural gas impacts. The primary non-natural gas impacts currently quantified by the Company are non-natural gas energy savings (electric, propane and other non-natural gas fuels), water and sewage savings. Additionally, for low-income programs, the Company has a valuation of health and human safety investments and provision of baseline end-use services. The Company treats the importation of funding from outside of the Avista ratepayer population as offsetting the customer incremental cost and not as a non-natural gas impact, but the consequences to the Total Resource Cost test is similar. The Company has a mechanism with the site-specific program to capturing unusual and unique non-natural gas impacts and incorporating them into the cost-effectiveness analysis.

3 – DEMAND SIDE MANAGEMENT	As staff asked in its acknowledgment letter in Docket UG-111588, Avista should include an analysis and narrative describing the "trigger point" avoided cost value, where the conservation programs of the company become cost-effective.	The Company has committed to monitoring the weighted average cost of gas (WACOG) as a proxy for the avoided cost between Integrated Resource Plans. Though the WACOG and the avoided cost differ in some significant and important ways, a significant upward movement in the WACOG would tend to indicate a similar movement in the avoided cost. This could then trigger an immediate re-evaluation of the potential between IRP cycles. Earlier analysis indicated that an increase of approximately 90% in the avoided cost would be necessary to deliver a portfolio that was cost-effective under the Total Resource Cost test.
3.10 – DEMAND SIDE MANAGEMENT	The targets for 2015 and 2016 for Oregon are substantially lower than 2013 and 2014 (161 and 111 versus 225 and 250). Please provide more information about why there is such a large reduction. OPUC may be interested in the Company continuing current levels of acquisition. Please present a case where that can happen and what measures could fall within the exception criteria in Order 94-590, Docket No. UM 551.	Incremental economic potential in the 2015 and 2016 biennium is 454 and 235 dekatherms. In the previous study, incremental economic potential for 2013 and 2014 was 486 and 642 dekatherms. The lower economic potential in the current study reflects lower avoided cost projections. This flows through to achievable potential and the targets for 2015 and 2016 are lower than they were for 2013 and 2014. See the comparison of avoided costs in the separate tab.
3.12– DEMAND SIDE MANAGEMENT	Good discussion on developing a regional natural gas market transformation organization. Does Avista have a timeline? Can this conversation be expanded? Please update the final draft with the most current information.	The interested regional natural gas utilities are continuing the process of developing a proposal for review by the full Northwest Energy Efficiency Alliance (NEEA) board. The deadline for completing that proposal is the end of the calendar year, but every attempt is being made to expedite that process. The best opportunity for interested parties to contribute to that discussion will be as part of the NEEA board review.
3.2 – DEMAND SIDE MANAGEMENT	Please provide more details about how ramp rates were calculated and how they were or weren't consistent with assumptions used by the Northwest Power Planning Council. Also, please include a side by side comparison with explanation of differences.	EnerNOC Consulting Services (now AEG) used the Council's Sixth Plan ramp rates as a starting point for the Avista study. Then, we made adjustments to the ramp rates in the early years of the projection to better align with Avista's recent program accomplishments. The ramp rates were also adjusted in the out years for some measures. The resulting Avista ramp rates are presented in the two tabs: Equip_Ramp Rates and Non_Equip_Ramp Rates.

3.4 – DEMAND SIDE MANAGEMENT	More details are needed about how achievable potential was calculated and how each of the elements mentioned were incorporated in practice.	In each year of the forecast, some number of appliances fail and need to be replaced. If a measure is cost effective, then the ramp rate is applied to determine what fraction of the market installs the cost-effective option. For example, the ramp rate in 2015 for furnaces in the commercial sector, a cost-effective measure, is 20%. Therefore, 20% of the furnaces that fail in 2015 are replaced with the energy-conservation measure (high efficiency furnace) and the remaining furnaces are replaced with the baseline option.
3.6 – DEMAND SIDE MANAGEMENT	Please describe why only 74 percent of economic potential is achievable by 2034. Provide details regarding underlying assumptions and data files.	This 74% is actually a very high share of economic potential and reflects the combination of lost-opportunity and non lost opportunity measures, with ramp rates in the out years of up to 65% and 85% respectively.
3.8 – DEMAND SIDE MANAGEMENT	In the Oregon achievable potential numbers; please explain what assumptions are made about which measures are included. Are only TRC cost effective measures (and those measures required by law) included in projections? How is low income handled relative to cost effectiveness? Please include a sensitivity case and numbers for the occasion where current exceptions to cost effectiveness are continued beyond the current two year window.	A comprehensive measure list was included in the analysis. The total resource cost test (TRC) was used for cost-effectiveness screening with a minimum threshold of 1.0. Only measures that are considered cost-effective are included in economic, and therefore achievable potential. The residential sector was segmented by housing type. Low income was not specifically considered as part of the CPA. However, the low-income segment is considered in the development of programs.
4.4 – SUPPLY SIDE RESOURCES	The last sentence of first full paragraph mentions a process to acquire value from each transaction. Please identify how that process is carried out and identify who is involved.	The value of a transaction for the purchase of natural gas can encompass many different aspects both financial and non-financial and is assessed at the time the transaction is executed. Our natural gas buyers are actively assessing the most cost effective way to meet customer demand and optimize unutilized resources. Therefore value cannot be necessarily measured from a single transaction. It may be a series of transactions that span across timeframes of a day, week, month or season.



4.11 – SUPPLY SIDE RESOURCES	Jackson Prairie paragraph mentions that Avista will look for exchange and transportation release opportunities. Please discuss how the opportunities will be monitored and what will be done with the intelligence gathered through such monitoring.	These opportunities can be discovered in a number of ways. For example, buyers may be contacted from marketers or other utility counterparts. When the opportunity presents itself we assess if it makes sense from a financial impact to customers as well as a reliability concerns.
5.20 – INTEGRATED RESOURCE PORTFOLIO	Avista has TF-2 service for its storage at Jackson Prairie. Presumably the company draws down JP during cold events when demand is high. Is TF-2 firm capacity? If not, please explain why the company feels it can rely upon the service for meeting peak demand.	TF2 is a firm service as noted on NWP website: "TF2 allows for contracting a daily amount of firm service for a specified number of days rather than a daily amount on an annual basis as is usually required."
5.23 – INTEGRATED RESOURCE PORTFOLIO	ACTION ITEM discusses routine LDC activities. The action items should not include actions that are "normal" utility activities. The action plan items should be specific and measurable.	With no resource deficiency in our expected case, there are no specific and measurable near term action items.
6.5 – ALTERNATE SCENARIOS	The last paragraph highlights a structural problem with the IRP analysis. The point of calculating PVRR is to be able to compare alternate portfolios (different ways of meeting forecast demand). See Guideline 1.c. Please expand the discussion to explain the intended PVRR calculation value and why in this IRP the value is not there.	Using PVRR analysis to compare various scenarios where some of the assumptions are similar is a very useful analysis. However, looking strictly at PVRR calculations without considering the assumptions of each scenario is not appropriate. For example the PVRR of our Expected scenario is higher than the PVRR of the High Growth scenario. However, there are lower supply costs and demand that remains unserved in the High Growth Scenario so selecting the lowest PVRR scenarios is not applicable. There are also non-economic factors that may make the selection of one scenario over the other based on pure PVRR analysis undesirable.
7 – DISTRIBUTION PLANNING	Will you be describing all projects on Table 7.1 and 7.2?	We only provide detail on specific projects that were driven from IRP analysis. We have provided major capital expenditures for informational purposes only.

8.2 – ACTION PLAN	There is no action item that speaks to the exception period for non-cost effective measures that will sunset in April 2015, and what action will be taken to address this ongoing situation.	Ongoing situation of Oegon DSM program will be addressed outside of the IRP through its Annual Plan, Year-End Reporting, and tariff filings. IRP Action Plan was updated to reflect the progress made on the 2013/2014 Action Items Ordered by the Commission.
-------------------	--	--

## **APPENDIX 1.1: AVISTA CORPORATION 2014 NATURAL GAS INTEGRATED RESOURCE PLAN WORK PLAN**

### **IRP WORK PLAN REQUIREMENTS**

Section 480-90-238 (4), of the natural gas Integrated Resource Plan (“IRP”) rules, specify requirements for the IRP Work Plan:

Not later than twelve months prior to the due date of a plan, the utility must provide a work plan for informal commission review. The work plan must outline the content of the integrated resource plan to be developed by the utility and the method for assessing potential resources.

Additionally, Section 480-90-238 (5) of the WAC states:

The work plan must outline the timing and extent of public participation.

### **OVERVIEW**

This Work Plan outlines the process Avista will follow to complete its 2014 Natural Gas IRP by Aug. 31, 2014. Avista uses a public process to obtain technical expertise and guidance throughout the planning period via Technical Advisory Committee (TAC) meetings. The TAC will be providing input into assumptions, scenarios, and modeling techniques.

### **PROCESS**

The 2014 IRP process will be similar to that used to produce the previously published plan. Avista will use SENDOUT® (a PC based linear programming model widely used to solve natural gas supply and transportation optimization questions) to develop the risk adjusted least-cost resource mix for the 20 year planning period.

This plan will continue to include demand analysis, demand side management and avoided cost determination, existing and potential supply-side resource analysis, resource integration and alternative sensitivities and scenario analysis.

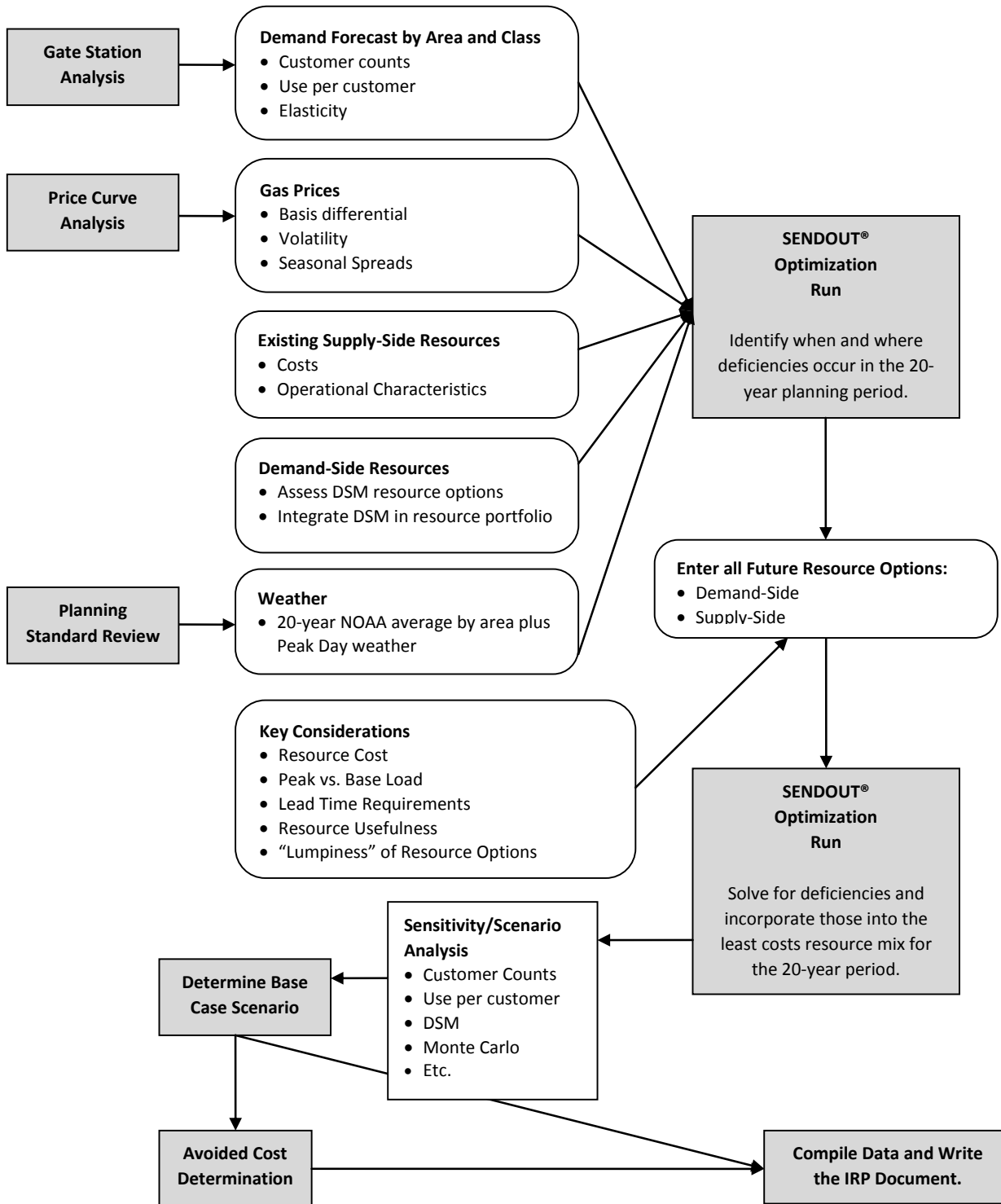
Additionally, Avista intends to incorporate action plan items identified in the 2012 Natural Gas IRP including more detailed demand analysis regarding use per customer, demand side management results and possible price elastic responses to evolving economic conditions, an updated assessment of conservation potential in our service territories, consideration of alternate forecasting methodologies, and the changing landscape of natural gas supply (i.e. shale gas, Canadian exports, and US LNG exports) and its implications to the planning process. Further details about Avista’s process for determining the risk adjusted least-cost resource mix is shown in Exhibit 1.

## TIMELINE

The following is Avista's TENTATIVE 2014 Natural Gas IRP timeline:

August 30, 2013	Work Plan filed with WUTC
January through April 2014	Technical Advisory Committee meetings (exact meeting dates <i>subject to change</i> ). Meeting topics will include:
	January 17 Demand Forecast & Demand-Side Management
	February 21 Distribution Planning & Supply/Infrastructure and Potential Case Discussion
	March 20 SENDOUT® Preliminary Output Results and Further Case Discussion
	April 17 SENDOUT® results
May 11, 2014	Draft of IRP document to TAC
June 29, 2014	Comments on draft due back to Avista
July 17, 2014	TAC final review meeting (if necessary)
August 31, 2014	File finalized IRP document

**EXHIBIT 1: AVISTA’S 2014 NATURAL GAS IRP MODELING PROCESS**



## APPENDIX 1.2: WASHINGTON PUBLIC UTILITY COMMISSION IRP POLICIES AND GUIDELINES – WAC 480-90-238

Rule	Requirement	Plan Citation
WAC 480-90-238(4)	Work plan filed no later than 12 months before next IRP due date.	Work plan submitted to the WUTC on August 31, 2011, See attachment to this Appendix 1.1.
WAC 480-90-238(4)	Work plan outlines content of IRP.	See workplan attached to this Appendix 0.1.
WAC 480-90-238(4)	Work plan outlines method for assessing potential resources. (See LRC analysis below)	See Appendix 1.1.
WAC 480-90-238(5)	Work plan outlines timing and extent of public participation.	See Appendix 1.1.
WAC 480-90-238(4)	Integrated resource plan submitted within two years of previous plan.	Last Integrated Resource Plan was submitted on August 31, 2012
WAC 480-90-238(5)	Commission issues notice of public hearing after company files plan for review.	TBD
WAC 480-90-238(5)	Commission holds public hearing.	TBD
WAC 480-90-238(2)(a)	Plan describes mix of natural gas supply resources.	See Chapter 4 on Supply Side Resources
WAC 480-90-238(2)(a)	Plan describes conservation supply.	See Chapter 3 on Demand Side Resources
WAC 480-90-238(2)(a)	Plan addresses supply in terms of current and future needs of utility and ratepayers.	See Chapter 4 on Supply Side Resources and Chapter 5 Integrated Resource Portfolio
WAC 480-90-238(2)(a)&(b)	Plan uses lowest reasonable cost (LRC) analysis to select mix of resources.	See Chapters 3 and 4 for Demand and Supply Side Resources. Chapter 5 details how Demand and Supply come together to select the least cost/best risk portfolio for ratepayers.
WAC 480-90-238(2)(b)	LRC analysis considers resource costs.	See Chapters 3 and 4 for Demand and Supply Side Resources. Chapter 5 details how Demand and Supply come together to select the least cost/best risk portfolio for ratepayers.
WAC 480-90-238(2)(b)	LRC analysis considers market-volatility risks.	See Chapter 4 on Supply Side Resources
WAC 480-90-238(2)(b)	LRC analysis considers demand side uncertainties.	See Chapter 2 Demand Forecasting
WAC 480-90-238(2)(b)	LRC analysis considers resource effect on system operation.	See Chapter 4 and Chapter 5
WAC 480-90-238(2)(b)	LRC analysis considers risks imposed on ratepayers.	See Chapter 4 procurement plan section. We seek to minimize but cannot eliminate price risk for our customers.
WAC 480-90-238(2)(b)	LRC analysis considers public policies regarding resource preference adopted by Washington state or federal government.	See Chapter 2 demand scenarios

WAC 480-90-238(2)(b)	LRC analysis considers cost of risks associated with environmental effects including emissions of carbon dioxide.	See Chapter 2 on demand scenarios
WAC 480-90-238(2)(b)	LRC analysis considers need for security of supply.	See Chapter 4 on Supply Side Resources
<b>Rule</b>	<b>Requirement</b>	<b>Plan Citation</b>
WAC 480-90-238(2)(c)	Plan defines conservation as any reduction in natural gas consumption that results from increases in the efficiency of energy use or distribution.	See Chapter 3 on Demand Side Resources
WAC 480-90-238(3)(a)	Plan includes a range of forecasts of future demand.	See Chapter 2 on Demand Forecast
WAC 480-90-238(3)(a)	Plan develops forecasts using methods that examine the effect of economic forces on the consumption of natural gas.	See Chapter 2 on Demand Forecast
WAC 480-90-238(3)(a)	Plan develops forecasts using methods that address changes in the number, type and efficiency of natural gas end-uses.	See Chapter 2 on Demand Forecast
WAC 480-90-238(3)(b)	Plan includes an assessment of commercially available conservation, including load management.	See Chapter 3 on Demand Side Management including demand response section.
WAC 480-90-238(3)(b)	Plan includes an assessment of currently employed and new policies and programs needed to obtain the conservation improvements.	See Chapter 3 and Appendix 3.1.
WAC 480-90-238(3)(c)	Plan includes an assessment of conventional and commercially available nonconventional gas supplies.	See Chapter 4 on Supply Side Resources
WAC 480-90-238(3)(d)	Plan includes an assessment of opportunities for using company-owned or contracted storage.	See Chapter 4 on Supply Side Resources
WAC 480-90-238(3)(e)	Plan includes an assessment of pipeline transmission capability and reliability and opportunities for additional pipeline transmission resources.	See Chapter 4 on Supply Side Resources
WAC 480-90-238(3)(f)	Plan includes a comparative evaluation of the cost of natural gas purchasing strategies, storage options, delivery resources, and improvements in conservation using a consistent method to calculate cost-effectiveness.	See Chapter 3 on Demand Side Resources and Chapter 4 on Supply Side Resources
WAC 480-90-238(3)(g)	Plan includes at least a 10 year long-range planning horizon.	Our plan is a comprehensive 20 year plan.
WAC 480-90-238(3)(g)	Demand forecasts and resource evaluations are integrated into the long range plan for resource acquisition.	Chapter 5 Integrated Resource Portfolio details how demand and supply come together to form the least cost/best risk portfolio.
WAC 480-90-238(3)(h)	Plan includes a two-year action plan that implements the long range plan.	See Section 8 Action Plan
WAC 480-90-238(3)(i)	Plan includes a progress report on the implementation of the previously filed plan.	See Section 8 Action Plan

## APPENDIX - CHAPTER 1

WAC 480-90-238(5)	Plan includes description of consultation with commission staff. (Description not required)	See Section 0 Introduction
WAC 480-90-238(5)	Plan includes description of completion of work plan. (Description not required)	See Appendix 1.1.



## APPENDIX 1.2: IDAHO PUBLIC UTILITY COMMISSION IRP POLICIES AND GUIDELINES – ORDER NO. 2534

	DESCRIPTION OF REQUIREMENT	FULLFILLMENT OF REQUIREMENT
1	Purpose and Process. Each gas utility regulated by the Idaho Public Utilities Commission with retail sales of more than 10,000,000,000 cubic feet in a calendar year (except gas utilities doing business in Idaho that are regulated by contract with a regulatory commission of another State) has the responsibility to meet system demand at least cost to the utility and its ratepayers. Therefore, an “integrated resource plan” shall be developed by each gas utility subject to this rule.	Avista prepares a comprehensive 20 year Integrated Resource Plan every two years. Avista will be filing its 2014 IRP on or before August 31, 2014.
2	Definition. Integrated resource planning. “Integrated resource planning” means planning by the use of any standard, regulation, practice, or policy to undertake a systematic comparison between demand-side management measures and the supply of gas by a gas utility to minimize life-cycle costs of adequate and reliable utility services to gas customers. Integrated resource planning shall take into account necessary features for system operation such as diversity, reliability, dispatchability, and other factors of risk and shall treat demand and supply to gas consumers on a consistent and integrated basis.	Avista's IRP brings together dynamic demand forecasts and matches them against demand-side and supply-side resources in order to evaluate the least cost/best risk portfolio for its core customers. While the primary focus has been to ensure customer's needs are met under peak or design weather conditions, this process also evaluates the resource portfolio under normal/average operating conditions. The IRP provides the framework and methodology for evaluating Avista's natural gas demand and resources.
3	Elements of Plan. Each gas utility shall submit to the Commission on a biennial basis an integrated resource plan that shall include:	2014 IRP to be filed on or before August 31, 2014. The last IRP was filed on August 31, 2012.
	A range of forecasts of future gas demand in firm and interruptible markets for each customer class for one, five, and twenty years using methods that examine the effect of economic forces on the consumption of gas and that address changes in the number, type and efficiency of gas end-uses.	See <b>Chapter 2 - Demand Forecasts</b> and <b>Appendix 2 et. al.</b> for a detailed discussion of how demand was forecasted for this IRP.
	An assessment for each customer class of the technically feasible improvements in the efficient use of gas, including load management, as well as the policies and programs needed to obtain the efficiency improvements.	See <b>Chapter 3 - Demand Side Management</b> and <b>DSM Appendices 3 et.al.</b> for detailed information on the DSM potential evaluated and selected for this IRP and the operational implementation process.

	An analysis for each customer class of gas supply options, including: (1) a projection of spot market versus long-term purchases for both firm and interruptible markets; (2) an evaluation of the opportunities for using company-owned or contracted storage or production; (3) an analysis of prospects for company participation in a gas futures market; and (4) an assessment of opportunities for access to multiple pipeline suppliers or direct purchases from producers.	See <b>Chapter 4 - Supply-Side Resources</b> for details about the market, storage, and pipeline transportation as well as other resource options considered in this IRP. See also the procurement plan section in this same chapter for supply procurement strategies.
	A comparative evaluation of gas purchasing options and improvements in the efficient use of gas based on a consistent method for calculating cost-effectiveness.	See Methodology section of <b>Chapter 3 - Demand-Side Resources</b> where we describe our process on how demand-side and supply-side resources are compared on par with each other in the SENDOUT® model. Chapter 3 also includes how results from the IRP are then utilized to create operational business plans. Operational implementation may differ from IRP results due to modeling assumptions.
	The integration of the demand forecast and resource evaluations into a long-range (e.g., twenty-year) integrated resource plan describing the strategies designed to meet current and future needs at the lowest cost to the utility and its ratepayers.	See <b>Chapter 5 - Integrated Resource Portfolio</b> for details on how we model demand and supply coming together to provide the least cost/best risk portfolio of resources.
	A short-term (e.g., two-year) plan outlining the specific actions to be taken by the utility in implementing the integrated resource plan.	See <b>Chapter 8 - Action Plan</b> for actions to be taken in implementing the IRP.
<b>4</b>	Relationship Between Plans. All plans following the initial integrated resource plan shall include a progress report that relates the new plan to the previously filed plan.	Avista strives to meet at least bi-annually with Staff and/or Commissioners to discuss the state of the market, procurement planning practices, and any other issues that may impact resource needs or other analysis within the IRP.
<b>5</b>	Plans to Be Considered in Rate Cases. The integrated resource plan will be considered with other available information to evaluate the performance of the utility in rate proceedings before the Commission.	We prepare and file our plan in part to establish a public record of our plan.
<b>6</b>	Public Participation. In formulating its plan, the gas utility must provide an opportunity for public participation and comment and must provide methods that will be available to the public of validating predicted performance.	Avista held four Technical Advisory Committee meetings beginning in January and ending in April. See <b>Chapter 0 - Introduction</b> for more detail about public participation in the IRP process.

<p>7</p>	<p>Legal Effect of Plan. The plan constitutes the base line against which the utility's performance will ordinarily be measured. The requirement for implementation of a plan does not mean that the plan must be followed without deviation. The requirement of implementation of a plan means that a gas utility, having made an integrated resource plan to provide adequate and reliable service to its gas customers at the lowest system cost, may and should deviate from that plan when presented with responsible, reliable opportunities to further lower its planned system cost not anticipated or identified in existing or earlier plans and not undermining the utility's reliability.</p>	<p>See section titled "Avista's Procurement Plan" in <b>Chapter 4 - Supply-Side Resources</b>. Among other details we discuss plan revisions in response to changing market conditions.</p>
	<p>In order to encourage prudent planning and prudent deviation from past planning when presented with opportunities for improving upon a plan, a gas utility's plan must be on file with the Commission and available for public inspection. But the filing of a plan does not constitute approval or disapproval of the plan having the force and effect of law, and deviation from the plan would not constitute violation of the Commission's Orders or rules. The prudence of a utility's plan and the utility's prudence in following or not following a plan are matters that may be considered in a general rate proceeding or other proceedings in which those issues have been noticed.</p>	<p>See also section titled "Alternate Supply-Side Scenarios" in <b>Chapter 5 - Integrated Resource Portfolio</b> where we discuss different supply portfolios that are responsive to changing assumptions about resource alternatives.</p>

## APPENDIX 1.2: OREGON PUBLIC UTILITY COMMISSION IRP STANDARD AND GUIDELINES – ORDER 07- 002

<b>Guideline 1: Substantive Requirements</b>		
<b>1.a.1</b>	All resources must be evaluated on a consistent and comparable basis.	All resource options considered, including demand-side and supply-side are modeled in SENDOUT® utilizing the same common general assumptions, approach and methodology.
<b>1.a.2</b>	All known resources for meeting the utility's load should be considered, including supply-side options which focus on the generation, purchase and transmission of power – or gas purchases, transportation, and storage – and demand-side options which focus on conservation and demand response.	Avista considered a range of resources including demand-side management, distribution system enhancements, capacity release recalls, interstate pipeline transportation, interruptible customer supply, and storage options including liquefied natural gas. Chapter 3 and Appendix 3.1 documents Avista's demand-side management resources considered. Chapter 4 and Appendix 5.3 documents supply-side resources. Chapter 5 and 6 documents how Avista developed and assessed each of these resources.
<b>1.a.3</b>	Utilities should compare different resource fuel types, technologies, lead times, in-service dates, durations and locations in portfolio risk modeling.	Avista considered various combinations of technologies, lead times, in-service dates, durations, and locations. Chapter 5 provides details about the modeling methodology and results. Chapter 4 describes resource attributes and Appendix 5.3 summarizes the resources' lead times, in-service dates and locations.
<b>1.a.4</b>	Consistent assumptions and methods should be used for evaluation of all resources.	Appendix 5.2 documents general assumptions used in Avista's SENDOUT® modeling software. All portfolio resources both demand and supply-side were evaluated within SENDOUT® using the same sets of inputs.
<b>1.a.5</b>	The after-tax marginal weighted-average cost of capital (WACC) should be used to discount all future resource costs.	Avista applied its after-tax WACC of 4.93% to discount all future resource costs. (See general assumptions at Appendix 5.2)
<b>1.b.1</b>	Risk and uncertainty must be considered. Electric utilities only	Not Applicable
<b>1.b.2</b>	Risk and uncertainty must be considered. Natural gas utilities should consider demand (peak, swing and base-load), commodity supply and price, transportation availability and price, and costs to comply with any regulation of greenhouse gas (GHG) emissions.	<p>Risk and uncertainty are key considerations in long term planning. In order to address risk and uncertainties a wide range of sensitivity, scenario and portfolio analysis is completed. A description of risk associated with each scenario is included in Appendix 2.6.</p> <p>One of the key risks is the "flat demand" risk as described in Chapter 1. Avista performed 15 sensitivities on demand. From there five demand scenarios were developed (Table 1.1) for SENDOUT® modeling purposes. Monthly demand coefficients were developed for base, heating demand while peak demand was contemplated through modeling a weather planning standard of the coldest day on record (see heating degree day data in Appendix 2.4).</p>

		<p>Avista evaluated several price forecasts and selected high, medium and low price scenarios for modeling purposes. The annual average prices are then weighted by month using fundamental forecast data. Additionally, the Henry Hub price forecasts are basis adjusted using the same fundamental forecast data.</p> <p>Four supply scenarios were also evaluated, see Table 4.3. These supply scenarios were combined with demand scenarios in order to establish portfolios for evaluation. Ultimately 9 portfolios were evaluated (See Table 6.3 for the PVRR results).</p> <p>Avista stochastic modeling techniques for price and weather variables to analyze weather sensitivity and to quantify the risk to customers under varying price environments. While there continues to be some uncertainty around GHG emission, Avista considered GHG emissions regulatory compliance costs in Appendix 3.2. As currently modeled, we include a carbon adder to our price curve to capture the costs of emission regulation.</p>
	Utilities should identify in their plans any additional sources of risk and uncertainty.	Avista evaluated additional risks and uncertainties. Risks associated with the planning environment are detailed in Chapter 0 Introduction. Avista also analyzed demand risk which is detailed in Chapter 2. Chapter 3 discusses the uncertainty around how much DSM is achievable. Supply-side resource risks are discussed in Chapter 4. Chapter 5 and 6 discusses the variables modeled for scenario and stochastic risk analysis.
<b>1c</b>	The primary goal must be the selection of a portfolio of resources with the best combination of expected costs and associated risks and uncertainties for the utility and its customers.	Avista evaluated cost/risk tradeoffs for each of the risk analysis portfolios considered. See Chapter 5 and 6 plus supporting information in Appendix 2.6 for Avista's portfolio risk analysis and determination of the preferred portfolio.
	The planning horizon for analyzing resource choices should be at least 20 years and account for end effects. Utilities should consider all costs with a reasonable likelihood of being included in rates over the long term, which extends beyond the planning horizon and the life of the resource.	Avista used a 20-year study period for portfolio modeling. Avista contemplated possible costs beyond the planning period that could affect rates including end effects such as infrastructure decommission costs and concluded there were no significant costs reasonably likely to impact rates under different resource selection scenarios.
	Utilities should use present value of revenue requirement (PVRR) as the key cost metric. The plan should include analysis of current and estimated future costs of all long-lived resources such as power plants, gas storage facilities and pipelines, as well as all short-lived resources such as gas supply and	Avista's SENDOUT® modeling software utilizes a PVRR cost metric methodology applied to both long and short-lived resources.

	short-term power purchases.	
	To address risk, the plan should include at a minimum: 1) Two measures of PVRR risk: one that measures the variability of costs and one that measures the severity of bad outcomes. 2) Discussion of the proposed use and impact on costs and risks of physical and financial hedging.	Avista, through its stochastic analysis, modeled 200 scenarios around varying gas price inputs via Monte Carlo iterations developing a distribution of Total 20 year cost estimates utilizing SENDOUT®'s PVRR methodology. Chapter 6 further describes this analysis. The variability of costs is plotted against the Expected Case while the scenarios beyond the 95 <sup>th</sup> percentile capture the severity of outcomes. Chapter 4 discusses Avista's physical and financial hedging methodology.
	The utility should explain in its plan how its resource choices appropriately balance cost and risk.	Chapter 4, 5, and 6 describe various specific resource considerations and related risks, and describes what criteria we used to determine what resource combinations provide an appropriate balance between cost and risk.
<b>1d</b>	The plan must be consistent with the long-run public interest as expressed in Oregon and federal energy policies.	Avista considered current and expected state and federal energy policies in portfolio modeling. Chapter 5 describes the decision process used to derive portfolios, which includes consideration of state resource policy directions.
<b>Guideline 2: Procedural Requirements</b>		
<b>2a</b>	The public, including other utilities, should be allowed significant involvement in the preparation of the IRP. Involvement includes opportunities to contribute information and ideas, as well as to receive information. Parties must have an opportunity to make relevant inquiries of the utility formulating the plan.	Chapter 0 provides an overview of the public process and documents the details on public meetings held for the 2014 IRP. Avista encourages participation in the development of the plan, as each party brings a unique perspective and the ability to exchange information and ideas makes for a more robust plan.
	While confidential information must be protected, the utility should make public, in its plan, any non-confidential information that is relevant to its resource evaluation and action plan.	The entire IRP, as well as the TAC process, includes all of the non-confidential information the company used for portfolio evaluation and selection. Avista also provided stakeholders with non-confidential information to support public meeting discussions via email. The document and appendices will be available on the company website for viewing.
	The utility must provide a draft IRP for public review and comment prior to filing a final plan with the Commission.	Avista distributed a draft IRP document for external review to all TAC members on May 25, 2014 and requested comments by July 13, 2014.
<b>Guideline 3: Plan Filing, Review and Updates</b>		
<b>3a</b>	Utility must file an IRP within two years of its previous IRP acknowledgement order.	This Plan complies with this requirement as the 2012 Natural Gas IRP was acknowledged on 4/30/2013.
<b>3b</b>	Utility must present the results of its filed plan to the Commission at a public meeting prior to the deadline for written public comment.	Avista will work with Staff to fulfill this guideline following filing of the IRP.
<b>3c</b>	Commission staff and parties should complete their comments and recommendations within six months of IRP filing	Pending

<b>3d</b>	The Commission will consider comments and recommendations on a utility's plan at a public meeting before issuing an order on acknowledgment. The Commission may provide the utility an opportunity to revise the plan before issuing an acknowledgment order	Pending
<b>3e</b>	The Commission may provide direction to a utility regarding any additional analyses or actions that the utility should undertake in its next IRP.	Pending
<b>3f</b>	Each utility must submit an annual update on its most recently acknowledged plan. The update is due on or before the acknowledgment order anniversary date. Once a utility anticipates a significant deviation from its acknowledged IRP, it must file an update with the Commission, unless the utility is within six months of filing its next IRP. The utility must summarize the update at a Commission public meeting. The utility may request acknowledgment of changes in proposed actions identified in an update	Because the 2012 IRP was not acknowledged until April 30, 2013 the Company did not submit an annual update as the 2014 IRP process was well underway by the anniversary date of the acknowledgement. The Company provided updates and comparisons to its 2012 IRP during its 2014 IRP TAC meetings held on January 24, 2014, February 25, 2014, March 26, 2014, and April 23, 2014, in which Commission Staff and other TAC members were present. In addition the Company provided an update during its Natural Gas Quarterly update meeting held on April 17, 2014. No request for acknowledgement was required as no significant deviation from the 2012 IRP was anticipated.
<b>3g</b>	Unless the utility requests acknowledgement of changes in proposed actions, the annual update is an informational filing that: <ul style="list-style-type: none"> <li>ii Describes what actions the utility has taken to implement the plan;</li> <li>ii Provides an assessment of what has changed since the acknowledgment order that affects the action plan, including changes in such factors as load, expiration of resource contracts, supply-side and demand-side resource acquisitions, resource costs, and transmission availability; and</li> <li>ii Justifies any deviations from the acknowledged action plan.</li> </ul>	The updates described in 3f above explained changes since acknowledgment of the 2012 IRP and an update of emerging planning issues. The updates did not request acknowledgement of any changes.  Also, as directed in Order No. 13-159, per the 2013-2014 Action Plan, the Company continued its DSM programs in Oregon with a minimum savings goal of 225,000 therms in 2013 and 250,000 therms in 2014. On April 30, 2014, the Company submitted its 2013 DSM Annual Report to Commission Staff which included updates and progress in meeting the DSM Action Items contained in Order No. 13-159. Lastly, as ordered the Company developed a potential mechanism for allocating funding for a separate low-income energy efficiency program and submitted a report to Commission Staff outlining the mechanism on October 30, 2013. On January 8, 2014 the Company filed a tariff to implement the low-income energy efficiency program, which was approved with an effective date of March 1, 2014.
<b>Guideline 4: Plan Components</b>		
	At a minimum, the plan must include the following elements:	
<b>4a</b>	An explanation of how the utility met	This table summarizes guideline compliance by

	each of the substantive and procedural requirements.	providing an overview of how Avista met each of the substantive and procedural requirements for a natural gas IRP.
<b>4b</b>	Analysis of high and low load growth scenarios in addition to stochastic load risk analysis with an explanation of major assumptions.	Avista developed five demand growth forecasts for scenario analysis. Stochastic variability of demand was also captured in the risk analysis. Chapter 1 describes the demand forecast data and Chapter 5 provides the scenario and risk analysis results. Appendix 5 details major assumptions.
<b>4c</b>	For electric utilities only	Not Applicable
<b>4d</b>	A determination of the peaking, swing and base-load gas supply and associated transportation and storage expected for each year of the plan, given existing resources; and identification of gas supplies (peak, swing and base-load), transportation and storage needed to bridge the gap between expected loads and resources.	Figures 0.6 and 0.7 summarize graphically projected annual peak day demand and the existing and selected resources by year to meet demand for the expected case. Appendix 6.1 and 6.2 summarize the peak day demand for the other demand scenarios.
<b>4e</b>	Identification and estimated costs of all supply-side and demand-side resource options, taking into account anticipated advances in technology	Chapter 3 and Appendix 3.1 identify the demand-side potential included in this IRP. Chapter 4 and 5 and Appendix 5.3 identify the supply-side resources.
<b>4f</b>	Analysis of measures the utility intends to take to provide reliable service, including cost-risk tradeoffs.	Chapter 5, 6, and 7 discusses the modeling tools, customer growth forecasting and cost-risk considerations used to maintain and plan a reliable gas delivery system. These Chapters also captures a summary of the reliability analysis process demonstrated at the second TAC meeting. Chapter 4 discusses the diversified infrastructure and multiple supply basin approach that acts to mitigate certain reliability risks. Appendix 2.6 highlights key risks associated with each portfolio.
<b>4g</b>	Identification of key assumptions about the future (e.g. fuel prices and environmental compliance costs) and alternative scenarios considered.	Appendix 5 and Chapter 5 describe the key assumptions and alternative scenarios used in this IRP.
<b>4h</b>	Construction of a representative set of resource portfolios to test various operating characteristics, resource types, fuels and sources, technologies, lead times, in-service dates, durations and general locations - system-wide or delivered to a specific portion of the system.	This Plan documents the development and results for portfolios evaluated in this IRP (see Table 4.3 for supply scenarios considered).
<b>4i</b>	Evaluation of the performance of the candidate portfolios over the range of identified risks and uncertainties.	We evaluated our candidate portfolio by performing stochastic analysis using SENDOUT® varying price under 200 different scenarios. Additionally, we test the portfolio of options with the use of SENDOUT® under deterministic scenarios where demand and price vary. For resources selected, we assess other risk factors such as varying lead times required and potential for cost overruns outside of the amounts



		included in the modeling assumptions.
<b>4j</b>	Results of testing and rank ordering of the portfolios by cost and risk metric, and interpretation of those results.	Avista's four distinct geographic Oregon service territories limit many resource option synergies which inherently reduces available portfolio options. Feasibility uncertainty, lead time variability and uncertain cost escalation around certain resource options also reduce reasonably viable options. Chapter 4 describes resource options reviewed including discussion on uncertainties in lead times and costs as well as viability and resource availability (e.g. LNG). Appendix 5.3 summarizes the potential resource options identifying investment and variable costs, asset availability and lead time requirements while results of resources selected are identified in Table 5.5 as well as graphically presented in Figure 5.18 and 5.19 for the Expected Case and Appendix 6.1 for the High Growth case.
<b>4k</b>	Analysis of the uncertainties associated with each portfolio evaluated	See the responses to 1.b above.
<b>4l</b>	Selection of a portfolio that represents the best combination of cost and risk for the utility and its customers	Avista evaluated cost/risk tradeoffs for each of the risk analysis portfolios considered. Chapter 5 and Appendix 2.6 show the company's portfolio risk analysis, as well as the process and determination of the preferred portfolio.
<b>4m</b>	Identification and explanation of any inconsistencies of the selected portfolio with any state and federal energy policies that may affect a utility's plan and any barriers to implementation	This IRP is presumed to have no inconsistencies.
<b>4n</b>	An action plan with resource activities the utility intends to undertake over the next two to four years to acquire the identified resources, regardless of whether the activity was acknowledged in a previous IRP, with the key attributes of each resource specified as in portfolio testing.	Chapter 8 presents the IRP Action Plan with focus on the following areas: <ul style="list-style-type: none"> <li>   Modeling</li> <li>   Supply/capacity</li> <li>   Forecasting</li> <li>   Regulatory communication</li> <li>   DSM</li> </ul>
<b>Guideline 5: Transmission</b>		
<b>5</b>	Portfolio analysis should include costs to the utility for the fuel transportation and electric transmission required for each resource being considered. In addition, utilities should consider fuel transportation and electric transmission facilities as resource options, taking into account their value for making additional purchases and sales, accessing less costly resources in remote locations, acquiring alternative fuel supplies, and improving reliability.	Not applicable to Avista's gas utility operations.

<b>Guideline 6: Conservation</b>		
<b>6a</b>	Each utility should ensure that a conservation potential study is conducted periodically for its entire service territory.	EnerNOC performed a conservation potential assessment study for our 2014 IRP. A discussion of the study is included in Chapter 3. The full study document is in Appendix 3.1. Avista incorporates a comprehensive assessment of the potential for utility acquisition of energy-efficiency resources into the regularly-scheduled Integrated Resource Planning process.
<b>6b</b>	To the extent that a utility controls the level of funding for conservation programs in its service territory, the utility should include in its action plan all best cost/risk portfolio conservation resources for meeting projected resource needs, specifying annual savings targets.	A discussion on the treatment of conservation programs is included in Chapter 3 while selection methodology is documented in Chapter 5. The action plan details conservation targets, if any, as developed through the operational business planning process. These targets are updated annually, with the most current avoided costs. Given the challenge of the low cost environment, current operational planning and program evaluation is still underway and targets for Oregon have not yet been set.
<b>6c</b>	To the extent that an outside party administers conservation programs in a utility's service territory at a level of funding that is beyond the utility's control, the utility should: 1) determine the amount of conservation resources in the best cost/ risk portfolio without regard to any limits on funding of conservation programs; and 2) identify the preferred portfolio and action plan consistent with the outside party's projection of conservation acquisition.	Not applicable. See the response for 5.b above.
<b>Guideline 7: Demand Response</b>		
<b>7</b>	Plans should evaluate demand response resources, including voluntary rate programs, on par with other options for meeting energy, capacity, and transmission needs (for electric utilities) or gas supply and transportation needs (for natural gas utilities).	Avista has periodically evaluated conceptual approaches to meeting capacity constraints using demand-response and similar voluntary programs. Technology, customer characteristics and cost issues are hurdles for developing effective programs. See Chapter 3 Demand Response section for more discussion.
<b>Guideline 8: Environmental Costs</b>		
<b>8</b>	Utilities should include, in their base-case analyses, the regulatory compliance costs they expect for CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub> , and Hg emissions. Utilities should analyze the range of potential CO <sub>2</sub> regulatory costs in Order No. 93-695, from \$0 - \$40 (1990\$). In addition, utilities should perform sensitivity analysis on a range of reasonably possible cost adders for NO <sub>x</sub> , SO <sub>2</sub> , and Hg, if applicable.	Avista's current direct gas distribution system infrastructure does not result in any CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub> , or Hg emissions. Upstream gas system infrastructure (pipelines, storage facilities, and gathering systems) do produce CO <sub>2</sub> emissions via compressors used to pressurize and move gas

		throughout the system. The Environmental Externalities discussion in Appendix 3.2 describes our analysis performed. See also the guidelines addendum reflecting revised guidance for environmental costs per Order 08-339.
<b>Guideline 9: Direct Access Loads</b>		
<b>9</b>	An electric utility's load-resource balance should exclude customer loads that are effectively committed to service by an alternative electricity supplier.	Not applicable to Avista's gas utility operations.
<b>Guideline 10: Multi-state utilities</b>		
<b>10</b>	Multi-state utilities should plan their generation and transmission systems, or gas supply and delivery, on an integrated-system basis that achieves a best cost/risk portfolio for all their retail customers.	The 2014 IRP conforms to the multi-state planning approach.
<b>Guideline 11: Reliability</b>		
<b>11</b>	Electric utilities should analyze reliability within the risk modeling of the actual portfolios being considered. Loss of load probability, expected planning reserve margin, and expected and worst-case unserved energy should be determined by year for top-performing portfolios. Natural gas utilities should analyze, on an integrated basis, gas supply, transportation, and storage, along with demand-side resources, to reliably meet peak, swing, and base-load system requirements. Electric and natural gas utility plans should demonstrate that the utility's chosen portfolio achieves its stated reliability, cost and risk objectives.	Avista's storage and transport resources while planned around meeting a peak day planning standard, also provides opportunities to capture off season pricing while providing system flexibility to meet swing and base-load requirements. Diversity in our transport options enables at least dual fuel source options in event of a transport disruption. For areas with only one fuel source option the cost of duplicative infrastructure is not feasible relative to the risk of generally high reliability infrastructure.
<b>Guideline 12: Distributed Generation</b>		
<b>12</b>	Electric utilities should evaluate distributed generation technologies on par with other supply-side resources and should consider, and quantify where possible, the additional benefits of distributed generation.	Not applicable to Avista's gas utility operations.
<b>Guideline 13: Resource Acquisition</b>		
<b>13a</b>	An electric utility should: identify its proposed acquisition strategy for each resource in its action plan; Assess the advantages and disadvantages of owning a resource instead of purchasing power from another party; identify any Benchmark Resources it plans to consider in competitive bidding.	Not applicable to Avista's gas utility operations.

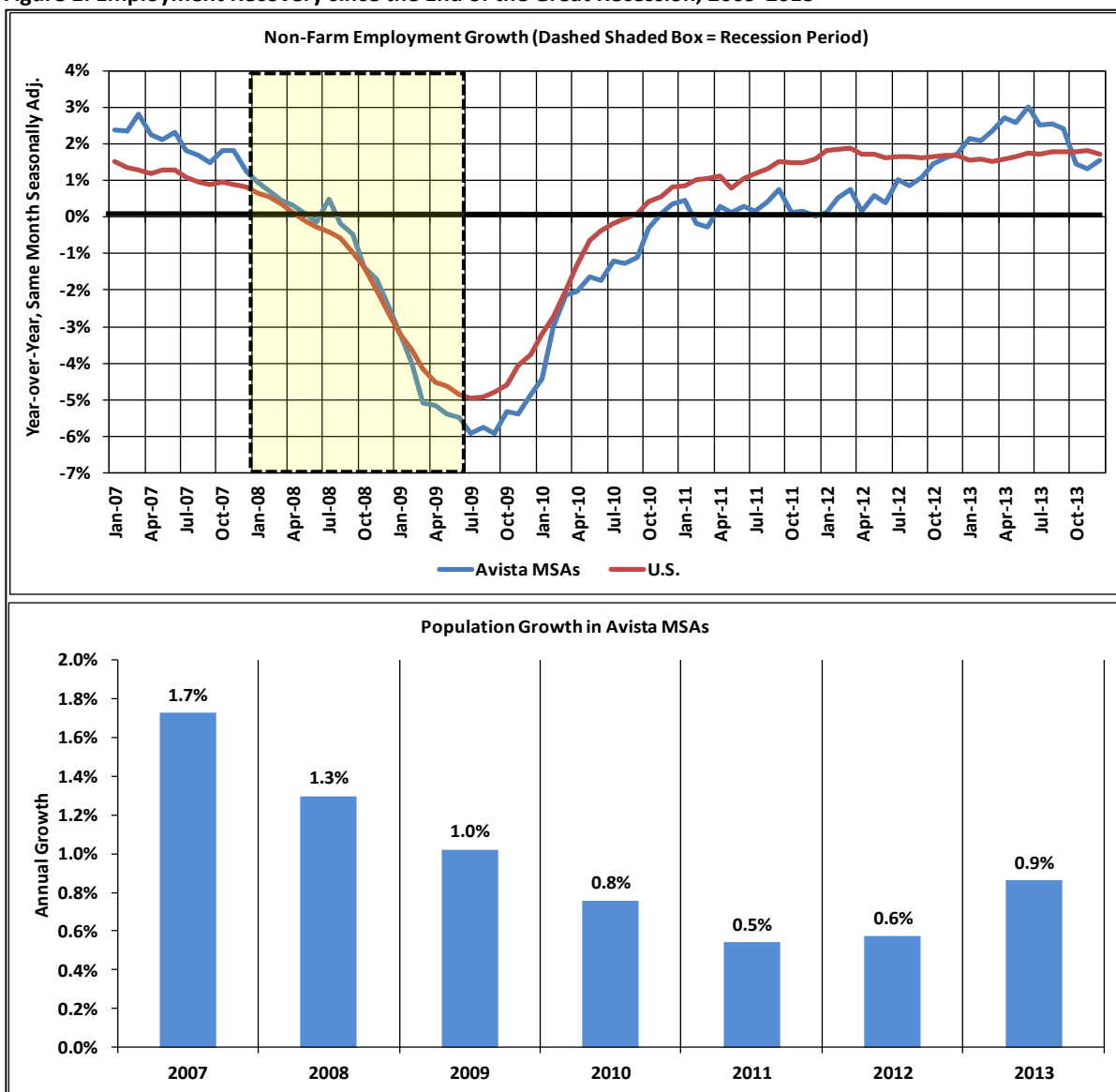
<b>13b</b>	Natural gas utilities should either describe in the IRP their bidding practices for gas supply and transportation, or provide a description of those practices following IRP acknowledgment.	A discussion of Avista's procurement practices is detailed in Chapter 4.
<b>Guideline 8: Environmental Costs</b>		
<b>a.</b>	<b>BASE CASE AND OTHER COMPLIANCE SCENARIOS:</b> The utility should construct a base-case scenario to reflect what it considers to be the most likely regulatory compliance future for carbon dioxide (CO <sub>2</sub> ), nitrogen oxides, sulfur oxides, and mercury emissions. The utility also should develop several compliance scenarios ranging from the present CO <sub>2</sub> regulatory level to the upper reaches of credible proposals by governing entities. Each compliance scenario should include a time profile of CO <sub>2</sub> compliance requirements. The utility should identify whether the basis of those requirements, or "costs", would be CO <sub>2</sub> taxes, a ban on certain types of resources, or CO <sub>2</sub> caps (with or without flexibility mechanisms such as allowance or credit trading or a safety valve). The analysis should recognize significant and important upstream emissions that would likely have a significant impact on its resource decisions. Each compliance scenario should maintain logical consistency, to the extent practicable, between the CO <sub>2</sub> regulatory requirements and other key inputs.	Avista's current direct gas distribution system infrastructure does not result in any CO <sub>2</sub> , NO <sub>x</sub> , SO <sub>2</sub> , or Hg emissions. Upstream gas system infrastructure (pipelines, storage facilities, and gathering systems) do produce CO <sub>2</sub> emissions via compressors used to pressurize and move gas throughout the system.  The Environmental Externalities discussion in Appendix 3.2 describes our process for addressing these costs.
<b>b.</b>	<b>TESTING ALTERNATIVE PORTFOLIOS AGAINST THE COMPLIANCE SCENARIOS:</b> The utility should estimate, under each of the compliance scenarios, the present value of revenue requirement (PVRR) costs and risk measures, over at least 20 years, for a set of reasonable alternative portfolios from which the preferred portfolio is selected. The utility should incorporate end-effect considerations in the analyses to allow for comparisons of portfolios containing resources with economic or physical lives that extend beyond the planning period. The utility should also modify projected lifetimes as necessary to be consistent with the compliance scenario under analysis. In addition, the utility should include, if material, sensitivity analyses on a range of reasonably possible regulatory futures for nitrogen oxides, sulfur oxides, and mercury to further inform the preferred portfolio selection.	The Environmental Externalities discussion in Appendix 3.2 describes our process for addressing these costs.

## APPENDIX 2.1: ECONOMIC OUTLOOK AND CUSTOMER COUNT FORECAST

### I. Service Area Economic Performance and Outlook

Avista’s core service area for natural gas includes Eastern Washington, Northern Idaho, and Southwest Oregon. Smaller service islands are also located in rural South-Central Washington and Northeast Oregon. Our service area is dominated by four metropolitan statistical areas (MSAs): the Spokane-Spokane Valley, WA MSA (Spokane-Stevens counties); the Coeur d’Alene, ID MSA (Kootenai County); the Lewiston-Clarkson ID-WA, MSA (Nez Perce-Asotin counties); and the Medford, OR MSA (Jackson County). These four MSAs represent the primary demand for Avista’s natural gas and account for 75% of both customers (i.e., meters) and load. The remaining 25% of customers and load are spread over low density rural areas in all three states.

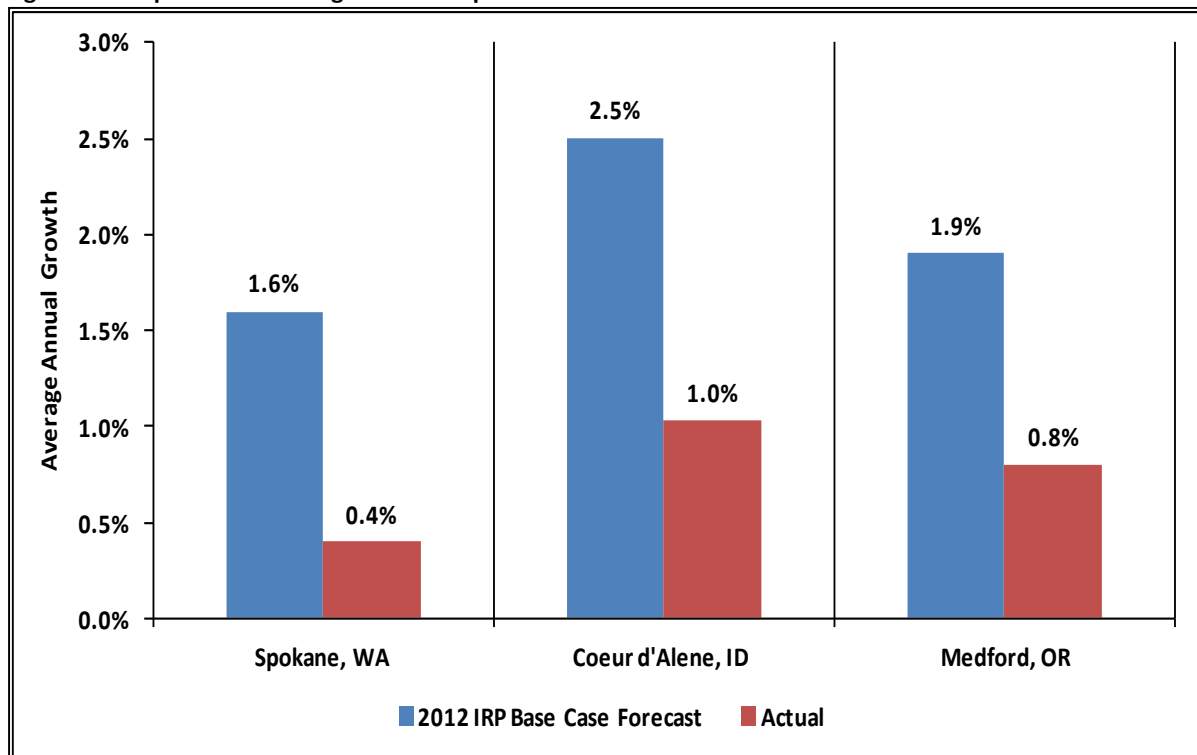
Figure 1: Employment Recovery since the End of the Great Recession, 2009-2013



Data source: Employment from the BLS; population from the U.S. Census.

Compared to the U.S. as a whole, our service area has been slow to recover from the Great Recession. Although the U.S. recession officially ended in June 2009 (dated by the National Bureau of Economic Research), our service area did not start a significant employment recovery until the second half of 2012 (Figure 1, top graph). As a result, service area population growth, which is significantly influenced by in-migration through employment opportunities, remains much lower than pre-recession levels (Figure 1, bottom graph) and has recovered at a much slower rate than anticipated in the 2012 IRP (Figure 2). In 2011, Avista's MSA population growth fell to around 0.5%, the lowest since the late 1980s. Since population growth is a long-run proxy for residential and commercial customer growth, this IRP shows a significant downward revision in total forecasted customers in WA-ID and OR compared to the 2012 IRP (Figure 3). Industrial customer growth, which is not significantly correlated with population growth, has been close to zero since the end of Great Recession. Over the same time period, our rural service areas have seen very little growth in total customers.

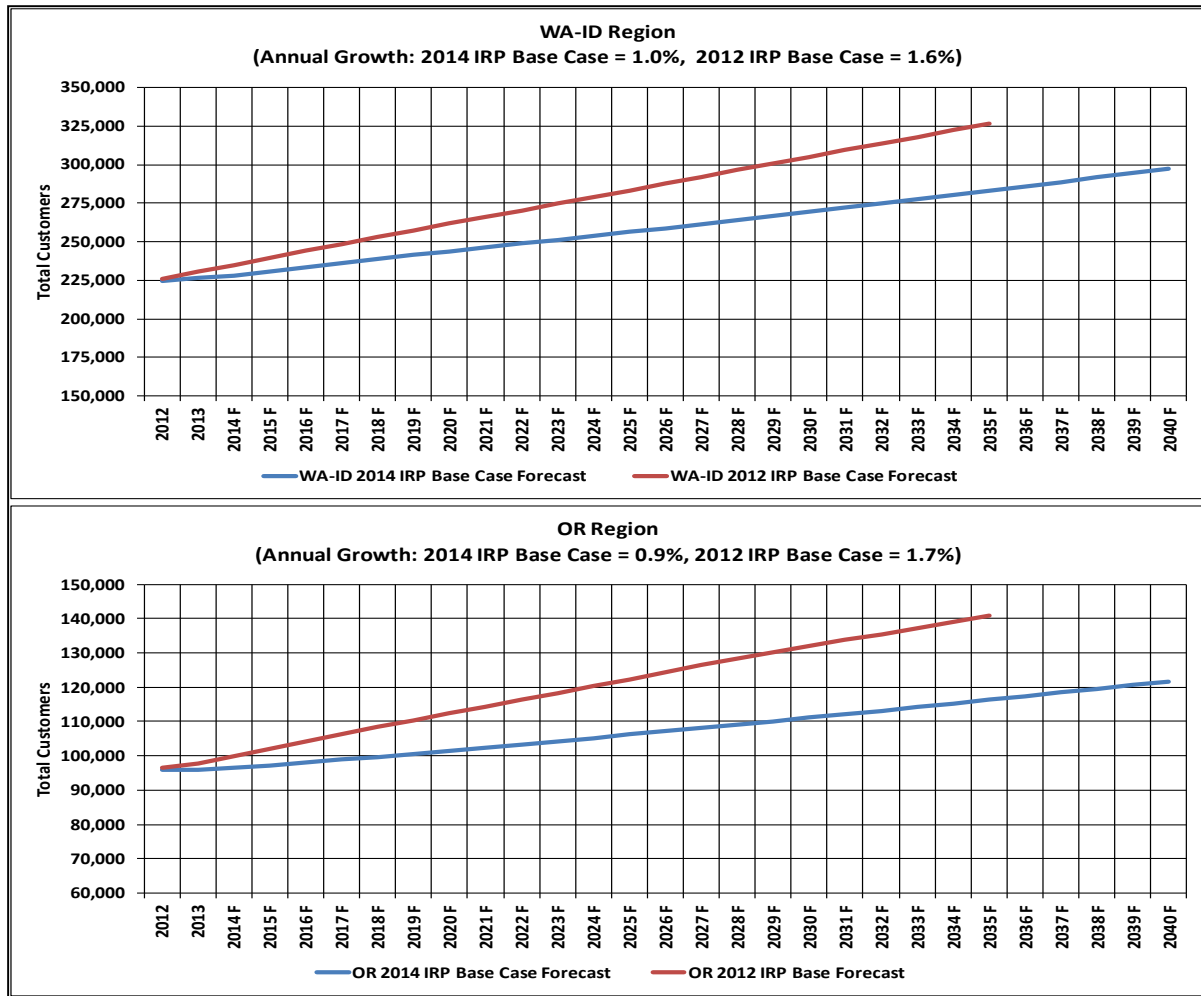
**Figure 2: Comparison of Average Annual Population Growth from 2011 to 2012**



Data source: Actual population growth calculated U.S. Census data.

In large part, the downward revision in this IRP reflects an assumed lower long-run GDP growth in the U.S., which filters down to our service area as lower employment growth relative to the U.S. In turn, this translates into lower population growth due to slower in-migration. The current assumption for long-run GDP growth is 2.5%, significantly lower than the 3% assumption in the 2012 IRP. Based on demographic and productivity trends, the 2.5% growth assumption is consistent with a growing consensus that long-run GDP growth will be in the 2.2-2.7% range. For example, the Energy Information Administration's (EIA) 2014 Annual Energy Outlook forecast assumes a 2.4% annual average growth rate out to 2040. Finally, since GDP is both a measure of output and income, the lower GDP growth assumption also implies slower industrial production growth and household income growth compared to the 2012 IRP.

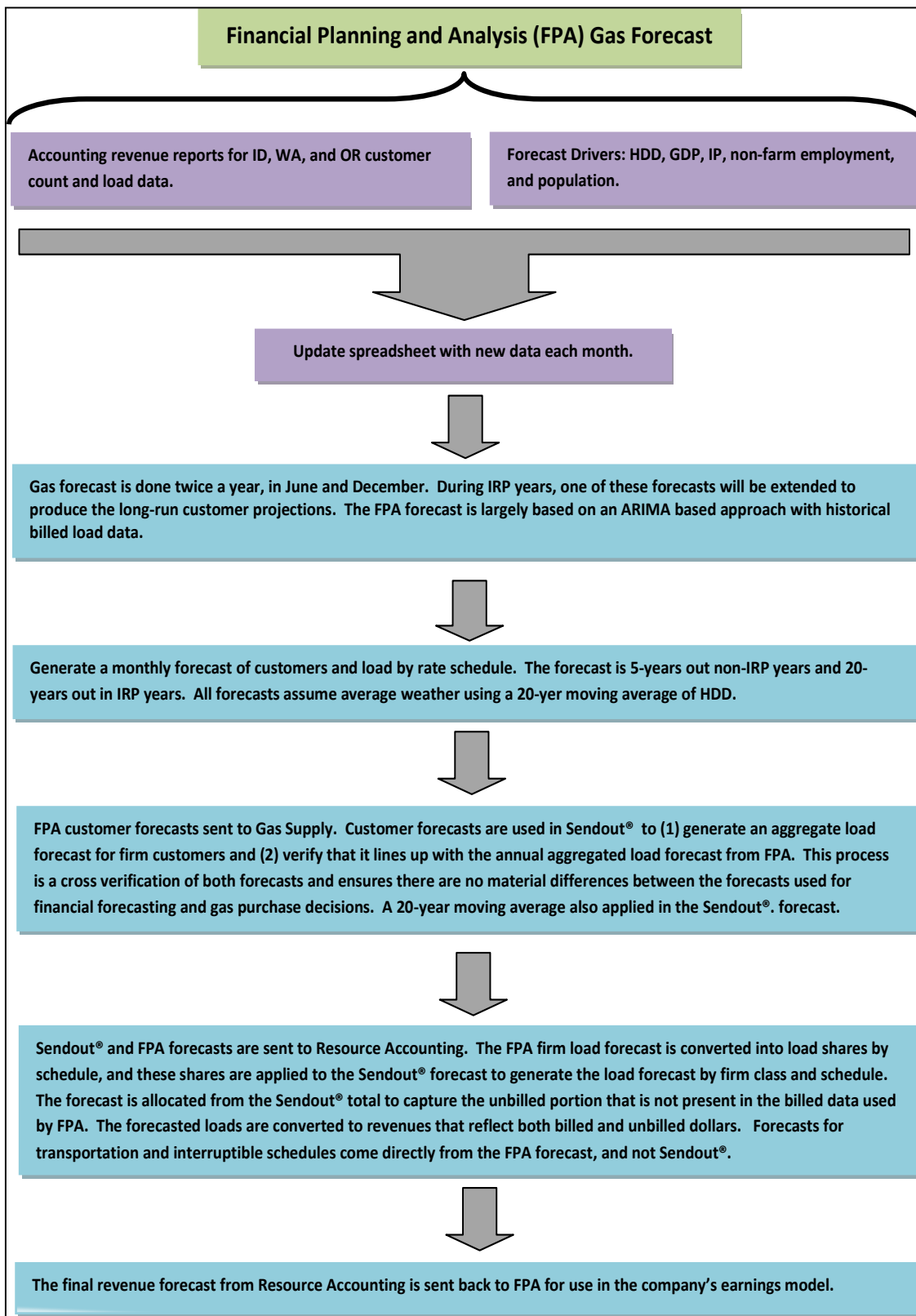
Figure 3: Comparison of Forecasted Customer Growth WA-ID and OR, 2014-2040



**II. Forecast Process and Methodology**

Figure 4 summarizes the forecast process for natural gas. In non-IRP periods, the forecast from Financial Planning and Analysis (FPA) is generated by schedule for each class (residential, commercial, and industrial) out five years. For schedules with the most load and customers, forecasts are generated from regression models that are either pure ARIMA models or ARIMA transfer function models. Pure ARIMA models use only past values of therm use per customer (UPC) or customers to forecast future UPC or customers. ARIMA transfer function models are based on weather, non-weather seasonal factors, long-run time trends, economic drivers, and ARIMA error correction terms. These are standard time-series models that are estimated using SAS/ETS software. The FPA customer forecasts are used as input into Sendout® to generate the IRP load forecasts for gas purchase decisions. Sendout® forecasts are compared against FRP forecasts to ensure that there are no significant deviations between the two forecasts. Over five year forecast horizon, the deviations are not typically material on an aggregate annual basis.

Figure 4: Avista's Forecast Process for Natural Gas



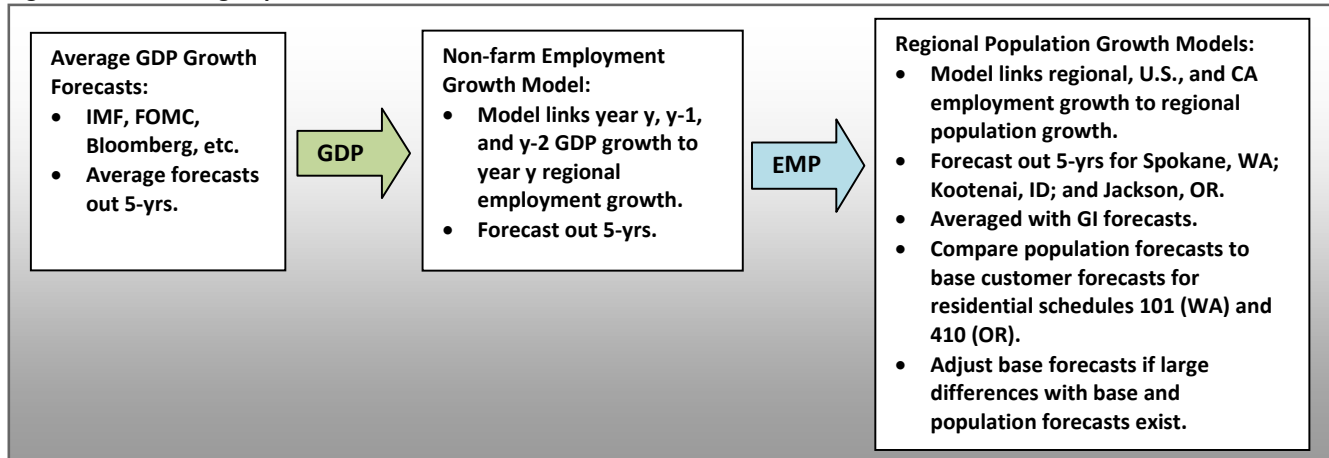


**Economic Drivers in Five Year Customer Forecasts**

Population growth is the key driver for the residential customer forecast. Because of the high historic correlation between residential and customer forecasts, population is also an indirect driver in forecast for commercial customers. As will be discussed below, the implicit assumption is that commercial customer growth tends to follow along with residential growth.

Population growth forecast is one of the key drivers behind the customer forecast for residential schedules 101 in WA-ID and 410 in OR. These two schedules represent the majority of customers and, therefore, drive overall residential customer growth. Because of their size and growth potential, a multi-step forecasting process has been developed for the Spokane-Spokane Valley-Coeur d’Alene combined MSAs and the Medford MSA. Figure 5 describes the forecasting process for population growth for these MSAs.

**Figure 5: Forecasting Population Growth**



The forecasting models for regional employment growth are:

$$[1] GEMP_{y,SPK+KOOT} = \vartheta_0 + \vartheta_1GGDP_{y,US} + \vartheta_2GGDP_{y-1,US} + \vartheta_3GGDP_{y-2,US} + \omega_{SC}D_{KC,1998-2000=1} + \omega_{SC}D_{HB,2005-2007=1} + \epsilon_{t,y}$$

$$[2] GEMP_{y,JACK} = \phi_0 + \phi_1GGDP_{y,US} + \phi_2GGDP_{y-1,US} + \phi_3GGDP_{y-2,US} + \omega_{SC}D_{HB,2004-2005=1} + ARIMA\epsilon_{t,y}(1,0,0)(0,0,0)_{12}$$

SPK+KOOT is for the combined area of Spokane, WA (Spokane MSA) and Kootenai, ID (Coeur d’Alene MSA), and JACK is for Jackson County, OR (Medford MSA).  $GEMP_y$  is employment growth in year y,  $GGDP_{y,US}$  is U.S. real GDP growth in year y.  $D_{KC}$  is a dummy variable for the collapse of Kaiser Aluminum in Spokane, and  $D_{HB}$  is a dummy for the housing bubble, specific to each region. The average GDP forecasts are used in the estimated model to generate five-year employment growth forecasts. Averaging the GDP forecasts reduces the systematic errors of a single-source forecast. Discussed below, employment growth forecasts are then used to generate population growth forecasts.

The major MSA forecasting models for regional population growth are:

$$[3] GPOP_{y,SPK+KOOT} = \kappa_0 + \kappa_1GEMP_{y-1,SPK+KOOT} + \kappa_2GEMP_{y-1,US} + \omega_{OL}D_{2001=1} + \epsilon_{t,y}$$

$$[4] GPOP_{y,JACK} = \psi_0 + \psi_1GEMP_{y-1,JACK} + \psi_2GEMP_{y-1,CA} + \omega_{OL}D_{1991=1} + \omega_{SC}D_{HB,2004-2006=1} + \epsilon_{t,y}$$

$D_{2001=1}$  and  $D_{1991=1}$  are outlier dummy variables for recession impacts.  $GEMP_{y-1,US}$  is U.S. employment growth in year y-1 and  $GEMP_{y-1,CA}$  is California Employment growth in year y-1. Because of its close proximity to CA, CA employment growth is better predictor of Medford’s population growth than U.S. growth.

Forecasts generated from [3] and [4] are combined with GI's population (GIPOP) forecasts for the same areas in the form of a simple average. As with the GDP forecasts, averaging with GI's population forecast reduces the systematic errors of a single-source forecast. In the case of Spokane-Kootenai, the forecasted growth rate is broken apart by to generate an individual rate for each MSA:

$$[5] F_{Avg}(POP_{y,SPK+KOOT}) = \frac{F(POP_{y,SPK+KOOT})+F(GIPOP_{y,SPK+KOOT})}{2}$$

$$[6] F_{Avg}(GPOP_{y,JACK}) = \frac{F(POP_{y,JACK})+F(GIPOP_{y,JACK})}{2}$$

Forecasts [5] and [6] are applied to base-line residential schedule 101 (WA-ID) and 410 (OR) customer forecasts generated by ARIMA models. If the base-line forecast appears are in line with the population growth forecasts from [5] and [6], then no direct adjustment is made to the base-line ARIMA forecasts. However, if the base-line ARIMA forecasts appear to be too low or too high relative to the population forecast, [5] and [6] are applied to adjust the base-line forecasts so that the final annual growth rate of forecasted customers matches the forecasted population growth rate,  $F_{Avg}(GPOP_y)$  for each major MSA.

For La Grande, OR (Union County); Klamath Falls, OR (Klamath County); and Roseburg, OR (Douglas County), GI's forecasts are used in lieu of in-house forecasts. Because of their small size, the WA service areas around Stevenson, WA (Skamania County) and Goldendale, WA (Klickitat County) are not broken out for forecasting purposes. The Lewiston-Clarkston area is aggregated into the Spokane and Kootenai customer count used for forecasting; therefore, it is not considered separately. Given its close proximity to the Medford area, this is also the case for Grants Pass, OR (Josephine County).

The residential customer forecasts, generated from the process described above, are then used as a driver in the forecasts for commercial schedule 101 (WA-ID) and schedule 420 (OR). The exception is Roseburg, OR, where there is little correlation between residential and commercial customer growth. As with residential schedules 101 and 410, commercial schedules 101 (WA) and 420 (OR) are the main drivers of overall commercial customer growth. This is a three step process. First, historical residential customers are used as an explanatory variable in an ARIMA model for forecasting commercial customers. Second, commercial ARIMA models for WA, ID, and OR are estimated from historical commercial and residential customer data. Third, five year commercial forecasts for schedules 101 or 420 are generated using the 101 or 410 residential customer forecasts in the commercial ARIMA models estimated with historical data. This method assumes this historical high correlation between residential and commercial customer growth continues in the future.

#### ***Long-Run IRP Forecasts after the Five Year Forecast Horizon***

Forecasts for IRP years are extend out from the five year forecasts by first assuming long-run values as inputs into [1] and [2]. As discussed above, the current assumption is a long-run GDP growth rate of 2.5%. This assumption generates long-run growth rate for employment growth, which is used in [3] and [4]. Finally, GI's long-range forecasts are combined with [3] and [4] to produce a base-line residential growth rate for the largest MSAs. As with the 5-year out forecast, the smaller service areas in OR rely on GI's forecasts as a proxy for residential customer growth, which currently extend to the early 2040s.

With the exception of Roseburg, OR, commercial customer growth is assumed to be equal to residential customer growth. This assumption is based on long-run relationship between residential and commercial customer growth after 2018. Figure 6 shows system wide same month, year-over-year residential and commercial customer growth (top graph) and industrial customer growth (bottom graph) for the 2007-2013 period.

**Figure 6: Year-over-Year Customer Growth for the Three Rate Classes, 2007-2013**

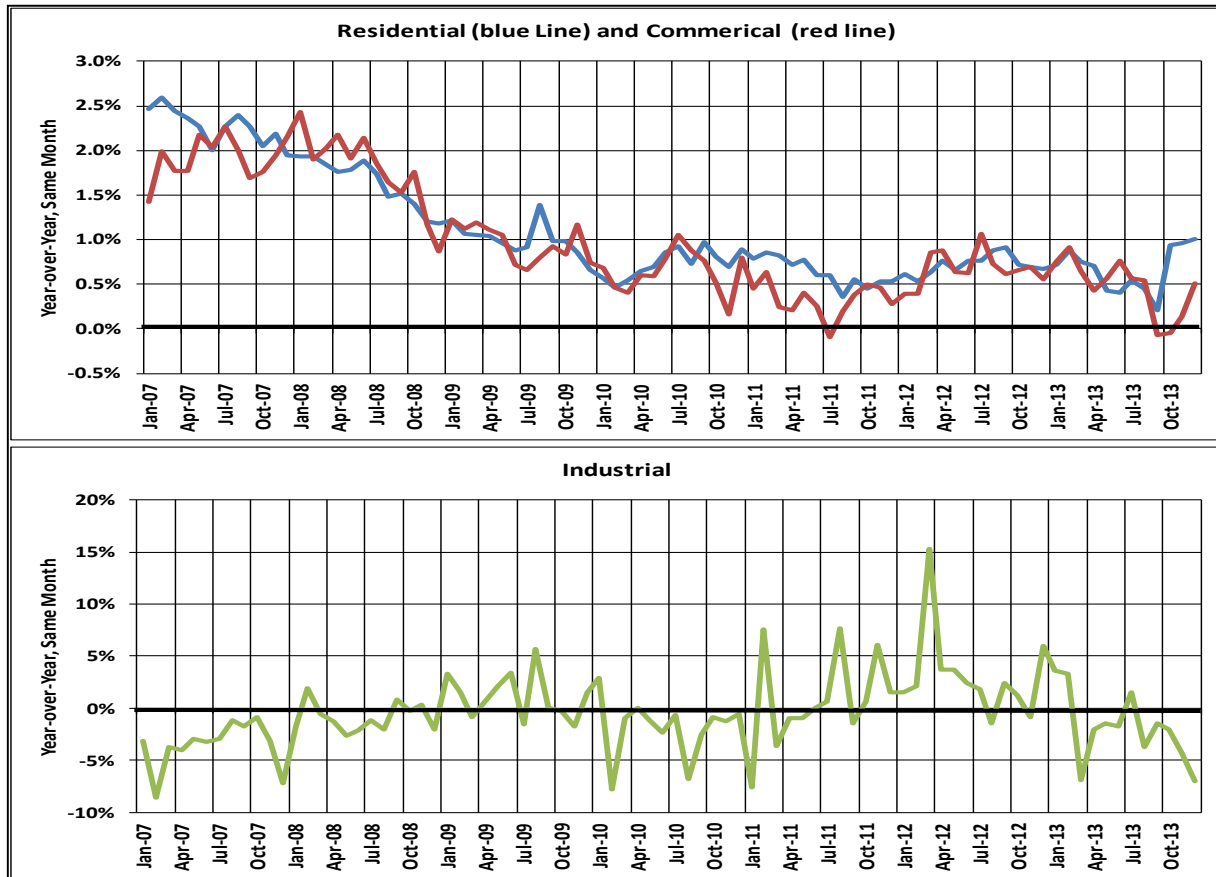


Figure 6 demonstrates that residential and commercial growth rates are highly correlated and maintain similar levels over the long-run—both classes’ growth rates averaged about 1% over this period. This growth is slightly higher than population growth because of the housing boom and existing households retrofitting with natural gas. However, by the end of 2009, with the collapse of the housing bubble and increased natural gas saturation, customer growth moved in line with population growth. For Roseburg, OR, it is assumed commercial customer growth will continue at an annual rate 0.02% after 2018, which reflects average commercial growth since 2008. In contrast, the behavior of Industrial customer growth looks quite different. Customer growth is both lower and more volatile. The average growth rate over this period is -0.4%, reflecting a trend of nearly flat or slowly declining customers, depending on the service area region. In addition, the standard deviation of growth is 3.7% compared to 0.6% for both residential and commercial growth—over five times higher. The current IRP forecast reflects this historical trend of weak growth. Some energy industry analysts believe the U.S.’s increased supply of natural gas and oil will attract industrial production back from overseas locations. However, in this IRP, we do not assume plentiful energy supplies in the U.S. will alter long-run trends in industrial customer growth in our service area.

#### **Establishing High-Low Cases for IRP Customer Forecast**

The customer forecasts for this IRP include high and low cases that set the expected bounds around the base-case. In the WA-ID area, the high and low cases were set by altering base case assumptions about U.S. and regional employment growth in equation [3] for the Spokane-Coeur d’Alene region. In particular, the high-case reflects more optimistic assumptions about long-run growth and the low case reflects more pessimistic assumptions. The WA-ID high case effectively assumes long-run employment growth of over 2.0% (compared to a base-case of around 1.7%), while the low-case assumes growth under 0.5%.

In the OR area, a similar approach was used for the Medford area using equation [4]. The Medford area high case also assumes long-run employment growth of over 2.0% (compared to a base-case of around 1.5%), while the low-case assumes growth under 0.5%. The range for employment growth was obtained by looking at different scenarios of U.S. GDP growth, as well as the historical distribution of employment growth rates since the early 1990s for our service area, U.S., and California. The areas of Klamath Falls, Roseburg, and La Grande were

considered separately by looking the historical distributions population growth rates since the 1980s. Since the early 1980s, annual population growth as averaged less than 1% in these three areas.

**Table F.1**

Year	Residential Customers	Commercial Customers	Industrial Customers
2013	203,503	22,712	229
2014	205,332	22,747	228
2015	207,565	22,969	227
2016	209,966	23,142	226
2017	212,602	23,344	225
2018	215,266	23,551	223
2019	217,419	23,787	222
2020	219,593	24,025	221
2021	221,789	24,265	220
2022	224,007	24,507	219
2023	226,247	24,753	218
2024	228,509	25,000	217
2025	230,794	25,250	216
2026	233,102	25,503	215
2027	235,433	25,758	214
2028	237,787	26,015	213
2029	240,165	26,275	212
2030	242,567	26,538	211
2031	244,993	26,803	210
2032	247,443	27,071	209
2033	249,917	27,342	208
20 yr CGR 2013-2033	1.03%	0.93%	-0.47%

Table F.2

Year	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Roseburg Customers	Commercial Roseburg Customers	Industrial Roseburg Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
2013	51,102	6,522	16	13,140	2,129	3	13,999	1,652	8	6,542	897	4
2014	51,486	6,528	16	13,181	2,131	3	14,041	1,651	8	6,590	898	3
2015	51,950	6,577	16	13,256	2,133	3	14,094	1,660	8	6,626	901	3
2016	52,470	6,629	16	13,347	2,135	3	14,165	1,665	8	6,664	904	3
2017	52,996	6,684	16	13,449	2,137	3	14,249	1,673	8	6,702	906	3
2018	53,527	6,739	16	13,559	2,138	3	14,343	1,678	8	6,740	909	3
2019	54,116	6,813	16	13,662	2,139	3	14,438	1,689	8	6,767	913	3
2020	54,711	6,888	16	13,766	2,139	3	14,533	1,700	8	6,794	917	3
2021	55,313	6,963	16	13,871	2,140	3	14,629	1,712	8	6,821	920	3
2022	55,921	7,040	16	13,976	2,140	3	14,726	1,723	8	6,848	924	3
2023	56,536	7,118	16	14,082	2,141	3	14,823	1,734	8	6,876	928	3
2024	57,158	7,196	16	14,189	2,141	3	14,921	1,746	8	6,903	931	3
2025	57,787	7,275	16	14,297	2,141	3	15,019	1,757	8	6,931	935	3
2026	58,423	7,355	16	14,406	2,142	3	15,118	1,769	8	6,959	939	3
2027	59,065	7,436	16	14,515	2,142	3	15,218	1,780	8	6,986	943	3
2028	59,715	7,518	16	14,625	2,143	3	15,319	1,792	8	7,014	946	3
2029	60,372	7,600	16	14,737	2,143	3	15,420	1,804	8	7,042	950	3
2030	61,036	7,684	16	14,849	2,144	3	15,521	1,816	8	7,071	954	3
2031	61,707	7,769	16	14,961	2,144	3	15,624	1,828	8	7,099	958	3
2032	62,386	7,854	16	15,075	2,144	3	15,727	1,840	8	7,127	962	3
2033	63,072	7,940	16	15,190	2,145	3	15,831	1,852	8	7,156	965	3
20 yr CGR 2013-2033	1.06%	0.99%	-0.10%	0.73%	0.04%	0.00%	0.62%	0.57%	0.03%	0.45%	0.37%	-1.24%

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
Jan-12	201,902	22,585	231	201,902	22,585	231	201,902	22,585	231
Feb-12	201,632	22,629	232	201,632	22,629	232	201,632	22,629	232
Mar-12	201,664	22,599	259	201,664	22,599	259	201,664	22,599	259
Apr-12	201,613	22,649	230	201,613	22,649	230	201,613	22,649	230
May-12	201,428	22,589	235	201,428	22,589	235	201,428	22,589	235
Jun-12	201,187	22,579	234	201,187	22,579	234	201,187	22,579	234
Jul-12	201,420	22,615	230	201,420	22,615	230	201,420	22,615	230
Aug-12	201,615	22,573	233	201,615	22,573	233	201,615	22,573	233
Sep-12	202,443	22,568	231	202,443	22,568	231	202,443	22,568	231
Oct-12	202,130	22,584	231	202,130	22,584	231	202,130	22,584	231
Nov-12	202,592	22,645	229	202,592	22,645	229	202,592	22,645	229
Dec-12	203,155	22,711	231	203,155	22,711	231	203,155	22,711	231
Jan-13	203,490	22,779	231	203,490	22,779	231	203,490	22,779	231
Feb-13	203,527	22,834	230	203,527	22,834	230	203,527	22,834	230
Mar-13	203,401	22,768	231	203,401	22,768	231	203,401	22,768	231
Apr-13	203,331	22,739	229	203,331	22,739	229	203,331	22,739	229
May-13	203,011	22,743	230	203,011	22,743	230	203,011	22,743	230
Jun-13	202,672	22,756	229	202,672	22,756	229	202,672	22,756	229
Jul-13	203,193	22,753	228	203,193	22,753	228	203,193	22,753	228
Aug-13	203,095	22,698	227	203,095	22,698	227	203,095	22,698	227
Sep-13	203,205	22,535	228	203,205	22,535	228	203,205	22,535	228
Oct-13	203,842	22,529	226	203,842	22,529	226	203,842	22,529	226
Nov-13	204,286	22,665	229	204,286	22,665	229	204,286	22,665	229
Dec-13	204,989	22,740	229	204,989	22,740	229	204,989	22,740	229
Jan-14	205,228	22,772	229	206,542	23,121	234	204,507	22,893	228
Feb-14	205,168	22,760	229	206,580	23,177	233	204,545	22,948	227
Mar-14	205,104	22,713	229	206,452	23,110	234	204,418	22,882	228
Apr-14	204,985	22,741	229	206,381	23,080	232	204,348	22,853	226
May-14	204,850	22,701	228	206,056	23,084	233	204,026	22,857	227
Jun-14	204,605	22,730	228	205,712	23,097	232	203,685	22,870	226
Jul-14	204,672	22,694	228	206,241	23,094	231	204,209	22,867	225
Aug-14	204,908	22,711	228	206,141	23,038	230	204,110	22,811	224
Sep-14	205,340	22,736	228	206,253	22,873	231	204,221	22,648	225
Oct-14	205,703	22,733	228	206,900	22,867	229	204,861	22,642	223
Nov-14	206,342	22,791	228	207,350	23,005	232	205,307	22,779	226
Dec-14	207,078	22,880	228	208,064	23,082	232	206,014	22,854	226
Jan-15	207,418	22,919	228	209,640	23,467	237	205,530	23,007	225
Feb-15	207,380	22,982	228	209,679	23,524	236	205,567	23,063	224
Mar-15	207,335	22,956	228	209,549	23,456	237	205,440	22,996	225
Apr-15	207,208	22,960	228	209,477	23,426	235	205,369	22,967	223
May-15	206,938	22,936	228	209,147	23,430	236	205,046	22,971	224
Jun-15	206,781	22,952	227	208,798	23,444	235	204,704	22,984	223
Jul-15	206,897	22,943	227	209,335	23,441	234	205,230	22,981	222
Aug-15	207,184	22,952	227	209,234	23,384	233	205,131	22,926	221

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
Sep-15	207,592	22,953	227	209,347	23,216	234	205,242	22,761	222
Oct-15	207,971	22,967	227	210,003	23,210	232	205,886	22,755	220
Nov-15	208,668	23,014	227	210,461	23,351	235	206,334	22,893	223
Dec-15	209,404	23,092	227	211,185	23,428	235	207,044	22,968	223
Jan-16	209,744	23,125	227	212,785	23,820	240	206,558	23,122	222
Feb-16	209,711	23,158	227	212,824	23,877	239	206,595	23,178	221
Mar-16	209,668	23,132	227	212,692	23,808	240	206,467	23,111	222
Apr-16	209,567	23,142	226	212,619	23,778	238	206,396	23,082	220
May-16	209,333	23,116	226	212,284	23,782	239	206,071	23,086	221
Jun-16	209,202	23,121	226	211,930	23,795	238	205,727	23,099	220
Jul-16	209,313	23,098	226	212,475	23,792	237	206,256	23,096	219
Aug-16	209,611	23,113	226	212,372	23,735	236	206,157	23,040	218
Sep-16	210,040	23,115	226	212,487	23,564	237	206,268	22,875	219
Oct-16	210,421	23,134	226	213,153	23,558	235	206,915	22,869	217
Nov-16	211,124	23,188	226	213,617	23,701	238	207,366	23,007	220
Dec-16	211,861	23,259	226	214,353	23,779	238	208,079	23,083	220
Jan-17	212,344	23,303	225	215,977	24,177	243	207,590	23,238	219
Feb-17	212,322	23,339	225	216,016	24,235	242	207,628	23,294	218
Mar-17	212,285	23,321	225	215,882	24,165	243	207,500	23,227	219
Apr-17	212,194	23,333	225	215,808	24,134	241	207,428	23,197	217
May-17	211,961	23,311	225	215,468	24,139	242	207,102	23,201	218
Jun-17	211,837	23,332	225	215,109	24,152	241	206,756	23,215	217
Jul-17	211,956	23,307	225	215,662	24,149	240	207,287	23,211	216
Aug-17	212,258	23,322	225	215,558	24,091	239	207,187	23,155	215
Sep-17	212,692	23,331	225	215,674	23,918	240	207,300	22,989	216
Oct-17	213,075	23,341	224	216,350	23,911	238	207,950	22,983	214
Nov-17	213,781	23,402	224	216,822	24,056	241	208,402	23,122	217
Dec-17	214,524	23,479	224	217,568	24,136	241	209,120	23,199	217
Jan-18	214,990	23,515	224	219,217	24,539	246	208,628	23,354	216
Feb-18	214,974	23,556	224	219,256	24,599	245	208,666	23,411	215
Mar-18	214,939	23,529	224	219,121	24,528	246	208,537	23,343	216
Apr-18	214,853	23,543	224	219,045	24,496	244	208,465	23,313	214
May-18	214,621	23,524	224	218,701	24,501	245	208,137	23,317	215
Jun-18	214,500	23,537	223	218,335	24,515	244	207,790	23,331	214
Jul-18	214,622	23,518	223	218,897	24,511	243	208,324	23,328	213
Aug-18	214,925	23,525	223	218,791	24,452	242	208,223	23,271	212
Sep-18	215,362	23,532	223	218,909	24,277	243	208,336	23,104	213
Oct-18	215,748	23,549	223	219,596	24,270	241	208,989	23,098	211
Nov-18	216,456	23,602	223	220,074	24,417	244	209,444	23,238	214
Dec-18	217,203	23,680	223	220,831	24,498	244	210,165	23,315	214
Jan-19	217,140	23,750	223	222,505	24,908	249	209,672	23,471	213
Feb-19	217,123	23,792	223	222,545	24,968	248	209,710	23,528	212
Mar-19	217,088	23,765	223	222,407	24,896	249	209,580	23,460	213
Apr-19	217,001	23,779	223	222,331	24,864	247	209,508	23,430	211

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
May-19	216,768	23,760	223	221,981	24,868	248	209,178	23,434	212
Jun-19	216,645	23,773	222	221,610	24,882	247	208,829	23,447	211
Jul-19	216,768	23,754	222	222,180	24,879	246	209,365	23,444	210
Aug-19	217,074	23,761	222	222,073	24,819	245	209,265	23,388	209
Sep-19	217,515	23,768	222	222,193	24,641	246	209,378	23,220	210
Oct-19	217,905	23,785	222	222,890	24,634	244	210,034	23,213	208
Nov-19	218,620	23,838	222	223,375	24,783	247	210,492	23,354	211
Dec-19	219,375	23,917	222	224,144	24,865	247	211,216	23,431	211
Jan-20	219,311	23,988	222	225,842	25,281	252	210,720	23,588	210
Feb-20	219,295	24,030	222	225,883	25,342	251	210,758	23,645	209
Mar-20	219,259	24,002	222	225,744	25,269	252	210,628	23,577	210
Apr-20	219,171	24,017	222	225,666	25,237	250	210,555	23,547	208
May-20	218,935	23,997	222	225,311	25,241	251	210,224	23,551	209
Jun-20	218,811	24,010	221	224,934	25,256	250	209,873	23,565	208
Jul-20	218,936	23,991	221	225,513	25,252	249	210,412	23,561	207
Aug-20	219,245	23,998	221	225,404	25,191	248	210,311	23,504	206
Sep-20	219,691	24,005	221	225,526	25,010	249	210,425	23,336	207
Oct-20	220,084	24,023	221	226,233	25,004	247	211,084	23,329	205
Nov-20	220,806	24,077	221	226,726	25,155	250	211,544	23,471	208
Dec-20	221,568	24,156	221	227,506	25,238	250	212,272	23,548	208
Jan-21	221,504	24,228	221	229,230	25,660	255	211,773	23,706	207
Feb-21	221,488	24,270	221	229,272	25,722	254	211,812	23,764	206
Mar-21	221,452	24,242	221	229,130	25,648	255	211,681	23,695	207
Apr-21	221,363	24,257	221	229,051	25,615	253	211,608	23,665	205
May-21	221,125	24,237	221	228,690	25,620	254	211,275	23,669	206
Jun-21	220,999	24,251	220	228,309	25,634	253	210,922	23,682	205
Jul-21	221,125	24,231	220	228,895	25,631	252	211,464	23,679	204
Aug-21	221,437	24,238	220	228,785	25,569	251	211,362	23,622	203
Sep-21	221,887	24,245	220	228,909	25,386	252	211,477	23,452	204
Oct-21	222,285	24,263	220	229,627	25,379	250	212,140	23,446	202
Nov-21	223,014	24,318	220	230,127	25,532	253	212,602	23,588	205
Dec-21	223,784	24,398	220	230,919	25,617	253	213,334	23,666	205
Jan-22	223,719	24,470	220	232,668	26,045	258	212,832	23,825	204
Feb-22	223,703	24,513	220	232,711	26,108	257	212,871	23,882	203
Mar-22	223,666	24,485	220	232,567	26,033	258	212,739	23,813	204
Apr-22	223,577	24,499	220	232,487	26,000	256	212,666	23,783	202
May-22	223,336	24,480	220	232,121	26,004	257	212,331	23,787	203
Jun-22	223,209	24,493	219	231,733	26,019	256	211,977	23,801	202
Jul-22	223,336	24,473	219	232,329	26,016	255	212,522	23,798	201
Aug-22	223,652	24,481	219	232,217	25,953	254	212,419	23,740	200
Sep-22	224,106	24,488	219	232,343	25,766	255	212,534	23,570	201
Oct-22	224,508	24,506	219	233,071	25,759	253	213,201	23,563	199
Nov-22	225,244	24,561	219	233,579	25,915	256	213,665	23,706	202
Dec-22	226,022	24,642	219	234,382	26,001	256	214,400	23,784	202



## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
Jan-23	225,956	24,715	219	236,158	26,436	261	213,897	23,944	201
Feb-23	225,940	24,758	219	236,201	26,500	260	213,935	24,002	200
Mar-23	225,903	24,730	219	236,055	26,423	261	213,803	23,932	201
Apr-23	225,812	24,744	219	235,974	26,390	259	213,729	23,902	199
May-23	225,569	24,724	219	235,603	26,394	260	213,393	23,906	200
Jun-23	225,441	24,738	218	235,209	26,409	259	213,037	23,920	199
Jul-23	225,570	24,718	218	235,814	26,406	258	213,584	23,917	198
Aug-23	225,888	24,725	218	235,700	26,342	257	213,481	23,859	197
Sep-23	226,347	24,733	218	235,828	26,153	258	213,597	23,687	198
Oct-23	226,753	24,751	218	236,567	26,146	256	214,267	23,681	196
Nov-23	227,497	24,806	218	237,082	26,304	259	214,733	23,825	199
Dec-23	228,282	24,888	218	237,898	26,391	259	215,472	23,903	199
Jan-24	228,216	24,962	218	239,701	26,832	264	214,966	24,064	198
Feb-24	228,199	25,006	218	239,744	26,897	263	215,005	24,122	197
Mar-24	228,162	24,977	218	239,596	26,820	264	214,872	24,052	198
Apr-24	228,071	24,992	218	239,514	26,785	262	214,798	24,021	196
May-24	227,825	24,972	218	239,137	26,790	263	214,460	24,026	197
Jun-24	227,696	24,985	217	238,737	26,805	262	214,102	24,039	196
Jul-24	227,825	24,965	217	239,351	26,802	261	214,652	24,036	195
Aug-24	228,147	24,973	217	239,236	26,737	260	214,549	23,978	194
Sep-24	228,611	24,980	217	239,365	26,545	261	214,665	23,806	195
Oct-24	229,021	24,998	217	240,115	26,538	259	215,338	23,800	193
Nov-24	229,772	25,054	217	240,638	26,699	262	215,807	23,944	196
Dec-24	230,565	25,137	217	241,467	26,787	262	216,550	24,023	196
Jan-25	230,498	25,212	217	243,296	27,235	267	216,041	24,184	195
Feb-25	230,481	25,256	217	243,341	27,301	266	216,080	24,242	194
Mar-25	230,443	25,227	217	243,190	27,222	267	215,946	24,172	195
Apr-25	230,351	25,242	217	243,106	27,187	265	215,872	24,141	193
May-25	230,103	25,221	217	242,724	27,192	266	215,532	24,146	194
Jun-25	229,973	25,235	216	242,318	27,207	265	215,172	24,160	193
Jul-25	230,104	25,215	216	242,941	27,204	264	215,725	24,156	192
Aug-25	230,429	25,222	216	242,824	27,138	263	215,621	24,098	191
Sep-25	230,897	25,230	216	242,956	26,943	264	215,738	23,925	192
Oct-25	231,311	25,248	216	243,717	26,936	262	216,415	23,919	190
Nov-25	232,070	25,305	216	244,248	27,099	265	216,886	24,063	193
Dec-25	232,871	25,389	216	245,089	27,189	265	217,632	24,143	193
Jan-26	232,803	25,464	216	246,946	27,644	270	217,121	24,305	192
Feb-26	232,786	25,508	216	246,991	27,710	269	217,161	24,364	191
Mar-26	232,748	25,479	216	246,838	27,630	270	217,026	24,293	192
Apr-26	232,655	25,494	216	246,753	27,595	268	216,951	24,262	190
May-26	232,404	25,473	216	246,364	27,600	269	216,610	24,266	191
Jun-26	232,273	25,488	215	245,953	27,616	268	216,248	24,280	190
Jul-26	232,405	25,467	215	246,585	27,612	267	216,804	24,277	189
Aug-26	232,733	25,475	215	246,466	27,545	266	216,700	24,218	188

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
Sep-26	233,206	25,482	215	246,600	27,347	267	216,817	24,045	189
Oct-26	233,624	25,501	215	247,373	27,340	265	217,497	24,038	187
Nov-26	234,390	25,558	215	247,912	27,506	268	217,970	24,184	190
Dec-26	235,199	25,642	215	248,765	27,597	268	218,720	24,264	190
Jan-27	235,131	25,718	215	250,650	28,058	273	218,207	24,426	189
Feb-27	235,114	25,763	215	250,696	28,126	272	218,246	24,485	188
Mar-27	235,075	25,734	215	250,540	28,045	273	218,111	24,415	189
Apr-27	234,981	25,749	215	250,454	28,009	271	218,036	24,384	187
May-27	234,728	25,728	215	250,060	28,014	272	217,693	24,388	188
Jun-27	234,595	25,742	214	249,642	28,030	271	217,329	24,402	187
Jul-27	234,729	25,722	214	250,284	28,026	270	217,888	24,399	186
Aug-27	235,060	25,729	214	250,163	27,958	269	217,783	24,340	185
Sep-27	235,538	25,737	214	250,299	27,758	270	217,901	24,165	186
Oct-27	235,960	25,756	214	251,084	27,750	268	218,584	24,158	184
Nov-27	236,734	25,814	214	251,630	27,918	271	219,060	24,305	187
Dec-27	237,551	25,899	214	252,496	28,011	271	219,814	24,385	187
Jan-28	237,482	25,976	214	254,410	28,479	276	219,298	24,549	186
Feb-28	237,465	26,021	214	254,456	28,548	275	219,338	24,608	185
Mar-28	237,426	25,991	214	254,298	28,465	276	219,202	24,537	186
Apr-28	237,331	26,006	214	254,211	28,429	274	219,126	24,505	184
May-28	237,076	25,985	214	253,811	28,434	275	218,781	24,510	185
Jun-28	236,941	26,000	213	253,387	28,450	274	218,416	24,524	184
Jul-28	237,076	25,979	213	254,038	28,447	273	218,978	24,521	183
Aug-28	237,411	25,987	213	253,916	28,378	272	218,872	24,461	182
Sep-28	237,893	25,994	213	254,053	28,174	273	218,991	24,286	183
Oct-28	238,320	26,013	213	254,850	28,166	271	219,677	24,279	181
Nov-28	239,102	26,072	213	255,405	28,337	274	220,155	24,426	184
Dec-28	239,927	26,158	213	256,284	28,431	274	220,913	24,507	184
Jan-29	239,857	26,235	213	258,226	28,906	279	220,394	24,671	183
Feb-29	239,839	26,281	213	258,273	28,976	278	220,434	24,731	182
Mar-29	239,800	26,251	213	258,113	28,892	279	220,298	24,659	183
Apr-29	239,704	26,267	213	258,024	28,855	277	220,222	24,628	181
May-29	239,446	26,245	213	257,618	28,861	278	219,875	24,632	182
Jun-29	239,311	26,260	212	257,188	28,877	277	219,508	24,646	181
Jul-29	239,447	26,239	212	257,849	28,873	276	220,072	24,643	180
Aug-29	239,785	26,246	212	257,725	28,803	275	219,966	24,584	179
Sep-29	240,272	26,254	212	257,864	28,597	276	220,085	24,407	180
Oct-29	240,703	26,273	212	258,673	28,589	274	220,775	24,401	178
Nov-29	241,493	26,332	212	259,236	28,762	277	221,256	24,548	181
Dec-29	242,326	26,419	212	260,128	28,857	277	222,018	24,629	181
Jan-30	242,256	26,498	212	262,099	29,340	282	221,496	24,795	180
Feb-30	242,238	26,544	212	262,147	29,411	281	221,536	24,855	179
Mar-30	242,198	26,513	212	261,985	29,326	282	221,399	24,783	180
Apr-30	242,101	26,529	212	261,894	29,288	280	221,323	24,751	178

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION WASHINGTON AND IDAHO

	Washington and Idaho - Expected Growth			Washington and Idaho - High Growth			Washington and Idaho - Low Growth		
	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers	Residential Customers	Commercial Customers	Industrial Customers
May-30	241,841	26,508	212	261,482	29,293	281	220,975	24,755	179
Jun-30	241,704	26,522	211	261,046	29,310	280	220,606	24,770	178
Jul-30	241,841	26,501	211	261,717	29,306	279	221,173	24,766	177
Aug-30	242,183	26,509	211	261,590	29,235	278	221,066	24,706	176
Sep-30	242,675	26,517	211	261,732	29,026	279	221,186	24,529	177
Oct-30	243,110	26,536	211	262,553	29,018	277	221,879	24,523	175
Nov-30	243,907	26,596	211	263,124	29,194	280	222,363	24,671	178
Dec-30	244,749	26,684	211	264,030	29,290	280	223,128	24,753	178
Jan-31	244,678	26,763	211	266,031	29,780	285	222,604	24,919	177
Feb-31	244,660	26,809	211	266,079	29,852	284	222,644	24,979	176
Mar-31	244,620	26,779	211	265,914	29,766	285	222,506	24,907	177
Apr-31	244,522	26,795	211	265,823	29,728	283	222,430	24,875	175
May-31	244,259	26,773	211	265,405	29,733	284	222,080	24,879	176
Jun-31	244,121	26,788	210	264,961	29,750	283	221,709	24,893	175
Jul-31	244,260	26,766	210	265,642	29,746	282	222,279	24,890	174
Aug-31	244,605	26,774	210	265,514	29,674	281	222,171	24,830	173
Sep-31	245,102	26,782	210	265,658	29,461	282	222,292	24,652	174
Oct-31	245,541	26,801	210	266,491	29,453	280	222,989	24,645	172
Nov-31	246,347	26,862	210	267,071	29,631	283	223,474	24,794	175
Dec-31	247,197	26,950	210	267,990	29,729	283	224,243	24,876	175
Jan-32	247,125	27,030	210	270,021	30,227	288	223,717	25,043	174
Feb-32	247,107	27,077	210	270,070	30,300	287	223,757	25,104	173
Mar-32	247,067	27,046	210	269,903	30,212	288	223,619	25,031	174
Apr-32	246,968	27,062	210	269,810	30,174	286	223,542	24,999	172
May-32	246,702	27,041	210	269,386	30,179	287	223,190	25,004	173
Jun-32	246,562	27,056	209	268,936	30,196	286	222,817	25,018	172
Jul-32	246,702	27,034	209	269,627	30,192	285	223,390	25,015	171
Aug-32	247,051	27,042	209	269,497	30,119	284	223,282	24,954	170
Sep-32	247,553	27,050	209	269,643	29,903	285	223,403	24,775	171
Oct-32	247,997	27,069	209	270,488	29,895	283	224,104	24,768	169
Nov-32	248,810	27,130	209	271,077	30,076	286	224,592	24,918	172
Dec-32	249,669	27,220	209	272,010	30,175	286	225,365	25,001	172
Jan-33	249,596	27,301	209	274,072	30,680	291	224,835	25,168	171
Feb-33	249,578	27,348	209	274,121	30,754	290	224,876	25,229	170
Mar-33	249,537	27,317	209	273,952	30,665	291	224,737	25,156	171
Apr-33	249,437	27,333	209	273,857	30,626	289	224,660	25,124	169
May-33	249,169	27,311	209	273,426	30,632	290	224,306	25,129	170
Jun-33	249,028	27,326	208	272,970	30,649	289	223,931	25,143	169
Jul-33	249,169	27,304	208	273,672	30,645	288	224,507	25,140	168
Aug-33	249,521	27,312	208	273,540	30,571	287	224,399	25,079	167
Sep-33	250,028	27,320	208	273,688	30,351	288	224,520	24,899	168
Oct-33	250,477	27,340	208	274,546	30,343	286	225,224	24,892	166
Nov-33	251,298	27,402	208	275,144	30,527	289	225,715	25,043	169
Dec-33	252,166	27,492	208	276,090	30,628	289	226,491	25,126	169

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	Jan-12	51,331	6,513	18	51,331	6,513	18	51,331	6,513
Feb-12	51,255	6,532	18	51,255	6,532	18	51,255	6,532	18
Mar-12	51,317	6,549	18	51,317	6,549	18	51,317	6,549	18
Apr-12	51,292	6,508	18	51,292	6,508	18	51,292	6,508	18
May-12	51,111	6,499	18	51,111	6,499	18	51,111	6,499	18
Jun-12	51,028	6,475	18	51,028	6,475	18	51,028	6,475	18
Jul-12	50,836	6,463	18	50,836	6,463	18	50,836	6,463	18
Aug-12	50,727	6,445	17	50,727	6,445	17	50,727	6,445	17
Sep-12	50,650	6,447	16	50,650	6,447	16	50,650	6,447	16
Oct-12	50,690	6,462	18	50,690	6,462	18	50,690	6,462	18
Nov-12	51,079	6,502	17	51,079	6,502	17	51,079	6,502	17
Dec-12	51,500	6,534	17	51,500	6,534	17	51,500	6,534	17
Jan-13	51,740	6,559	17	51,740	6,559	17	51,740	6,559	17
Feb-13	51,700	6,589	17	51,700	6,589	17	51,700	6,589	17
Mar-13	51,645	6,582	17	51,645	6,582	17	51,645	6,582	17
Apr-13	51,602	6,565	17	51,602	6,565	17	51,602	6,565	17
May-13	50,798	6,517	16	50,798	6,517	16	50,798	6,517	16
Jun-13	50,658	6,524	16	50,658	6,524	16	50,658	6,524	16
Jul-13	50,499	6,493	16	50,499	6,493	16	50,499	6,493	16
Aug-13	50,451	6,479	16	50,451	6,479	16	50,451	6,479	16
Sep-13	50,413	6,448	16	50,413	6,448	16	50,413	6,448	16
Oct-13	51,350	6,487	16	51,350	6,487	16	51,350	6,487	16
Nov-13	51,025	6,488	16	51,025	6,488	16	51,025	6,488	16
Dec-13	51,339	6,532	16	51,339	6,532	16	51,339	6,532	16
Jan-14	51,845	6,589	16	52,594	6,667	17	52,025	6,595	16
Feb-14	51,794	6,593	16	52,553	6,698	17	51,984	6,625	16
Mar-14	51,751	6,579	16	52,497	6,691	17	51,929	6,618	16
Apr-14	51,713	6,556	16	52,453	6,673	17	51,886	6,601	16
May-14	51,491	6,536	16	51,636	6,625	17	51,077	6,553	16
Jun-14	51,333	6,518	16	51,494	6,632	17	50,937	6,560	16
Jul-14	51,141	6,484	16	51,332	6,600	17	50,777	6,529	16
Aug-14	51,032	6,474	16	51,283	6,586	17	50,728	6,515	16
Sep-14	50,982	6,456	16	51,245	6,554	17	50,690	6,483	16
Oct-14	51,234	6,470	16	52,197	6,594	17	51,632	6,523	16
Nov-14	51,598	6,519	16	51,867	6,595	17	51,306	6,524	16
Dec-14	51,914	6,562	16	52,186	6,640	17	51,621	6,568	16
Jan-15	52,311	6,610	16	53,462	6,777	17	52,311	6,631	16
Feb-15	52,260	6,625	16	53,420	6,808	17	52,270	6,662	16
Mar-15	52,217	6,616	16	53,363	6,801	17	52,215	6,655	16
Apr-15	52,178	6,598	16	53,319	6,783	17	52,171	6,637	16
May-15	51,956	6,589	16	52,488	6,734	17	51,358	6,589	16
Jun-15	51,797	6,579	16	52,344	6,741	17	51,217	6,596	16
Jul-15	51,603	6,547	16	52,179	6,709	17	51,056	6,565	16
Aug-15	51,494	6,535	16	52,130	6,695	17	51,007	6,550	16

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	Sep-15	51,443	6,514	16	52,090	6,663	17	50,969	6,519
Oct-15	51,696	6,524	16	53,059	6,703	17	51,916	6,559	16
Nov-15	52,064	6,572	16	52,723	6,704	17	51,588	6,560	16
Dec-15	52,381	6,616	16	53,047	6,749	17	51,905	6,604	16
Jan-16	52,834	6,670	16	54,344	6,889	18	52,598	6,668	15
Feb-16	52,782	6,682	16	54,302	6,921	18	52,558	6,698	15
Mar-16	52,738	6,671	16	54,244	6,913	18	52,502	6,691	15
Apr-16	52,700	6,652	16	54,199	6,895	18	52,458	6,674	15
May-16	52,476	6,640	16	53,354	6,845	18	51,641	6,625	15
Jun-16	52,317	6,628	16	53,207	6,852	18	51,498	6,632	15
Jul-16	52,122	6,595	16	53,040	6,820	18	51,337	6,601	15
Aug-16	52,011	6,584	16	52,990	6,805	18	51,288	6,586	15
Sep-16	51,961	6,564	16	52,950	6,772	18	51,249	6,555	15
Oct-16	52,215	6,575	16	53,934	6,813	18	52,202	6,595	15
Nov-16	52,585	6,624	16	53,593	6,814	18	51,872	6,596	15
Dec-16	52,904	6,668	16	53,922	6,861	18	52,191	6,640	15
Jan-17	53,361	6,722	16	55,240	7,003	18	52,888	6,704	15
Feb-17	53,310	6,735	16	55,198	7,035	18	52,847	6,735	15
Mar-17	53,266	6,725	16	55,139	7,027	18	52,791	6,728	15
Apr-17	53,227	6,706	16	55,093	7,009	18	52,747	6,711	15
May-17	53,002	6,695	16	54,235	6,958	18	51,925	6,662	15
Jun-17	52,841	6,684	16	54,085	6,965	18	51,782	6,669	15
Jul-17	52,645	6,651	16	53,915	6,932	18	51,619	6,637	15
Aug-17	52,535	6,639	16	53,864	6,917	18	51,570	6,623	15
Sep-17	52,483	6,618	16	53,824	6,884	18	51,531	6,591	15
Oct-17	52,739	6,630	16	54,824	6,926	18	52,489	6,631	15
Nov-17	53,111	6,679	16	54,477	6,927	18	52,157	6,632	15
Dec-17	53,432	6,723	16	54,812	6,974	18	52,478	6,677	15
Jan-18	53,894	6,778	16	56,152	7,118	19	53,179	6,741	14
Feb-18	53,842	6,791	16	56,108	7,151	19	53,137	6,772	14
Mar-18	53,798	6,780	16	56,049	7,143	19	53,081	6,765	14
Apr-18	53,759	6,761	16	56,002	7,125	19	53,037	6,748	14
May-18	53,532	6,749	16	55,129	7,073	19	52,210	6,698	14
Jun-18	53,372	6,738	16	54,977	7,080	19	52,067	6,705	14
Jul-18	53,175	6,705	16	54,805	7,047	19	51,903	6,674	14
Aug-18	53,062	6,693	16	54,753	7,031	19	51,854	6,659	14
Sep-18	53,012	6,673	16	54,712	6,998	19	51,815	6,627	14
Oct-18	53,268	6,684	16	55,729	7,040	19	52,778	6,667	14
Nov-18	53,643	6,734	16	55,376	7,041	19	52,444	6,668	14
Dec-18	53,966	6,778	16	55,717	7,089	19	52,766	6,714	14
Jan-19	54,487	6,853	16	57,078	7,236	19	53,471	6,778	14
Feb-19	54,435	6,866	16	57,034	7,269	19	53,430	6,809	14
Mar-19	54,390	6,855	16	56,973	7,261	19	53,373	6,802	14
Apr-19	54,350	6,835	16	56,926	7,242	19	53,328	6,785	14

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	May-19	54,121	6,823	16	56,039	7,189	19	52,498	6,735
Jun-19	53,959	6,812	16	55,885	7,197	19	52,353	6,742	14
Jul-19	53,760	6,779	16	55,709	7,163	19	52,189	6,710	14
Aug-19	53,646	6,767	16	55,656	7,147	19	52,139	6,696	14
Sep-19	53,595	6,746	16	55,614	7,113	19	52,100	6,664	14
Oct-19	53,854	6,758	16	56,648	7,156	19	53,068	6,704	14
Nov-19	54,233	6,808	16	56,289	7,157	19	52,732	6,705	14
Dec-19	54,560	6,853	16	56,636	7,206	19	53,057	6,751	14
Jan-20	55,086	6,928	16	58,020	7,355	20	53,765	6,816	13
Feb-20	55,033	6,941	16	57,975	7,389	20	53,724	6,847	13
Mar-20	54,988	6,930	16	57,914	7,381	20	53,666	6,840	13
Apr-20	54,948	6,911	16	57,865	7,362	20	53,622	6,822	13
May-20	54,716	6,898	16	56,964	7,308	20	52,786	6,772	13
Jun-20	54,552	6,887	16	56,807	7,316	20	52,641	6,779	13
Jul-20	54,351	6,853	16	56,628	7,281	20	52,476	6,747	13
Aug-20	54,236	6,841	16	56,575	7,265	20	52,426	6,733	13
Sep-20	54,185	6,821	16	56,532	7,231	20	52,386	6,700	13
Oct-20	54,447	6,832	16	57,583	7,274	20	53,360	6,741	13
Nov-20	54,829	6,883	16	57,218	7,275	20	53,022	6,742	13
Dec-20	55,160	6,928	16	57,570	7,325	20	53,348	6,788	13
Jan-21	55,692	7,004	16	58,977	7,476	20	54,061	6,853	13
Feb-21	55,639	7,018	16	58,932	7,511	20	54,019	6,885	13
Mar-21	55,593	7,006	16	58,869	7,503	20	53,962	6,877	13
Apr-21	55,553	6,987	16	58,820	7,483	20	53,917	6,859	13
May-21	55,318	6,974	16	57,904	7,429	20	53,077	6,809	13
Jun-21	55,152	6,963	16	57,744	7,437	20	52,930	6,817	13
Jul-21	54,949	6,929	16	57,563	7,401	20	52,764	6,784	13
Aug-21	54,833	6,916	16	57,508	7,385	20	52,714	6,770	13
Sep-21	54,781	6,896	16	57,465	7,350	20	52,674	6,737	13
Oct-21	55,046	6,907	16	58,533	7,394	20	53,653	6,778	13
Nov-21	55,432	6,959	16	58,162	7,396	20	53,314	6,779	13
Dec-21	55,767	7,004	16	58,520	7,446	20	53,642	6,825	13
Jan-22	56,305	7,081	16	59,951	7,600	21	54,358	6,891	12
Feb-22	56,251	7,095	16	59,904	7,635	21	54,316	6,922	12
Mar-22	56,205	7,083	16	59,840	7,626	21	54,258	6,915	12
Apr-22	56,164	7,063	16	59,791	7,607	21	54,213	6,897	12
May-22	55,927	7,051	16	58,859	7,551	21	53,369	6,847	12
Jun-22	55,759	7,039	16	58,697	7,559	21	53,221	6,854	12
Jul-22	55,553	7,005	16	58,513	7,523	21	53,054	6,822	12
Aug-22	55,436	6,992	16	58,457	7,507	21	53,004	6,807	12
Sep-22	55,383	6,971	16	58,413	7,471	21	52,964	6,774	12
Oct-22	55,651	6,983	16	59,499	7,516	21	53,948	6,815	12
Nov-22	56,042	7,035	16	59,122	7,518	21	53,607	6,816	12
Dec-22	56,380	7,081	16	59,486	7,569	21	53,937	6,863	12

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	Jan-23	56,924	7,159	16	60,940	7,725	21	54,657	6,929
Feb-23	56,870	7,173	16	60,893	7,761	21	54,615	6,960	12
Mar-23	56,823	7,161	16	60,828	7,752	21	54,557	6,953	12
Apr-23	56,781	7,141	16	60,777	7,732	21	54,511	6,935	12
May-23	56,542	7,128	16	59,830	7,676	21	53,662	6,884	12
Jun-23	56,372	7,117	16	59,665	7,684	21	53,514	6,892	12
Jul-23	56,164	7,082	16	59,478	7,647	21	53,346	6,859	12
Aug-23	56,046	7,069	16	59,421	7,631	21	53,295	6,844	12
Sep-23	55,992	7,048	16	59,377	7,594	21	53,255	6,812	12
Oct-23	56,263	7,060	16	60,480	7,640	21	54,245	6,853	12
Nov-23	56,658	7,113	16	60,098	7,642	21	53,902	6,854	12
Dec-23	57,000	7,159	16	60,467	7,693	21	54,234	6,900	12
Jan-24	57,550	7,238	16	61,945	7,853	22	54,958	6,967	11
Feb-24	57,495	7,252	16	61,897	7,889	22	54,915	6,999	11
Mar-24	57,448	7,240	16	61,831	7,880	22	54,857	6,991	11
Apr-24	57,406	7,220	16	61,780	7,860	22	54,811	6,973	11
May-24	57,164	7,207	16	60,817	7,802	22	53,957	6,922	11
Jun-24	56,992	7,195	16	60,650	7,811	22	53,808	6,930	11
Jul-24	56,782	7,160	16	60,459	7,774	22	53,640	6,897	11
Aug-24	56,662	7,147	16	60,402	7,757	22	53,589	6,882	11
Sep-24	56,608	7,126	16	60,356	7,720	22	53,548	6,849	11
Oct-24	56,882	7,137	16	61,478	7,766	22	54,544	6,890	11
Nov-24	57,282	7,191	16	61,089	7,768	22	54,198	6,891	11
Dec-24	57,627	7,238	16	61,465	7,820	22	54,532	6,938	11
Jan-25	58,183	7,317	16	62,967	7,982	22	55,260	7,005	11
Feb-25	58,128	7,331	16	62,919	8,019	22	55,217	7,037	11
Mar-25	58,080	7,320	16	62,852	8,010	22	55,159	7,030	11
Apr-25	58,038	7,299	16	62,799	7,990	22	55,113	7,012	11
May-25	57,793	7,286	16	61,821	7,931	22	54,254	6,960	11
Jun-25	57,619	7,274	16	61,651	7,940	22	54,104	6,968	11
Jul-25	57,407	7,239	16	61,457	7,902	22	53,935	6,935	11
Aug-25	57,286	7,226	16	61,399	7,885	22	53,883	6,920	11
Sep-25	57,231	7,204	16	61,352	7,847	22	53,843	6,887	11
Oct-25	57,508	7,216	16	62,493	7,895	22	54,844	6,928	11
Nov-25	57,912	7,270	16	62,097	7,896	22	54,496	6,929	11
Dec-25	58,261	7,317	16	62,479	7,949	22	54,832	6,976	11
Jan-26	58,823	7,398	16	64,006	8,114	23	55,564	7,044	10
Feb-26	58,767	7,412	16	63,957	8,151	23	55,521	7,076	10
Mar-26	58,719	7,400	16	63,889	8,142	23	55,462	7,068	10
Apr-26	58,676	7,379	16	63,836	8,121	23	55,416	7,050	10
May-26	58,429	7,366	16	62,841	8,062	23	54,552	6,999	10
Jun-26	58,253	7,354	16	62,668	8,071	23	54,402	7,006	10
Jul-26	58,038	7,318	16	62,471	8,032	23	54,231	6,973	10
Aug-26	57,916	7,305	16	62,412	8,015	23	54,180	6,958	10

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	Sep-26	57,861	7,283	16	62,365	7,977	23	54,139	6,925
Oct-26	58,141	7,295	16	63,524	8,025	23	55,145	6,966	10
Nov-26	58,549	7,350	16	63,122	8,026	23	54,796	6,968	10
Dec-26	58,902	7,398	16	63,510	8,081	23	55,133	7,015	10
Jan-27	59,470	7,479	16	65,062	8,248	23	55,870	7,083	10
Feb-27	59,413	7,494	16	65,012	8,286	23	55,826	7,115	10
Mar-27	59,365	7,482	16	64,943	8,277	23	55,767	7,107	10
Apr-27	59,321	7,461	16	64,889	8,255	23	55,721	7,089	10
May-27	59,071	7,447	16	63,878	8,195	23	54,852	7,037	10
Jun-27	58,894	7,435	16	63,702	8,204	23	54,701	7,045	10
Jul-27	58,677	7,399	16	63,502	8,165	23	54,530	7,011	10
Aug-27	58,553	7,386	16	63,441	8,147	23	54,478	6,996	10
Sep-27	58,497	7,363	16	63,394	8,108	23	54,437	6,963	10
Oct-27	58,780	7,376	16	64,572	8,157	23	55,448	7,005	10
Nov-27	59,193	7,431	16	64,163	8,159	23	55,098	7,006	10
Dec-27	59,550	7,479	16	64,558	8,214	23	55,437	7,053	10
Jan-28	60,125	7,562	16	66,136	8,384	24	56,177	7,121	9
Feb-28	60,067	7,576	16	66,085	8,422	24	56,133	7,154	9
Mar-28	60,018	7,564	16	66,014	8,413	24	56,074	7,146	9
Apr-28	59,974	7,543	16	65,959	8,392	24	56,027	7,128	9
May-28	59,721	7,529	16	64,932	8,330	24	55,154	7,076	9
Jun-28	59,542	7,517	16	64,753	8,339	24	55,002	7,083	9
Jul-28	59,322	7,480	16	64,550	8,300	24	54,829	7,050	9
Aug-28	59,197	7,467	16	64,488	8,282	24	54,777	7,035	9
Sep-28	59,141	7,444	16	64,440	8,242	24	54,736	7,001	9
Oct-28	59,427	7,457	16	65,637	8,292	24	55,753	7,043	9
Nov-28	59,844	7,513	16	65,222	8,293	24	55,401	7,044	9
Dec-28	60,205	7,562	16	65,623	8,349	24	55,741	7,092	9
Jan-29	60,786	7,645	16	67,227	8,522	24	56,486	7,161	9
Feb-29	60,728	7,659	16	67,175	8,561	24	56,442	7,193	9
Mar-29	60,678	7,647	16	67,104	8,552	24	56,382	7,186	9
Apr-29	60,634	7,626	16	67,048	8,530	24	56,335	7,167	9
May-29	60,378	7,612	16	66,003	8,468	24	55,457	7,115	9
Jun-29	60,197	7,600	16	65,821	8,477	24	55,305	7,122	9
Jul-29	59,975	7,562	16	65,615	8,437	24	55,131	7,089	9
Aug-29	59,848	7,549	16	65,552	8,418	24	55,079	7,073	9
Sep-29	59,791	7,526	16	65,503	8,378	24	55,037	7,039	9
Oct-29	60,080	7,539	16	66,720	8,429	24	56,060	7,082	9
Nov-29	60,502	7,595	16	66,298	8,430	24	55,705	7,083	9
Dec-29	60,867	7,645	16	66,706	8,487	24	56,048	7,131	9
Jan-30	61,455	7,729	16	68,336	8,663	25	56,797	7,200	8
Feb-30	61,396	7,744	16	68,284	8,703	25	56,753	7,233	8
Mar-30	61,345	7,731	16	68,211	8,693	25	56,692	7,225	8
Apr-30	61,301	7,709	16	68,154	8,671	25	56,645	7,207	8



## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION MEDFORD

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers	Residential Medford Customers	Commercial Medford Customers	Industrial Medford Customers
	May-30	61,042	7,696	16	67,092	8,607	25	55,762	7,154
Jun-30	60,859	7,683	16	66,907	8,617	25	55,609	7,162	8
Jul-30	60,634	7,646	16	66,697	8,576	25	55,434	7,128	8
Aug-30	60,506	7,632	16	66,634	8,557	25	55,382	7,112	8
Sep-30	60,449	7,609	16	66,584	8,516	25	55,340	7,078	8
Oct-30	60,741	7,622	16	67,821	8,568	25	56,368	7,121	8
Nov-30	61,168	7,679	16	67,392	8,569	25	56,012	7,122	8
Dec-30	61,537	7,729	16	67,807	8,627	25	56,356	7,170	8
Jan-31	62,131	7,814	16	69,464	8,806	25	57,109	7,240	8
Feb-31	62,071	7,829	16	69,410	8,846	25	57,065	7,273	8
Mar-31	62,020	7,816	16	69,336	8,837	25	57,004	7,265	8
Apr-31	61,975	7,794	16	69,279	8,814	25	56,957	7,246	8
May-31	61,714	7,780	16	68,199	8,749	25	56,069	7,193	8
Jun-31	61,528	7,768	16	68,011	8,759	25	55,915	7,201	8
Jul-31	61,301	7,730	16	67,798	8,717	25	55,739	7,167	8
Aug-31	61,172	7,716	16	67,733	8,698	25	55,686	7,151	8
Sep-31	61,114	7,693	16	67,682	8,657	25	55,644	7,117	8
Oct-31	61,409	7,706	16	68,940	8,709	25	56,678	7,160	8
Nov-31	61,841	7,763	16	68,504	8,711	25	56,320	7,161	8
Dec-31	62,214	7,814	16	68,926	8,770	25	56,666	7,210	8
Jan-32	62,814	7,900	16	70,610	8,951	26	57,423	7,279	7
Feb-32	62,754	7,915	16	70,555	8,992	26	57,379	7,313	7
Mar-32	62,702	7,902	16	70,480	8,983	26	57,318	7,305	7
Apr-32	62,657	7,880	16	70,422	8,959	26	57,270	7,286	7
May-32	62,392	7,866	16	69,325	8,894	26	56,378	7,233	7
Jun-32	62,205	7,853	16	69,133	8,903	26	56,222	7,241	7
Jul-32	61,976	7,815	16	68,916	8,861	26	56,046	7,206	7
Aug-32	61,845	7,801	16	68,851	8,842	26	55,992	7,191	7
Sep-32	61,786	7,777	16	68,799	8,800	26	55,950	7,156	7
Oct-32	62,085	7,790	16	70,078	8,853	26	56,990	7,200	7
Nov-32	62,521	7,849	16	69,634	8,854	26	56,629	7,201	7
Dec-32	62,898	7,900	16	70,063	8,914	26	56,978	7,249	7
Jan-33	63,505	7,987	16	71,775	9,099	26	57,739	7,319	7
Feb-33	63,444	8,002	16	71,720	9,140	26	57,694	7,353	7
Mar-33	63,392	7,989	16	71,643	9,131	26	57,633	7,345	7
Apr-33	63,346	7,967	16	71,584	9,107	26	57,585	7,326	7
May-33	63,079	7,953	16	70,468	9,041	26	56,688	7,273	7
Jun-33	62,889	7,940	16	70,274	9,050	26	56,531	7,280	7
Jul-33	62,657	7,901	16	70,054	9,007	26	56,354	7,246	7
Aug-33	62,525	7,887	16	69,987	8,988	26	56,300	7,230	7
Sep-33	62,466	7,863	16	69,934	8,945	26	56,258	7,196	7
Oct-33	62,768	7,876	16	71,234	8,999	26	57,304	7,239	7
Nov-33	63,209	7,935	16	70,783	9,000	26	56,941	7,240	7
Dec-33	63,590	7,987	16	71,219	9,061	26	57,291	7,289	7

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers
Jan-12	13,221	2,155	2	13,221	2,155	2	13,221	2,155	2
Feb-12	13,186	2,145	2	13,186	2,145	2	13,186	2,145	2
Mar-12	13,217	2,151	2	13,217	2,151	2	13,217	2,151	2
Apr-12	13,221	2,149	3	13,221	2,149	3	13,221	2,149	3
May-12	13,137	2,145	2	13,137	2,145	2	13,137	2,145	2
Jun-12	13,080	2,132	2	13,080	2,132	2	13,080	2,132	2
Jul-12	13,037	2,125	2	13,037	2,125	2	13,037	2,125	2
Aug-12	12,928	2,112	2	12,928	2,112	2	12,928	2,112	2
Sep-12	12,976	2,120	2	12,976	2,120	2	12,976	2,120	2
Oct-12	12,964	2,116	3	12,964	2,116	3	12,964	2,116	3
Nov-12	13,086	2,130	3	13,086	2,130	3	13,086	2,130	3
Dec-12	13,200	2,133	3	13,200	2,133	3	13,200	2,133	3
Jan-13	13,233	2,133	3	13,233	2,133	3	13,233	2,133	3
Feb-13	13,266	2,141	3	13,266	2,141	3	13,266	2,141	3
Mar-13	13,227	2,146	3	13,227	2,146	3	13,227	2,146	3
Apr-13	13,191	2,138	3	13,191	2,138	3	13,191	2,138	3
May-13	13,150	2,140	3	13,150	2,140	3	13,150	2,140	3
Jun-13	13,093	2,135	3	13,093	2,135	3	13,093	2,135	3
Jul-13	13,059	2,128	3	13,059	2,128	3	13,059	2,128	3
Aug-13	12,981	2,111	3	12,981	2,111	3	12,981	2,111	3
Sep-13	12,981	2,104	3	12,981	2,104	3	12,981	2,104	3
Oct-13	13,064	2,114	3	13,064	2,114	3	13,064	2,114	3
Nov-13	13,144	2,119	3	13,144	2,119	3	13,144	2,119	3
Dec-13	13,293	2,136	3	13,293	2,136	3	13,293	2,136	3
Jan-14	13,270	2,134	3	13,384	2,137	3	13,283	2,133	3
Feb-14	13,294	2,140	3	13,417	2,145	3	13,316	2,141	3
Mar-14	13,286	2,144	3	13,378	2,150	3	13,277	2,146	3
Apr-14	13,255	2,140	3	13,341	2,142	3	13,241	2,138	3
May-14	13,212	2,138	3	13,300	2,144	3	13,200	2,140	3
Jun-14	13,135	2,132	3	13,242	2,139	3	13,143	2,135	3
Jul-14	13,085	2,126	3	13,208	2,132	3	13,109	2,128	3
Aug-14	13,012	2,115	3	13,129	2,115	3	13,030	2,111	3
Sep-14	13,011	2,117	3	13,129	2,108	3	13,030	2,104	3
Oct-14	13,060	2,116	3	13,213	2,118	3	13,114	2,114	3
Nov-14	13,179	2,130	3	13,294	2,123	3	13,194	2,118	3
Dec-14	13,370	2,144	3	13,445	2,140	3	13,344	2,135	3
Jan-15	13,347	2,138	3	13,536	2,142	3	13,334	2,132	3
Feb-15	13,369	2,144	3	13,570	2,150	3	13,367	2,140	3
Mar-15	13,362	2,146	3	13,530	2,155	3	13,328	2,145	3
Apr-15	13,331	2,142	3	13,493	2,147	3	13,291	2,137	3
May-15	13,287	2,139	3	13,452	2,149	3	13,250	2,139	3
Jun-15	13,210	2,132	3	13,393	2,144	3	13,193	2,134	3
Jul-15	13,160	2,127	3	13,358	2,137	3	13,158	2,127	3
Aug-15	13,087	2,116	3	13,279	2,119	3	13,080	2,110	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers
Sep-15	13,085	2,118	3	13,279	2,112	3	13,080	2,103	3
Oct-15	13,135	2,118	3	13,364	2,122	3	13,163	2,113	3
Nov-15	13,253	2,132	3	13,445	2,127	3	13,244	2,118	3
Dec-15	13,445	2,146	3	13,598	2,144	3	13,394	2,135	3
Jan-16	13,439	2,140	3	13,691	2,146	3	13,384	2,132	3
Feb-16	13,461	2,146	3	13,725	2,154	3	13,418	2,140	3
Mar-16	13,454	2,148	3	13,685	2,159	3	13,378	2,145	3
Apr-16	13,423	2,143	3	13,647	2,151	3	13,342	2,137	3
May-16	13,378	2,141	3	13,605	2,153	3	13,300	2,139	3
Jun-16	13,302	2,134	3	13,546	2,148	3	13,243	2,134	3
Jul-16	13,250	2,129	3	13,511	2,141	3	13,208	2,127	3
Aug-16	13,178	2,118	3	13,430	2,124	3	13,130	2,110	3
Sep-16	13,176	2,120	3	13,430	2,117	3	13,130	2,103	3
Oct-16	13,225	2,119	3	13,516	2,127	3	13,213	2,113	3
Nov-16	13,345	2,133	3	13,599	2,132	3	13,294	2,118	3
Dec-16	13,538	2,147	3	13,753	2,149	3	13,445	2,135	3
Jan-17	13,540	2,142	3	13,847	2,150	3	13,435	2,131	3
Feb-17	13,562	2,148	3	13,881	2,158	3	13,469	2,139	3
Mar-17	13,556	2,149	3	13,841	2,163	3	13,429	2,144	3
Apr-17	13,524	2,145	3	13,803	2,155	3	13,393	2,136	3
May-17	13,479	2,143	3	13,760	2,157	3	13,351	2,138	3
Jun-17	13,402	2,136	3	13,700	2,152	3	13,293	2,133	3
Jul-17	13,352	2,130	3	13,665	2,145	3	13,259	2,126	3
Aug-17	13,279	2,119	3	13,583	2,128	3	13,179	2,109	3
Sep-17	13,277	2,122	3	13,583	2,121	3	13,179	2,102	3
Oct-17	13,326	2,121	3	13,670	2,131	3	13,264	2,112	3
Nov-17	13,447	2,135	3	13,754	2,136	3	13,345	2,117	3
Dec-17	13,640	2,149	3	13,910	2,153	3	13,496	2,134	3
Jan-18	13,651	2,144	3	14,005	2,154	3	13,486	2,131	3
Feb-18	13,674	2,150	3	14,040	2,162	3	13,520	2,139	3
Mar-18	13,666	2,151	3	13,998	2,168	3	13,480	2,144	3
Apr-18	13,635	2,147	3	13,960	2,159	3	13,444	2,136	3
May-18	13,590	2,145	3	13,917	2,161	3	13,402	2,138	3
Jun-18	13,513	2,137	3	13,857	2,156	3	13,344	2,133	3
Jul-18	13,462	2,132	3	13,821	2,149	3	13,309	2,126	3
Aug-18	13,387	2,121	3	13,738	2,132	3	13,230	2,109	3
Sep-18	13,385	2,124	3	13,738	2,125	3	13,230	2,102	3
Oct-18	13,436	2,123	3	13,826	2,135	3	13,314	2,112	3
Nov-18	13,557	2,137	3	13,910	2,140	3	13,396	2,117	3
Dec-18	13,752	2,151	3	14,068	2,157	3	13,548	2,134	3
Jan-19	13,755	2,144	3	14,164	2,159	3	13,538	2,130	3
Feb-19	13,778	2,150	3	14,200	2,167	3	13,571	2,138	3
Mar-19	13,770	2,151	3	14,158	2,172	3	13,531	2,143	3
Apr-19	13,739	2,147	3	14,119	2,164	3	13,495	2,135	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers
May-19	13,693	2,145	3	14,075	2,166	3	13,453	2,137	3
Jun-19	13,615	2,137	3	14,014	2,161	3	13,394	2,132	3
Jul-19	13,564	2,132	3	13,978	2,154	3	13,360	2,125	3
Aug-19	13,489	2,121	3	13,895	2,136	3	13,280	2,108	3
Sep-19	13,487	2,124	3	13,895	2,129	3	13,280	2,101	3
Oct-19	13,538	2,123	3	13,983	2,139	3	13,365	2,111	3
Nov-19	13,660	2,137	3	14,069	2,144	3	13,447	2,116	3
Dec-19	13,856	2,151	3	14,229	2,162	3	13,599	2,133	3
Jan-20	13,860	2,145	3	14,326	2,163	3	13,589	2,130	3
Feb-20	13,882	2,151	3	14,362	2,171	3	13,623	2,138	3
Mar-20	13,875	2,152	3	14,319	2,176	3	13,583	2,143	3
Apr-20	13,843	2,148	3	14,280	2,168	3	13,546	2,135	3
May-20	13,797	2,146	3	14,236	2,170	3	13,504	2,137	3
Jun-20	13,719	2,138	3	14,174	2,165	3	13,445	2,132	3
Jul-20	13,667	2,133	3	14,137	2,158	3	13,410	2,125	3
Aug-20	13,592	2,122	3	14,053	2,141	3	13,330	2,108	3
Sep-20	13,590	2,125	3	14,053	2,134	3	13,330	2,101	3
Oct-20	13,641	2,124	3	14,143	2,144	3	13,415	2,111	3
Nov-20	13,763	2,138	3	14,229	2,149	3	13,498	2,116	3
Dec-20	13,961	2,152	3	14,391	2,166	3	13,651	2,133	3
Jan-21	13,965	2,145	3	14,489	2,167	3	13,641	2,130	3
Feb-21	13,988	2,151	3	14,525	2,175	3	13,675	2,138	3
Mar-21	13,980	2,152	3	14,483	2,181	3	13,634	2,143	3
Apr-21	13,948	2,148	3	14,443	2,172	3	13,597	2,135	3
May-21	13,902	2,146	3	14,398	2,174	3	13,555	2,137	3
Jun-21	13,823	2,138	3	14,336	2,169	3	13,496	2,132	3
Jul-21	13,771	2,133	3	14,299	2,162	3	13,461	2,125	3
Aug-21	13,695	2,122	3	14,213	2,145	3	13,381	2,108	3
Sep-21	13,693	2,125	3	14,213	2,138	3	13,381	2,101	3
Oct-21	13,745	2,124	3	14,304	2,148	3	13,466	2,111	3
Nov-21	13,868	2,138	3	14,392	2,153	3	13,549	2,116	3
Dec-21	14,068	2,152	3	14,555	2,170	3	13,703	2,132	3
Jan-22	14,071	2,146	3	14,654	2,172	3	13,693	2,129	3
Feb-22	14,094	2,152	3	14,691	2,180	3	13,727	2,137	3
Mar-22	14,087	2,153	3	14,648	2,185	3	13,686	2,142	3
Apr-22	14,054	2,149	3	14,608	2,177	3	13,649	2,134	3
May-22	14,008	2,147	3	14,562	2,179	3	13,607	2,136	3
Jun-22	13,928	2,139	3	14,499	2,174	3	13,548	2,131	3
Jul-22	13,876	2,134	3	14,462	2,167	3	13,512	2,124	3
Aug-22	13,799	2,123	3	14,375	2,149	3	13,432	2,107	3
Sep-22	13,797	2,126	3	14,375	2,142	3	13,432	2,100	3
Oct-22	13,850	2,125	3	14,467	2,152	3	13,518	2,110	3
Nov-22	13,973	2,139	3	14,556	2,157	3	13,600	2,115	3
Dec-22	14,175	2,153	3	14,721	2,175	3	13,755	2,132	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers
Jan-23	14,178	2,146	3	14,821	2,176	3	13,745	2,129	3
Feb-23	14,201	2,152	3	14,858	2,184	3	13,779	2,137	3
Mar-23	14,194	2,153	3	14,815	2,189	3	13,738	2,142	3
Apr-23	14,161	2,149	3	14,774	2,181	3	13,701	2,134	3
May-23	14,114	2,147	3	14,728	2,183	3	13,658	2,136	3
Jun-23	14,034	2,139	3	14,665	2,178	3	13,599	2,131	3
Jul-23	13,981	2,134	3	14,626	2,171	3	13,564	2,124	3
Aug-23	13,904	2,123	3	14,539	2,154	3	13,483	2,107	3
Sep-23	13,902	2,126	3	14,539	2,146	3	13,483	2,100	3
Oct-23	13,955	2,125	3	14,632	2,157	3	13,569	2,110	3
Nov-23	14,080	2,139	3	14,722	2,162	3	13,652	2,115	3
Dec-23	14,282	2,153	3	14,889	2,179	3	13,807	2,132	3
Jan-24	14,286	2,147	3	14,990	2,180	3	13,797	2,128	3
Feb-24	14,309	2,153	3	15,028	2,189	3	13,831	2,136	3
Mar-24	14,302	2,154	3	14,984	2,194	3	13,791	2,141	3
Apr-24	14,269	2,150	3	14,943	2,186	3	13,753	2,133	3
May-24	14,222	2,148	3	14,896	2,188	3	13,710	2,135	3
Jun-24	14,141	2,140	3	14,832	2,182	3	13,651	2,130	3
Jul-24	14,087	2,135	3	14,793	2,175	3	13,615	2,123	3
Aug-24	14,010	2,123	3	14,705	2,158	3	13,534	2,106	3
Sep-24	14,008	2,126	3	14,705	2,151	3	13,534	2,099	3
Oct-24	14,061	2,125	3	14,799	2,161	3	13,621	2,109	3
Nov-24	14,187	2,140	3	14,889	2,166	3	13,704	2,114	3
Dec-24	14,391	2,154	3	15,058	2,183	3	13,859	2,131	3
Jan-25	14,394	2,147	3	15,161	2,185	3	13,849	2,128	3
Feb-25	14,418	2,153	3	15,199	2,193	3	13,884	2,136	3
Mar-25	14,410	2,154	3	15,154	2,198	3	13,843	2,141	3
Apr-25	14,377	2,150	3	15,113	2,190	3	13,805	2,133	3
May-25	14,330	2,148	3	15,066	2,192	3	13,762	2,135	3
Jun-25	14,248	2,140	3	15,001	2,187	3	13,703	2,130	3
Jul-25	14,195	2,135	3	14,962	2,180	3	13,667	2,123	3
Aug-25	14,116	2,124	3	14,872	2,162	3	13,585	2,106	3
Sep-25	14,114	2,127	3	14,872	2,155	3	13,585	2,099	3
Oct-25	14,168	2,126	3	14,968	2,165	3	13,672	2,109	3
Nov-25	14,294	2,140	3	15,059	2,170	3	13,756	2,114	3
Dec-25	14,500	2,154	3	15,230	2,188	3	13,912	2,131	3
Jan-26	14,504	2,147	3	15,334	2,189	3	13,902	2,127	3
Feb-26	14,527	2,153	3	15,372	2,197	3	13,936	2,135	3
Mar-26	14,520	2,154	3	15,327	2,202	3	13,896	2,140	3
Apr-26	14,486	2,150	3	15,285	2,194	3	13,858	2,132	3
May-26	14,439	2,148	3	15,238	2,196	3	13,815	2,134	3
Jun-26	14,356	2,140	3	15,172	2,191	3	13,755	2,129	3
Jul-26	14,302	2,135	3	15,132	2,184	3	13,719	2,122	3
Aug-26	14,223	2,124	3	15,042	2,167	3	13,637	2,106	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Roseburg Customers	Commercial Roseburg Customers	Industrial Roseburg Customers	Residential Roseburg Customers	Commercial Roseburg Customers	Industrial Roseburg Customers	Residential Roseburg Customers	Commercial Roseburg Customers	Industrial Roseburg Customers
	Sep-26	14,221	2,127	3	15,042	2,159	3	13,637	2,099
Oct-26	14,275	2,126	3	15,138	2,170	3	13,724	2,109	3
Nov-26	14,403	2,140	3	15,231	2,175	3	13,808	2,113	3
Dec-26	14,610	2,154	3	15,404	2,192	3	13,965	2,130	3
Jan-27	14,614	2,148	3	15,509	2,194	3	13,955	2,127	3
Feb-27	14,638	2,154	3	15,548	2,202	3	13,989	2,135	3
Mar-27	14,630	2,155	3	15,502	2,207	3	13,948	2,140	3
Apr-27	14,596	2,151	3	15,460	2,199	3	13,910	2,132	3
May-27	14,548	2,149	3	15,412	2,201	3	13,867	2,134	3
Jun-27	14,466	2,141	3	15,345	2,196	3	13,807	2,129	3
Jul-27	14,411	2,136	3	15,305	2,188	3	13,771	2,122	3
Aug-27	14,332	2,125	3	15,214	2,171	3	13,689	2,105	3
Sep-27	14,329	2,128	3	15,214	2,164	3	13,689	2,098	3
Oct-27	14,384	2,127	3	15,311	2,174	3	13,776	2,108	3
Nov-27	14,512	2,141	3	15,405	2,179	3	13,861	2,113	3
Dec-27	14,721	2,155	3	15,579	2,196	3	14,018	2,130	3
Jan-28	14,725	2,148	3	15,686	2,198	3	14,008	2,127	3
Feb-28	14,749	2,154	3	15,725	2,206	3	14,043	2,135	3
Mar-28	14,741	2,155	3	15,679	2,211	3	14,001	2,140	3
Apr-28	14,707	2,151	3	15,636	2,203	3	13,963	2,132	3
May-28	14,659	2,149	3	15,587	2,205	3	13,920	2,134	3
Jun-28	14,576	2,141	3	15,520	2,200	3	13,859	2,129	3
Jul-28	14,521	2,136	3	15,479	2,193	3	13,823	2,122	3
Aug-28	14,440	2,125	3	15,387	2,175	3	13,741	2,105	3
Sep-28	14,438	2,128	3	15,387	2,168	3	13,741	2,098	3
Oct-28	14,493	2,127	3	15,485	2,178	3	13,829	2,108	3
Nov-28	14,623	2,141	3	15,580	2,183	3	13,913	2,113	3
Dec-28	14,833	2,155	3	15,757	2,201	3	14,071	2,130	3
Jan-29	14,837	2,149	3	15,864	2,202	3	14,061	2,126	3
Feb-29	14,861	2,155	3	15,904	2,211	3	14,096	2,134	3
Mar-29	14,853	2,156	3	15,857	2,216	3	14,055	2,139	3
Apr-29	14,819	2,152	3	15,814	2,207	3	14,016	2,131	3
May-29	14,770	2,150	3	15,765	2,210	3	13,973	2,133	3
Jun-29	14,686	2,142	3	15,697	2,204	3	13,912	2,128	3
Jul-29	14,631	2,137	3	15,656	2,197	3	13,876	2,121	3
Aug-29	14,550	2,126	3	15,562	2,180	3	13,793	2,104	3
Sep-29	14,548	2,129	3	15,562	2,172	3	13,793	2,097	3
Oct-29	14,603	2,128	3	15,662	2,183	3	13,881	2,107	3
Nov-29	14,734	2,142	3	15,758	2,188	3	13,966	2,112	3
Dec-29	14,946	2,156	3	15,937	2,205	3	14,125	2,129	3
Jan-30	14,950	2,149	3	16,045	2,207	3	14,114	2,126	3
Feb-30	14,974	2,155	3	16,085	2,215	3	14,150	2,134	3
Mar-30	14,966	2,156	3	16,038	2,220	3	14,108	2,139	3
Apr-30	14,932	2,152	3	15,994	2,212	3	14,070	2,131	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### ROSEBURG

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers	Roseburg Customers
May-30	14,883	2,150	3	15,945	2,214	3	14,026	2,133	3
Jun-30	14,798	2,142	3	15,876	2,209	3	13,965	2,128	3
Jul-30	14,742	2,137	3	15,834	2,202	3	13,929	2,121	3
Aug-30	14,661	2,126	3	15,740	2,184	3	13,846	2,104	3
Sep-30	14,659	2,129	3	15,740	2,177	3	13,846	2,097	3
Oct-30	14,714	2,128	3	15,840	2,187	3	13,934	2,107	3
Nov-30	14,846	2,142	3	15,937	2,192	3	14,019	2,112	3
Dec-30	15,060	2,156	3	16,118	2,210	3	14,178	2,129	3
Jan-31	15,063	2,150	3	16,228	2,211	3	14,168	2,125	3
Feb-31	15,088	2,156	3	16,269	2,219	3	14,203	2,133	3
Mar-31	15,080	2,157	3	16,221	2,225	3	14,162	2,138	3
Apr-31	15,045	2,153	3	16,177	2,216	3	14,123	2,130	3
May-31	14,996	2,151	3	16,126	2,218	3	14,079	2,132	3
Jun-31	14,910	2,143	3	16,057	2,213	3	14,018	2,127	3
Jul-31	14,854	2,137	3	16,015	2,206	3	13,982	2,120	3
Aug-31	14,772	2,126	3	15,919	2,188	3	13,898	2,103	3
Sep-31	14,770	2,129	3	15,919	2,181	3	13,898	2,096	3
Oct-31	14,826	2,128	3	16,021	2,191	3	13,987	2,106	3
Nov-31	14,959	2,143	3	16,119	2,197	3	14,073	2,111	3
Dec-31	15,174	2,157	3	16,302	2,214	3	14,232	2,128	3
Jan-32	15,178	2,150	3	16,413	2,216	3	14,222	2,125	3
Feb-32	15,203	2,156	3	16,454	2,224	3	14,257	2,133	3
Mar-32	15,195	2,157	3	16,406	2,229	3	14,215	2,138	3
Apr-32	15,160	2,153	3	16,361	2,221	3	14,177	2,130	3
May-32	15,110	2,151	3	16,310	2,223	3	14,133	2,132	3
Jun-32	15,024	2,143	3	16,240	2,218	3	14,071	2,127	3
Jul-32	14,967	2,138	3	16,197	2,210	3	14,035	2,120	3
Aug-32	14,884	2,127	3	16,101	2,193	3	13,951	2,103	3
Sep-32	14,882	2,130	3	16,101	2,185	3	13,951	2,096	3
Oct-32	14,939	2,129	3	16,204	2,196	3	14,040	2,106	3
Nov-32	15,072	2,143	3	16,303	2,201	3	14,126	2,111	3
Dec-32	15,289	2,157	3	16,488	2,219	3	14,286	2,128	3
Jan-33	15,293	2,150	3	16,600	2,220	3	14,276	2,124	3
Feb-33	15,318	2,156	3	16,642	2,228	3	14,311	2,132	3
Mar-33	15,310	2,157	3	16,593	2,233	3	14,269	2,137	3
Apr-33	15,275	2,153	3	16,548	2,225	3	14,231	2,129	3
May-33	15,225	2,151	3	16,496	2,227	3	14,186	2,131	3
Jun-33	15,138	2,143	3	16,425	2,222	3	14,125	2,126	3
Jul-33	15,081	2,138	3	16,382	2,215	3	14,088	2,120	3
Aug-33	14,998	2,127	3	16,284	2,197	3	14,004	2,103	3
Sep-33	14,995	2,130	3	16,284	2,190	3	14,004	2,096	3
Oct-33	15,052	2,129	3	16,388	2,200	3	14,094	2,106	3
Nov-33	15,187	2,143	3	16,489	2,205	3	14,180	2,110	3
Dec-33	15,406	2,157	3	16,676	2,223	3	14,341	2,127	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers
	Jan-12	14,067	1,636	7	14,067	1,636	7	14,067	1,636
Feb-12	14,047	1,635	7	14,047	1,635	7	14,047	1,635	7
Mar-12	14,044	1,643	7	14,044	1,643	7	14,044	1,643	7
Apr-12	14,063	1,640	7	14,063	1,640	7	14,063	1,640	7
May-12	14,002	1,643	7	14,002	1,643	7	14,002	1,643	7
Jun-12	13,927	1,632	7	13,927	1,632	7	13,927	1,632	7
Jul-12	13,796	1,626	7	13,796	1,626	7	13,796	1,626	7
Aug-12	13,770	1,625	7	13,770	1,625	7	13,770	1,625	7
Sep-12	13,766	1,621	8	13,766	1,621	8	13,766	1,621	8
Oct-12	13,802	1,625	7	13,802	1,625	7	13,802	1,625	7
Nov-12	14,010	1,631	7	14,010	1,631	7	14,010	1,631	7
Dec-12	14,044	1,636	11	14,044	1,636	11	14,044	1,636	11
Jan-13	14,099	1,661	8	14,099	1,661	8	14,099	1,661	8
Feb-13	14,116	1,673	8	14,116	1,673	8	14,116	1,673	8
Mar-13	14,077	1,659	8	14,077	1,659	8	14,077	1,659	8
Apr-13	14,053	1,649	8	14,053	1,649	8	14,053	1,649	8
May-13	13,964	1,655	8	13,964	1,655	8	13,964	1,655	8
Jun-13	13,933	1,652	8	13,933	1,652	8	13,933	1,652	8
Jul-13	13,885	1,648	8	13,885	1,648	8	13,885	1,648	8
Aug-13	13,828	1,643	8	13,828	1,643	8	13,828	1,643	8
Sep-13	13,821	1,636	7	13,821	1,636	7	13,821	1,636	7
Oct-13	14,009	1,635	9	14,009	1,635	9	14,009	1,635	9
Nov-13	14,070	1,649	8	14,070	1,649	8	14,070	1,649	8
Dec-13	14,134	1,662	8	14,134	1,662	8	14,134	1,662	8
Jan-14	14,152	1,671	8	14,239	1,677	8	14,146	1,666	8
Feb-14	14,160	1,663	8	14,256	1,690	8	14,163	1,679	8
Mar-14	14,144	1,660	8	14,216	1,675	8	14,123	1,664	8
Apr-14	14,130	1,663	8	14,192	1,665	8	14,099	1,654	8
May-14	14,078	1,657	8	14,102	1,671	8	14,010	1,660	8
Jun-14	14,004	1,652	8	14,071	1,668	8	13,979	1,657	8
Jul-14	13,929	1,641	8	14,022	1,664	8	13,931	1,653	8
Aug-14	13,846	1,630	8	13,965	1,659	8	13,874	1,648	8
Sep-14	13,847	1,629	8	13,958	1,652	8	13,867	1,641	8
Oct-14	13,936	1,638	8	14,148	1,651	8	14,055	1,640	8
Nov-14	14,095	1,651	8	14,209	1,665	8	14,116	1,654	8
Dec-14	14,175	1,656	8	14,274	1,678	8	14,181	1,667	8
Jan-15	14,207	1,665	8	14,380	1,694	8	14,192	1,672	8
Feb-15	14,222	1,675	8	14,397	1,706	8	14,209	1,684	8
Mar-15	14,200	1,678	8	14,357	1,692	8	14,170	1,670	8
Apr-15	14,171	1,671	8	14,333	1,682	8	14,146	1,660	8
May-15	14,137	1,667	8	14,242	1,688	8	14,056	1,666	8
Jun-15	14,057	1,661	8	14,210	1,685	8	14,025	1,663	8
Jul-15	13,981	1,652	8	14,161	1,681	8	13,977	1,659	8
Aug-15	13,894	1,646	8	14,103	1,676	8	13,919	1,654	8



## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers
Sep-15	13,897	1,645	8	14,096	1,669	8	13,912	1,647	8
Oct-15	13,996	1,647	8	14,288	1,668	8	14,102	1,646	8
Nov-15	14,144	1,654	8	14,350	1,682	8	14,163	1,660	8
Dec-15	14,226	1,662	8	14,415	1,695	8	14,227	1,673	8
Jan-16	14,278	1,680	8	14,522	1,711	8	14,239	1,677	8
Feb-16	14,295	1,686	8	14,539	1,723	8	14,256	1,690	8
Mar-16	14,273	1,679	8	14,499	1,709	8	14,217	1,675	8
Apr-16	14,236	1,672	8	14,475	1,698	8	14,193	1,665	8
May-16	14,209	1,669	8	14,383	1,705	8	14,103	1,671	8
Jun-16	14,128	1,665	8	14,351	1,702	8	14,071	1,668	8
Jul-16	14,051	1,657	8	14,301	1,697	8	14,023	1,664	8
Aug-16	13,964	1,647	8	14,243	1,692	8	13,965	1,659	8
Sep-16	13,965	1,642	8	14,236	1,685	8	13,958	1,652	8
Oct-16	14,070	1,646	8	14,429	1,684	8	14,148	1,651	8
Nov-16	14,213	1,659	8	14,492	1,698	8	14,210	1,665	8
Dec-16	14,296	1,672	8	14,558	1,712	8	14,274	1,679	8
Jan-17	14,363	1,686	8	14,666	1,728	9	14,286	1,683	7
Feb-17	14,379	1,688	8	14,683	1,740	9	14,303	1,695	7
Mar-17	14,359	1,686	8	14,643	1,726	9	14,264	1,681	7
Apr-17	14,319	1,683	8	14,618	1,715	9	14,239	1,671	7
May-17	14,295	1,680	8	14,525	1,722	9	14,149	1,677	7
Jun-17	14,213	1,674	8	14,493	1,718	9	14,118	1,674	7
Jul-17	14,135	1,663	8	14,443	1,714	9	14,069	1,670	7
Aug-17	14,047	1,653	8	14,384	1,709	9	14,011	1,665	7
Sep-17	14,047	1,652	8	14,376	1,702	9	14,004	1,658	7
Oct-17	14,155	1,659	8	14,572	1,701	9	14,195	1,657	7
Nov-17	14,299	1,670	8	14,636	1,715	9	14,257	1,671	7
Dec-17	14,380	1,677	8	14,702	1,729	9	14,321	1,684	7
Jan-18	14,457	1,690	8	14,811	1,745	9	14,333	1,689	7
Feb-18	14,474	1,697	8	14,829	1,757	9	14,350	1,701	7
Mar-18	14,454	1,695	8	14,788	1,743	9	14,311	1,687	7
Apr-18	14,413	1,689	8	14,763	1,732	9	14,286	1,676	7
May-18	14,388	1,684	8	14,669	1,739	9	14,196	1,682	7
Jun-18	14,307	1,677	8	14,636	1,735	9	14,164	1,679	7
Jul-18	14,229	1,668	8	14,586	1,731	9	14,116	1,675	7
Aug-18	14,141	1,661	8	14,526	1,726	9	14,058	1,670	7
Sep-18	14,140	1,659	8	14,519	1,719	9	14,051	1,663	7
Oct-18	14,249	1,663	8	14,716	1,718	9	14,242	1,662	7
Nov-18	14,393	1,672	8	14,780	1,732	9	14,304	1,676	7
Dec-18	14,474	1,682	8	14,848	1,746	9	14,369	1,690	7
Jan-19	14,553	1,701	8	14,957	1,762	9	14,380	1,694	7
Feb-19	14,570	1,708	8	14,976	1,775	9	14,398	1,706	7
Mar-19	14,549	1,706	8	14,934	1,760	9	14,358	1,692	7
Apr-19	14,508	1,700	8	14,909	1,749	9	14,334	1,682	7

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers
	May-19	14,483	1,695	8	14,814	1,756	9	14,243	1,688
Jun-19	14,401	1,688	8	14,781	1,753	9	14,211	1,685	7
Jul-19	14,323	1,679	8	14,730	1,748	9	14,162	1,681	7
Aug-19	14,235	1,672	8	14,670	1,743	9	14,104	1,676	7
Sep-19	14,233	1,670	8	14,663	1,736	9	14,097	1,669	7
Oct-19	14,343	1,674	8	14,862	1,735	9	14,289	1,668	7
Nov-19	14,488	1,683	8	14,927	1,749	9	14,351	1,682	7
Dec-19	14,570	1,693	8	14,995	1,763	9	14,416	1,695	7
Jan-20	14,649	1,712	8	15,106	1,780	10	14,428	1,700	6
Feb-20	14,666	1,719	8	15,124	1,792	10	14,445	1,712	6
Mar-20	14,646	1,717	8	15,082	1,777	10	14,405	1,698	6
Apr-20	14,604	1,711	8	15,056	1,767	10	14,381	1,687	6
May-20	14,579	1,706	8	14,961	1,773	10	14,290	1,694	6
Jun-20	14,496	1,699	8	14,928	1,770	10	14,258	1,691	6
Jul-20	14,417	1,690	8	14,876	1,766	10	14,209	1,686	6
Aug-20	14,328	1,683	8	14,815	1,760	10	14,151	1,681	6
Sep-20	14,327	1,681	8	14,808	1,753	10	14,143	1,674	6
Oct-20	14,438	1,685	8	15,009	1,752	10	14,336	1,673	6
Nov-20	14,583	1,694	8	15,074	1,767	10	14,398	1,687	6
Dec-20	14,666	1,704	8	15,143	1,781	10	14,464	1,701	6
Jan-21	14,745	1,724	8	15,255	1,797	10	14,476	1,705	6
Feb-21	14,763	1,731	8	15,274	1,810	10	14,493	1,718	6
Mar-21	14,742	1,729	8	15,231	1,795	10	14,453	1,703	6
Apr-21	14,700	1,723	8	15,205	1,784	10	14,428	1,693	6
May-21	14,675	1,718	8	15,109	1,791	10	14,337	1,699	6
Jun-21	14,592	1,710	8	15,075	1,787	10	14,305	1,696	6
Jul-21	14,513	1,701	8	15,024	1,783	10	14,256	1,692	6
Aug-21	14,423	1,694	8	14,962	1,778	10	14,197	1,687	6
Sep-21	14,422	1,692	8	14,954	1,770	10	14,190	1,680	6
Oct-21	14,533	1,696	8	15,158	1,769	10	14,383	1,679	6
Nov-21	14,679	1,705	8	15,224	1,784	10	14,446	1,693	6
Dec-21	14,763	1,716	8	15,293	1,798	10	14,511	1,706	6
Jan-22	14,843	1,735	8	15,406	1,815	10	14,523	1,711	6
Feb-22	14,860	1,742	8	15,425	1,828	10	14,541	1,723	6
Mar-22	14,839	1,740	8	15,382	1,813	10	14,501	1,709	6
Apr-22	14,797	1,734	8	15,356	1,802	10	14,476	1,699	6
May-22	14,772	1,729	8	15,259	1,808	10	14,384	1,705	6
Jun-22	14,688	1,722	8	15,225	1,805	10	14,352	1,702	6
Jul-22	14,608	1,712	8	15,172	1,801	10	14,303	1,698	6
Aug-22	14,518	1,705	8	15,110	1,795	10	14,244	1,692	6
Sep-22	14,517	1,703	8	15,102	1,788	10	14,237	1,685	6
Oct-22	14,629	1,707	8	15,308	1,787	10	14,431	1,684	6
Nov-22	14,776	1,717	8	15,374	1,802	10	14,493	1,699	6
Dec-22	14,860	1,727	8	15,444	1,816	10	14,559	1,712	6

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers
Jan-23	14,941	1,747	8	15,559	1,833	11	14,571	1,717	5
Feb-23	14,958	1,754	8	15,577	1,846	11	14,589	1,729	5
Mar-23	14,937	1,752	8	15,534	1,831	11	14,549	1,715	5
Apr-23	14,895	1,745	8	15,508	1,820	11	14,524	1,704	5
May-23	14,870	1,740	8	15,410	1,826	11	14,432	1,710	5
Jun-23	14,785	1,733	8	15,375	1,823	11	14,400	1,707	5
Jul-23	14,705	1,724	8	15,322	1,819	11	14,350	1,703	5
Aug-23	14,614	1,717	8	15,260	1,813	11	14,291	1,698	5
Sep-23	14,613	1,714	8	15,252	1,805	11	14,284	1,691	5
Oct-23	14,726	1,719	8	15,459	1,804	11	14,478	1,690	5
Nov-23	14,874	1,728	8	15,527	1,820	11	14,541	1,704	5
Dec-23	14,958	1,738	8	15,597	1,834	11	14,607	1,718	5
Jan-24	15,039	1,758	8	15,713	1,851	11	14,619	1,722	5
Feb-24	15,057	1,765	8	15,732	1,864	11	14,637	1,735	5
Mar-24	15,036	1,763	8	15,688	1,849	11	14,597	1,720	5
Apr-24	14,993	1,757	8	15,661	1,838	11	14,572	1,710	5
May-24	14,968	1,752	8	15,562	1,844	11	14,479	1,716	5
Jun-24	14,883	1,745	8	15,528	1,841	11	14,447	1,713	5
Jul-24	14,802	1,735	8	15,474	1,837	11	14,397	1,709	5
Aug-24	14,710	1,728	8	15,411	1,831	11	14,338	1,704	5
Sep-24	14,709	1,726	8	15,403	1,823	11	14,331	1,696	5
Oct-24	14,823	1,730	8	15,612	1,822	11	14,526	1,695	5
Nov-24	14,972	1,739	8	15,680	1,838	11	14,589	1,710	5
Dec-24	15,057	1,750	8	15,752	1,852	11	14,656	1,723	5
Jan-25	15,138	1,770	8	15,868	1,869	11	14,668	1,728	5
Feb-25	15,156	1,777	8	15,887	1,883	11	14,685	1,740	5
Mar-25	15,135	1,775	8	15,843	1,867	11	14,645	1,726	5
Apr-25	15,092	1,769	8	15,816	1,856	11	14,620	1,715	5
May-25	15,067	1,763	8	15,716	1,863	11	14,527	1,722	5
Jun-25	14,981	1,756	8	15,681	1,859	11	14,495	1,719	5
Jul-25	14,900	1,747	8	15,627	1,855	11	14,445	1,714	5
Aug-25	14,808	1,739	8	15,563	1,849	11	14,386	1,709	5
Sep-25	14,807	1,737	8	15,555	1,841	11	14,378	1,702	5
Oct-25	14,921	1,741	8	15,767	1,840	11	14,574	1,701	5
Nov-25	15,071	1,751	8	15,836	1,856	11	14,637	1,715	5
Dec-25	15,156	1,761	8	15,908	1,871	11	14,704	1,729	5
Jan-26	15,238	1,781	8	16,025	1,888	12	14,716	1,734	4
Feb-26	15,256	1,789	8	16,045	1,902	12	14,734	1,746	4
Mar-26	15,235	1,787	8	16,000	1,886	12	14,693	1,732	4
Apr-26	15,192	1,780	8	15,973	1,874	12	14,668	1,721	4
May-26	15,166	1,775	8	15,872	1,881	12	14,575	1,727	4
Jun-26	15,080	1,768	8	15,837	1,878	12	14,543	1,724	4
Jul-26	14,998	1,758	8	15,782	1,873	12	14,493	1,720	4
Aug-26	14,905	1,751	8	15,717	1,867	12	14,433	1,715	4

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential	Commercial	Industrial	Residential	Commercial	Industrial	Residential	Commercial	Industrial
	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers	Klamath Falls Customers
Sep-26	14,904	1,749	8	15,709	1,860	12	14,426	1,708	4
Oct-26	15,019	1,753	8	15,923	1,858	12	14,622	1,707	4
Nov-26	15,170	1,762	8	15,992	1,874	12	14,686	1,721	4
Dec-26	15,256	1,773	8	16,065	1,889	12	14,753	1,735	4
Jan-27	15,339	1,793	8	16,184	1,907	12	14,765	1,739	4
Feb-27	15,357	1,801	8	16,204	1,920	12	14,782	1,752	4
Mar-27	15,336	1,798	8	16,159	1,904	12	14,741	1,737	4
Apr-27	15,292	1,792	8	16,131	1,893	12	14,716	1,727	4
May-27	15,266	1,787	8	16,029	1,900	12	14,623	1,733	4
Jun-27	15,179	1,779	8	15,993	1,896	12	14,591	1,730	4
Jul-27	15,097	1,770	8	15,938	1,892	12	14,540	1,726	4
Aug-27	15,004	1,762	8	15,873	1,886	12	14,481	1,721	4
Sep-27	15,003	1,760	8	15,865	1,878	12	14,473	1,713	4
Oct-27	15,118	1,764	8	16,081	1,877	12	14,670	1,712	4
Nov-27	15,270	1,774	8	16,151	1,893	12	14,734	1,727	4
Dec-27	15,357	1,785	8	16,224	1,908	12	14,801	1,740	4
Jan-28	15,440	1,805	8	16,344	1,926	12	14,813	1,745	4
Feb-28	15,458	1,812	8	16,364	1,939	12	14,831	1,758	4
Mar-28	15,437	1,810	8	16,319	1,923	12	14,790	1,743	4
Apr-28	15,393	1,804	8	16,291	1,912	12	14,765	1,733	4
May-28	15,367	1,799	8	16,188	1,919	12	14,671	1,739	4
Jun-28	15,280	1,791	8	16,152	1,915	12	14,639	1,736	4
Jul-28	15,196	1,781	8	16,096	1,910	12	14,588	1,731	4
Aug-28	15,103	1,774	8	16,030	1,905	12	14,529	1,726	4
Sep-28	15,102	1,772	8	16,022	1,897	12	14,521	1,719	4
Oct-28	15,218	1,776	8	16,240	1,895	12	14,719	1,718	4
Nov-28	15,371	1,786	8	16,311	1,912	12	14,783	1,733	4
Dec-28	15,458	1,796	8	16,385	1,927	12	14,850	1,746	4
Jan-29	15,542	1,817	8	16,506	1,945	13	14,862	1,751	3
Feb-29	15,560	1,824	8	16,526	1,959	13	14,880	1,764	3
Mar-29	15,539	1,822	8	16,480	1,942	13	14,839	1,749	3
Apr-29	15,494	1,816	8	16,452	1,931	13	14,814	1,738	3
May-29	15,468	1,810	8	16,348	1,938	13	14,720	1,745	3
Jun-29	15,380	1,803	8	16,312	1,934	13	14,687	1,741	3
Jul-29	15,297	1,793	8	16,255	1,929	13	14,637	1,737	3
Aug-29	15,202	1,786	8	16,189	1,923	13	14,576	1,732	3
Sep-29	15,201	1,783	8	16,181	1,915	13	14,569	1,725	3
Oct-29	15,318	1,788	8	16,401	1,914	13	14,767	1,723	3
Nov-29	15,473	1,797	8	16,472	1,931	13	14,832	1,738	3
Dec-29	15,560	1,808	8	16,547	1,946	13	14,899	1,752	3
Jan-30	15,645	1,829	8	16,669	1,964	13	14,911	1,757	3
Feb-30	15,663	1,836	8	16,690	1,978	13	14,929	1,769	3
Mar-30	15,641	1,834	8	16,643	1,961	13	14,888	1,755	3
Apr-30	15,597	1,828	8	16,615	1,950	13	14,863	1,744	3

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### KLAMATH FALLS

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers	Residential Klamath Falls Customers	Commercial Klamath Falls Customers	Industrial Klamath Falls Customers
	May-30	15,570	1,822	8	16,510	1,957	13	14,768	1,750
Jun-30	15,482	1,815	8	16,473	1,953	13	14,736	1,747	3
Jul-30	15,398	1,805	8	16,416	1,948	13	14,685	1,743	3
Aug-30	15,303	1,797	8	16,349	1,943	13	14,625	1,738	3
Sep-30	15,302	1,795	8	16,341	1,934	13	14,617	1,730	3
Oct-30	15,420	1,800	8	16,563	1,933	13	14,816	1,729	3
Nov-30	15,575	1,809	8	16,635	1,950	13	14,881	1,744	3
Dec-30	15,663	1,820	8	16,711	1,965	13	14,948	1,758	3
Jan-31	15,748	1,841	8	16,834	1,983	13	14,960	1,762	3
Feb-31	15,767	1,849	8	16,855	1,998	13	14,978	1,775	3
Mar-31	15,745	1,846	8	16,808	1,981	13	14,937	1,760	3
Apr-31	15,699	1,840	8	16,780	1,969	13	14,912	1,750	3
May-31	15,673	1,834	8	16,673	1,976	13	14,817	1,756	3
Jun-31	15,584	1,827	8	16,636	1,973	13	14,784	1,753	3
Jul-31	15,499	1,817	8	16,579	1,968	13	14,733	1,749	3
Aug-31	15,404	1,809	8	16,511	1,962	13	14,673	1,743	3
Sep-31	15,403	1,807	8	16,503	1,953	13	14,665	1,736	3
Oct-31	15,521	1,811	8	16,727	1,952	13	14,865	1,735	3
Nov-31	15,678	1,821	8	16,800	1,969	13	14,930	1,750	3
Dec-31	15,767	1,832	8	16,876	1,984	13	14,998	1,764	3
Jan-32	15,852	1,853	8	17,001	2,003	14	15,010	1,768	2
Feb-32	15,871	1,861	8	17,022	2,017	14	15,028	1,781	2
Mar-32	15,848	1,859	8	16,975	2,000	14	14,986	1,766	2
Apr-32	15,803	1,852	8	16,946	1,988	14	14,961	1,756	2
May-32	15,777	1,846	8	16,838	1,996	14	14,866	1,762	2
Jun-32	15,687	1,839	8	16,801	1,992	14	14,833	1,759	2
Jul-32	15,602	1,829	8	16,743	1,987	14	14,782	1,754	2
Aug-32	15,505	1,821	8	16,674	1,981	14	14,721	1,749	2
Sep-32	15,504	1,819	8	16,666	1,973	14	14,714	1,742	2
Oct-32	15,624	1,823	8	16,893	1,972	14	14,914	1,741	2
Nov-32	15,781	1,833	8	16,966	1,988	14	14,979	1,756	2
Dec-32	15,871	1,844	8	17,043	2,004	14	15,047	1,769	2
Jan-33	15,956	1,865	8	17,169	2,023	14	15,059	1,774	2
Feb-33	15,975	1,873	8	17,190	2,037	14	15,077	1,787	2
Mar-33	15,953	1,871	8	17,143	2,020	14	15,036	1,772	2
Apr-33	15,907	1,864	8	17,113	2,008	14	15,010	1,761	2
May-33	15,881	1,859	8	17,005	2,015	14	14,915	1,768	2
Jun-33	15,790	1,851	8	16,967	2,012	14	14,882	1,765	2
Jul-33	15,705	1,841	8	16,909	2,007	14	14,831	1,760	2
Aug-33	15,608	1,833	8	16,839	2,001	14	14,770	1,755	2
Sep-33	15,607	1,831	8	16,831	1,992	14	14,762	1,747	2
Oct-33	15,727	1,835	8	17,060	1,991	14	14,963	1,746	2
Nov-33	15,885	1,845	8	17,134	2,008	14	15,028	1,761	2
Dec-33	15,975	1,856	8	17,212	2,024	14	15,097	1,775	2

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	Jan-12	6,562	892	1	6,562	892	1	6,562	892
Feb-12	6,578	893	1	6,578	893	1	6,578	893	1
Mar-12	6,562	899	1	6,562	899	1	6,562	899	1
Apr-12	6,555	898	2	6,555	898	2	6,555	898	2
May-12	6,559	894	1	6,559	894	1	6,559	894	1
Jun-12	6,492	892	1	6,492	892	1	6,492	892	1
Jul-12	6,479	890	1	6,479	890	1	6,479	890	1
Aug-12	6,478	888	8	6,478	888	8	6,478	888	8
Sep-12	6,452	883	5	6,452	883	5	6,452	883	5
Oct-12	6,465	882	7	6,465	882	7	6,465	882	7
Nov-12	6,557	883	7	6,557	883	7	6,557	883	7
Dec-12	6,585	894	7	6,585	894	7	6,585	894	7
Jan-13	6,595	898	7	6,595	898	7	6,595	898	7
Feb-13	6,607	903	7	6,607	903	7	6,607	903	7
Mar-13	6,602	899	1	6,602	899	1	6,602	899	1
Apr-13	6,589	899	1	6,589	899	1	6,589	899	1
May-13	6,544	901	1	6,544	901	1	6,544	901	1
Jun-13	6,503	896	3	6,503	896	3	6,503	896	3
Jul-13	6,468	892	3	6,468	892	3	6,468	892	3
Aug-13	6,443	896	5	6,443	896	5	6,443	896	5
Sep-13	6,461	889	7	6,461	889	7	6,461	889	7
Oct-13	6,472	887	6	6,472	887	6	6,472	887	6
Nov-13	6,595	900	4	6,595	900	4	6,595	900	4
Dec-13	6,621	903	2	6,621	903	2	6,621	903	2
Jan-14	6,644	902	4	6,635	903	4	6,608	900	4
Feb-14	6,646	903	2	6,647	908	2	6,620	905	2
Mar-14	6,633	902	1	6,642	904	1	6,615	901	1
Apr-14	6,617	900	1	6,629	904	1	6,602	901	1
May-14	6,603	899	1	6,583	906	1	6,557	903	1
Jun-14	6,566	896	1	6,542	901	1	6,516	898	1
Jul-14	6,532	894	1	6,507	897	1	6,481	894	1
Aug-14	6,522	893	5	6,482	901	5	6,456	898	5
Sep-14	6,506	893	7	6,500	894	7	6,474	891	7
Oct-14	6,543	895	7	6,511	892	7	6,485	889	7
Nov-14	6,621	900	4	6,635	905	4	6,608	902	4
Dec-14	6,649	902	2	6,661	908	2	6,634	904	2
Jan-15	6,677	904	4	6,674	909	4	6,621	902	4
Feb-15	6,686	905	2	6,687	914	2	6,633	907	2
Mar-15	6,666	904	1	6,681	910	1	6,628	903	1
Apr-15	6,654	903	1	6,668	910	1	6,615	903	1
May-15	6,637	901	1	6,623	912	1	6,570	905	1
Jun-15	6,603	899	1	6,581	907	1	6,529	900	1
Jul-15	6,568	896	1	6,546	903	1	6,494	896	1
Aug-15	6,556	895	5	6,521	907	5	6,469	900	5

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	Sep-15	6,543	895	7	6,539	900	7	6,487	893
Oct-15	6,578	898	7	6,550	898	7	6,498	891	7
Nov-15	6,657	903	4	6,674	911	4	6,621	903	4
Dec-15	6,683	905	2	6,701	913	2	6,648	906	2
Jan-16	6,716	907	4	6,714	914	4	6,635	903	4
Feb-16	6,724	908	2	6,727	919	2	6,647	908	2
Mar-16	6,705	907	1	6,722	915	1	6,642	904	1
Apr-16	6,693	906	1	6,708	915	1	6,629	904	1
May-16	6,675	904	1	6,663	917	1	6,583	906	1
Jun-16	6,642	902	1	6,621	912	1	6,542	901	1
Jul-16	6,605	899	1	6,585	908	1	6,507	897	1
Aug-16	6,596	898	5	6,560	912	5	6,482	901	5
Sep-16	6,581	898	7	6,578	905	7	6,500	894	7
Oct-16	6,616	901	7	6,589	903	7	6,511	892	7
Nov-16	6,696	906	4	6,714	916	4	6,635	905	4
Dec-16	6,722	908	2	6,741	919	2	6,661	908	2
Jan-17	6,755	910	4	6,755	920	4	6,648	905	4
Feb-17	6,762	911	2	6,767	925	2	6,660	910	2
Mar-17	6,744	909	1	6,762	921	1	6,655	906	1
Apr-17	6,731	908	1	6,749	921	1	6,642	906	1
May-17	6,714	907	1	6,702	923	1	6,597	908	1
Jun-17	6,679	905	1	6,660	918	1	6,555	903	1
Jul-17	6,643	902	1	6,625	914	1	6,520	899	1
Aug-17	6,633	901	5	6,599	918	5	6,495	903	5
Sep-17	6,619	901	7	6,617	911	7	6,513	896	7
Oct-17	6,654	904	7	6,629	908	7	6,524	894	7
Nov-17	6,734	909	4	6,755	922	4	6,648	907	4
Dec-17	6,760	911	2	6,781	924	2	6,674	910	2
Jan-18	6,803	914	4	6,795	925	4	6,661	907	4
Feb-18	6,810	914	2	6,808	930	2	6,673	912	2
Mar-18	6,792	913	1	6,802	926	1	6,668	908	1
Apr-18	6,780	912	1	6,789	926	1	6,655	908	1
May-18	6,762	911	1	6,743	928	1	6,610	910	1
Jun-18	6,728	908	1	6,700	923	1	6,568	905	1
Jul-18	6,692	906	1	6,664	919	1	6,533	901	1
Aug-18	6,681	905	5	6,639	923	5	6,508	905	5
Sep-18	6,667	905	7	6,657	916	7	6,526	898	7
Oct-18	6,664	904	7	6,669	914	7	6,537	896	7
Nov-18	6,734	909	4	6,795	927	4	6,661	909	4
Dec-18	6,766	911	2	6,822	930	2	6,687	912	2
Jan-19	6,830	918	4	6,836	931	4	6,675	909	4
Feb-19	6,837	918	2	6,848	936	2	6,687	914	2
Mar-19	6,819	917	1	6,843	932	1	6,682	910	1
Apr-19	6,807	916	1	6,830	932	1	6,668	910	1

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	May-19	6,789	914	1	6,783	934	1	6,623	912
Jun-19	6,755	912	1	6,741	929	1	6,581	907	1
Jul-19	6,719	909	1	6,704	925	1	6,546	903	1
Aug-19	6,708	908	5	6,678	929	5	6,521	907	5
Sep-19	6,694	908	7	6,697	921	7	6,539	900	7
Oct-19	6,691	908	7	6,709	919	7	6,550	898	7
Nov-19	6,761	912	4	6,836	933	4	6,675	911	4
Dec-19	6,793	915	2	6,863	936	2	6,701	913	2
Jan-20	6,858	921	4	6,877	936	4	6,688	911	4
Feb-20	6,865	922	2	6,890	942	2	6,700	916	2
Mar-20	6,846	920	1	6,884	937	1	6,695	912	1
Apr-20	6,834	919	1	6,871	937	1	6,682	912	1
May-20	6,816	918	1	6,824	940	1	6,636	914	1
Jun-20	6,782	916	1	6,781	934	1	6,595	909	1
Jul-20	6,746	913	1	6,745	930	1	6,559	905	1
Aug-20	6,735	912	5	6,719	934	5	6,534	909	5
Sep-20	6,720	912	7	6,737	927	7	6,552	902	7
Oct-20	6,717	912	7	6,749	925	7	6,563	899	7
Nov-20	6,788	916	4	6,877	938	4	6,688	912	4
Dec-20	6,820	918	2	6,904	941	2	6,714	915	2
Jan-21	6,885	925	4	6,918	942	4	6,701	912	4
Feb-21	6,892	925	2	6,931	947	2	6,713	918	2
Mar-21	6,874	924	1	6,926	943	1	6,708	913	1
Apr-21	6,862	923	1	6,912	943	1	6,695	913	1
May-21	6,843	922	1	6,865	945	1	6,649	916	1
Jun-21	6,809	919	1	6,822	940	1	6,608	910	1
Jul-21	6,773	916	1	6,785	936	1	6,572	906	1
Aug-21	6,762	916	5	6,759	940	5	6,547	910	5
Sep-21	6,747	916	7	6,778	933	7	6,565	903	7
Oct-21	6,744	915	7	6,789	930	7	6,576	901	7
Nov-21	6,816	920	4	6,918	944	4	6,701	914	4
Dec-21	6,847	922	2	6,946	947	2	6,728	917	2
Jan-22	6,913	929	4	6,960	948	4	6,715	914	4
Feb-22	6,920	929	2	6,972	953	2	6,727	919	2
Mar-22	6,901	928	1	6,967	949	1	6,722	915	1
Apr-22	6,889	927	1	6,953	949	1	6,709	915	1
May-22	6,871	925	1	6,906	951	1	6,663	917	1
Jun-22	6,837	923	1	6,863	946	1	6,621	912	1
Jul-22	6,800	920	1	6,826	941	1	6,585	908	1
Aug-22	6,789	919	5	6,799	946	5	6,560	912	5
Sep-22	6,774	919	7	6,818	938	7	6,578	905	7
Oct-22	6,771	919	7	6,830	936	7	6,589	903	7
Nov-22	6,843	923	4	6,960	950	4	6,715	916	4
Dec-22	6,875	926	2	6,987	953	2	6,741	919	2



## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	Jan-23	6,940	932	4	7,002	953	4	6,728	916
Feb-23	6,947	933	2	7,014	959	2	6,740	921	2
Mar-23	6,929	931	1	7,009	954	1	6,735	917	1
Apr-23	6,917	931	1	6,995	954	1	6,722	917	1
May-23	6,898	929	1	6,947	957	1	6,676	919	1
Jun-23	6,864	927	1	6,904	951	1	6,634	914	1
Jul-23	6,827	924	1	6,867	947	1	6,599	910	1
Aug-23	6,816	923	5	6,840	951	5	6,573	914	5
Sep-23	6,801	923	7	6,859	944	7	6,591	907	7
Oct-23	6,798	923	7	6,871	942	7	6,603	905	7
Nov-23	6,870	927	4	7,002	955	4	6,728	918	4
Dec-23	6,902	929	2	7,029	958	2	6,755	921	2
Jan-24	6,968	936	4	7,044	959	4	6,742	918	4
Feb-24	6,975	937	2	7,056	964	2	6,754	923	2
Mar-24	6,957	935	1	7,051	960	1	6,749	919	1
Apr-24	6,944	934	1	7,037	960	1	6,735	919	1
May-24	6,926	933	1	6,989	962	1	6,689	921	1
Jun-24	6,892	930	1	6,945	957	1	6,648	916	1
Jul-24	6,854	928	1	6,908	953	1	6,612	912	1
Aug-24	6,843	927	5	6,881	957	5	6,586	916	5
Sep-24	6,829	927	7	6,900	949	7	6,605	909	7
Oct-24	6,825	926	7	6,912	947	7	6,616	907	7
Nov-24	6,898	931	4	7,044	961	4	6,742	920	4
Dec-24	6,930	933	2	7,071	964	2	6,768	923	2
Jan-25	6,996	940	4	7,086	965	4	6,755	920	4
Feb-25	7,003	940	2	7,099	970	2	6,767	925	2
Mar-25	6,984	939	1	7,093	966	1	6,762	921	1
Apr-25	6,972	938	1	7,079	966	1	6,749	921	1
May-25	6,953	937	1	7,031	968	1	6,703	923	1
Jun-25	6,919	934	1	6,987	963	1	6,661	918	1
Jul-25	6,882	931	1	6,949	958	1	6,625	914	1
Aug-25	6,870	930	5	6,923	963	5	6,599	918	5
Sep-25	6,856	930	7	6,942	955	7	6,618	911	7
Oct-25	6,853	930	7	6,954	953	7	6,629	909	7
Nov-25	6,925	934	4	7,086	967	4	6,755	922	4
Dec-25	6,957	937	2	7,114	970	2	6,782	924	2
Jan-26	7,024	944	4	7,128	971	4	6,769	922	4
Feb-26	7,031	944	2	7,141	976	2	6,781	927	2
Mar-26	7,012	943	1	7,136	972	1	6,776	923	1
Apr-26	7,000	942	1	7,122	972	1	6,762	923	1
May-26	6,981	940	1	7,073	974	1	6,716	925	1
Jun-26	6,947	938	1	7,029	968	1	6,674	920	1
Jul-26	6,909	935	1	6,991	964	1	6,638	915	1
Aug-26	6,898	934	5	6,964	968	5	6,613	920	5

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	Sep-26	6,883	934	7	6,984	961	7	6,631	912
Oct-26	6,880	934	7	6,995	959	7	6,642	910	7
Nov-26	6,953	938	4	7,128	972	4	6,769	923	4
Dec-26	6,985	941	2	7,156	976	2	6,795	926	2
Jan-27	7,052	947	4	7,171	976	4	6,782	923	4
Feb-27	7,059	948	2	7,184	982	2	6,794	929	2
Mar-27	7,040	946	1	7,179	978	1	6,789	925	1
Apr-27	7,028	945	1	7,165	978	1	6,776	925	1
May-27	7,009	944	1	7,116	980	1	6,730	927	1
Jun-27	6,975	942	1	7,071	974	1	6,687	921	1
Jul-27	6,937	939	1	7,033	970	1	6,651	917	1
Aug-27	6,925	938	5	7,006	974	5	6,626	921	5
Sep-27	6,911	938	7	7,025	967	7	6,644	914	7
Oct-27	6,908	938	7	7,037	964	7	6,656	912	7
Nov-27	6,981	942	4	7,171	978	4	6,782	925	4
Dec-27	7,013	944	2	7,199	981	2	6,809	928	2
Jan-28	7,080	951	4	7,214	982	4	6,796	925	4
Feb-28	7,087	952	2	7,227	988	2	6,808	930	2
Mar-28	7,069	950	1	7,222	983	1	6,803	926	1
Apr-28	7,056	949	1	7,208	983	1	6,789	926	1
May-28	7,037	948	1	7,158	986	1	6,743	928	1
Jun-28	7,002	945	1	7,114	980	1	6,701	923	1
Jul-28	6,965	942	1	7,075	976	1	6,665	919	1
Aug-28	6,953	942	5	7,048	980	5	6,639	923	5
Sep-28	6,938	942	7	7,068	972	7	6,658	916	7
Oct-28	6,935	941	7	7,080	970	7	6,669	914	7
Nov-28	7,009	946	4	7,214	984	4	6,796	927	4
Dec-28	7,041	948	2	7,243	987	2	6,822	930	2
Jan-29	7,108	955	4	7,257	988	4	6,809	927	4
Feb-29	7,116	955	2	7,271	994	2	6,822	932	2
Mar-29	7,097	954	1	7,265	989	1	6,816	928	1
Apr-29	7,084	953	1	7,251	989	1	6,803	928	1
May-29	7,065	952	1	7,201	991	1	6,757	930	1
Jun-29	7,030	949	1	7,156	986	1	6,714	925	1
Jul-29	6,993	946	1	7,118	982	1	6,678	921	1
Aug-29	6,981	945	5	7,090	986	5	6,652	925	5
Sep-29	6,966	945	7	7,110	978	7	6,671	918	7
Oct-29	6,963	945	7	7,122	976	7	6,682	916	7
Nov-29	7,037	950	4	7,257	990	4	6,809	929	4
Dec-29	7,069	952	2	7,286	993	2	6,836	932	2
Jan-30	7,137	959	4	7,301	994	4	6,823	929	4
Feb-30	7,144	959	2	7,314	1,000	2	6,835	934	2
Mar-30	7,125	958	1	7,309	995	1	6,830	930	1
Apr-30	7,113	957	1	7,294	995	1	6,817	930	1

## APPENDIX 2.2: CUSTOMER FORECASTS BY REGION

### LA GRANDE

	Oregon - Expected Growth			Oregon - High Growth			Oregon - Low Growth		
	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers	Residential LaGrande Customers	Commercial LaGrande Customers	Industrial LaGrande Customers
	May-30	7,093	955	1	7,245	997	1	6,770	932
Jun-30	7,059	953	1	7,199	992	1	6,728	927	1
Jul-30	7,021	950	1	7,160	987	1	6,691	923	1
Aug-30	7,009	949	5	7,133	992	5	6,666	927	5
Sep-30	6,994	949	7	7,153	984	7	6,684	920	7
Oct-30	6,991	949	7	7,165	982	7	6,696	918	7
Nov-30	7,065	953	4	7,301	996	4	6,823	931	4
Dec-30	7,098	956	2	7,330	999	2	6,850	934	2
Jan-31	7,165	963	4	7,345	1,000	4	6,836	931	4
Feb-31	7,173	963	2	7,358	1,006	2	6,849	936	2
Mar-31	7,154	962	1	7,353	1,001	1	6,844	932	1
Apr-31	7,141	961	1	7,338	1,001	1	6,830	932	1
May-31	7,122	959	1	7,288	1,003	1	6,784	934	1
Jun-31	7,087	957	1	7,242	998	1	6,741	929	1
Jul-31	7,049	954	1	7,203	993	1	6,705	925	1
Aug-31	7,037	953	5	7,175	998	5	6,679	929	5
Sep-31	7,022	953	7	7,196	990	7	6,698	922	7
Oct-31	7,019	953	7	7,208	988	7	6,709	919	7
Nov-31	7,093	957	4	7,345	1,002	4	6,836	933	4
Dec-31	7,126	960	2	7,374	1,005	2	6,863	936	2
Jan-32	7,194	966	4	7,389	1,006	4	6,850	933	4
Feb-32	7,202	967	2	7,402	1,012	2	6,863	938	2
Mar-32	7,182	966	1	7,397	1,007	1	6,857	934	1
Apr-32	7,170	965	1	7,382	1,007	1	6,844	934	1
May-32	7,150	963	1	7,332	1,009	1	6,797	936	1
Jun-32	7,115	960	1	7,286	1,004	1	6,755	931	1
Jul-32	7,077	958	1	7,247	999	1	6,718	927	1
Aug-32	7,065	957	5	7,219	1,004	5	6,692	931	5
Sep-32	7,050	957	7	7,239	996	7	6,711	923	7
Oct-32	7,047	956	7	7,251	994	7	6,722	921	7
Nov-32	7,122	961	4	7,389	1,008	4	6,850	935	4
Dec-32	7,155	963	2	7,418	1,011	2	6,877	938	2
Jan-33	7,223	970	4	7,433	1,012	4	6,864	935	4
Feb-33	7,230	971	2	7,447	1,018	2	6,876	940	2
Mar-33	7,211	969	1	7,441	1,013	1	6,871	936	1
Apr-33	7,198	968	1	7,426	1,013	1	6,858	936	1
May-33	7,179	967	1	7,376	1,016	1	6,811	938	1
Jun-33	7,144	964	1	7,329	1,010	1	6,768	933	1
Jul-33	7,105	961	1	7,290	1,005	1	6,732	928	1
Aug-33	7,093	961	5	7,262	1,010	5	6,706	933	5
Sep-33	7,078	961	7	7,282	1,002	7	6,724	925	7
Oct-33	7,075	960	7	7,295	1,000	7	6,736	923	7
Nov-33	7,150	965	4	7,433	1,014	4	6,864	936	4
Dec-33	7,183	967	2	7,462	1,017	2	6,891	939	2

### APPENDIX 2.3: DEMAND COEFFICIENTS

	January	February	March	April	May	June	July	August	September	October	November	December
<b>HEAT COEFFICIENTS</b>												
WA/ID Residential	0.009653	0.009544	0.009042	0.007642	0.005096	0.003866	0.000691	0.000768	0.002725	0.006970	0.008833	0.009620
WA/ID Commercial	0.048562	0.047053	0.043468	0.035557	0.023406	0.020180	0.006577	0.008521	0.016160	0.032551	0.042232	0.047461
WA/ID Industrial	0.117333	0.112057	0.105316	0.098644	0.097972	0.136265	0.130544	0.067139	0.119601	0.134183	0.114920	0.126836
Roseburg Residential	0.010687	0.010367	0.009721	0.007918	0.005406	0.004600	0.001486	0.003424	0.002799	0.006260	0.007701	0.010748
Roseburg Commercial	0.042045	0.039664	0.035551	0.030689	0.020086	0.021323	0.010073	0.030308	0.016645	0.032359	0.029985	0.045113
Roseburg Industrial	0.134944	0.128278	0.193123	0.250720	0.244527	0.365646	0.871099	1.458261	1.572231	0.765100	0.154081	0.102736
Medford Residential	0.011011	0.010571	0.009769	0.008484	0.006075	0.004465	0.000000	0.000229	0.003441	0.007392	0.009451	0.010665
Medford Commercial	0.043468	0.039906	0.036884	0.033342	0.024208	0.021766	0.000000	0.001982	0.021539	0.030094	0.036756	0.043289
Medford Industrial	0.048846	0.022250	0.039482	0.065815	0.068050	0.127835	0.000000	0.000000	0.318489	0.085234	0.056711	0.079292
LaGrande Residential	0.009396	0.008731	0.008246	0.006698	0.006580	0.003782	0.001318	0.003200	0.000622	0.005574	0.007952	0.008383
LaGrande Commercial	0.039780	0.036526	0.033212	0.023394	0.021045	0.012020	0.007462	0.036060	0.005256	0.019711	0.031028	0.035610
LaGrande Industrial	0.000000	0.000000	0.014191	0.156925	0.225875	2.103282	0.762568	18.064739	3.936633	0.839843	0.025550	0.007093
Klamath Residential	0.008051	0.007645	0.007361	0.006111	0.003960	0.002162	0.000125	0.000024	0.001179	0.004770	0.006925	0.007151
Klamath Commercial	0.031553	0.029541	0.027199	0.021085	0.012997	0.012421	0.003716	0.005496	0.009214	0.017109	0.025669	0.026212
Klamath Industrial	0.033503	0.029395	0.035901	0.044675	0.026656	0.073581	0.043124	0.050675	0.116683	0.043722	0.029335	0.053690
<b>BASE COEFFICIENTS</b>												
WA/ID Residential	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899	0.051899
WA/ID Commercial	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193	0.354193
WA/ID Industrial	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451	3.941451
Roseburg Residential	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418	0.053418
Roseburg Commercial	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016	0.378016
Roseburg Industrial	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912	16.187912
Medford Residential	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191	0.044191
Medford Commercial	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099	0.314099
Medford Industrial	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537	2.135537
LaGrande Residential	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280	0.054280
LaGrande Commercial	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460	0.287460
LaGrande Industrial	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065	0.869065
Klamath Residential	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598	0.038598
Klamath Commercial	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845	0.262845
Klamath Industrial	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956	2.919956
<b>SUPER PEAK 1/</b>												
WA/ID Res	0.009605614	0.009605614										0.009605614
WA/ID Com	0.047692046	0.047692046										0.047692046
WA/ID Ind	0.118742005	0.118742005										0.118742005
Rose Res	0.010600643	0.010600643										0.010600643
Rose Com	0.042273836	0.042273836										0.042273836
Rose Ind	0.121986166	0.121986166										0.121986166
Medford Res	0.010749125	0.010749125										0.010749125
Medford Com	0.042220865	0.042220865										0.042220865
Medford Ind	0.050129224	0.050129224										0.050129224
LaGrande Res	0.008836594	0.008836594										0.008836594
LaGrande Com	0.037305148	0.037305148										0.037305148
LaGrande Ind	0.002364178	0.002364178										0.002364178
Klamath Res	0.007615622	0.007615622										0.007615622
Klamath Com	0.029101928	0.029101928										0.029101928
Klamath Ind	0.038862569	0.038862569										0.038862569
1/ Average of DEC JAN FEB heat coefficients												

**APPENDIX 2.3: WA/ID BASE COEFFICIENT CALCULATION**

<b>WA-ID</b>	
<b>Average Actual Demand by Class</b>	
Year	Month 7
2009 Average of Res Demand	10,211
Average of Com Demand	7,583
Average of Ind Demand	774
2010 Average of Res Demand	10,717
Average of Com Demand	8,158
Average of Ind Demand	1,177
2011 Average of Res Demand	10,772
Average of Com Demand	8,383
Average of Ind Demand	1,146
2012 Average of Res Demand	10,027
Average of Com Demand	8,124
Average of Ind Demand	941
2013 Average of Res Demand	10,259
Average of Com Demand	7,204
Average of Ind Demand	636
Total Average of Res Demand	10,397
Total Average of Com Demand	7,890
Total Average of Ind Demand	935

**Average Actual Customer Count by Class**

Year	Month 7
2009 Average of Res Cust	196,276
Average of Com Cust	21,928
Average of Ind Cust	234
2010 Average of Res Cust	197,541
Average of Com Cust	22,126
Average of Ind Cust	229
2011 Average of Res Cust	198,492
Average of Com Cust	22,218
Average of Ind Cust	232
2012 Average of Res Cust	200,290
Average of Com Cust	22,315
Average of Ind Cust	233
2013 Average of Res Cust	199,628
Average of Com Cust	22,410
Average of Ind Cust	226
Total Average of Res Cust	198,445
Total Average of Com Cust	22,199
Total Average of Ind Cust	231

**Base Coefficients***(Actual Average Demand/Customer Count)*

0.051899	Res Base Usage
0.354193	Com Base Usage
3.941451	Ind Base Usage

**APPENDIX 2.3: MEDFORD BASE COEFFICIENT CALCULATION**

<b>Medford</b>		
<b>Average Actual Demand by Class</b>		
Year		Month 7
2009	Average of Res Demand	2,248
	Average of Com Demand	2,061
	Average of Ind Demand	36
2010	Average of Res Demand	2,265
	Average of Com Demand	2,047
	Average of Ind Demand	38
2011	Average of Res Demand	2,123
	Average of Com Demand	1,935
	Average of Ind Demand	37
2012	Average of Res Demand	2,278
	Average of Com Demand	2,057
	Average of Ind Demand	31
2013	Average of Res Demand	2,297
	Average of Com Demand	2,083
	Average of Ind Demand	40
Total Average of Res Demand		2,242
Total Average of Com Demand		2,037
Total Average of Ind Demand		36
<b>Average Actual Customer Count by Class</b>		
Year		Month 7
2009	Average of Res Cust	49,868
	Average of Com Cust	6,301
	Average of Ind Cust	13
2010	Average of Res Cust	50,420
	Average of Com Cust	6,417
	Average of Ind Cust	13
2011	Average of Res Cust	50,367
	Average of Com Cust	6,403
	Average of Ind Cust	17
2012	Average of Res Cust	50,727
	Average of Com Cust	6,445
	Average of Ind Cust	17
2013	Average of Res Cust	50,499
	Average of Com Cust	6,493
	Average of Ind Cust	16
Total Average of Res Cust		50,376
Total Average of Com Cust		6,412
Total Average of Ind Cust		15
<b>Base Coefficients</b>		
<i>(Actual Average Demand/Customer Count)</i>		
	0.044191	Res Base Usage
	0.314099	Com Base Usage
	2.135537	Ind Base Usage

**APPENDIX 2.3: ROSEBURG BASE COEFFICIENT CALCULATION**

<b>Roseburg</b>		
<b>Average Actual Demand by Class</b>		
Year		Month 7
2009	Average of Res Demand	536
	Average of Com Demand	680
	Average of Ind Demand	32
2010	Average of Res Demand	565
	Average of Com Demand	644
	Average of Ind Demand	38
2011	Average of Res Demand	841
	Average of Com Demand	953
	Average of Ind Demand	33
2012	Average of Res Demand	680
	Average of Com Demand	820
	Average of Ind Demand	48
2013	Average of Res Demand	559
	Average of Com Demand	622
	Average of Ind Demand	32
Total Average of Res Demand		636
Total Average of Com Demand		744
Total Average of Ind Demand		37
<b>Average Actual Customer Count by Class</b>		
Year		Month 7
2009	Average of Res Cust	12,874
	Average of Com Cust	2,120
	Average of Ind Cust	1
2010	Average of Res Cust	12,960
	Average of Com Cust	2,107
	Average of Ind Cust	2
2011	Average of Res Cust	12,961
	Average of Com Cust	2,096
	Average of Ind Cust	2
2012	Average of Res Cust	12,928
	Average of Com Cust	2,112
	Average of Ind Cust	2
2013	Average of Res Cust	13,059
	Average of Com Cust	2,128
	Average of Ind Cust	3
Total Average of Res Cust		12,956
Total Average of Com Cust		2,113
Total Average of Ind Cust		2
		<b>Base Coefficients</b>
		<i>(Actual Average Demand/Customer Count)</i>
		0.053418 Res Base Usage
		0.378016 Com Base Usage
		16.187912 Ind Base Usage

**APPENDIX 2.3: KLAMATH FALLS BASE COEFFICIENT CALCULATION**

<b>Klamath Falls</b>		
<b>Average Actual Demand by Class</b>		
Year		Month 7
2009	Average of Res Demand	458
	Average of Com Demand	426
	Average of Ind Demand	15
2010	Average of Res Demand	503
	Average of Com Demand	475
	Average of Ind Demand	21
2011	Average of Res Demand	531
	Average of Com Demand	480
	Average of Ind Demand	21
2012	Average of Res Demand	507
	Average of Com Demand	424
	Average of Ind Demand	22
2013	Average of Res Demand	559
	Average of Com Demand	383
	Average of Ind Demand	21
Total Average of Res Demand		512
Total Average of Com Demand		438
Total Average of Ind Demand		20

**Average Actual Customer Count by Class**

Year		Month 7
2009	Average of Res Cust	13,604
	Average of Com Cust	1,615
	Average of Ind Cust	6
2010	Average of Res Cust	13,679
	Average of Com Cust	1,610
	Average of Ind Cust	7
2011	Average of Res Cust	13,725
	Average of Com Cust	1,621
	Average of Ind Cust	7
2012	Average of Res Cust	13,770
	Average of Com Cust	1,625
	Average of Ind Cust	7
2013	Average of Res Cust	13,885
	Average of Com Cust	1,648
	Average of Ind Cust	8
Total Average of Res Cust		13,733
Total Average of Com Cust		1,624
Total Average of Ind Cust		7

**Base Coefficients***(Actual Average Demand/Customer Count)*

0.038598	Res Base Usage
0.262845	Com Base Usage
2.919956	Ind Base Usage



**APPENDIX 2.3: LA GRANDE BASE COEFFICIENT CALCULATION**

<b>LaGrande</b>				
<b>Average Actual Demand by Class</b>				
Year	Values	Month		
		7	8	Grand Total
2009	Average of Res Demand	286	409	347
	Average of Com Demand	234	323	279
	Average of Ind Demand	9	665	337
2010	Average of Res Demand	299	477	388
	Average of Com Demand	225	357	291
	Average of Ind Demand	21	557	289
2011	Average of Res Demand	310	384	347
	Average of Com Demand	237	380	308
	Average of Ind Demand	13	659	336
2012	Average of Res Demand	416	413	414
	Average of Com Demand	307	404	356
	Average of Ind Demand	(6)	691	343
2013	Average of Res Demand	326	734	530
	Average of Com Demand	219	541	380
	Average of Ind Demand	14	113	63
Total Average of Res Demand		327	483	405
Total Average of Com Demand		244	401	323
Total Average of Ind Demand		10	537	274

**Average Actual Customer Count by Class**

Year	Values	Month		
		7	8	Grand Total
2009	Average of Res Cust	6,362	6,338	6,350
	Average of Com Cust	891	887	889
	Average of Ind Cust	2	7	5
2010	Average of Res Cust	6,401	6,392	6,397
	Average of Com Cust	885	882	884
	Average of Ind Cust	1	6	4
2011	Average of Res Cust	6,427	6,400	6,414
	Average of Com Cust	873	875	874
	Average of Ind Cust	13	7	10
2012	Average of Res Cust	6,478	6,452	6,465
	Average of Com Cust	888	883	886
	Average of Ind Cust	8	7	8
2013	Average of Res Cust	6,468	6,443	6,456
	Average of Com Cust	892	896	894
	Average of Ind Cust	3	5	4
Total Average of Res Cust		6,427	6,405	6,416
Total Average of Com Cust		886	885	885
Total Average of Ind Cust		5	6	6

**Base Coefficients***(Actual Average Demand/Customer Count)*

0.054280	Res Base Usage
0.287460	Com Base Usage
0.869065	Ind Base Usage

**APPENDIX 2.4: HEATING DEGREE DAY DATA MONTHLY TABLES**

Temp Pattern	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
WA/ID	2014	1,122	844	777	490	280	138	-	49	82	558	1,132	1,210	6,681
WA/ID	2015	1,346	1,008	769	570	224	206	88	2	147	692	1,011	1,158	7,221
WA/ID	2016	1,128	918	871	512	311	142	7	34	218	507	1,039	1,163	6,849
WA/ID	2017	1,164	1,085	735	530	322	162	31	36	124	648	805	1,050	6,692
WA/ID	2018	1,102	930	861	584	346	195	38	46	272	490	1,132	1,131	7,128
WA/ID	2019	1,250	965	903	598	285	155	45	21	237	470	779	1,191	6,899
WA/ID	2020	1,219	857	959	581	361	128	25	28	139	685	859	1,190	7,031
WA/ID	2021	1,141	901	861	547	486	161	83	2	200	603	887	1,221	7,094
WA/ID	2022	1,111	784	871	599	399	95	38	19	219	692	709	1,313	6,847
WA/ID	2023	1,034	887	738	607	244	123	29	24	247	482	821	1,190	6,426
WA/ID	2024	1,187	859	862	518	352	126	90	8	228	535	915	1,119	6,800
WA/ID	2025	1,072	962	821	529	275	95	57	13	296	511	937	1,313	6,881
WA/ID	2026	1,230	1,008	794	541	270	105	4	6	77	642	833	1,203	6,712
WA/ID	2027	1,303	999	783	472	435	179	3	2	105	512	1,020	1,089	6,902
WA/ID	2028	1,197	951	680	557	422	164	-	44	178	644	1,132	1,015	6,985
WA/ID	2029	1,055	806	886	658	258	153	33	47	139	547	800	1,170	6,552
WA/ID	2030	1,194	1,116	698	558	331	124	8	19	199	545	712	1,246	6,749
WA/ID	2031	1,127	995	871	477	445	121	28	40	251	594	893	1,097	6,938
WA/ID	2032	1,296	1,024	875	515	416	174	-	2	167	522	873	1,177	7,039
WA/ID	2033	1,118	849	934	581	372	203	9	4	127	655	910	1,171	6,933

Temp Pattern	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Klamath Falls	2014	978	910	825	780	478	178	3	91	120	497	914	1,294	7,068
Klamath Falls	2015	918	635	933	497	405	340	67	43	136	400	722	1,175	6,270
Klamath Falls	2016	1,072	940	830	479	362	158	19	59	219	629	917	1,083	6,568
Klamath Falls	2017	1,259	826	892	459	510	255	47	83	81	404	836	908	6,760
Klamath Falls	2018	1,044	788	776	682	620	232	-	125	232	575	946	1,074	7,094
Klamath Falls	2019	1,107	878	595	691	472	164	39	29	148	463	732	973	6,290
Klamath Falls	2020	776	925	694	780	364	228	25	13	70	605	926	975	6,380
Klamath Falls	2021	973	833	896	664	519	233	80	70	259	440	643	1,018	6,626
Klamath Falls	2022	1,169	898	816	478	620	205	39	40	393	451	1,051	999	7,158
Klamath Falls	2023	914	860	933	702	419	102	76	83	220	356	856	1,149	6,670
Klamath Falls	2024	1,103	872	988	654	384	219	68	50	251	566	779	1,154	7,086
Klamath Falls	2025	1,238	1,091	780	550	400	206	103	61	276	322	812	956	6,795
Klamath Falls	2026	1,163	836	711	561	554	241	13	70	230	510	801	1,248	6,939
Klamath Falls	2027	892	846	779	577	309	324	89	13	36	609	1,079	1,077	6,629
Klamath Falls	2028	1,151	801	922	735	259	142	-	98	146	419	706	989	6,369
Klamath Falls	2029	1,012	811	719	646	392	164	52	31	166	624	848	1,132	6,598
Klamath Falls	2030	1,042	690	848	656	419	154	53	46	301	636	750	921	6,518
Klamath Falls	2031	998	961	896	605	462	82	19	79	55	324	906	1,046	6,432
Klamath Falls	2032	1,211	748	791	540	336	152	80	29	393	599	1,122	1,166	7,167
Klamath Falls	2033	1,068	707	719	561	333	272	104	30	187	517	860	1,070	6,429

Temp Pattern	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Medford	2014	743	650	580	527	254	51	-	33	26	300	652	1,111	4,927
Medford	2015	704	490	691	316	199	139	8	-	32	224	524	919	4,248
Medford	2016	804	669	585	304	167	41	-	9	66	235	654	821	4,354
Medford	2017	923	596	649	290	278	92	4	27	11	401	600	693	4,565
Medford	2018	785	572	531	445	343	80	-	59	71	374	673	811	4,743
Medford	2019	826	629	393	451	249	44	3	-	37	267	531	703	4,133
Medford	2020	602	660	447	519	168	77	-	-	6	402	660	705	4,245
Medford	2021	740	601	653	433	285	80	11	17	81	245	465	751	4,361
Medford	2022	865	642	571	303	343	65	3	-	139	256	743	731	4,662
Medford	2023	702	618	691	459	210	19	10	27	66	224	614	891	4,530
Medford	2024	823	625	773	426	184	72	8	2	78	365	562	897	4,816
Medford	2025	910	765	535	353	196	66	15	10	88	224	584	693	4,440
Medford	2026	862	602	464	361	312	84	-	18	70	312	577	998	4,659
Medford	2027	688	609	533	372	127	128	13	-	3	406	761	814	4,454
Medford	2028	854	580	679	482	89	32	-	39	36	226	514	719	4,252
Medford	2029	765	586	473	420	190	44	5	-	44	420	608	873	4,429
Medford	2030	784	510	604	427	210	39	5	-	98	431	543	693	4,345
Medford	2031	756	682	653	392	242	19	-	24	3	224	647	781	4,422
Medford	2032	893	546	546	346	147	37	11	-	145	397	761	910	4,739
Medford	2033	801	520	472	361	145	100	16	-	53	319	614	817	4,218

**APPENDIX 2.4: HEATING DEGREE DAY DATA MONTHLY TABLES**

Temp														
Pattern	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
Roseburg	2014	684	492	487	277	153	58	-	9	26	289	654	740	3,868
Roseburg	2015	862	606	479	369	99	131	19	-	49	356	608	707	4,285
Roseburg	2016	688	543	581	302	184	61	2	4	74	256	627	710	4,032
Roseburg	2017	717	645	445	323	195	83	7	5	41	348	473	638	3,919
Roseburg	2018	668	552	571	385	218	119	8	8	93	245	654	690	4,211
Roseburg	2019	784	576	613	400	159	76	10	-	80	232	456	728	4,113
Roseburg	2020	760	501	622	381	232	46	6	2	46	356	508	727	4,187
Roseburg	2021	699	531	571	342	339	82	18	-	67	319	527	747	4,243
Roseburg	2022	675	449	581	402	269	12	8	-	74	356	405	806	4,037
Roseburg	2023	615	521	448	411	119	41	7	1	84	240	484	727	3,696
Roseburg	2024	735	502	572	309	224	44	20	-	77	275	545	683	3,985
Roseburg	2025	645	574	531	322	149	12	13	-	106	259	560	806	3,975
Roseburg	2026	768	606	504	335	144	21	1	-	21	345	491	736	3,971
Roseburg	2027	825	600	493	234	304	101	1	-	34	259	615	663	4,129
Roseburg	2028	742	566	388	354	292	85	-	7	60	346	654	616	4,110
Roseburg	2029	632	465	596	469	132	73	7	8	46	282	470	715	3,895
Roseburg	2030	740	645	408	355	203	42	2	-	67	281	412	763	3,917
Roseburg	2031	688	597	581	263	314	38	6	6	85	313	531	668	4,090
Roseburg	2032	819	617	585	305	286	96	-	-	56	266	517	719	4,266
Roseburg	2033	681	495	622	380	243	127	2	-	41	353	536	715	4,197
Temp														
Pattern	Year	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
LaGrande	2014	881	847	604	486	478	119	52	74	258	478	935	995	6,206
LaGrande	2015	909	848	792	563	227	123	24	37	244	505	744	990	6,006
LaGrande	2016	1,105	799	624	574	284	162	13	75	297	613	650	866	6,061
LaGrande	2017	1,015	812	685	518	396	158	28	20	231	537	656	1,166	6,222
LaGrande	2018	1,113	712	781	619	324	202	74	42	151	448	781	1,082	6,329
LaGrande	2019	973	711	755	458	396	120	49	56	206	485	633	1,156	5,997
LaGrande	2020	1,018	807	636	674	466	196	55	59	251	487	755	1,023	6,427
LaGrande	2021	840	825	727	563	346	84	17	61	190	490	622	1,162	5,927
LaGrande	2022	882	933	843	599	337	121	63	36	169	491	831	910	6,215
LaGrande	2023	1,030	915	748	459	345	172	69	9	97	492	952	1,039	6,327
LaGrande	2024	908	874	764	547	290	167	-	56	219	488	899	978	6,191
LaGrande	2025	913	806	767	513	313	138	59	49	231	560	756	1,083	6,187
LaGrande	2026	965	848	805	502	368	156	-	42	174	524	803	1,043	6,231
LaGrande	2027	1,058	925	718	589	219	151	53	80	246	614	585	935	6,172
LaGrande	2028	1,003	797	843	637	340	174	44	20	109	581	726	1,078	6,352
LaGrande	2029	1,021	788	740	488	362	167	14	57	103	591	695	1,012	6,037
LaGrande	2030	1,032	884	777	441	327	158	81	105	181	459	842	1,016	6,304
LaGrande	2031	1,030	801	696	496	429	213	39	39	297	584	805	895	6,324
LaGrande	2032	840	737	744	409	294	101	-	26	229	515	760	1,121	5,775
LaGrande	2033	1,085	710	811	654	245	154	4	91	209	391	759	1,029	6,141

**APPENDIX 2.4: HEATING DEGREE DAILY MONTH BY AREA**

Temp Pattern	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
WA/ID	1	36	35	29	23	16	4	0	0	0	8	28	32
WA/ID	2	37	35	28	24	15	6	0	0	0	13	27	33
WA/ID	3	38	35	29	23	15	4	0	0	0	13	27	36
WA/ID	4	36	32	29	22	16	4	0	0	0	13	27	37
WA/ID	5	37	33	29	22	15	7	0	0	2	15	28	37
WA/ID	6	36	32	29	20	15	9	0	0	3	14	26	38
WA/ID	7	34	33	28	20	14	8	0	0	3	14	25	39
WA/ID	8	34	34	29	20	13	9	0	0	2	15	25	39
WA/ID	9	34	34	27	21	13	8	0	0	3	16	27	39
WA/ID	10	34	35	27	20	12	7	0	0	3	17	27	37
WA/ID	11	37	35	25	19	11	7	0	0	2	18	27	36
WA/ID	12	36	33	25	20	10	5	0	0	1	18	26	35
WA/ID	13	35	62	24	20	11	4	0	0	1	16	26	35
WA/ID	14	33	72	24	22	8	5	0	0	0	16	28	35
WA/ID	15	36	82	24	21	8	4	0	0	1	18	27	35
WA/ID	16	37	67	24	18	8	3	0	0	3	17	27	35
WA/ID	17	36	57	25	19	9	4	0	0	5	17	27	36
WA/ID	18	35	31	25	19	9	5	0	0	5	18	29	51
WA/ID	19	35	30	25	19	8	6	0	0	6	18	29	56
WA/ID	20	34	30	24	16	11	4	0	0	9	18	29	61
WA/ID	21	35	29	25	16	11	1	0	0	10	19	32	58
WA/ID	22	36	29	24	16	11	1	0	0	8	19	34	53
WA/ID	23	35	30	24	16	10	2	0	0	6	21	33	38
WA/ID	24	35	33	24	17	7	2	0	0	6	22	32	38
WA/ID	25	34	34	24	16	8	1	0	0	5	23	32	37
WA/ID	26	35	34	24	16	8	1	0	0	7	23	33	37
WA/ID	27	36	33	24	15	7	0	0	0	7	23	34	36
WA/ID	28	36	32	24	16	8	0	0	0	7	23	34	35
WA/ID	29	34	30	23	16	8	0	0	0	7	25	33	36
WA/ID	30	33		21	16	7	0	0	0	8	26	32	38
WA/ID	31	33		22		5		0	0		26		37

Temp Pattern	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
LaGrande	1	33	32	27	21	16	5	0	0	2	9	26	29
LaGrande	2	32	32	25	22	16	5	0	0	3	12	24	31
LaGrande	3	35	31	27	21	15	6	0	0	2	12	24	33
LaGrande	4	34	28	27	21	15	4	0	0	0	14	23	34
LaGrande	5	34	29	26	22	15	7	0	0	2	15	23	36
LaGrande	6	33	29	26	20	14	8	0	0	3	14	21	34
LaGrande	7	30	29	25	20	13	7	0	0	5	13	22	35
LaGrande	8	30	30	26	20	13	7	0	0	4	15	22	35
LaGrande	9	30	30	23	20	14	8	0	0	5	14	24	36
LaGrande	10	30	31	23	20	14	8	0	0	3	16	24	32
LaGrande	11	32	29	23	19	11	7	0	0	3	17	25	33
LaGrande	12	33	29	22	18	11	6	0	0	1	17	24	31
LaGrande	13	31	61	21	18	10	4	0	0	3	15	24	29
LaGrande	14	31	68	22	21	9	4	0	0	3	14	25	31
LaGrande	15	35	74	22	21	9	4	0	0	3	17	24	31
LaGrande	16	33	61	22	18	9	4	0	0	5	16	23	33
LaGrande	17	33	60	23	18	8	4	0	0	6	16	24	34
LaGrande	18	31	27	22	19	8	6	0	0	7	17	26	51
LaGrande	19	30	28	22	19	9	7	0	0	6	16	24	58
LaGrande	20	30	27	22	17	10	4	0	0	9	17	26	64
LaGrande	21	32	27	23	17	12	3	0	0	10	19	27	58
LaGrande	22	34	25	22	15	12	1	0	0	10	18	29	51
LaGrande	23	32	27	22	16	10	2	0	0	8	18	30	34
LaGrande	24	31	29	22	18	8	2	0	1	7	20	29	34
LaGrande	25	30	29	22	15	9	2	0	0	8	21	29	34
LaGrande	26	32	29	23	14	9	1	0	0	10	21	30	34
LaGrande	27	34	29	24	13	8	1	0	0	9	21	30	33
LaGrande	28	32	27	23	16	9	0	0	0	9	20	30	31
LaGrande	29	32	25	22	17	8	0	0	0	8	22	28	32
LaGrande	30	30		21	15	7	0	0	1	6	22	27	34
LaGrande	31	31		20		6		0	1		24		32

**APPENDIX 2.4: HEATING DEGREE DAILY MONTH BY AREA**

Temp Pattern	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Medford	1	26	24	20	16	10	0	0	0	0	3	17	25
Medford	2	26	23	21	16	9	1	0	0	0	6	18	24
Medford	3	28	22	22	16	9	1	0	0	0	6	17	26
Medford	4	27	22	21	15	9	0	0	0	0	7	18	26
Medford	5	26	22	21	16	8	2	0	0	0	7	17	27
Medford	6	27	21	20	14	8	2	0	0	0	6	16	27
Medford	7	24	21	20	15	6	2	0	0	0	7	17	29
Medford	8	25	24	19	15	7	3	0	0	0	7	19	28
Medford	9	26	22	18	15	9	2	0	0	0	9	21	27
Medford	10	25	22	17	14	8	2	0	0	0	9	19	27
Medford	11	25	22	17	13	6	2	0	0	0	10	19	27
Medford	12	26	21	17	14	6	1	0	0	0	10	18	25
Medford	13	27	32	16	15	5	0	0	0	0	8	19	23
Medford	14	27	36	17	16	4	0	0	0	0	8	19	25
Medford	15	26	38	16	15	3	0	0	0	0	10	18	28
Medford	16	26	32	17	14	3	0	0	0	0	8	19	28
Medford	17	25	28	18	14	3	0	0	0	0	9	20	27
Medford	18	24	20	16	15	4	0	0	0	0	10	21	50
Medford	19	23	20	15	13	5	0	0	0	0	9	20	59
Medford	20	25	20	16	12	6	0	0	0	0	11	22	61
Medford	21	26	20	15	12	6	0	0	0	0	12	24	56
Medford	22	25	21	16	11	6	0	0	0	0	11	23	55
Medford	23	25	22	16	11	4	0	0	0	0	12	23	28
Medford	24	24	21	15	10	4	0	0	0	0	13	23	29
Medford	25	23	21	17	9	4	0	0	0	1	14	21	28
Medford	26	24	22	17	8	2	0	0	0	1	14	23	28
Medford	27	25	21	18	9	4	0	0	0	0	15	24	27
Medford	28	24	21	17	10	4	0	0	0	0	15	23	26
Medford	29	24	19	16	10	3	0	0	0	1	15	24	26
Medford	30	23		16	10	0	0	0	0	1	16	24	27
Medford	31	23		15		0		0	0		16		27

Temp Pattern	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Klamath Falls	1	34	32	29	24	18	7	0	0	3	10	25	31
Klamath Falls	2	34	32	29	24	17	8	0	0	2	13	26	32
Klamath Falls	3	36	30	30	24	17	8	0	0	3	15	25	35
Klamath Falls	4	36	30	30	24	17	8	1	0	4	16	26	35
Klamath Falls	5	35	30	29	24	16	10	0	0	6	15	25	35
Klamath Falls	6	33	29	28	23	15	10	0	0	6	14	24	34
Klamath Falls	7	31	30	28	23	15	10	0	0	5	14	25	36
Klamath Falls	8	32	32	27	24	16	11	0	0	4	15	28	36
Klamath Falls	9	33	31	27	24	18	10	0	0	5	16	30	35
Klamath Falls	10	33	30	27	24	16	10	0	0	5	17	28	36
Klamath Falls	11	33	30	25	22	14	10	0	0	4	18	27	36
Klamath Falls	12	34	29	25	22	14	9	0	0	3	17	24	34
Klamath Falls	13	34	42	25	24	13	8	0	0	4	15	26	33
Klamath Falls	14	34	51	25	25	11	6	0	0	6	15	27	36
Klamath Falls	15	34	54	24	24	11	6	0	0	6	16	26	37
Klamath Falls	16	34	53	25	23	12	6	0	0	9	17	25	35
Klamath Falls	17	33	47	26	23	12	6	0	0	10	17	28	37
Klamath Falls	18	32	29	25	24	13	7	0	0	9	17	28	36
Klamath Falls	19	32	30	24	22	13	8	0	0	8	17	27	63
Klamath Falls	20	33	30	23	21	13	6	0	0	8	18	28	72
Klamath Falls	21	35	28	23	20	13	5	0	1	8	20	29	67
Klamath Falls	22	35	29	24	19	13	6	0	1	8	19	30	58
Klamath Falls	23	34	31	26	19	13	5	0	1	8	20	32	53.5
Klamath Falls	24	33	29	24	18	11	4	0	1	8	21	32	37
Klamath Falls	25	32	31	25	17	11	4	0	1	10	22	31	36
Klamath Falls	26	32	31	26	17	10	3	0	2	10	22	33	36
Klamath Falls	27	33	30	26	17	10	1	0	1	8	23	32	34
Klamath Falls	28	33	29	25	19	11	0	0	1	8	21	32	32
Klamath Falls	29	31	30	25	18	10	1	0	0	8	22	33	33
Klamath Falls	30	31		24	18	9	1	0	3	9	23	31	35
Klamath Falls	31	32		24		6		0	2		24		35

## APPENDIX 2.4: HEATING DEGREE DAILY MONTH BY AREA

Temp Pattern	Day	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Roseburg	1	21	20	18	16	9	1	0	0	0	3	14	21
Roseburg	2	22	20	18	15	9	2	0	0	0	5	14	21
Roseburg	3	22	20	19	14	9	2	0	0	0	6	15	22
Roseburg	4	22	19	18	14	9	1	0	0	0	7	15	21
Roseburg	5	22	19	19	15	8	3	0	0	0	5	15	22
Roseburg	6	21	18	18	14	8	3	0	0	0	4	13	23
Roseburg	7	19	20	18	14	7	3	0	0	0	5	15	24
Roseburg	8	20	21	17	15	8	3	0	0	0	6	17	23
Roseburg	9	21	21	16	14	10	3	0	0	0	7	17	22
Roseburg	10	21	20	16	13	9	4	0	0	0	9	17	22
Roseburg	11	22	19	14	12	7	3	0	0	0	9	16	22
Roseburg	12	21	18	15	13	7	1	0	0	0	9	14	21
Roseburg	13	23	32	15	13	6	0	0	0	0	7	14	21
Roseburg	14	23	37	15	15	4	1	0	0	0	8	15	22
Roseburg	15	23	42	15	14	5	0	0	0	0	9	15	23
Roseburg	16	22	34	17	13	5	1	0	0	0	8	16	22
Roseburg	17	22	28	17	13	4	0	0	0	1	9	17	23
Roseburg	18	21	18	14	14	4	2	0	0	0	9	17	40
Roseburg	19	21	18	15	13	5	1	0	0	0	8	16	53
Roseburg	20	21	19	15	12	6	0	0	0	0	10	20	55
Roseburg	21	22	18	16	11	7	0	0	0	1	10	21	46
Roseburg	22	22	18	16	10	6	1	0	0	0	10	20	48
Roseburg	23	21	19	15	10	5	0	0	0	0	11	21	22
Roseburg	24	21	19	15	9	4	0	0	0	0	12	19	23
Roseburg	25	21	20	16	8	3	0	0	0	2	13	20	23
Roseburg	26	23	19	17	8	2	0	0	0	2	13	20	23
Roseburg	27	23	18	16	9	4	0	0	0	1	14	21	23
Roseburg	28	20	18	16	9	5	0	0	0	0	12	20	22
Roseburg	29	19	18	15	8	3	0	0	0	1	13	20	22
Roseburg	30	19		15	8	2	0	0	0	1	13	20	23
Roseburg	31	20		15		1		0	0		14		22

## APPENDIX 2.5: DEMAND SENSITIVITIES SUMMARY OF ASSUMPTIONS – DEMAND SCENARIOS

	DEMAND INFLUENCING - DIRECT				PRICE INFLUENCING - INDIRECT									
	Low Cust Growth	High Cust Growth	CNG/NGV Vehicles	Alternate Weather Std	DSM Case	Peak plus DSM Case	Alterante Historical UPC Case	Expect Elasticity	Low Prices	High Prices	Carbon Legislation	Carbon Legislation	Carbon Legislation	Exported LNG
<b>INPUT ASSUMPTIONS</b>	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case	Reference Case
<b>Customer Growth Rate</b>	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Residential WA/ID	40%	60%	Decrease in Cust Growth Rates	Increase in Cust Growth Rates	None	None	None	None	None	None	None	None	None	None
Residential Medford	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Residential Roseburg	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Residential Klamath	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Residential La Grande	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Commercial WA/ID	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Commercial Medford	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Commercial Roseburg	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Commercial Klamath	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Commercial La Grande	3 Year Historical	3 Year Historical	15% Growth	15% Growth	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
<b>Use per Customer</b>	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical
Planning Standard	Normal plus GW Adj	Coldest on Record	Coldest on Record	Coldest on Record	Normal plus GW Adj	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record
<b>Demand Side Management Programs Included</b>	No	No	No	No	Yes	Yes	No	No	No	No	No	No	No	No
<b>Prices</b>	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected
Price curve	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Price curve adder (\$/Dth)	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Elasticity	None	None	None	None	None	None	None	None	None	None	None	None	None	None
Carbon Adhler (\$/Ton)	None	None	None	None	None	None	None	None	None	None	None	None	None	None
<b>RESULTS</b>														
<b>FIRST YEAR UNSERVED</b>														
WA/ID	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Medford	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Roseburg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Klamath	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
La Grande	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## APPENDIX 2.5: DEMAND SCENARIOS PROPOSED SCENARIOS

INPUT ASSUMPTIONS	Expected Case	High Growth & Low Prices	Low Growth & High Prices	Cold Day 20-yr Weather Std	Average Case
<b>Customer Growth Rate</b>	Reference Case Cust Growth Rates	60% Increase in Cust Growth Rates	40% Decrease in Cust Growth Rates	Reference Case Cust Growth Rates	Reference Case Cust Growth Rates
<b>Use per Customer</b>	3 yr Flat + Price Elast.	3 yr Flat + Price Elast. + CNG/NGV	3 yr Flat + Price Elast.	3 yr Flat + Price Elast.	3 yr Flat + Price Elast.
<b>Demand Side Management</b>	Yes	Yes	Yes	Yes	Yes
<b>Weather Planning Standard</b>	Coldest Day	Coldest Day	Coldest Day	Alternate Planning Standard	Normal
<b>Prices</b>					
Price curve	Expected	Low	High	Expected	Expected
Elasticity	Expected	None	Expected	Expected	Expected
Carbon Adder (\$/Ton)	\$8.32-\$14.83	None	\$8.32-\$14.83	\$8.32-\$14.83	\$8.32-\$14.83
<b>RESULTS</b>					
<b>First Gas Year Unserved</b>					
WA/ID	N/A	2029	N/A	N/A	N/A
Medford	N/A	2029	N/A	N/A	N/A
Roseburg	N/A	N/A	N/A	N/A	N/A
Klamath	N/A	N/A	N/A	N/A	N/A
La Grande	N/A	N/A	N/A	N/A	N/A
<b>SCENARIO SUMMARY</b>					
	Most aggressive peak weather planning case utilizing Average Case assumptions as a starting point and layering in coldest weather on record. The likelihood of occurrence is low.	Aggressive growth assumptions in order to evaluate when our earliest resource shortage could occur. Not likely of occurring.	Stagnant growth assumptions in order to evaluate if a shortage does occur. Not likely to occur.	Evaluates adopting an alternate peak weather standard. Helps provide some bounds around our sensitivity to weather.	Case most representative of our average (budget, PGA, rate case, procurement) planning criteria. Most likely to occur.
<b>RISK ASSESSMENT</b>					
<p>Higher or lower customer growth rates, which are heavily based on economic recovery. Higher or lower growth rates will lead to accelerated or delayed unserved demand. Looking at various growth assumptions off the Expected Case allows us to capture the risk in terms of the change in demand linked to customer growth.</p> <p>Higher or lower use per customer will also lead to accelerated or delayed unserved demand. Use per customer can differ in many ways. Direct use per customer influencers, such as demand side management, NGV/CNG usage, and derivation of the use per customer starting point (i.e. one year, three year, etc). Again, varying these assumptions under our forecasting methodology allows us to quantify the change each assumption has to our forecast.</p> <p>Weather volatility and predictability are a key risk. As the most correlated direct demand influencer, varying weather assumptions is key to understanding the weather related risks.</p> <p>Indirect influencers including elasticity and price are also important assumptions. The two go hand in hand, as price changes it will influence how much customers consume. If forecasted prices remain relatively stable over the planning horizon our current elasticity assumption will not provide much decreased usage. However, price adders or an overall steepening of the price curve will trigger a greater decline in usage due to the price elastic response. The magnitude of the elasticity adjustment is also important. We are using a long run elasticity factor as calculated by the AGA. We continue to evaluate this assumption and are looking to update the study as part of our Action Plan.</p>					



## APPENDIX 2.6: DEMAND FORECAST SENSITIVITIES AND SCENARIOS DESCRIPTIONS

### DEFINITIONS

**DYNAMIC DEMAND METHODOLOGY** – Avista’s demand forecasting approach wherein we 1) identify key demand drivers behind natural gas consumption, 2) perform sensitivity analysis on each demand driver, and 3) combine demand drivers under various scenarios to develop alternative potential outcomes for forecasted demand.

**DEMAND INFLUENCING FACTORS** – Factors that directly influence the volume of natural gas consumed by our core customers.

**PRICE INFLUENCING FACTORS** – Factors that, through price elasticity response, indirectly influence the volume of natural gas consumed by our core customers.

**REFERENCE CASE** – A baseline point of reference that captures the basic inputs for determining a demand forecast in SENDOUT® which includes number of customers, use per customer, average daily weather temperatures (including an adjustment for global warming) and expected natural gas prices.

**SENSITIVITIES** – Focused analysis of a specific natural gas demand driver and its impact on forecasted demand relative to the Reference Case when underlying input assumptions are modified.

**SCENARIOS** – Combination of natural gas demand drivers that make up a demand forecast.

Avista evaluates each sensitivities impact.

### SENSITIVITIES

The following Sensitivities were performed on identified demand drivers against the reference case for consideration in Scenario development. Note that Sensitivity assumptions reflect incremental adjustments we estimate are not captured in the underlying reference case forecast.

Following are the Demand Influencing (Direct) Sensitivities we evaluated:

**REFERENCE CASE PLUS PEAK** – Same assumptions as in the Reference Case with an adjustment made to normal weather to incorporate peak weather conditions. The peak weather data being the coldest day on record for each weather area.

**LOW & HIGH CUSTOMER GROWTH** – In our low customer growth Sensitivity, annual customer growth rates underperform the reference rate of growth by 40% over our 20 year planning horizon while annual customer growth rates exceed the reference rate by 60% in our high growth Sensitivity.

**NATURAL GAS VEHICLES (NGV) AND/OR COMPRESSED NATURAL GAS (CNG) VEHICLES** – NGV/CNG vehicles assumed to produce a 15% cumulative incremental demand over our 20 year planning horizon. Our assumption utilized market consumption estimates from an independent analysis on NGV/CNG vehicle viability. The analysis indicates significant challenges exist to widespread adoption but did provide a scenario for significant market penetration (10% in 10 years).

**ALTERNATE WEATHER STANDARD (COLDEST DAY 20 YRS)** – Peak Day weather temperature reduced to coldest average daily temperature (HDDs) experienced in the most recent 20 years in each region.

**DSM** – Reference case assumptions including the potential DSM identified by the Conservation Potential Assessment provided by Global Energy Partners. See Appendix 4.1 for full assessment report.

**PEAK PLUS DSM** – Reference plus peak weather assumptions including the potential DSM identified by the Conservation Potential Assessment provided by Global Energy Partners. See Appendix 4.1 for the full assessment report.

**ALTERNATE USE PER CUSTOMER** – Reference case use per customer was based upon 3 years of actual use per customer per heating degree day data. This sensitivity used five years of historical use per customer per heating degree day data.

Following are the Price Influencing (Indirect) Sensitivities we evaluated:

**EXPECTED ELASTICITY** – For our expected elasticity Sensitivity, we incorporate reduced consumption in response to higher natural gas prices utilizing a price elasticity study prepared by the American Gas Association.

**LOW & HIGH PRICES** – To capture a wide band of alternative prices forecasts, we use the Northwest Power and Conservation Council’s “very low” and “very high” natural gas price forecast scenarios with first five years modified to include blend of recent market prices (Nymex forward prices) consistent with our Expected price forecast.

**CARBON LEGISLATION LOW CASE** – Utilizes carbon cost adders quantified by independent analysis from Consultant #1. They identify both an adder reflecting carbon allowances as well as an adder to capture the effect of increased natural gas demand as more gas turbines come online to replace coal plants and back up wind generation. The allowance adder escalates from \$14/ton in 2022 to \$22/ton by 2033.

**CARBON LEGISLATION MEDIUM CASE** – Utilizes carbon cost adders quantified by independent analysis from Consultant #1. They identify both an adder reflecting carbon allowances as well as an adder to capture the effect of increased natural gas demand as more gas turbines come online to replace coal plants and back up wind generation. The allowance adder escalates from \$8.32/ton in 2021 to \$14.83/ton by 2033. This is the expected carbon adder utilized in our carbon case sensitivities.

**CARBON LEGISLATION HIGH CASE** – Utilizes carbon cost adders quantified by independent analysis from Consultant #1. They identify both an adder reflecting carbon allowances as well as an adder to capture the effect of increased natural gas demand as more gas turbines come online to replace coal plants and back up wind generation. The allowance adder escalates from \$16/ton in 2021 to \$28/ton by 2033.

**EXPORTED LNG** – Beginning in 2017, we apply an estimate of \$.50/mmbtu *incremental* adder each year to regional natural gas prices to capture upward price pressure because of exports of LNG to Asian and European countries. There is much uncertainty about the region price impact LNG will have. It is highly dependent on many things including which export facilities get built and the pipeline infrastructure used to serve them. There are several analyses that have been conducted where the price impact can be minimal to \$1.00/mmbtu.

## SCENARIOS

After identifying the above demand drivers and analyzing the various Sensitivities, we have developed the following demand forecast Scenarios:

**AVERAGE CASE** – This Scenario we believe represents the most likely average demand forecast modeled. We assume service territory customer growth rates consistent with the reference case, rolling 30 year normal weather in each service territory, our expected natural gas price forecast (Consultant #1), expected price elasticity, and the CO2 cost adders from our **Carbon Legislation Medium Case** Sensitivity, and DSM. The Scenario does not include incremental cost adders for declining Canadian imports or drilling restrictions beyond what is incorporated in the selected price forecast.

**EXPECTED CASE** – This Scenario represents the peak demand forecast. We assume service territory customer growth rates consistent with the reference case, a weather standard of coldest day on record in each service territory, our middle range natural gas price forecast (Consultant #1), expected price elasticity, and the CO2 cost adders from our **Carbon Legislation Medium Case** Sensitivity, and DSM.

**HIGH GROWTH, LOW PRICE** – This Scenario models a rapid return to robust growth in part spurred on by low energy prices. We assume customer growth rates 60% higher than the reference case, coldest day on record weather standard, incremental demand from NGV/CNG, our low natural gas price forecast, no price elasticity, DSM, and no CO2 adders.

**LOW GROWTH, HIGH PRICE** – This Scenario models an extended period of slow economic growth in part resulting from high energy prices. We assume customer growth rates 40% lower than the reference case, coldest day on record weather standard, our high natural gas price forecast, expected price elasticity, and CO2 adders from our **Carbon Legislation Medium Case** Sensitivity.

**ALTERNATE WEATHER STANDARD** – This Scenario models all the same assumptions as the **Expected Case** Scenario except for the change in the weather planning standard from coldest day on record to coldest day in 20 years for each service territory. As noted in the Sensitivity analysis, this change does not affect the Klamath Falls and La Grande service territories which have each experienced their coldest day on record within the last 20 years.

A case incorporating Exported LNG was not included in this IRP's scenario analysis. There is much uncertainty about the location and timing of exported LNG and its potential price impacts. The forecasters we subscribe to have incorporated some level of export LNG into their price forecasts and therefore our expected price curve does include an export LNG assumption. At this time the effects of LNG are minimal given the robust North American supply picture. Avista will closely monitor developments with export LNG for the potential price and infrastructure impacts.

### APPENDIX 2.7: ANNUAL DEMAND, AVERAGE DAY DEMAND AND PEAK DAY DEMAND (NET OF DSM – CASE AVERAGE)

Scenario	Gas Year	Klamath Falls (MDth)			Klamath (MDth/day)			La Grande (MDth)			La Grande (MDth/day)			Medford/Roseburg (MDth)			Medford/Roseburg (MDth/day)		
		Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day
Average Case	2013-2014	1,257.66	3.45	6.27	720.60	1.97	3.29	6,207.32	17.01	33.85	6,207.32	17.01	33.85	6,207.32	17.01	33.85	6,207.32	17.01	33.85
Average Case	2014-2015	1,261.98	3.46	6.27	723.27	1.98	3.31	6,252.06	17.13	34.12	6,252.06	17.13	34.12	6,252.06	17.13	34.12	6,252.06	17.13	34.12
Average Case	2015-2016	1,272.99	3.49	6.29	729.63	2.00	3.32	6,328.05	17.34	34.38	6,328.05	17.34	34.38	6,328.05	17.34	34.38	6,328.05	17.34	34.38
Average Case	2016-2017	1,265.52	3.47	6.28	725.57	1.99	3.31	6,315.96	17.30	34.40	6,315.96	17.30	34.40	6,315.96	17.30	34.40	6,315.96	17.30	34.40
Average Case	2017-2018	1,272.48	3.49	6.31	729.40	2.00	3.33	6,368.55	17.45	34.69	6,368.55	17.45	34.69	6,368.55	17.45	34.69	6,368.55	17.45	34.69
Average Case	2018-2019	1,280.28	3.51	6.34	731.59	2.00	3.35	6,427.02	17.61	34.99	6,427.02	17.61	34.99	6,427.02	17.61	34.99	6,427.02	17.61	34.99
Average Case	2019-2020	1,294.56	3.55	6.38	737.44	2.02	3.36	6,515.10	17.85	35.32	6,515.10	17.85	35.32	6,515.10	17.85	35.32	6,515.10	17.85	35.32
Average Case	2020-2021	1,294.13	3.55	6.41	735.69	2.02	3.36	6,536.37	17.91	35.57	6,536.37	17.91	35.57	6,536.37	17.91	35.57	6,536.37	17.91	35.57
Average Case	2021-2022	1,290.82	3.54	6.38	732.27	2.01	3.34	6,544.39	17.93	35.53	6,544.39	17.93	35.53	6,544.39	17.93	35.53	6,544.39	17.93	35.53
Average Case	2022-2023	1,298.09	3.56	6.41	734.46	2.01	3.35	6,601.11	18.09	35.84	6,601.11	18.09	35.84	6,601.11	18.09	35.84	6,601.11	18.09	35.84
Average Case	2023-2024	1,312.52	3.60	6.46	740.33	2.03	3.37	6,691.81	18.33	36.18	6,691.81	18.33	36.18	6,691.81	18.33	36.18	6,691.81	18.33	36.18
Average Case	2024-2025	1,307.44	3.58	6.45	736.13	2.02	3.36	6,692.29	18.34	36.29	6,692.29	18.34	36.29	6,692.29	18.34	36.29	6,692.29	18.34	36.29
Average Case	2025-2026	1,308.20	3.58	6.45	734.86	2.01	3.35	6,719.70	18.41	36.38	6,719.70	18.41	36.38	6,719.70	18.41	36.38	6,719.70	18.41	36.38
Average Case	2026-2027	1,313.43	3.60	6.47	735.96	2.02	3.35	6,768.76	18.54	36.63	6,768.76	18.54	36.63	6,768.76	18.54	36.63	6,768.76	18.54	36.63
Average Case	2027-2028	1,328.10	3.64	6.52	741.84	2.03	3.37	6,861.81	18.80	36.98	6,861.81	18.80	36.98	6,861.81	18.80	36.98	6,861.81	18.80	36.98
Average Case	2028-2029	1,330.67	3.65	6.56	741.76	2.03	3.38	6,899.62	18.90	37.34	6,899.62	18.90	37.34	6,899.62	18.90	37.34	6,899.62	18.90	37.34
Average Case	2029-2030	1,328.02	3.64	6.53	738.69	2.02	3.36	6,911.87	18.94	37.33	6,911.87	18.94	37.33	6,911.87	18.94	37.33	6,911.87	18.94	37.33
Average Case	2030-2031	1,336.73	3.66	6.58	741.63	2.03	3.37	6,978.53	19.12	37.69	6,978.53	19.12	37.69	6,978.53	19.12	37.69	6,978.53	19.12	37.69
Average Case	2031-2032	1,347.05	3.69	6.59	745.11	2.04	3.37	7,052.70	19.32	37.91	7,052.70	19.32	37.91	7,052.70	19.32	37.91	7,052.70	19.32	37.91
Average Case	2032-2033	1,347.00	3.69	6.62	743.57	2.04	3.38	7,078.88	19.39	38.19	7,078.88	19.39	38.19	7,078.88	19.39	38.19	7,078.88	19.39	38.19
Peak Day Demand Oregon (MDth/day)																			
Average Case	2013-2014	8,185.58	22.43	43.41	25,157.85	68.93	114.99	33,343.42	91.35	158.40	33,343.42	91.35	158.40	33,343.42	91.35	158.40	33,343.42	91.35	158.40
Average Case	2014-2015	8,237.30	22.57	43.70	25,396.41	69.58	116.16	33,633.72	92.15	159.86	33,633.72	92.15	159.86	33,633.72	92.15	159.86	33,633.72	92.15	159.86
Average Case	2015-2016	8,330.67	22.82	44.00	25,762.27	70.58	117.29	34,092.94	93.41	161.29	34,092.94	93.41	161.29	34,092.94	93.41	161.29	34,092.94	93.41	161.29
Average Case	2016-2017	8,307.06	22.76	43.99	25,744.70	70.53	117.61	34,051.75	93.29	161.61	34,051.75	93.29	161.61	34,051.75	93.29	161.61	34,051.75	93.29	161.61
Average Case	2017-2018	8,370.42	22.93	44.33	26,025.73	71.30	118.92	34,396.15	94.24	163.25	34,396.15	94.24	163.25	34,396.15	94.24	163.25	34,396.15	94.24	163.25
Average Case	2018-2019	8,438.90	23.12	44.67	26,286.70	72.02	120.08	34,725.60	95.14	164.76	34,725.60	95.14	164.76	34,725.60	95.14	164.76	34,725.60	95.14	164.76
Average Case	2019-2020	8,547.10	23.42	45.07	26,660.40	73.04	121.26	35,207.49	96.46	166.33	35,207.49	96.46	166.33	35,207.49	96.46	166.33	35,207.49	96.46	166.33
Average Case	2020-2021	8,566.19	23.47	45.34	26,738.05	73.25	122.11	35,304.24	96.72	167.45	35,304.24	96.72	167.45	35,304.24	96.72	167.45	35,304.24	96.72	167.45
Average Case	2021-2022	8,567.49	23.47	45.26	26,752.36	73.29	122.00	35,319.85	96.77	167.26	35,319.85	96.77	167.26	35,319.85	96.77	167.26	35,319.85	96.77	167.26
Average Case	2022-2023	8,633.66	23.65	45.60	26,986.60	73.94	123.06	35,620.26	97.59	168.66	35,620.26	97.59	168.66	35,620.26	97.59	168.66	35,620.26	97.59	168.66
Average Case	2023-2024	8,744.67	23.96	46.01	27,370.34	74.99	124.26	36,115.01	98.95	170.27	36,115.01	98.95	170.27	36,115.01	98.95	170.27	36,115.01	98.95	170.27
Average Case	2024-2025	8,735.86	23.93	46.10	27,352.57	74.94	124.62	36,088.43	98.87	170.71	36,088.43	98.87	170.71	36,088.43	98.87	170.71	36,088.43	98.87	170.71
Average Case	2025-2026	8,762.76	24.01	46.18	27,453.85	75.22	124.96	36,216.61	99.22	171.14	36,216.61	99.22	171.14	36,216.61	99.22	171.14	36,216.61	99.22	171.14
Average Case	2026-2027	8,818.15	24.16	46.45	27,650.79	75.76	125.81	36,468.94	99.91	172.26	36,468.94	99.91	172.26	36,468.94	99.91	172.26	36,468.94	99.91	172.26
Average Case	2027-2028	8,931.74	24.47	46.86	28,044.14	76.83	127.04	36,975.89	101.30	173.91	36,975.89	101.30	173.91	36,975.89	101.30	173.91	36,975.89	101.30	173.91
Average Case	2028-2029	8,972.05	24.58	47.28	28,192.71	77.24	128.29	37,164.76	101.82	175.47	37,164.76	101.82	175.47	37,164.76	101.82	175.47	37,164.76	101.82	175.47
Average Case	2029-2030	8,978.58	24.60	47.22	28,223.36	77.32	128.25	37,201.94	101.92	175.47	37,201.94	101.92	175.47	37,201.94	101.92	175.47	37,201.94	101.92	175.47
Average Case	2030-2031	9,056.89	24.81	47.64	28,498.85	78.08	129.50	37,555.74	102.89	177.15	37,555.74	102.89	177.15	37,555.74	102.89	177.15	37,555.74	102.89	177.15
Average Case	2031-2032	9,144.86	25.05	47.88	28,804.79	78.92	130.25	37,949.65	103.97	178.13	37,949.65	103.97	178.13	37,949.65	103.97	178.13	37,949.65	103.97	178.13
Average Case	2032-2033	9,169.44	25.12	48.19	28,900.19	79.18	131.22	38,069.63	104.30	179.41	38,069.63	104.30	179.41	38,069.63	104.30	179.41	38,069.63	104.30	179.41

### APPENDIX 2.7: ANNUAL DEMAND, AVERAGE DAY DEMAND AND PEAK DAY DEMAND (NET OF DSM) – CASE HIGH

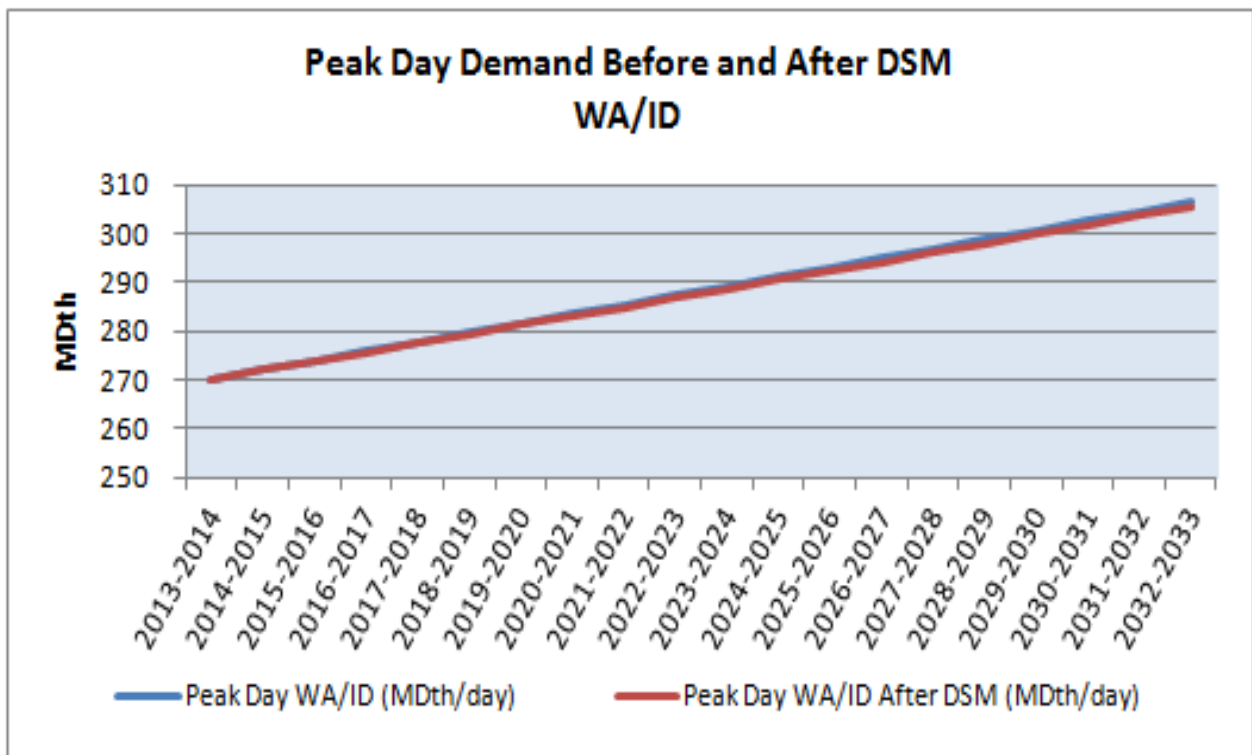
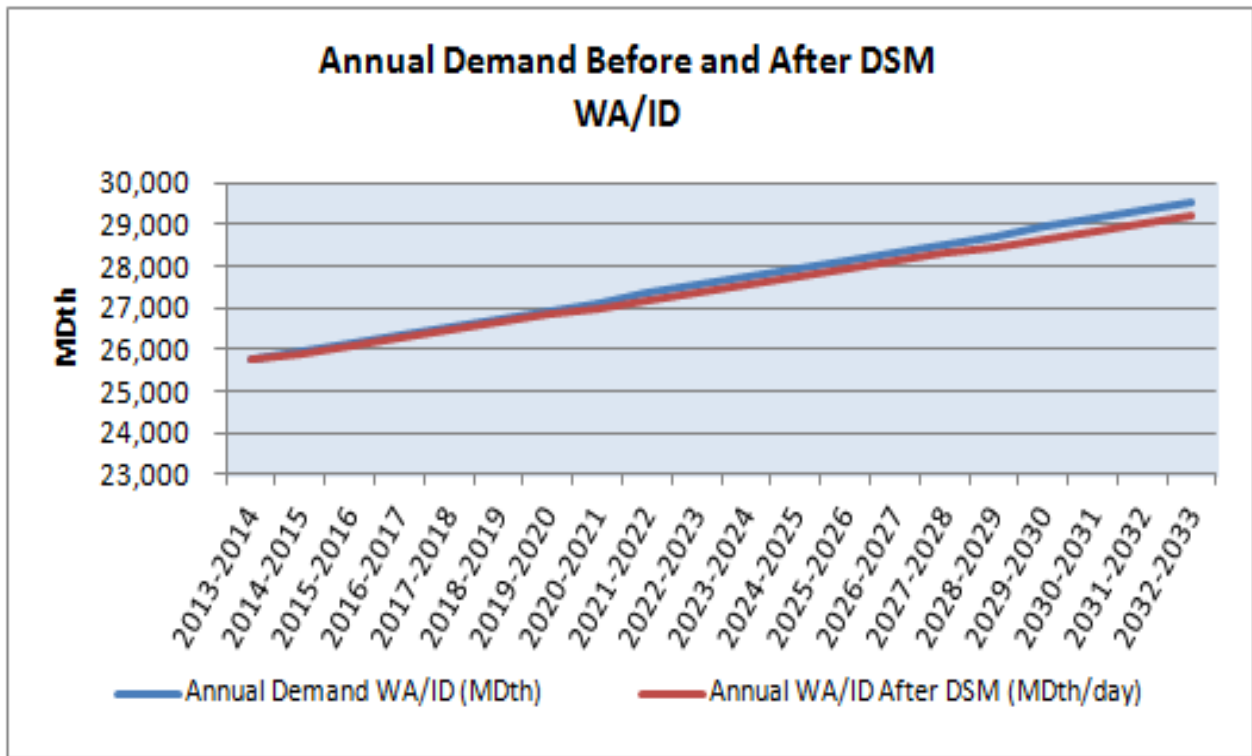
Scenario	Gas Year	Klamath Falls (MDth)			Klamath (MDth/day)			La Grande (MDth)			La Grande (MDth/day)			Roseburg (MDth)			Roseburg (MDth/day)		
		Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day	Annual Demand	Daily Demand	Peak Day
High Growth & Low Prices	2013-2014	1,299.14	3.56	11.49	746.65	2.05	7.40	746.65	2.05	7.40	746.65	2.05	7.40	6,478.36	17.75	70.03	6,478.36	17.75	70.03
High Growth & Low Prices	2014-2015	1,310.90	3.59	11.54	750.58	2.06	7.45	750.58	2.06	7.45	750.58	2.06	7.45	6,566.28	17.99	70.69	6,566.28	17.99	70.69
High Growth & Low Prices	2015-2016	1,329.72	3.64	11.65	757.88	2.08	7.49	757.88	2.08	7.49	757.88	2.08	7.49	6,688.55	18.32	71.72	6,688.55	18.32	71.72
High Growth & Low Prices	2016-2017	1,337.90	3.67	11.77	759.49	2.08	7.54	759.49	2.08	7.54	759.49	2.08	7.54	6,758.43	18.52	72.77	6,758.43	18.52	72.77
High Growth & Low Prices	2017-2018	1,351.30	3.70	11.89	763.87	2.09	7.58	763.87	2.09	7.58	763.87	2.09	7.58	6,857.04	18.79	73.84	6,857.04	18.79	73.84
High Growth & Low Prices	2018-2019	1,364.54	3.74	12.01	768.46	2.11	7.63	768.46	2.11	7.63	768.46	2.11	7.63	6,956.69	19.06	74.92	6,956.69	19.06	74.92
High Growth & Low Prices	2019-2020	1,385.22	3.80	12.13	776.06	2.13	7.68	776.06	2.13	7.68	776.06	2.13	7.68	7,086.78	19.42	76.02	7,086.78	19.42	76.02
High Growth & Low Prices	2020-2021	1,392.83	3.82	12.25	777.54	2.13	7.72	777.54	2.13	7.72	777.54	2.13	7.72	7,161.25	19.62	77.14	7,161.25	19.62	77.14
High Growth & Low Prices	2021-2022	1,406.48	3.85	12.37	782.23	2.14	7.77	782.23	2.14	7.77	782.23	2.14	7.77	7,266.36	19.91	78.28	7,266.36	19.91	78.28
High Growth & Low Prices	2022-2023	1,421.38	3.89	12.50	786.84	2.16	7.81	786.84	2.16	7.81	786.84	2.16	7.81	7,372.42	20.20	79.44	7,372.42	20.20	79.44
High Growth & Low Prices	2023-2024	1,442.01	3.95	12.63	794.53	2.18	7.86	794.53	2.18	7.86	794.53	2.18	7.86	7,510.78	20.58	80.60	7,510.78	20.58	80.60
High Growth & Low Prices	2024-2025	1,449.61	3.97	12.75	796.17	2.18	7.91	796.17	2.18	7.91	796.17	2.18	7.91	7,590.23	20.80	81.79	7,590.23	20.80	81.79
High Growth & Low Prices	2025-2026	1,465.00	4.01	12.88	800.92	2.19	7.96	800.92	2.19	7.96	800.92	2.19	7.96	7,701.96	21.10	83.00	7,701.96	21.10	83.00
High Growth & Low Prices	2026-2027	1,479.57	4.05	13.01	805.62	2.21	8.00	805.62	2.21	8.00	805.62	2.21	8.00	7,815.11	21.41	84.24	7,815.11	21.41	84.24
High Growth & Low Prices	2027-2028	1,500.79	4.11	13.14	813.51	2.23	8.05	813.51	2.23	8.05	813.51	2.23	8.05	7,962.11	21.81	85.48	7,962.11	21.81	85.48
High Growth & Low Prices	2028-2029	1,509.86	4.14	13.27	815.15	2.23	8.10	815.15	2.23	8.10	815.15	2.23	8.10	8,046.90	22.05	86.75	8,046.90	22.05	86.75
High Growth & Low Prices	2029-2030	1,524.87	4.18	13.40	819.98	2.25	8.15	819.98	2.25	8.15	819.98	2.25	8.15	8,165.97	22.37	88.03	8,165.97	22.37	88.03
High Growth & Low Prices	2030-2031	1,539.79	4.22	13.54	824.86	2.26	8.20	824.86	2.26	8.20	824.86	2.26	8.20	8,286.24	22.70	89.35	8,286.24	22.70	89.35
High Growth & Low Prices	2031-2032	1,562.89	4.28	13.67	833.02	2.28	8.25	833.02	2.28	8.25	833.02	2.28	8.25	8,442.87	23.13	90.67	8,442.87	23.13	90.67
High Growth & Low Prices	2032-2033	1,571.39	4.31	13.81	834.67	2.29	8.30	834.67	2.29	8.30	834.67	2.29	8.30	8,533.22	23.38	92.03	8,533.22	23.38	92.03
High Growth & Low Prices	2013-2014	8,524.15	23.35	88.92	26,163.75	71.68	273.78	26,163.75	71.68	273.78	26,163.75	71.68	273.78	34,687.90	95.04	362.70	34,687.90	95.04	362.70
High Growth & Low Prices	2014-2015	8,627.75	23.64	89.68	26,533.25	72.69	277.88	26,533.25	72.69	277.88	26,533.25	72.69	277.88	35,161.01	96.33	367.55	35,161.01	96.33	367.55
High Growth & Low Prices	2015-2016	8,776.16	24.04	90.86	27,046.80	74.10	282.04	27,046.80	74.10	282.04	27,046.80	74.10	282.04	35,822.96	98.15	372.90	35,822.96	98.15	372.90
High Growth & Low Prices	2016-2017	8,855.81	24.26	92.08	27,332.78	74.88	286.26	27,332.78	74.88	286.26	27,332.78	74.88	286.26	36,188.59	99.15	378.34	36,188.59	99.15	378.34
High Growth & Low Prices	2017-2018	8,972.21	24.58	93.31	27,741.43	76.00	290.55	27,741.43	76.00	290.55	27,741.43	76.00	290.55	36,713.64	100.59	383.86	36,713.64	100.59	383.86
High Growth & Low Prices	2018-2019	9,089.69	24.90	94.56	28,156.12	77.14	294.90	28,156.12	77.14	294.90	28,156.12	77.14	294.90	37,245.82	102.04	389.46	37,245.82	102.04	389.46
High Growth & Low Prices	2019-2020	9,248.07	25.34	95.83	28,700.50	78.63	299.31	28,700.50	78.63	299.31	28,700.50	78.63	299.31	37,948.57	103.97	395.13	37,948.57	103.97	395.13
High Growth & Low Prices	2020-2021	9,331.63	25.57	97.12	29,003.73	79.46	303.79	29,003.73	79.46	303.79	29,003.73	79.46	303.79	38,335.36	105.03	400.91	38,335.36	105.03	400.91
High Growth & Low Prices	2021-2022	9,455.07	25.90	98.42	29,437.06	80.65	308.33	29,437.06	80.65	308.33	29,437.06	80.65	308.33	38,892.13	106.55	406.75	38,892.13	106.55	406.75
High Growth & Low Prices	2022-2023	9,580.64	26.25	99.75	29,876.72	81.85	312.95	29,876.72	81.85	312.95	29,876.72	81.85	312.95	39,457.36	108.10	412.69	39,457.36	108.10	412.69
High Growth & Low Prices	2023-2024	9,747.32	26.70	101.09	30,454.12	83.44	317.63	30,454.12	83.44	317.63	30,454.12	83.44	317.63	40,201.45	110.14	418.71	40,201.45	110.14	418.71
High Growth & Low Prices	2024-2025	9,836.00	26.95	102.45	30,775.67	84.32	322.38	30,775.67	84.32	322.38	30,775.67	84.32	322.38	40,611.68	111.26	424.84	40,611.68	111.26	424.84
High Growth & Low Prices	2025-2026	9,967.89	27.31	103.83	31,235.11	85.58	327.20	31,235.11	85.58	327.20	31,235.11	85.58	327.20	41,203.00	112.88	431.04	41,203.00	112.88	431.04
High Growth & Low Prices	2026-2027	10,100.30	27.67	105.25	31,701.38	86.85	332.10	31,701.38	86.85	332.10	31,701.38	86.85	332.10	41,801.68	114.53	437.35	41,801.68	114.53	437.35
High Growth & Low Prices	2027-2028	10,276.42	28.15	106.67	32,313.76	88.53	337.07	32,313.76	88.53	337.07	32,313.76	88.53	337.07	42,590.18	116.69	443.73	42,590.18	116.69	443.73
High Growth & Low Prices	2028-2029	10,371.91	28.42	108.12	32,654.55	89.46	342.11	32,654.55	89.46	342.11	32,654.55	89.46	342.11	43,026.46	117.88	450.23	43,026.46	117.88	450.23
High Growth & Low Prices	2029-2030	10,510.83	28.80	109.59	33,141.79	90.80	347.22	33,141.79	90.80	347.22	33,141.79	90.80	347.22	43,652.62	119.60	456.81	43,652.62	119.60	456.81
High Growth & Low Prices	2030-2031	10,650.89	29.18	111.08	33,636.27	92.15	352.42	33,636.27	92.15	352.42	33,636.27	92.15	352.42	44,287.16	121.33	463.50	44,287.16	121.33	463.50
High Growth & Low Prices	2031-2032	10,838.78	29.70	112.59	34,285.78	93.93	357.69	34,285.78	93.93	357.69	34,285.78	93.93	357.69	45,124.57	123.63	470.28	45,124.57	123.63	470.28
High Growth & Low Prices	2032-2033	10,939.29	29.97	114.13	34,647.06	94.92	363.03	34,647.06	94.92	363.03	34,647.06	94.92	363.03	45,586.34	124.89	477.17	45,586.34	124.89	477.17



### APPENDIX 2.7: ANNUAL DEMAND, AVERAGE DAY DEMAND AND PEAK DAY DEMAND (NET OF DSM) – CASE COLDEST IN 20

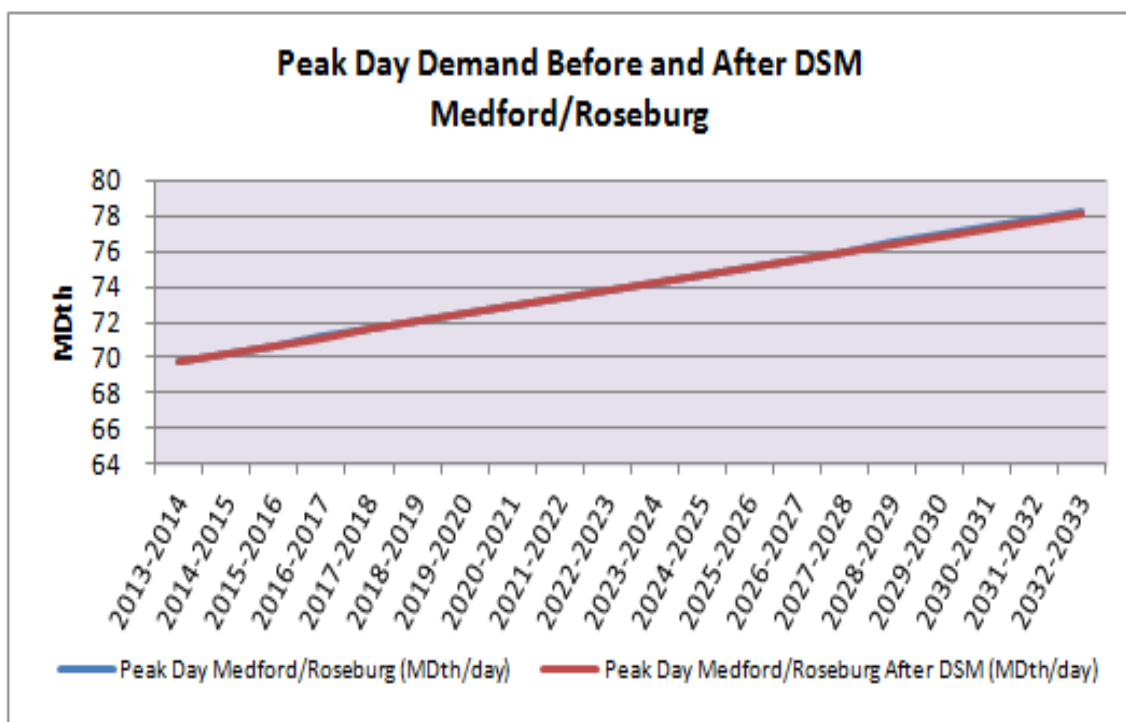
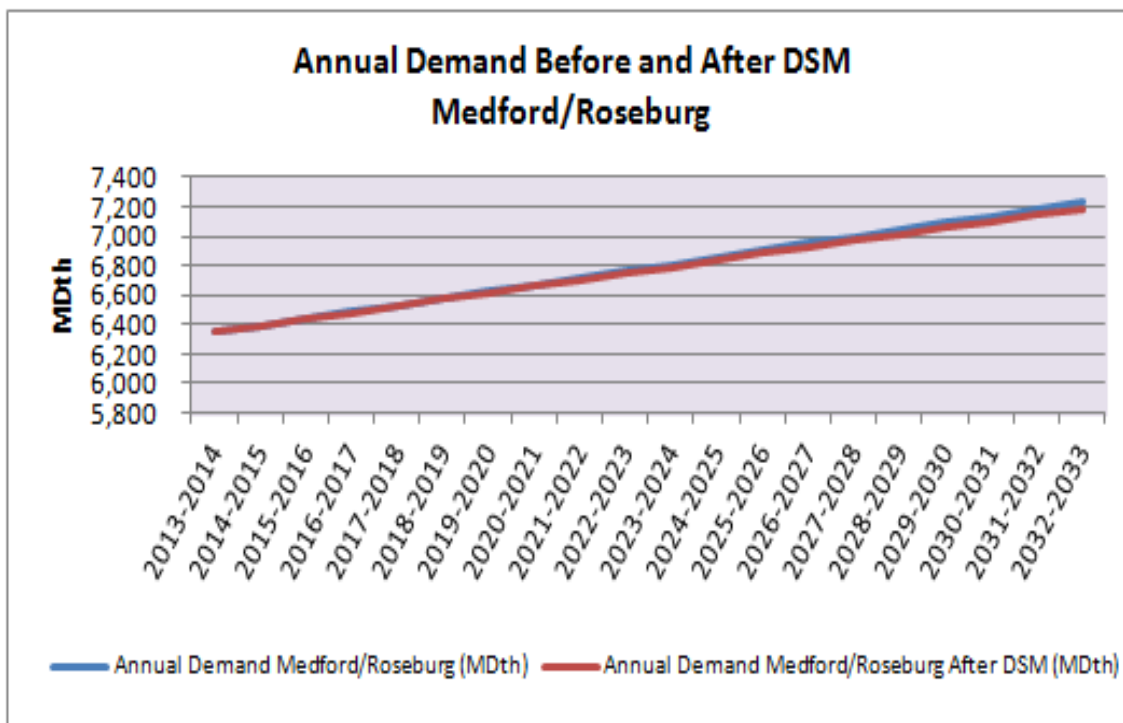
Scenario	Gas Year	Klam Falls (MDth)			Klamath (MDth/day)			La Grande (MDth/day)			Roseburg (MDth/day)		
		Annual Demand (MDth)	Daily Demand (MDth/day)	Peak Day (MDth/day)	Annual Demand (MDth)	Daily Demand (MDth/day)	Peak Day (MDth/day)	Annual Demand (MDth)	Daily Demand (MDth/day)	Peak Day (MDth/day)	Annual Demand (MDth)	Daily Demand (MDth/day)	Peak Day (MDth/day)
Cold Day 20Yr Weather Std	2013-2014	1,290.24	3.53	11.49	746.36	2.04	7.39	6,424.46	17.60	62.53	34,366.54	94.15	333.86
Cold Day 20Yr Weather Std	2014-2015	1,294.65	3.55	11.50	749.13	2.05	7.42	6,470.83	17.73	63.04	34,665.90	94.98	337.00
Cold Day 20Yr Weather Std	2015-2016	1,305.81	3.58	11.54	755.61	2.07	7.46	6,548.62	17.94	63.52	35,134.78	96.26	340.05
Cold Day 20Yr Weather Std	2016-2017	1,298.20	3.56	11.50	751.44	2.06	7.43	6,536.32	17.91	63.50	35,093.95	96.15	340.48
Cold Day 20Yr Weather Std	2017-2018	1,305.33	3.58	11.56	755.41	2.07	7.47	6,590.81	18.06	64.04	35,449.16	97.12	344.00
Cold Day 20Yr Weather Std	2018-2019	1,313.33	3.60	11.62	757.67	2.08	7.50	6,651.33	18.22	64.58	35,788.87	98.05	347.21
Cold Day 20Yr Weather Std	2019-2020	1,327.82	3.64	11.70	763.63	2.09	7.53	6,741.61	18.47	65.20	36,281.00	99.40	350.53
Cold Day 20Yr Weather Std	2020-2021	1,327.50	3.64	11.74	761.88	2.09	7.54	6,764.35	18.53	65.64	36,584.47	99.68	352.81
Cold Day 20Yr Weather Std	2021-2022	1,323.98	3.63	11.68	758.24	2.08	7.48	6,771.62	18.55	65.50	36,705.65	100.56	354.91
Cold Day 20Yr Weather Std	2022-2023	1,331.43	3.65	11.74	760.49	2.08	7.50	6,830.26	18.71	66.05	37,185.54	101.88	358.97
Cold Day 20Yr Weather Std	2023-2024	1,346.08	3.69	11.82	766.47	2.10	7.53	6,923.21	18.97	66.69	37,314.82	102.23	359.58
Cold Day 20Yr Weather Std	2024-2025	1,340.93	3.67	11.80	762.15	2.09	7.50	6,924.00	18.97	66.83	37,573.71	102.94	361.82
Cold Day 20Yr Weather Std	2025-2026	1,341.62	3.68	11.79	760.76	2.08	7.48	6,951.68	19.05	66.95	37,891.31	104.36	365.30
Cold Day 20Yr Weather Std	2026-2027	1,346.95	3.69	11.83	761.87	2.09	7.48	7,002.18	19.18	67.38	38,290.95	104.91	368.81
Cold Day 20Yr Weather Std	2027-2028	1,361.84	3.73	11.91	767.86	2.10	7.51	7,097.53	19.45	68.04	38,325.02	105.00	368.18
Cold Day 20Yr Weather Std	2028-2029	1,364.63	3.74	11.98	767.88	2.10	7.54	7,137.67	19.56	68.70	38,689.67	106.00	371.72
Cold Day 20Yr Weather Std	2029-2030	1,361.78	3.73	11.93	764.59	2.09	7.49	7,149.31	19.59	68.61	39,088.87	107.09	373.60
Cold Day 20Yr Weather Std	2030-2031	1,370.71	3.76	12.01	767.64	2.10	7.52	7,218.33	19.78	69.27	39,216.55	107.44	376.21
Cold Day 20Yr Weather Std	2031-2032	1,381.09	3.78	12.03	771.09	2.11	7.51	7,293.67	19.98	69.64			
Cold Day 20Yr Weather Std	2032-2033	1,381.16	3.78	12.08	769.58	2.11	7.52	7,321.52	20.06	70.14			
Cold Day 20Yr Weather Std	2013-2014	8,461.06	23.18	81.41	25,905.48	70.97	252.45	34,366.54	94.15	333.86			
Cold Day 20Yr Weather Std	2014-2015	8,514.61	23.33	81.96	26,151.29	71.65	255.04	34,665.90	94.98	337.00			
Cold Day 20Yr Weather Std	2015-2016	8,610.04	23.59	82.51	26,524.74	72.67	257.54	35,134.78	96.26	340.05			
Cold Day 20Yr Weather Std	2016-2017	8,585.96	23.52	82.44	26,507.99	72.62	258.05	35,093.95	96.15	340.48			
Cold Day 20Yr Weather Std	2017-2018	8,651.54	23.70	83.07	26,797.62	73.42	260.93	35,449.16	97.12	344.00			
Cold Day 20Yr Weather Std	2018-2019	8,722.34	23.90	83.70	27,066.53	74.15	263.50	35,788.87	98.05	347.21			
Cold Day 20Yr Weather Std	2019-2020	8,833.06	24.20	84.44	27,447.93	75.20	266.10	36,281.00	99.40	350.53			
Cold Day 20Yr Weather Std	2020-2021	8,853.73	24.26	84.92	27,530.74	75.43	267.90	36,584.47	99.68	352.81			
Cold Day 20Yr Weather Std	2021-2022	8,853.85	24.26	84.66	27,542.53	75.46	267.32	36,705.65	100.56	354.91			
Cold Day 20Yr Weather Std	2022-2023	8,922.18	24.44	85.29	27,783.48	76.12	269.61	37,185.54	101.88	358.97			
Cold Day 20Yr Weather Std	2023-2024	9,035.76	24.76	86.04	28,175.10	77.19	272.27	37,210.86	101.95	358.31			
Cold Day 20Yr Weather Std	2024-2025	9,027.08	24.73	86.14	28,158.46	77.15	272.83	37,185.54	101.88	358.97			
Cold Day 20Yr Weather Std	2025-2026	9,054.06	24.81	86.22	28,260.75	77.43	273.36	37,314.82	102.23	359.58			
Cold Day 20Yr Weather Std	2026-2027	9,111.01	24.96	86.69	28,462.70	77.98	275.13	37,573.71	102.94	361.82			
Cold Day 20Yr Weather Std	2027-2028	9,227.22	25.28	87.46	28,864.09	79.08	277.85	38,091.31	104.36	365.30			
Cold Day 20Yr Weather Std	2028-2029	9,270.18	25.40	88.22	29,020.77	79.51	280.58	38,290.95	104.91	368.81			
Cold Day 20Yr Weather Std	2029-2030	9,275.68	25.41	88.02	29,049.33	79.59	280.16	38,325.02	105.00	368.18			
Cold Day 20Yr Weather Std	2030-2031	9,356.68	25.63	88.80	29,332.99	80.36	282.92	38,689.67	106.00	371.72			
Cold Day 20Yr Weather Std	2031-2032	9,445.85	25.88	89.18	29,643.02	81.21	284.42	39,088.87	107.09	373.60			
Cold Day 20Yr Weather Std	2032-2033	9,472.27	25.95	89.74	29,744.29	81.49	286.47	39,216.55	107.44	376.21			

**APPENDIX 2.8: PEAK DAY DEMAND BEFORE AND AFTER DSM  
WA/ID**

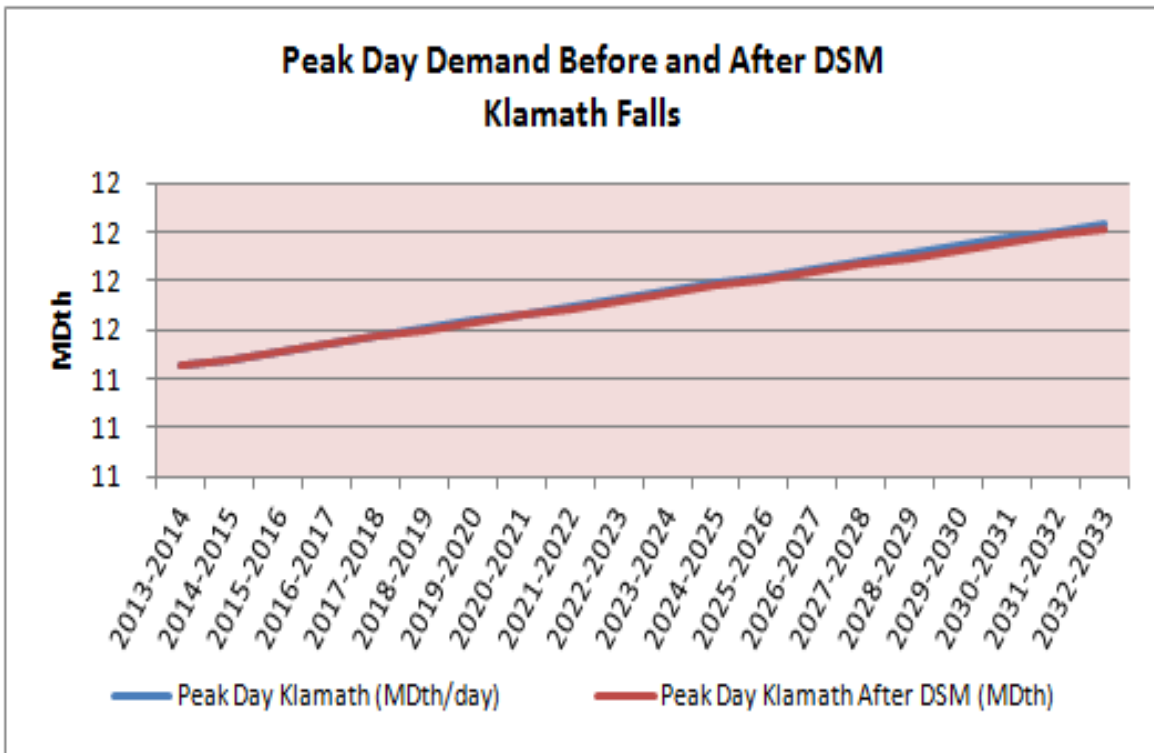
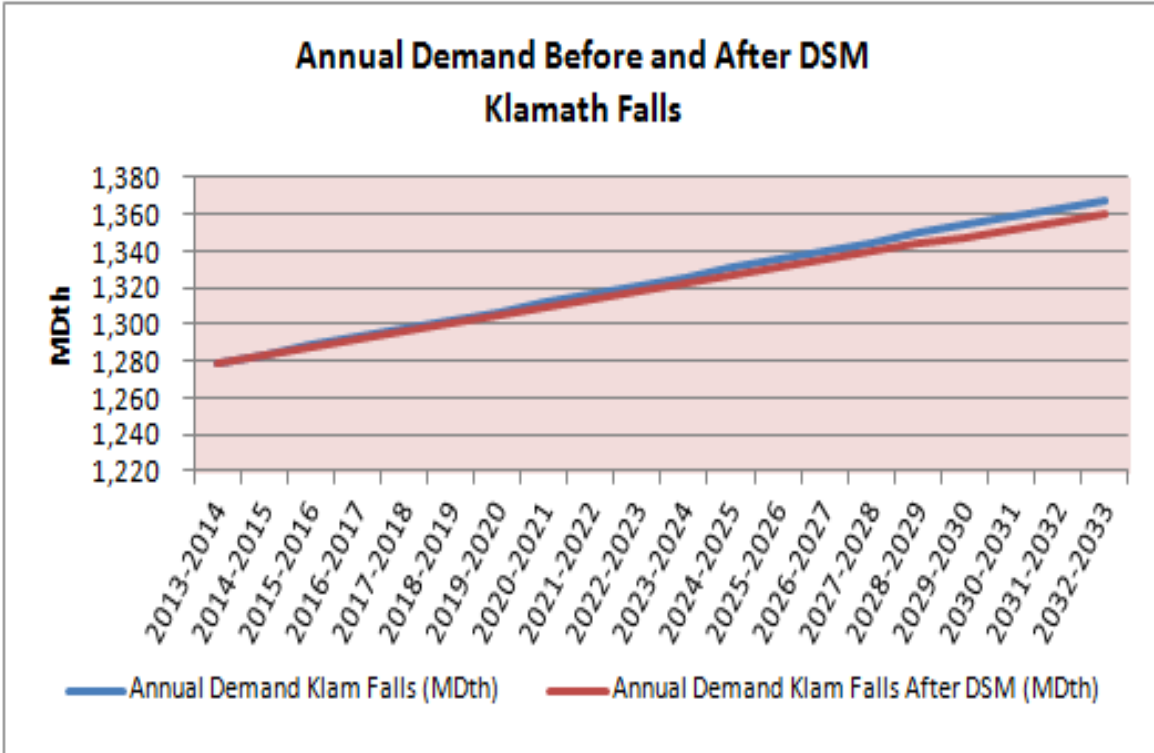




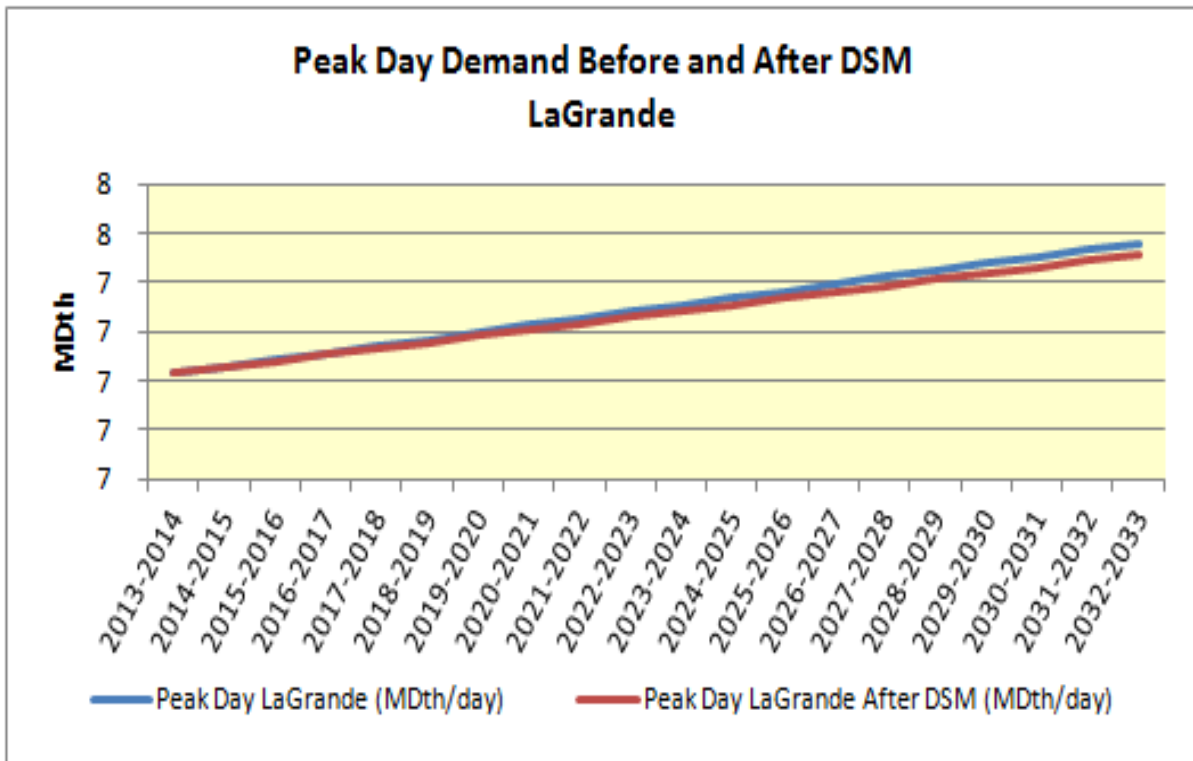
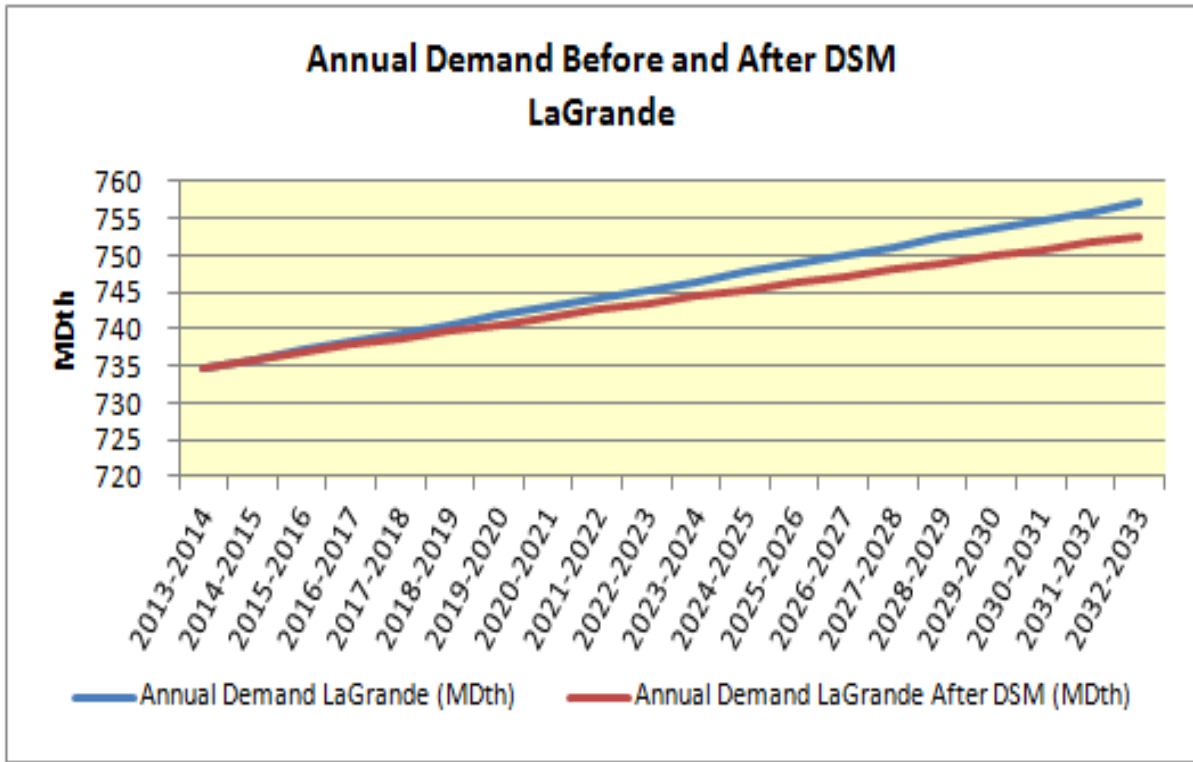
**APPENDIX 2.8: PEAK DAY DEMAND BEFORE AND AFTER DSM  
MEDFORD/ROSEBURG**



**APPENDIX 2.8: PEAK DAY DEMAND BEFORE AND AFTER DSM  
KLAMATH FALLS**



**APPENDIX 2.8: PEAK DAY DEMAND BEFORE AND AFTER DSM  
LA GRANDE**



## APPENDIX 2.9: DETAILED DEMAND DATA EXPECTED MIX

Area	2014:		2014:	2014 Total	2015:		2015:	2015 Total	2016:		2016:	2016 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	830.12	437.90	10.79	1,278.81	833.01	439.37	10.79	1,283.17	840.67	442.76	10.82	1,294.25
La Grande	454.22	271.28	9.24	734.73	456.50	271.72	9.24	737.46	460.91	273.71	9.24	743.86
Medford GTN	2,128.03	1,292.49	11.40	3,431.92	2,148.66	1,299.90	11.40	3,459.97	2,178.41	1,315.57	11.43	3,505.41
Medford NWP	956.07	580.68	5.12	1,541.88	965.34	584.02	5.12	1,554.48	978.71	591.05	5.14	1,574.90
Roseburg	745.28	607.72	20.14	1,373.14	749.33	608.89	20.14	1,378.36	757.46	611.76	20.19	1,389.41
<b>OR Sub-Total</b>	<b>5,113.72</b>	<b>3,190.07</b>	<b>56.69</b>	<b>8,360.47</b>	<b>5,152.85</b>	<b>3,203.91</b>	<b>56.69</b>	<b>8,413.44</b>	<b>5,216.16</b>	<b>3,234.86</b>	<b>56.81</b>	<b>8,507.84</b>
Wa/Id Both	9,182.14	5,449.74	294.60	14,926.47	9,279.41	5,495.35	293.40	15,068.15	9,425.86	5,564.72	292.88	15,283.46
Wa/Id GTN	1,266.50	751.69	40.63	2,058.82	1,279.92	757.98	40.47	2,078.37	1,300.12	767.55	40.40	2,108.06
Wa/Id NWP	5,382.63	3,194.67	172.69	8,750.00	5,439.65	3,221.41	171.99	8,833.06	5,525.50	3,262.08	171.69	8,959.27
<b>WA/ID Sub-Total</b>	<b>15,831.27</b>	<b>9,396.10</b>	<b>507.93</b>	<b>25,735.30</b>	<b>15,998.98</b>	<b>9,474.74</b>	<b>505.86</b>	<b>25,979.58</b>	<b>16,251.48</b>	<b>9,594.35</b>	<b>504.97</b>	<b>26,350.79</b>
<b>Case Total</b>	<b>20,944.99</b>	<b>12,586.17</b>	<b>564.61</b>	<b>34,095.77</b>	<b>21,151.82</b>	<b>12,678.64</b>	<b>562.54</b>	<b>34,393.01</b>	<b>21,467.64</b>	<b>12,829.21</b>	<b>561.78</b>	<b>34,858.63</b>

Area	2017:		2017:	2017 Total	2018:		2018:	2018 Total	2019:		2019:	2019 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	835.65	440.18	10.77	1,286.60	841.00	441.91	10.77	1,293.68	846.55	444.29	10.77	1,301.61
La Grande	458.69	271.82	9.16	739.67	461.61	272.81	9.16	743.58	463.01	273.64	9.16	745.81
Medford GTN	2,176.38	1,313.83	11.38	3,501.58	2,198.14	1,324.65	11.38	3,534.16	2,221.64	1,338.17	11.38	3,571.18
Medford NWP	977.79	590.27	5.11	1,573.17	987.57	595.13	5.11	1,587.81	998.13	601.21	5.11	1,604.44
Roseburg	755.19	606.95	20.11	1,382.25	761.25	607.50	20.11	1,388.87	767.17	607.65	20.11	1,394.94
<b>OR Sub-Total</b>	<b>5,203.70</b>	<b>3,223.05</b>	<b>56.53</b>	<b>8,483.28</b>	<b>5,249.57</b>	<b>3,242.00</b>	<b>56.53</b>	<b>8,548.10</b>	<b>5,296.49</b>	<b>3,264.97</b>	<b>56.53</b>	<b>8,617.99</b>
Wa/Id Both	9,433.69	5,549.89	289.17	15,272.75	9,551.88	5,600.55	287.30	15,439.74	9,654.37	5,654.36	286.02	15,594.74
Wa/Id GTN	1,301.20	765.50	39.89	2,106.59	1,317.50	772.49	39.63	2,129.62	1,331.64	779.91	39.45	2,151.00
Wa/Id NWP	5,530.10	3,253.38	169.51	8,952.99	5,599.38	3,283.08	168.42	9,050.88	5,659.46	3,314.62	167.67	9,141.75
<b>WA/ID Sub-Total</b>	<b>16,264.99</b>	<b>9,568.77</b>	<b>498.57</b>	<b>26,332.33</b>	<b>16,468.77</b>	<b>9,656.12</b>	<b>495.35</b>	<b>26,620.23</b>	<b>16,645.46</b>	<b>9,748.89</b>	<b>493.14</b>	<b>26,887.49</b>
<b>Case Total</b>	<b>21,468.69</b>	<b>12,791.83</b>	<b>555.10</b>	<b>34,815.61</b>	<b>21,718.33</b>	<b>12,898.12</b>	<b>551.88</b>	<b>35,168.33</b>	<b>21,941.95</b>	<b>13,013.86</b>	<b>549.67</b>	<b>35,505.47</b>

Area	2020:		2020:	2020 Total	2021:		2021:	2021 Total	2022:		2022:	2022 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	856.04	449.14	10.80	1,315.99	855.60	449.27	10.76	1,315.62	852.78	448.49	10.73	1,312.00
La Grande	466.73	275.80	9.16	751.69	465.63	275.18	9.13	749.94	463.21	274.02	9.03	746.25
Medford GTN	2,255.30	1,357.98	11.40	3,624.69	2,265.30	1,365.05	11.37	3,641.71	2,268.63	1,369.37	11.33	3,649.33
Medford NWP	1,013.25	610.11	5.12	1,628.48	1,017.74	613.28	5.11	1,636.13	1,019.24	615.23	5.09	1,639.56
Roseburg	776.30	610.20	20.17	1,406.67	777.17	606.90	20.11	1,404.18	776.49	603.08	20.08	1,399.64
<b>OR Sub-Total</b>	<b>5,367.63</b>	<b>3,303.24</b>	<b>56.66</b>	<b>8,727.52</b>	<b>5,381.43</b>	<b>3,309.68</b>	<b>56.47</b>	<b>8,747.59</b>	<b>5,380.34</b>	<b>3,310.18</b>	<b>56.26</b>	<b>8,746.78</b>
Wa/Id Both	9,793.59	5,735.32	285.67	15,814.59	9,823.86	5,754.92	283.12	15,861.91	9,825.54	5,761.06	280.56	15,867.16
Wa/Id GTN	1,350.84	791.08	39.40	2,181.32	1,355.02	793.78	39.05	2,187.85	1,355.25	794.63	38.70	2,188.57
Wa/Id NWP	5,741.07	3,362.08	167.46	9,270.62	5,758.82	3,373.58	165.97	9,298.36	5,759.80	3,377.17	164.47	9,301.44
<b>WA/ID Sub-Total</b>	<b>16,885.51</b>	<b>9,888.48</b>	<b>492.54</b>	<b>27,266.53</b>	<b>16,937.70</b>	<b>9,922.28</b>	<b>488.14</b>	<b>27,348.12</b>	<b>16,940.58</b>	<b>9,932.86</b>	<b>483.73</b>	<b>27,357.17</b>
<b>Case Total</b>	<b>22,253.14</b>	<b>13,191.72</b>	<b>549.19</b>	<b>35,994.05</b>	<b>22,319.13</b>	<b>13,231.96</b>	<b>544.61</b>	<b>36,095.70</b>	<b>22,320.93</b>	<b>13,243.04</b>	<b>539.98</b>	<b>36,103.95</b>

Area	2023:		2023:	2023 Total	2024:		2024:	2024 Total	2025:		2025:	2025 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	857.52	451.12	10.73	1,319.36	867.12	456.02	10.76	1,333.89	863.34	454.64	10.71	1,328.69
La Grande	464.60	274.85	9.02	748.46	468.32	277.03	9.02	754.37	465.54	275.54	8.95	750.03
Medford GTN	2,291.28	1,383.30	11.33	3,685.90	2,325.98	1,403.82	11.36	3,741.16	2,327.68	1,406.85	11.30	3,745.84
Medford NWP	1,029.41	621.48	5.09	1,655.98	1,045.01	630.70	5.10	1,680.81	1,045.77	632.07	5.08	1,682.91
Roseburg	781.68	602.73	20.07	1,404.48	790.99	605.20	20.13	1,416.32	789.28	600.42	20.05	1,409.75
<b>OR Sub-Total</b>	<b>5,424.49</b>	<b>3,333.47</b>	<b>56.23</b>	<b>8,814.19</b>	<b>5,497.41</b>	<b>3,372.77</b>	<b>56.36</b>	<b>8,926.54</b>	<b>5,491.61</b>	<b>3,369.52</b>	<b>56.09</b>	<b>8,917.22</b>
Wa/Id Both	9,913.51	5,813.19	279.15	16,005.85	10,056.41	5,896.36	278.79	16,231.56	10,049.06	5,896.07	275.79	16,220.92
Wa/Id GTN	1,367.38	801.82	38.50	2,207.70	1,387.09	813.29	38.45	2,238.84	1,386.08	813.25	38.04	2,237.37
Wa/Id NWP	5,811.37	3,407.73	163.64	9,382.74	5,895.14	3,456.49	163.43	9,515.05	5,890.83	3,456.32	161.67	9,508.82
<b>WA/ID Sub-Total</b>	<b>17,092.26</b>	<b>10,022.74</b>	<b>481.30</b>	<b>27,596.29</b>	<b>17,338.64</b>	<b>10,166.14</b>	<b>480.67</b>	<b>27,985.45</b>	<b>17,325.97</b>	<b>10,165.64</b>	<b>475.50</b>	<b>27,967.11</b>
<b>Case Total</b>	<b>22,516.75</b>	<b>13,356.21</b>	<b>537.53</b>	<b>36,410.49</b>	<b>22,836.05</b>	<b>13,538.91</b>	<b>537.03</b>	<b>36,911.99</b>	<b>22,817.58</b>	<b>13,535.16</b>	<b>531.60</b>	<b>36,884.33</b>

## APPENDIX 2.9: DETAILED DEMAND DATA EXPECTED MIX

Area	2026:				2027:				2028:			
	Residential	Commercial	Ind FirmSale	2026 Total	Residential	Commercial	Ind FirmSale	2027 Total	Residential	Commercial	Ind FirmSale	2028 Total
Klam Falls	863.43	455.17	10.69	1,329.28	866.74	457.10	10.68	1,334.53	876.44	462.14	10.71	1,349.29
La Grande	464.57	275.15	8.88	748.60	465.24	275.57	8.85	749.67	468.96	277.76	8.85	755.57
Medford GTN	2,338.71	1,415.10	11.28	3,765.10	2,358.21	1,427.66	11.27	3,797.14	2,393.93	1,448.77	11.30	3,854.00
Medford NWP	1,050.72	635.77	5.07	1,691.56	1,059.48	641.41	5.06	1,705.96	1,075.53	650.90	5.08	1,731.51
Roseburg	790.87	597.82	20.03	1,408.71	795.01	596.92	20.02	1,411.95	804.45	599.27	20.08	1,423.81
<b>OR Sub-Total</b>	<b>5,508.30</b>	<b>3,379.01</b>	<b>55.95</b>	<b>8,943.26</b>	<b>5,544.68</b>	<b>3,398.66</b>	<b>55.89</b>	<b>8,999.24</b>	<b>5,619.31</b>	<b>3,438.85</b>	<b>56.02</b>	<b>9,114.18</b>
Wa/Id Both	10,084.65	5,920.45	273.71	16,278.81	10,157.79	5,964.84	272.10	16,394.73	10,304.11	6,050.20	271.72	16,626.03
Wa/Id GTN	1,390.99	816.61	37.75	2,245.35	1,401.07	822.74	37.53	2,261.34	1,421.26	834.51	37.48	2,293.25
Wa/Id NWP	5,911.69	3,470.61	160.45	9,542.75	5,954.56	3,496.63	159.51	9,610.70	6,040.34	3,546.67	159.28	9,746.29
<b>WA/ID Sub-Total</b>	<b>17,387.33</b>	<b>10,207.68</b>	<b>471.92</b>	<b>28,066.92</b>	<b>17,513.42</b>	<b>10,284.21</b>	<b>469.14</b>	<b>28,266.77</b>	<b>17,765.71</b>	<b>10,431.37</b>	<b>468.48</b>	<b>28,665.57</b>
<b>Case Total</b>	<b>22,895.63</b>	<b>13,586.68</b>	<b>527.87</b>	<b>37,010.18</b>	<b>23,058.11</b>	<b>13,682.87</b>	<b>525.03</b>	<b>37,266.01</b>	<b>23,385.03</b>	<b>13,870.22</b>	<b>524.51</b>	<b>37,779.75</b>

Area	2029:				2030:				2031:			
	Residential	Commercial	Ind FirmSale	2029 Total	Residential	Commercial	Ind FirmSale	2030 Total	Residential	Commercial	Ind FirmSale	2031 Total
Klam Falls	878.21	463.15	10.68	1,352.05	875.84	462.60	10.66	1,349.09	881.62	465.67	10.66	1,357.94
La Grande	468.97	277.76	8.85	755.59	466.78	276.72	8.75	752.25	468.65	277.84	8.75	755.25
Medford GTN	2,410.38	1,459.25	11.27	3,880.90	2,415.26	1,464.60	11.24	3,891.09	2,441.83	1,480.71	11.24	3,933.78
Medford NWP	1,082.92	655.60	5.06	1,743.59	1,085.12	658.01	5.05	1,748.17	1,097.05	665.25	5.05	1,767.35
Roseburg	807.13	597.20	20.02	1,424.36	806.83	593.56	20.00	1,420.39	812.96	593.71	20.00	1,426.67
<b>OR Sub-Total</b>	<b>5,647.62</b>	<b>3,452.96</b>	<b>55.89</b>	<b>9,156.48</b>	<b>5,649.82</b>	<b>3,455.48</b>	<b>55.69</b>	<b>9,160.99</b>	<b>5,702.11</b>	<b>3,483.19</b>	<b>55.69</b>	<b>9,240.99</b>
Wa/Id Both	10,361.96	6,084.76	269.57	16,716.29	10,369.58	6,094.42	267.17	16,731.17	10,473.26	6,155.43	265.91	16,894.60
Wa/Id GTN	1,429.24	839.28	37.18	2,305.69	1,430.29	840.61	36.85	2,307.75	1,444.59	849.03	36.68	2,330.29
Wa/Id NWP	6,074.25	3,566.93	158.02	9,799.20	6,078.72	3,572.59	156.62	9,807.93	6,139.50	3,608.36	155.88	9,903.73
<b>WA/ID Sub-Total</b>	<b>17,865.45</b>	<b>10,490.97</b>	<b>464.77</b>	<b>28,821.18</b>	<b>17,878.58</b>	<b>10,507.63</b>	<b>460.64</b>	<b>28,846.85</b>	<b>18,057.35</b>	<b>10,612.81</b>	<b>458.46</b>	<b>29,128.62</b>
<b>Case Total</b>	<b>23,513.07</b>	<b>13,943.93</b>	<b>520.66</b>	<b>37,977.66</b>	<b>23,528.40</b>	<b>13,963.11</b>	<b>516.33</b>	<b>38,007.84</b>	<b>23,759.46</b>	<b>14,096.00</b>	<b>514.16</b>	<b>38,369.62</b>

Area	2032:				2033:			
	Residential	Commercial	Ind FirmSale	2032 Total	Residential	Commercial	Ind FirmSale	2033 Total
Klam Falls	888.17	469.34	10.68	1,368.19	888.05	469.52	10.64	1,368.21
La Grande	470.76	279.15	8.72	758.63	469.83	278.59	8.69	757.11
Medford GTN	2,469.97	1,498.24	11.25	3,979.47	2,481.83	1,506.57	11.22	3,999.61
Medford NWP	1,109.70	673.12	5.06	1,787.88	1,115.02	676.86	5.04	1,796.93
Roseburg	820.02	594.62	20.04	1,434.68	821.22	591.51	19.98	1,432.71
<b>OR Sub-Total</b>	<b>5,758.62</b>	<b>3,514.48</b>	<b>55.74</b>	<b>9,328.84</b>	<b>5,775.95</b>	<b>3,523.05</b>	<b>55.57</b>	<b>9,354.57</b>
Wa/Id Both	10,585.02	6,222.52	265.07	17,072.60	10,621.78	6,246.07	262.69	17,130.54
Wa/Id GTN	1,460.00	858.28	36.56	2,354.84	1,465.07	861.53	36.23	2,362.83
Wa/Id NWP	6,205.01	3,647.68	155.38	10,008.08	6,226.56	3,661.49	153.99	10,042.04
<b>WA/ID Sub-Total</b>	<b>18,250.03</b>	<b>10,728.48</b>	<b>457.01</b>	<b>29,435.52</b>	<b>18,313.41</b>	<b>10,769.09</b>	<b>452.91</b>	<b>29,535.41</b>
<b>Case Total</b>	<b>24,008.65</b>	<b>14,242.96</b>	<b>512.75</b>	<b>38,764.36</b>	<b>24,089.36</b>	<b>14,292.14</b>	<b>508.48</b>	<b>38,889.98</b>

## APPENDIX 2.9: DETAILED DEMAND DATA

### LOW GROWTH HIGH PRICE

Area	2014:		2014:		2014:		2015:		2015:		2015:		2016:		2016:		2016:	
	Residential	Commercial	Ind FirmSale	2014 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2016 Total		
Klam Falls	830.06	438.68	10.79	1,279.53	817.28	433.29	10.73	1,261.30	816.62	433.46	10.74	1,260.82						
La Grande	452.54	271.25	9.24	733.03	445.52	267.47	9.03	722.02	444.61	266.91	8.94	720.46						
Medford GTN	2,130.77	1,296.84	11.40	3,439.01	2,104.13	1,284.85	11.33	3,400.31	2,106.85	1,288.01	10.79	3,405.64						
Medford NWP	957.30	582.64	5.12	1,545.06	945.33	577.25	5.09	1,527.67	946.55	578.67	4.85	1,530.07						
Roseburg	745.71	607.58	20.14	1,373.43	736.56	599.62	20.08	1,356.25	737.02	598.42	20.11	1,355.55						
<b>OR Sub-Total</b>	<b>5,116.38</b>	<b>3,196.99</b>	<b>56.69</b>	<b>8,370.06</b>	<b>5,048.81</b>	<b>3,162.47</b>	<b>56.27</b>	<b>8,267.56</b>	<b>5,051.65</b>	<b>3,165.47</b>	<b>55.42</b>	<b>8,272.54</b>						
Wa/Id Both	9,159.37	5,469.65	292.21	14,921.23	9,035.18	5,404.56	285.85	14,725.60	9,042.25	5,412.54	281.83	14,736.62						
Wa/Id GTN	1,263.36	754.43	40.31	2,058.10	1,246.23	745.46	39.43	2,031.12	1,247.21	746.56	38.87	2,032.64						
Wa/Id NWP	5,369.29	3,206.34	171.30	8,746.93	5,296.48	3,168.19	167.57	8,632.25	5,300.63	3,172.87	165.21	8,638.71						
<b>WA/ID Sub-Total</b>	<b>15,792.02</b>	<b>9,430.42</b>	<b>503.82</b>	<b>25,726.26</b>	<b>15,577.90</b>	<b>9,318.21</b>	<b>492.85</b>	<b>25,388.96</b>	<b>15,590.08</b>	<b>9,331.97</b>	<b>485.91</b>	<b>25,407.96</b>						
<b>Case Total</b>	<b>20,908.40</b>	<b>12,627.42</b>	<b>560.50</b>	<b>34,096.32</b>	<b>20,626.71</b>	<b>12,480.69</b>	<b>549.12</b>	<b>33,656.52</b>	<b>20,641.73</b>	<b>12,497.43</b>	<b>541.33</b>	<b>33,680.50</b>						
Area	2017:		2017:		2017:		2018:		2018:		2018:		2019:		2019:		2019:	
	Residential	Commercial	Ind FirmSale	2017 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2019 Total		
Klam Falls	812.08	431.50	9.62	1,253.20	811.59	431.52	9.35	1,252.46	809.78	430.94	9.34	1,250.05						
La Grande	441.94	265.45	8.90	716.29	441.20	265.16	8.86	715.22	439.81	264.49	8.80	713.10						
Medford GTN	2,101.03	1,285.86	10.58	3,397.47	2,104.71	1,289.00	10.03	3,403.74	2,105.06	1,290.48	9.85	3,405.38						
Medford NWP	943.94	577.70	4.75	1,526.40	945.59	579.11	4.51	1,529.21	945.75	579.78	4.42	1,529.95						
Roseburg	733.95	594.21	20.04	1,348.20	734.29	592.58	20.03	1,346.90	733.61	590.18	20.01	1,343.80						
<b>OR Sub-Total</b>	<b>5,092.95</b>	<b>3,154.72</b>	<b>53.89</b>	<b>8,241.57</b>	<b>5,037.40</b>	<b>3,157.37</b>	<b>52.76</b>	<b>8,247.53</b>	<b>5,034.01</b>	<b>3,155.87</b>	<b>52.41</b>	<b>8,242.29</b>						
Wa/Id Both	9,009.27	5,395.39	276.54	14,681.20	9,019.48	5,403.46	272.25	14,695.19	9,014.95	5,403.52	267.77	14,686.24						
Wa/Id GTN	1,242.66	744.19	38.14	2,024.99	1,244.07	745.31	37.55	2,026.92	1,243.44	745.31	36.93	2,025.69						
Wa/Id NWP	5,281.30	3,162.82	162.11	8,606.22	5,287.28	3,167.55	159.59	8,614.42	5,284.62	3,167.58	156.97	8,609.17						
<b>WA/ID Sub-Total</b>	<b>15,533.22</b>	<b>9,302.40</b>	<b>476.80</b>	<b>25,312.42</b>	<b>15,550.82</b>	<b>9,316.32</b>	<b>469.40</b>	<b>25,336.53</b>	<b>15,543.01</b>	<b>9,316.41</b>	<b>461.67</b>	<b>25,321.10</b>						
<b>Case Total</b>	<b>20,566.17</b>	<b>12,457.12</b>	<b>530.69</b>	<b>33,553.98</b>	<b>20,588.22</b>	<b>12,473.69</b>	<b>522.16</b>	<b>33,584.07</b>	<b>20,577.02</b>	<b>12,472.28</b>	<b>514.09</b>	<b>33,563.39</b>						
Area	2020:		2020:		2020:		2021:		2021:		2021:		2022:		2022:		2022:	
	Residential	Commercial	Ind FirmSale	2020 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2022 Total		
Klam Falls	813.75	433.19	8.28	1,255.22	811.05	431.97	7.99	1,251.02	810.43	431.93	7.98	1,250.34						
La Grande	441.23	265.40	8.77	715.40	439.49	264.29	8.75	712.53	438.73	263.90	8.70	711.33						
Medford GTN	2,119.35	1,299.51	9.32	3,428.18	2,118.06	1,299.63	9.13	3,426.82	2,121.43	1,302.63	8.58	3,432.64						
Medford NWP	952.17	583.84	4.19	1,540.20	951.59	583.89	4.10	1,539.58	953.11	585.24	3.85	1,542.20						
Roseburg	737.67	591.20	20.05	1,348.92	736.02	588.13	19.99	1,344.15	736.27	586.29	19.98	1,342.55						
<b>OR Sub-Total</b>	<b>5,064.16</b>	<b>3,173.14</b>	<b>50.61</b>	<b>8,287.92</b>	<b>5,056.22</b>	<b>3,167.92</b>	<b>49.96</b>	<b>8,274.10</b>	<b>5,059.97</b>	<b>3,170.00</b>	<b>49.10</b>	<b>8,279.07</b>						
Wa/Id Both	9,073.06	5,439.26	264.49	14,776.81	9,060.16	5,433.10	259.59	14,752.85	9,068.94	5,440.38	255.34	14,764.65						
Wa/Id GTN	1,251.46	750.24	36.48	2,038.18	1,249.68	749.39	35.81	2,034.88	1,250.89	750.40	35.22	2,036.50						
Wa/Id NWP	5,318.69	3,188.53	155.04	8,662.27	5,311.13	3,184.92	152.17	8,648.22	5,316.27	3,189.19	149.68	8,655.14						
<b>WA/ID Sub-Total</b>	<b>15,643.20</b>	<b>9,378.04</b>	<b>456.01</b>	<b>25,477.26</b>	<b>15,620.96</b>	<b>9,367.41</b>	<b>447.57</b>	<b>25,435.94</b>	<b>15,636.10</b>	<b>9,379.96</b>	<b>440.24</b>	<b>25,456.30</b>						
<b>Case Total</b>	<b>20,707.36</b>	<b>12,551.19</b>	<b>506.63</b>	<b>33,765.18</b>	<b>20,677.18</b>	<b>12,535.33</b>	<b>497.53</b>	<b>33,710.04</b>	<b>20,696.07</b>	<b>12,549.96</b>	<b>489.34</b>	<b>33,735.37</b>						
Area	2023:		2023:		2023:		2024:		2024:		2024:		2025:		2025:		2025:	
	Residential	Commercial	Ind FirmSale	2023 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2025 Total		
Klam Falls	808.37	431.31	6.90	1,246.58	814.71	434.58	6.66	1,255.95	809.55	432.26	6.63	1,248.44						
La Grande	437.21	263.17	8.64	709.02	439.83	264.79	8.64	713.27	436.86	263.17	8.59	708.62						
Medford GTN	2,121.19	1,303.86	8.40	3,433.45	2,141.60	1,315.93	7.88	3,465.42	2,134.06	1,312.96	7.69	3,454.71						
Medford NWP	953.00	585.79	3.77	1,542.56	962.17	591.22	3.54	1,556.93	958.78	589.88	3.45	1,552.11						
Roseburg	735.38	583.99	19.96	1,339.34	741.31	586.01	20.02	1,347.34	737.73	581.72	19.95	1,339.40						
<b>OR Sub-Total</b>	<b>5,055.14</b>	<b>3,168.12</b>	<b>47.69</b>	<b>8,270.95</b>	<b>5,099.63</b>	<b>3,192.53</b>	<b>46.75</b>	<b>8,338.91</b>	<b>5,076.98</b>	<b>3,179.99</b>	<b>46.31</b>	<b>8,303.29</b>						
Wa/Id Both	9,061.69	5,438.99	250.90	14,751.58	9,146.62	5,489.51	247.94	14,884.06	9,106.09	5,468.27	242.80	14,817.17						
Wa/Id GTN	1,249.89	750.21	34.61	2,034.70	1,261.60	757.17	34.20	2,052.97	1,256.01	754.24	33.49	2,043.75						
Wa/Id NWP	5,312.03	3,188.37	147.08	8,647.48	5,361.81	3,217.99	145.34	8,725.14	5,338.06	3,205.54	142.33	8,685.93						
<b>WA/ID Sub-Total</b>	<b>15,623.61</b>	<b>9,377.56</b>	<b>432.58</b>	<b>25,433.76</b>	<b>15,770.04</b>	<b>9,464.66</b>	<b>427.48</b>	<b>25,662.18</b>	<b>15,700.16</b>	<b>9,428.05</b>	<b>418.62</b>	<b>25,546.84</b>						
<b>Case Total</b>	<b>20,678.76</b>	<b>12,545.68</b>	<b>480.27</b>	<b>33,704.70</b>	<b>20,869.66</b>	<b>12,657.20</b>	<b>474.22</b>	<b>34,001.08</b>	<b>20,777.14</b>	<b>12,608.05</b>	<b>464.94</b>	<b>33,850.12</b>						

## APPENDIX 2.9: DETAILED DEMAND DATA LOW GROWTH HIGH PRICE

Area	2026:				2027:				2028:			
	Residential	Commercial	Ind FirmSale	2026 Total	Residential	Commercial	Ind FirmSale	2027 Total	Residential	Commercial	Ind FirmSale	2028 Total
Klam Falls	808.49	432.06	5.56	1,246.11	808.59	432.34	5.30	1,246.22	813.41	434.99	5.31	1,253.71
La Grande	435.87	262.63	8.54	707.04	435.44	262.40	8.51	706.35	437.29	263.49	8.49	709.27
Medford GTN	2,136.35	1,315.47	7.14	3,458.96	2,141.59	1,319.51	6.97	3,468.07	2,158.33	1,329.75	6.45	3,494.53
Medford NWP	959.81	591.01	3.21	1,554.03	962.16	592.82	3.13	1,558.12	969.69	597.42	2.90	1,570.01
Roseburg	737.65	579.79	19.93	1,337.37	738.44	578.46	19.93	1,336.83	743.22	579.94	19.97	1,343.14
<b>OR Sub-Total</b>	<b>5,078.17</b>	<b>3,180.96</b>	<b>44.39</b>	<b>8,303.52</b>	<b>5,086.23</b>	<b>3,185.52</b>	<b>43.84</b>	<b>8,315.59</b>	<b>5,121.94</b>	<b>3,205.59</b>	<b>43.12</b>	<b>8,370.66</b>
Wa/Id Both	9,110.02	5,472.99	238.55	14,821.56	9,126.87	5,484.77	234.46	14,846.11	9,195.41	5,526.44	231.28	14,953.12
Wa/Id GTN	1,256.55	754.89	32.90	2,044.35	1,258.88	756.52	32.34	2,047.74	1,268.33	762.27	31.90	2,062.50
Wa/Id NWP	5,340.36	3,208.30	139.84	8,688.50	5,350.24	3,215.21	137.44	8,702.89	5,390.41	3,239.64	135.58	8,765.63
<b>WA/ID Sub-Total</b>	<b>15,706.94</b>	<b>9,436.18</b>	<b>411.29</b>	<b>25,554.41</b>	<b>15,735.99</b>	<b>9,456.50</b>	<b>404.25</b>	<b>25,596.74</b>	<b>15,854.15</b>	<b>9,528.35</b>	<b>398.75</b>	<b>25,781.25</b>
<b>Case Total</b>	<b>20,785.11</b>	<b>12,617.14</b>	<b>455.68</b>	<b>33,857.92</b>	<b>20,822.21</b>	<b>12,642.03</b>	<b>448.08</b>	<b>33,912.33</b>	<b>20,976.10</b>	<b>12,733.94</b>	<b>441.87</b>	<b>34,151.91</b>

Area	2029:				2030:				2031:			
	Residential	Commercial	Ind FirmSale	2029 Total	Residential	Commercial	Ind FirmSale	2030 Total	Residential	Commercial	Ind FirmSale	2031 Total
Klam Falls	810.73	433.81	4.23	1,248.76	808.86	433.21	3.96	1,246.03	808.47	433.27	3.96	1,245.70
La Grande	435.58	262.55	8.47	706.60	434.18	261.87	8.41	704.47	433.53	261.58	8.38	703.48
Medford GTN	2,157.03	1,329.94	6.27	3,493.24	2,157.30	1,331.47	5.72	3,494.49	2,161.34	1,334.88	5.56	3,501.78
Medford NWP	969.10	597.51	2.82	1,569.42	969.22	598.20	2.57	1,569.99	971.04	599.73	2.50	1,573.26
Roseburg	741.57	576.75	19.91	1,338.23	740.86	574.54	19.90	1,335.30	741.28	572.91	19.89	1,334.08
<b>OR Sub-Total</b>	<b>5,114.01</b>	<b>3,200.55</b>	<b>41.70</b>	<b>8,356.25</b>	<b>5,110.43</b>	<b>3,199.29</b>	<b>40.57</b>	<b>8,350.28</b>	<b>5,115.65</b>	<b>3,202.37</b>	<b>40.27</b>	<b>8,358.30</b>
Wa/Id Both	9,182.38	5,520.16	226.57	14,929.11	9,177.27	5,520.04	222.27	14,919.58	9,188.77	5,528.96	218.18	14,935.91
Wa/Id GTN	1,266.53	761.40	31.25	2,059.19	1,265.83	761.38	30.66	2,057.87	1,267.42	762.62	30.09	2,060.13
Wa/Id NWP	5,382.77	3,235.96	132.82	8,751.54	5,379.78	3,235.88	130.30	8,745.96	5,386.52	3,241.12	127.90	8,755.53
<b>WA/ID Sub-Total</b>	<b>15,831.68</b>	<b>9,517.52</b>	<b>390.64</b>	<b>25,739.84</b>	<b>15,822.88</b>	<b>9,517.31</b>	<b>383.23</b>	<b>25,723.42</b>	<b>15,842.71</b>	<b>9,532.69</b>	<b>376.17</b>	<b>25,751.57</b>
<b>Case Total</b>	<b>20,945.69</b>	<b>12,718.06</b>	<b>432.33</b>	<b>34,096.09</b>	<b>20,933.31</b>	<b>12,716.60</b>	<b>423.80</b>	<b>34,073.70</b>	<b>20,958.36</b>	<b>12,735.07</b>	<b>416.44</b>	<b>34,109.87</b>

Area	2032:				2033:			
	Residential	Commercial	Ind FirmSale	2032 Total	Residential	Commercial	Ind FirmSale	2033 Total
Klam Falls	811.70	435.24	2.90	1,249.84	810.69	434.76	2.64	1,248.09
La Grande	434.54	262.31	8.34	705.19	433.71	261.83	8.34	703.88
Medford GTN	2,174.10	1,343.25	5.03	3,522.38	2,177.17	1,345.59	4.86	3,527.61
Medford NWP	976.77	603.49	2.26	1,582.52	978.15	604.54	2.18	1,584.87
Roseburg	744.81	573.56	19.93	1,338.30	744.49	571.25	19.88	1,335.62
<b>OR Sub-Total</b>	<b>5,141.92</b>	<b>3,217.86</b>	<b>38.46</b>	<b>8,398.23</b>	<b>5,144.21</b>	<b>3,217.97</b>	<b>37.89</b>	<b>8,400.07</b>
Wa/Id Both	9,239.55	5,560.98	214.78	15,015.32	9,245.69	5,565.19	210.37	15,021.24
Wa/Id GTN	1,274.42	767.03	29.63	2,071.08	1,275.27	767.61	29.02	2,071.90
Wa/Id NWP	5,416.29	3,259.89	125.91	8,802.08	5,419.89	3,262.35	123.32	8,805.56
<b>WA/ID Sub-Total</b>	<b>15,930.26</b>	<b>9,587.90</b>	<b>370.32</b>	<b>25,888.48</b>	<b>15,940.84</b>	<b>9,595.15</b>	<b>362.71</b>	<b>25,898.70</b>
<b>Case Total</b>	<b>21,072.18</b>	<b>12,805.76</b>	<b>408.77</b>	<b>34,286.71</b>	<b>21,085.05</b>	<b>12,813.12</b>	<b>400.59</b>	<b>34,298.77</b>

## APPENDIX 2.9: DETAILED DEMAND DATA HIGH GROWTH LOW PRICE

Area	2014:		2014:		2014:		2015:		2015:		2015:		2016:		2016:		2016:			
	Residential	Commercial	Ind FirmSale	2014 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2016 Total	Residential	Commercial	Ind FirmSale	2016 Total
Klam Falls	841.21	446.80	11.13	1,299.14	848.83	450.94	11.13	1,310.90	861.14	457.42	11.16	1,329.72	861.14	457.42	11.16	1,329.72	861.14	457.42	11.16	1,329.72
La Grande	459.92	276.32	10.40	746.65	462.31	277.87	10.40	750.58	466.93	280.55	10.40	757.88	466.93	280.55	10.40	757.88	466.93	280.55	10.40	757.88
Medford GTN	2,167.72	1,325.88	12.31	3,505.91	2,201.35	1,346.64	12.48	3,560.47	2,246.92	1,374.02	13.07	3,634.01	2,246.92	1,374.02	13.07	3,634.01	2,246.92	1,374.02	13.07	3,634.01
Medford NWP	973.90	595.68	5.53	1,575.12	989.01	605.01	5.61	1,599.63	1,009.49	617.31	5.87	1,632.67	1,009.49	617.31	5.87	1,632.67	1,009.49	617.31	5.87	1,632.67
Roseburg	757.88	617.79	21.68	1,397.34	765.84	618.66	21.67	1,406.17	777.90	622.24	21.73	1,421.87	777.90	622.24	21.73	1,421.87	777.90	622.24	21.73	1,421.87
<b>OR Sub-Total</b>	<b>5,200.63</b>	<b>3,262.47</b>	<b>61.05</b>	<b>8,524.15</b>	<b>5,267.34</b>	<b>3,299.12</b>	<b>61.28</b>	<b>8,627.75</b>	<b>5,362.37</b>	<b>3,351.54</b>	<b>62.24</b>	<b>8,776.16</b>	<b>5,362.37</b>	<b>3,351.54</b>	<b>62.24</b>	<b>8,776.16</b>	<b>5,362.37</b>	<b>3,351.54</b>	<b>62.24</b>	<b>8,776.16</b>
Wa/Id Both	9,301.50	5,568.80	304.67	15,174.98	9,432.92	5,647.87	308.50	15,389.29	9,616.39	5,757.28	313.48	15,687.14	9,616.39	5,757.28	313.48	15,687.14	9,616.39	5,757.28	313.48	15,687.14
Wa/Id GTN	1,282.97	768.11	42.02	2,093.10	1,301.09	779.02	42.55	2,122.66	1,326.40	794.11	43.24	2,163.74	1,326.40	794.11	43.24	2,163.74	1,326.40	794.11	43.24	2,163.74
Wa/Id NWP	5,452.60	3,264.47	178.60	8,895.68	5,529.64	3,310.82	180.85	9,021.31	5,637.19	3,374.96	183.76	9,195.91	5,637.19	3,374.96	183.76	9,195.91	5,637.19	3,374.96	183.76	9,195.91
<b>WA/ID Sub-Total</b>	<b>16,037.07</b>	<b>9,601.38</b>	<b>525.30</b>	<b>26,163.75</b>	<b>16,263.65</b>	<b>9,737.70</b>	<b>531.90</b>	<b>26,533.25</b>	<b>16,579.98</b>	<b>9,926.34</b>	<b>540.48</b>	<b>27,046.80</b>	<b>16,579.98</b>	<b>9,926.34</b>	<b>540.48</b>	<b>27,046.80</b>	<b>16,579.98</b>	<b>9,926.34</b>	<b>540.48</b>	<b>27,046.80</b>
<b>Case Total</b>	<b>21,237.70</b>	<b>12,863.85</b>	<b>586.35</b>	<b>34,687.90</b>	<b>21,531.00</b>	<b>13,036.82</b>	<b>593.19</b>	<b>35,161.01</b>	<b>21,942.35</b>	<b>13,277.88</b>	<b>602.73</b>	<b>35,822.96</b>	<b>21,942.35</b>	<b>13,277.88</b>	<b>602.73</b>	<b>35,822.96</b>	<b>21,942.35</b>	<b>13,277.88</b>	<b>602.73</b>	<b>35,822.96</b>

Area	2017:		2017:		2017:		2018:		2018:		2018:		2019:		2019:		2019:			
	Residential	Commercial	Ind FirmSale	2017 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2019 Total	Residential	Commercial	Ind FirmSale	2019 Total
Klam Falls	865.71	459.94	12.24	1,337.90	874.29	464.49	12.52	1,351.30	882.94	469.09	12.52	1,364.54	882.94	469.09	12.52	1,364.54	882.94	469.09	12.52	1,364.54
La Grande	467.87	281.21	10.40	759.49	470.67	282.80	10.40	763.87	473.49	284.57	10.40	768.46	473.49	284.57	10.40	768.46	473.49	284.57	10.40	768.46
Medford GTN	2,274.60	1,391.45	13.21	3,679.26	2,312.13	1,414.41	13.77	3,740.31	2,350.28	1,437.73	13.94	3,801.95	2,350.28	1,437.73	13.94	3,801.95	2,350.28	1,437.73	13.94	3,801.95
Medford NWP	1,021.92	625.14	5.93	1,653.00	1,038.78	635.46	6.19	1,680.43	1,055.92	645.94	6.26	1,708.12	1,055.92	645.94	6.26	1,708.12	1,055.92	645.94	6.26	1,708.12
Roseburg	783.41	621.09	21.67	1,426.18	792.34	622.28	21.67	1,436.30	801.36	623.58	21.67	1,446.61	801.36	623.58	21.67	1,446.61	801.36	623.58	21.67	1,446.61
<b>OR Sub-Total</b>	<b>5,413.51</b>	<b>3,378.84</b>	<b>63.46</b>	<b>8,855.81</b>	<b>5,488.22</b>	<b>3,419.43</b>	<b>64.56</b>	<b>8,972.21</b>	<b>5,563.98</b>	<b>3,460.91</b>	<b>64.80</b>	<b>9,089.69</b>	<b>5,563.98</b>	<b>3,460.91</b>	<b>64.80</b>	<b>9,089.69</b>	<b>5,563.98</b>	<b>3,460.91</b>	<b>64.80</b>	<b>9,089.69</b>
Wa/Id Both	9,718.02	5,818.59	316.40	15,853.01	9,863.80	5,905.88	320.35	16,090.03	10,011.75	5,994.51	324.29	16,330.55	10,011.75	5,994.51	324.29	16,330.55	10,011.75	5,994.51	324.29	16,330.55
Wa/Id GTN	1,340.42	802.56	43.64	2,186.62	1,360.52	814.60	44.19	2,219.31	1,380.93	826.83	44.73	2,252.49	1,380.93	826.83	44.73	2,252.49	1,380.93	826.83	44.73	2,252.49
Wa/Id NWP	5,696.77	3,410.90	185.48	9,293.14	5,782.23	3,462.07	187.79	9,432.09	5,868.96	3,514.02	190.10	9,573.08	5,868.96	3,514.02	190.10	9,573.08	5,868.96	3,514.02	190.10	9,573.08
<b>WA/ID Sub-Total</b>	<b>16,755.21</b>	<b>10,032.05</b>	<b>545.51</b>	<b>27,332.78</b>	<b>17,006.56</b>	<b>10,182.55</b>	<b>552.32</b>	<b>27,741.43</b>	<b>17,261.64</b>	<b>10,335.36</b>	<b>559.13</b>	<b>28,156.12</b>	<b>17,261.64</b>	<b>10,335.36</b>	<b>559.13</b>	<b>28,156.12</b>	<b>17,261.64</b>	<b>10,335.36</b>	<b>559.13</b>	<b>28,156.12</b>
<b>Case Total</b>	<b>22,168.72</b>	<b>13,410.89</b>	<b>608.98</b>	<b>36,188.59</b>	<b>22,494.77</b>	<b>13,601.98</b>	<b>616.88</b>	<b>36,713.64</b>	<b>22,825.62</b>	<b>13,796.26</b>	<b>623.93</b>	<b>37,245.82</b>	<b>22,825.62</b>	<b>13,796.26</b>	<b>623.93</b>	<b>37,245.82</b>	<b>22,825.62</b>	<b>13,796.26</b>	<b>623.93</b>	<b>37,245.82</b>

Area	2020:		2020:		2020:		2021:		2021:		2021:		2022:		2022:		2022:			
	Residential	Commercial	Ind FirmSale	2020 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2022 Total	Residential	Commercial	Ind FirmSale	2022 Total
Klam Falls	895.76	475.79	13.67	1,385.22	900.50	478.42	13.91	1,392.83	909.43	483.14	13.91	1,406.48	909.43	483.14	13.91	1,406.48	909.43	483.14	13.91	1,406.48
La Grande	478.24	287.42	10.40	776.06	479.20	287.95	10.40	777.54	482.07	289.76	10.40	782.23	482.07	289.76	10.40	782.23	482.07	289.76	10.40	782.23
Medford GTN	2,398.92	1,466.99	14.54	3,880.46	2,428.47	1,485.57	14.68	3,928.72	2,468.54	1,510.11	15.24	3,993.90	2,468.54	1,510.11	15.24	3,993.90	2,468.54	1,510.11	15.24	3,993.90
Medford NWP	1,077.78	659.08	6.53	1,743.39	1,091.05	667.43	6.59	1,765.08	1,109.06	678.46	6.85	1,794.36	1,109.06	678.46	6.85	1,794.36	1,109.06	678.46	6.85	1,794.36
Roseburg	813.98	627.22	21.73	1,462.94	819.74	626.04	21.67	1,467.45	829.09	627.34	21.67	1,478.10	829.09	627.34	21.67	1,478.10	829.09	627.34	21.67	1,478.10
<b>OR Sub-Total</b>	<b>5,664.68</b>	<b>3,516.50</b>	<b>66.89</b>	<b>9,248.07</b>	<b>5,718.96</b>	<b>3,545.41</b>	<b>67.26</b>	<b>9,331.63</b>	<b>5,798.19</b>	<b>3,588.81</b>	<b>68.07</b>	<b>9,455.07</b>	<b>5,798.19</b>	<b>3,588.81</b>	<b>68.07</b>	<b>9,455.07</b>	<b>5,798.19</b>	<b>3,588.81</b>	<b>68.07</b>	<b>9,455.07</b>
Wa/Id Both	10,206.47	6,110.49	329.33	16,646.29	10,314.37	6,175.61	332.19	16,822.16	10,469.08	6,268.27	336.14	17,073.49	10,469.08	6,268.27	336.14	17,073.49	10,469.08	6,268.27	336.14	17,073.49
Wa/Id GTN	1,407.79	842.83	45.42	2,296.04	1,422.67	851.81	45.82	2,320.30	1,444.01	864.59	46.36	2,354.96	1,444.01	864.59	46.36	2,354.96	1,444.01	864.59	46.36	2,354.96
Wa/Id NWP	5,983.11	3,582.01	193.05	9,758.17	6,046.35	3,620.18	194.73	9,861.27	6,137.05	3,674.50	197.05	10,008.60	6,137.05	3,674.50	197.05	10,008.60	6,137.05	3,674.50	197.05	10,008.60
<b>WA/ID Sub-Total</b>	<b>17,597.37</b>	<b>10,535.32</b>	<b>567.80</b>	<b>28,700.50</b>	<b>17,783.39</b>	<b>10,647.60</b>	<b>572.74</b>	<b>29,003.73</b>	<b>18,050.14</b>	<b>10,807.36</b>	<b>579.55</b>	<b>29,437.06</b>	<b>18,050.14</b>	<b>10,807.36</b>	<b>579.55</b>	<b>29,437.06</b>	<b>18,050.14</b>	<b>10,807.36</b>	<b>579.55</b>	<b>29,437.06</b>
<b>Case Total</b>	<b>23,262.05</b>	<b>14,051.82</b>	<b>634.69</b>	<b>37,948.57</b>	<b>23,502.35</b>	<b>14,193.01</b>	<b>640.00</b>	<b>38,335.36</b>	<b>23,848.33</b>	<b>14,396.17</b>	<b>647.62</b>	<b>38,892.13</b>	<b>23,848.33</b>	<b>14,396.17</b>	<b>647.62</b>	<b>38,892.13</b>	<b>23,848.33</b>	<b>14,396.17</b>	<b>647.62</b>	<b>38,892.13</b>

Area	2023:		2023:		2023:		2024:		2024:		2024:		2025:		2025:		2025:			
	Residential	Commercial	Ind FirmSale	2023 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2025 Total	Residential	Commercial	Ind FirmSale	2025 Total
Klam Falls	918.41	487.94	15.03	1,421.38	931.75	494.92	15.35	1,442.01	936.69	497.62	15.30	1,449.61	936.69	497.62	15.30	1,449.61	936.69	497.62	15.30	1,449.61
La Grande	484.96	291.47	10.40	786.84	489.82	294.31	10.40	794.53	490.80	294.96	10.40	796.17	490.80	294.96	10.40	796.17	490.80	294.96	10.40	796.17
Medford GTN	2,509.28	1,535.02	15.41	4,059.71	2,561.21	1,566.24	16.02	4,143.46	2,592.77	1,586.08	16.15	4,194.99	2,592.77	1,586.08	16.15	4,194.99	2,592.77	1,586.08	16.15	4,194.99
Medford NWP	1,127.36	689.65	6.92	1,823.93	1,150.69	703.67	7.20	1,861.56	1,164.87	71										



## APPENDIX 2.9: DETAILED DEMAND DATA HIGH GROWTH LOW PRICE

Area	2026:				2027:				2028:			
	Residential	Commercial	Ind FirmSale	2026 Total	Residential	Commercial	Ind FirmSale	2027 Total	Residential	Commercial	Ind FirmSale	2028 Total
Klam Falls	945.97	502.61	16.42	1,465.00	955.34	507.54	16.69	1,479.57	969.21	514.85	16.74	1,500.79
La Grande	493.74	296.78	10.40	800.92	496.70	298.51	10.40	805.62	501.68	301.43	10.40	813.51
Medford GTN	2,635.55	1,612.23	16.71	4,264.49	2,679.03	1,638.88	16.88	4,334.79	2,734.48	1,672.20	17.49	4,424.17
Medford NWP	1,184.09	724.34	7.51	1,915.93	1,203.62	736.31	7.58	1,947.51	1,228.53	751.28	7.86	1,987.67
Roseburg	867.54	632.33	21.67	1,521.55	877.45	633.69	21.67	1,532.81	891.24	637.29	21.73	1,550.27
<b>OR Sub-Total</b>	<b>6,126.89</b>	<b>3,768.29</b>	<b>72.71</b>	<b>9,967.89</b>	<b>6,212.15</b>	<b>3,814.92</b>	<b>73.23</b>	<b>10,100.30</b>	<b>6,325.14</b>	<b>3,877.06</b>	<b>74.22</b>	<b>10,276.42</b>
Wa/Id Both	11,111.50	6,652.93	351.93	18,116.37	11,278.17	6,752.75	355.88	18,386.80	11,497.51	6,883.46	361.01	18,741.98
Wa/Id GTN	1,532.62	917.65	48.54	2,498.81	1,555.61	931.41	49.09	2,536.11	1,585.86	949.44	49.79	2,585.10
Wa/Id NWP	6,513.64	3,900.00	206.30	10,619.94	6,611.34	3,958.51	208.62	10,778.47	6,739.92	4,035.13	211.63	10,986.68
<b>WA/ID Sub-Total</b>	<b>19,157.76</b>	<b>11,470.58</b>	<b>606.78</b>	<b>31,235.11</b>	<b>19,445.12</b>	<b>11,642.68</b>	<b>613.58</b>	<b>31,701.38</b>	<b>19,823.30</b>	<b>11,868.03</b>	<b>622.44</b>	<b>32,313.76</b>
<b>Case Total</b>	<b>25,284.65</b>	<b>15,238.86</b>	<b>679.49</b>	<b>41,203.00</b>	<b>25,657.27</b>	<b>15,457.60</b>	<b>686.81</b>	<b>41,801.68</b>	<b>26,148.44</b>	<b>15,745.08</b>	<b>696.66</b>	<b>42,590.18</b>

Area	2029:				2030:				2031:			
	Residential	Commercial	Ind FirmSale	2029 Total	Residential	Commercial	Ind FirmSale	2030 Total	Residential	Commercial	Ind FirmSale	2031 Total
Klam Falls	974.35	517.70	17.81	1,509.86	983.99	522.80	18.08	1,524.87	993.73	527.97	18.08	1,539.79
La Grande	502.69	302.05	10.40	815.15	505.70	303.88	10.40	819.98	508.75	305.72	10.40	824.86
Medford GTN	2,768.17	1,693.35	17.61	4,479.14	2,813.84	1,721.33	18.18	4,553.35	2,860.27	1,749.72	18.35	4,628.34
Medford NWP	1,243.67	760.78	7.91	2,012.37	1,264.19	773.35	8.17	2,045.71	1,285.05	786.11	8.24	2,079.40
Roseburg	897.55	636.18	21.67	1,555.40	907.79	637.46	21.67	1,566.92	918.13	638.69	21.67	1,578.50
<b>OR Sub-Total</b>	<b>6,386.43</b>	<b>3,910.07</b>	<b>75.41</b>	<b>10,371.91</b>	<b>6,475.51</b>	<b>3,958.82</b>	<b>76.50</b>	<b>10,510.83</b>	<b>6,565.93</b>	<b>4,008.20</b>	<b>76.75</b>	<b>10,650.89</b>
Wa/Id Both	11,619.05	6,956.81	363.77	18,939.64	11,793.33	7,061.18	367.72	19,222.24	11,970.23	7,167.13	371.67	19,509.04
Wa/Id GTN	1,602.63	959.56	50.18	2,612.36	1,626.67	973.96	50.72	2,651.34	1,651.07	988.57	51.26	2,690.90
Wa/Id NWP	6,811.17	4,078.13	213.25	11,102.55	6,913.33	4,139.31	215.56	11,268.21	7,017.03	4,201.42	217.88	11,436.33
<b>WA/ID Sub-Total</b>	<b>20,032.85</b>	<b>11,994.50</b>	<b>627.20</b>	<b>32,654.55</b>	<b>20,333.33</b>	<b>12,174.45</b>	<b>634.00</b>	<b>33,141.79</b>	<b>20,638.33</b>	<b>12,357.13</b>	<b>640.81</b>	<b>33,636.27</b>
<b>Case Total</b>	<b>26,419.28</b>	<b>15,904.57</b>	<b>702.61</b>	<b>43,026.46</b>	<b>26,808.84</b>	<b>16,133.27</b>	<b>710.51</b>	<b>43,652.62</b>	<b>27,204.26</b>	<b>16,365.33</b>	<b>717.56</b>	<b>44,287.16</b>

Area	2032:				2033:			
	Residential	Commercial	Ind FirmSale	2032 Total	Residential	Commercial	Ind FirmSale	2033 Total
Klam Falls	1,008.16	535.48	19.25	1,562.89	1,013.50	538.42	19.48	1,571.39
La Grande	513.84	308.78	10.40	833.02	514.86	309.40	10.40	834.67
Medford GTN	2,919.48	1,785.35	18.96	4,723.78	2,955.44	1,807.93	19.08	4,782.45
Medford NWP	1,311.65	802.11	8.52	2,122.28	1,327.81	812.26	8.57	2,148.64
Roseburg	932.58	642.49	21.73	1,596.80	939.19	641.27	21.67	1,602.13
<b>OR Sub-Total</b>	<b>6,685.70</b>	<b>4,074.21</b>	<b>78.87</b>	<b>10,838.78</b>	<b>6,750.80</b>	<b>4,109.28</b>	<b>79.20</b>	<b>10,939.29</b>
Wa/Id Both	12,203.04	7,305.86	376.86	19,885.75	12,332.03	7,383.69	379.57	20,095.29
Wa/Id GTN	1,683.18	1,007.70	51.98	2,742.86	1,700.97	1,018.44	52.35	2,771.76
Wa/Id NWP	7,153.50	4,282.74	220.92	11,657.17	7,229.12	4,328.37	222.50	11,780.00
<b>WA/ID Sub-Total</b>	<b>21,039.72</b>	<b>12,596.31</b>	<b>649.75</b>	<b>34,285.78</b>	<b>21,262.13</b>	<b>12,730.51</b>	<b>654.43</b>	<b>34,647.06</b>
<b>Case Total</b>	<b>27,725.42</b>	<b>16,670.52</b>	<b>728.62</b>	<b>45,124.57</b>	<b>28,012.93</b>	<b>16,839.79</b>	<b>733.63</b>	<b>45,586.34</b>

## APPENDIX 2.9: DETAILED DEMAND DATA AVERAGE MIX

Area	2014:				2015:				2016:			
	Residential	Commercial	Ind FirmSale	2014 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2016 Total
Klam Falls	813.35	433.25	11.05	1,257.66	816.19	434.74	11.05	1,261.98	823.80	438.10	11.08	1,272.99
La Grande	443.90	266.30	10.40	720.60	446.13	266.74	10.40	723.27	450.50	268.73	10.40	729.63
Medford GTN	2,071.71	1,272.19	11.61	3,355.51	2,091.73	1,279.56	11.61	3,382.89	2,121.02	1,295.10	11.64	3,427.76
Medford NWP	930.77	571.56	5.21	1,507.55	939.76	574.87	5.21	1,519.85	952.92	581.86	5.23	1,540.01
Roseburg	724.44	598.21	21.61	1,344.26	728.37	599.34	21.61	1,349.32	736.40	602.22	21.67	1,360.29
<b>OR Sub-Total</b>	<b>4,984.18</b>	<b>3,141.51</b>	<b>59.88</b>	<b>8,185.58</b>	<b>5,022.18</b>	<b>3,155.25</b>	<b>59.88</b>	<b>8,237.30</b>	<b>5,084.64</b>	<b>3,186.01</b>	<b>60.02</b>	<b>8,330.67</b>
Wa/Id Both	8,953.25	5,341.51	296.79	14,591.55	9,048.11	5,386.23	295.58	14,729.92	9,192.20	5,454.85	295.07	14,942.12
Wa/Id GTN	1,234.93	736.76	40.94	2,012.63	1,248.02	742.93	40.77	2,031.71	1,267.89	752.39	40.70	2,060.98
Wa/Id NWP	5,248.46	3,131.23	173.98	8,553.67	5,304.06	3,157.44	173.27	8,634.78	5,388.53	3,197.67	172.97	8,759.17
<b>WA/ID Sub-Total</b>	<b>15,436.64</b>	<b>9,209.50</b>	<b>511.71</b>	<b>25,157.85</b>	<b>15,600.19</b>	<b>9,286.60</b>	<b>509.63</b>	<b>25,396.41</b>	<b>15,848.61</b>	<b>9,404.92</b>	<b>508.74</b>	<b>25,762.27</b>
<b>Case Total</b>	<b>20,420.83</b>	<b>12,351.01</b>	<b>571.58</b>	<b>33,343.42</b>	<b>20,622.37</b>	<b>12,441.84</b>	<b>569.50</b>	<b>33,633.72</b>	<b>20,933.26</b>	<b>12,590.93</b>	<b>568.75</b>	<b>34,092.94</b>

Area	2017:				2018:				2019:			
	Residential	Commercial	Ind FirmSale	2017 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2019 Total
Klam Falls	818.89	435.60	11.03	1,265.52	824.15	437.30	11.03	1,272.48	829.58	439.67	11.03	1,280.28
La Grande	448.35	266.90	10.32	725.57	451.21	267.87	10.32	729.40	452.58	268.69	10.32	731.59
Medford GTN	2,119.09	1,293.52	11.58	3,424.19	2,140.28	1,304.17	11.58	3,456.03	2,163.19	1,317.54	11.58	3,492.31
Medford NWP	952.06	581.14	5.20	1,538.40	961.57	585.93	5.20	1,552.71	971.87	591.94	5.20	1,569.01
Roseburg	734.23	597.55	21.58	1,353.37	740.13	598.10	21.58	1,359.81	745.88	598.24	21.58	1,365.70
<b>OR Sub-Total</b>	<b>5,072.62</b>	<b>3,174.71</b>	<b>59.72</b>	<b>8,307.06</b>	<b>5,117.33</b>	<b>3,193.37</b>	<b>59.72</b>	<b>8,370.42</b>	<b>5,163.10</b>	<b>3,216.07</b>	<b>59.72</b>	<b>8,438.90</b>
Wa/Id Both	9,199.90	5,440.65	291.37	14,931.92	9,315.17	5,490.27	289.49	15,094.92	9,415.06	5,543.04	288.19	15,246.29
Wa/Id GTN	1,268.95	750.43	40.19	2,059.58	1,284.85	757.28	39.93	2,082.06	1,298.63	764.56	39.75	2,102.94
Wa/Id NWP	5,393.05	3,189.35	170.80	8,753.20	5,460.62	3,218.43	169.70	8,848.75	5,519.17	3,249.37	168.94	8,937.48
<b>WA/ID Sub-Total</b>	<b>15,861.90</b>	<b>9,380.43</b>	<b>502.37</b>	<b>25,744.70</b>	<b>16,060.64</b>	<b>9,465.98</b>	<b>499.12</b>	<b>26,025.73</b>	<b>16,232.86</b>	<b>9,556.96</b>	<b>496.89</b>	<b>26,286.70</b>
<b>Case Total</b>	<b>20,934.52</b>	<b>12,555.14</b>	<b>562.09</b>	<b>34,051.75</b>	<b>21,177.97</b>	<b>12,659.34</b>	<b>558.84</b>	<b>34,396.15</b>	<b>21,395.96</b>	<b>12,773.03</b>	<b>556.61</b>	<b>34,725.60</b>

Area	2020:				2021:				2022:			
	Residential	Commercial	Ind FirmSale	2020 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2022 Total
Klam Falls	838.99	444.51	11.06	1,294.56	838.48	444.62	11.03	1,294.13	835.88	443.95	11.00	1,290.82
La Grande	456.27	270.84	10.33	737.44	455.17	270.22	10.30	735.69	452.93	269.16	10.19	732.27
Medford GTN	2,196.28	1,337.17	11.61	3,545.06	2,205.83	1,344.09	11.57	3,561.50	2,209.58	1,348.72	11.54	3,569.84
Medford NWP	986.73	600.76	5.22	1,592.71	991.03	603.87	5.20	1,600.09	992.71	605.95	5.18	1,603.84
Roseburg	754.87	600.81	21.64	1,377.33	755.66	597.55	21.58	1,374.78	755.20	593.97	21.55	1,370.71
<b>OR Sub-Total</b>	<b>5,233.14</b>	<b>3,254.09</b>	<b>59.86</b>	<b>8,547.10</b>	<b>5,246.17</b>	<b>3,260.35</b>	<b>59.67</b>	<b>8,566.19</b>	<b>5,246.29</b>	<b>3,261.74</b>	<b>59.46</b>	<b>8,567.49</b>
Wa/Id Both	9,552.12	5,623.06	287.85	15,463.03	9,580.83	5,641.95	285.29	15,508.07	9,584.34	5,649.26	282.77	15,516.37
Wa/Id GTN	1,317.53	775.59	39.70	2,132.83	1,321.49	778.20	39.35	2,139.04	1,321.98	779.21	39.00	2,140.19
Wa/Id NWP	5,599.52	3,296.28	168.74	9,064.53	5,616.35	3,307.35	167.24	9,090.94	5,618.40	3,311.63	165.76	9,095.80
<b>WA/ID Sub-Total</b>	<b>16,469.17</b>	<b>9,694.93</b>	<b>496.30</b>	<b>26,660.40</b>	<b>16,518.67</b>	<b>9,727.51</b>	<b>491.88</b>	<b>26,738.05</b>	<b>16,524.72</b>	<b>9,740.10</b>	<b>487.54</b>	<b>26,752.36</b>
<b>Case Total</b>	<b>21,702.31</b>	<b>12,949.02</b>	<b>556.16</b>	<b>35,207.49</b>	<b>21,764.84</b>	<b>12,987.85</b>	<b>551.55</b>	<b>35,304.24</b>	<b>21,771.01</b>	<b>13,001.84</b>	<b>547.00</b>	<b>35,319.85</b>

Area	2023:				2024:				2025:			
	Residential	Commercial	Ind FirmSale	2023 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2025 Total
Klam Falls	840.54	446.56	10.99	1,298.09	850.05	451.45	11.03	1,312.52	846.35	450.11	10.98	1,307.44
La Grande	454.30	269.98	10.18	734.46	457.99	272.16	10.18	740.33	455.30	270.72	10.11	736.13
Medford GTN	2,231.69	1,362.48	11.54	3,605.70	2,265.81	1,382.83	11.56	3,660.20	2,267.48	1,385.93	11.51	3,664.92
Medford NWP	1,002.64	612.13	5.18	1,619.95	1,017.97	621.27	5.20	1,644.44	1,018.72	622.66	5.17	1,646.56
Roseburg	760.27	593.63	21.54	1,375.45	769.44	596.13	21.60	1,387.18	767.80	591.48	21.52	1,380.81
<b>OR Sub-Total</b>	<b>5,289.44</b>	<b>3,284.78</b>	<b>59.43</b>	<b>8,633.66</b>	<b>5,361.26</b>	<b>3,323.84</b>	<b>59.57</b>	<b>8,744.67</b>	<b>5,355.65</b>	<b>3,320.90</b>	<b>59.30</b>	<b>8,735.86</b>
Wa/Id Both	9,670.35	5,700.51	281.36	15,652.23	9,811.06	5,782.74	281.00	15,874.80	9,803.83	5,782.65	278.01	15,864.49
Wa/Id GTN	1,333.84	786.28	38.81	2,158.93	1,353.25	797.62	38.76	2,189.63	1,352.25	797.61	38.35	2,188.21
Wa/Id NWP	5,668.83	3,341.68	164.93	9,175.44	5,751.31	3,389.88	164.72	9,305.91	5,747.07	3,389.83	162.97	9,299.87
<b>WA/ID Sub-Total</b>	<b>16,673.02</b>	<b>9,828.47</b>	<b>485.10</b>	<b>26,986.60</b>	<b>16,915.62</b>	<b>9,970.24</b>	<b>484.48</b>	<b>27,370.34</b>	<b>16,903.16</b>	<b>9,970.09</b>	<b>479.33</b>	<b>27,352.57</b>
<b>Case Total</b>	<b>21,962.47</b>	<b>13,113.26</b>	<b>544.53</b>	<b>35,620.26</b>	<b>22,276.88</b>	<b>13,294.08</b>	<b>544.05</b>	<b>36,115.01</b>	<b>22,258.81</b>	<b>13,290.99</b>	<b>538.63</b>	<b>36,088.43</b>

## APPENDIX 2.9: DETAILED DEMAND DATA AVERAGE MIX

Area	2026:				2027:				2028:			
	Residential	Commercial	Ind FirmSale	2026 Total	Residential	Commercial	Ind FirmSale	2027 Total	Residential	Commercial	Ind FirmSale	2028 Total
Klam Falls	846.53	450.71	10.96	1,308.20	849.83	452.65	10.95	1,313.43	859.43	457.68	10.98	1,328.10
La Grande	454.43	270.38	10.04	734.86	455.12	270.82	10.01	735.96	458.82	273.00	10.02	741.84
Medford GTN	2,278.57	1,394.31	11.49	3,684.38	2,297.72	1,406.79	11.48	3,715.99	2,332.84	1,427.73	11.51	3,772.09
Medford NWP	1,023.71	626.43	5.16	1,655.30	1,032.31	632.03	5.16	1,669.50	1,048.09	641.45	5.17	1,694.71
Roseburg	769.48	589.03	21.51	1,380.02	773.57	588.20	21.50	1,383.27	782.88	590.58	21.56	1,395.02
<b>OR Sub-Total</b>	<b>5,372.73</b>	<b>3,330.86</b>	<b>59.16</b>	<b>8,762.76</b>	<b>5,408.55</b>	<b>3,350.50</b>	<b>59.10</b>	<b>8,818.15</b>	<b>5,482.06</b>	<b>3,390.44</b>	<b>59.24</b>	<b>8,931.74</b>
Wa/Id Both	9,839.83	5,807.45	275.95	15,923.23	9,911.75	5,851.37	274.34	16,037.46	10,055.86	5,935.77	273.97	16,265.60
Wa/Id GTN	1,357.22	801.03	38.06	2,196.31	1,367.14	807.09	37.84	2,212.06	1,387.02	818.73	37.79	2,243.53
Wa/Id NWP	5,768.18	3,404.37	161.76	9,334.31	5,810.33	3,430.11	160.82	9,401.27	5,894.81	3,479.59	160.60	9,535.01
<b>WA/ID Sub-Total</b>	<b>16,965.23</b>	<b>10,012.84</b>	<b>475.78</b>	<b>27,453.85</b>	<b>17,089.22</b>	<b>10,088.56</b>	<b>473.01</b>	<b>27,650.79</b>	<b>17,337.69</b>	<b>10,234.09</b>	<b>472.36</b>	<b>28,044.14</b>
<b>Case Total</b>	<b>22,337.96</b>	<b>13,343.70</b>	<b>534.94</b>	<b>36,216.61</b>	<b>22,497.77</b>	<b>13,439.06</b>	<b>532.11</b>	<b>36,468.94</b>	<b>22,819.75</b>	<b>13,624.53</b>	<b>531.60</b>	<b>36,975.89</b>

Area	2029:				2030:				2031:			
	Residential	Commercial	Ind FirmSale	2029 Total	Residential	Commercial	Ind FirmSale	2030 Total	Residential	Commercial	Ind FirmSale	2031 Total
Klam Falls	861.07	458.65	10.95	1,330.67	858.89	458.20	10.93	1,328.02	864.56	461.24	10.93	1,336.73
La Grande	458.77	272.98	10.01	741.76	456.74	272.03	9.92	738.69	458.58	273.14	9.92	741.63
Medford GTN	2,348.55	1,437.91	11.48	3,797.95	2,353.82	1,443.56	11.45	3,808.84	2,379.72	1,459.45	11.45	3,850.62
Medford NWP	1,055.15	646.02	5.16	1,706.32	1,057.51	648.56	5.14	1,711.22	1,069.15	655.69	5.14	1,729.99
Roseburg	785.37	588.48	21.50	1,395.35	785.29	585.06	21.47	1,391.82	791.25	585.21	21.47	1,397.93
<b>OR Sub-Total</b>	<b>5,508.92</b>	<b>3,404.03</b>	<b>59.10</b>	<b>8,972.05</b>	<b>5,512.26</b>	<b>3,407.41</b>	<b>58.91</b>	<b>8,978.58</b>	<b>5,563.26</b>	<b>3,434.73</b>	<b>58.91</b>	<b>9,056.89</b>
Wa/Id Both	10,110.98	5,969.00	271.79	16,351.77	10,120.33	5,979.80	269.43	16,369.55	10,221.52	6,039.66	268.15	16,529.33
Wa/Id GTN	1,394.62	823.31	37.49	2,255.42	1,395.91	824.80	37.16	2,257.87	1,409.86	833.06	36.99	2,279.91
Wa/Id NWP	5,927.12	3,499.07	159.32	9,585.52	5,932.60	3,505.40	157.94	9,595.94	5,991.92	3,540.49	157.19	9,689.61
<b>WA/ID Sub-Total</b>	<b>17,432.72</b>	<b>10,291.39</b>	<b>468.60</b>	<b>28,192.71</b>	<b>17,448.84</b>	<b>10,310.00</b>	<b>464.53</b>	<b>28,223.36</b>	<b>17,623.30</b>	<b>10,413.21</b>	<b>462.33</b>	<b>28,498.85</b>
<b>Case Total</b>	<b>22,941.63</b>	<b>13,695.42</b>	<b>527.70</b>	<b>37,164.76</b>	<b>22,961.09</b>	<b>13,717.41</b>	<b>523.44</b>	<b>37,201.94</b>	<b>23,186.56</b>	<b>13,847.94</b>	<b>521.24</b>	<b>37,555.74</b>

Area	2032:				2033:			
	Residential	Commercial	Ind FirmSale	2032 Total	Residential	Commercial	Ind FirmSale	2033 Total
Klam Falls	871.15	464.95	10.95	1,347.05	870.97	465.12	10.91	1,347.00
La Grande	460.74	274.49	9.88	745.11	459.80	273.91	9.86	743.57
Medford GTN	2,407.68	1,477.02	11.47	3,896.17	2,419.03	1,485.18	11.43	3,915.65
Medford NWP	1,081.71	663.59	5.15	1,750.45	1,086.81	667.25	5.14	1,759.20
Roseburg	798.33	586.23	21.52	1,406.08	799.43	583.15	21.45	1,404.03
<b>OR Sub-Total</b>	<b>5,619.61</b>	<b>3,466.28</b>	<b>58.97</b>	<b>9,144.86</b>	<b>5,636.04</b>	<b>3,474.61</b>	<b>58.79</b>	<b>9,169.44</b>
Wa/Id Both	10,332.73	6,106.71	267.33	16,706.78	10,367.71	6,129.46	264.94	16,762.11
Wa/Id GTN	1,425.20	842.31	36.87	2,304.38	1,430.03	845.44	36.54	2,312.01
Wa/Id NWP	6,057.12	3,579.80	156.71	9,793.63	6,077.63	3,593.13	155.31	9,826.06
<b>WA/ID Sub-Total</b>	<b>17,815.05</b>	<b>10,528.81</b>	<b>460.92</b>	<b>28,804.79</b>	<b>17,875.37</b>	<b>10,568.03</b>	<b>456.79</b>	<b>28,900.19</b>
<b>Case Total</b>	<b>23,434.66</b>	<b>13,995.09</b>	<b>519.89</b>	<b>37,949.65</b>	<b>23,511.41</b>	<b>14,042.64</b>	<b>515.58</b>	<b>38,069.63</b>

## APPENDIX 2.9: DETAILED DEMAND DATA COLDEST IN 20 YEARS

Area	2014:				2015:				2016:			
	Residential	Commercial	Ind FirmSale	2014 Total	Residential	Commercial	Ind FirmSale	2015 Total	Residential	Commercial	Ind FirmSale	2016 Total
Klam Falls	835.92	443.20	11.13	1,290.24	838.83	444.69	11.13	1,294.65	846.54	448.10	11.16	1,305.81
La Grande	460.28	275.68	10.40	746.36	462.60	276.13	10.40	749.13	467.06	278.15	10.40	755.61
Medford GTN	2,152.19	1,312.19	11.72	3,476.10	2,173.01	1,319.74	11.72	3,504.47	2,203.07	1,335.63	11.75	3,550.45
Medford NWP	966.92	589.53	5.27	1,561.72	976.28	592.93	5.27	1,574.47	989.79	600.06	5.28	1,595.13
Roseburg	750.21	614.75	21.67	1,386.64	754.29	615.93	21.67	1,391.89	762.47	618.83	21.73	1,403.04
<b>OR Sub-Total</b>	<b>5,165.53</b>	<b>3,235.35</b>	<b>60.19</b>	<b>8,461.06</b>	<b>5,205.00</b>	<b>3,249.42</b>	<b>60.19</b>	<b>8,514.61</b>	<b>5,268.94</b>	<b>3,280.77</b>	<b>60.32</b>	<b>8,610.04</b>
Wa/Id Both	9,231.09	5,493.50	300.60	15,025.18	9,328.88	5,539.50	299.37	15,167.75	9,476.12	5,609.39	298.84	15,384.35
Wa/Id GTN	1,273.25	757.72	41.46	2,072.44	1,286.74	764.07	41.29	2,092.10	1,307.05	773.71	41.22	2,121.98
Wa/Id NWP	5,411.33	3,220.33	176.21	8,807.86	5,468.65	3,247.29	175.49	8,891.44	5,554.97	3,288.26	175.18	9,018.41
<b>WA/ID Sub-Total</b>	<b>15,915.66</b>	<b>9,471.55</b>	<b>518.27</b>	<b>25,905.48</b>	<b>16,084.27</b>	<b>9,550.86</b>	<b>516.16</b>	<b>26,151.29</b>	<b>16,338.14</b>	<b>9,671.36</b>	<b>515.24</b>	<b>26,524.74</b>
<b>Case Total</b>	<b>21,081.19</b>	<b>12,706.90</b>	<b>578.45</b>	<b>34,366.54</b>	<b>21,289.28</b>	<b>12,800.28</b>	<b>576.35</b>	<b>34,665.90</b>	<b>21,607.08</b>	<b>12,952.13</b>	<b>575.57</b>	<b>35,134.78</b>

Area	2017:				2018:				2019:			
	Residential	Commercial	Ind FirmSale	2017 Total	Residential	Commercial	Ind FirmSale	2018 Total	Residential	Commercial	Ind FirmSale	2019 Total
Klam Falls	841.54	445.55	11.11	1,298.20	846.94	447.29	11.11	1,305.33	852.52	449.70	11.11	1,313.33
La Grande	464.86	276.26	10.32	751.44	467.82	277.26	10.32	755.41	469.24	278.11	10.32	757.67
Medford GTN	2,201.20	1,333.98	11.69	3,546.88	2,223.20	1,344.97	11.69	3,579.87	2,246.99	1,358.74	11.69	3,617.42
Medford NWP	988.94	599.33	5.25	1,593.52	998.83	604.26	5.25	1,608.35	1,009.52	610.45	5.25	1,625.22
Roseburg	760.25	614.02	21.65	1,395.92	766.36	614.58	21.65	1,402.59	772.31	614.73	21.65	1,408.69
<b>OR Sub-Total</b>	<b>5,256.80</b>	<b>3,269.14</b>	<b>60.03</b>	<b>8,585.96</b>	<b>5,303.15</b>	<b>3,288.36</b>	<b>60.03</b>	<b>8,651.54</b>	<b>5,350.59</b>	<b>3,311.72</b>	<b>60.03</b>	<b>8,722.34</b>
Wa/Id Both	9,484.63	5,594.92	295.08	15,374.64	9,603.46	5,645.98	293.18	15,542.62	9,706.49	5,700.23	291.87	15,698.59
Wa/Id GTN	1,308.23	771.71	40.70	2,120.64	1,324.62	778.76	40.44	2,143.81	1,338.83	786.24	40.26	2,165.32
Wa/Id NWP	5,559.96	3,279.78	172.98	9,012.72	5,629.62	3,309.71	171.86	9,111.19	5,690.01	3,341.51	171.09	9,202.62
<b>WA/ID Sub-Total</b>	<b>16,352.81</b>	<b>9,646.41</b>	<b>508.77</b>	<b>26,507.99</b>	<b>16,557.70</b>	<b>9,734.45</b>	<b>505.48</b>	<b>26,797.62</b>	<b>16,735.34</b>	<b>9,827.98</b>	<b>503.22</b>	<b>27,066.53</b>
<b>Case Total</b>	<b>21,609.61</b>	<b>12,915.55</b>	<b>568.80</b>	<b>35,093.95</b>	<b>21,860.84</b>	<b>13,022.81</b>	<b>565.51</b>	<b>35,449.16</b>	<b>22,085.92</b>	<b>13,139.70</b>	<b>563.25</b>	<b>35,788.87</b>

Area	2020:				2021:				2022:			
	Residential	Commercial	Ind FirmSale	2020 Total	Residential	Commercial	Ind FirmSale	2021 Total	Residential	Commercial	Ind FirmSale	2022 Total
Klam Falls	862.08	454.61	11.14	1,327.82	861.65	454.75	11.10	1,327.50	858.90	454.02	11.07	1,323.98
La Grande	473.00	280.30	10.33	763.63	471.91	279.68	10.30	761.88	469.51	278.54	10.19	758.24
Medford GTN	2,281.00	1,378.82	11.72	3,671.55	2,291.20	1,386.06	11.69	3,688.95	2,294.77	1,390.60	11.65	3,697.03
Medford NWP	1,024.80	619.47	5.27	1,649.54	1,029.38	622.72	5.25	1,657.36	1,030.98	624.76	5.23	1,660.98
Roseburg	781.51	617.30	21.71	1,420.52	782.41	613.99	21.64	1,418.04	781.80	610.20	21.61	1,413.61
<b>OR Sub-Total</b>	<b>5,422.39</b>	<b>3,350.51</b>	<b>60.17</b>	<b>8,833.06</b>	<b>5,436.55</b>	<b>3,357.21</b>	<b>59.97</b>	<b>8,853.73</b>	<b>5,435.97</b>	<b>3,358.12</b>	<b>59.76</b>	<b>8,853.85</b>
Wa/Id Both	9,846.47	5,781.82	291.51	15,919.80	9,877.14	5,801.77	288.92	15,967.83	9,879.74	5,808.59	286.34	15,974.67
Wa/Id GTN	1,358.13	797.49	40.21	2,195.83	1,362.36	800.24	39.85	2,202.46	1,362.72	801.18	39.49	2,203.40
Wa/Id NWP	5,772.07	3,389.35	170.88	9,332.30	5,790.05	3,401.04	169.36	9,360.45	5,791.57	3,405.04	167.85	9,364.46
<b>WA/ID Sub-Total</b>	<b>16,976.67</b>	<b>9,968.66</b>	<b>502.60</b>	<b>27,447.93</b>	<b>17,029.55</b>	<b>10,003.05</b>	<b>498.13</b>	<b>27,530.74</b>	<b>17,034.04</b>	<b>10,014.81</b>	<b>493.68</b>	<b>27,542.53</b>
<b>Case Total</b>	<b>22,399.06</b>	<b>13,319.17</b>	<b>562.77</b>	<b>36,281.00</b>	<b>22,466.10</b>	<b>13,360.26</b>	<b>558.11</b>	<b>36,384.47</b>	<b>22,470.01</b>	<b>13,372.93</b>	<b>553.44</b>	<b>36,396.38</b>

Area	2023:				2024:				2025:			
	Residential	Commercial	Ind FirmSale	2023 Total	Residential	Commercial	Ind FirmSale	2024 Total	Residential	Commercial	Ind FirmSale	2025 Total
Klam Falls	863.67	456.69	11.07	1,331.43	873.34	461.64	11.10	1,346.08	869.59	460.28	11.05	1,340.93
La Grande	470.93	279.38	10.18	760.49	474.69	281.60	10.18	766.47	471.92	280.11	10.11	762.15
Medford GTN	2,317.70	1,404.76	11.65	3,734.11	2,352.76	1,425.58	11.68	3,790.01	2,354.66	1,428.78	11.62	3,795.06
Medford NWP	1,041.29	631.13	5.23	1,677.64	1,057.04	640.48	5.25	1,702.76	1,057.89	641.92	5.22	1,705.03
Roseburg	787.05	609.85	21.61	1,418.50	796.42	612.35	21.67	1,430.44	794.75	607.57	21.59	1,423.91
<b>OR Sub-Total</b>	<b>5,480.64</b>	<b>3,381.81</b>	<b>59.73</b>	<b>8,922.18</b>	<b>5,554.24</b>	<b>3,421.65</b>	<b>59.87</b>	<b>9,035.76</b>	<b>5,548.82</b>	<b>3,418.66</b>	<b>59.60</b>	<b>9,027.08</b>
Wa/Id Both	9,968.30	5,861.22	284.90	16,114.42	10,111.98	5,945.05	284.53	16,341.56	10,105.21	5,945.21	281.49	16,331.91
Wa/Id GTN	1,374.94	808.44	39.30	2,222.68	1,394.76	820.01	39.24	2,254.01	1,393.82	820.03	38.83	2,252.68
Wa/Id NWP	5,843.49	3,435.89	167.01	9,446.38	5,927.71	3,485.03	166.79	9,579.53	5,923.74	3,485.12	165.01	9,573.88
<b>WA/ID Sub-Total</b>	<b>17,186.73</b>	<b>10,105.54</b>	<b>491.21</b>	<b>27,783.48</b>	<b>17,434.46</b>	<b>10,250.08</b>	<b>490.56</b>	<b>28,175.10</b>	<b>17,422.78</b>	<b>10,250.35</b>	<b>485.33</b>	<b>28,158.46</b>
<b>Case Total</b>	<b>22,667.36</b>	<b>13,487.35</b>	<b>550.94</b>	<b>36,705.65</b>	<b>22,988.70</b>	<b>13,671.73</b>	<b>550.43</b>	<b>37,210.86</b>	<b>22,971.59</b>	<b>13,669.02</b>	<b>544.92</b>	<b>37,185.54</b>

## APPENDIX 2.9: DETAILED DEMAND DATA COLDEST IN 20 YEARS

Area	2026:			2026 Total	2027:			2027 Total	2028:			2028 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	869.73	460.86	11.03	1,341.62	873.10	462.83	11.02	1,346.95	882.85	467.93	11.05	1,361.84
La Grande	470.98	279.74	10.04	760.76	471.67	280.18	10.02	761.87	475.44	282.40	10.02	767.86
Medford GTN	2,365.95	1,437.26	11.60	3,814.82	2,385.74	1,450.06	11.59	3,847.39	2,421.83	1,471.48	11.62	3,904.93
Medford NWP	1,062.97	645.73	5.21	1,713.90	1,071.85	651.48	5.21	1,728.54	1,088.07	661.10	5.22	1,754.39
Roseburg	796.41	604.98	21.57	1,422.96	800.60	604.10	21.56	1,426.26	810.12	606.48	21.62	1,438.21
<b>OR Sub-Total</b>	<b>5,566.04</b>	<b>3,428.57</b>	<b>59.46</b>	<b>9,054.06</b>	<b>5,602.96</b>	<b>3,448.65</b>	<b>59.40</b>	<b>9,111.01</b>	<b>5,678.30</b>	<b>3,489.38</b>	<b>59.53</b>	<b>9,227.22</b>
Wa/Id Both	10,141.63	5,970.22	279.39	16,391.24	10,215.45	6,015.17	277.75	16,508.37	10,362.60	6,101.22	277.36	16,741.17
Wa/Id GTN	1,398.85	823.48	38.54	2,260.86	1,409.03	829.68	38.31	2,277.02	1,429.32	841.55	38.26	2,309.13
Wa/Id NWP	5,945.09	3,499.79	163.78	9,608.66	5,988.37	3,526.13	162.82	9,677.32	6,074.63	3,576.57	162.59	9,813.79
<b>WA/ID Sub-Total</b>	<b>17,485.56</b>	<b>10,293.49</b>	<b>481.70</b>	<b>28,260.75</b>	<b>17,612.84</b>	<b>10,370.98</b>	<b>478.88</b>	<b>28,462.70</b>	<b>17,866.55</b>	<b>10,519.34</b>	<b>478.21</b>	<b>28,864.09</b>
<b>Case Total</b>	<b>23,051.60</b>	<b>13,722.06</b>	<b>541.15</b>	<b>37,314.82</b>	<b>23,215.80</b>	<b>13,819.63</b>	<b>538.28</b>	<b>37,573.71</b>	<b>23,544.85</b>	<b>14,008.72</b>	<b>537.74</b>	<b>38,091.31</b>

Area	2029:			2029 Total	2030:			2030 Total	2031:			2031 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	884.65	468.96	11.02	1,364.63	882.33	468.45	11.00	1,361.78	888.16	471.56	11.00	1,370.71
La Grande	475.45	282.41	10.02	767.88	473.29	281.38	9.92	764.59	475.19	282.53	9.92	767.64
Medford GTN	2,438.52	1,482.14	11.59	3,932.25	2,443.66	1,487.73	11.56	3,942.95	2,470.54	1,504.10	11.56	3,986.20
Medford NWP	1,095.57	665.89	5.21	1,766.66	1,097.88	668.40	5.19	1,771.47	1,109.95	675.76	5.19	1,790.90
Roseburg	812.81	604.38	21.56	1,438.75	812.60	600.77	21.53	1,434.90	818.77	600.92	21.53	1,441.22
<b>OR Sub-Total</b>	<b>5,707.01</b>	<b>3,503.78</b>	<b>59.40</b>	<b>9,270.18</b>	<b>5,709.75</b>	<b>3,506.73</b>	<b>59.20</b>	<b>9,275.68</b>	<b>5,762.62</b>	<b>3,534.87</b>	<b>59.20</b>	<b>9,356.68</b>
Wa/Id Both	10,420.78	6,136.10	275.16	16,832.04	10,429.38	6,146.49	272.75	16,848.61	10,533.66	6,208.02	271.46	17,013.14
Wa/Id GTN	1,437.35	846.36	37.95	2,321.66	1,438.53	847.79	37.62	2,323.95	1,452.92	856.28	37.44	2,346.64
Wa/Id NWP	6,108.73	3,597.03	161.30	9,867.06	6,113.77	3,603.11	159.89	9,876.77	6,174.90	3,639.18	159.13	9,973.22
<b>WA/ID Sub-Total</b>	<b>17,966.86</b>	<b>10,579.49</b>	<b>474.42</b>	<b>29,020.77</b>	<b>17,981.69</b>	<b>10,597.39</b>	<b>470.25</b>	<b>29,049.33</b>	<b>18,161.48</b>	<b>10,703.48</b>	<b>468.03</b>	<b>29,332.99</b>
<b>Case Total</b>	<b>23,673.87</b>	<b>14,083.26</b>	<b>533.82</b>	<b>38,290.95</b>	<b>23,691.44</b>	<b>14,104.13</b>	<b>529.45</b>	<b>38,325.02</b>	<b>23,924.10</b>	<b>14,238.35</b>	<b>527.23</b>	<b>38,689.67</b>

Area	2032:			2032 Total	2033:			2033 Total
	Residential	Commercial	Ind FirmSale		Residential	Commercial	Ind FirmSale	
Klam Falls	894.79	475.29	11.02	1,381.09	894.69	475.49	10.98	1,381.16
La Grande	477.34	283.87	9.88	771.09	476.41	283.31	9.86	769.58
Medford GTN	2,499.05	1,521.94	11.57	4,032.57	2,511.14	1,530.46	11.54	4,053.14
Medford NWP	1,122.76	683.77	5.20	1,811.73	1,128.20	687.60	5.18	1,820.98
Roseburg	825.92	601.87	21.58	1,449.37	827.15	598.74	21.51	1,447.40
<b>OR Sub-Total</b>	<b>5,819.85</b>	<b>3,566.74</b>	<b>59.25</b>	<b>9,445.85</b>	<b>5,837.59</b>	<b>3,575.60</b>	<b>59.07</b>	<b>9,472.27</b>
Wa/Id Both	10,646.44	6,275.91	270.61	17,192.95	10,683.64	6,299.86	268.18	17,251.69
Wa/Id GTN	1,468.47	865.64	37.32	2,371.44	1,473.61	868.95	36.99	2,379.54
Wa/Id NWP	6,241.01	3,678.98	158.63	10,078.63	6,262.83	3,693.02	157.21	10,113.06
<b>WA/ID Sub-Total</b>	<b>18,355.93</b>	<b>10,820.53</b>	<b>466.56</b>	<b>29,643.02</b>	<b>18,420.08</b>	<b>10,861.82</b>	<b>462.39</b>	<b>29,744.29</b>
<b>Case Total</b>	<b>24,175.78</b>	<b>14,387.28</b>	<b>525.82</b>	<b>39,088.87</b>	<b>24,257.67</b>	<b>14,437.42</b>	<b>521.46</b>	<b>39,216.55</b>



## APPENDIX 3.1: AVISTA GAS CPA REPORT 4/23/2014



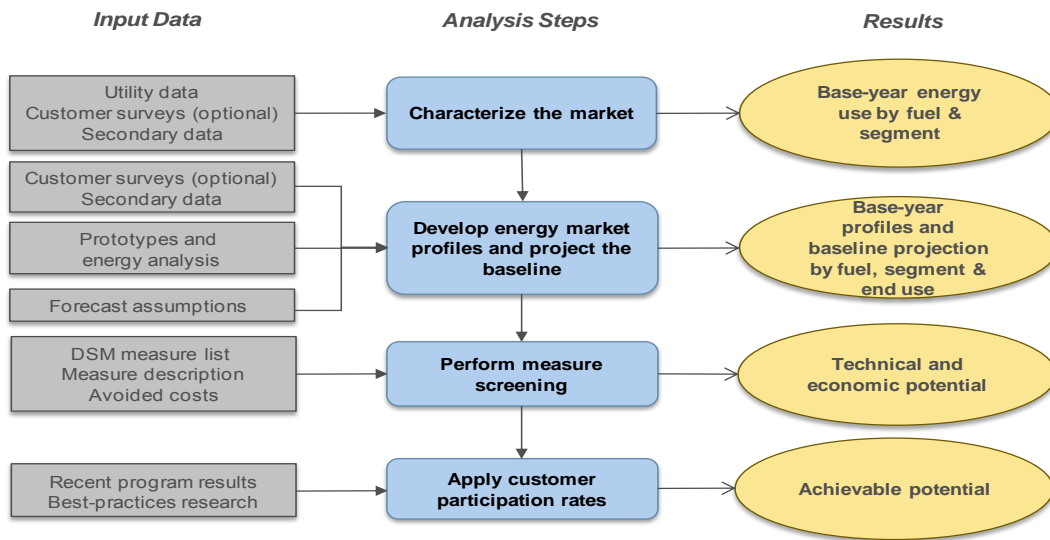
### Avista Natural Gas Conservation Potential Assessment Results

April 23, 2014

#### Topics

- Overview of analysis approach
- Market characterization
- Energy market profile
- Baseline projection
- Conservation potential

## Approach



## Approach

Market Dimension	Segmentation Variable	Dimension Examples
1	State	Washington, Idaho, and Oregon
2	Sector	Residential, Commercial, and Industrial
3	Building type	<b>Residential:</b> Single family, Multi Family, and Mobile Home
		<b>Commercial:</b> Small Commercial and Large Commercial
		<b>Industrial:</b> All sectors combined
4	Vintage	Existing and new construction
5	End uses	Space heating, water heating, appliances, process, etc. (as appropriate by sector)
6	Appliances/end uses and technologies	Technologies such as furnaces, boilers, ovens, fryers, etc
7	Equipment efficiency levels for new purchases	Baseline and higher-efficiency options as appropriate for each technology





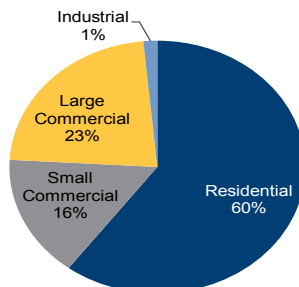
Market Characterization

**Avista market characterization (All states, 2013)**

- Based on 2013 Avista gas sales data
- Excludes transport and Oregon 444

Avista Total	2013 Sales (1,000Thrm)	# of Meters	Average Use per Meter (Thrm)
Residential	199,115	288,088	691
Small Commercial	51,825	30,410	1,704
Large Commercial	74,664	3,875	19,266
Industrial	5,015	255	19,649
<b>Total</b>	<b>330,619</b>	<b>322,628</b>	<b>1,025</b>

**Avista Natural Gas Use (2013)**



## Avista market characterization (2013)

Washington	Rate Class	2013 Sales (1,000Thrm)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Thrm)
Residential	101	102,680	59%	135,792	90%	756
Small Commercial	101	17,267	10%	11,971	8%	1,442
Large Commercial	111,132	51,078	29%	2,469	2%	20,687
Industrial	101,111,112	2,384	1%	134	0%	17,756
<b>Washington total</b>		<b>173,409</b>	<b>100%</b>	<b>150,366</b>	<b>100%</b>	<b>1,153</b>

Idaho	Rate Class	2013 Sales (1,000Thrm)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Thrm)
Residential	101	46,336	61%	67,415	89%	687
Small Commercial	101	7,725	10%	7,292	10%	1,059
Large Commercial	111,132	19,968	26%	1,335	2%	14,961
Industrial	101,111,112	2,222	3%	94	0%	23,698
<b>Idaho total</b>		<b>76,250</b>	<b>100%</b>	<b>76,136</b>	<b>100%</b>	<b>1,001</b>

Oregon	Rate Class	2013 Sales (1,000Thrm)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Thrm)
Residential	410	50,099	62%	84,881	88%	590
Small Commercial	420	26,833	33%	11,146	12%	2,407
Large Commercial	424	3,618	4%	72	0%	50,484
Industrial	420,424	410	1%	27	0%	15,044
<b>Oregon total</b>		<b>80,960</b>	<b>100%</b>	<b>96,126</b>	<b>100%</b>	<b>842</b>

ENERNOC

7

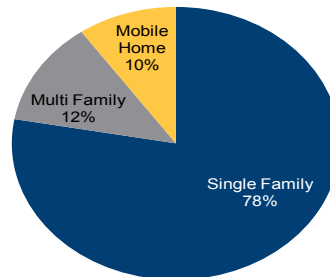


### Residential Sector

## Avista residential market characterization (All states, 2013)

All States Residential	2013 Sales (1,000 Therms)	# of Meters	Average Use per Household (Therms/HH)
Single Family	165,435	224,253	738
Multi Family	16,935	35,706	474
Mobile Home	16,745	28,128	595
<b>Total</b>	<b>199,115</b>	<b>288,088</b>	<b>691</b>

### Avista Residential Natural Gas Use (2013)



## Avista residential market characterization (2013)

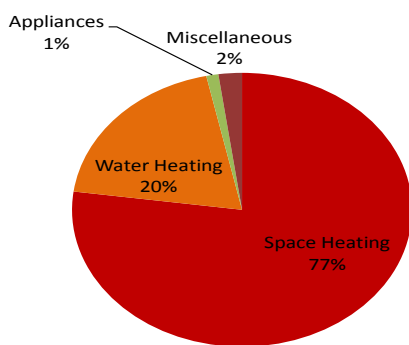
Washington	2013 Sales (1,000 Therms)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Therms)
Single Family	86,211	84%	106,732	79%	808
Multi Family	9,743	9%	19,147	14%	509
Mobile Home	6,726	7%	9,913	7%	678
<b>Washington total</b>	<b>102,680</b>	<b>100%</b>	<b>135,792</b>	<b>100%</b>	<b>756</b>

Idaho	2013 Sales (1,000 Therms)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Therms)
Single Family	38,758	84%	52,719	78%	735
Multi Family	4,496	10%	9,708	14%	463
Mobile Home	3,081	7%	4,989	7%	618
<b>Idaho total</b>	<b>46,336</b>	<b>100%</b>	<b>67,415</b>	<b>100%</b>	<b>687</b>

Oregon	2013 Sales (1,000 Therms)	% of Sales	# of Meters	% of Meters	Average Use/Meter (Therms)
Single Family	40,466	81%	64,803	76%	624
Multi Family	2,695	5%	6,851	8%	393
Mobile Home	6,938	14%	13,227	16%	525
<b>Oregon total</b>	<b>50,099</b>	<b>100%</b>	<b>84,881</b>	<b>100%</b>	<b>590</b>

## Avista residential market characterization (2013)

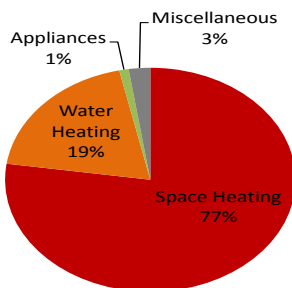
- Energy Market Profiles
  - Characterize energy use by sector, segment, end use, and technology
  - Existing, replacement, and new construction
- Accounts for
  - Codes and standards
  - Previous DSM results
  - Equipment saturation and fuel shares



## Energy market profile for Washington, single family

End Use	Technology	Saturation	UEC (Therms)	Intensity (Therms/HH)	Usage (MMThrm)
Space Heating	Furnace	87.8%	623.3	547.1	58.4
Space Heating	Boiler	3.6%	705.8	25.5	2.7
Space Heating	Other Heating	8.6%	600.0	51.7	5.5
Water Heating	Water Heater	60.8%	256.1	155.6	16.6
Appliances	Clothes Dryer	8.3%	30.8	2.5	0.3
Appliances	Stove/Oven	10.3%	57.4	5.9	0.6
Miscellaneous	Pool Heater	1.1%	219.0	2.5	0.3
Miscellaneous	Miscellaneous	100.0%	16.9	16.9	1.8
<b>Total</b>				<b>807.7</b>	<b>86.2</b>

Energy Usage, Washington Single Family



## Assumptions in the residential baseline projection

- Projection of growth without conservation programs
- Incorporates
  - Customer growth, about 1.5% per year
  - Differences in new homes (i.e., larger than average dwellings)
  - Per capita income growth, about 2.1% per year
  - Retail price forecast
  - Trends in end-use/technology saturations
  - Equipment purchase decisions

Today's Efficiency or Standard Assumption  
 Next Standard (relative to today's standard)

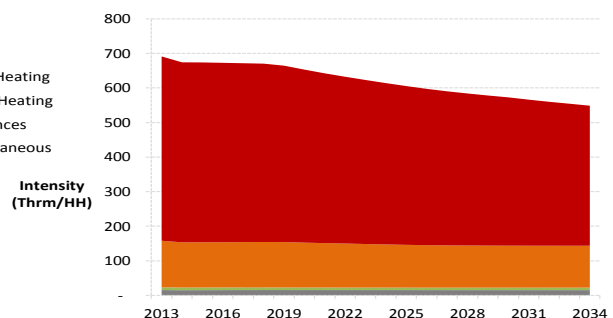
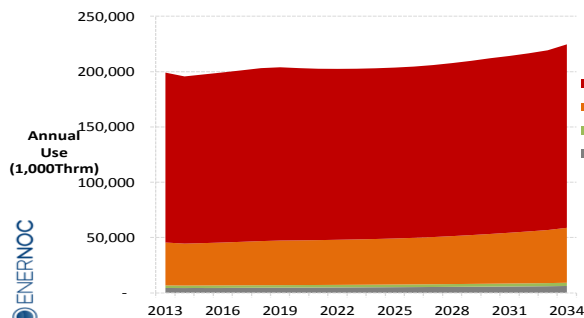
End Use	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Space Heating	Furnace	AFUE 90% - Non-weatherized		AFUE 90% - Weatherized										
	Boiler	EF 0.82												
Water Heating	Water Heater (<=55 gallons)	EF 0.59		EF 0.62										
	Water Heater (>55 gallons)	EF 0.59		Condensing Technology										
Appliances	Clothes Dryer	Conventional		5% more efficient										
	Range/Oven	No Standing Pilot Light												
Miscellaneous	Pool Heater	EF 0.82												

ENERNOC

13

## Residential baseline projection results

- Residential sector use increases 13% from 199 million therms to 224 million therms
- Use per household decreases by 21%
  - Larger home size and income effects are offset by efficiency standards



ENERNOC

14



## Commercial Sector

### Avista commercial market characterization (2013)

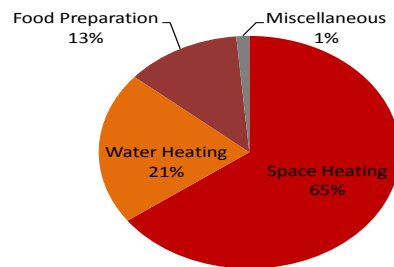
Washington	2013 Sales (1,000Thrm)	% of Sales	SqFt	Average Use/SqFt (Thrm)
Small Commercial	17,267	25%	47,567,634	0.36
Large Commercial	51,078	75%	77,391,189	0.66
<b>Washington total</b>	<b>68,345</b>	<b>100%</b>	<b>124,958,823</b>	<b>0.55</b>

Idaho	2013 Sales (1,000Thrm)	% of Sales	SqFt	Average Use/SqFt (Thrm)
Small Commercial	7,725	28%	22,293,951	0.35
Large Commercial	19,968	72%	31,695,198	0.63
<b>Idaho total</b>	<b>27,693</b>	<b>100%</b>	<b>53,989,149</b>	<b>0.51</b>

Oregon	2013 Sales (1,000Thrm)	% of Sales	SqFt	Average Use/SqFt (Thrm)
Small Commercial	26,833	88%	81,311,800	0.33
Large Commercial	3,618	12%	6,030,062	0.60
<b>Oregon total</b>	<b>30,451</b>	<b>100%</b>	<b>87,341,862</b>	<b>0.35</b>

## Avista commercial market characterization (2013)

- Energy Market Profiles
  - Characterize energy use by sector, segment, end use, and technology
  - Existing, replacement, and new construction
- Accounts for
  - Codes and standards
  - Previous DSM results
  - Equipment saturation and fuel shares



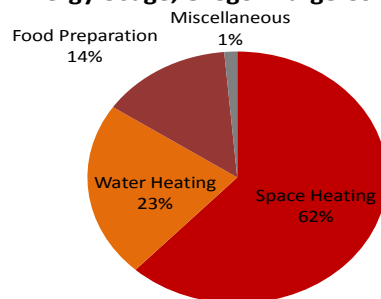
ENERNOC

17

## Energy market profile for Oregon, large commercial

End Use	Technology	Saturation	EUI (Therms)	Intensity (Therms/sqf)	Usage (MMThrm)
Space Heating	Furnace	45.2%	0.24	0.11	0.6
Space Heating	Boiler	29.8%	0.77	0.23	1.4
Space Heating	Other Heating	16.6%	0.21	0.04	0.2
Water Heating	Water Heater	42.5%	0.32	0.14	0.8
Food Preparation	Oven	16.2%	0.06	0.01	0.1
Food Preparation	Fryer	16.2%	0.09	0.02	0.1
Food Preparation	Broiler	16.2%	0.09	0.02	0.1
Food Preparation	Griddle	16.2%	0.07	0.01	0.1
Food Preparation	Range	16.2%	0.07	0.01	0.1
Food Preparation	Steamer	16.2%	0.12	0.02	0.1
Miscellaneous	Pool Heater	1.2%	0.09	0.00	0.0
Miscellaneous	Miscellaneous	100.0%	0.01	0.01	0.1
<b>Total</b>				<b>0.600</b>	<b>3.6</b>

### Energy Usage, Oregon Large Commercial



ENERNOC

18

## Assumptions in the commercial baseline projection

- Projection of growth without conservation programs
- Incorporates
  - Floor space growth, about 1.1% per year
  - Differences in new construction
  - Retail price forecast
  - Trends in end-use/technology saturations
  - Equipment purchase decisions
  - Building codes and appliance standards

Today's Efficiency or Standard Assumption  
 Next Standard (relative to today's standard)

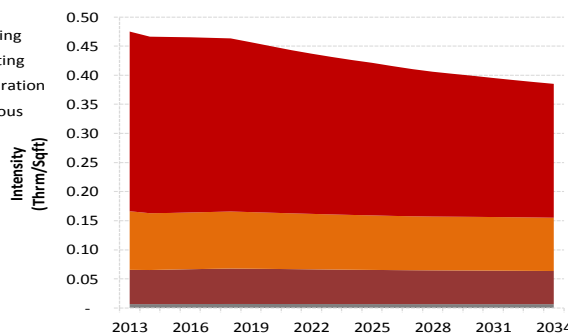
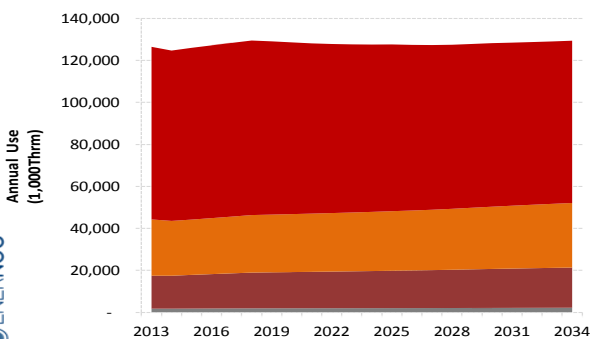
End Use	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025
Space Heating	Furnace	AFUE 76%												
	Boiler	EF 0.82												
Water Heating	Water Heater	EF 0.80												
Miscellaneous	Pool Heater	EF 0.82												

ENERNOC

19

## Commercial baseline projection results

- Commercial sector use increases 2% from 127 million therms to 130 million therms
- Use per square footage decreases by 19%
  - Energy consumption stays relatively flat while floor space increases



ENERNOC

20





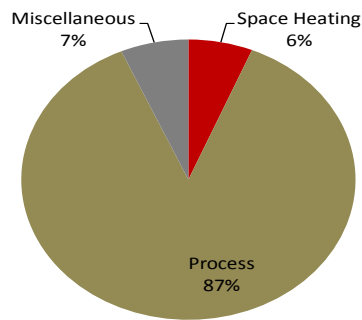
## Industrial Sector

### Avista industrial market characterization (2013)

State	2013 Sales (1,000 Therms)	Square Feet	Average Use/SqFt (Therms)
Washington	2,384	3,009,759	0.79
Idaho	2,222	2,927,137	0.76
Oregon	410	564,683	0.73
<b>All states total</b>	<b>5,015</b>	<b>6,501,579</b>	<b>0.77</b>

## Avista industrial market characterization (2013)

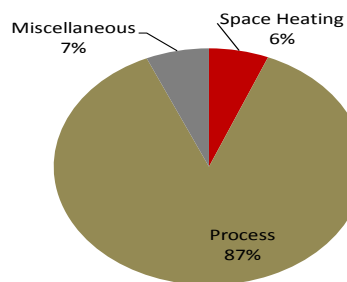
- Energy Market Profiles
  - Characterize energy use by sector, segment, end use, and technology
  - Existing, replacement, and new construction
- Accounts for
  - Codes and standards
  - Previous DSM results
  - Equipment saturation and fuel shares



## Energy market profile for Idaho, industrial

End Use	Technology	Saturation	EUI (Therms)	Intensity (Therms/sqft)	Usage (MMThrm)
Space Heating	Furnace	9.6%	0.017	0.00	0.00
Space Heating	Boiler	81.3%	0.055	0.04	0.13
Space Heating	Other Heating	4.8%	0.015	0.00	0.00
Process	Process Heating	100.0%	0.656	0.66	1.92
Process	Process Cooling	100.0%	0.001	0.00	0.00
Process	Other Process	100.0%	0.004	0.00	0.01
Other	Other Uses	100.0%	0.050	0.05	0.15
<b>Total</b>				<b>0.76</b>	<b>2.22</b>

Energy Usage, Idaho Industrial



## Assumptions in the industrial baseline projection

- Projection of growth without conservation programs
- Incorporates
  - Floor space decline, about 0.5% per year (space consolidation)
  - Differences in new construction
  - Retail price forecast
  - Trends in end-use/technology saturations
  - Equipment purchase decisions
  - Building codes and appliance standards

Today's Efficiency or Standard Assumption  
 Next Standard (relative to today's standard)

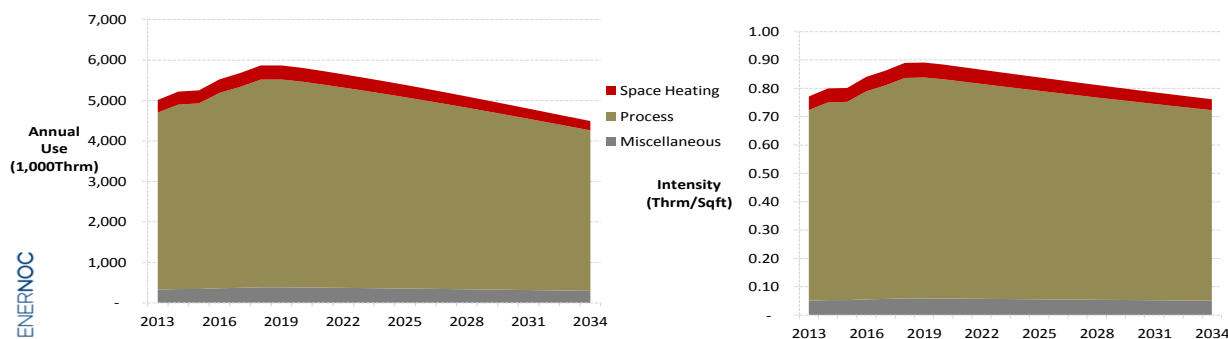
End Use	Technology	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	
Space Heating	Furnace	AFUE 76%													
	Boiler	EF 0.82													

ENERNOC

25

## Industrial baseline projection results

- Industrial sector use decreases 10% from 5 million therms to 4.5 million therms
- Use per square footage slightly decreases by 1%

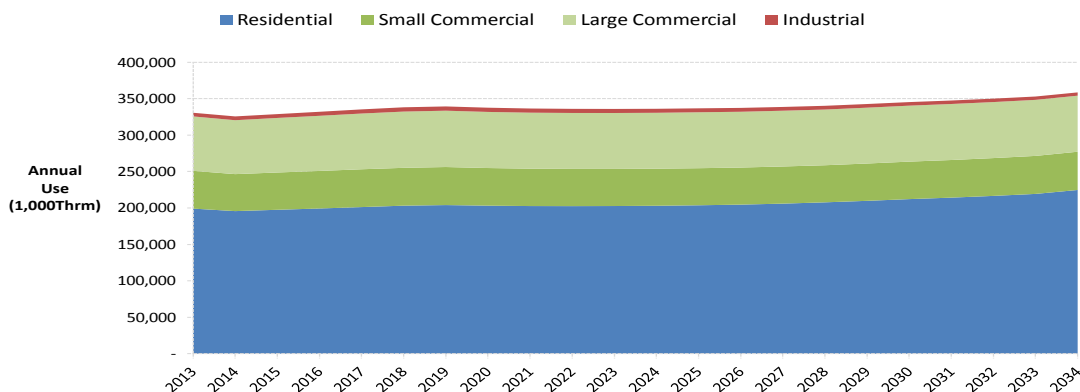


ENERNOC

26

## Baseline projection – all sectors

- Overall increase in use 8%
- Average annual growth 0.4%



ENERNOC

27

## Energy conservation measures

- Assessed 1,785 measures
- Measure attributes
  - Average lifetime
  - Energy savings
  - Cost
  - Timing of standards
  - Base-year saturation
  - Applicability / feasibility
- Example: Washington, Single Family, Existing

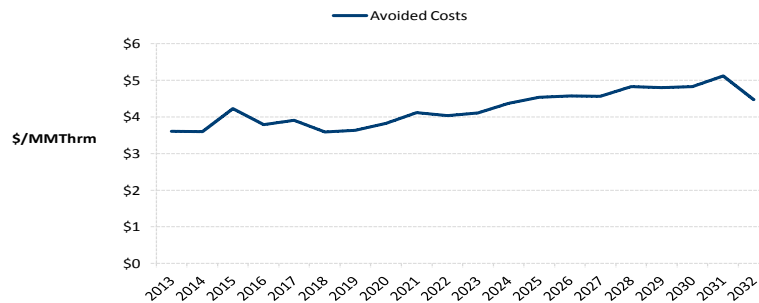
Technology	Efficiency Level	Lifetime	Equipment Cost	Energy Usage (Therms/year)	Off Market
Furnace	100.0%	20	\$3,651	565	2014
Furnace	97.5%	20	\$4,056	551	2014
Furnace	94.0%	20	\$4,259	531	2014
Furnace	87.7%	20	\$4,462	495	2034
Furnace	81.6%	20	\$6,084	461	2034

ENERNOC

28

## Conservation potential assumptions

- Three levels of potential
  - *Technical potential* – all applicable measures are implemented, regardless of cost
  - *Economic potential* – all cost-effective measures
    - TRC test with B/C ratio  $\geq 1.0$  (Idaho and Oregon)
    - UCT test with B/C ratio  $\geq 1.0$  (Washington)
  - *Achievable potential* – accounts for market acceptance and rates at which programs can realistically be implemented
    - Based on Sixth Plan ramp rates

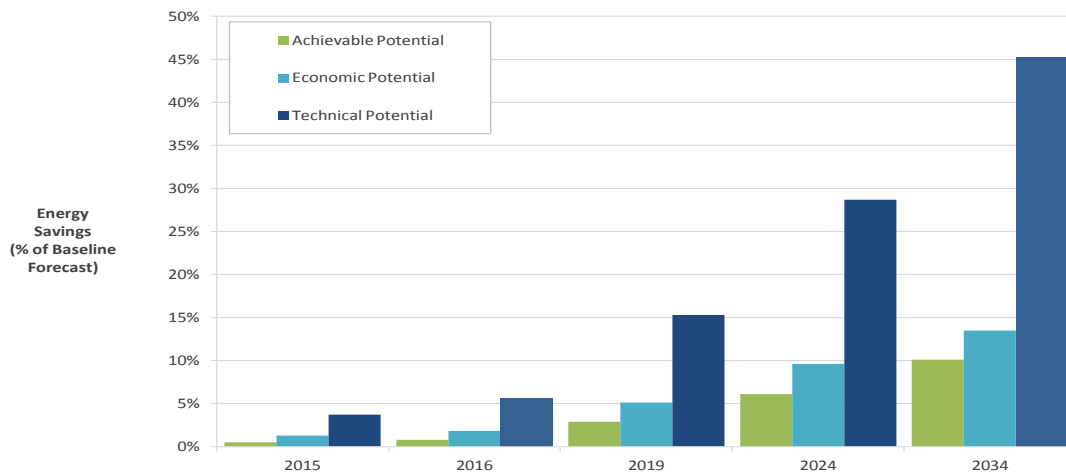


## Summary of CPA results (across all states)

- Achievable potential begins at 40% of economic potential in 2015 and reaches 74% by 2034

	2015	2016	2019	2024	2034
Baseline Forecast	328,757	331,980	338,917	336,073	358,562
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	1,677	2,639	9,854	20,369	36,110
Economic Potential	4,153	5,877	17,317	32,220	48,528
Technical Potential	12,207	18,677	51,810	96,562	162,236
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.5%	0.8%	2.9%	6.1%	10.1%
Economic Potential	1.3%	1.8%	5.1%	9.6%	13.5%
Technical Potential	3.7%	5.6%	15.3%	28.7%	45.2%

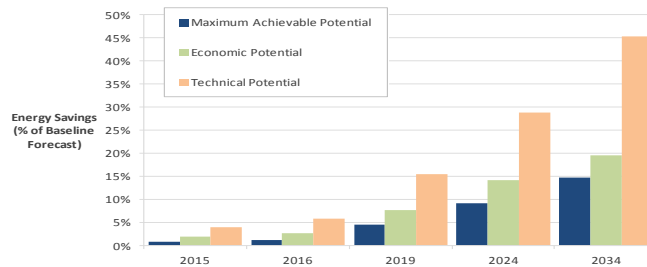
## Summary of CPA results (continued)



### Savings by State - Washington

## Total potential results, Washington

	2015	2016	2019	2024	2034
Baseline Forecast	171,422	172,719	175,548	173,273	179,456
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	1,287	2,024	7,742	15,656	26,259
Economic Potential	3,127	4,385	13,330	24,445	35,042
Technical Potential	6,620	9,963	26,953	50,035	81,431
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.8%	1.2%	4.4%	9.0%	14.6%
Economic Potential	1.8%	2.5%	7.6%	14.1%	19.5%
Technical Potential	3.9%	5.8%	15.4%	28.9%	45.4%

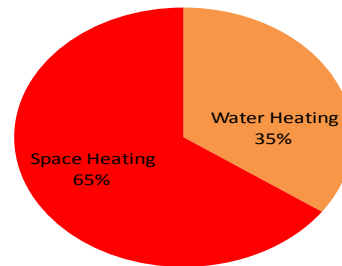


## Residential potential results, Washington

	2015	2016	2019	2024	2034
Baseline Forecast	101,488	102,205	104,445	103,847	112,733
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	370	682	4,604	8,733	12,938
Economic Potential	964	1,471	7,571	13,180	16,955
Technical Potential	3,017	4,832	15,965	28,899	49,110
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.4%	0.7%	4.4%	8.4%	11.5%
Economic Potential	1.0%	1.4%	7.2%	12.7%	15.0%
Technical Potential	3.0%	4.7%	15.3%	27.8%	43.6%

## Residential results – Key measures, Washington

Measure / Technology	2024 Cumulative Savings (1,000Thrm)
Insulation - Infiltration Control	
Water Heating - Low Flow Showerheads	
Ducting - Repair and Sealing	
Home Energy Management System	
Thermostat - Clock/Programmable	
Water Heating - Thermostat Setback	
Water Heating - Hot Water Saver	
Water Heating - Tank Blanket/Insulation	
Water Heating - Faucet Aerators	
Water Heating - Pipe Insulation	
Insulation - Ceiling	61
Boiler - Pipe Insulation	58
Insulation - Attic Hatch	49
Insulation - Wall Cavity	5
<b>Total</b>	<b>8,733</b>



ENERNOC

35

## Commercial potential results, Washington

	2015	2016	2019	2024	2034
Baseline Forecast	67,462	67,947	68,368	66,870	64,746
Cumulative Natural Gas Savings (1,000Thrm)					
Achievable Potential	893	1,305	3,020	6,704	13,100
Economic Potential	2,138	2,874	5,635	11,012	17,839
Technical Potential	3,555	5,061	10,803	20,762	31,923
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	1.3%	1.9%	4.4%	10.0%	20.2%
Economic Potential	3.2%	4.2%	8.2%	16.5%	27.6%
Technical Potential	5.3%	7.4%	15.8%	31.0%	49.3%

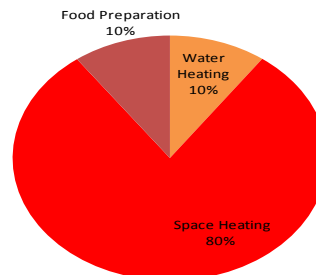
ENERNOC

36



## Commercial results – Key measures, Washington

Measure / Technology	2024 Cumulative Savings (1,000Thrm)
Space Heating - Heat Recovery Ventilator	
Energy Management System	
Custom Measures	
Boiler - Hot Water Reset	
Water Heating - Faucet Aerators	
Furnace - Maintenance	
Boiler - Maintenance	
Space Heating - Furnace	
Thermostat - Clock/Programmable	
Insulation - Ceiling	
Advanced New Construction Designs	
Insulation - Wall Cavity	
Boiler - High Efficiency Hot Water Circulation	
Food Preparation - Fryer	
Food Preparation - Oven	129
Food Preparation - Steamer	113
Food Preparation - Range	101
Food Preparation - Griddle	81
Water Heating - Tank Blanket/Insulation	53
Space Heating - Boiler	34
Water Heating - Hot Water Saver	4
<b>Total</b>	<b>6,704</b>



ENERNOC

37

## Industrial potential results, Washington

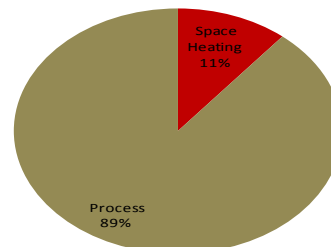
	2015	2016	2019	2024	2034
Baseline Forecast	2,472	2,567	2,735	2,555	1,977
Cumulative Natural Gas Savings (1,000Thrm)					
Achievable Potential	24	38	118	220	220
Economic Potential	25	39	124	253	248
Technical Potential	48	69	184	374	398
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	1.0%	1.5%	4.3%	8.6%	11.1%
Economic Potential	1.0%	1.5%	4.5%	9.9%	12.6%
Technical Potential	1.9%	2.7%	6.7%	14.6%	20.1%

ENERNOC

38

## Industrial results – Key measures, Washington

Measure / Technology	202
Process - Boiler Hot Water Reset	(1
Insulation - Wall Cavity	
Space Heating - Heat Recovery Ventilator	
<b>Total</b>	



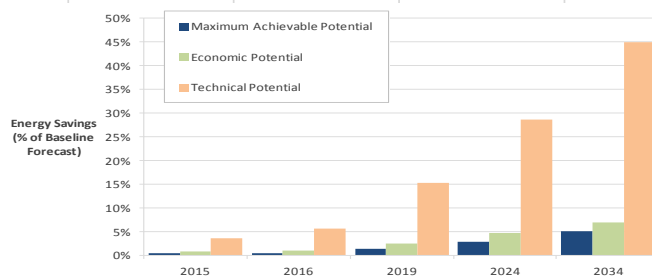
39



## Savings by State - Idaho

## Total potential results, Idaho

	2015	2016	2019	2024	2034
Baseline Forecast	77,988	79,291	82,115	82,171	89,483
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	228	342	1,031	2,320	4,503
Economic Potential	571	803	1,984	3,881	6,209
Technical Potential	2,818	4,387	12,471	23,483	40,252
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.3%	0.4%	1.3%	2.8%	5.0%
Economic Potential	0.7%	1.0%	2.4%	4.7%	6.9%
Technical Potential	3.6%	5.5%	15.2%	28.6%	45.0%

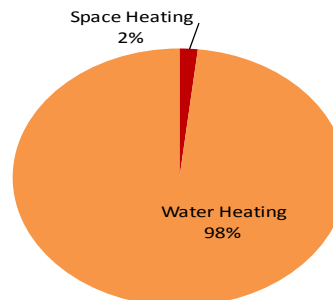


## Residential potential results, Idaho

	2015	2016	2019	2024	2034
Baseline Forecast	46,978	47,633	49,132	49,102	55,990
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	6	18	263	496	874
Economic Potential	10	31	434	756	1,117
Technical Potential	1,239	2,065	7,276	13,308	24,129
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.0%	0.0%	0.5%	1.0%	1.6%
Economic Potential	0.0%	0.1%	0.9%	1.5%	2.0%
Technical Potential	2.6%	4.3%	14.8%	27.1%	43.1%

## Residential results – Key measures, Idaho

Measure / Technology	2024
Water Heating - Pipe Insulation	(
Water Heating - Tank Blanket/Insulation	
Water Heating - Low Flow Showerheads	
Boiler - Pipe Insulation	
Insulation - Ceiling	
<b>Total</b>	

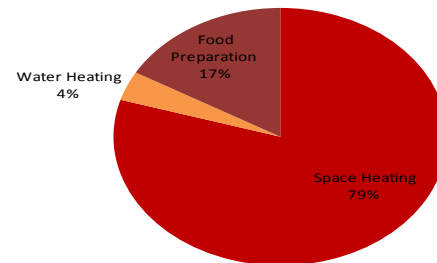


## Commercial potential results, Idaho

	2015	2016	2019	2024	2034
Baseline Forecast	28,645	29,129	30,299	30,572	31,360
Cumulative Natural Gas Savings (1,000Thrm)					
Achievable Potential	220	320	760	1,786	3,478
Economic Potential	559	768	1,543	3,083	4,921
Technical Potential	1,533	2,253	5,014	9,808	15,689
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	0.8%	1.1%	2.5%	5.8%	11.1%
Economic Potential	2.0%	2.6%	5.1%	10.1%	15.7%
Technical Potential	5.4%	7.7%	16.5%	32.1%	50.0%

## Commercial results – Key measures, Idaho

Measure / Technology	2024 Cumulative Savings (1,000Thm)
Space Heating - Heat Recovery Ventilator	
Energy Management System	
Boiler - Hot Water Reset	
Boiler - Maintenance	
Space Heating - Furnace	
Food Preparation - Fryer	
Boiler - High Efficiency Hot Water Circulation	
Food Preparation - Oven	
Food Preparation - Steamer	
Food Preparation - Range	30
Water Heating - Faucet Aerators	40
Food Preparation - Griddle	40
Water Heating - Tank Blanket/Insulation	26
Insulation - Ceiling	8
<b>Total</b>	<b>1,786</b>



ENERNOC

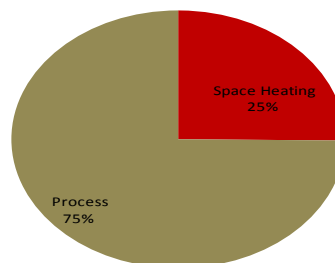
## Industrial potential results, Idaho

	2015	2016	2019	2024	2034
Baseline Forecast	2,365	2,530	2,684	2,497	2,133
Cumulative Natural Gas Savings (1,000Thm)					
Achievable Potential	3	4	7	38	151
Economic Potential	3	4	8	43	172
Technical Potential	46	69	181	368	434
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	0.1%	0.1%	0.3%	1.5%	7.1%
Economic Potential	0.1%	0.1%	0.3%	1.7%	8.1%
Technical Potential	1.9%	2.7%	6.8%	14.7%	20.3%

ENERNOC

## Industrial results – Key measures, Idaho

Measure / Technology
Process - Boiler Hot Water Reset
Insulation - Wall Cavity
<b>Total</b>



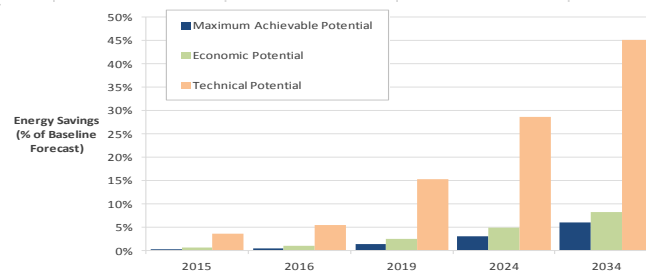
47



## Savings by State - Oregon

## Total potential results, Oregon

	2015	2016	2019	2024	2034
Baseline Forecast	79,346	79,969	81,255	80,629	89,623
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	161	273	1,081	2,393	5,349
Economic Potential	454	690	2,004	3,894	7,276
Technical Potential	2,769	4,327	12,387	23,043	40,553
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.2%	0.3%	1.3%	3.0%	6.0%
Economic Potential	0.6%	0.9%	2.5%	4.8%	8.1%
Technical Potential	3.5%	5.4%	15.2%	28.6%	45.2%

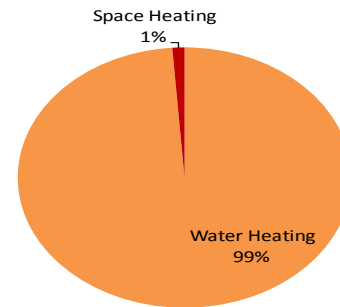


## Residential potential results, Oregon

	2015	2016	2019	2024	2034
Baseline Forecast	49,029	49,426	50,374	50,070	55,947
<b>Cumulative Natural Gas Savings (1,000Thrm)</b>					
Achievable Potential	8	27	376	679	1,368
Economic Potential	14	44	595	1,006	1,690
Technical Potential	1,326	2,218	7,699	13,823	24,244
<b>Cumulative Natural Gas Savings (% of Baseline)</b>					
Achievable Potential	0.0%	0.1%	0.7%	1.4%	2.4%
Economic Potential	0.0%	0.1%	1.2%	2.0%	3.0%
Technical Potential	2.7%	4.5%	15.3%	27.6%	43.3%

## Residential results – Key measures, Oregon

Measure / Technology	202
Water Heating - Pipe Insulation	(3
Water Heating - Tank Blanket/Insulation	
Water Heating - Faucet Aerators	
Water Heating - Low Flow Showerheads	
Insulation - Ceiling	
Boiler - Pipe Insulation	
<b>Total</b>	



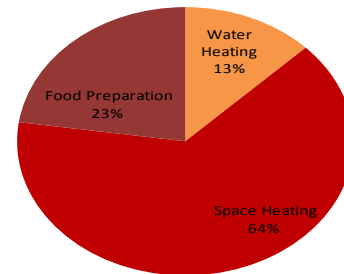
## Commercial potential results, Oregon

	2015	2016	2019	2024	2034
Baseline Forecast	29,902	30,115	30,433	30,134	33,296
Cumulative Natural Gas Savings (1,000Thrm)					
Achievable Potential	153	245	704	1,704	3,944
Economic Potential	440	645	1,407	2,876	5,545
Technical Potential	1,434	2,097	4,657	9,158	16,232
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	0.5%	0.8%	2.3%	5.7%	11.8%
Economic Potential	1.5%	2.1%	4.6%	9.5%	16.7%
Technical Potential	4.8%	7.0%	15.3%	30.4%	48.7%



## Commercial results – Key measures, Oregon

Measure / Technology	2014
Space Heating - Heat Recovery Ventilator	
Space Heating - Furnace	
Water Heating - Faucet Aerators	
Water Heating - Tank Blanket/Insulation	
Food Preparation - Fryer	
Food Preparation - Oven	
Boiler - Maintenance	
Food Preparation - Steamer	
Food Preparation - Range	
Energy Management System	37
Food Preparation - Griddle	34
Insulation - Ceiling	30
Boiler - Hot Water Reset	29
Boiler - High Efficiency Hot Water Circulation	13
<b>Total</b>	<b>1,704</b>



ENERNOC

53

## Industrial potential results, Oregon

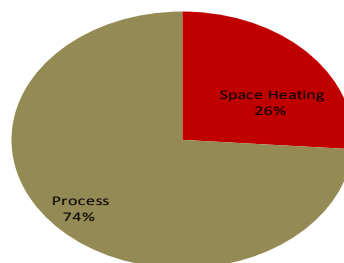
	2015	2016	2019	2024	2034
Baseline Forecast	415	427	448	425	380
Cumulative Natural Gas Savings (1,000Thrm)					
Achievable Potential	0	1	1	10	36
Economic Potential	0	1	1	11	41
Technical Potential	8	12	30	63	77
Cumulative Natural Gas Savings (% of Baseline)					
Achievable Potential	0.1%	0.1%	0.3%	2.4%	9.6%
Economic Potential	0.1%	0.1%	0.3%	2.7%	10.9%
Technical Potential	1.9%	2.7%	6.8%	14.7%	20.3%

ENERNOC

54

## Industrial results – Key measures, Oregon

Measure / Technology	Cu
Process - Boiler Hot Water Reset	(1,
Insulation - Wall Cavity	
<b>Total</b>	



ENERNOC

55



Ingrid Rohmund  
[irohmund@enernoc.com](mailto:irohmund@enernoc.com)

Bridget Kester  
[bkester@enernoc.com](mailto:bkester@enernoc.com)

Sogol Kananizadeh  
[skananizadeh@enernoc.com](mailto:skananizadeh@enernoc.com)

Sharon Yoshida  
[Syoshida@enernoc.com](mailto:Syoshida@enernoc.com)

## APPENDIX 3.2: ENVIRONMENTAL EXTERNALITIES OVERVIEW (OREGON JURISDICTION ONLY)

The methodology for determining avoided costs from reduced incremental natural gas usage considers commodity and variable transportation costs only. These avoided cost streams do not include environmental externality costs related to the gathering, transmission, distribution or end-use of natural gas.

Per traditional economic theory and industry practice, an environmental externality factor is typically added to the avoided cost when there is an opportunity to displace traditional supply-side resources with an alternative resource with no adverse environmental impact.

### REGULATORY GUIDANCE

The Oregon Public Utility Commission (OPUC) issued Order 93-965 (UM-424) to address how utilities should consider the impact of environmental externalities in planning for future energy resources. The Order required analysis on the potential natural gas cost impacts from emitting carbon dioxide (CO<sub>2</sub>) and nitric-oxide (NO<sub>x</sub>).

The OPUC's Order No. 07-002 in Docket UM 1056 (Investigation Into Integrated Resource Planning) established the following guideline for the treatment of environmental costs used by energy utilities that evaluate demand-side and supply-side energy choices:

#### UM 1056, Guideline 8 - Environmental Costs

*“Utilities should include, in their base-case analyses, the regulatory compliance costs they expect for carbon dioxide (CO<sub>2</sub>), nitrogen oxides (NO<sub>x</sub>), sulfur oxides (SO<sub>2</sub>), and mercury (Hg) emissions. Utilities should analyze the range of potential CO<sub>2</sub> regulatory costs in Order No. 93-695, from \$0 - \$40 (1990\$). In addition, utilities should perform sensitivity analysis on a range of reasonably possible cost adders for nitrogen oxides (NO<sub>x</sub>), sulfur dioxide (SO<sub>2</sub>), and mercury (Hg), if applicable.*

In June 2008, the OPUC issued Order 08-338 (UM1302) which revised UM1056, Guideline 8. The revised guideline requires the utility should construct a base case portfolio to reflect what it considers to be the most likely regulatory compliance future for the various emissions. Additionally the guideline requires the utility to develop several compliance scenarios ranging from the present CO<sub>2</sub> regulatory level to the upper reaches of credible proposals and each scenario should include a time profile of CO<sub>2</sub> costs. The utility is also required to include a “trigger point” analysis in which the utility must determine at what level of carbon costs its selection of portfolio resources would be significantly different.

### ANALYSIS

Unlike electric utilities, environmental cost issues rarely impact a natural gas utility's supply-side resource options. This is because the only supply-side energy resource is natural gas. The utility cannot choose between say "dirty" coal-fired generation and "clean" wind energy sources. The supply-side implication of environmental externalities generally relates to combustion of fuel to move or compress natural gas. Avista's direct gas distribution system infrastructure relies solely on the upstream line pressure of the

interstate pipeline transportation network to distribute natural gas to its customers and thus does not directly combust fuels that result in any CO<sub>2</sub>, NO<sub>x</sub>, SO<sub>2</sub>, or Hg emissions.

Upstream gas system infrastructure (pipelines, storage facilities, and gathering systems), however, do produce CO<sub>2</sub> emissions via compressors used to pressurize and move natural gas. Accessing CO<sub>2</sub> emissions data on these upstream activities to perform detailed meaningful analysis is challenging. In the 2009 Natural Gas IRP there was significant momentum regarding GHG legislation and the movement towards the creation of carbon cap and trade markets or tax structure. Since then, the momentum has slowed significantly. Where there is still a focus on reducing GHG emissions and improving the nation's carbon footprint, the timing of implementing a carbon cap and trade/tax framework has been delayed. Additionally, the pricing level of the framework has been greatly reduced.. Whichever structure ultimately gets implemented, Avista believes the cost pass through mechanisms for upstream gas system infrastructure will not make a difference in supply-side resource selection although the amount of cost pass through could differ widely.

Table 3.2.1 summarizes a range of environmental cost adders we believe capture several compliance futures including our expected scenario. The CO<sub>2</sub> cost adders reflect outlooks we obtained from one of our consultants, and following discussion and feedback from the TAC, have been incorporated into our Expected, Low Growth/High Price, and Alternate Planning Standard portfolios.

The guidelines also call for a trigger point analysis that reflects a “turning point” at which an alternate resource portfolio would be selected at different carbon cost adders levels. Because natural gas is the only supply resource applicable to LDC's any alternate resource portfolio selection would be a result of delivery methods of natural gas to customers. Conceptually, there could be differing levels of cost adders applicable to pipeline transported supply versus in service territory LNG storage gas. From a practical standpoint however, the differences in these relative cost adders would be very minor and would not change supply-side resource selection regardless of various carbon cost adder levels. We do acknowledge there is influence to the avoided costs which would impact the cost effectiveness of demand-side measures in the DSM business planning process.

## **CONSERVATION COST ADVANTAGE**

For this IRP, we also incorporated a 10 percent environmental externality factor into our assessment of the cost-effectiveness of existing demand-side management programs. Our assessment of prospective demand-side management opportunities is based on an avoided cost stream that includes this 10 percent factor.

Environmental externalities were evaluated in the IRP by adding the cost per therm equivalent of the externality cost values to supply-side resources as described in OPUC Order No. 93-965. Avista found that the environmental cost adders had no impact on the company's supply-side choices, although they did impact the level of demand-side measures that could be cost-effective to acquire.

## **REGULATORY FILING**

Avista will file revised cost-effectiveness limits (CELs) based upon the updated avoided costs available from this IRP process within the prescribed regulatory timetable.

**TABLE 3.2.1: ENVIRONMENTAL EXTERNALITIES COST ADDER ANALYSIS (2012\$)**

		2020	2025	2030	2035		
Expected Carbon Case	NOx	\$/ton	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500	
		\$/lb	\$ 1.25	\$ 1.25	\$ 1.25	\$ 1.25	
		lbs/therm	0.008	0.008	0.008	0.008	
		NOx Adder \$/therm	\$ 0.01	\$ 0.01	\$ 0.01	\$ 0.01	
		CO2	\$/ton	\$ 8.32	\$ 10.59	\$ 12.85	\$ 14.83
	\$/lb	\$ 0.0042	\$ 0.0051	\$ 0.0064	\$ 0.0074		
	lbs/therm	11.64	11.64	11.64	11.64		
	CO2 Adder \$/therm	\$ 0.05	\$ 0.06	\$ 0.07	\$ 0.09		
	Total	<b>Total Adders \$/therm</b>	<b>\$ 0.06</b>	<b>\$ 0.07</b>	<b>\$ 0.08</b>	<b>\$ 0.10</b>	
			2020	2025	2030	2035	
	High Carbon Case	NOx	\$/ton	\$ 2,500	\$ 2,500	\$ 2,500	\$ 2,500
			\$/lb	\$ 1.25	\$ 1.25	\$ 1.25	\$ 1.25
			lbs/therm	0.008	0.008	0.008	0.008
NOx Adder \$/therm			\$ 0.01	\$ 0.01	\$ 0.01	\$ 0.01	
CO2			\$/ton	\$ 16.00	\$ 20.00	\$ 25.00	\$ 27.00
\$/lb		\$ 0.0080	\$ 0.0100	\$ 0.0125	\$ 0.0135		
lbs/therm		11.64	11.64	11.64	11.64		
CO2 Adder \$/therm		\$ 0.09	\$ 0.12	\$ 0.15	\$ 0.16		
Total		<b>Total Adders \$/therm</b>	<b>\$ 0.10</b>	<b>\$ 0.13</b>	<b>\$ 0.16</b>	<b>\$ 0.17</b>	
		2020	2025	2030	2035		
Expected Carbon Low Nox		NOx	\$/ton	\$ 500	\$ 500	\$ 500	\$ 500
			\$/lb	\$ 0.25	\$ 0.25	\$ 0.25	\$ 0.25
			lbs/therm	0.008	0.008	0.008	0.008
	NOx Adder \$/therm		\$ 0.00	\$ 0.00	\$ 0.00	\$ 0.00	
	CO2		\$/ton	\$ -	\$ 5.00	\$ 5.00	\$ 5.00
	\$/lb	\$ -	\$ 0.0025	\$ 0.0025	\$ 0.0025		
	lbs/therm	11.64	11.64	11.64	11.64		
	CO2 Adder \$/therm	\$ -	\$ 0.03	\$ 0.03	\$ 0.03		
	Total	<b>Total Adders \$/therm</b>	<b>\$ 0.00</b>	<b>\$ 0.03</b>	<b>\$ 0.03</b>	<b>\$ 0.03</b>	



**APPENDIX 4.1: CURRENT TRANSPORTATION/STORAGE RATES AND ASSUMPTIONS**

<b>Rates in US\$/Dth/Day</b>				
	<u>Reservation</u>	<u>Commodity</u>	<u>Fuel Rate 3/</u>	<u>Rate Change Assumptions</u>
<b>TransCanada Alberta System Firm Rates -</b>				
Postage Stamp Rates				
AEC0/NIT to ABC	0.1910	-	0.00%	Changes every three years
AEC0/NIT to ABC Winter Only	0.2388		0.00%	Changes every three years
<b>TransCanada BC System Firm Rates -</b>				
Postage Stamp Rates				
ABC to Kingsgate	0.0897	0.0300	0.38%	Changes every three years
<b>GTN FTS-1 Rates</b>				
Mileage Based - Representative Example				
Kingsgate to Spokane	0.0949	0.0017	0.31%	Changes every five years
Kingsgate to Medford	0.3471	0.0096	1.38%	Changes every five years
Meford Lateral	0.2953	-	0.00%	Changes every five years
<b>Spectra Energy/Westcoast System Firm Rates -</b>				
Postage Stamp Rates				
Station 2 to Huntington/Sumas	0.5444	-	2.13%	Changes every three years
<b>Williams NWP</b>				
Postage Stamp Rates				
TF-1 1/	0.4100	0.03370	1.45%	Changes every five years
TF-2 1/	0.4100	0.03370	1.45%	Changes every five years
SGS-2F 2/	0.0156	0.03370	1.60%	Changes every five years
1/ TF-1 based upon annual delivery capability. TF-2 based upon approximately 32 days of delivery capability				
2/ Not applicable for WA/ID Customers				
3/ Fuel retained in-kind				

## APPENDIX 4.2: ALTERNATE SUPPLY SCENARIOS

	<u>Existing Resources</u>	<u>Existing + Expected Available</u>	<u>GTN Fully Subscribed</u>
<b>INPUT ASSUMPTIONS</b>			
<b>Resources</b>	Currently contracted capacity net of long term releases	Currently contracted capacity net of long term releases	Currently contracted capacity net of long term releases
		Currently available GTN	
		Capacity Release Recalls	Capacity Release Recalls
		NWP Expansions	NWP Expansions
		Satellite LNG	Satellite LNG
<b>Rates</b>	Current Rates	Current Rates	Current Rates



## APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

### EXPECTED PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Expected Case	AECO	2013-2014	\$ 3.26	\$ 3.65	\$ 4.18	\$ 3.34	\$ 3.44	\$ 3.42	\$ 3.37	\$ 3.38	\$ 3.37	\$ 3.30	\$ 3.33	\$ 3.18
Expected Case	AECO	2014-2015	\$ 3.28	\$ 3.26	\$ 3.34	\$ 3.38	\$ 3.48	\$ 3.36	\$ 3.35	\$ 3.39	\$ 3.45	\$ 3.49	\$ 3.54	\$ 3.61
Expected Case	AECO	2015-2016	\$ 3.78	\$ 3.91	\$ 3.96	\$ 3.88	\$ 3.93	\$ 3.73	\$ 3.60	\$ 3.61	\$ 3.62	\$ 3.45	\$ 3.36	\$ 3.38
Expected Case	AECO	2016-2017	\$ 3.52	\$ 3.45	\$ 3.45	\$ 3.49	\$ 3.54	\$ 3.40	\$ 3.37	\$ 3.39	\$ 3.40	\$ 3.40	\$ 3.42	\$ 3.46
Expected Case	AECO	2017-2018	\$ 3.60	\$ 3.61	\$ 3.62	\$ 3.62	\$ 3.59	\$ 3.38	\$ 3.31	\$ 3.28	\$ 3.25	\$ 3.23	\$ 3.25	\$ 3.27
Expected Case	AECO	2018-2019	\$ 3.48	\$ 3.40	\$ 3.25	\$ 3.28	\$ 3.36	\$ 3.22	\$ 3.18	\$ 3.16	\$ 3.19	\$ 3.18	\$ 3.21	\$ 3.25
Expected Case	AECO	2019-2020	\$ 3.46	\$ 3.46	\$ 3.24	\$ 3.32	\$ 3.45	\$ 3.32	\$ 3.28	\$ 3.30	\$ 3.31	\$ 3.32	\$ 3.32	\$ 3.39
Expected Case	AECO	2020-2021	\$ 3.53	\$ 3.47	\$ 3.33	\$ 3.40	\$ 3.57	\$ 3.57	\$ 3.57	\$ 3.60	\$ 3.59	\$ 3.62	\$ 3.67	\$ 3.72
Expected Case	AECO	2021-2022	\$ 3.84	\$ 3.89	\$ 3.96	\$ 3.95	\$ 3.85	\$ 3.60	\$ 3.54	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.63	\$ 3.68
Expected Case	AECO	2022-2023	\$ 3.95	\$ 3.97	\$ 3.94	\$ 3.93	\$ 3.91	\$ 3.71	\$ 3.58	\$ 3.55	\$ 3.55	\$ 3.56	\$ 3.65	\$ 3.71
Expected Case	AECO	2023-2024	\$ 4.02	\$ 4.11	\$ 4.22	\$ 4.26	\$ 4.26	\$ 4.04	\$ 3.92	\$ 3.89	\$ 3.88	\$ 3.90	\$ 3.99	\$ 4.05
Expected Case	AECO	2024-2025	\$ 4.34	\$ 4.43	\$ 4.50	\$ 4.48	\$ 4.45	\$ 4.26	\$ 4.23	\$ 4.22	\$ 4.21	\$ 4.23	\$ 4.30	\$ 4.37
Expected Case	AECO	2025-2026	\$ 4.61	\$ 4.69	\$ 4.67	\$ 4.70	\$ 4.70	\$ 4.47	\$ 4.40	\$ 4.37	\$ 4.36	\$ 4.38	\$ 4.45	\$ 4.50
Expected Case	AECO	2026-2027	\$ 4.79	\$ 4.85	\$ 4.73	\$ 4.67	\$ 4.76	\$ 4.45	\$ 4.39	\$ 4.36	\$ 4.36	\$ 4.38	\$ 4.44	\$ 4.49
Expected Case	AECO	2027-2028	\$ 4.83	\$ 4.86	\$ 4.71	\$ 4.67	\$ 4.71	\$ 4.48	\$ 4.44	\$ 4.42	\$ 4.42	\$ 4.44	\$ 4.52	\$ 4.58
Expected Case	AECO	2028-2029	\$ 5.05	\$ 5.12	\$ 5.24	\$ 5.32	\$ 5.30	\$ 4.98	\$ 4.92	\$ 4.88	\$ 4.86	\$ 4.87	\$ 4.93	\$ 4.98
Expected Case	AECO	2029-2030	\$ 5.32	\$ 5.37	\$ 5.36	\$ 5.24	\$ 5.21	\$ 4.84	\$ 4.72	\$ 4.69	\$ 4.68	\$ 4.69	\$ 4.78	\$ 4.85
Expected Case	AECO	2030-2031	\$ 5.42	\$ 5.50	\$ 5.40	\$ 5.27	\$ 5.30	\$ 5.04	\$ 5.01	\$ 4.98	\$ 5.02	\$ 5.04	\$ 5.12	\$ 5.20
Expected Case	AECO	2031-2032	\$ 5.67	\$ 5.39	\$ 5.45	\$ 5.47	\$ 5.65	\$ 5.42	\$ 5.39	\$ 5.31	\$ 5.20	\$ 5.20	\$ 5.39	\$ 5.44
Expected Case	AECO	2032-2033	\$ 5.73	\$ 5.59	\$ 5.70	\$ 5.73	\$ 5.87	\$ 5.67	\$ 5.66	\$ 5.61	\$ 5.53	\$ 5.53	\$ 5.75	\$ 5.80
Expected Case	Malin	2013-2014	\$ 3.62	\$ 4.53	\$ 4.69	\$ 3.81	\$ 3.83	\$ 3.82	\$ 3.78	\$ 3.77	\$ 3.77	\$ 3.71	\$ 3.74	\$ 3.61
Expected Case	Malin	2014-2015	\$ 3.71	\$ 3.75	\$ 3.79	\$ 3.83	\$ 3.82	\$ 3.76	\$ 3.74	\$ 3.79	\$ 3.86	\$ 3.90	\$ 3.96	\$ 4.03
Expected Case	Malin	2015-2016	\$ 4.25	\$ 4.43	\$ 4.49	\$ 4.39	\$ 4.30	\$ 4.16	\$ 4.04	\$ 4.01	\$ 4.03	\$ 3.89	\$ 3.85	\$ 3.83
Expected Case	Malin	2016-2017	\$ 4.04	\$ 3.99	\$ 3.97	\$ 3.97	\$ 3.93	\$ 3.88	\$ 3.91	\$ 3.92	\$ 3.93	\$ 3.96	\$ 4.00	\$ 4.00
Expected Case	Malin	2017-2018	\$ 4.17	\$ 4.17	\$ 4.16	\$ 4.12	\$ 4.02	\$ 3.92	\$ 3.91	\$ 3.85	\$ 3.83	\$ 3.87	\$ 3.92	\$ 3.90
Expected Case	Malin	2018-2019	\$ 4.08	\$ 4.00	\$ 3.85	\$ 3.82	\$ 3.83	\$ 3.81	\$ 3.82	\$ 3.81	\$ 3.84	\$ 3.86	\$ 3.92	\$ 3.96
Expected Case	Malin	2019-2020	\$ 4.09	\$ 4.05	\$ 3.79	\$ 3.79	\$ 3.91	\$ 3.93	\$ 3.89	\$ 3.91	\$ 3.94	\$ 3.98	\$ 4.00	\$ 4.04
Expected Case	Malin	2020-2021	\$ 4.20	\$ 4.14	\$ 3.83	\$ 3.88	\$ 4.06	\$ 4.22	\$ 4.15	\$ 4.19	\$ 4.24	\$ 4.27	\$ 4.35	\$ 4.40
Expected Case	Malin	2021-2022	\$ 4.55	\$ 4.49	\$ 4.41	\$ 4.30	\$ 4.27	\$ 4.16	\$ 4.13	\$ 4.11	\$ 4.11	\$ 4.15	\$ 4.29	\$ 4.34
Expected Case	Malin	2022-2023	\$ 4.63	\$ 4.54	\$ 4.45	\$ 4.45	\$ 4.45	\$ 4.35	\$ 4.21	\$ 4.13	\$ 4.14	\$ 4.15	\$ 4.36	\$ 4.42
Expected Case	Malin	2023-2024	\$ 4.76	\$ 4.68	\$ 4.72	\$ 4.64	\$ 4.79	\$ 4.69	\$ 4.51	\$ 4.49	\$ 4.51	\$ 4.56	\$ 4.66	\$ 4.72
Expected Case	Malin	2024-2025	\$ 5.05	\$ 5.02	\$ 5.00	\$ 4.83	\$ 4.93	\$ 4.90	\$ 4.86	\$ 4.83	\$ 4.90	\$ 4.92	\$ 5.01	\$ 5.05
Expected Case	Malin	2025-2026	\$ 5.33	\$ 5.27	\$ 5.22	\$ 5.20	\$ 5.28	\$ 5.14	\$ 5.05	\$ 5.02	\$ 5.08	\$ 5.10	\$ 5.21	\$ 5.24
Expected Case	Malin	2026-2027	\$ 5.52	\$ 5.53	\$ 5.28	\$ 5.09	\$ 5.24	\$ 5.11	\$ 5.05	\$ 5.03	\$ 5.04	\$ 5.08	\$ 5.15	\$ 5.22
Expected Case	Malin	2027-2028	\$ 5.56	\$ 5.48	\$ 5.26	\$ 5.16	\$ 5.26	\$ 5.14	\$ 5.08	\$ 5.08	\$ 5.10	\$ 5.17	\$ 5.25	\$ 5.31
Expected Case	Malin	2028-2029	\$ 5.78	\$ 5.69	\$ 5.80	\$ 5.72	\$ 5.68	\$ 5.54	\$ 5.51	\$ 5.47	\$ 5.52	\$ 5.55	\$ 5.63	\$ 5.68
Expected Case	Malin	2029-2030	\$ 6.01	\$ 5.94	\$ 5.88	\$ 5.68	\$ 5.64	\$ 5.47	\$ 5.37	\$ 5.34	\$ 5.36	\$ 5.42	\$ 5.52	\$ 5.58
Expected Case	Malin	2030-2031	\$ 6.14	\$ 6.08	\$ 5.98	\$ 5.75	\$ 5.73	\$ 5.65	\$ 5.64	\$ 5.62	\$ 5.69	\$ 5.75	\$ 5.85	\$ 5.91
Expected Case	Malin	2031-2032	\$ 6.37	\$ 6.02	\$ 5.95	\$ 5.97	\$ 6.07	\$ 5.90	\$ 5.85	\$ 5.77	\$ 5.65	\$ 5.67	\$ 5.89	\$ 5.99
Expected Case	Malin	2032-2033	\$ 6.26	\$ 6.12	\$ 6.23	\$ 6.25	\$ 6.29	\$ 6.14	\$ 6.13	\$ 6.06	\$ 5.99	\$ 6.01	\$ 6.26	\$ 6.35
Expected Case	Rockies	2013-2014	\$ 3.53	\$ 4.56	\$ 4.66	\$ 3.77	\$ 3.79	\$ 3.77	\$ 3.75	\$ 3.74	\$ 3.73	\$ 3.67	\$ 3.70	\$ 3.57
Expected Case	Rockies	2014-2015	\$ 3.67	\$ 3.72	\$ 3.76	\$ 3.80	\$ 3.78	\$ 3.71	\$ 3.71	\$ 3.76	\$ 3.82	\$ 3.86	\$ 3.91	\$ 3.96
Expected Case	Rockies	2015-2016	\$ 4.17	\$ 4.39	\$ 4.45	\$ 4.36	\$ 4.26	\$ 4.12	\$ 4.01	\$ 3.98	\$ 3.99	\$ 3.85	\$ 3.80	\$ 3.78
Expected Case	Rockies	2016-2017	\$ 3.95	\$ 3.95	\$ 3.93	\$ 3.93	\$ 3.89	\$ 3.83	\$ 3.83	\$ 3.82	\$ 3.83	\$ 3.85	\$ 3.88	\$ 3.89
Expected Case	Rockies	2017-2018	\$ 4.07	\$ 4.13	\$ 4.12	\$ 4.08	\$ 3.98	\$ 3.84	\$ 3.81	\$ 3.75	\$ 3.73	\$ 3.72	\$ 3.77	\$ 3.75
Expected Case	Rockies	2018-2019	\$ 3.92	\$ 3.95	\$ 3.81	\$ 3.77	\$ 3.78	\$ 3.72	\$ 3.69	\$ 3.68	\$ 3.68	\$ 3.71	\$ 3.76	\$ 3.76
Expected Case	Rockies	2019-2020	\$ 3.84	\$ 3.91	\$ 3.75	\$ 3.75	\$ 3.77	\$ 3.71	\$ 3.70	\$ 3.72	\$ 3.73	\$ 3.75	\$ 3.78	\$ 3.81
Expected Case	Rockies	2020-2021	\$ 3.90	\$ 3.98	\$ 3.78	\$ 3.80	\$ 3.82	\$ 3.87	\$ 3.94	\$ 3.92	\$ 4.00	\$ 4.03	\$ 4.09	\$ 4.11
Expected Case	Rockies	2021-2022	\$ 4.15	\$ 4.25	\$ 4.21	\$ 4.12	\$ 3.92	\$ 3.78	\$ 3.75	\$ 3.73	\$ 3.73	\$ 3.75	\$ 3.85	\$ 3.88
Expected Case	Rockies	2022-2023	\$ 4.13	\$ 4.14	\$ 4.15	\$ 4.11	\$ 4.04	\$ 3.94	\$ 3.83	\$ 3.80	\$ 3.82	\$ 3.84	\$ 3.93	\$ 3.99
Expected Case	Rockies	2023-2024	\$ 4.22	\$ 4.29	\$ 4.32	\$ 4.30	\$ 4.25	\$ 4.15	\$ 4.03	\$ 3.98	\$ 4.00	\$ 4.01	\$ 4.10	\$ 4.21
Expected Case	Rockies	2024-2025	\$ 4.43	\$ 4.50	\$ 4.72	\$ 4.72	\$ 4.61	\$ 4.52	\$ 4.53	\$ 4.50	\$ 4.55	\$ 4.57	\$ 4.62	\$ 4.66
Expected Case	Rockies	2025-2026	\$ 4.85	\$ 4.88	\$ 4.90	\$ 4.90	\$ 4.84	\$ 4.73	\$ 4.67	\$ 4.64	\$ 4.67	\$ 4.69	\$ 4.75	\$ 4.83
Expected Case	Rockies	2026-2027	\$ 4.97	\$ 5.02	\$ 5.10	\$ 5.00	\$ 4.96	\$ 4.86	\$ 4.83	\$ 4.81	\$ 4.84	\$ 4.85	\$ 4.92	\$ 4.97
Expected Case	Rockies	2027-2028	\$ 5.19	\$ 5.24	\$ 5.10	\$ 5.07	\$ 4.99	\$ 4.89	\$ 4.88	\$ 4.85	\$ 4.88	\$ 4.91	\$ 4.99	\$ 5.05
Expected Case	Rockies	2028-2029	\$ 5.39	\$ 5.45	\$ 5.50	\$ 5.43	\$ 5.36	\$ 5.24	\$ 5.22	\$ 5.15	\$ 5.18	\$ 5.21	\$ 5.27	\$ 5.29
Expected Case	Rockies	2029-2030	\$ 5.54	\$ 5.56	\$ 5.55	\$ 5.44	\$ 5.28	\$ 5.16	\$ 5.05	\$ 5.02	\$ 5.05	\$ 5.08	\$ 5.17	\$ 5.24
Expected Case	Rockies	2030-2031	\$ 5.58	\$ 5.65	\$ 5.61	\$ 5.52	\$ 5.36	\$ 5.27	\$ 5.26	\$ 5.24	\$ 5.31	\$ 5.36	\$ 5.44	\$ 5.47
Expected Case	Rockies	2031-2032	\$ 5.81	\$ 5.64	\$ 5.53	\$ 5.55	\$ 5.62	\$ 5.49	\$ 5.44	\$ 5.35	\$ 5.25	\$ 5.26	\$ 5.47	\$ 5.54
Expected Case	Rockies	2032-2033	\$ 5.76	\$ 5.67	\$ 5.76	\$ 5.78	\$ 5.81	\$ 5.71	\$ 5.69	\$ 5.61	\$ 5.55	\$ 5.56	\$ 5.79	\$ 5.86

## APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

### EXPECTED PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Expected Case	Stanfield	2013-2014	\$ 3.60	\$ 4.56	\$ 4.66	\$ 3.72	\$ 3.76	\$ 3.73	\$ 3.72	\$ 3.73	\$ 3.73	\$ 3.67	\$ 3.69	\$ 3.53
Expected Case	Stanfield	2014-2015	\$ 3.67	\$ 3.66	\$ 3.72	\$ 3.76	\$ 3.78	\$ 3.67	\$ 3.71	\$ 3.75	\$ 3.81	\$ 3.85	\$ 3.90	\$ 3.94
Expected Case	Stanfield	2015-2016	\$ 4.17	\$ 4.43	\$ 4.49	\$ 4.39	\$ 4.24	\$ 4.08	\$ 3.96	\$ 3.97	\$ 3.99	\$ 3.82	\$ 3.77	\$ 3.74
Expected Case	Stanfield	2016-2017	\$ 3.95	\$ 3.99	\$ 3.97	\$ 3.88	\$ 3.85	\$ 3.78	\$ 3.78	\$ 3.78	\$ 3.79	\$ 3.81	\$ 3.85	\$ 3.87
Expected Case	Stanfield	2017-2018	\$ 4.15	\$ 4.18	\$ 4.17	\$ 4.03	\$ 3.94	\$ 3.79	\$ 3.76	\$ 3.69	\$ 3.68	\$ 3.69	\$ 3.73	\$ 3.71
Expected Case	Stanfield	2018-2019	\$ 4.04	\$ 4.00	\$ 3.85	\$ 3.83	\$ 3.75	\$ 3.76	\$ 3.64	\$ 3.62	\$ 3.65	\$ 3.66	\$ 3.71	\$ 3.85
Expected Case	Stanfield	2019-2020	\$ 3.91	\$ 4.04	\$ 3.79	\$ 3.70	\$ 3.82	\$ 3.75	\$ 3.71	\$ 3.72	\$ 3.76	\$ 3.78	\$ 3.80	\$ 3.84
Expected Case	Stanfield	2020-2021	\$ 4.01	\$ 4.07	\$ 3.84	\$ 3.79	\$ 3.96	\$ 4.02	\$ 3.98	\$ 4.01	\$ 4.04	\$ 4.07	\$ 4.15	\$ 4.19
Expected Case	Stanfield	2021-2022	\$ 4.45	\$ 4.48	\$ 4.46	\$ 4.36	\$ 4.17	\$ 4.00	\$ 3.96	\$ 3.93	\$ 3.93	\$ 3.95	\$ 4.09	\$ 4.13
Expected Case	Stanfield	2022-2023	\$ 4.56	\$ 4.54	\$ 4.35	\$ 4.35	\$ 4.28	\$ 4.15	\$ 4.03	\$ 4.01	\$ 4.01	\$ 4.02	\$ 4.13	\$ 4.18
Expected Case	Stanfield	2023-2024	\$ 4.65	\$ 4.68	\$ 4.74	\$ 4.57	\$ 4.64	\$ 4.48	\$ 4.34	\$ 4.31	\$ 4.30	\$ 4.32	\$ 4.45	\$ 4.51
Expected Case	Stanfield	2024-2025	\$ 4.97	\$ 5.02	\$ 4.90	\$ 4.78	\$ 4.81	\$ 4.70	\$ 4.69	\$ 4.65	\$ 4.67	\$ 4.69	\$ 4.78	\$ 4.83
Expected Case	Stanfield	2025-2026	\$ 5.24	\$ 5.27	\$ 5.24	\$ 5.10	\$ 5.10	\$ 4.93	\$ 4.85	\$ 4.82	\$ 4.85	\$ 4.86	\$ 4.96	\$ 5.11
Expected Case	Stanfield	2026-2027	\$ 5.42	\$ 5.47	\$ 5.30	\$ 5.05	\$ 5.13	\$ 5.02	\$ 4.86	\$ 4.83	\$ 4.84	\$ 4.86	\$ 4.92	\$ 5.12
Expected Case	Stanfield	2027-2028	\$ 5.45	\$ 5.48	\$ 5.27	\$ 5.06	\$ 5.11	\$ 5.05	\$ 4.89	\$ 4.88	\$ 4.90	\$ 4.93	\$ 5.01	\$ 5.20
Expected Case	Stanfield	2028-2029	\$ 5.67	\$ 5.69	\$ 5.82	\$ 5.79	\$ 5.61	\$ 5.39	\$ 5.34	\$ 5.29	\$ 5.32	\$ 5.34	\$ 5.42	\$ 5.46
Expected Case	Stanfield	2029-2030	\$ 5.95	\$ 5.96	\$ 5.94	\$ 5.74	\$ 5.54	\$ 5.41	\$ 5.17	\$ 5.14	\$ 5.14	\$ 5.18	\$ 5.28	\$ 5.48
Expected Case	Stanfield	2030-2031	\$ 6.06	\$ 6.11	\$ 6.00	\$ 5.82	\$ 5.66	\$ 5.59	\$ 5.46	\$ 5.44	\$ 5.48	\$ 5.53	\$ 5.61	\$ 5.68
Expected Case	Stanfield	2031-2032	\$ 6.31	\$ 6.02	\$ 5.94	\$ 5.97	\$ 6.06	\$ 5.74	\$ 5.69	\$ 5.60	\$ 5.48	\$ 5.48	\$ 5.69	\$ 5.80
Expected Case	Stanfield	2032-2033	\$ 6.25	\$ 6.11	\$ 6.22	\$ 6.24	\$ 6.29	\$ 5.98	\$ 6.08	\$ 5.89	\$ 5.81	\$ 5.82	\$ 6.07	\$ 6.16
Expected Case	Sumas	2013-2014	\$ 3.93	\$ 5.31	\$ 4.68	\$ 3.87	\$ 3.83	\$ 3.60	\$ 3.66	\$ 3.60	\$ 3.63	\$ 3.50	\$ 3.56	\$ 3.40
Expected Case	Sumas	2014-2015	\$ 3.82	\$ 3.97	\$ 3.98	\$ 3.91	\$ 3.82	\$ 3.55	\$ 3.65	\$ 3.61	\$ 3.67	\$ 3.67	\$ 3.78	\$ 3.84
Expected Case	Sumas	2015-2016	\$ 4.33	\$ 4.65	\$ 4.66	\$ 4.46	\$ 4.30	\$ 3.92	\$ 3.91	\$ 3.83	\$ 3.84	\$ 3.64	\$ 3.61	\$ 3.62
Expected Case	Sumas	2016-2017	\$ 4.11	\$ 4.21	\$ 4.14	\$ 4.04	\$ 3.93	\$ 3.59	\$ 3.68	\$ 3.64	\$ 3.65	\$ 3.59	\$ 3.67	\$ 3.75
Expected Case	Sumas	2017-2018	\$ 4.22	\$ 4.39	\$ 4.34	\$ 4.20	\$ 4.03	\$ 3.65	\$ 3.63	\$ 3.54	\$ 3.51	\$ 3.43	\$ 3.50	\$ 3.58
Expected Case	Sumas	2018-2019	\$ 4.11	\$ 4.22	\$ 4.02	\$ 3.90	\$ 3.84	\$ 3.50	\$ 3.48	\$ 3.43	\$ 3.46	\$ 3.42	\$ 3.45	\$ 3.47
Expected Case	Sumas	2019-2020	\$ 3.94	\$ 4.26	\$ 3.96	\$ 3.86	\$ 3.79	\$ 3.50	\$ 3.58	\$ 3.56	\$ 3.58	\$ 3.56	\$ 3.56	\$ 3.60
Expected Case	Sumas	2020-2021	\$ 4.01	\$ 4.29	\$ 4.00	\$ 3.95	\$ 3.95	\$ 3.75	\$ 3.86	\$ 3.86	\$ 3.85	\$ 3.85	\$ 3.90	\$ 3.92
Expected Case	Sumas	2021-2022	\$ 4.52	\$ 4.70	\$ 4.63	\$ 4.43	\$ 4.22	\$ 3.80	\$ 3.85	\$ 3.79	\$ 3.79	\$ 3.77	\$ 3.88	\$ 3.91
Expected Case	Sumas	2022-2023	\$ 4.63	\$ 4.76	\$ 4.62	\$ 4.37	\$ 4.18	\$ 3.92	\$ 3.86	\$ 3.79	\$ 3.84	\$ 3.78	\$ 3.90	\$ 3.95
Expected Case	Sumas	2023-2024	\$ 4.50	\$ 4.90	\$ 4.91	\$ 4.65	\$ 4.58	\$ 4.29	\$ 4.22	\$ 4.16	\$ 4.19	\$ 4.13	\$ 4.26	\$ 4.33
Expected Case	Sumas	2024-2025	\$ 4.81	\$ 5.23	\$ 5.18	\$ 4.87	\$ 4.76	\$ 4.51	\$ 4.53	\$ 4.48	\$ 4.51	\$ 4.46	\$ 4.57	\$ 4.65
Expected Case	Sumas	2025-2026	\$ 5.08	\$ 5.49	\$ 5.41	\$ 5.27	\$ 5.05	\$ 4.72	\$ 4.69	\$ 4.63	\$ 4.66	\$ 4.61	\$ 4.72	\$ 4.74
Expected Case	Sumas	2026-2027	\$ 5.26	\$ 5.69	\$ 5.47	\$ 5.22	\$ 5.07	\$ 4.68	\$ 4.70	\$ 4.63	\$ 4.67	\$ 4.63	\$ 4.72	\$ 4.75
Expected Case	Sumas	2027-2028	\$ 5.31	\$ 5.70	\$ 5.44	\$ 5.23	\$ 5.05	\$ 4.71	\$ 4.72	\$ 4.67	\$ 4.71	\$ 4.70	\$ 4.78	\$ 4.81
Expected Case	Sumas	2028-2029	\$ 5.74	\$ 5.91	\$ 5.99	\$ 5.86	\$ 5.68	\$ 5.23	\$ 5.24	\$ 5.14	\$ 5.19	\$ 5.18	\$ 5.24	\$ 5.26
Expected Case	Sumas	2029-2030	\$ 6.02	\$ 6.25	\$ 6.31	\$ 5.81	\$ 5.64	\$ 5.08	\$ 5.02	\$ 4.94	\$ 4.99	\$ 4.97	\$ 5.06	\$ 5.12
Expected Case	Sumas	2030-2031	\$ 6.13	\$ 6.39	\$ 6.47	\$ 5.89	\$ 5.76	\$ 5.28	\$ 5.32	\$ 5.24	\$ 5.35	\$ 5.34	\$ 5.42	\$ 5.47
Expected Case	Sumas	2031-2032	\$ 6.38	\$ 6.41	\$ 6.16	\$ 6.19	\$ 6.11	\$ 5.58	\$ 5.45	\$ 5.19	\$ 5.34	\$ 5.33	\$ 5.50	\$ 5.62
Expected Case	Sumas	2032-2033	\$ 6.30	\$ 6.43	\$ 6.55	\$ 6.58	\$ 6.34	\$ 5.83	\$ 5.73	\$ 5.49	\$ 5.67	\$ 5.67	\$ 5.87	\$ 5.98

## APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

### HIGH GROWTH LOW PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
High Growth & Low Prices	AECO	2013-2014	\$ 3.44	\$ 3.35	\$ 3.36	\$ 3.38	\$ 3.50	\$ 3.48	\$ 3.44	\$ 3.45	\$ 3.43	\$ 3.42	\$ 3.45	\$ 3.47
High Growth & Low Prices	AECO	2014-2015	\$ 3.50	\$ 3.43	\$ 3.55	\$ 3.56	\$ 3.70	\$ 3.63	\$ 3.56	\$ 3.55	\$ 3.52	\$ 3.51	\$ 3.55	\$ 3.61
High Growth & Low Prices	AECO	2015-2016	\$ 3.63	\$ 3.54	\$ 3.45	\$ 3.46	\$ 3.62	\$ 3.55	\$ 3.49	\$ 3.51	\$ 3.48	\$ 3.45	\$ 3.46	\$ 3.50
High Growth & Low Prices	AECO	2016-2017	\$ 3.54	\$ 3.45	\$ 3.41	\$ 3.43	\$ 3.54	\$ 3.44	\$ 3.37	\$ 3.37	\$ 3.35	\$ 3.34	\$ 3.36	\$ 3.41
High Growth & Low Prices	AECO	2017-2018	\$ 3.42	\$ 3.31	\$ 3.30	\$ 3.29	\$ 3.40	\$ 3.33	\$ 3.28	\$ 3.28	\$ 3.26	\$ 3.24	\$ 3.25	\$ 3.29
High Growth & Low Prices	AECO	2018-2019	\$ 3.40	\$ 3.27	\$ 3.11	\$ 3.12	\$ 3.31	\$ 3.22	\$ 3.17	\$ 3.14	\$ 3.12	\$ 3.10	\$ 3.12	\$ 3.17
High Growth & Low Prices	AECO	2019-2020	\$ 3.30	\$ 3.18	\$ 3.06	\$ 3.11	\$ 3.37	\$ 3.28	\$ 3.21	\$ 3.18	\$ 3.14	\$ 3.13	\$ 3.15	\$ 3.20
High Growth & Low Prices	AECO	2020-2021	\$ 3.28	\$ 3.13	\$ 3.12	\$ 3.16	\$ 3.38	\$ 3.28	\$ 3.20	\$ 3.16	\$ 3.08	\$ 3.07	\$ 3.13	\$ 3.18
High Growth & Low Prices	AECO	2021-2022	\$ 3.27	\$ 3.24	\$ 3.32	\$ 3.36	\$ 3.48	\$ 3.38	\$ 3.31	\$ 3.25	\$ 3.22	\$ 3.21	\$ 3.29	\$ 3.34
High Growth & Low Prices	AECO	2022-2023	\$ 3.39	\$ 3.32	\$ 3.20	\$ 3.19	\$ 3.32	\$ 3.19	\$ 3.05	\$ 2.99	\$ 2.96	\$ 2.94	\$ 3.01	\$ 3.06
High Growth & Low Prices	AECO	2023-2024	\$ 3.27	\$ 3.25	\$ 3.24	\$ 3.27	\$ 3.43	\$ 3.31	\$ 3.18	\$ 3.11	\$ 3.06	\$ 3.05	\$ 3.14	\$ 3.18
High Growth & Low Prices	AECO	2024-2025	\$ 3.29	\$ 3.31	\$ 3.39	\$ 3.37	\$ 3.50	\$ 3.39	\$ 3.33	\$ 3.28	\$ 3.22	\$ 3.22	\$ 3.30	\$ 3.35
High Growth & Low Prices	AECO	2025-2026	\$ 3.44	\$ 3.42	\$ 3.31	\$ 3.33	\$ 3.48	\$ 3.35	\$ 3.24	\$ 3.17	\$ 3.13	\$ 3.12	\$ 3.20	\$ 3.25
High Growth & Low Prices	AECO	2026-2027	\$ 3.40	\$ 3.39	\$ 3.23	\$ 3.15	\$ 3.45	\$ 3.24	\$ 3.16	\$ 3.08	\$ 3.05	\$ 3.04	\$ 3.13	\$ 3.18
High Growth & Low Prices	AECO	2027-2028	\$ 3.35	\$ 3.32	\$ 3.07	\$ 3.04	\$ 3.32	\$ 3.16	\$ 3.09	\$ 3.03	\$ 2.98	\$ 2.98	\$ 3.05	\$ 3.11
High Growth & Low Prices	AECO	2028-2029	\$ 3.33	\$ 3.30	\$ 3.30	\$ 3.36	\$ 3.58	\$ 3.37	\$ 3.31	\$ 3.24	\$ 3.20	\$ 3.18	\$ 3.24	\$ 3.28
High Growth & Low Prices	AECO	2029-2030	\$ 3.44	\$ 3.44	\$ 3.42	\$ 3.31	\$ 3.63	\$ 3.34	\$ 3.26	\$ 3.19	\$ 3.15	\$ 3.13	\$ 3.19	\$ 3.26
High Growth & Low Prices	AECO	2030-2031	\$ 3.57	\$ 3.52	\$ 3.32	\$ 3.22	\$ 3.61	\$ 3.41	\$ 3.36	\$ 3.29	\$ 3.28	\$ 3.27	\$ 3.34	\$ 3.39
High Growth & Low Prices	AECO	2031-2032	\$ 3.55	\$ 3.31	\$ 3.27	\$ 3.28	\$ 3.44	\$ 3.28	\$ 3.27	\$ 3.19	\$ 3.08	\$ 3.07	\$ 3.21	\$ 3.26
High Growth & Low Prices	AECO	2032-2033	\$ 3.37	\$ 3.31	\$ 3.31	\$ 3.30	\$ 3.45	\$ 3.28	\$ 3.27	\$ 3.22	\$ 3.10	\$ 3.08	\$ 3.24	\$ 3.31
High Growth & Low Prices	Malin	2013-2014	\$ 3.90	\$ 3.87	\$ 3.85	\$ 3.85	\$ 3.88	\$ 3.88	\$ 3.85	\$ 3.84	\$ 3.84	\$ 3.83	\$ 3.86	\$ 3.91
High Growth & Low Prices	Malin	2014-2015	\$ 3.93	\$ 3.93	\$ 4.00	\$ 4.01	\$ 4.04	\$ 4.03	\$ 3.96	\$ 3.95	\$ 3.93	\$ 3.92	\$ 3.97	\$ 4.02
High Growth & Low Prices	Malin	2015-2016	\$ 4.09	\$ 4.06	\$ 3.98	\$ 3.97	\$ 3.99	\$ 3.99	\$ 3.93	\$ 3.90	\$ 3.89	\$ 3.89	\$ 3.94	\$ 3.96
High Growth & Low Prices	Malin	2016-2017	\$ 4.07	\$ 3.98	\$ 3.92	\$ 3.91	\$ 3.93	\$ 3.91	\$ 3.91	\$ 3.89	\$ 3.89	\$ 3.89	\$ 3.94	\$ 3.94
High Growth & Low Prices	Malin	2017-2018	\$ 3.99	\$ 3.88	\$ 3.84	\$ 3.80	\$ 3.83	\$ 3.87	\$ 3.87	\$ 3.85	\$ 3.84	\$ 3.87	\$ 3.92	\$ 3.92
High Growth & Low Prices	Malin	2018-2019	\$ 4.01	\$ 3.86	\$ 3.70	\$ 3.66	\$ 3.78	\$ 3.81	\$ 3.81	\$ 3.79	\$ 3.77	\$ 3.79	\$ 3.82	\$ 3.87
High Growth & Low Prices	Malin	2019-2020	\$ 3.93	\$ 3.77	\$ 3.61	\$ 3.59	\$ 3.83	\$ 3.89	\$ 3.82	\$ 3.79	\$ 3.78	\$ 3.78	\$ 3.82	\$ 3.86
High Growth & Low Prices	Malin	2020-2021	\$ 3.95	\$ 3.80	\$ 3.63	\$ 3.63	\$ 3.87	\$ 3.93	\$ 3.78	\$ 3.74	\$ 3.73	\$ 3.73	\$ 3.81	\$ 3.86
High Growth & Low Prices	Malin	2021-2022	\$ 3.98	\$ 3.84	\$ 3.76	\$ 3.71	\$ 3.89	\$ 3.95	\$ 3.90	\$ 3.84	\$ 3.82	\$ 3.84	\$ 3.95	\$ 4.00
High Growth & Low Prices	Malin	2022-2023	\$ 4.06	\$ 3.88	\$ 3.71	\$ 3.71	\$ 3.86	\$ 3.83	\$ 3.69	\$ 3.57	\$ 3.55	\$ 3.53	\$ 3.72	\$ 3.76
High Growth & Low Prices	Malin	2023-2024	\$ 4.00	\$ 3.82	\$ 3.75	\$ 3.66	\$ 3.96	\$ 3.96	\$ 3.77	\$ 3.71	\$ 3.69	\$ 3.71	\$ 3.82	\$ 3.85
High Growth & Low Prices	Malin	2024-2025	\$ 4.01	\$ 3.89	\$ 3.89	\$ 3.72	\$ 3.98	\$ 4.03	\$ 3.96	\$ 3.89	\$ 3.91	\$ 3.91	\$ 4.01	\$ 4.03
High Growth & Low Prices	Malin	2025-2026	\$ 4.16	\$ 4.00	\$ 3.86	\$ 3.83	\$ 4.06	\$ 4.01	\$ 3.89	\$ 3.83	\$ 3.84	\$ 3.84	\$ 3.96	\$ 4.00
High Growth & Low Prices	Malin	2026-2027	\$ 4.14	\$ 4.07	\$ 3.77	\$ 3.58	\$ 3.94	\$ 3.90	\$ 3.82	\$ 3.74	\$ 3.74	\$ 3.75	\$ 3.84	\$ 3.91
High Growth & Low Prices	Malin	2027-2028	\$ 4.09	\$ 3.94	\$ 3.62	\$ 3.52	\$ 3.87	\$ 3.82	\$ 3.74	\$ 3.69	\$ 3.66	\$ 3.70	\$ 3.78	\$ 3.84
High Growth & Low Prices	Malin	2028-2029	\$ 4.06	\$ 3.88	\$ 3.86	\$ 3.77	\$ 3.97	\$ 3.93	\$ 3.90	\$ 3.84	\$ 3.87	\$ 3.85	\$ 3.93	\$ 3.98
High Growth & Low Prices	Malin	2029-2030	\$ 4.13	\$ 4.00	\$ 3.94	\$ 3.75	\$ 4.06	\$ 3.97	\$ 3.91	\$ 3.84	\$ 3.83	\$ 3.87	\$ 3.94	\$ 3.98
High Growth & Low Prices	Malin	2030-2031	\$ 4.29	\$ 4.11	\$ 3.90	\$ 3.70	\$ 4.04	\$ 4.02	\$ 4.00	\$ 3.93	\$ 3.94	\$ 3.98	\$ 4.06	\$ 4.09
High Growth & Low Prices	Malin	2031-2032	\$ 4.25	\$ 3.95	\$ 3.77	\$ 3.78	\$ 3.86	\$ 3.76	\$ 3.73	\$ 3.65	\$ 3.54	\$ 3.53	\$ 3.71	\$ 3.82
High Growth & Low Prices	Malin	2032-2033	\$ 3.90	\$ 3.85	\$ 3.83	\$ 3.83	\$ 3.87	\$ 3.75	\$ 3.74	\$ 3.67	\$ 3.56	\$ 3.56	\$ 3.76	\$ 3.86
High Growth & Low Prices	Rockies	2013-2014	\$ 3.86	\$ 3.84	\$ 3.82	\$ 3.81	\$ 3.85	\$ 3.83	\$ 3.82	\$ 3.81	\$ 3.80	\$ 3.79	\$ 3.81	\$ 3.86
High Growth & Low Prices	Rockies	2014-2015	\$ 3.89	\$ 3.89	\$ 3.97	\$ 3.97	\$ 4.01	\$ 3.97	\$ 3.93	\$ 3.92	\$ 3.89	\$ 3.88	\$ 3.93	\$ 3.95
High Growth & Low Prices	Rockies	2015-2016	\$ 4.02	\$ 4.02	\$ 3.94	\$ 3.94	\$ 3.95	\$ 3.95	\$ 3.90	\$ 3.87	\$ 3.84	\$ 3.84	\$ 3.89	\$ 3.91
High Growth & Low Prices	Rockies	2016-2017	\$ 3.98	\$ 3.94	\$ 3.89	\$ 3.87	\$ 3.90	\$ 3.86	\$ 3.83	\$ 3.80	\$ 3.79	\$ 3.78	\$ 3.82	\$ 3.84
High Growth & Low Prices	Rockies	2017-2018	\$ 3.89	\$ 3.83	\$ 3.80	\$ 3.76	\$ 3.79	\$ 3.79	\$ 3.78	\$ 3.75	\$ 3.74	\$ 3.73	\$ 3.77	\$ 3.77
High Growth & Low Prices	Rockies	2018-2019	\$ 3.85	\$ 3.81	\$ 3.66	\$ 3.61	\$ 3.73	\$ 3.73	\$ 3.68	\$ 3.65	\$ 3.61	\$ 3.64	\$ 3.67	\$ 3.68
High Growth & Low Prices	Rockies	2019-2020	\$ 3.68	\$ 3.63	\$ 3.57	\$ 3.54	\$ 3.69	\$ 3.67	\$ 3.62	\$ 3.60	\$ 3.57	\$ 3.56	\$ 3.60	\$ 3.62
High Growth & Low Prices	Rockies	2020-2021	\$ 3.65	\$ 3.65	\$ 3.57	\$ 3.55	\$ 3.63	\$ 3.58	\$ 3.57	\$ 3.48	\$ 3.49	\$ 3.48	\$ 3.54	\$ 3.57
High Growth & Low Prices	Rockies	2021-2022	\$ 3.58	\$ 3.61	\$ 3.57	\$ 3.52	\$ 3.54	\$ 3.57	\$ 3.52	\$ 3.46	\$ 3.44	\$ 3.44	\$ 3.52	\$ 3.54
High Growth & Low Prices	Rockies	2022-2023	\$ 3.56	\$ 3.49	\$ 3.41	\$ 3.37	\$ 3.45	\$ 3.41	\$ 3.30	\$ 3.24	\$ 3.23	\$ 3.22	\$ 3.29	\$ 3.33
High Growth & Low Prices	Rockies	2023-2024	\$ 3.46	\$ 3.43	\$ 3.35	\$ 3.31	\$ 3.42	\$ 3.42	\$ 3.29	\$ 3.20	\$ 3.18	\$ 3.17	\$ 3.26	\$ 3.34
High Growth & Low Prices	Rockies	2024-2025	\$ 3.38	\$ 3.38	\$ 3.61	\$ 3.62	\$ 3.66	\$ 3.65	\$ 3.63	\$ 3.56	\$ 3.56	\$ 3.56	\$ 3.62	\$ 3.64
High Growth & Low Prices	Rockies	2025-2026	\$ 3.68	\$ 3.61	\$ 3.53	\$ 3.52	\$ 3.61	\$ 3.60	\$ 3.51	\$ 3.44	\$ 3.44	\$ 3.43	\$ 3.50	\$ 3.58
High Growth & Low Prices	Rockies	2026-2027	\$ 3.59	\$ 3.57	\$ 3.59	\$ 3.48	\$ 3.66	\$ 3.65	\$ 3.60	\$ 3.52	\$ 3.53	\$ 3.52	\$ 3.61	\$ 3.65
High Growth & Low Prices	Rockies	2027-2028	\$ 3.71	\$ 3.70	\$ 3.47	\$ 3.43	\$ 3.60	\$ 3.57	\$ 3.53	\$ 3.45	\$ 3.45	\$ 3.45	\$ 3.52	\$ 3.58
High Growth & Low Prices	Rockies	2028-2029	\$ 3.67	\$ 3.63	\$ 3.56	\$ 3.47	\$ 3.65	\$ 3.64	\$ 3.61	\$ 3.51	\$ 3.52	\$ 3.52	\$ 3.58	\$ 3.59
High Growth & Low Prices	Rockies	2029-2030	\$ 3.66	\$ 3.63	\$ 3.61	\$ 3.51	\$ 3.70	\$ 3.66	\$ 3.59	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.58	\$ 3.64
High Growth & Low Prices	Rockies	2030-2031	\$ 3.73	\$ 3.67	\$ 3.53	\$ 3.46	\$ 3.67	\$ 3.64	\$ 3.61	\$ 3.54	\$ 3.56	\$ 3.59	\$ 3.65	\$ 3.66
High Growth & Low Prices	Rockies	2031-2032	\$ 3.68	\$ 3.56	\$ 3.36	\$ 3.36	\$ 3.42	\$ 3.35	\$ 3.32	\$ 3.23	\$ 3.13	\$ 3.12	\$ 3.29	\$ 3.36
High Growth & Low Prices	Rockies	2032-2033	\$ 3.40	\$ 3.39	\$ 3.36	\$ 3.36	\$ 3.38	\$ 3.32	\$ 3.30	\$ 3.22	\$ 3.13	\$ 3.11	\$ 3.29	\$ 3.37

## APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

### HIGH GROWTH LOW PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
High Growth & Low Prices	Stanfield	2013-2014	\$ 3.82	\$ 3.87	\$ 3.85	\$ 3.76	\$ 3.81	\$ 3.79	\$ 3.80	\$ 3.81	\$ 3.79	\$ 3.79	\$ 3.81	\$ 3.82
High Growth & Low Prices	Stanfield	2014-2015	\$ 3.89	\$ 3.83	\$ 3.93	\$ 3.94	\$ 4.01	\$ 3.94	\$ 3.92	\$ 3.91	\$ 3.89	\$ 3.87	\$ 3.91	\$ 3.93
High Growth & Low Prices	Stanfield	2015-2016	\$ 4.02	\$ 4.06	\$ 3.98	\$ 3.98	\$ 3.93	\$ 3.90	\$ 3.85	\$ 3.87	\$ 3.84	\$ 3.81	\$ 3.86	\$ 3.87
High Growth & Low Prices	Stanfield	2016-2017	\$ 3.97	\$ 3.99	\$ 3.93	\$ 3.82	\$ 3.86	\$ 3.82	\$ 3.77	\$ 3.75	\$ 3.75	\$ 3.75	\$ 3.78	\$ 3.81
High Growth & Low Prices	Stanfield	2017-2018	\$ 3.97	\$ 3.88	\$ 3.85	\$ 3.70	\$ 3.75	\$ 3.74	\$ 3.73	\$ 3.70	\$ 3.69	\$ 3.69	\$ 3.73	\$ 3.73
High Growth & Low Prices	Stanfield	2018-2019	\$ 3.97	\$ 3.86	\$ 3.70	\$ 3.67	\$ 3.69	\$ 3.77	\$ 3.63	\$ 3.60	\$ 3.58	\$ 3.59	\$ 3.62	\$ 3.77
High Growth & Low Prices	Stanfield	2019-2020	\$ 3.75	\$ 3.75	\$ 3.61	\$ 3.50	\$ 3.74	\$ 3.71	\$ 3.63	\$ 3.60	\$ 3.60	\$ 3.58	\$ 3.62	\$ 3.65
High Growth & Low Prices	Stanfield	2020-2021	\$ 3.76	\$ 3.73	\$ 3.63	\$ 3.54	\$ 3.77	\$ 3.73	\$ 3.61	\$ 3.57	\$ 3.53	\$ 3.53	\$ 3.61	\$ 3.65
High Growth & Low Prices	Stanfield	2021-2022	\$ 3.88	\$ 3.84	\$ 3.82	\$ 3.76	\$ 3.80	\$ 3.79	\$ 3.73	\$ 3.67	\$ 3.64	\$ 3.63	\$ 3.75	\$ 3.80
High Growth & Low Prices	Stanfield	2022-2023	\$ 4.00	\$ 3.88	\$ 3.61	\$ 3.61	\$ 3.70	\$ 3.63	\$ 3.51	\$ 3.45	\$ 3.42	\$ 3.41	\$ 3.49	\$ 3.52
High Growth & Low Prices	Stanfield	2023-2024	\$ 3.89	\$ 3.82	\$ 3.76	\$ 3.59	\$ 3.80	\$ 3.75	\$ 3.59	\$ 3.53	\$ 3.49	\$ 3.48	\$ 3.60	\$ 3.64
High Growth & Low Prices	Stanfield	2024-2025	\$ 3.92	\$ 3.89	\$ 3.79	\$ 3.68	\$ 3.86	\$ 3.82	\$ 3.79	\$ 3.71	\$ 3.68	\$ 3.68	\$ 3.77	\$ 3.81
High Growth & Low Prices	Stanfield	2025-2026	\$ 4.07	\$ 4.00	\$ 3.88	\$ 3.72	\$ 3.88	\$ 3.81	\$ 3.69	\$ 3.63	\$ 3.61	\$ 3.60	\$ 3.71	\$ 3.86
High Growth & Low Prices	Stanfield	2026-2027	\$ 4.03	\$ 4.02	\$ 3.79	\$ 3.53	\$ 3.82	\$ 3.82	\$ 3.63	\$ 3.55	\$ 3.53	\$ 3.53	\$ 3.62	\$ 3.81
High Growth & Low Prices	Stanfield	2027-2028	\$ 3.98	\$ 3.94	\$ 3.63	\$ 3.43	\$ 3.72	\$ 3.73	\$ 3.55	\$ 3.49	\$ 3.46	\$ 3.46	\$ 3.54	\$ 3.73
High Growth & Low Prices	Stanfield	2028-2029	\$ 3.95	\$ 3.88	\$ 3.88	\$ 3.83	\$ 3.90	\$ 3.78	\$ 3.73	\$ 3.66	\$ 3.66	\$ 3.65	\$ 3.73	\$ 3.76
High Growth & Low Prices	Stanfield	2029-2030	\$ 4.07	\$ 4.02	\$ 4.00	\$ 3.81	\$ 3.97	\$ 3.91	\$ 3.72	\$ 3.64	\$ 3.61	\$ 3.63	\$ 3.70	\$ 3.88
High Growth & Low Prices	Stanfield	2030-2031	\$ 4.21	\$ 4.13	\$ 3.92	\$ 3.76	\$ 3.98	\$ 3.96	\$ 3.81	\$ 3.75	\$ 3.74	\$ 3.75	\$ 3.82	\$ 3.87
High Growth & Low Prices	Stanfield	2031-2032	\$ 4.18	\$ 3.94	\$ 3.77	\$ 3.78	\$ 3.86	\$ 3.60	\$ 3.56	\$ 3.48	\$ 3.36	\$ 3.35	\$ 3.52	\$ 3.62
High Growth & Low Prices	Stanfield	2032-2033	\$ 3.88	\$ 3.83	\$ 3.82	\$ 3.82	\$ 3.87	\$ 3.59	\$ 3.69	\$ 3.51	\$ 3.38	\$ 3.37	\$ 3.56	\$ 3.67
High Growth & Low Prices	Sumas	2013-2014	\$ 3.97	\$ 4.09	\$ 4.02	\$ 3.91	\$ 3.88	\$ 3.66	\$ 3.73	\$ 3.68	\$ 3.70	\$ 3.62	\$ 3.68	\$ 3.70
High Growth & Low Prices	Sumas	2014-2015	\$ 4.04	\$ 4.15	\$ 4.19	\$ 4.09	\$ 4.04	\$ 3.82	\$ 3.87	\$ 3.77	\$ 3.74	\$ 3.69	\$ 3.79	\$ 3.83
High Growth & Low Prices	Sumas	2015-2016	\$ 4.18	\$ 4.28	\$ 4.15	\$ 4.05	\$ 3.99	\$ 3.74	\$ 3.80	\$ 3.72	\$ 3.69	\$ 3.63	\$ 3.70	\$ 3.75
High Growth & Low Prices	Sumas	2016-2017	\$ 4.14	\$ 4.21	\$ 4.10	\$ 3.98	\$ 3.93	\$ 3.63	\$ 3.68	\$ 3.62	\$ 3.61	\$ 3.53	\$ 3.60	\$ 3.69
High Growth & Low Prices	Sumas	2017-2018	\$ 4.04	\$ 4.10	\$ 4.01	\$ 3.87	\$ 3.84	\$ 3.60	\$ 3.59	\$ 3.54	\$ 3.52	\$ 3.43	\$ 3.50	\$ 3.60
High Growth & Low Prices	Sumas	2018-2019	\$ 4.04	\$ 4.08	\$ 3.87	\$ 3.74	\$ 3.78	\$ 3.50	\$ 3.47	\$ 3.40	\$ 3.39	\$ 3.34	\$ 3.36	\$ 3.39
High Growth & Low Prices	Sumas	2019-2020	\$ 3.79	\$ 3.97	\$ 3.78	\$ 3.66	\$ 3.71	\$ 3.46	\$ 3.50	\$ 3.44	\$ 3.41	\$ 3.36	\$ 3.38	\$ 3.41
High Growth & Low Prices	Sumas	2020-2021	\$ 3.76	\$ 3.95	\$ 3.80	\$ 3.71	\$ 3.75	\$ 3.46	\$ 3.49	\$ 3.42	\$ 3.34	\$ 3.30	\$ 3.36	\$ 3.38
High Growth & Low Prices	Sumas	2021-2022	\$ 3.95	\$ 4.06	\$ 3.99	\$ 3.83	\$ 3.84	\$ 3.59	\$ 3.62	\$ 3.53	\$ 3.50	\$ 3.46	\$ 3.54	\$ 3.57
High Growth & Low Prices	Sumas	2022-2023	\$ 4.07	\$ 4.10	\$ 3.88	\$ 3.63	\$ 3.60	\$ 3.40	\$ 3.33	\$ 3.23	\$ 3.25	\$ 3.16	\$ 3.27	\$ 3.29
High Growth & Low Prices	Sumas	2023-2024	\$ 3.74	\$ 4.04	\$ 3.93	\$ 3.66	\$ 3.75	\$ 3.57	\$ 3.48	\$ 3.38	\$ 3.37	\$ 3.29	\$ 3.41	\$ 3.46
High Growth & Low Prices	Sumas	2024-2025	\$ 3.77	\$ 4.11	\$ 4.07	\$ 3.76	\$ 3.82	\$ 3.63	\$ 3.63	\$ 3.54	\$ 3.53	\$ 3.45	\$ 3.57	\$ 3.62
High Growth & Low Prices	Sumas	2025-2026	\$ 3.91	\$ 4.22	\$ 4.05	\$ 3.90	\$ 3.82	\$ 3.60	\$ 3.53	\$ 3.43	\$ 3.43	\$ 3.35	\$ 3.47	\$ 3.50
High Growth & Low Prices	Sumas	2026-2027	\$ 3.88	\$ 4.24	\$ 3.96	\$ 3.70	\$ 3.76	\$ 3.47	\$ 3.47	\$ 3.35	\$ 3.37	\$ 3.29	\$ 3.41	\$ 3.44
High Growth & Low Prices	Sumas	2027-2028	\$ 3.83	\$ 4.16	\$ 3.80	\$ 3.59	\$ 3.65	\$ 3.39	\$ 3.38	\$ 3.28	\$ 3.27	\$ 3.24	\$ 3.31	\$ 3.34
High Growth & Low Prices	Sumas	2028-2029	\$ 4.02	\$ 4.10	\$ 4.05	\$ 3.90	\$ 3.97	\$ 3.62	\$ 3.63	\$ 3.50	\$ 3.53	\$ 3.48	\$ 3.54	\$ 3.56
High Growth & Low Prices	Sumas	2029-2030	\$ 4.14	\$ 4.32	\$ 4.38	\$ 3.88	\$ 4.06	\$ 3.58	\$ 3.56	\$ 3.44	\$ 3.46	\$ 3.41	\$ 3.48	\$ 3.52
High Growth & Low Prices	Sumas	2030-2031	\$ 4.27	\$ 4.42	\$ 4.39	\$ 3.83	\$ 4.08	\$ 3.65	\$ 3.67	\$ 3.55	\$ 3.60	\$ 3.56	\$ 3.63	\$ 3.66
High Growth & Low Prices	Sumas	2031-2032	\$ 4.25	\$ 4.34	\$ 3.99	\$ 4.00	\$ 3.90	\$ 3.44	\$ 3.33	\$ 3.07	\$ 3.23	\$ 3.20	\$ 3.33	\$ 3.44
High Growth & Low Prices	Sumas	2032-2033	\$ 3.93	\$ 4.16	\$ 4.15	\$ 4.16	\$ 3.92	\$ 3.44	\$ 3.33	\$ 3.10	\$ 3.25	\$ 3.22	\$ 3.36	\$ 3.49

# APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

## LOW GROWTH HIGH PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Low Growth & High Prices	AECO	2013-2014	\$ 3.26	\$ 3.65	\$ 4.18	\$ 3.34	\$ 3.90	\$ 3.88	\$ 3.84	\$ 3.85	\$ 3.83	\$ 3.82	\$ 3.85	\$ 3.87
Low Growth & High Prices	AECO	2014-2015	\$ 3.90	\$ 3.83	\$ 4.15	\$ 4.16	\$ 4.30	\$ 4.23	\$ 4.16	\$ 4.15	\$ 4.12	\$ 4.11	\$ 4.15	\$ 4.21
Low Growth & High Prices	AECO	2015-2016	\$ 4.23	\$ 4.14	\$ 4.25	\$ 4.26	\$ 4.42	\$ 4.35	\$ 4.29	\$ 4.31	\$ 4.28	\$ 4.25	\$ 4.26	\$ 4.30
Low Growth & High Prices	AECO	2016-2017	\$ 4.34	\$ 4.25	\$ 4.41	\$ 4.43	\$ 4.54	\$ 4.44	\$ 4.37	\$ 4.37	\$ 4.35	\$ 4.34	\$ 4.36	\$ 4.41
Low Growth & High Prices	AECO	2017-2018	\$ 4.42	\$ 4.31	\$ 4.60	\$ 4.59	\$ 4.70	\$ 4.63	\$ 4.58	\$ 4.58	\$ 4.56	\$ 4.54	\$ 4.55	\$ 4.59
Low Growth & High Prices	AECO	2018-2019	\$ 4.70	\$ 4.57	\$ 4.61	\$ 4.62	\$ 4.81	\$ 4.72	\$ 4.67	\$ 4.64	\$ 4.62	\$ 4.60	\$ 4.62	\$ 4.67
Low Growth & High Prices	AECO	2019-2020	\$ 4.80	\$ 4.68	\$ 4.66	\$ 4.71	\$ 4.97	\$ 4.88	\$ 4.81	\$ 4.78	\$ 4.74	\$ 4.73	\$ 4.75	\$ 4.80
Low Growth & High Prices	AECO	2020-2021	\$ 4.88	\$ 4.73	\$ 4.84	\$ 4.87	\$ 5.09	\$ 5.00	\$ 4.91	\$ 4.87	\$ 4.79	\$ 4.78	\$ 4.84	\$ 4.89
Low Growth & High Prices	AECO	2021-2022	\$ 4.99	\$ 4.95	\$ 5.32	\$ 5.36	\$ 5.48	\$ 5.38	\$ 5.31	\$ 5.25	\$ 5.23	\$ 5.21	\$ 5.30	\$ 5.34
Low Growth & High Prices	AECO	2022-2023	\$ 5.39	\$ 5.32	\$ 5.39	\$ 5.38	\$ 5.51	\$ 5.38	\$ 5.24	\$ 5.18	\$ 5.15	\$ 5.13	\$ 5.20	\$ 5.24
Low Growth & High Prices	AECO	2023-2024	\$ 5.45	\$ 5.43	\$ 5.71	\$ 5.74	\$ 5.90	\$ 5.78	\$ 5.65	\$ 5.59	\$ 5.54	\$ 5.53	\$ 5.61	\$ 5.66
Low Growth & High Prices	AECO	2024-2025	\$ 5.76	\$ 5.78	\$ 6.04	\$ 6.03	\$ 6.16	\$ 6.04	\$ 5.99	\$ 5.93	\$ 5.88	\$ 5.87	\$ 5.95	\$ 6.00
Low Growth & High Prices	AECO	2025-2026	\$ 6.09	\$ 6.08	\$ 6.25	\$ 6.27	\$ 6.42	\$ 6.29	\$ 6.18	\$ 6.11	\$ 6.06	\$ 6.05	\$ 6.14	\$ 6.19
Low Growth & High Prices	AECO	2026-2027	\$ 6.34	\$ 6.33	\$ 6.45	\$ 6.37	\$ 6.67	\$ 6.46	\$ 6.38	\$ 6.30	\$ 6.27	\$ 6.26	\$ 6.35	\$ 6.40
Low Growth & High Prices	AECO	2027-2028	\$ 6.57	\$ 6.54	\$ 6.57	\$ 6.54	\$ 6.82	\$ 6.66	\$ 6.59	\$ 6.53	\$ 6.48	\$ 6.48	\$ 6.55	\$ 6.61
Low Growth & High Prices	AECO	2028-2029	\$ 6.82	\$ 6.80	\$ 7.07	\$ 7.14	\$ 7.36	\$ 7.15	\$ 7.09	\$ 7.02	\$ 6.98	\$ 6.95	\$ 7.02	\$ 7.06
Low Growth & High Prices	AECO	2029-2030	\$ 7.21	\$ 7.21	\$ 7.47	\$ 7.36	\$ 7.68	\$ 7.39	\$ 7.31	\$ 7.24	\$ 7.20	\$ 7.18	\$ 7.24	\$ 7.31
Low Growth & High Prices	AECO	2030-2031	\$ 7.62	\$ 7.57	\$ 7.64	\$ 7.54	\$ 7.94	\$ 7.73	\$ 7.68	\$ 7.62	\$ 7.60	\$ 7.59	\$ 7.66	\$ 7.71
Low Growth & High Prices	AECO	2031-2032	\$ 7.87	\$ 7.64	\$ 7.87	\$ 7.88	\$ 8.04	\$ 7.88	\$ 7.86	\$ 7.79	\$ 7.68	\$ 7.66	\$ 7.81	\$ 7.86
Low Growth & High Prices	AECO	2032-2033	\$ 7.96	\$ 7.91	\$ 8.28	\$ 8.27	\$ 8.42	\$ 8.25	\$ 8.24	\$ 8.19	\$ 8.07	\$ 8.05	\$ 8.21	\$ 8.28
Low Growth & High Prices	Malin	2013-2014	\$ 3.62	\$ 4.53	\$ 4.69	\$ 3.81	\$ 4.28	\$ 4.28	\$ 4.25	\$ 4.24	\$ 4.24	\$ 4.23	\$ 4.26	\$ 4.31
Low Growth & High Prices	Malin	2014-2015	\$ 4.33	\$ 4.33	\$ 4.60	\$ 4.61	\$ 4.64	\$ 4.63	\$ 4.56	\$ 4.55	\$ 4.53	\$ 4.52	\$ 4.57	\$ 4.62
Low Growth & High Prices	Malin	2015-2016	\$ 4.69	\$ 4.66	\$ 4.78	\$ 4.77	\$ 4.79	\$ 4.73	\$ 4.70	\$ 4.69	\$ 4.69	\$ 4.69	\$ 4.74	\$ 4.76
Low Growth & High Prices	Malin	2016-2017	\$ 4.87	\$ 4.78	\$ 4.92	\$ 4.91	\$ 4.93	\$ 4.91	\$ 4.91	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.94	\$ 4.94
Low Growth & High Prices	Malin	2017-2018	\$ 4.99	\$ 4.88	\$ 5.14	\$ 5.10	\$ 5.13	\$ 5.17	\$ 5.17	\$ 5.15	\$ 5.14	\$ 5.17	\$ 5.22	\$ 5.22
Low Growth & High Prices	Malin	2018-2019	\$ 5.31	\$ 5.16	\$ 5.20	\$ 5.16	\$ 5.28	\$ 5.31	\$ 5.31	\$ 5.29	\$ 5.27	\$ 5.29	\$ 5.32	\$ 5.37
Low Growth & High Prices	Malin	2019-2020	\$ 5.43	\$ 5.27	\$ 5.21	\$ 5.19	\$ 5.43	\$ 5.49	\$ 5.42	\$ 5.39	\$ 5.38	\$ 5.38	\$ 5.42	\$ 5.46
Low Growth & High Prices	Malin	2020-2021	\$ 5.55	\$ 5.40	\$ 5.34	\$ 5.35	\$ 5.58	\$ 5.65	\$ 5.50	\$ 5.46	\$ 5.44	\$ 5.44	\$ 5.52	\$ 5.58
Low Growth & High Prices	Malin	2021-2022	\$ 5.70	\$ 5.55	\$ 5.76	\$ 5.71	\$ 5.90	\$ 5.95	\$ 5.90	\$ 5.84	\$ 5.82	\$ 5.84	\$ 5.95	\$ 6.00
Low Growth & High Prices	Malin	2022-2023	\$ 6.07	\$ 5.88	\$ 5.90	\$ 5.89	\$ 6.05	\$ 6.02	\$ 5.87	\$ 5.75	\$ 5.74	\$ 5.72	\$ 5.91	\$ 5.95
Low Growth & High Prices	Malin	2023-2024	\$ 6.19	\$ 6.01	\$ 6.22	\$ 6.13	\$ 6.43	\$ 6.43	\$ 6.24	\$ 6.18	\$ 6.16	\$ 6.19	\$ 6.29	\$ 6.33
Low Growth & High Prices	Malin	2024-2025	\$ 6.48	\$ 6.37	\$ 6.55	\$ 6.38	\$ 6.64	\$ 6.68	\$ 6.62	\$ 6.54	\$ 6.57	\$ 6.57	\$ 6.66	\$ 6.68
Low Growth & High Prices	Malin	2025-2026	\$ 6.82	\$ 6.66	\$ 6.80	\$ 6.76	\$ 6.99	\$ 6.95	\$ 6.83	\$ 6.77	\$ 6.78	\$ 6.78	\$ 6.89	\$ 6.93
Low Growth & High Prices	Malin	2026-2027	\$ 7.08	\$ 7.01	\$ 6.99	\$ 6.79	\$ 7.16	\$ 7.12	\$ 7.04	\$ 6.96	\$ 6.95	\$ 6.97	\$ 7.06	\$ 7.13
Low Growth & High Prices	Malin	2027-2028	\$ 7.31	\$ 7.16	\$ 7.12	\$ 7.02	\$ 7.37	\$ 7.32	\$ 7.23	\$ 7.18	\$ 7.16	\$ 7.20	\$ 7.28	\$ 7.33
Low Growth & High Prices	Malin	2028-2029	\$ 7.56	\$ 7.38	\$ 7.63	\$ 7.54	\$ 7.74	\$ 7.71	\$ 7.67	\$ 7.61	\$ 7.64	\$ 7.63	\$ 7.71	\$ 7.76
Low Growth & High Prices	Malin	2029-2030	\$ 7.91	\$ 7.78	\$ 8.00	\$ 7.80	\$ 8.11	\$ 8.03	\$ 7.96	\$ 7.89	\$ 7.88	\$ 7.92	\$ 7.99	\$ 8.04
Low Growth & High Prices	Malin	2030-2031	\$ 8.34	\$ 8.16	\$ 8.23	\$ 8.03	\$ 8.37	\$ 8.34	\$ 8.32	\$ 8.26	\$ 8.27	\$ 8.30	\$ 8.39	\$ 8.42
Low Growth & High Prices	Malin	2031-2032	\$ 8.57	\$ 8.27	\$ 8.37	\$ 8.38	\$ 8.46	\$ 8.36	\$ 8.33	\$ 8.24	\$ 8.13	\$ 8.13	\$ 8.31	\$ 8.41
Low Growth & High Prices	Malin	2032-2033	\$ 8.50	\$ 8.44	\$ 8.80	\$ 8.79	\$ 8.83	\$ 8.72	\$ 8.70	\$ 8.64	\$ 8.53	\$ 8.52	\$ 8.72	\$ 8.83
Low Growth & High Prices	Rockies	2013-2014	\$ 3.53	\$ 4.56	\$ 4.66	\$ 3.77	\$ 4.25	\$ 4.23	\$ 4.22	\$ 4.21	\$ 4.20	\$ 4.19	\$ 4.21	\$ 4.26
Low Growth & High Prices	Rockies	2014-2015	\$ 4.29	\$ 4.29	\$ 4.57	\$ 4.57	\$ 4.61	\$ 4.57	\$ 4.53	\$ 4.52	\$ 4.49	\$ 4.48	\$ 4.53	\$ 4.55
Low Growth & High Prices	Rockies	2015-2016	\$ 4.62	\$ 4.62	\$ 4.74	\$ 4.74	\$ 4.75	\$ 4.75	\$ 4.70	\$ 4.67	\$ 4.64	\$ 4.64	\$ 4.69	\$ 4.71
Low Growth & High Prices	Rockies	2016-2017	\$ 4.78	\$ 4.74	\$ 4.89	\$ 4.87	\$ 4.90	\$ 4.86	\$ 4.83	\$ 4.80	\$ 4.79	\$ 4.78	\$ 4.82	\$ 4.84
Low Growth & High Prices	Rockies	2017-2018	\$ 4.89	\$ 4.83	\$ 5.10	\$ 5.06	\$ 5.09	\$ 5.09	\$ 5.08	\$ 5.05	\$ 5.04	\$ 5.03	\$ 5.07	\$ 5.07
Low Growth & High Prices	Rockies	2018-2019	\$ 5.15	\$ 5.11	\$ 5.16	\$ 5.11	\$ 5.23	\$ 5.23	\$ 5.18	\$ 5.15	\$ 5.11	\$ 5.14	\$ 5.17	\$ 5.18
Low Growth & High Prices	Rockies	2019-2020	\$ 5.18	\$ 5.13	\$ 5.17	\$ 5.14	\$ 5.29	\$ 5.27	\$ 5.22	\$ 5.20	\$ 5.17	\$ 5.16	\$ 5.20	\$ 5.22
Low Growth & High Prices	Rockies	2020-2021	\$ 5.25	\$ 5.25	\$ 5.28	\$ 5.27	\$ 5.34	\$ 5.29	\$ 5.28	\$ 5.19	\$ 5.21	\$ 5.20	\$ 5.25	\$ 5.28
Low Growth & High Prices	Rockies	2021-2022	\$ 5.29	\$ 5.32	\$ 5.57	\$ 5.52	\$ 5.55	\$ 5.57	\$ 5.52	\$ 5.47	\$ 5.44	\$ 5.44	\$ 5.52	\$ 5.54
Low Growth & High Prices	Rockies	2022-2023	\$ 5.57	\$ 5.49	\$ 5.59	\$ 5.56	\$ 5.64	\$ 5.60	\$ 5.49	\$ 5.43	\$ 5.41	\$ 5.41	\$ 5.48	\$ 5.52
Low Growth & High Prices	Rockies	2023-2024	\$ 5.65	\$ 5.61	\$ 5.82	\$ 5.79	\$ 5.89	\$ 5.89	\$ 5.76	\$ 5.67	\$ 5.65	\$ 5.64	\$ 5.73	\$ 5.81
Low Growth & High Prices	Rockies	2024-2025	\$ 5.86	\$ 5.85	\$ 6.27	\$ 6.28	\$ 6.32	\$ 6.31	\$ 6.28	\$ 6.21	\$ 6.22	\$ 6.21	\$ 6.28	\$ 6.29
Low Growth & High Prices	Rockies	2025-2026	\$ 6.33	\$ 6.27	\$ 6.47	\$ 6.46	\$ 6.55	\$ 6.54	\$ 6.45	\$ 6.38	\$ 6.38	\$ 6.37	\$ 6.44	\$ 6.52
Low Growth & High Prices	Rockies	2026-2027	\$ 6.53	\$ 6.50	\$ 6.81	\$ 6.70	\$ 6.88	\$ 6.87	\$ 6.82	\$ 6.74	\$ 6.75	\$ 6.74	\$ 6.83	\$ 6.87
Low Growth & High Prices	Rockies	2027-2028	\$ 6.93	\$ 6.92	\$ 6.96	\$ 6.93	\$ 7.09	\$ 7.07	\$ 7.03	\$ 6.95	\$ 6.95	\$ 6.94	\$ 7.02	\$ 7.08
Low Growth & High Prices	Rockies	2028-2029	\$ 7.17	\$ 7.13	\$ 7.34	\$ 7.25	\$ 7.42	\$ 7.41	\$ 7.38	\$ 7.29	\$ 7.30	\$ 7.30	\$ 7.35	\$ 7.37
Low Growth & High Prices	Rockies	2029-2030	\$ 7.43	\$ 7.40	\$ 7.66	\$ 7.56	\$ 7.75	\$ 7.72	\$ 7.64	\$ 7.57	\$ 7.57	\$ 7.57	\$ 7.64	\$ 7.70
Low Growth & High Prices	Rockies	2030-2031	\$ 7.78	\$ 7.72	\$ 7.86	\$ 7.79	\$ 8.00	\$ 7.97	\$ 7.93	\$ 7.87	\$ 7.89	\$ 7.91	\$ 7.98	\$ 7.99
Low Growth & High Prices	Rockies	2031-2032	\$ 8.01	\$ 7.89	\$ 7.96	\$ 7.96	\$ 8.01	\$ 7.95	\$ 7.92	\$ 7.83	\$ 7.73	\$ 7.72	\$ 7.89	\$ 7.96
Low Growth & High Prices	Rockies	2032-2033	\$ 8.00	\$ 7.99	\$ 8.33	\$ 8.33	\$ 8.35	\$ 8.29	\$ 8.27	\$ 8.19	\$ 8.09	\$ 8.08	\$ 8.25	\$ 8.34

## APPENDIX 5.1: MONTHLY PRICE DATA BY BASIN

### LOW GROWTH HIGH PRICE

		2012\$												
Scenario	Index	Gas Year	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct
Low Growth & High Prices	Stanfield	2013-2014	\$ 3.60	\$ 4.56	\$ 4.66	\$ 3.72	\$ 4.21	\$ 4.19	\$ 4.20	\$ 4.21	\$ 4.19	\$ 4.19	\$ 4.21	\$ 4.22
Low Growth & High Prices	Stanfield	2014-2015	\$ 4.29	\$ 4.23	\$ 4.53	\$ 4.54	\$ 4.61	\$ 4.54	\$ 4.52	\$ 4.51	\$ 4.49	\$ 4.47	\$ 4.51	\$ 4.53
Low Growth & High Prices	Stanfield	2015-2016	\$ 4.62	\$ 4.66	\$ 4.78	\$ 4.78	\$ 4.73	\$ 4.70	\$ 4.65	\$ 4.67	\$ 4.64	\$ 4.61	\$ 4.66	\$ 4.67
Low Growth & High Prices	Stanfield	2016-2017	\$ 4.77	\$ 4.79	\$ 4.93	\$ 4.82	\$ 4.86	\$ 4.82	\$ 4.77	\$ 4.75	\$ 4.75	\$ 4.75	\$ 4.78	\$ 4.81
Low Growth & High Prices	Stanfield	2017-2018	\$ 4.97	\$ 4.88	\$ 5.15	\$ 5.00	\$ 5.05	\$ 5.04	\$ 5.03	\$ 5.00	\$ 4.99	\$ 4.99	\$ 5.03	\$ 5.03
Low Growth & High Prices	Stanfield	2018-2019	\$ 5.27	\$ 5.16	\$ 5.20	\$ 5.17	\$ 5.19	\$ 5.27	\$ 5.13	\$ 5.10	\$ 5.08	\$ 5.09	\$ 5.12	\$ 5.27
Low Growth & High Prices	Stanfield	2019-2020	\$ 5.25	\$ 5.25	\$ 5.21	\$ 5.10	\$ 5.34	\$ 5.31	\$ 5.23	\$ 5.20	\$ 5.20	\$ 5.18	\$ 5.22	\$ 5.25
Low Growth & High Prices	Stanfield	2020-2021	\$ 5.36	\$ 5.33	\$ 5.34	\$ 5.25	\$ 5.48	\$ 5.44	\$ 5.32	\$ 5.28	\$ 5.25	\$ 5.24	\$ 5.32	\$ 5.37
Low Growth & High Prices	Stanfield	2021-2022	\$ 5.59	\$ 5.55	\$ 5.82	\$ 5.76	\$ 5.80	\$ 5.79	\$ 5.73	\$ 5.67	\$ 5.64	\$ 5.64	\$ 5.75	\$ 5.80
Low Growth & High Prices	Stanfield	2022-2023	\$ 6.00	\$ 5.89	\$ 5.79	\$ 5.79	\$ 5.88	\$ 5.81	\$ 5.69	\$ 5.63	\$ 5.60	\$ 5.59	\$ 5.68	\$ 5.71
Low Growth & High Prices	Stanfield	2023-2024	\$ 6.08	\$ 6.01	\$ 6.24	\$ 6.06	\$ 6.27	\$ 6.22	\$ 6.07	\$ 6.00	\$ 5.96	\$ 5.95	\$ 6.07	\$ 6.12
Low Growth & High Prices	Stanfield	2024-2025	\$ 6.39	\$ 6.36	\$ 6.44	\$ 6.33	\$ 6.52	\$ 6.48	\$ 6.44	\$ 6.36	\$ 6.34	\$ 6.33	\$ 6.43	\$ 6.46
Low Growth & High Prices	Stanfield	2025-2026	\$ 6.72	\$ 6.66	\$ 6.81	\$ 6.66	\$ 6.82	\$ 6.75	\$ 6.63	\$ 6.56	\$ 6.55	\$ 6.54	\$ 6.65	\$ 6.80
Low Growth & High Prices	Stanfield	2026-2027	\$ 6.97	\$ 6.96	\$ 7.01	\$ 6.75	\$ 7.04	\$ 7.03	\$ 6.85	\$ 6.77	\$ 6.75	\$ 6.75	\$ 6.83	\$ 7.02
Low Growth & High Prices	Stanfield	2027-2028	\$ 7.20	\$ 7.16	\$ 7.13	\$ 6.93	\$ 7.22	\$ 7.23	\$ 7.05	\$ 6.99	\$ 6.96	\$ 6.96	\$ 7.04	\$ 7.23
Low Growth & High Prices	Stanfield	2028-2029	\$ 7.45	\$ 7.38	\$ 7.65	\$ 7.60	\$ 7.67	\$ 7.56	\$ 7.50	\$ 7.43	\$ 7.44	\$ 7.42	\$ 7.50	\$ 7.54
Low Growth & High Prices	Stanfield	2029-2030	\$ 7.85	\$ 7.80	\$ 8.06	\$ 7.86	\$ 8.02	\$ 7.97	\$ 7.77	\$ 7.69	\$ 7.66	\$ 7.68	\$ 7.75	\$ 7.93
Low Growth & High Prices	Stanfield	2030-2031	\$ 8.26	\$ 8.18	\$ 8.25	\$ 8.09	\$ 8.30	\$ 8.29	\$ 8.14	\$ 8.07	\$ 8.06	\$ 8.08	\$ 8.15	\$ 8.19
Low Growth & High Prices	Stanfield	2031-2032	\$ 8.51	\$ 8.27	\$ 8.37	\$ 8.37	\$ 8.45	\$ 8.20	\$ 8.16	\$ 8.08	\$ 7.96	\$ 7.94	\$ 8.12	\$ 8.22
Low Growth & High Prices	Stanfield	2032-2033	\$ 8.48	\$ 8.43	\$ 8.79	\$ 8.78	\$ 8.83	\$ 8.56	\$ 8.66	\$ 8.47	\$ 8.35	\$ 8.34	\$ 8.53	\$ 8.63
Low Growth & High Prices	Sumas	2013-2014	\$ 3.93	\$ 5.31	\$ 4.68	\$ 3.87	\$ 4.28	\$ 4.06	\$ 4.13	\$ 4.08	\$ 4.10	\$ 4.02	\$ 4.08	\$ 4.10
Low Growth & High Prices	Sumas	2014-2015	\$ 4.44	\$ 4.55	\$ 4.79	\$ 4.69	\$ 4.64	\$ 4.42	\$ 4.47	\$ 4.37	\$ 4.34	\$ 4.29	\$ 4.39	\$ 4.43
Low Growth & High Prices	Sumas	2015-2016	\$ 4.78	\$ 4.88	\$ 4.95	\$ 4.85	\$ 4.79	\$ 4.54	\$ 4.60	\$ 4.52	\$ 4.49	\$ 4.43	\$ 4.50	\$ 4.55
Low Growth & High Prices	Sumas	2016-2017	\$ 4.94	\$ 5.01	\$ 5.10	\$ 4.98	\$ 4.93	\$ 4.63	\$ 4.68	\$ 4.62	\$ 4.61	\$ 4.53	\$ 4.60	\$ 4.69
Low Growth & High Prices	Sumas	2017-2018	\$ 5.04	\$ 5.10	\$ 5.31	\$ 5.17	\$ 5.14	\$ 4.90	\$ 4.89	\$ 4.84	\$ 4.82	\$ 4.73	\$ 4.80	\$ 4.90
Low Growth & High Prices	Sumas	2018-2019	\$ 5.34	\$ 5.38	\$ 5.37	\$ 5.24	\$ 5.28	\$ 5.00	\$ 4.97	\$ 4.90	\$ 4.89	\$ 4.84	\$ 4.86	\$ 4.89
Low Growth & High Prices	Sumas	2019-2020	\$ 5.29	\$ 5.47	\$ 5.38	\$ 5.26	\$ 5.31	\$ 5.06	\$ 5.10	\$ 5.04	\$ 5.01	\$ 4.96	\$ 4.98	\$ 5.01
Low Growth & High Prices	Sumas	2020-2021	\$ 5.36	\$ 5.55	\$ 5.51	\$ 5.42	\$ 5.47	\$ 5.18	\$ 5.21	\$ 5.13	\$ 5.05	\$ 5.02	\$ 5.07	\$ 5.10
Low Growth & High Prices	Sumas	2021-2022	\$ 5.66	\$ 5.77	\$ 5.99	\$ 5.83	\$ 5.84	\$ 5.59	\$ 5.62	\$ 5.53	\$ 5.50	\$ 5.46	\$ 5.54	\$ 5.57
Low Growth & High Prices	Sumas	2022-2023	\$ 6.07	\$ 6.10	\$ 6.07	\$ 5.82	\$ 5.78	\$ 5.59	\$ 5.52	\$ 5.41	\$ 5.43	\$ 5.35	\$ 5.45	\$ 5.48
Low Growth & High Prices	Sumas	2023-2024	\$ 5.93	\$ 6.23	\$ 6.41	\$ 6.14	\$ 6.22	\$ 6.04	\$ 5.95	\$ 5.85	\$ 5.84	\$ 5.76	\$ 5.89	\$ 5.94
Low Growth & High Prices	Sumas	2024-2025	\$ 6.24	\$ 6.58	\$ 6.72	\$ 6.42	\$ 6.47	\$ 6.29	\$ 6.28	\$ 6.19	\$ 6.18	\$ 6.11	\$ 6.22	\$ 6.28
Low Growth & High Prices	Sumas	2025-2026	\$ 6.57	\$ 6.88	\$ 6.98	\$ 6.83	\$ 6.76	\$ 6.54	\$ 6.47	\$ 6.37	\$ 6.36	\$ 6.29	\$ 6.41	\$ 6.43
Low Growth & High Prices	Sumas	2026-2027	\$ 6.82	\$ 7.18	\$ 7.18	\$ 6.92	\$ 6.98	\$ 6.69	\$ 6.69	\$ 6.57	\$ 6.59	\$ 6.51	\$ 6.63	\$ 6.66
Low Growth & High Prices	Sumas	2027-2028	\$ 7.05	\$ 7.38	\$ 7.30	\$ 7.09	\$ 7.15	\$ 6.89	\$ 6.87	\$ 6.78	\$ 6.77	\$ 6.74	\$ 6.81	\$ 6.84
Low Growth & High Prices	Sumas	2028-2029	\$ 7.52	\$ 7.60	\$ 7.82	\$ 7.67	\$ 7.74	\$ 7.40	\$ 7.41	\$ 7.28	\$ 7.31	\$ 7.26	\$ 7.32	\$ 7.34
Low Growth & High Prices	Sumas	2029-2030	\$ 7.92	\$ 8.09	\$ 8.43	\$ 7.93	\$ 8.12	\$ 7.64	\$ 7.62	\$ 7.49	\$ 7.51	\$ 7.47	\$ 7.53	\$ 7.58
Low Growth & High Prices	Sumas	2030-2031	\$ 8.33	\$ 8.47	\$ 8.72	\$ 8.16	\$ 8.40	\$ 7.98	\$ 8.00	\$ 7.88	\$ 7.93	\$ 7.89	\$ 7.96	\$ 7.99
Low Growth & High Prices	Sumas	2031-2032	\$ 8.58	\$ 8.66	\$ 8.59	\$ 8.59	\$ 8.50	\$ 8.04	\$ 7.93	\$ 7.67	\$ 7.82	\$ 7.79	\$ 7.92	\$ 8.04
Low Growth & High Prices	Sumas	2032-2033	\$ 8.53	\$ 8.75	\$ 9.12	\$ 9.12	\$ 8.88	\$ 8.41	\$ 8.30	\$ 8.07	\$ 8.21	\$ 8.19	\$ 8.33	\$ 8.45

**APPENDIX 5.2: WEIGHTED AVERAGE COST OF CAPITAL**

<b>Avista Corporation Capital Structure and Overall Rate of Return</b>					
<b>WASHINGTON</b>					
<b>From 2012 Rate Case Settlement</b>					
	Cost of Capital	Percent of Total Capital	Cost	Component	After Tax
L/T Debt		53.00%	5.72%	3.03%	1.97%
Common Equity		47.00%	9.80%	4.61%	4.61%
<b>TOTAL</b>		<b>100.00%</b>		<b>7.64%</b>	<b>6.58%</b>
<b>IDAHO</b>					
	<b>Agreed-upon</b> Cost of Capital	Percent of Total Capital	Cost	Component	
L/T Debt (1)		50.00%	6.60%	3.30%	2.15%
Common Equity		50.00%	10.50%	5.25%	5.25%
<b>TOTAL</b>		<b>100.00%</b>		<b>8.55%</b>	<b>7.40%</b>
<b>OREGON</b>					
	<b>Agreed-upon</b> Cost of Capital	Percent of Total Capital	Cost	Component	
L/T Debt		50.00%	5.90%	2.95%	1.92%
Common Equity		50.00%	10.10%	5.05%	5.05%
<b>TOTAL</b>		<b>100.00%</b>		<b>8.00%</b>	<b>6.97%</b>
11/13 Gas Net Rate Base AMA					
WA	\$	217,600	45%		
ID	\$	110,739	23%		
OR	\$	151,627	32%		
	\$	479,966			
<b>System Weighted Average Cost of Capital (Nominal)*</b>					<b>6.93%</b>
GDP price deflator					1.90%
Real After Tax WACC					<b>4.93%</b>

### APPENDIX 5.3: POTENTIAL SUPPLY SIDE RESOURCE OPTIONS

Additional Resources	Jurisdiction	Size	Cost/Rates	Availability	Modeled	Case(s)	Notes
<b>Pipeline</b>							
Capacity Release Recalls	WA/ID	28,000 Dth/d 25,000 - 75,000 Dth/d	NWPL fixed rate	2018	Yes	Expected/High	Recall previously released capacity Currently available unsubscribed capacity from Kingsgate to Spokane
GTN Capacity	WA/ID	25,000 - 50,000 Dth/d	GTN rate	2013	Yes	Expected/High	Currently available unsubscribed capacity; requires expansion of Medford Lateral
GTN Capacity	OR	25,000 - 50,000 Dth/d	GTN rate	2013	Yes	Expected/High	Additional compression to allow more gas to flow from GTN mainline to the lateral
GTN Medford Lateral Expansion	OR	25,000 - 50,000 Dth/d	GTN rate	2014	Yes	Expected/High	Transport expansion from Sumas/JP to WA/ID
NWP Expansion	WA/ID	75,000 Dth/d	NWPL fixed rate x 3	2018	Yes	Expected/High	Transport expansion from Sumas/JP to Oregon
NWP Expansion	OR	50,000 Dth/d	NWPL fixed rate x 5	2018	Yes	Expected/High	Transport expansion from Sumas/JP to Oregon
<b>Satellite LNG</b>							
WA/ID Satellite LNG	WA/ID	270,000 capacity; 90,000 delivery for 3 days	\$132 million capital cost \$1 million annual O&M	November 2018	Yes	Expected/High	
Medford/Roseburg Satellite LNG	OR	135,000 capacity; 45,000 delivery for 3 days	\$66 million capital cost \$850,000 annual O&M	November 2018	Yes	Expected/High	
Klamath Falls Satellite LNG	OR	45,000 capacity; 15,000 delivery for 3 days	\$22 million capital cost \$850,000 annual O&M	November 2018	Yes	Expected/High	
La Grande Satellite LNG	OR	45,000 capacity; 15,000 delivery for 3 days	\$22 million capital cost \$850,000 annual O&M	November 2018	Yes	Expected/High	
<b>Company Owned Liquefaction LNG</b>							
WA/ID	WA	600 MMcf capacity; 150,000 delivery for 4 days	\$75 million capital cost, \$2 million annual O&M	November 2018	No		Considered and discussed but not taken to full cycle modeling.
<b>Export LNG</b>							
An Oregon Export LNG Facility plus pipeline build through Avista service territory.	OR	25,000 Dth/d	Pipeline charge \$1.00/Dth/d	November 2018	No		Considered and discussed but not taken to full cycle modeling.
<b>Other Resources Considered</b>							
Citygate deliveries	WA/ID/OR				No		Represents the ability to buy a delivered product from another utility or marketer. Limited counterparties to structure transaction
<b>Inground Storage</b>							
California					No		Dependent on GTN backhaul or convert to bidirectional pipeline
JP Expansion					No		Dependent on NWP Expansion or other Tport arrangements back to service territory
Mist					No		Dependent on NWP Expansion or other Tport arrangements back to service territory. Long term subscription may not be available



### APPENDIX 5.4: EXPECTED CASE AVOIDED COST

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Expected Case	2013-2014	\$ 3.54	\$ 4.12	\$ 3.54	\$ 3.54	\$ 3.54	\$ 3.53	\$ 3.45	\$ 4.12	\$ 3.70	\$ 3.65	
Expected Case	2014-2015	\$ 3.50	\$ 4.16	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.56	\$ 3.42	\$ 4.17	\$ 3.72	\$ 3.63	
Expected Case	2015-2016	\$ 3.77	\$ 4.46	\$ 3.77	\$ 3.77	\$ 3.77	\$ 3.84	\$ 3.70	\$ 4.48	\$ 4.01	\$ 3.91	
Expected Case	2016-2017	\$ 3.53	\$ 4.34	\$ 3.53	\$ 3.53	\$ 3.53	\$ 3.60	\$ 3.45	\$ 4.35	\$ 3.80	\$ 3.69	
Expected Case	2017-2018	\$ 3.50	\$ 4.38	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.58	\$ 3.43	\$ 4.38	\$ 3.80	\$ 3.68	
Expected Case	2018-2019	\$ 3.36	\$ 4.26	\$ 3.36	\$ 3.36	\$ 3.36	\$ 3.42	\$ 3.28	\$ 4.27	\$ 3.65	\$ 3.54	
Expected Case	2019-2020	\$ 3.44	\$ 4.20	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.51	\$ 3.36	\$ 4.20	\$ 3.69	\$ 3.59	
Expected Case	2020-2021	\$ 3.67	\$ 4.28	\$ 3.67	\$ 3.67	\$ 3.67	\$ 3.71	\$ 3.57	\$ 4.28	\$ 3.85	\$ 3.79	
Expected Case	2021-2022	\$ 3.80	\$ 4.16	\$ 3.80	\$ 3.80	\$ 3.80	\$ 3.85	\$ 3.72	\$ 4.17	\$ 3.92	\$ 3.87	
Expected Case	2022-2023	\$ 3.84	\$ 4.23	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.87	\$ 3.76	\$ 4.24	\$ 3.96	\$ 3.92	
Expected Case	2023-2024	\$ 4.14	\$ 4.30	\$ 4.14	\$ 4.14	\$ 4.14	\$ 4.13	\$ 4.06	\$ 4.33	\$ 4.17	\$ 4.17	
Expected Case	2024-2025	\$ 4.45	\$ 4.86	\$ 4.45	\$ 4.45	\$ 4.45	\$ 4.46	\$ 4.35	\$ 4.88	\$ 4.56	\$ 4.53	
Expected Case	2025-2026	\$ 4.64	\$ 5.06	\$ 4.64	\$ 4.64	\$ 4.64	\$ 4.66	\$ 4.54	\$ 5.07	\$ 4.76	\$ 4.72	
Expected Case	2026-2027	\$ 4.67	\$ 5.30	\$ 4.67	\$ 4.67	\$ 4.67	\$ 4.71	\$ 4.57	\$ 5.30	\$ 4.86	\$ 4.79	
Expected Case	2027-2028	\$ 4.71	\$ 5.42	\$ 4.71	\$ 4.71	\$ 4.71	\$ 4.76	\$ 4.61	\$ 5.43	\$ 4.93	\$ 4.85	
Expected Case	2028-2029	\$ 5.17	\$ 5.61	\$ 5.17	\$ 5.17	\$ 5.17	\$ 5.19	\$ 5.06	\$ 5.62	\$ 5.29	\$ 5.25	
Expected Case	2029-2030	\$ 5.09	\$ 5.57	\$ 5.09	\$ 5.09	\$ 5.09	\$ 5.12	\$ 5.00	\$ 5.59	\$ 5.24	\$ 5.18	
Expected Case	2030-2031	\$ 5.31	\$ 5.68	\$ 5.31	\$ 5.31	\$ 5.31	\$ 5.33	\$ 5.21	\$ 5.71	\$ 5.42	\$ 5.39	
Expected Case	2031-2032	\$ 5.54	\$ 5.63	\$ 5.53	\$ 5.53	\$ 5.53	\$ 5.54	\$ 5.43	\$ 5.67	\$ 5.55	\$ 5.55	
Expected Case	2032-2033	\$ 5.81	\$ 5.79	\$ 5.79	\$ 5.79	\$ 5.79	\$ 5.74	\$ 5.70	\$ 5.79	\$ 5.75	\$ 5.80	

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Winter	OR Winter	
Expected Case	2013-2014	\$ 3.72	\$ 4.16	\$ 3.72	\$ 3.72	\$ 3.72	\$ 3.78	\$ 3.59	\$ 4.10	\$ 3.83	\$ 3.81	
Expected Case	2014-2015	\$ 3.47	\$ 4.14	\$ 3.47	\$ 3.47	\$ 3.47	\$ 3.70	\$ 3.36	\$ 4.14	\$ 3.73	\$ 3.60	
Expected Case	2015-2016	\$ 4.00	\$ 4.61	\$ 4.00	\$ 4.00	\$ 4.00	\$ 4.24	\$ 3.91	\$ 4.60	\$ 4.25	\$ 4.13	
Expected Case	2016-2017	\$ 3.61	\$ 4.38	\$ 3.61	\$ 3.61	\$ 3.61	\$ 3.85	\$ 3.50	\$ 4.37	\$ 3.91	\$ 3.76	
Expected Case	2017-2018	\$ 3.71	\$ 4.54	\$ 3.71	\$ 3.71	\$ 3.71	\$ 3.98	\$ 3.62	\$ 4.54	\$ 4.04	\$ 3.88	
Expected Case	2018-2019	\$ 3.49	\$ 4.29	\$ 3.49	\$ 3.49	\$ 3.49	\$ 3.72	\$ 3.37	\$ 4.28	\$ 3.79	\$ 3.65	
Expected Case	2019-2020	\$ 3.52	\$ 4.23	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.75	\$ 3.40	\$ 4.22	\$ 3.79	\$ 3.66	
Expected Case	2020-2021	\$ 3.63	\$ 4.23	\$ 3.63	\$ 3.63	\$ 3.63	\$ 3.82	\$ 3.47	\$ 4.23	\$ 3.84	\$ 3.75	
Expected Case	2021-2022	\$ 4.01	\$ 4.37	\$ 4.01	\$ 4.01	\$ 4.01	\$ 4.23	\$ 3.91	\$ 4.36	\$ 4.17	\$ 4.08	
Expected Case	2022-2023	\$ 4.05	\$ 4.32	\$ 4.05	\$ 4.05	\$ 4.05	\$ 4.21	\$ 3.96	\$ 4.32	\$ 4.16	\$ 4.10	
Expected Case	2023-2024	\$ 4.29	\$ 4.42	\$ 4.29	\$ 4.29	\$ 4.29	\$ 4.36	\$ 4.19	\$ 4.42	\$ 4.32	\$ 4.32	
Expected Case	2024-2025	\$ 4.60	\$ 4.82	\$ 4.60	\$ 4.60	\$ 4.60	\$ 4.72	\$ 4.46	\$ 4.82	\$ 4.67	\$ 4.65	
Expected Case	2025-2026	\$ 4.82	\$ 5.11	\$ 4.82	\$ 4.82	\$ 4.82	\$ 4.99	\$ 4.69	\$ 5.11	\$ 4.93	\$ 4.88	
Expected Case	2026-2027	\$ 4.91	\$ 5.26	\$ 4.91	\$ 4.91	\$ 4.91	\$ 5.11	\$ 4.78	\$ 5.25	\$ 5.05	\$ 4.98	
Expected Case	2027-2028	\$ 4.91	\$ 5.48	\$ 4.91	\$ 4.91	\$ 4.91	\$ 5.15	\$ 4.77	\$ 5.47	\$ 5.13	\$ 5.03	
Expected Case	2028-2029	\$ 5.38	\$ 5.70	\$ 5.38	\$ 5.38	\$ 5.38	\$ 5.54	\$ 5.22	\$ 5.70	\$ 5.49	\$ 5.45	
Expected Case	2029-2030	\$ 5.43	\$ 5.69	\$ 5.43	\$ 5.43	\$ 5.43	\$ 5.61	\$ 5.32	\$ 5.69	\$ 5.54	\$ 5.49	
Expected Case	2030-2031	\$ 5.53	\$ 5.74	\$ 5.53	\$ 5.53	\$ 5.53	\$ 5.68	\$ 5.40	\$ 5.74	\$ 5.61	\$ 5.57	
Expected Case	2031-2032	\$ 5.67	\$ 5.83	\$ 5.67	\$ 5.67	\$ 5.67	\$ 5.80	\$ 5.55	\$ 5.82	\$ 5.73	\$ 5.70	
Expected Case	2032-2033	\$ 5.88	\$ 5.86	\$ 5.87	\$ 5.87	\$ 5.87	\$ 5.85	\$ 5.75	\$ 5.86	\$ 5.82	\$ 5.87	

1/ Avoided costs are before Environmental Externalities adder.

### APPENDIX 5.4: LOW GROWTH CASE AVOIDED COST

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Low Growth & High Prices	2013-2014	\$ 3.89	\$ 4.53	\$ 3.89	\$ 3.89	\$ 3.89	\$ 3.91	\$ 3.79	\$ 4.52	\$ 4.07	\$ 4.02	
Low Growth & High Prices	2014-2015	\$ 4.22	\$ 4.89	\$ 4.22	\$ 4.22	\$ 4.22	\$ 4.26	\$ 4.14	\$ 4.90	\$ 4.43	\$ 4.36	
Low Growth & High Prices	2015-2016	\$ 4.38	\$ 5.08	\$ 4.38	\$ 4.38	\$ 4.38	\$ 4.42	\$ 4.30	\$ 5.08	\$ 4.60	\$ 4.52	
Low Growth & High Prices	2016-2017	\$ 4.49	\$ 5.27	\$ 4.49	\$ 4.49	\$ 4.49	\$ 4.52	\$ 4.40	\$ 5.28	\$ 4.73	\$ 4.64	
Low Growth & High Prices	2017-2018	\$ 4.66	\$ 5.53	\$ 4.66	\$ 4.66	\$ 4.66	\$ 4.70	\$ 4.57	\$ 5.53	\$ 4.93	\$ 4.83	
Low Growth & High Prices	2018-2019	\$ 4.77	\$ 5.65	\$ 4.77	\$ 4.77	\$ 4.77	\$ 4.80	\$ 4.67	\$ 5.65	\$ 5.04	\$ 4.94	
Low Growth & High Prices	2019-2020	\$ 4.89	\$ 5.64	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.92	\$ 4.79	\$ 5.64	\$ 5.12	\$ 5.04	
Low Growth & High Prices	2020-2021	\$ 4.99	\$ 5.64	\$ 4.99	\$ 4.99	\$ 4.99	\$ 5.01	\$ 4.89	\$ 5.65	\$ 5.19	\$ 5.12	
Low Growth & High Prices	2021-2022	\$ 5.38	\$ 5.72	\$ 5.38	\$ 5.38	\$ 5.38	\$ 5.38	\$ 5.28	\$ 5.72	\$ 5.46	\$ 5.45	
Low Growth & High Prices	2022-2023	\$ 5.40	\$ 5.77	\$ 5.40	\$ 5.40	\$ 5.40	\$ 5.40	\$ 5.31	\$ 5.78	\$ 5.50	\$ 5.48	
Low Growth & High Prices	2023-2024	\$ 5.74	\$ 5.88	\$ 5.74	\$ 5.74	\$ 5.74	\$ 5.71	\$ 5.65	\$ 5.90	\$ 5.75	\$ 5.77	
Low Growth & High Prices	2024-2025	\$ 6.08	\$ 6.46	\$ 6.08	\$ 6.08	\$ 6.08	\$ 6.07	\$ 5.97	\$ 6.46	\$ 6.17	\$ 6.16	
Low Growth & High Prices	2025-2026	\$ 6.31	\$ 6.71	\$ 6.31	\$ 6.31	\$ 6.31	\$ 6.30	\$ 6.20	\$ 6.71	\$ 6.40	\$ 6.39	
Low Growth & High Prices	2026-2027	\$ 6.52	\$ 7.14	\$ 6.52	\$ 6.52	\$ 6.52	\$ 6.52	\$ 6.41	\$ 7.14	\$ 6.69	\$ 6.64	
Low Growth & High Prices	2027-2028	\$ 6.72	\$ 7.41	\$ 6.72	\$ 6.72	\$ 6.72	\$ 6.72	\$ 6.60	\$ 7.41	\$ 6.91	\$ 6.86	
Low Growth & High Prices	2028-2029	\$ 7.19	\$ 7.61	\$ 7.19	\$ 7.19	\$ 7.19	\$ 7.17	\$ 7.06	\$ 7.61	\$ 7.28	\$ 7.27	
Low Growth & High Prices	2029-2030	\$ 7.47	\$ 7.88	\$ 7.47	\$ 7.47	\$ 7.47	\$ 7.44	\$ 7.34	\$ 7.88	\$ 7.56	\$ 7.55	
Low Growth & High Prices	2030-2031	\$ 7.82	\$ 8.15	\$ 7.82	\$ 7.82	\$ 7.82	\$ 7.79	\$ 7.69	\$ 8.15	\$ 7.88	\$ 7.88	
Low Growth & High Prices	2031-2032	\$ 7.97	\$ 8.01	\$ 7.95	\$ 7.95	\$ 7.95	\$ 7.92	\$ 7.85	\$ 8.05	\$ 7.94	\$ 7.97	
Low Growth & High Prices	2032-2033	\$ 8.33	\$ 8.29	\$ 8.29	\$ 8.29	\$ 8.29	\$ 8.23	\$ 8.21	\$ 8.28	\$ 8.24	\$ 8.30	

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Winter	OR Winter	
Low Growth & High Prices	2013-2014	\$ 3.84	\$ 4.42	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.99	\$ 3.69	\$ 4.39	\$ 4.02	\$ 3.95	
Low Growth & High Prices	2014-2015	\$ 4.19	\$ 4.85	\$ 4.19	\$ 4.19	\$ 4.19	\$ 4.38	\$ 4.08	\$ 4.85	\$ 4.44	\$ 4.32	
Low Growth & High Prices	2015-2016	\$ 4.39	\$ 5.07	\$ 4.39	\$ 4.39	\$ 4.39	\$ 4.57	\$ 4.28	\$ 5.06	\$ 4.64	\$ 4.52	
Low Growth & High Prices	2016-2017	\$ 4.52	\$ 5.27	\$ 4.52	\$ 4.52	\$ 4.52	\$ 4.71	\$ 4.41	\$ 5.27	\$ 4.80	\$ 4.67	
Low Growth & High Prices	2017-2018	\$ 4.66	\$ 5.48	\$ 4.66	\$ 4.66	\$ 4.66	\$ 4.85	\$ 4.54	\$ 5.48	\$ 4.96	\$ 4.82	
Low Growth & High Prices	2018-2019	\$ 4.80	\$ 5.63	\$ 4.80	\$ 4.80	\$ 4.80	\$ 4.98	\$ 4.68	\$ 5.63	\$ 5.10	\$ 4.97	
Low Growth & High Prices	2019-2020	\$ 4.90	\$ 5.62	\$ 4.90	\$ 4.90	\$ 4.90	\$ 5.08	\$ 4.78	\$ 5.62	\$ 5.16	\$ 5.05	
Low Growth & High Prices	2020-2021	\$ 5.03	\$ 5.65	\$ 5.03	\$ 5.03	\$ 5.03	\$ 5.19	\$ 4.90	\$ 5.65	\$ 5.25	\$ 5.15	
Low Growth & High Prices	2021-2022	\$ 5.36	\$ 5.69	\$ 5.36	\$ 5.36	\$ 5.36	\$ 5.48	\$ 5.24	\$ 5.69	\$ 5.47	\$ 5.42	
Low Growth & High Prices	2022-2023	\$ 5.52	\$ 5.76	\$ 5.52	\$ 5.52	\$ 5.52	\$ 5.63	\$ 5.42	\$ 5.76	\$ 5.60	\$ 5.57	
Low Growth & High Prices	2023-2024	\$ 5.76	\$ 5.88	\$ 5.75	\$ 5.75	\$ 5.75	\$ 5.80	\$ 5.67	\$ 5.88	\$ 5.78	\$ 5.78	
Low Growth & High Prices	2024-2025	\$ 6.10	\$ 6.32	\$ 6.10	\$ 6.10	\$ 6.10	\$ 6.20	\$ 5.98	\$ 6.32	\$ 6.16	\$ 6.14	
Low Growth & High Prices	2025-2026	\$ 6.37	\$ 6.65	\$ 6.37	\$ 6.37	\$ 6.37	\$ 6.49	\$ 6.25	\$ 6.65	\$ 6.46	\$ 6.42	
Low Growth & High Prices	2026-2027	\$ 6.59	\$ 6.99	\$ 6.59	\$ 6.59	\$ 6.59	\$ 6.73	\$ 6.46	\$ 6.99	\$ 6.72	\$ 6.67	
Low Growth & High Prices	2027-2028	\$ 6.78	\$ 7.36	\$ 6.78	\$ 6.78	\$ 6.78	\$ 6.92	\$ 6.63	\$ 7.36	\$ 6.97	\$ 6.89	
Low Growth & High Prices	2028-2029	\$ 7.21	\$ 7.53	\$ 7.21	\$ 7.21	\$ 7.21	\$ 7.31	\$ 7.06	\$ 7.53	\$ 7.30	\$ 7.27	
Low Growth & High Prices	2029-2030	\$ 7.56	\$ 7.78	\$ 7.56	\$ 7.56	\$ 7.56	\$ 7.65	\$ 7.42	\$ 7.78	\$ 7.61	\$ 7.60	
Low Growth & High Prices	2030-2031	\$ 7.84	\$ 8.04	\$ 7.84	\$ 7.84	\$ 7.84	\$ 7.93	\$ 7.69	\$ 8.04	\$ 7.89	\$ 7.88	
Low Growth & High Prices	2031-2032	\$ 8.02	\$ 8.10	\$ 8.01	\$ 8.01	\$ 8.01	\$ 8.05	\$ 7.89	\$ 8.10	\$ 8.01	\$ 8.03	
Low Growth & High Prices	2032-2033	\$ 8.33	\$ 8.31	\$ 8.32	\$ 8.32	\$ 8.32	\$ 8.26	\$ 8.20	\$ 8.27	\$ 8.24	\$ 8.32	

1/ Avoided costs are before Environmental Externalities adder.

### APPENDIX 5.4: HIGH GROWTH CASE AVOIDED COST

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
High Growth & Low Prices	2013-2014	\$ 3.53	\$ 3.90	\$ 3.53	\$ 3.53	\$ 3.53	\$ 3.56	\$ 3.44	\$ 3.89	\$ 3.63	\$ 3.60	
High Growth & Low Prices	2014-2015	\$ 3.65	\$ 4.04	\$ 3.65	\$ 3.65	\$ 3.65	\$ 3.68	\$ 3.57	\$ 4.03	\$ 3.76	\$ 3.73	
High Growth & Low Prices	2015-2016	\$ 3.61	\$ 4.01	\$ 3.61	\$ 3.61	\$ 3.61	\$ 3.65	\$ 3.53	\$ 4.00	\$ 3.72	\$ 3.69	
High Growth & Low Prices	2016-2017	\$ 3.52	\$ 4.08	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.57	\$ 3.43	\$ 4.08	\$ 3.69	\$ 3.63	
High Growth & Low Prices	2017-2018	\$ 3.41	\$ 4.01	\$ 3.41	\$ 3.41	\$ 3.41	\$ 3.46	\$ 3.32	\$ 4.01	\$ 3.60	\$ 3.53	
High Growth & Low Prices	2018-2019	\$ 3.31	\$ 3.92	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.35	\$ 3.20	\$ 3.91	\$ 3.49	\$ 3.43	
High Growth & Low Prices	2019-2020	\$ 3.33	\$ 3.84	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.35	\$ 3.21	\$ 3.84	\$ 3.47	\$ 3.43	
High Growth & Low Prices	2020-2021	\$ 3.32	\$ 3.81	\$ 3.32	\$ 3.32	\$ 3.32	\$ 3.34	\$ 3.19	\$ 3.81	\$ 3.45	\$ 3.42	
High Growth & Low Prices	2021-2022	\$ 3.46	\$ 3.77	\$ 3.49	\$ 3.49	\$ 3.49	\$ 3.46	\$ 3.32	\$ 3.77	\$ 3.51	\$ 3.54	
High Growth & Low Prices	2022-2023	\$ 3.27	\$ 3.61	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.27	\$ 3.15	\$ 3.61	\$ 3.34	\$ 3.36	
High Growth & Low Prices	2023-2024	\$ 3.34	\$ 3.49	\$ 3.36	\$ 3.36	\$ 3.36	\$ 3.32	\$ 3.22	\$ 3.49	\$ 3.34	\$ 3.38	
High Growth & Low Prices	2024-2025	\$ 3.48	\$ 3.84	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.48	\$ 3.34	\$ 3.84	\$ 3.56	\$ 3.58	
High Growth & Low Prices	2025-2026	\$ 3.43	\$ 3.80	\$ 3.47	\$ 3.47	\$ 3.47	\$ 3.44	\$ 3.30	\$ 3.80	\$ 3.51	\$ 3.53	
High Growth & Low Prices	2026-2027	\$ 3.38	\$ 3.79	\$ 3.42	\$ 3.42	\$ 3.42	\$ 3.38	\$ 3.22	\$ 3.79	\$ 3.46	\$ 3.49	
High Growth & Low Prices	2027-2028	\$ 3.32	\$ 9.20	\$ 3.36	\$ 3.36	\$ 3.36	\$ 8.77	\$ 3.14	\$ 9.20	\$ 7.04	\$ 4.52	
High Growth & Low Prices	2028-2029	\$ 3.49	\$ 9.34	\$ 3.54	\$ 3.54	\$ 3.54	\$ 8.96	\$ 3.32	\$ 9.34	\$ 7.21	\$ 4.69	
High Growth & Low Prices	2029-2030	\$ 3.48	\$ 9.32	\$ 8.99	\$ 8.99	\$ 8.99	\$ 8.96	\$ 3.33	\$ 9.32	\$ 7.20	\$ 7.96	
High Growth & Low Prices	2030-2031	\$ 3.56	\$ 9.35	\$ 9.07	\$ 9.07	\$ 9.07	\$ 9.02	\$ 8.87	\$ 9.36	\$ 9.08	\$ 8.02	
High Growth & Low Prices	2031-2032	\$ 3.44	\$ 8.96	\$ 14.35	\$ 14.35	\$ 14.35	\$ 8.88	\$ 8.74	\$ 8.96	\$ 8.86	\$ 11.09	
High Growth & Low Prices	2032-2033	\$ 3.43	\$ 8.93	\$ 14.36	\$ 14.36	\$ 14.36	\$ 8.87	\$ 8.75	\$ 8.91	\$ 8.84	\$ 11.09	

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Winter	OR Winter	
High Growth & Low Prices	2013-2014	\$ 3.54	\$ 3.92	\$ 3.54	\$ 3.54	\$ 3.54	\$ 3.70	\$ 3.42	\$ 3.88	\$ 3.67	\$ 3.61	
High Growth & Low Prices	2014-2015	\$ 3.67	\$ 4.04	\$ 3.67	\$ 3.67	\$ 3.67	\$ 3.83	\$ 3.56	\$ 4.02	\$ 3.81	\$ 3.75	
High Growth & Low Prices	2015-2016	\$ 3.67	\$ 4.05	\$ 3.67	\$ 3.67	\$ 3.67	\$ 3.84	\$ 3.55	\$ 4.03	\$ 3.81	\$ 3.75	
High Growth & Low Prices	2016-2017	\$ 3.61	\$ 4.34	\$ 3.61	\$ 3.61	\$ 3.61	\$ 3.83	\$ 3.49	\$ 4.33	\$ 3.88	\$ 3.76	
High Growth & Low Prices	2017-2018	\$ 3.50	\$ 4.25	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.71	\$ 3.36	\$ 4.25	\$ 3.77	\$ 3.65	
High Growth & Low Prices	2018-2019	\$ 3.45	\$ 4.23	\$ 3.45	\$ 3.45	\$ 3.45	\$ 3.62	\$ 3.26	\$ 4.23	\$ 3.70	\$ 3.61	
High Growth & Low Prices	2019-2020	\$ 3.44	\$ 4.07	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.57	\$ 3.22	\$ 4.07	\$ 3.62	\$ 3.57	
High Growth & Low Prices	2020-2021	\$ 3.45	\$ 4.03	\$ 3.45	\$ 3.45	\$ 3.45	\$ 3.59	\$ 3.23	\$ 4.03	\$ 3.61	\$ 3.57	
High Growth & Low Prices	2021-2022	\$ 3.61	\$ 3.81	\$ 3.61	\$ 3.61	\$ 3.61	\$ 3.68	\$ 3.35	\$ 3.81	\$ 3.61	\$ 3.65	
High Growth & Low Prices	2022-2023	\$ 3.52	\$ 3.68	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.60	\$ 3.30	\$ 3.68	\$ 3.52	\$ 3.55	
High Growth & Low Prices	2023-2024	\$ 3.51	\$ 3.59	\$ 3.51	\$ 3.51	\$ 3.51	\$ 3.55	\$ 3.31	\$ 3.59	\$ 3.48	\$ 3.53	
High Growth & Low Prices	2024-2025	\$ 3.63	\$ 3.79	\$ 3.63	\$ 3.63	\$ 3.63	\$ 3.71	\$ 3.39	\$ 3.79	\$ 3.63	\$ 3.66	
High Growth & Low Prices	2025-2026	\$ 3.66	\$ 3.83	\$ 3.66	\$ 3.66	\$ 3.66	\$ 3.75	\$ 3.41	\$ 3.83	\$ 3.66	\$ 3.69	
High Growth & Low Prices	2026-2027	\$ 3.64	\$ 3.86	\$ 3.64	\$ 3.64	\$ 3.64	\$ 3.71	\$ 3.34	\$ 3.86	\$ 3.64	\$ 3.69	
High Growth & Low Prices	2027-2028	\$ 3.60	\$ 17.04	\$ 3.60	\$ 3.60	\$ 3.60	\$ 16.79	\$ 3.24	\$ 17.04	\$ 12.36	\$ 6.29	
High Growth & Low Prices	2028-2029	\$ 3.73	\$ 17.11	\$ 3.73	\$ 3.73	\$ 3.73	\$ 17.01	\$ 3.39	\$ 17.11	\$ 12.50	\$ 6.40	
High Growth & Low Prices	2029-2030	\$ 3.76	\$ 17.10	\$ 16.98	\$ 16.98	\$ 16.98	\$ 17.09	\$ 3.47	\$ 17.10	\$ 12.55	\$ 14.36	
High Growth & Low Prices	2030-2031	\$ 3.78	\$ 17.08	\$ 16.99	\$ 16.99	\$ 16.99	\$ 17.06	\$ 16.69	\$ 17.10	\$ 16.95	\$ 14.37	
High Growth & Low Prices	2031-2032	\$ 3.69	\$ 16.88	\$ 29.94	\$ 29.94	\$ 29.94	\$ 16.87	\$ 16.52	\$ 16.88	\$ 16.76	\$ 22.08	
High Growth & Low Prices	2032-2033	\$ 3.64	\$ 16.90	\$ 30.07	\$ 30.07	\$ 30.07	\$ 16.90	\$ 16.59	\$ 16.90	\$ 16.79	\$ 22.15	

1/ Avoided costs are before Environmental Externalities adder.

### APPENDIX 5.4: CARBON LEGISLATION – MEDIUM CASE AVOIDED COST

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Carbon Legislation - Medium Case	2013-2014	\$ 3.52	\$ 3.71	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.45	\$ 3.45	\$ 3.66	\$ 3.52	\$ 3.56	
Carbon Legislation - Medium Case	2014-2015	\$ 3.49	\$ 3.72	\$ 3.49	\$ 3.49	\$ 3.49	\$ 3.51	\$ 3.43	\$ 3.72	\$ 3.55	\$ 3.53	
Carbon Legislation - Medium Case	2015-2016	\$ 3.76	\$ 3.92	\$ 3.76	\$ 3.76	\$ 3.76	\$ 3.77	\$ 3.70	\$ 3.92	\$ 3.79	\$ 3.79	
Carbon Legislation - Medium Case	2016-2017	\$ 3.52	\$ 3.80	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.57	\$ 3.45	\$ 3.80	\$ 3.61	\$ 3.57	
Carbon Legislation - Medium Case	2017-2018	\$ 3.49	\$ 3.79	\$ 3.49	\$ 3.49	\$ 3.49	\$ 3.54	\$ 3.43	\$ 3.79	\$ 3.59	\$ 3.55	
Carbon Legislation - Medium Case	2018-2019	\$ 3.34	\$ 3.64	\$ 3.34	\$ 3.34	\$ 3.34	\$ 3.39	\$ 3.28	\$ 3.63	\$ 3.43	\$ 3.40	
Carbon Legislation - Medium Case	2019-2020	\$ 3.43	\$ 3.68	\$ 3.43	\$ 3.43	\$ 3.43	\$ 3.47	\$ 3.36	\$ 3.68	\$ 3.50	\$ 3.48	
Carbon Legislation - Medium Case	2020-2021	\$ 4.14	\$ 4.34	\$ 4.14	\$ 4.14	\$ 4.14	\$ 4.17	\$ 4.05	\$ 4.34	\$ 4.19	\$ 4.18	
Carbon Legislation - Medium Case	2021-2022	\$ 4.32	\$ 4.47	\$ 4.32	\$ 4.32	\$ 4.32	\$ 4.32	\$ 4.24	\$ 4.47	\$ 4.34	\$ 4.35	
Carbon Legislation - Medium Case	2022-2023	\$ 4.30	\$ 4.44	\$ 4.30	\$ 4.30	\$ 4.30	\$ 4.28	\$ 4.23	\$ 4.44	\$ 4.32	\$ 4.33	
Carbon Legislation - Medium Case	2023-2024	\$ 4.53	\$ 4.58	\$ 4.53	\$ 4.53	\$ 4.53	\$ 4.50	\$ 4.46	\$ 4.58	\$ 4.51	\$ 4.54	
Carbon Legislation - Medium Case	2024-2025	\$ 4.77	\$ 4.93	\$ 4.77	\$ 4.77	\$ 4.77	\$ 4.75	\$ 4.69	\$ 4.93	\$ 4.79	\$ 4.80	
Carbon Legislation - Medium Case	2025-2026	\$ 4.91	\$ 5.08	\$ 4.91	\$ 4.91	\$ 4.91	\$ 4.89	\$ 4.83	\$ 5.08	\$ 4.93	\$ 4.95	
Carbon Legislation - Medium Case	2026-2027	\$ 4.90	\$ 5.10	\$ 4.90	\$ 4.90	\$ 4.90	\$ 4.90	\$ 4.81	\$ 5.10	\$ 4.93	\$ 4.94	
Carbon Legislation - Medium Case	2027-2028	\$ 4.89	\$ 5.09	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.80	\$ 5.09	\$ 4.93	\$ 4.93	
Carbon Legislation - Medium Case	2028-2029	\$ 5.30	\$ 5.47	\$ 5.30	\$ 5.30	\$ 5.30	\$ 5.28	\$ 5.20	\$ 5.48	\$ 5.32	\$ 5.33	
Carbon Legislation - Medium Case	2029-2030	\$ 5.19	\$ 5.36	\$ 5.19	\$ 5.19	\$ 5.19	\$ 5.17	\$ 5.10	\$ 5.36	\$ 5.21	\$ 5.22	
Carbon Legislation - Medium Case	2030-2031	\$ 5.37	\$ 5.50	\$ 5.37	\$ 5.37	\$ 5.37	\$ 5.34	\$ 5.28	\$ 5.50	\$ 5.37	\$ 5.40	
Carbon Legislation - Medium Case	2031-2032	\$ 5.57	\$ 5.57	\$ 5.55	\$ 5.55	\$ 5.55	\$ 5.52	\$ 5.47	\$ 5.57	\$ 5.52	\$ 5.56	
Carbon Legislation - Medium Case	2032-2033	\$ 5.80	\$ 5.77	\$ 5.76	\$ 5.76	\$ 5.76	\$ 5.73	\$ 5.71	\$ 5.76	\$ 5.73	\$ 5.77	

Winter Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Carbon Legislation - Medium Case	2013-2014	\$ 3.69	\$ 3.87	\$ 3.69	\$ 3.69	\$ 3.69	\$ 3.60	\$ 3.60	\$ 3.74	\$ 3.65	\$ 3.72	
Carbon Legislation - Medium Case	2014-2015	\$ 3.44	\$ 3.71	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.57	\$ 3.36	\$ 3.71	\$ 3.55	\$ 3.49	
Carbon Legislation - Medium Case	2015-2016	\$ 3.98	\$ 4.22	\$ 3.98	\$ 3.98	\$ 3.98	\$ 4.07	\$ 3.91	\$ 4.21	\$ 4.06	\$ 4.03	
Carbon Legislation - Medium Case	2016-2017	\$ 3.58	\$ 3.95	\$ 3.58	\$ 3.58	\$ 3.58	\$ 3.77	\$ 3.50	\$ 3.95	\$ 3.74	\$ 3.65	
Carbon Legislation - Medium Case	2017-2018	\$ 3.69	\$ 4.09	\$ 3.69	\$ 3.69	\$ 3.69	\$ 3.89	\$ 3.62	\$ 4.09	\$ 3.87	\$ 3.77	
Carbon Legislation - Medium Case	2018-2019	\$ 3.44	\$ 3.84	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.64	\$ 3.37	\$ 3.83	\$ 3.61	\$ 3.52	
Carbon Legislation - Medium Case	2019-2020	\$ 3.48	\$ 3.79	\$ 3.48	\$ 3.48	\$ 3.48	\$ 3.67	\$ 3.40	\$ 3.79	\$ 3.62	\$ 3.54	
Carbon Legislation - Medium Case	2020-2021	\$ 3.95	\$ 4.24	\$ 3.95	\$ 3.95	\$ 3.95	\$ 4.12	\$ 3.82	\$ 4.24	\$ 4.06	\$ 4.01	
Carbon Legislation - Medium Case	2021-2022	\$ 4.53	\$ 4.69	\$ 4.53	\$ 4.53	\$ 4.53	\$ 4.63	\$ 4.45	\$ 4.69	\$ 4.59	\$ 4.56	
Carbon Legislation - Medium Case	2022-2023	\$ 4.51	\$ 4.62	\$ 4.51	\$ 4.51	\$ 4.51	\$ 4.56	\$ 4.43	\$ 4.62	\$ 4.54	\$ 4.53	
Carbon Legislation - Medium Case	2023-2024	\$ 4.68	\$ 4.73	\$ 4.67	\$ 4.67	\$ 4.67	\$ 4.69	\$ 4.60	\$ 4.72	\$ 4.67	\$ 4.68	
Carbon Legislation - Medium Case	2024-2025	\$ 4.90	\$ 4.99	\$ 4.90	\$ 4.90	\$ 4.90	\$ 4.94	\$ 4.81	\$ 4.99	\$ 4.91	\$ 4.92	
Carbon Legislation - Medium Case	2025-2026	\$ 5.09	\$ 5.21	\$ 5.09	\$ 5.09	\$ 5.09	\$ 5.14	\$ 5.00	\$ 5.21	\$ 5.11	\$ 5.11	
Carbon Legislation - Medium Case	2026-2027	\$ 5.13	\$ 5.30	\$ 5.13	\$ 5.13	\$ 5.13	\$ 5.23	\$ 5.03	\$ 5.30	\$ 5.19	\$ 5.17	
Carbon Legislation - Medium Case	2027-2028	\$ 5.09	\$ 5.30	\$ 5.08	\$ 5.08	\$ 5.08	\$ 5.21	\$ 4.98	\$ 5.30	\$ 5.16	\$ 5.13	
Carbon Legislation - Medium Case	2028-2029	\$ 5.50	\$ 5.62	\$ 5.49	\$ 5.49	\$ 5.49	\$ 5.56	\$ 5.38	\$ 5.62	\$ 5.52	\$ 5.52	
Carbon Legislation - Medium Case	2029-2030	\$ 5.54	\$ 5.64	\$ 5.54	\$ 5.54	\$ 5.54	\$ 5.59	\$ 5.44	\$ 5.64	\$ 5.56	\$ 5.56	
Carbon Legislation - Medium Case	2030-2031	\$ 5.59	\$ 5.66	\$ 5.59	\$ 5.59	\$ 5.59	\$ 5.62	\$ 5.48	\$ 5.66	\$ 5.59	\$ 5.60	
Carbon Legislation - Medium Case	2031-2032	\$ 5.71	\$ 5.74	\$ 5.70	\$ 5.70	\$ 5.70	\$ 5.72	\$ 5.59	\$ 5.72	\$ 5.68	\$ 5.71	
Carbon Legislation - Medium Case	2032-2033	\$ 5.86	\$ 5.84	\$ 5.85	\$ 5.85	\$ 5.85	\$ 5.84	\$ 5.76	\$ 5.84	\$ 5.81	\$ 5.85	

1/Avoided costs are before Environmental Externalities adder.

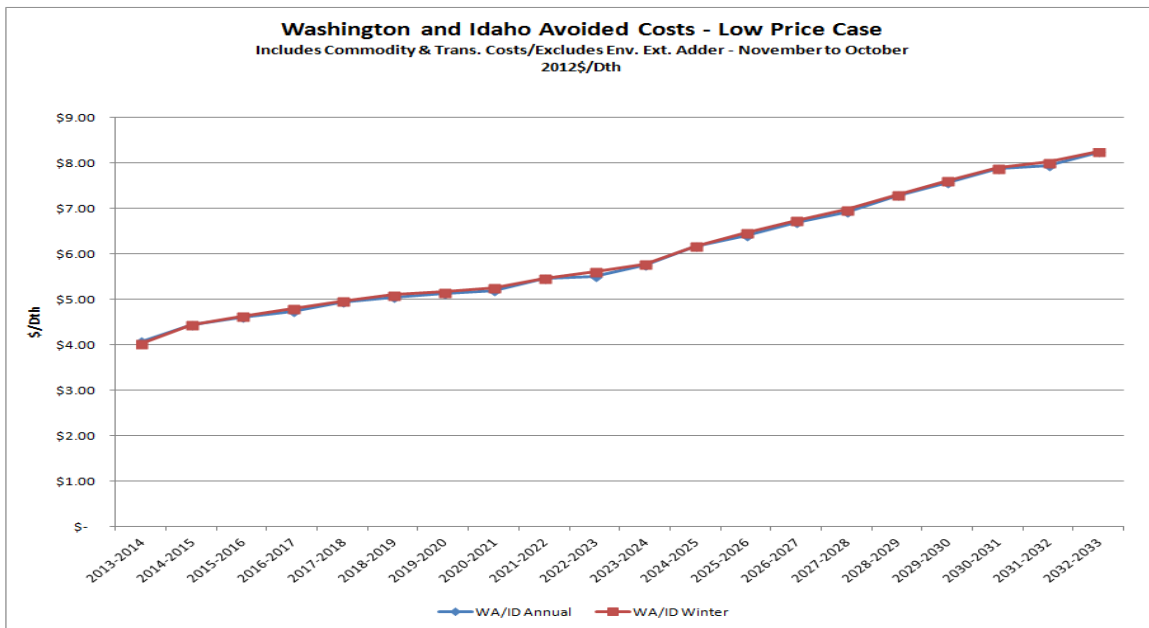
### APPENDIX 5.4: COLD DAY 20 YR WEATHER STANDARD AVOIDED COST

Annual Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Cold Day 20 Yr Weather Std	2013-2014	\$ 3.53	\$ 4.12	\$ 3.53	\$ 3.53	\$ 3.53	\$ 3.54	\$ 3.45	\$ 4.12	\$ 3.70	\$ 3.65	
Cold Day 20 Yr Weather Std	2014-2015	\$ 3.50	\$ 4.16	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.56	\$ 3.42	\$ 4.17	\$ 3.72	\$ 3.63	
Cold Day 20 Yr Weather Std	2015-2016	\$ 3.77	\$ 4.46	\$ 3.77	\$ 3.77	\$ 3.77	\$ 3.84	\$ 3.70	\$ 4.48	\$ 4.01	\$ 3.91	
Cold Day 20 Yr Weather Std	2016-2017	\$ 3.53	\$ 4.34	\$ 3.53	\$ 3.53	\$ 3.53	\$ 3.60	\$ 3.45	\$ 4.34	\$ 3.80	\$ 3.69	
Cold Day 20 Yr Weather Std	2017-2018	\$ 3.50	\$ 4.38	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.58	\$ 3.43	\$ 4.38	\$ 3.80	\$ 3.67	
Cold Day 20 Yr Weather Std	2018-2019	\$ 3.36	\$ 4.26	\$ 3.36	\$ 3.36	\$ 3.36	\$ 3.42	\$ 3.28	\$ 4.27	\$ 3.65	\$ 3.54	
Cold Day 20 Yr Weather Std	2019-2020	\$ 3.44	\$ 4.20	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.51	\$ 3.36	\$ 4.21	\$ 3.69	\$ 3.59	
Cold Day 20 Yr Weather Std	2020-2021	\$ 3.75	\$ 4.36	\$ 3.75	\$ 3.75	\$ 3.75	\$ 3.78	\$ 3.64	\$ 4.37	\$ 3.93	\$ 3.87	
Cold Day 20 Yr Weather Std	2021-2022	\$ 3.81	\$ 4.17	\$ 3.81	\$ 3.81	\$ 3.81	\$ 3.87	\$ 3.74	\$ 4.17	\$ 3.93	\$ 3.88	
Cold Day 20 Yr Weather Std	2022-2023	\$ 3.77	\$ 4.15	\$ 3.77	\$ 3.77	\$ 3.77	\$ 3.80	\$ 3.69	\$ 4.17	\$ 3.89	\$ 3.84	
Cold Day 20 Yr Weather Std	2023-2024	\$ 3.97	\$ 4.13	\$ 3.97	\$ 3.97	\$ 3.97	\$ 3.97	\$ 3.90	\$ 4.16	\$ 4.01	\$ 4.00	
Cold Day 20 Yr Weather Std	2024-2025	\$ 4.19	\$ 4.61	\$ 4.19	\$ 4.19	\$ 4.19	\$ 4.22	\$ 4.11	\$ 4.64	\$ 4.32	\$ 4.28	
Cold Day 20 Yr Weather Std	2025-2026	\$ 4.30	\$ 4.73	\$ 4.30	\$ 4.30	\$ 4.30	\$ 4.34	\$ 4.22	\$ 4.74	\$ 4.44	\$ 4.39	
Cold Day 20 Yr Weather Std	2026-2027	\$ 4.25	\$ 4.89	\$ 4.25	\$ 4.25	\$ 4.25	\$ 4.30	\$ 4.17	\$ 4.89	\$ 4.45	\$ 4.38	
Cold Day 20 Yr Weather Std	2027-2028	\$ 4.22	\$ 4.92	\$ 4.22	\$ 4.22	\$ 4.22	\$ 4.27	\$ 4.12	\$ 4.93	\$ 4.44	\$ 4.36	
Cold Day 20 Yr Weather Std	2028-2029	\$ 4.59	\$ 5.04	\$ 4.59	\$ 4.59	\$ 4.59	\$ 4.63	\$ 4.49	\$ 5.05	\$ 4.72	\$ 4.68	
Cold Day 20 Yr Weather Std	2029-2030	\$ 4.44	\$ 4.92	\$ 4.44	\$ 4.44	\$ 4.44	\$ 4.47	\$ 4.36	\$ 4.94	\$ 4.59	\$ 4.54	
Cold Day 20 Yr Weather Std	2030-2031	\$ 4.59	\$ 4.96	\$ 4.59	\$ 4.59	\$ 4.59	\$ 4.61	\$ 4.50	\$ 5.00	\$ 4.70	\$ 4.67	
Cold Day 20 Yr Weather Std	2031-2032	\$ 4.73	\$ 4.86	\$ 4.74	\$ 4.74	\$ 4.74	\$ 4.76	\$ 4.64	\$ 4.90	\$ 4.77	\$ 4.76	
Cold Day 20 Yr Weather Std	2032-2033	\$ 4.94	\$ 4.93	\$ 4.93	\$ 4.93	\$ 4.93	\$ 4.88	\$ 4.84	\$ 4.93	\$ 4.89	\$ 4.93	

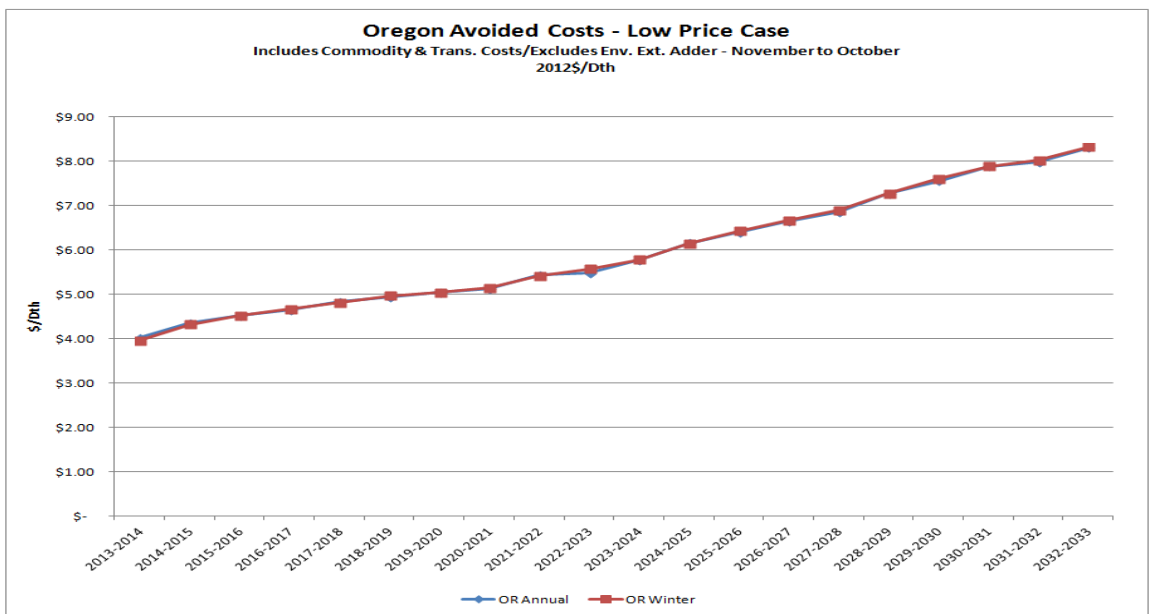
Winter Avoided Costs 1/ 2012\$												
Scenario	Gas Year	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Cold Day 20 Yr Weather Std	2013-2014	\$ 3.72	\$ 4.16	\$ 3.72	\$ 3.72	\$ 3.72	\$ 3.81	\$ 3.59	\$ 4.10	\$ 3.84	\$ 3.81	
Cold Day 20 Yr Weather Std	2014-2015	\$ 3.47	\$ 4.14	\$ 3.47	\$ 3.47	\$ 3.47	\$ 3.70	\$ 3.36	\$ 4.14	\$ 3.73	\$ 3.60	
Cold Day 20 Yr Weather Std	2015-2016	\$ 4.00	\$ 4.61	\$ 4.00	\$ 4.00	\$ 4.00	\$ 4.24	\$ 3.91	\$ 4.60	\$ 4.25	\$ 4.13	
Cold Day 20 Yr Weather Std	2016-2017	\$ 3.61	\$ 4.37	\$ 3.61	\$ 3.61	\$ 3.61	\$ 3.85	\$ 3.50	\$ 4.37	\$ 3.91	\$ 3.76	
Cold Day 20 Yr Weather Std	2017-2018	\$ 3.71	\$ 4.54	\$ 3.71	\$ 3.71	\$ 3.71	\$ 3.98	\$ 3.62	\$ 4.54	\$ 4.05	\$ 3.88	
Cold Day 20 Yr Weather Std	2018-2019	\$ 3.49	\$ 4.29	\$ 3.49	\$ 3.49	\$ 3.49	\$ 3.72	\$ 3.37	\$ 4.28	\$ 3.79	\$ 3.65	
Cold Day 20 Yr Weather Std	2019-2020	\$ 3.52	\$ 4.23	\$ 3.52	\$ 3.52	\$ 3.52	\$ 3.75	\$ 3.40	\$ 4.22	\$ 3.79	\$ 3.66	
Cold Day 20 Yr Weather Std	2020-2021	\$ 3.70	\$ 4.31	\$ 3.70	\$ 3.70	\$ 3.70	\$ 3.87	\$ 3.53	\$ 4.31	\$ 3.90	\$ 3.82	
Cold Day 20 Yr Weather Std	2021-2022	\$ 4.04	\$ 4.38	\$ 4.04	\$ 4.04	\$ 4.04	\$ 4.26	\$ 3.95	\$ 4.37	\$ 4.19	\$ 4.11	
Cold Day 20 Yr Weather Std	2022-2023	\$ 4.00	\$ 4.27	\$ 4.00	\$ 4.00	\$ 4.00	\$ 4.16	\$ 3.90	\$ 4.27	\$ 4.11	\$ 4.05	
Cold Day 20 Yr Weather Std	2023-2024	\$ 4.13	\$ 4.25	\$ 4.13	\$ 4.13	\$ 4.13	\$ 4.21	\$ 4.05	\$ 4.25	\$ 4.17	\$ 4.16	
Cold Day 20 Yr Weather Std	2024-2025	\$ 4.35	\$ 4.59	\$ 4.35	\$ 4.35	\$ 4.35	\$ 4.51	\$ 4.23	\$ 4.59	\$ 4.44	\$ 4.40	
Cold Day 20 Yr Weather Std	2025-2026	\$ 4.50	\$ 4.80	\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.69	\$ 4.39	\$ 4.80	\$ 4.63	\$ 4.56	
Cold Day 20 Yr Weather Std	2026-2027	\$ 4.51	\$ 4.85	\$ 4.51	\$ 4.51	\$ 4.51	\$ 4.71	\$ 4.39	\$ 4.85	\$ 4.65	\$ 4.58	
Cold Day 20 Yr Weather Std	2027-2028	\$ 4.45	\$ 4.98	\$ 4.45	\$ 4.45	\$ 4.45	\$ 4.68	\$ 4.31	\$ 4.98	\$ 4.65	\$ 4.55	
Cold Day 20 Yr Weather Std	2028-2029	\$ 4.82	\$ 5.15	\$ 4.82	\$ 4.82	\$ 4.82	\$ 5.01	\$ 4.68	\$ 5.15	\$ 4.94	\$ 4.89	
Cold Day 20 Yr Weather Std	2029-2030	\$ 4.81	\$ 5.05	\$ 4.81	\$ 4.81	\$ 4.81	\$ 4.98	\$ 4.70	\$ 5.05	\$ 4.91	\$ 4.86	
Cold Day 20 Yr Weather Std	2030-2031	\$ 4.84	\$ 5.04	\$ 4.84	\$ 4.84	\$ 4.84	\$ 4.98	\$ 4.70	\$ 5.05	\$ 4.91	\$ 4.88	
Cold Day 20 Yr Weather Std	2031-2032	\$ 4.89	\$ 5.08	\$ 4.88	\$ 4.88	\$ 4.88	\$ 5.06	\$ 4.77	\$ 5.08	\$ 4.97	\$ 4.92	
Cold Day 20 Yr Weather Std	2032-2033	\$ 5.03	\$ 5.01	\$ 5.02	\$ 5.02	\$ 5.02	\$ 5.00	\$ 4.90	\$ 5.00	\$ 4.97	\$ 5.02	

1/Avoided costs are before Environmental Externalities added.

### APPENDIX 5.4: WASHINGTON AND IDAHO AVOIDED COSTS - LOW GROWTH/HIGH PRICE CASE



### APPENDIX 5.4: NATURAL GAS OREGON AVOIDED COSTS - LOW GROWTH/HIGH PRICE CASE



### APPENDIX 5.4: LOW GROWTH – HIGH PRICE MONTHLY DETAIL

Monthly Avoided Cost Detail 1/													
2012\$													
Scenario	Gas Year	Month	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Low Growth & High Prices	2013-2014	Nov	\$ 3.33	\$ 3.83	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.27	\$ 3.27	\$ 3.83	\$ 3.46	\$ 3.43	
Low Growth & High Prices	2013-2014	Dec	\$ 4.01	\$ 4.73	\$ 4.02	\$ 4.02	\$ 4.02	\$ 4.21	\$ 3.66	\$ 4.59	\$ 4.15	\$ 4.16	
Low Growth & High Prices	2013-2014	Jan	\$ 4.26	\$ 4.61	\$ 4.26	\$ 4.26	\$ 4.26	\$ 4.61	\$ 4.20	\$ 4.61	\$ 4.47	\$ 4.33	
Low Growth & High Prices	2013-2014	Feb	\$ 3.56	\$ 4.30	\$ 3.56	\$ 3.56	\$ 3.56	\$ 3.89	\$ 3.35	\$ 4.30	\$ 3.85	\$ 3.71	
Low Growth & High Prices	2013-2014	Mar	\$ 3.98	\$ 4.59	\$ 3.98	\$ 3.98	\$ 3.98	\$ 3.92	\$ 3.92	\$ 4.59	\$ 4.14	\$ 4.10	
Low Growth & High Prices	2013-2014	Apr	\$ 3.96	\$ 4.61	\$ 3.96	\$ 3.96	\$ 3.96	\$ 3.90	\$ 3.90	\$ 4.61	\$ 4.13	\$ 4.09	
Low Growth & High Prices	2013-2014	May	\$ 3.92	\$ 4.59	\$ 3.92	\$ 3.92	\$ 3.92	\$ 3.86	\$ 3.86	\$ 4.59	\$ 4.10	\$ 4.05	
Low Growth & High Prices	2013-2014	Jun	\$ 3.93	\$ 4.59	\$ 3.93	\$ 3.93	\$ 3.93	\$ 3.87	\$ 3.87	\$ 4.59	\$ 4.11	\$ 4.06	
Low Growth & High Prices	2013-2014	Jul	\$ 3.91	\$ 4.59	\$ 3.91	\$ 3.91	\$ 3.91	\$ 3.85	\$ 3.85	\$ 4.59	\$ 4.09	\$ 4.04	
Low Growth & High Prices	2013-2014	Aug	\$ 3.90	\$ 4.59	\$ 3.90	\$ 3.90	\$ 3.90	\$ 3.84	\$ 3.84	\$ 4.59	\$ 4.09	\$ 4.04	
Low Growth & High Prices	2013-2014	Sep	\$ 3.93	\$ 4.59	\$ 3.93	\$ 3.93	\$ 3.93	\$ 3.87	\$ 3.87	\$ 4.59	\$ 4.11	\$ 4.06	
Low Growth & High Prices	2013-2014	Oct	\$ 3.95	\$ 4.68	\$ 3.95	\$ 3.95	\$ 3.95	\$ 3.89	\$ 3.89	\$ 4.68	\$ 4.15	\$ 4.09	
Low Growth & High Prices	2014-2015	Nov	\$ 3.98	\$ 4.71	\$ 3.98	\$ 3.98	\$ 3.98	\$ 3.92	\$ 3.92	\$ 4.71	\$ 4.18	\$ 4.12	
Low Growth & High Prices	2014-2015	Dec	\$ 4.07	\$ 4.79	\$ 4.07	\$ 4.07	\$ 4.07	\$ 4.40	\$ 3.84	\$ 4.80	\$ 4.35	\$ 4.22	
Low Growth & High Prices	2014-2015	Jan	\$ 4.23	\$ 4.92	\$ 4.23	\$ 4.23	\$ 4.23	\$ 4.65	\$ 4.17	\$ 4.92	\$ 4.58	\$ 4.37	
Low Growth & High Prices	2014-2015	Feb	\$ 4.29	\$ 4.94	\$ 4.29	\$ 4.29	\$ 4.29	\$ 4.63	\$ 4.18	\$ 4.93	\$ 4.58	\$ 4.42	
Low Growth & High Prices	2014-2015	Mar	\$ 4.38	\$ 4.92	\$ 4.38	\$ 4.38	\$ 4.38	\$ 4.32	\$ 4.32	\$ 4.92	\$ 4.52	\$ 4.49	
Low Growth & High Prices	2014-2015	Apr	\$ 4.31	\$ 4.95	\$ 4.31	\$ 4.31	\$ 4.31	\$ 4.25	\$ 4.25	\$ 4.95	\$ 4.48	\$ 4.44	
Low Growth & High Prices	2014-2015	May	\$ 4.24	\$ 4.92	\$ 4.24	\$ 4.24	\$ 4.24	\$ 4.18	\$ 4.18	\$ 4.92	\$ 4.42	\$ 4.38	
Low Growth & High Prices	2014-2015	Jun	\$ 4.23	\$ 4.92	\$ 4.23	\$ 4.23	\$ 4.23	\$ 4.17	\$ 4.17	\$ 4.92	\$ 4.42	\$ 4.37	
Low Growth & High Prices	2014-2015	Jul	\$ 4.20	\$ 4.89	\$ 4.20	\$ 4.20	\$ 4.20	\$ 4.14	\$ 4.14	\$ 4.92	\$ 4.40	\$ 4.34	
Low Growth & High Prices	2014-2015	Aug	\$ 4.19	\$ 4.88	\$ 4.19	\$ 4.19	\$ 4.19	\$ 4.13	\$ 4.13	\$ 4.92	\$ 4.39	\$ 4.33	
Low Growth & High Prices	2014-2015	Sep	\$ 4.23	\$ 4.92	\$ 4.23	\$ 4.23	\$ 4.23	\$ 4.17	\$ 4.17	\$ 4.92	\$ 4.42	\$ 4.37	
Low Growth & High Prices	2014-2015	Oct	\$ 4.29	\$ 4.93	\$ 4.29	\$ 4.29	\$ 4.29	\$ 4.23	\$ 4.23	\$ 4.93	\$ 4.46	\$ 4.42	
Low Growth & High Prices	2015-2016	Nov	\$ 4.31	\$ 5.04	\$ 4.31	\$ 4.31	\$ 4.31	\$ 4.25	\$ 4.25	\$ 5.04	\$ 4.51	\$ 4.46	
Low Growth & High Prices	2015-2016	Dec	\$ 4.37	\$ 5.08	\$ 4.37	\$ 4.37	\$ 4.37	\$ 4.70	\$ 4.16	\$ 5.07	\$ 4.64	\$ 4.51	
Low Growth & High Prices	2015-2016	Jan	\$ 4.33	\$ 5.07	\$ 4.33	\$ 4.33	\$ 4.33	\$ 4.75	\$ 4.27	\$ 5.07	\$ 4.69	\$ 4.48	
Low Growth & High Prices	2015-2016	Feb	\$ 4.40	\$ 5.10	\$ 4.40	\$ 4.40	\$ 4.40	\$ 4.72	\$ 4.28	\$ 5.07	\$ 4.69	\$ 4.54	
Low Growth & High Prices	2015-2016	Mar	\$ 4.51	\$ 5.07	\$ 4.51	\$ 4.51	\$ 4.51	\$ 4.44	\$ 4.44	\$ 5.07	\$ 4.65	\$ 4.62	
Low Growth & High Prices	2015-2016	Apr	\$ 4.44	\$ 5.17	\$ 4.44	\$ 4.44	\$ 4.44	\$ 4.37	\$ 4.37	\$ 5.17	\$ 4.63	\$ 4.58	
Low Growth & High Prices	2015-2016	May	\$ 4.37	\$ 5.07	\$ 4.37	\$ 4.37	\$ 4.37	\$ 4.31	\$ 4.31	\$ 5.07	\$ 4.56	\$ 4.51	
Low Growth & High Prices	2015-2016	Jun	\$ 4.40	\$ 5.07	\$ 4.40	\$ 4.40	\$ 4.40	\$ 4.33	\$ 4.33	\$ 5.07	\$ 4.57	\$ 4.53	
Low Growth & High Prices	2015-2016	Jul	\$ 4.36	\$ 5.04	\$ 4.36	\$ 4.36	\$ 4.36	\$ 4.30	\$ 4.30	\$ 5.07	\$ 4.56	\$ 4.50	
Low Growth & High Prices	2015-2016	Aug	\$ 4.33	\$ 5.07	\$ 4.33	\$ 4.33	\$ 4.33	\$ 4.27	\$ 4.27	\$ 5.07	\$ 4.54	\$ 4.48	
Low Growth & High Prices	2015-2016	Sep	\$ 4.34	\$ 5.07	\$ 4.34	\$ 4.34	\$ 4.34	\$ 4.28	\$ 4.28	\$ 5.07	\$ 4.54	\$ 4.49	
Low Growth & High Prices	2015-2016	Oct	\$ 4.39	\$ 5.14	\$ 4.39	\$ 4.39	\$ 4.39	\$ 4.32	\$ 4.32	\$ 5.14	\$ 4.59	\$ 4.54	
Low Growth & High Prices	2016-2017	Nov	\$ 4.43	\$ 5.24	\$ 4.43	\$ 4.43	\$ 4.43	\$ 4.36	\$ 4.36	\$ 5.24	\$ 4.65	\$ 4.59	
Low Growth & High Prices	2016-2017	Dec	\$ 4.49	\$ 5.27	\$ 4.49	\$ 4.49	\$ 4.49	\$ 4.82	\$ 4.27	\$ 5.27	\$ 4.78	\$ 4.64	
Low Growth & High Prices	2016-2017	Jan	\$ 4.50	\$ 5.27	\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.91	\$ 4.43	\$ 5.27	\$ 4.87	\$ 4.65	
Low Growth & High Prices	2016-2017	Feb	\$ 4.56	\$ 5.28	\$ 4.56	\$ 4.56	\$ 4.56	\$ 4.91	\$ 4.45	\$ 5.28	\$ 4.88	\$ 4.71	
Low Growth & High Prices	2016-2017	Mar	\$ 4.63	\$ 5.27	\$ 4.63	\$ 4.63	\$ 4.63	\$ 4.56	\$ 4.56	\$ 5.27	\$ 4.80	\$ 4.76	
Low Growth & High Prices	2016-2017	Apr	\$ 4.53	\$ 5.32	\$ 4.53	\$ 4.53	\$ 4.53	\$ 4.46	\$ 4.46	\$ 5.32	\$ 4.75	\$ 4.69	
Low Growth & High Prices	2016-2017	May	\$ 4.46	\$ 5.28	\$ 4.46	\$ 4.46	\$ 4.46	\$ 4.39	\$ 4.39	\$ 5.28	\$ 4.68	\$ 4.62	
Low Growth & High Prices	2016-2017	Jun	\$ 4.46	\$ 5.26	\$ 4.46	\$ 4.46	\$ 4.46	\$ 4.39	\$ 4.39	\$ 5.28	\$ 4.68	\$ 4.62	
Low Growth & High Prices	2016-2017	Jul	\$ 4.44	\$ 5.25	\$ 4.44	\$ 4.44	\$ 4.44	\$ 4.37	\$ 4.37	\$ 5.28	\$ 4.67	\$ 4.60	
Low Growth & High Prices	2016-2017	Aug	\$ 4.43	\$ 5.26	\$ 4.43	\$ 4.43	\$ 4.43	\$ 4.36	\$ 4.36	\$ 5.28	\$ 4.66	\$ 4.59	
Low Growth & High Prices	2016-2017	Sep	\$ 4.45	\$ 5.28	\$ 4.45	\$ 4.45	\$ 4.45	\$ 4.38	\$ 4.38	\$ 5.28	\$ 4.68	\$ 4.61	
Low Growth & High Prices	2016-2017	Oct	\$ 4.50	\$ 5.30	\$ 4.50	\$ 4.50	\$ 4.50	\$ 4.43	\$ 4.43	\$ 5.30	\$ 4.72	\$ 4.66	
Low Growth & High Prices	2017-2018	Nov	\$ 4.51	\$ 5.39	\$ 4.51	\$ 4.51	\$ 4.51	\$ 4.44	\$ 4.44	\$ 5.39	\$ 4.76	\$ 4.68	
Low Growth & High Prices	2017-2018	Dec	\$ 4.56	\$ 5.40	\$ 4.56	\$ 4.56	\$ 4.56	\$ 4.90	\$ 4.33	\$ 5.41	\$ 4.88	\$ 4.73	
Low Growth & High Prices	2017-2018	Jan	\$ 4.69	\$ 5.55	\$ 4.69	\$ 4.69	\$ 4.69	\$ 5.10	\$ 4.62	\$ 5.55	\$ 5.09	\$ 4.86	
Low Growth & High Prices	2017-2018	Feb	\$ 4.73	\$ 5.55	\$ 4.73	\$ 4.73	\$ 4.73	\$ 5.09	\$ 4.61	\$ 5.55	\$ 5.08	\$ 4.90	
Low Growth & High Prices	2017-2018	Mar	\$ 4.79	\$ 5.51	\$ 4.79	\$ 4.79	\$ 4.79	\$ 4.72	\$ 4.72	\$ 5.51	\$ 4.98	\$ 4.94	
Low Growth & High Prices	2017-2018	Apr	\$ 4.72	\$ 5.58	\$ 4.72	\$ 4.72	\$ 4.72	\$ 4.65	\$ 4.65	\$ 5.58	\$ 4.96	\$ 4.89	
Low Growth & High Prices	2017-2018	May	\$ 4.67	\$ 5.55	\$ 4.67	\$ 4.67	\$ 4.67	\$ 4.60	\$ 4.60	\$ 5.55	\$ 4.91	\$ 4.85	
Low Growth & High Prices	2017-2018	Jun	\$ 4.67	\$ 5.55	\$ 4.67	\$ 4.67	\$ 4.67	\$ 4.60	\$ 4.60	\$ 5.55	\$ 4.92	\$ 4.85	
Low Growth & High Prices	2017-2018	Jul	\$ 4.65	\$ 5.55	\$ 4.65	\$ 4.65	\$ 4.65	\$ 4.58	\$ 4.58	\$ 5.55	\$ 4.90	\$ 4.83	
Low Growth & High Prices	2017-2018	Aug	\$ 4.63	\$ 5.55	\$ 4.63	\$ 4.63	\$ 4.63	\$ 4.56	\$ 4.56	\$ 5.55	\$ 4.89	\$ 4.81	
Low Growth & High Prices	2017-2018	Sep	\$ 4.64	\$ 5.55	\$ 4.64	\$ 4.64	\$ 4.64	\$ 4.57	\$ 4.57	\$ 5.55	\$ 4.90	\$ 4.82	
Low Growth & High Prices	2017-2018	Oct	\$ 4.68	\$ 5.58	\$ 4.68	\$ 4.68	\$ 4.68	\$ 4.61	\$ 4.61	\$ 5.58	\$ 4.93	\$ 4.86	
Low Growth & High Prices	2018-2019	Nov	\$ 4.79	\$ 5.62	\$ 4.79	\$ 4.79	\$ 4.79	\$ 4.72	\$ 4.72	\$ 5.62	\$ 5.02	\$ 4.96	
Low Growth & High Prices	2018-2019	Dec	\$ 4.83	\$ 5.64	\$ 4.83	\$ 4.83	\$ 4.83	\$ 5.15	\$ 4.59	\$ 5.63	\$ 5.12	\$ 4.99	
Low Growth & High Prices	2018-2019	Jan	\$ 4.70	\$ 5.63	\$ 4.70	\$ 4.70	\$ 4.70	\$ 5.11	\$ 4.63	\$ 5.63	\$ 5.12	\$ 4.89	
Low Growth & High Prices	2018-2019	Feb	\$ 4.79	\$ 5.63	\$ 4.79	\$ 4.79	\$ 4.79	\$ 5.11	\$ 4.64	\$ 5.63	\$ 5.13	\$ 4.96	
Low Growth & High Prices	2018-2019	Mar	\$ 4.90	\$ 5.63	\$ 4.90	\$ 4.90	\$ 4.90	\$ 4.83	\$ 4.83	\$ 5.63	\$ 5.10	\$ 5.05	
Low Growth & High Prices	2018-2019	Apr	\$ 4.81	\$ 5.76	\$ 4.81	\$ 4.81	\$ 4.81	\$ 4.74	\$ 4.74	\$ 5.76	\$ 5.08	\$ 5.00	
Low Growth & High Prices	2018-2019	May	\$ 4.76	\$ 5.63	\$ 4.76	\$ 4.76	\$ 4.76	\$ 4.69	\$ 4.69	\$ 5.63	\$ 5.00	\$ 4.94	
Low Growth & High Prices	2018-2019	Jun	\$ 4.73	\$ 5.63	\$ 4.73	\$ 4.73	\$ 4.73	\$ 4.66	\$ 4.66	\$ 5.63	\$ 4.98	\$ 4.91	
Low Growth & High Prices	2018-2019	Jul	\$ 4.71	\$ 5.63	\$ 4.71	\$ 4.71	\$ 4.71	\$ 4.64	\$ 4.64	\$ 5.64	\$ 4.97	\$ 4.89	
Low Growth & High Prices	2018-2019	Aug	\$ 4.69	\$ 5.64	\$ 4.69	\$ 4.69	\$ 4.69	\$ 4.62	\$ 4.62	\$ 5.64	\$ 4.96	\$ 4.88	
Low Growth & High Prices	2018-2019	Sep	\$ 4.71	\$ 5.64	\$ 4.71	\$ 4.71	\$ 4.71	\$ 4.64	\$ 4.64	\$ 5.64	\$ 4.97	\$ 4.90	
Low Growth & High Prices	2018-2019	Oct	\$ 4.76	\$ 5.72	\$ 4.76	\$ 4.76	\$ 4.76	\$ 4.69	\$ 4.69	\$ 5.72	\$ 5.03	\$ 4.95	
Low Growth & High Prices	2019-2020	Nov	\$ 4.89	\$ 5.59	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.82	\$ 4.82	\$ 5.59	\$ 5.08	\$ 5.03	
Low Growth & High Prices	2019-2020	Dec	\$ 4.92	\$ 5.61	\$ 4.92	\$ 4.92	\$ 4.92	\$ 5.24	\$ 4.70	\$ 5.62	\$ 5.18	\$ 5.06	
Low Growth & High Prices	2019-2020	Jan	\$ 4.75	\$ 5.64	\$ 4.75	\$ 4.75	\$ 4.75	\$ 5.16	\$ 4.68	\$ 5.64	\$ 5.16	\$ 4.93	
Low Growth & High Prices	2019-2020	Feb	\$ 4.88	\$ 5.61	\$ 4.88	\$ 4.88	\$ 4.88	\$ 5.19	\$ 4.73	\$ 5.61	\$ 5.17	\$ 5.03	
Low Growth & High Prices	2019-2020	Mar	\$ 5.07	\$ 5.64	\$ 5.07	\$ 5.07	\$ 5.07	\$ 4.99	\$ 4.99	\$ 5.64	\$ 5.21	\$ 5.18	
Low Growth & High Prices	2019-2020	Apr	\$ 4.98	\$ 5.69	\$ 4.98	\$ 4.98	\$ 4.98	\$ 4.90	\$ 4.90	\$ 5.69	\$ 5.16	\$ 5.12	
Low Growth & High Prices	2019-2020	May	\$ 4.90	\$ 5.65	\$ 4.90	\$ 4.90	\$ 4.90	\$ 4.83	\$ 4.83	\$ 5.65	\$ 5.10	\$ 5.05	
Low Growth & High Prices	2019-2020	Jun	\$ 4.87	\$ 5.65	\$ 4.87	\$ 4.87	\$ 4.87	\$ 4.80	\$ 4.80	\$ 5.65	\$ 5.08	\$ 5.03	
Low Growth & High Prices	2019-2020	Jul	\$ 4.83	\$ 5.62	\$ 4.83	\$ 4.83	\$ 4.83	\$ 4.76	\$ 4.76	\$ 5.65	\$ 5.05	\$ 4.99	
Low Growth & High Prices	2019-2020	Aug	\$ 4.82	\$ 5.62	\$ 4.82	\$ 4.82	\$ 4.82	\$ 4.75	\$ 4.75	\$ 5.65	\$ 5.05	\$ 4.98	
Low Growth & High Prices	2019-2020	Sep	\$ 4.84	\$ 5.65	\$ 4.84	\$ 4.84	\$ 4.84	\$ 4.77	\$ 4.77	\$ 5.65	\$ 5.06	\$ 5.00	
Low Growth & High Prices	2019-2020	Oct	\$ 4.89	\$ 5.67	\$ 4.89	\$ 4.89	\$ 4.89	\$ 4.82	\$ 4.82	\$ 5.67	\$ 5.10	\$ 5.05	

1/ Avoided costs are before Environmental Externalities adder.





### APPENDIX 5.4: LOW GROWTH – HIGH PRICE MONTHLY DETAIL

Monthly Avoided Cost Detail 1/ 2012\$													
Scenario	Gas Year	Month	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Low Growth & High Prices	2028-2029	Nov	\$ 6.95	\$ 7.54	\$ 6.95	\$ 6.95	\$ 6.95	\$ 6.85	\$ 6.85	\$ 7.54	\$ 7.08	\$ 7.07	
Low Growth & High Prices	2028-2029	Dec	\$ 7.07	\$ 7.51	\$ 7.07	\$ 7.07	\$ 7.07	\$ 7.34	\$ 6.83	\$ 7.51	\$ 7.23	\$ 7.16	
Low Growth & High Prices	2028-2029	Jan	\$ 7.20	\$ 7.63	\$ 7.20	\$ 7.20	\$ 7.20	\$ 7.57	\$ 7.10	\$ 7.63	\$ 7.43	\$ 7.29	
Low Growth & High Prices	2028-2029	Feb	\$ 7.33	\$ 7.44	\$ 7.33	\$ 7.33	\$ 7.33	\$ 7.40	\$ 7.17	\$ 7.44	\$ 7.33	\$ 7.35	
Low Growth & High Prices	2028-2029	Mar	\$ 7.50	\$ 7.51	\$ 7.50	\$ 7.50	\$ 7.50	\$ 7.39	\$ 7.39	\$ 7.51	\$ 7.43	\$ 7.50	
Low Growth & High Prices	2028-2029	Apr	\$ 7.28	\$ 7.70	\$ 7.28	\$ 7.28	\$ 7.28	\$ 7.18	\$ 7.18	\$ 7.70	\$ 7.35	\$ 7.37	
Low Growth & High Prices	2028-2029	May	\$ 7.22	\$ 7.71	\$ 7.22	\$ 7.22	\$ 7.22	\$ 7.12	\$ 7.12	\$ 7.71	\$ 7.31	\$ 7.32	
Low Growth & High Prices	2028-2029	Jun	\$ 7.15	\$ 7.59	\$ 7.15	\$ 7.15	\$ 7.15	\$ 7.05	\$ 7.05	\$ 7.64	\$ 7.24	\$ 7.24	
Low Growth & High Prices	2028-2029	Jul	\$ 7.11	\$ 7.65	\$ 7.11	\$ 7.11	\$ 7.11	\$ 7.01	\$ 7.01	\$ 7.65	\$ 7.22	\$ 7.22	
Low Growth & High Prices	2028-2029	Aug	\$ 7.08	\$ 7.64	\$ 7.08	\$ 7.08	\$ 7.08	\$ 6.98	\$ 6.98	\$ 7.64	\$ 7.20	\$ 7.19	
Low Growth & High Prices	2028-2029	Sep	\$ 7.15	\$ 7.66	\$ 7.15	\$ 7.15	\$ 7.15	\$ 7.05	\$ 7.05	\$ 7.66	\$ 7.25	\$ 7.25	
Low Growth & High Prices	2028-2029	Oct	\$ 7.19	\$ 7.71	\$ 7.19	\$ 7.19	\$ 7.19	\$ 7.09	\$ 7.09	\$ 7.71	\$ 7.29	\$ 7.30	
Low Growth & High Prices	2029-2030	Nov	\$ 7.35	\$ 7.68	\$ 7.35	\$ 7.35	\$ 7.35	\$ 7.24	\$ 7.24	\$ 7.68	\$ 7.39	\$ 7.41	
Low Growth & High Prices	2029-2030	Dec	\$ 7.46	\$ 7.67	\$ 7.46	\$ 7.46	\$ 7.46	\$ 7.67	\$ 7.24	\$ 7.67	\$ 7.53	\$ 7.50	
Low Growth & High Prices	2029-2030	Jan	\$ 7.61	\$ 7.88	\$ 7.61	\$ 7.61	\$ 7.61	\$ 7.88	\$ 7.50	\$ 7.88	\$ 7.75	\$ 7.66	
Low Growth & High Prices	2029-2030	Feb	\$ 7.56	\$ 7.81	\$ 7.56	\$ 7.56	\$ 7.56	\$ 7.74	\$ 7.39	\$ 7.81	\$ 7.64	\$ 7.61	
Low Growth & High Prices	2029-2030	Mar	\$ 7.82	\$ 7.85	\$ 7.82	\$ 7.82	\$ 7.82	\$ 7.71	\$ 7.71	\$ 7.85	\$ 7.76	\$ 7.83	
Low Growth & High Prices	2029-2030	Apr	\$ 7.53	\$ 8.07	\$ 7.53	\$ 7.53	\$ 7.53	\$ 7.42	\$ 7.42	\$ 8.07	\$ 7.64	\$ 7.64	
Low Growth & High Prices	2029-2030	May	\$ 7.45	\$ 7.95	\$ 7.45	\$ 7.45	\$ 7.45	\$ 7.34	\$ 7.34	\$ 7.95	\$ 7.54	\$ 7.55	
Low Growth & High Prices	2029-2030	Jun	\$ 7.38	\$ 7.89	\$ 7.38	\$ 7.38	\$ 7.38	\$ 7.27	\$ 7.27	\$ 7.89	\$ 7.47	\$ 7.48	
Low Growth & High Prices	2029-2030	Jul	\$ 7.34	\$ 7.89	\$ 7.34	\$ 7.34	\$ 7.34	\$ 7.23	\$ 7.23	\$ 7.89	\$ 7.45	\$ 7.45	
Low Growth & High Prices	2029-2030	Aug	\$ 7.32	\$ 7.89	\$ 7.32	\$ 7.32	\$ 7.32	\$ 7.21	\$ 7.21	\$ 7.89	\$ 7.43	\$ 7.43	
Low Growth & High Prices	2029-2030	Sep	\$ 7.38	\$ 7.89	\$ 7.38	\$ 7.38	\$ 7.38	\$ 7.27	\$ 7.27	\$ 7.89	\$ 7.47	\$ 7.48	
Low Growth & High Prices	2029-2030	Oct	\$ 7.45	\$ 8.12	\$ 7.45	\$ 7.45	\$ 7.45	\$ 7.34	\$ 7.34	\$ 8.12	\$ 7.60	\$ 7.58	
Low Growth & High Prices	2030-2031	Nov	\$ 7.76	\$ 7.97	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.65	\$ 7.65	\$ 7.97	\$ 7.76	\$ 7.80	
Low Growth & High Prices	2030-2031	Dec	\$ 7.82	\$ 7.96	\$ 7.82	\$ 7.82	\$ 7.82	\$ 7.95	\$ 7.60	\$ 7.96	\$ 7.84	\$ 7.85	
Low Growth & High Prices	2030-2031	Jan	\$ 7.78	\$ 8.10	\$ 7.78	\$ 7.78	\$ 7.78	\$ 8.10	\$ 7.67	\$ 8.10	\$ 7.96	\$ 7.85	
Low Growth & High Prices	2030-2031	Feb	\$ 7.76	\$ 8.08	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.97	\$ 7.57	\$ 8.08	\$ 7.87	\$ 7.82	
Low Growth & High Prices	2030-2031	Mar	\$ 8.09	\$ 8.09	\$ 8.09	\$ 8.09	\$ 8.09	\$ 7.97	\$ 7.97	\$ 8.09	\$ 8.01	\$ 8.09	
Low Growth & High Prices	2030-2031	Apr	\$ 7.88	\$ 8.23	\$ 7.88	\$ 7.88	\$ 7.88	\$ 7.76	\$ 7.76	\$ 8.23	\$ 7.92	\$ 7.95	
Low Growth & High Prices	2030-2031	May	\$ 7.82	\$ 8.21	\$ 7.82	\$ 7.82	\$ 7.82	\$ 7.71	\$ 7.71	\$ 8.21	\$ 7.88	\$ 7.90	
Low Growth & High Prices	2030-2031	Jun	\$ 7.76	\$ 8.16	\$ 7.76	\$ 7.76	\$ 7.76	\$ 7.65	\$ 7.65	\$ 8.16	\$ 7.82	\$ 7.84	
Low Growth & High Prices	2030-2031	Jul	\$ 7.74	\$ 8.21	\$ 7.74	\$ 7.74	\$ 7.74	\$ 7.63	\$ 7.63	\$ 8.21	\$ 7.82	\$ 7.84	
Low Growth & High Prices	2030-2031	Aug	\$ 7.73	\$ 8.22	\$ 7.73	\$ 7.73	\$ 7.73	\$ 7.62	\$ 7.62	\$ 8.22	\$ 7.82	\$ 7.83	
Low Growth & High Prices	2030-2031	Sep	\$ 7.80	\$ 8.29	\$ 7.80	\$ 7.80	\$ 7.80	\$ 7.69	\$ 7.69	\$ 8.29	\$ 7.89	\$ 7.90	
Low Growth & High Prices	2030-2031	Oct	\$ 7.86	\$ 8.29	\$ 7.86	\$ 7.86	\$ 7.86	\$ 7.74	\$ 7.74	\$ 8.29	\$ 7.92	\$ 7.94	
Low Growth & High Prices	2031-2032	Nov	\$ 8.02	\$ 8.11	\$ 8.02	\$ 8.02	\$ 8.02	\$ 7.90	\$ 7.90	\$ 8.11	\$ 7.97	\$ 8.04	
Low Growth & High Prices	2031-2032	Dec	\$ 7.88	\$ 8.14	\$ 7.88	\$ 7.88	\$ 7.88	\$ 8.14	\$ 7.67	\$ 8.14	\$ 7.98	\$ 7.93	
Low Growth & High Prices	2031-2032	Jan	\$ 8.02	\$ 8.07	\$ 8.02	\$ 8.02	\$ 8.02	\$ 8.07	\$ 7.90	\$ 8.07	\$ 8.01	\$ 8.03	
Low Growth & High Prices	2031-2032	Feb	\$ 8.03	\$ 8.10	\$ 8.03	\$ 8.03	\$ 8.03	\$ 8.07	\$ 7.91	\$ 8.10	\$ 8.02	\$ 8.04	
Low Growth & High Prices	2031-2032	Mar	\$ 8.15	\$ 8.07	\$ 8.10	\$ 8.10	\$ 8.10	\$ 8.07	\$ 8.07	\$ 8.07	\$ 8.07	\$ 8.10	
Low Growth & High Prices	2031-2032	Apr	\$ 8.03	\$ 8.05	\$ 8.03	\$ 8.03	\$ 8.03	\$ 7.91	\$ 7.91	\$ 8.05	\$ 7.96	\$ 8.03	
Low Growth & High Prices	2031-2032	May	\$ 8.01	\$ 8.00	\$ 8.00	\$ 8.00	\$ 8.00	\$ 7.89	\$ 7.89	\$ 8.00	\$ 7.93	\$ 8.00	
Low Growth & High Prices	2031-2032	Jun	\$ 7.94	\$ 7.90	\$ 7.81	\$ 7.81	\$ 7.81	\$ 7.82	\$ 7.82	\$ 8.00	\$ 7.88	\$ 7.85	
Low Growth & High Prices	2031-2032	Jul	\$ 7.82	\$ 7.81	\$ 7.81	\$ 7.81	\$ 7.81	\$ 7.71	\$ 7.71	\$ 8.00	\$ 7.81	\$ 7.81	
Low Growth & High Prices	2031-2032	Aug	\$ 7.80	\$ 7.81	\$ 7.80	\$ 7.80	\$ 7.80	\$ 7.69	\$ 7.69	\$ 8.00	\$ 7.79	\$ 7.81	
Low Growth & High Prices	2031-2032	Sep	\$ 7.96	\$ 8.00	\$ 7.96	\$ 7.96	\$ 7.96	\$ 7.84	\$ 7.84	\$ 8.00	\$ 7.89	\$ 7.97	
Low Growth & High Prices	2031-2032	Oct	\$ 8.01	\$ 8.09	\$ 8.01	\$ 8.01	\$ 8.01	\$ 7.89	\$ 7.89	\$ 8.09	\$ 7.96	\$ 8.02	
Low Growth & High Prices	2032-2033	Nov	\$ 8.11	\$ 8.06	\$ 8.11	\$ 8.11	\$ 8.11	\$ 7.99	\$ 7.99	\$ 8.06	\$ 8.01	\$ 8.10	
Low Growth & High Prices	2032-2033	Dec	\$ 8.14	\$ 8.17	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.17	\$ 7.94	\$ 8.17	\$ 8.10	\$ 8.15	
Low Growth & High Prices	2032-2033	Jan	\$ 8.43	\$ 8.42	\$ 8.43	\$ 8.43	\$ 8.43	\$ 8.31	\$ 8.31	\$ 8.31	\$ 8.31	\$ 8.43	
Low Growth & High Prices	2032-2033	Feb	\$ 8.42	\$ 8.44	\$ 8.42	\$ 8.42	\$ 8.42	\$ 8.38	\$ 8.30	\$ 8.38	\$ 8.35	\$ 8.43	
Low Growth & High Prices	2032-2033	Mar	\$ 8.54	\$ 8.45	\$ 8.49	\$ 8.49	\$ 8.49	\$ 8.45	\$ 8.45	\$ 8.45	\$ 8.45	\$ 8.49	
Low Growth & High Prices	2032-2033	Apr	\$ 8.40	\$ 8.36	\$ 8.40	\$ 8.40	\$ 8.40	\$ 8.28	\$ 8.28	\$ 8.36	\$ 8.31	\$ 8.40	
Low Growth & High Prices	2032-2033	May	\$ 8.39	\$ 8.33	\$ 8.33	\$ 8.33	\$ 8.33	\$ 8.27	\$ 8.27	\$ 8.33	\$ 8.29	\$ 8.34	
Low Growth & High Prices	2032-2033	Jun	\$ 8.30	\$ 8.22	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.22	\$ 8.22	\$ 8.22	\$ 8.22	\$ 8.19	
Low Growth & High Prices	2032-2033	Jul	\$ 8.22	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.10	\$ 8.10	\$ 8.14	\$ 8.11	\$ 8.16	
Low Growth & High Prices	2032-2033	Aug	\$ 8.20	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.14	\$ 8.08	\$ 8.08	\$ 8.14	\$ 8.10	\$ 8.15	
Low Growth & High Prices	2032-2033	Sep	\$ 8.36	\$ 8.32	\$ 8.32	\$ 8.32	\$ 8.32	\$ 8.24	\$ 8.24	\$ 8.32	\$ 8.27	\$ 8.33	
Low Growth & High Prices	2032-2033	Oct	\$ 8.44	\$ 8.43	\$ 8.43	\$ 8.43	\$ 8.43	\$ 8.31	\$ 8.31	\$ 8.43	\$ 8.35	\$ 8.43	

1/ Avoided costs are before Environmental Externalities adder.





### APPENDIX 5.4: EXPECTED MONTHLY DETAIL

Monthly Avoided Cost Detail 1/ 2012\$													
Scenario	Gas Year	Month	Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP	WA/ID Annual	OR Annual	
Expected Case	2028-2029	Nov	\$ 5.15	\$ 5.76	\$ 5.15	\$ 5.15	\$ 5.15	\$ 5.26	\$ 5.07	\$ 5.76	\$ 5.36	\$ 5.27	
Expected Case	2028-2029	Dec	\$ 5.52	\$ 5.78	\$ 5.52	\$ 5.52	\$ 5.52	\$ 5.65	\$ 5.14	\$ 5.78	\$ 5.52	\$ 5.57	
Expected Case	2028-2029	Jan	\$ 5.41	\$ 5.77	\$ 5.41	\$ 5.41	\$ 5.41	\$ 5.74	\$ 5.26	\$ 5.77	\$ 5.59	\$ 5.49	
Expected Case	2028-2029	Feb	\$ 5.43	\$ 5.73	\$ 5.43	\$ 5.43	\$ 5.43	\$ 5.73	\$ 5.34	\$ 5.73	\$ 5.60	\$ 5.49	
Expected Case	2028-2029	Mar	\$ 5.40	\$ 5.45	\$ 5.40	\$ 5.40	\$ 5.40	\$ 5.40	\$ 5.35	\$ 5.32	\$ 5.45	\$ 5.37	\$ 5.41
Expected Case	2028-2029	Apr	\$ 5.08	\$ 5.53	\$ 5.08	\$ 5.08	\$ 5.08	\$ 5.00	\$ 5.00	\$ 5.55	\$ 5.18	\$ 5.17	
Expected Case	2028-2029	May	\$ 5.02	\$ 5.55	\$ 5.02	\$ 5.02	\$ 5.02	\$ 4.94	\$ 4.94	\$ 5.55	\$ 5.14	\$ 5.12	
Expected Case	2028-2029	Jun	\$ 4.98	\$ 5.45	\$ 4.98	\$ 4.98	\$ 4.98	\$ 4.90	\$ 4.90	\$ 5.55	\$ 5.12	\$ 5.07	
Expected Case	2028-2029	Jul	\$ 4.95	\$ 5.53	\$ 4.95	\$ 4.95	\$ 4.95	\$ 4.88	\$ 4.88	\$ 5.55	\$ 5.10	\$ 5.07	
Expected Case	2028-2029	Aug	\$ 4.97	\$ 5.55	\$ 4.97	\$ 4.97	\$ 4.97	\$ 4.89	\$ 4.89	\$ 5.55	\$ 5.11	\$ 5.08	
Expected Case	2028-2029	Sep	\$ 5.03	\$ 5.58	\$ 5.03	\$ 5.03	\$ 5.03	\$ 4.95	\$ 4.95	\$ 5.58	\$ 5.16	\$ 5.14	
Expected Case	2028-2029	Oct	\$ 5.08	\$ 5.63	\$ 5.08	\$ 5.08	\$ 5.08	\$ 5.00	\$ 5.00	\$ 5.63	\$ 5.21	\$ 5.19	
Expected Case	2029-2030	Nov	\$ 5.42	\$ 5.77	\$ 5.42	\$ 5.42	\$ 5.42	\$ 5.51	\$ 5.34	\$ 5.77	\$ 5.54	\$ 5.49	
Expected Case	2029-2030	Dec	\$ 5.62	\$ 5.78	\$ 5.62	\$ 5.62	\$ 5.62	\$ 5.78	\$ 5.39	\$ 5.78	\$ 5.65	\$ 5.65	
Expected Case	2029-2030	Jan	\$ 5.47	\$ 5.77	\$ 5.47	\$ 5.47	\$ 5.47	\$ 5.77	\$ 5.38	\$ 5.77	\$ 5.64	\$ 5.53	
Expected Case	2029-2030	Feb	\$ 5.34	\$ 5.76	\$ 5.34	\$ 5.34	\$ 5.34	\$ 5.76	\$ 5.26	\$ 5.76	\$ 5.59	\$ 5.43	
Expected Case	2029-2030	Mar	\$ 5.31	\$ 5.38	\$ 5.31	\$ 5.31	\$ 5.31	\$ 5.26	\$ 5.23	\$ 5.38	\$ 5.29	\$ 5.32	
Expected Case	2029-2030	Apr	\$ 4.93	\$ 5.51	\$ 4.93	\$ 4.93	\$ 4.93	\$ 4.86	\$ 4.86	\$ 5.51	\$ 5.08	\$ 5.05	
Expected Case	2029-2030	May	\$ 4.81	\$ 5.41	\$ 4.81	\$ 4.81	\$ 4.81	\$ 4.74	\$ 4.74	\$ 5.50	\$ 4.99	\$ 4.93	
Expected Case	2029-2030	Jun	\$ 4.78	\$ 5.38	\$ 4.78	\$ 4.78	\$ 4.78	\$ 4.71	\$ 4.71	\$ 5.50	\$ 4.97	\$ 4.90	
Expected Case	2029-2030	Jul	\$ 4.77	\$ 5.45	\$ 4.77	\$ 4.77	\$ 4.77	\$ 4.70	\$ 4.70	\$ 5.50	\$ 4.97	\$ 4.91	
Expected Case	2029-2030	Aug	\$ 4.78	\$ 5.50	\$ 4.78	\$ 4.78	\$ 4.78	\$ 4.71	\$ 4.71	\$ 5.50	\$ 4.97	\$ 4.93	
Expected Case	2029-2030	Sep	\$ 4.87	\$ 5.50	\$ 4.87	\$ 4.87	\$ 4.87	\$ 4.80	\$ 4.80	\$ 5.50	\$ 5.03	\$ 5.00	
Expected Case	2029-2030	Oct	\$ 4.94	\$ 5.66	\$ 4.94	\$ 4.94	\$ 4.94	\$ 4.87	\$ 4.87	\$ 5.66	\$ 5.13	\$ 5.09	
Expected Case	2030-2031	Nov	\$ 5.52	\$ 5.77	\$ 5.52	\$ 5.52	\$ 5.52	\$ 5.57	\$ 5.44	\$ 5.77	\$ 5.59	\$ 5.57	
Expected Case	2030-2031	Dec	\$ 5.75	\$ 5.83	\$ 5.75	\$ 5.75	\$ 5.75	\$ 5.83	\$ 5.52	\$ 5.83	\$ 5.73	\$ 5.77	
Expected Case	2030-2031	Jan	\$ 5.57	\$ 5.83	\$ 5.57	\$ 5.57	\$ 5.57	\$ 5.83	\$ 5.42	\$ 5.83	\$ 5.69	\$ 5.63	
Expected Case	2030-2031	Feb	\$ 5.41	\$ 5.82	\$ 5.41	\$ 5.41	\$ 5.41	\$ 5.80	\$ 5.29	\$ 5.82	\$ 5.64	\$ 5.49	
Expected Case	2030-2031	Mar	\$ 5.40	\$ 5.45	\$ 5.40	\$ 5.40	\$ 5.40	\$ 5.35	\$ 5.32	\$ 5.45	\$ 5.37	\$ 5.41	
Expected Case	2030-2031	Apr	\$ 5.14	\$ 5.53	\$ 5.14	\$ 5.14	\$ 5.14	\$ 5.06	\$ 5.06	\$ 5.66	\$ 5.26	\$ 5.22	
Expected Case	2030-2031	May	\$ 5.11	\$ 5.54	\$ 5.11	\$ 5.11	\$ 5.11	\$ 5.03	\$ 5.03	\$ 5.66	\$ 5.24	\$ 5.19	
Expected Case	2030-2031	Jun	\$ 5.08	\$ 5.53	\$ 5.08	\$ 5.08	\$ 5.08	\$ 5.00	\$ 5.00	\$ 5.66	\$ 5.22	\$ 5.17	
Expected Case	2030-2031	Jul	\$ 5.12	\$ 5.63	\$ 5.12	\$ 5.12	\$ 5.12	\$ 5.04	\$ 5.04	\$ 5.66	\$ 5.25	\$ 5.22	
Expected Case	2030-2031	Aug	\$ 5.14	\$ 5.67	\$ 5.14	\$ 5.14	\$ 5.14	\$ 5.06	\$ 5.06	\$ 5.67	\$ 5.26	\$ 5.24	
Expected Case	2030-2031	Sep	\$ 5.22	\$ 5.75	\$ 5.22	\$ 5.22	\$ 5.22	\$ 5.14	\$ 5.14	\$ 5.75	\$ 5.34	\$ 5.33	
Expected Case	2030-2031	Oct	\$ 5.30	\$ 5.77	\$ 5.30	\$ 5.30	\$ 5.30	\$ 5.22	\$ 5.22	\$ 5.77	\$ 5.40	\$ 5.39	
Expected Case	2031-2032	Nov	\$ 5.78	\$ 5.87	\$ 5.78	\$ 5.78	\$ 5.78	\$ 5.77	\$ 5.69	\$ 5.87	\$ 5.78	\$ 5.80	
Expected Case	2031-2032	Dec	\$ 5.71	\$ 5.89	\$ 5.71	\$ 5.71	\$ 5.71	\$ 5.89	\$ 5.41	\$ 5.89	\$ 5.73	\$ 5.75	
Expected Case	2031-2032	Jan	\$ 5.57	\$ 5.86	\$ 5.57	\$ 5.57	\$ 5.57	\$ 5.86	\$ 5.47	\$ 5.86	\$ 5.73	\$ 5.63	
Expected Case	2031-2032	Feb	\$ 5.58	\$ 5.83	\$ 5.58	\$ 5.58	\$ 5.58	\$ 5.84	\$ 5.49	\$ 5.84	\$ 5.72	\$ 5.63	
Expected Case	2031-2032	Mar	\$ 5.73	\$ 5.67	\$ 5.69	\$ 5.69	\$ 5.69	\$ 5.67	\$ 5.67	\$ 5.67	\$ 5.67	\$ 5.70	
Expected Case	2031-2032	Apr	\$ 5.52	\$ 5.59	\$ 5.52	\$ 5.52	\$ 5.52	\$ 5.44	\$ 5.44	\$ 5.59	\$ 5.49	\$ 5.54	
Expected Case	2031-2032	May	\$ 5.49	\$ 5.52	\$ 5.49	\$ 5.49	\$ 5.49	\$ 5.41	\$ 5.41	\$ 5.52	\$ 5.45	\$ 5.50	
Expected Case	2031-2032	Jun	\$ 5.41	\$ 5.42	\$ 5.33	\$ 5.33	\$ 5.33	\$ 5.33	\$ 5.33	\$ 5.52	\$ 5.39	\$ 5.36	
Expected Case	2031-2032	Jul	\$ 5.30	\$ 5.33	\$ 5.30	\$ 5.30	\$ 5.30	\$ 5.22	\$ 5.22	\$ 5.52	\$ 5.32	\$ 5.31	
Expected Case	2031-2032	Aug	\$ 5.30	\$ 5.35	\$ 5.30	\$ 5.30	\$ 5.30	\$ 5.22	\$ 5.22	\$ 5.52	\$ 5.32	\$ 5.31	
Expected Case	2031-2032	Sep	\$ 5.49	\$ 5.58	\$ 5.49	\$ 5.49	\$ 5.49	\$ 5.41	\$ 5.41	\$ 5.58	\$ 5.47	\$ 5.51	
Expected Case	2031-2032	Oct	\$ 5.55	\$ 5.67	\$ 5.55	\$ 5.55	\$ 5.55	\$ 5.46	\$ 5.46	\$ 5.67	\$ 5.53	\$ 5.57	
Expected Case	2032-2033	Nov	\$ 5.84	\$ 5.82	\$ 5.84	\$ 5.84	\$ 5.84	\$ 5.78	\$ 5.75	\$ 5.82	\$ 5.78	\$ 5.84	
Expected Case	2032-2033	Dec	\$ 5.91	\$ 5.83	\$ 5.91	\$ 5.91	\$ 5.91	\$ 5.83	\$ 5.61	\$ 5.83	\$ 5.75	\$ 5.90	
Expected Case	2032-2033	Jan	\$ 5.83	\$ 5.85	\$ 5.83	\$ 5.83	\$ 5.83	\$ 5.85	\$ 5.72	\$ 5.85	\$ 5.81	\$ 5.84	
Expected Case	2032-2033	Feb	\$ 5.87	\$ 5.91	\$ 5.87	\$ 5.87	\$ 5.87	\$ 5.90	\$ 5.75	\$ 5.90	\$ 5.85	\$ 5.88	
Expected Case	2032-2033	Mar	\$ 5.95	\$ 5.89	\$ 5.91	\$ 5.91	\$ 5.91	\$ 5.89	\$ 5.89	\$ 5.89	\$ 5.89	\$ 5.92	
Expected Case	2032-2033	Apr	\$ 5.78	\$ 5.78	\$ 5.78	\$ 5.78	\$ 5.78	\$ 5.69	\$ 5.69	\$ 5.78	\$ 5.72	\$ 5.78	
Expected Case	2032-2033	May	\$ 5.77	\$ 5.75	\$ 5.75	\$ 5.75	\$ 5.75	\$ 5.68	\$ 5.68	\$ 5.75	\$ 5.70	\$ 5.75	
Expected Case	2032-2033	Jun	\$ 5.70	\$ 5.64	\$ 5.62	\$ 5.62	\$ 5.62	\$ 5.63	\$ 5.63	\$ 5.63	\$ 5.63	\$ 5.64	
Expected Case	2032-2033	Jul	\$ 5.64	\$ 5.60	\$ 5.62	\$ 5.62	\$ 5.62	\$ 5.55	\$ 5.55	\$ 5.60	\$ 5.57	\$ 5.62	
Expected Case	2032-2033	Aug	\$ 5.64	\$ 5.62	\$ 5.62	\$ 5.62	\$ 5.62	\$ 5.55	\$ 5.55	\$ 5.62	\$ 5.57	\$ 5.62	
Expected Case	2032-2033	Sep	\$ 5.86	\$ 5.86	\$ 5.86	\$ 5.86	\$ 5.86	\$ 5.77	\$ 5.77	\$ 5.86	\$ 5.80	\$ 5.86	
Expected Case	2032-2033	Oct	\$ 5.91	\$ 5.95	\$ 5.91	\$ 5.91	\$ 5.91	\$ 5.82	\$ 5.82	\$ 5.95	\$ 5.87	\$ 5.92	

1/ Avoided costs are before Environmental Externalities adder.





### APPENDIX 5.4: HIGH GROWTH – LOW PRICE MONTHLY DETAIL

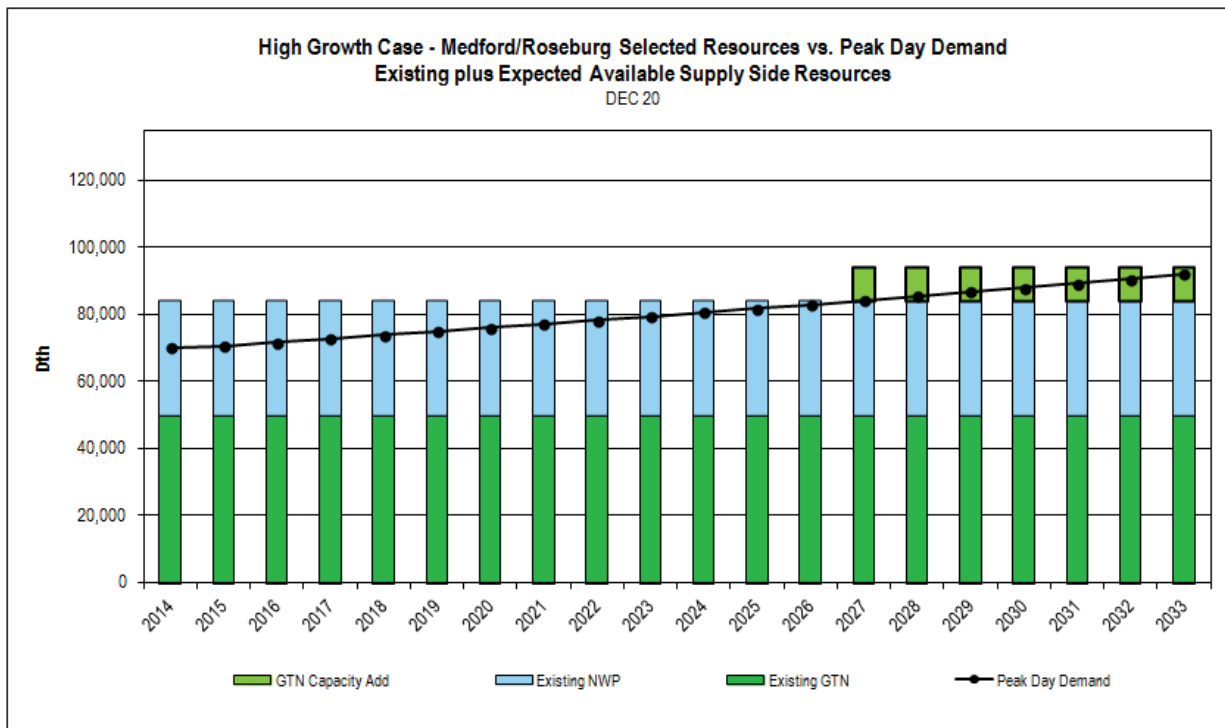
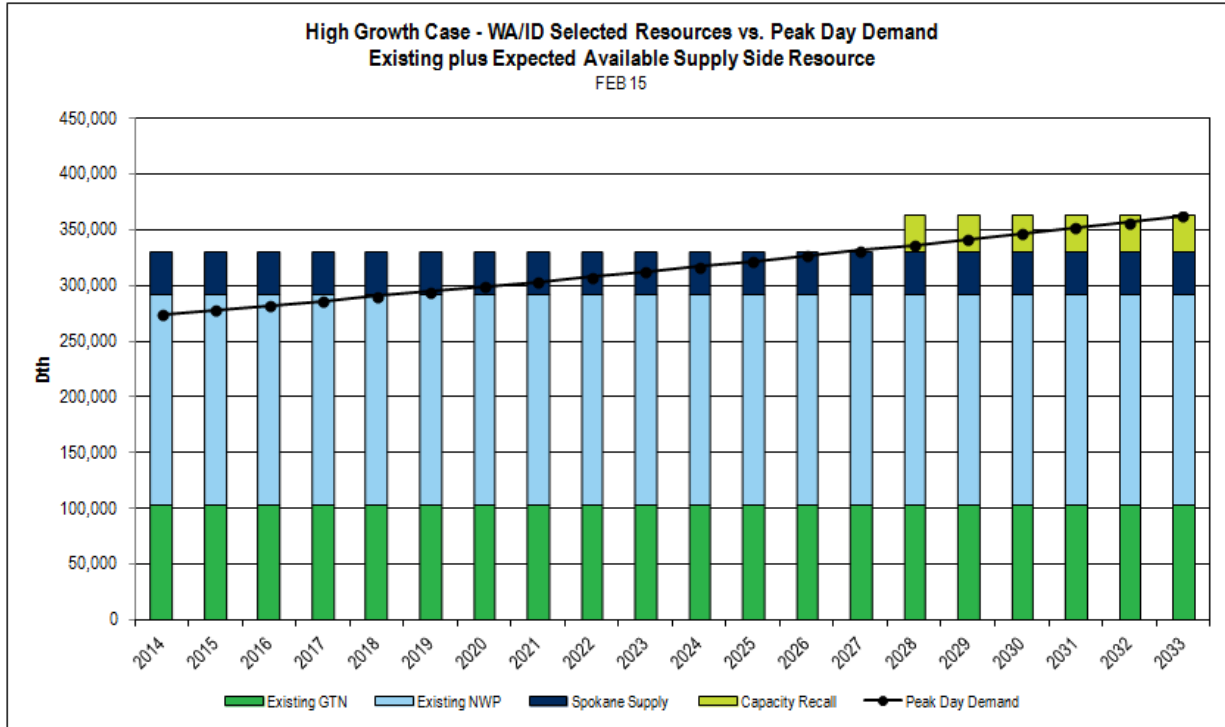
Scenario	Gas Year	Month	2012\$										WA/ID Annual	OR Annual
			Klam Falls	La Grande	Medford GTN	Medford NWP	Roseburg	Wa/Id Both	Wa/Id GTN	Wa/Id NWP				
High Growth & Low Prices	2028-2029	Nov	\$ 3.40	\$ 3.96	\$ 3.40	\$ 3.40	\$ 3.40	\$ 3.78	\$ 3.34	\$ 3.96	\$ 3.69	\$ 3.51		
High Growth & Low Prices	2028-2029	Dec	\$ 4.02	\$ 3.99	\$ 4.02	\$ 4.02	\$ 4.02	\$ 3.83	\$ 3.31	\$ 3.99	\$ 3.71	\$ 4.02		
High Growth & Low Prices	2028-2029	Jan	\$ 3.87	\$ 3.87	\$ 3.87	\$ 3.87	\$ 3.87	\$ 3.80	\$ 3.31	\$ 3.87	\$ 3.66	\$ 3.87		
High Growth & Low Prices	2028-2029	Feb	\$ 3.66	\$ 75.14	\$ 3.66	\$ 3.66	\$ 3.66	\$ 75.14	\$ 3.37	\$ 75.14	\$ 51.22	\$ 17.96		
High Growth & Low Prices	2028-2029	Mar	\$ 3.66	\$ 3.75	\$ 3.66	\$ 3.66	\$ 3.66	\$ 3.68	\$ 3.60	\$ 3.76	\$ 3.68	\$ 3.68		
High Growth & Low Prices	2028-2029	Apr	\$ 3.44	\$ 3.91	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.38	\$ 3.38	\$ 3.92	\$ 3.56	\$ 3.54		
High Growth & Low Prices	2028-2029	May	\$ 3.38	\$ 3.96	\$ 3.38	\$ 3.38	\$ 3.38	\$ 3.32	\$ 3.32	\$ 3.96	\$ 3.53	\$ 3.50		
High Growth & Low Prices	2028-2029	Jun	\$ 3.31	\$ 3.82	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.25	\$ 3.25	\$ 3.83	\$ 3.44	\$ 3.41		
High Growth & Low Prices	2028-2029	Jul	\$ 3.27	\$ 3.83	\$ 3.27	\$ 3.27	\$ 3.27	\$ 3.21	\$ 3.21	\$ 3.83	\$ 3.42	\$ 3.38		
High Growth & Low Prices	2028-2029	Aug	\$ 3.25	\$ 3.83	\$ 3.25	\$ 3.25	\$ 3.25	\$ 3.19	\$ 3.19	\$ 3.83	\$ 3.40	\$ 3.37		
High Growth & Low Prices	2028-2029	Sep	\$ 3.31	\$ 3.83	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.25	\$ 3.25	\$ 3.83	\$ 3.45	\$ 3.41		
High Growth & Low Prices	2028-2029	Oct	\$ 3.35	\$ 3.88	\$ 3.88	\$ 3.88	\$ 3.88	\$ 3.29	\$ 3.29	\$ 3.88	\$ 3.49	\$ 3.78		
High Growth & Low Prices	2029-2030	Nov	\$ 3.51	\$ 3.92	\$ 3.51	\$ 3.51	\$ 3.51	\$ 3.92	\$ 3.45	\$ 3.92	\$ 3.77	\$ 3.60		
High Growth & Low Prices	2029-2030	Dec	\$ 4.02	\$ 3.93	\$ 68.39	\$ 68.39	\$ 68.39	\$ 3.93	\$ 3.45	\$ 3.93	\$ 3.77	\$ 42.63		
High Growth & Low Prices	2029-2030	Jan	\$ 3.92	\$ 3.92	\$ 3.92	\$ 3.92	\$ 3.92	\$ 3.92	\$ 3.43	\$ 3.92	\$ 3.76	\$ 3.92		
High Growth & Low Prices	2029-2030	Feb	\$ 3.62	\$ 75.13	\$ 3.62	\$ 3.62	\$ 3.62	\$ 75.13	\$ 3.32	\$ 75.13	\$ 51.19	\$ 17.92		
High Growth & Low Prices	2029-2030	Mar	\$ 3.71	\$ 3.81	\$ 3.71	\$ 3.71	\$ 3.71	\$ 3.73	\$ 3.65	\$ 3.81	\$ 3.73	\$ 3.73		
High Growth & Low Prices	2029-2030	Apr	\$ 3.41	\$ 3.87	\$ 3.41	\$ 3.41	\$ 3.41	\$ 3.35	\$ 3.35	\$ 3.87	\$ 3.52	\$ 3.50		
High Growth & Low Prices	2029-2030	May	\$ 3.33	\$ 3.91	\$ 3.33	\$ 3.33	\$ 3.33	\$ 3.27	\$ 3.27	\$ 3.91	\$ 3.48	\$ 3.45		
High Growth & Low Prices	2029-2030	Jun	\$ 3.26	\$ 3.80	\$ 3.26	\$ 3.26	\$ 3.26	\$ 3.20	\$ 3.20	\$ 3.80	\$ 3.40	\$ 3.37		
High Growth & Low Prices	2029-2030	Jul	\$ 3.22	\$ 3.80	\$ 3.22	\$ 3.22	\$ 3.22	\$ 3.16	\$ 3.16	\$ 3.80	\$ 3.38	\$ 3.34		
High Growth & Low Prices	2029-2030	Aug	\$ 3.20	\$ 3.80	\$ 3.20	\$ 3.20	\$ 3.20	\$ 3.14	\$ 3.14	\$ 3.81	\$ 3.36	\$ 3.32		
High Growth & Low Prices	2029-2030	Sep	\$ 3.26	\$ 3.81	\$ 3.26	\$ 3.26	\$ 3.26	\$ 3.20	\$ 3.20	\$ 3.81	\$ 3.40	\$ 3.37		
High Growth & Low Prices	2029-2030	Oct	\$ 3.33	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.27	\$ 3.27	\$ 3.84	\$ 3.46	\$ 3.74		
High Growth & Low Prices	2030-2031	Nov	\$ 3.65	\$ 3.94	\$ 3.65	\$ 3.65	\$ 3.65	\$ 3.94	\$ 3.59	\$ 3.94	\$ 3.82	\$ 3.71		
High Growth & Low Prices	2030-2031	Dec	\$ 4.06	\$ 3.95	\$ 68.42	\$ 68.42	\$ 68.42	\$ 3.95	\$ 3.53	\$ 3.95	\$ 3.81	\$ 42.66		
High Growth & Low Prices	2030-2031	Jan	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.84	\$ 3.82	\$ 3.33	\$ 3.94	\$ 3.70	\$ 3.84		
High Growth & Low Prices	2030-2031	Feb	\$ 3.66	\$ 75.09	\$ 3.66	\$ 3.66	\$ 3.66	\$ 75.06	\$ 74.55	\$ 75.09	\$ 74.90	\$ 17.94		
High Growth & Low Prices	2030-2031	Mar	\$ 3.69	\$ 3.78	\$ 3.69	\$ 3.69	\$ 3.69	\$ 3.70	\$ 3.63	\$ 3.78	\$ 3.70	\$ 3.71		
High Growth & Low Prices	2030-2031	Apr	\$ 3.48	\$ 3.92	\$ 3.48	\$ 3.48	\$ 3.48	\$ 3.42	\$ 3.42	\$ 3.92	\$ 3.59	\$ 3.57		
High Growth & Low Prices	2030-2031	May	\$ 3.43	\$ 3.91	\$ 3.43	\$ 3.43	\$ 3.43	\$ 3.37	\$ 3.37	\$ 3.91	\$ 3.55	\$ 3.53		
High Growth & Low Prices	2030-2031	Jun	\$ 3.36	\$ 3.85	\$ 3.36	\$ 3.36	\$ 3.36	\$ 3.30	\$ 3.30	\$ 3.86	\$ 3.49	\$ 3.46		
High Growth & Low Prices	2030-2031	Jul	\$ 3.35	\$ 3.86	\$ 3.35	\$ 3.35	\$ 3.35	\$ 3.29	\$ 3.29	\$ 3.86	\$ 3.48	\$ 3.45		
High Growth & Low Prices	2030-2031	Aug	\$ 3.34	\$ 3.86	\$ 3.34	\$ 3.34	\$ 3.34	\$ 3.28	\$ 3.28	\$ 3.86	\$ 3.48	\$ 3.45		
High Growth & Low Prices	2030-2031	Sep	\$ 3.41	\$ 3.86	\$ 3.41	\$ 3.41	\$ 3.41	\$ 3.35	\$ 3.35	\$ 3.86	\$ 3.52	\$ 3.50		
High Growth & Low Prices	2030-2031	Oct	\$ 3.46	\$ 3.98	\$ 3.98	\$ 3.98	\$ 3.98	\$ 3.40	\$ 3.40	\$ 3.98	\$ 3.60	\$ 3.87		
High Growth & Low Prices	2031-2032	Nov	\$ 3.63	\$ 3.86	\$ 3.63	\$ 3.63	\$ 3.63	\$ 3.86	\$ 3.57	\$ 3.86	\$ 3.76	\$ 3.67		
High Growth & Low Prices	2031-2032	Dec	\$ 3.98	\$ 3.87	\$ 132.71	\$ 132.71	\$ 132.71	\$ 3.83	\$ 3.32	\$ 3.87	\$ 3.68	\$ 81.20		
High Growth & Low Prices	2031-2032	Jan	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.77	\$ 3.28	\$ 3.82	\$ 3.62	\$ 3.79		
High Growth & Low Prices	2031-2032	Feb	\$ 3.51	\$ 72.57	\$ 3.51	\$ 3.51	\$ 3.51	\$ 72.57	\$ 72.15	\$ 72.57	\$ 72.43	\$ 17.32		
High Growth & Low Prices	2031-2032	Mar	\$ 3.51	\$ 3.47	\$ 3.50	\$ 3.50	\$ 3.50	\$ 3.47	\$ 3.45	\$ 3.47	\$ 3.47	\$ 3.50		
High Growth & Low Prices	2031-2032	Apr	\$ 3.35	\$ 3.47	\$ 3.35	\$ 3.35	\$ 3.35	\$ 3.29	\$ 3.29	\$ 3.47	\$ 3.35	\$ 3.38		
High Growth & Low Prices	2031-2032	May	\$ 3.34	\$ 3.42	\$ 3.34	\$ 3.34	\$ 3.34	\$ 3.28	\$ 3.28	\$ 3.42	\$ 3.33	\$ 3.36		
High Growth & Low Prices	2031-2032	Jun	\$ 3.26	\$ 3.23	\$ 3.23	\$ 3.23	\$ 3.23	\$ 3.20	\$ 3.20	\$ 3.23	\$ 3.21	\$ 3.23		
High Growth & Low Prices	2031-2032	Jul	\$ 3.15	\$ 3.23	\$ 3.15	\$ 3.15	\$ 3.15	\$ 3.09	\$ 3.09	\$ 3.23	\$ 3.14	\$ 3.17		
High Growth & Low Prices	2031-2032	Aug	\$ 3.14	\$ 3.23	\$ 3.14	\$ 3.14	\$ 3.14	\$ 3.08	\$ 3.08	\$ 3.23	\$ 3.13	\$ 3.16		
High Growth & Low Prices	2031-2032	Sep	\$ 3.28	\$ 3.28	\$ 3.28	\$ 3.28	\$ 3.28	\$ 3.22	\$ 3.22	\$ 3.28	\$ 3.24	\$ 3.28		
High Growth & Low Prices	2031-2032	Oct	\$ 3.33	\$ 3.51	\$ 3.51	\$ 3.51	\$ 3.51	\$ 3.27	\$ 3.27	\$ 3.51	\$ 3.35	\$ 3.47		
High Growth & Low Prices	2032-2033	Nov	\$ 3.44	\$ 3.55	\$ 3.44	\$ 3.44	\$ 3.44	\$ 3.55	\$ 3.38	\$ 3.55	\$ 3.49	\$ 3.47		
High Growth & Low Prices	2032-2033	Dec	\$ 3.89	\$ 3.80	\$ 132.64	\$ 132.64	\$ 132.64	\$ 3.80	\$ 3.32	\$ 3.80	\$ 3.64	\$ 81.12		
High Growth & Low Prices	2032-2033	Jan	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.79	\$ 3.32	\$ 3.79	\$ 3.64	\$ 3.79		
High Growth & Low Prices	2032-2033	Feb	\$ 3.52	\$ 75.05	\$ 3.52	\$ 3.52	\$ 3.52	\$ 75.05	\$ 74.62	\$ 75.05	\$ 74.91	\$ 17.82		
High Growth & Low Prices	2032-2033	Mar	\$ 3.52	\$ 3.48	\$ 3.51	\$ 3.51	\$ 3.51	\$ 3.48	\$ 3.46	\$ 3.48	\$ 3.48	\$ 3.51		
High Growth & Low Prices	2032-2033	Apr	\$ 3.35	\$ 3.41	\$ 3.35	\$ 3.35	\$ 3.35	\$ 3.29	\$ 3.29	\$ 3.41	\$ 3.33	\$ 3.36		
High Growth & Low Prices	2032-2033	May	\$ 3.34	\$ 3.38	\$ 3.34	\$ 3.34	\$ 3.34	\$ 3.28	\$ 3.28	\$ 3.38	\$ 3.32	\$ 3.35		
High Growth & Low Prices	2032-2033	Jun	\$ 3.29	\$ 3.25	\$ 3.17	\$ 3.17	\$ 3.17	\$ 3.03	\$ 3.23	\$ 3.03	\$ 3.10	\$ 3.21		
High Growth & Low Prices	2032-2033	Jul	\$ 3.17	\$ 3.17	\$ 3.17	\$ 3.17	\$ 3.17	\$ 3.11	\$ 3.11	\$ 3.17	\$ 3.13	\$ 3.17		
High Growth & Low Prices	2032-2033	Aug	\$ 3.15	\$ 3.17	\$ 3.15	\$ 3.15	\$ 3.15	\$ 3.09	\$ 3.09	\$ 3.17	\$ 3.12	\$ 3.15		
High Growth & Low Prices	2032-2033	Sep	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.31	\$ 3.25	\$ 3.25	\$ 3.31	\$ 3.27	\$ 3.31		
High Growth & Low Prices	2032-2033	Oct	\$ 3.38	\$ 3.48	\$ 3.48	\$ 3.48	\$ 3.48	\$ 3.32	\$ 3.32	\$ 3.48	\$ 3.38	\$ 3.46		

1/ Avoided costs are before Environmental Externalities adder.

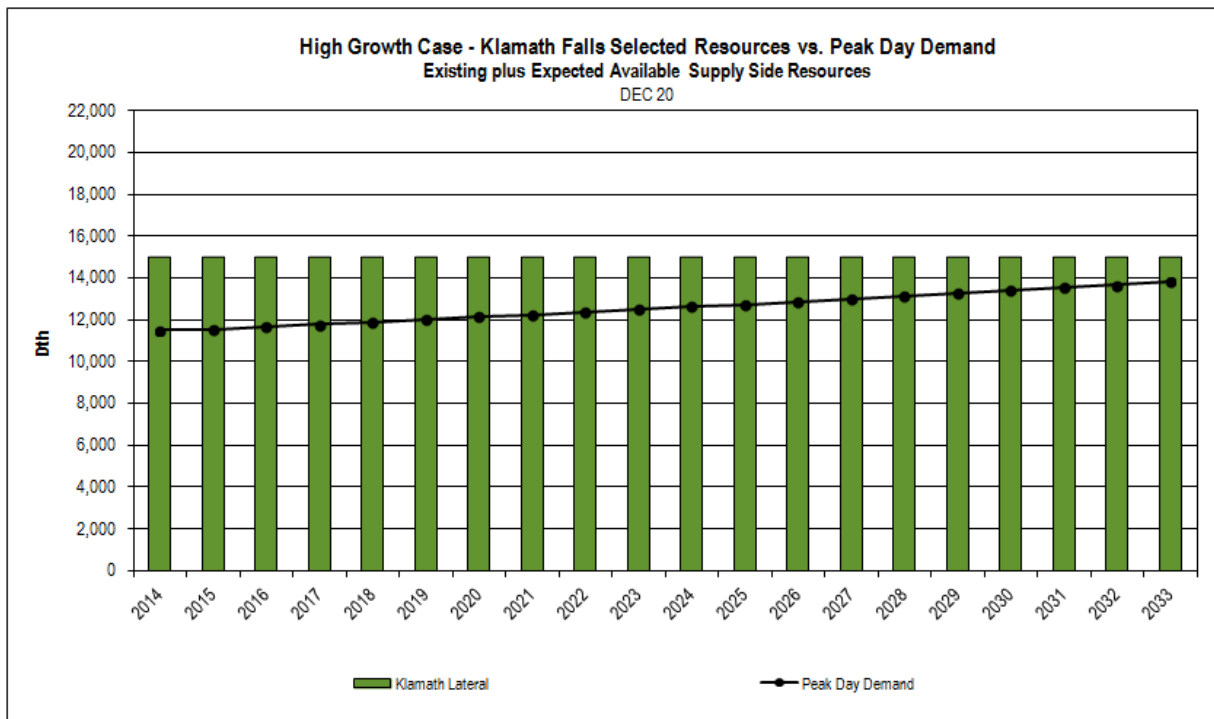
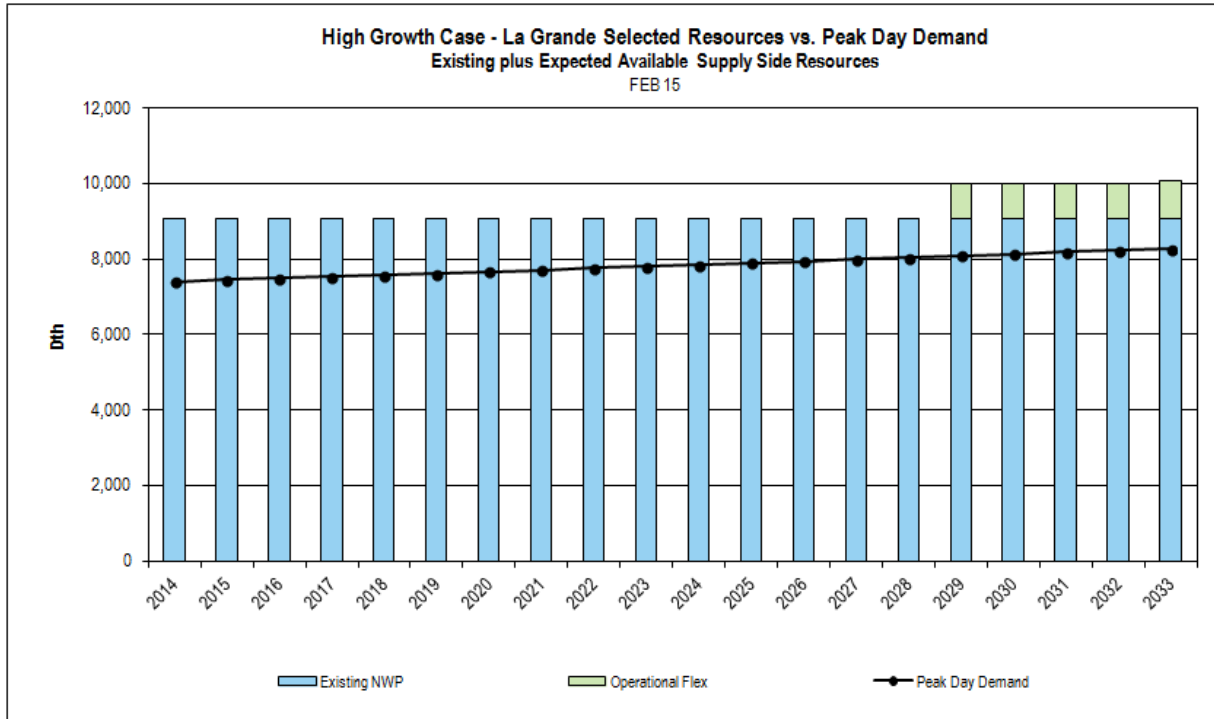




### APPENDIX 6.1: HIGH GROWTH CASES SELECTED RESOURCES VS. PEAK DAY DEMAND EXISTING PLUS EXPECTED AVAILABLE



### APPENDIX 6.1: HIGH GROWTH CASES SELECTED RESOURCES VS. PEAK DAY DEMAND EXISTING PLUS EXPECTED AVAILABLE



## APPENDIX 6.2: PEAK DAY DEMAND TABLE HIGH GROWTH

Peak Day Demand - Served and Unserved (MDth/d) Before Resource Additions & Net of DSM Savings									
Case	Gas Year	LaGrande			LaGrande	WA/ID Served	WA/ID Unserved	WA/ID Total	WA/ID % of Peak Day Served
		Served	Unserved	Total	% of Peak Day Served				
High Growth & Low Prices	2014	7,404	-	7,404	100%	273,778	-	273,778	100%
High Growth & Low Prices	2015	7,449	-	7,449	100%	277,834	-	277,834	100%
High Growth & Low Prices	2016	7,492	-	7,492	100%	281,972	-	281,972	100%
High Growth & Low Prices	2017	7,538	-	7,538	100%	286,157	-	286,157	100%
High Growth & Low Prices	2018	7,581	-	7,581	100%	290,384	-	290,384	100%
High Growth & Low Prices	2019	7,626	-	7,626	100%	294,655	-	294,655	100%
High Growth & Low Prices	2020	7,673	-	7,673	100%	298,996	-	298,996	100%
High Growth & Low Prices	2021	7,717	-	7,717	100%	303,428	-	303,428	100%
High Growth & Low Prices	2022	7,763	-	7,763	100%	307,929	-	307,929	100%
High Growth & Low Prices	2023	7,810	-	7,810	100%	312,500	-	312,500	100%
High Growth & Low Prices	2024	7,854	-	7,854	100%	317,136	-	317,136	100%
High Growth & Low Prices	2025	7,901	-	7,901	100%	321,846	-	321,846	100%
High Growth & Low Prices	2026	7,948	-	7,948	100%	326,626	-	326,626	100%
High Growth & Low Prices	2027	7,995	-	7,995	100%	331,483	-	331,483	100%
High Growth & Low Prices	2028	8,043	-	8,043	100%	331,804	4,607	336,411	99%
High Growth & Low Prices	2029	8,091	-	8,091	100%	332,121	9,293	341,414	97%
High Growth & Low Prices	2030	8,139	-	8,139	100%	332,447	14,050	346,497	96%
High Growth & Low Prices	2031	8,187	-	8,187	100%	332,391	19,267	351,658	95%
High Growth & Low Prices	2032	8,235	-	8,235	100%	332,314	24,586	356,900	93%
High Growth & Low Prices	2033	8,284	-	8,284	100%	332,237	29,982	362,219	92%

Case	Gas Year	Klamath Falls			Klamath Falls	Medford/Roseburg Served	Medford/Roseburg Unserved	Medford/Roseburg Total	Medford/Roseburg % of Peak Day Served
		Served	Unserved	Total	% of Peak Day Served				
High Growth & Low Prices	2014	11,488	-	11,488	100%	70,032	-	70,032	100%
High Growth & Low Prices	2015	11,539	-	11,539	100%	70,686	-	70,686	100%
High Growth & Low Prices	2016	11,653	-	11,653	100%	71,711	-	71,711	100%
High Growth & Low Prices	2017	11,768	-	11,768	100%	72,765	-	72,765	100%
High Growth & Low Prices	2018	11,890	-	11,890	100%	73,822	-	73,822	100%
High Growth & Low Prices	2019	12,005	-	12,005	100%	74,901	-	74,901	100%
High Growth & Low Prices	2020	12,122	-	12,122	100%	75,994	-	75,994	100%
High Growth & Low Prices	2021	12,248	-	12,248	100%	77,109	-	77,109	100%
High Growth & Low Prices	2022	12,366	-	12,366	100%	78,236	-	78,236	100%
High Growth & Low Prices	2023	12,487	-	12,487	100%	79,391	-	79,391	100%
High Growth & Low Prices	2024	12,616	-	12,616	100%	80,551	-	80,551	100%
High Growth & Low Prices	2025	12,739	-	12,739	100%	81,736	-	81,736	100%
High Growth & Low Prices	2026	12,865	-	12,865	100%	82,938	-	82,938	100%
High Growth & Low Prices	2027	12,996	-	12,996	100%	84,166	-	84,166	100%
High Growth & Low Prices	2028	13,123	-	13,123	100%	85,403	-	85,403	100%
High Growth & Low Prices	2029	13,252	-	13,252	100%	86,668	-	86,668	100%
High Growth & Low Prices	2030	13,388	-	13,388	100%	87,097	849	87,947	99%
High Growth & Low Prices	2031	13,518	-	13,518	100%	87,091	2,163	89,254	98%
High Growth & Low Prices	2032	13,649	-	13,649	100%	87,085	3,490	90,575	96%
High Growth & Low Prices	2033	13,790	-	13,790	100%	87,079	4,843	91,922	95%

## APPENDIX 6.2: PEAK DAY DEMAND TABLE

### LOW GROWTH

Peak Day Demand - Served and Unserved (MDth/d)									
Before Resource Additions & Net of DSM Savings									
Case	Gas Year	LaGrande			LaGrande	WA/ID Served	WA/ID Unserved	WA/ID Total	WA/ID % of Peak Day Served
		Served	Unserved	Total	% of Peak Day Served				
Low Growth & High Prices	2014	7,345	-	7,345	100%	270,352	-	270,352	100%
Low Growth & High Prices	2015	7,195	-	7,195	100%	265,445	-	265,445	100%
Low Growth & High Prices	2016	7,132	-	7,132	100%	263,889	-	263,889	100%
Low Growth & High Prices	2017	7,109	-	7,109	100%	263,718	-	263,718	100%
Low Growth & High Prices	2018	7,089	-	7,089	100%	263,664	-	263,664	100%
Low Growth & High Prices	2019	7,056	-	7,056	100%	263,054	-	263,054	100%
Low Growth & High Prices	2020	7,045	-	7,045	100%	263,292	-	263,292	100%
Low Growth & High Prices	2021	7,040	-	7,040	100%	263,837	-	263,837	100%
Low Growth & High Prices	2022	7,017	-	7,017	100%	263,736	-	263,736	100%
Low Growth & High Prices	2023	6,981	-	6,981	100%	263,060	-	263,060	100%
Low Growth & High Prices	2024	6,995	-	6,995	100%	264,284	-	264,284	100%
Low Growth & High Prices	2025	6,965	-	6,965	100%	263,830	-	263,830	100%
Low Growth & High Prices	2026	6,940	-	6,940	100%	263,559	-	263,559	100%
Low Growth & High Prices	2027	6,926	-	6,926	100%	263,749	-	263,749	100%
Low Growth & High Prices	2028	6,921	-	6,921	100%	264,377	-	264,377	100%
Low Growth & High Prices	2029	6,917	-	6,917	100%	264,926	-	264,926	100%
Low Growth & High Prices	2030	6,883	-	6,883	100%	264,327	-	264,327	100%
Low Growth & High Prices	2031	6,865	-	6,865	100%	264,329	-	264,329	100%
Low Growth & High Prices	2032	6,846	-	6,846	100%	264,312	-	264,312	100%
Low Growth & High Prices	2033	6,859	-	6,859	100%	265,562	-	265,562	100%

Case	Gas Year	Klamath Falls			Klamath Falls	Medford/Roseburg Served	Medford/Roseburg Unserved	Medford/Roseburg Total	Medford/Roseburg % of Peak Day Served
		Served	Unserved	Total	% of Peak Day Served				
Low Growth & High Prices	2014	11,451	-	11,451	100%	69,822	-	69,822	100%
Low Growth & High Prices	2015	11,230	-	11,230	100%	68,580	-	68,580	100%
Low Growth & High Prices	2016	11,151	-	11,151	100%	68,191	-	68,191	100%
Low Growth & High Prices	2017	11,130	-	11,130	100%	68,150	-	68,150	100%
Low Growth & High Prices	2018	11,105	-	11,105	100%	68,148	-	68,148	100%
Low Growth & High Prices	2019	11,067	-	11,067	100%	68,004	-	68,004	100%
Low Growth & High Prices	2020	11,061	-	11,061	100%	68,080	-	68,080	100%
Low Growth & High Prices	2021	11,063	-	11,063	100%	68,222	-	68,222	100%
Low Growth & High Prices	2022	11,043	-	11,043	100%	68,206	-	68,206	100%
Low Growth & High Prices	2023	11,001	-	11,001	100%	68,039	-	68,039	100%
Low Growth & High Prices	2024	11,030	-	11,030	100%	68,359	-	68,359	100%
Low Growth & High Prices	2025	10,995	-	10,995	100%	68,244	-	68,244	100%
Low Growth & High Prices	2026	10,969	-	10,969	100%	68,184	-	68,184	100%
Low Growth & High Prices	2027	10,956	-	10,956	100%	68,235	-	68,235	100%
Low Growth & High Prices	2028	10,965	-	10,965	100%	68,402	-	68,402	100%
Low Growth & High Prices	2029	10,972	-	10,972	100%	68,545	-	68,545	100%
Low Growth & High Prices	2030	10,926	-	10,926	100%	68,398	-	68,398	100%
Low Growth & High Prices	2031	10,911	-	10,911	100%	68,399	-	68,399	100%
Low Growth & High Prices	2032	10,895	-	10,895	100%	68,401	-	68,401	100%
Low Growth & High Prices	2033	10,922	-	10,922	100%	68,719	-	68,719	100%

## APPENDIX 6.2: PEAK DAY DEMAND TABLE COLDEST IN 20 YEARS

Peak Day Demand - Served and Unserved (MDth/d) Before Resource Additions & Net of DSM Savings										
Case	Gas Year	LaGrande				LaGrande % of Peak Day Served	WA/ID			WA/ID % of Peak Day Served
		Served	Unserved	Total	Served		Unserved	Total		
Coldest in 20	2014	7,388	-	7,388	100%	252,453	-	252,453	100%	
Coldest in 20	2015	7,422	-	7,422	100%	254,998	-	254,998	100%	
Coldest in 20	2016	7,457	-	7,457	100%	257,472	-	257,472	100%	
Coldest in 20	2017	7,429	-	7,429	100%	257,946	-	257,946	100%	
Coldest in 20	2018	7,471	-	7,471	100%	260,769	-	260,769	100%	
Coldest in 20	2019	7,501	-	7,501	100%	263,261	-	263,261	100%	
Coldest in 20	2020	7,532	-	7,532	100%	265,785	-	265,785	100%	
Coldest in 20	2021	7,536	-	7,536	100%	267,539	-	267,539	100%	
Coldest in 20	2022	7,478	-	7,478	100%	266,917	-	266,917	100%	
Coldest in 20	2023	7,498	-	7,498	100%	269,164	-	269,164	100%	
Coldest in 20	2024	7,528	-	7,528	100%	271,778	-	271,778	100%	
Coldest in 20	2025	7,497	-	7,497	100%	272,296	-	272,296	100%	
Coldest in 20	2026	7,469	-	7,469	100%	272,781	-	272,781	100%	
Coldest in 20	2027	7,474	-	7,474	100%	274,514	-	274,514	100%	
Coldest in 20	2028	7,503	-	7,503	100%	277,190	-	277,190	100%	
Coldest in 20	2029	7,531	-	7,531	100%	279,891	-	279,891	100%	
Coldest in 20	2030	7,476	-	7,476	100%	279,431	-	279,431	100%	
Coldest in 20	2031	7,506	-	7,506	100%	282,162	-	282,162	100%	
Coldest in 20	2032	7,502	-	7,502	100%	283,631	-	283,631	100%	
Coldest in 20	2033	7,512	-	7,512	100%	285,655	-	285,655	100%	

Case	Gas Year	Klamath Falls				Klamath Falls % of Peak Day Served	Medford/Roseburg			Medford/Roseburg % of Peak Day Served
		Served	Unserved	Total	Served		Unserved	Total		
Coldest in 20	2014	11,488	-	11,488	100%	62,534	-	62,534	100%	
Coldest in 20	2015	11,497	-	11,497	100%	63,033	-	63,033	100%	
Coldest in 20	2016	11,538	-	11,538	100%	63,512	-	63,512	100%	
Coldest in 20	2017	11,500	-	11,500	100%	63,494	-	63,494	100%	
Coldest in 20	2018	11,556	-	11,556	100%	64,022	-	64,022	100%	
Coldest in 20	2019	11,617	-	11,617	100%	64,557	-	64,557	100%	
Coldest in 20	2020	11,692	-	11,692	100%	65,174	-	65,174	100%	
Coldest in 20	2021	11,732	-	11,732	100%	65,602	-	65,602	100%	
Coldest in 20	2022	11,671	-	11,671	100%	65,458	-	65,458	100%	
Coldest in 20	2023	11,731	-	11,731	100%	66,006	-	66,006	100%	
Coldest in 20	2024	11,806	-	11,806	100%	66,639	-	66,639	100%	
Coldest in 20	2025	11,793	-	11,793	100%	66,771	-	66,771	100%	
Coldest in 20	2026	11,776	-	11,776	100%	66,891	-	66,891	100%	
Coldest in 20	2027	11,814	-	11,814	100%	67,315	-	67,315	100%	
Coldest in 20	2028	11,891	-	11,891	100%	67,964	-	67,964	100%	
Coldest in 20	2029	11,966	-	11,966	100%	68,621	-	68,621	100%	
Coldest in 20	2030	11,910	-	11,910	100%	68,518	-	68,518	100%	
Coldest in 20	2031	11,987	-	11,987	100%	69,180	-	69,180	100%	
Coldest in 20	2032	12,011	-	12,011	100%	69,540	-	69,540	100%	
Coldest in 20	2033	12,057	-	12,057	100%	70,032	-	70,032	100%	



## **APPENDIX 7.1: DISTRIBUTION SYSTEM MODELING**

### **OVERVIEW**

The primary goal of distribution system planning is to design for present needs and to plan for future expansion to serve demand growth. This allows Avista to satisfy current demand-serving requirements while taking steps toward meeting future needs. Distribution system planning identifies potential problems and areas of the distribution system that require reinforcement. By knowing when and where pressure problems may occur, the necessary reinforcements can be incorporated into normal maintenance. Thus, more costly reactive and emergency solutions can be avoided.

### **COMPUTER MODELING**

When designing new main extensions, computer modeling can help determine the optimum size facilities for present and future needs. Undersized facilities are costly to replace, and oversized facilities incur unnecessary expenses to Avista and its customers.

### **THEORY AND APPLICATION OF STUDY**

Natural gas network load studies have evolved in the last decade to become a highly technical and useful means of analyzing the operation of a distribution system. Using a pipeline fluid flow formula, a specified parameter of each pipe element can be simultaneously solved. Through years of research, pipeline equations have been refined to the point where solutions obtained closely represent actual system behavior.

Avista conducts network load studies using GL Noble Denton's SynerGEE® 4.6.0 software. This computer-based modeling tool runs on a Windows operating system and allows users to analyze and interpret solutions graphically.

### **CREATING A MODEL**

To properly study the distribution system, all natural gas main information is entered (length, pipe roughness and ID) into the model. "Main" refers to all pipelines supplying services.

Nodes are placed at all pipe intersections, beginnings and ends of mains, changes in pipe diameter/material, and to identify all large customers. A model element connects two nodes together. Therefore, a "to node" and a "from node" will represent an element between those two nodes. Almost all of the elements in a model are pipes.

Regulators are treated like adjustable valves in which the downstream pressure is set to a known value. Although specific regulator types can be entered for realistic behavior, the expected flow passing through the actual regulator is determined and the modeled regulator is forced to accommodate such flows.

### **FLUID MECHANICS OF THE MODEL**

Pipe flow equations are used to determine the relationships between flow, pressure drop, diameter and pipe length. For all models, the Fundamental Flow equation (FM) is used due to its demonstrated reliability.

Efficiency factors are used to account for the equivalent resistance of valves, fittings and angle changes within the distribution system. Starting with a 95 percent factor, the efficiency can be changed to fine tune the model to match field results.

Pipe roughness, along with flow conditions, creates a friction factor for all pipes within a system. Thus, each pipe may have a unique friction factor, minimizing computational errors associated with generalized friction values.

## LOAD DATA

All studies are considered steady state; all natural gas entering the distribution system must equal the natural gas exiting the distribution system at any given time.

Customer loads are obtained from Avista’s customer billing system and converted to an algebraic format so loads can be generated for various conditions. Customer Management Module (CMM), a new add-on application for SynerGEE, processes customer usage history and generates a base load (non-temperature dependent) and heat load (varying with temperature) for each customer.

In the event of a peak day or an extremely cold weather condition, it is assumed that all curtailable loads are interrupted. Therefore, the models will be conducted with only core loads.

## DETERMINING NATURAL GAS CUSTOMERS’ MAXIMUM HOURLY USAGE

### DETERMINING DESIGN PEAK HOURLY LOAD

The design peak hourly load for a customer is estimated by adding the hourly base load and the hourly heat load for a design temperature. This estimate reflects highest system hourly demands, as shown in Table 1:

Table 1 - Determining Peak* Hourly Load			
Peak Hourly Base Load	+	Peak Hourly Heat Load	= Peak Hourly Load

This method differs from the approach that we use for IRP peak day load planning. The primary reason for this difference is due to the importance of responding to hourly peaking in the distribution system, while IRP resource planning focuses on peak day requirements to the city gate.

## APPLYING LOADS

Having estimated the peak loads for all customers in a particular service area, the model can be loaded. The first step is to assign each load to the respective node or element.

## GENERATING LOADS

Temperature-based and non-temperature-based loads are established for each node or element, thus loads can be varied based on any temperature (HDD). Such a tool is necessary to evaluate the difference in flow and pressure due to different weather conditions.



## **GEOGRAPHIC INFORMATION SYSTEM (GIS)**

Several years ago Avista converted its natural gas facility maps to GIS. While the GIS can provide a variety of map products, its power lies in its analytical capability. A GIS consists of three components: spatial operations, data association and map representation.

A GIS allows analysts to conduct spatial operations (relating a feature or facility to another geographically). A spatial operation is possible if a facility displayed on a map maintains a relationship to other facilities. Spatial relationships allow analysts to perform a multitude of queries, including:

- Identify electric customers adjacent to natural gas mains who are not currently using natural gas
- Display the ratio of customers to length of pipe in Emergency Operating Procedure zones (geographical areas defined by the number of customers and their safety in the event of an emergency)
- Classify high-pressure pipeline proximity criteria

The second component of the GIS is data association. This allows analysts to model relationships between facilities displayed on a map to tabular information in a database. Databases store facility information, such as pipe size, pipe material, pressure rating, or related information (e.g., customer databases, equipment databases and work management systems). Data association allows interactive queries within a map-like environment.

Finally, the GIS provides a means to create maps of existing facilities in different scales, projections and displays. In addition, the results of a comparative or spatial analysis can be presented pictorially. This allows users to present complex analyses rapidly and in an easy-to-understand method.

## **BUILDING SYNERGEE® MODELS FROM A GIS**

The GIS can provide additional benefits through the ease of creation and maintenance of load studies. Avista can create load studies from the GIS based on tabular data (attributes) installed during the mapping process.

## **MAINTENANCE USING A GIS**

The GIS helps maintain the existing distribution facility by allowing a design to be initiated on a GIS. Currently, design jobs for the company's natural gas system are managed through Avista's Facility Management (AFM) tool. Once jobs are completed, the as-built information is automatically updated on GIS, eliminating the need to convert physical maps to a GIS at a later date. Because the facility is updated, load studies can remain current by refreshing the analysis.

## **DEVELOPING A PRESENT CASE LOAD STUDY**

In order for any model to have accuracy, a present case model has to be developed that reflects what the system was doing when downstream pressures and flows are known. To establish the present case, pressure charts located throughout the distribution system are used.

Pressure charts plot pressure (some include temperature) versus time over several days. Various locations recording simultaneously are used to validate the model. Customer loads on SynerGEE® are generated to correspond with actual temperatures recorded on the pressure charts. An accurate model's downstream

pressures will match the corresponding location's field pressure chart. Efficiency factors are fine-tuned to further refine the model's pressures.

Since telemetry at the gate stations record hourly flow, temperature and pressure, these values are used to validate the model. All loads are representative of the average daily temperature and are defined as hourly flows. If the load generating method is truly accurate, all natural gas entering the actual system (physical) equals total natural gas demand solved by the simulated system (model).

## **DEVELOPING A PEAK CASE LOAD STUDY**

Using the calculated peak loads, a model can be analyzed to identify the behavior during a peak day. The efficiency factors established in the present case are used throughout subsequent models.

## **ANALYZING RESULTS**

After a model has been balanced, several features within the SynerGEE® model are used to translate results. Color plots are generated to depict flow direction, pressure, pipe diameter and gradient with specific break points. Reinforcements can be identified by visual inspection. When user edits are completed and the model is re-balanced, pressure changes can be visually displayed, helping identify optimum reinforcements.

An optimum reinforcement will have the largest pressure increase per unit length. Reinforcements can also be deferred and occasionally eliminated through load mitigation of DSM efforts.

## **PLANNING CRITERIA**

In most instances, models resulting in node pressures below 15 psig indicate a likelihood of distribution low pressure, and therefore necessitate reinforcements. For most Avista distribution systems, a minimum of 15 psig will ensure deliverability as natural gas exits the distribution mains and travels through service pipelines to a customer's meter. Some Avista distribution areas operate at lower pressures and are assigned a minimum pressure of 5 psig for model results. Given a lower operating pressure, service pipelines in such areas are sized accordingly to maintain reliability.

## **DETERMINING MAXIMUM CAPACITY FOR A SYSTEM**

Using a peak day model, loads can be prorated at intervals until area pressures drop to 15 psig. At that point, the total amount of natural gas entering the system equals the maximum capacity before new construction is necessary. The difference between natural gas entering the system in this scenario and a peak day model is the maximum additional capacity that can be added to the system.

Since the approximate natural gas usage for the average customer is known, it can be determined how many new customers can be added to the distribution system before necessitating system reinforcements. The above models and procedures are utilized with new construction proposals or pipe reinforcements to determine the potential increase in capacity.

## **FIVE-YEAR FORECASTING**

The intent of our load study forecasting is to predict the system's behavior and reinforcements necessary within the next five years. Various Avista personnel provide information to determine where and why certain areas may experience growth.

By combining information from Avista’s demand forecast, IRP planning efforts, regional growth plans and area developments, proposals for pipeline reinforcements and expansions can be evaluated with SynerGEE®.





# 2014 Avista Natural Gas IRP

Technical Advisory Committee Meeting 1  
January 24, 2014  
Portland, Oregon

# Agenda

- Introductions & Logistics
- Purpose of IRP and Avista's IRP Process
- Avista's Demand Overview and 2012 IRP Revisited
- Economic Outlook and Customer Count Forecast
- Demand Forecast Methodology
- Dynamic Demand Forecasting
- Demand Side Management
- Questions/Wrap Up

## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply/Infrastructure, Natural Gas Pricing, and Potential Case Discussion– *February 25*
  - Distribution Planning, SENDOUT® Preliminary Output Results and Further Case Discussion – *March 26*
  - SENDOUT® results – *April 23*
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document



# Purpose of Gas Integrated Resource Planning

- Comprehensive long-range resource planning tool
- Fully integrates forecasted demand requirements with potential demand side and supply side resources
- Process determines the least cost, risk adjusted means for meeting demand requirements for our firm residential, commercial and industrial customers
- Responsive to Idaho, Oregon and Washington rules and/or orders





## Avista's IRP Process

- Comprehensive analysis bringing demand forecasting and existing and potential supply-side and demand-side resources together into a 20-year, risk adjusted least-cost plan
- Considers:
  - Customer growth and usage
  - Weather planning standard
  - Demand-side management opportunities
  - Existing and potential supply-side resource options
  - Risk
  - Public participation through Technical Advisory Committee meetings (TAC)
- 2012 IRP completed and filed in all three jurisdictions on August 31, 2012 and acknowledged





# Avista's Demand Overview and 2012 IRP Re-Visited

# Avista's Demand Overview



# Service Territory and Customer Overview

- Serves electric and natural gas customers in eastern Washington and northern Idaho, and natural gas customers in southern and eastern Oregon
  - Population of service area 1,590,341
    - ▶ 365,000 electric customers
    - ▶ 331,000 natural gas customers
- Have one of the smallest carbon footprints among America’s 100 largest investor-owned utilities
- Committed to environmental stewardship and efficient use of resources



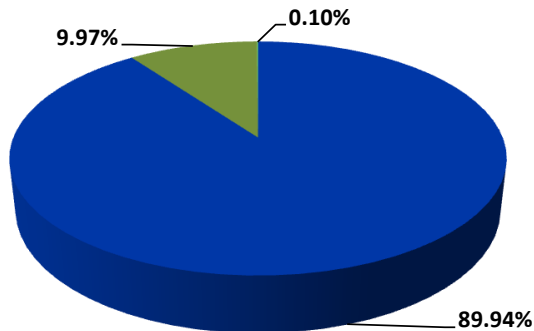
State	Total Customers	% of Total
Washington	157,557	47%
Oregon	97,404	29%
Idaho	76,739	23%
<b>Total</b> <small>Avista Utilities</small>	<b>331,700</b>	<b>100%</b>

2014 Natural Gas IRP Appendices

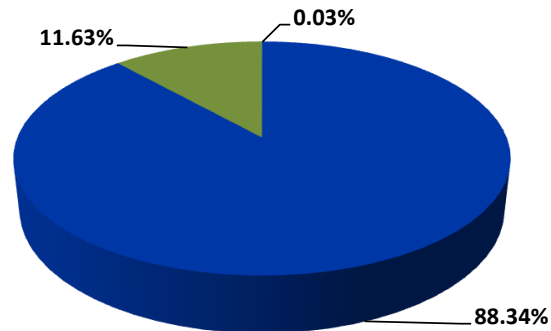


# 2013 Customer Make Up and Demand Mix

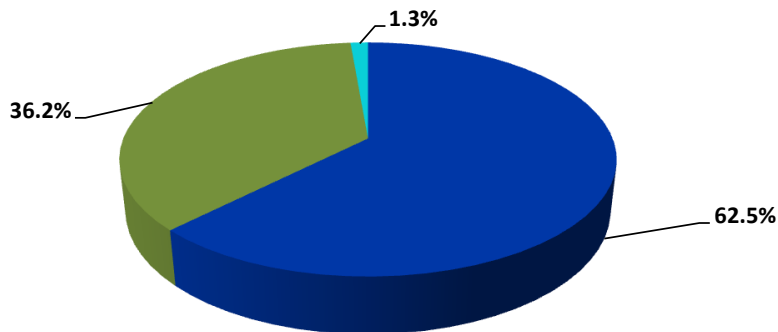
**Customer Make up  
WA-ID**



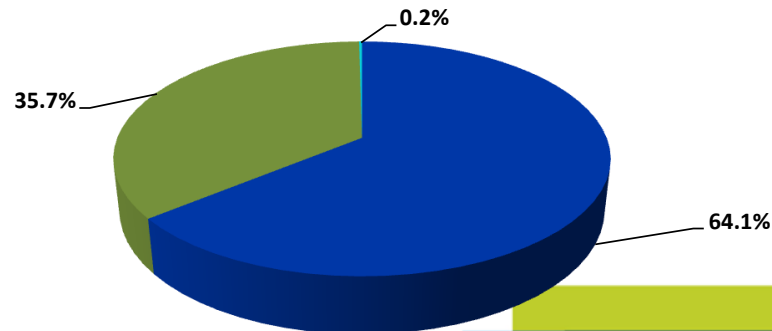
**Customer Make up  
Oregon**



**Annual Demand  
WA-ID**



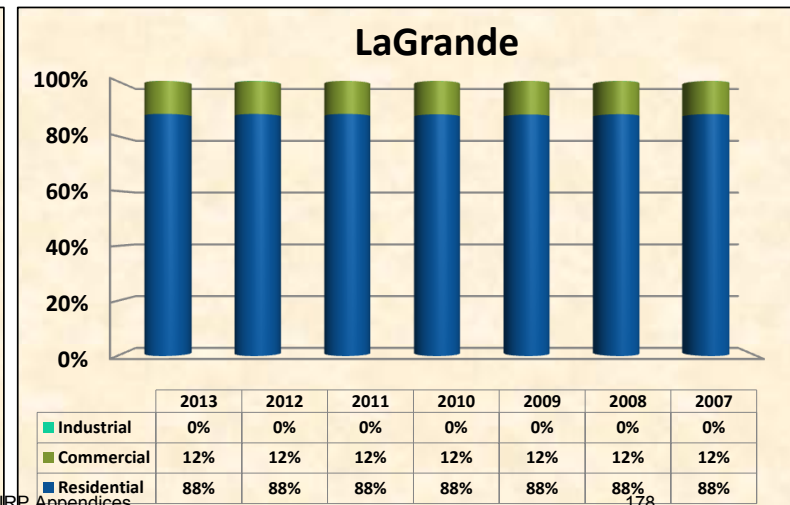
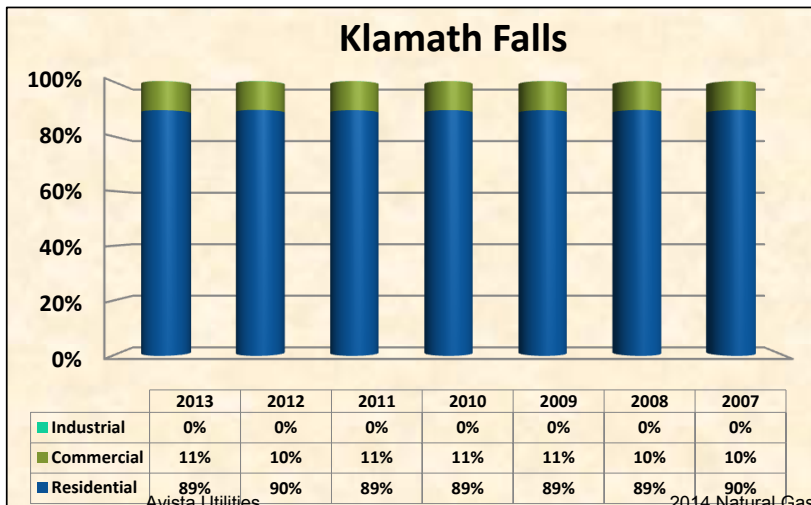
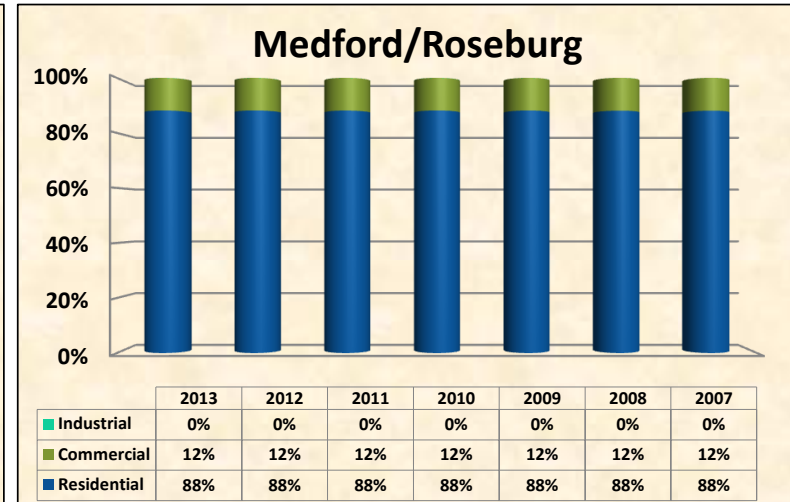
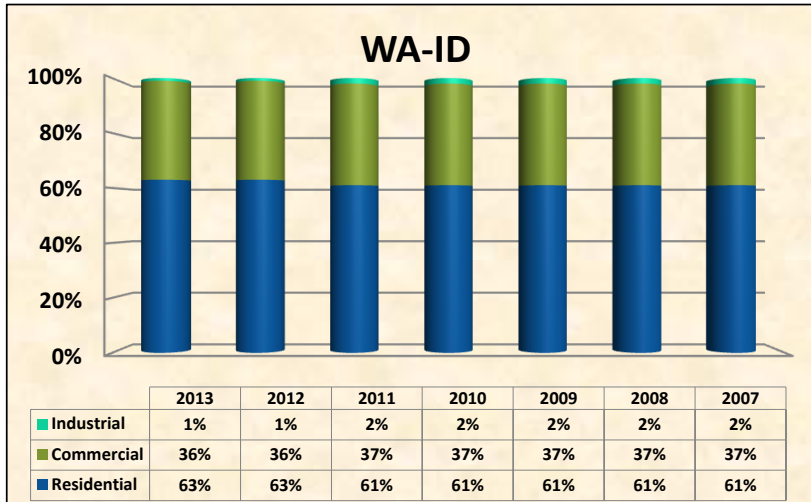
**Annual Demand  
Oregon**



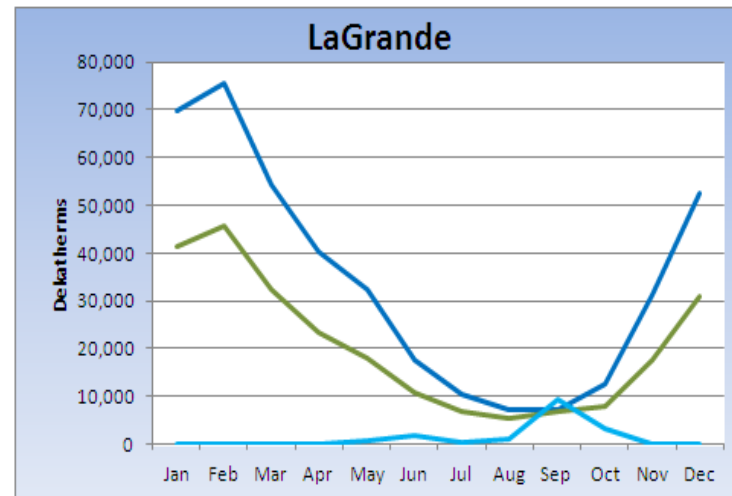
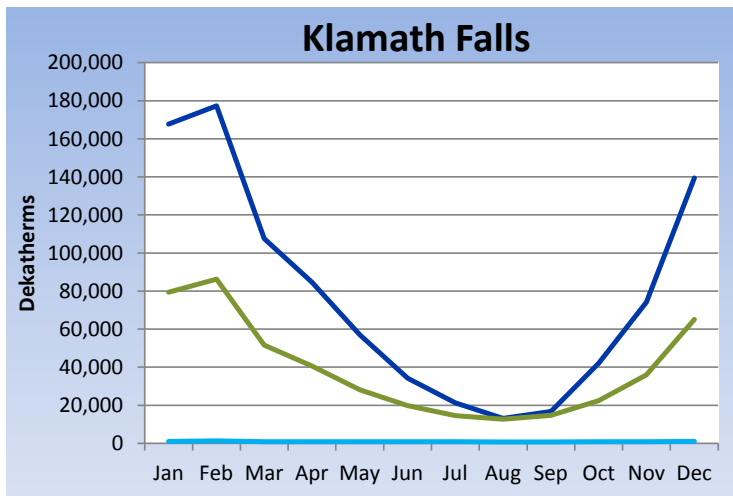
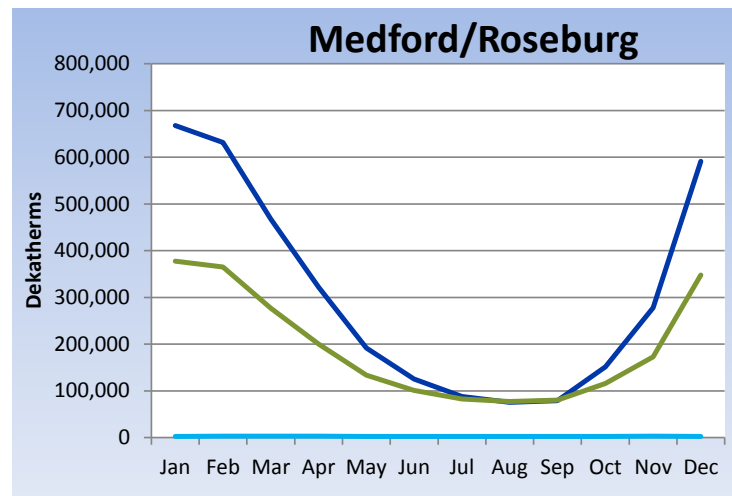
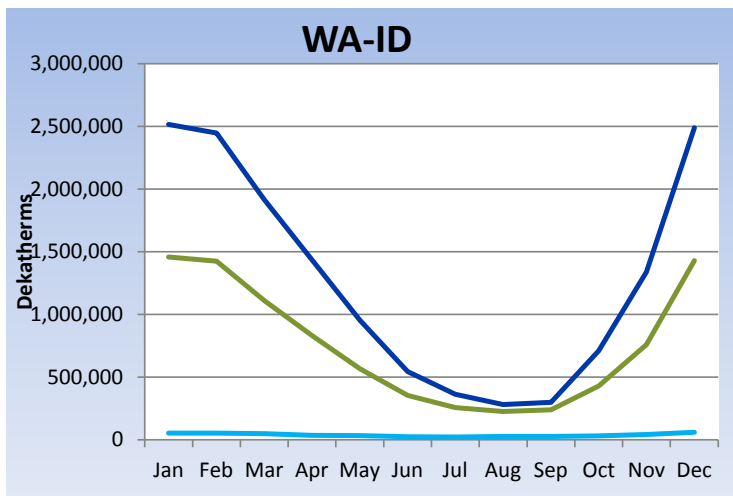
Avista Utilities Residential Commercial Industrial 2014 Natural Gas IRP Appendices

Residential Commercial Industrial AVISTA

# Historical Demand Mix

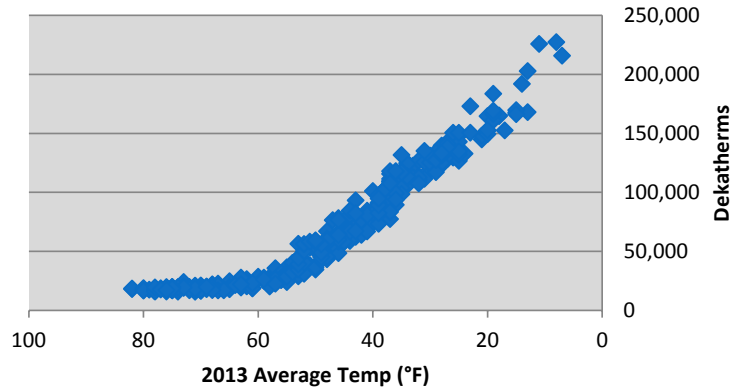


# Seasonal Demand Profiles

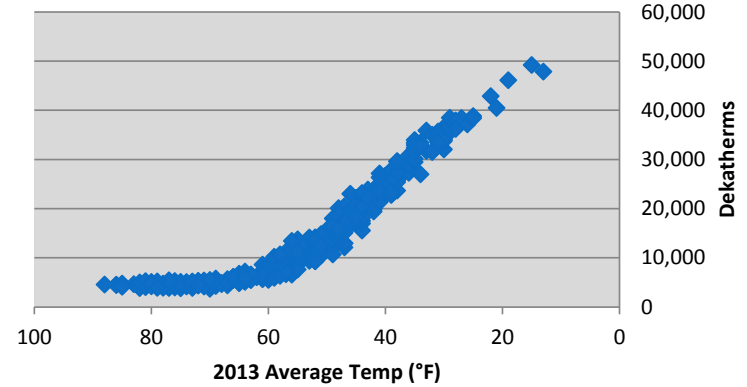


# Daily Demand Profiles

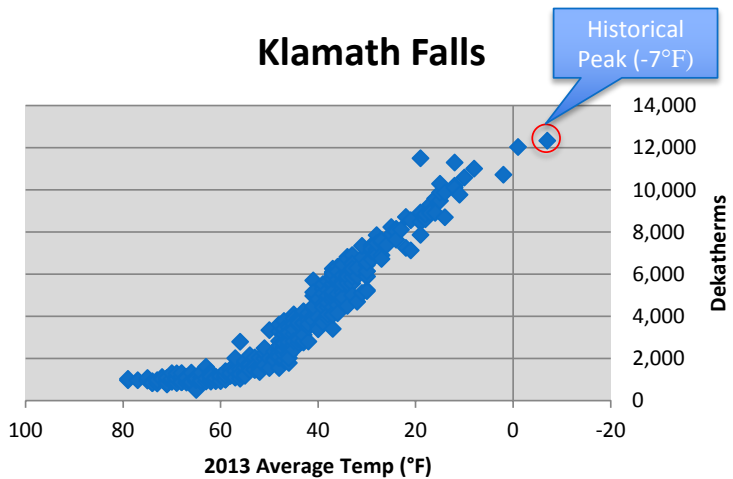
**WA-ID**



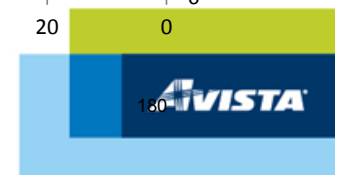
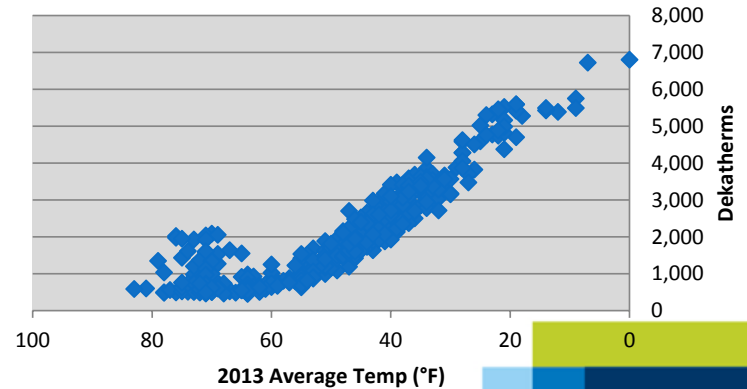
**Medford/Roseburg**



**Klamath Falls**



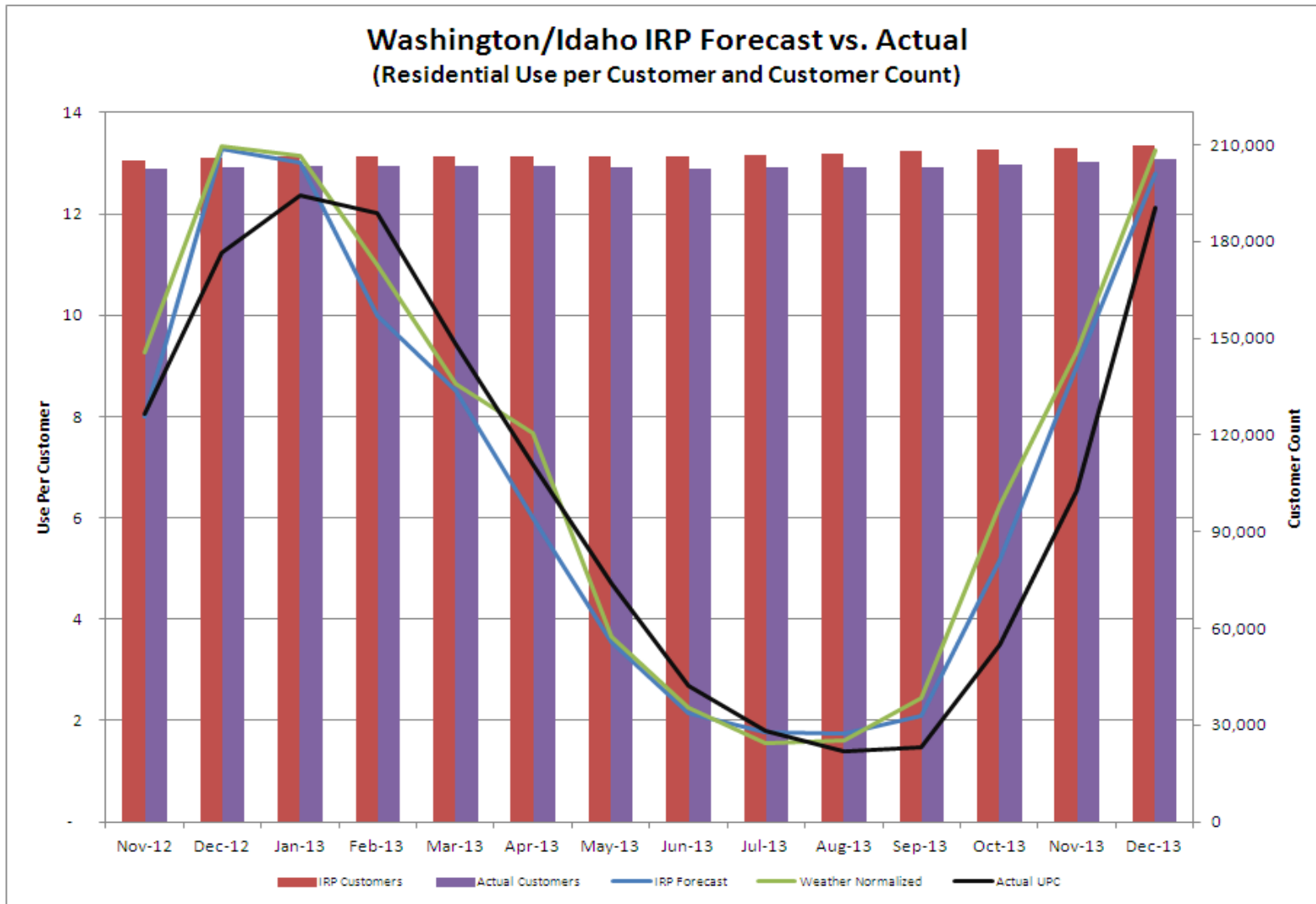
**LaGrande**

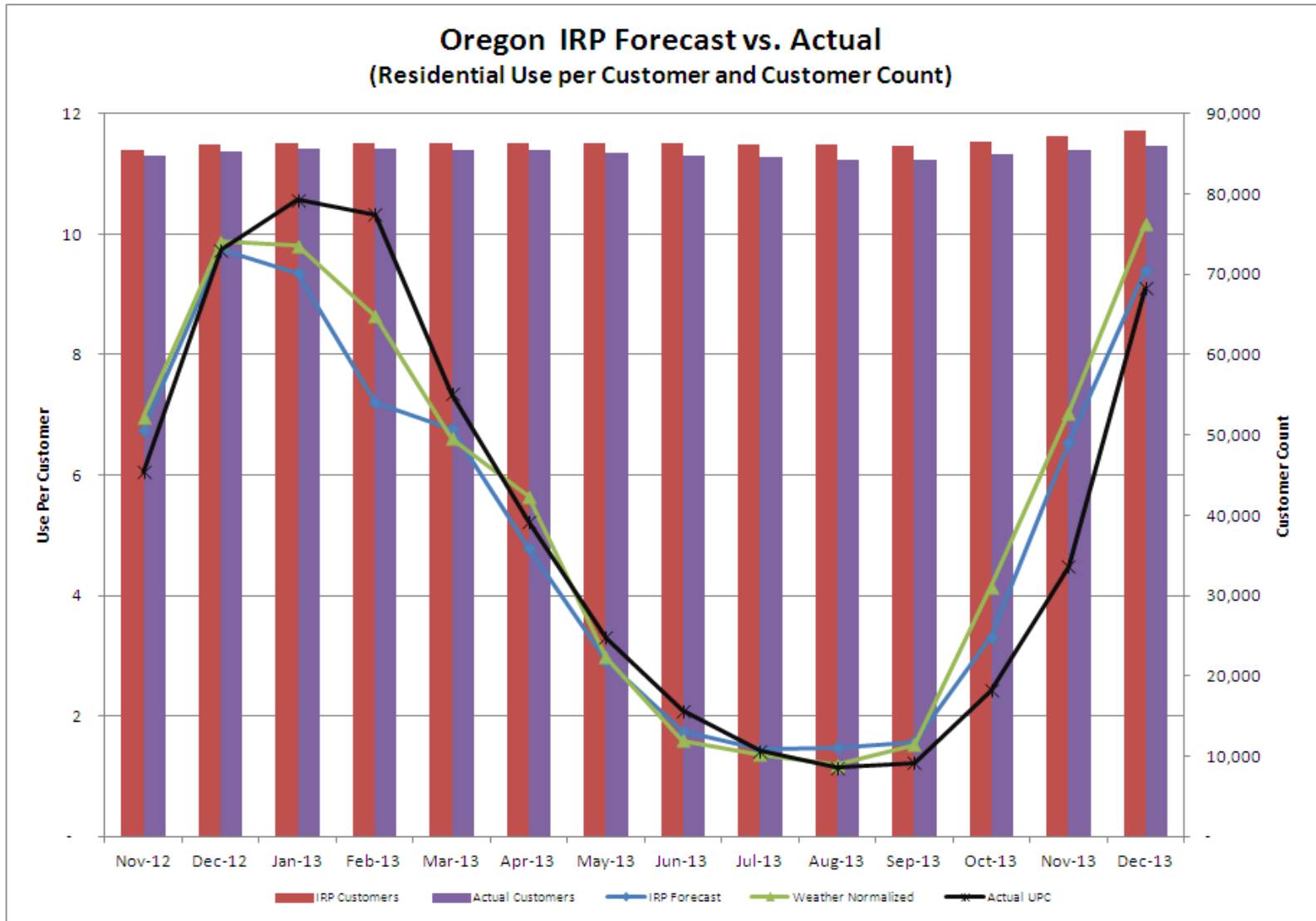


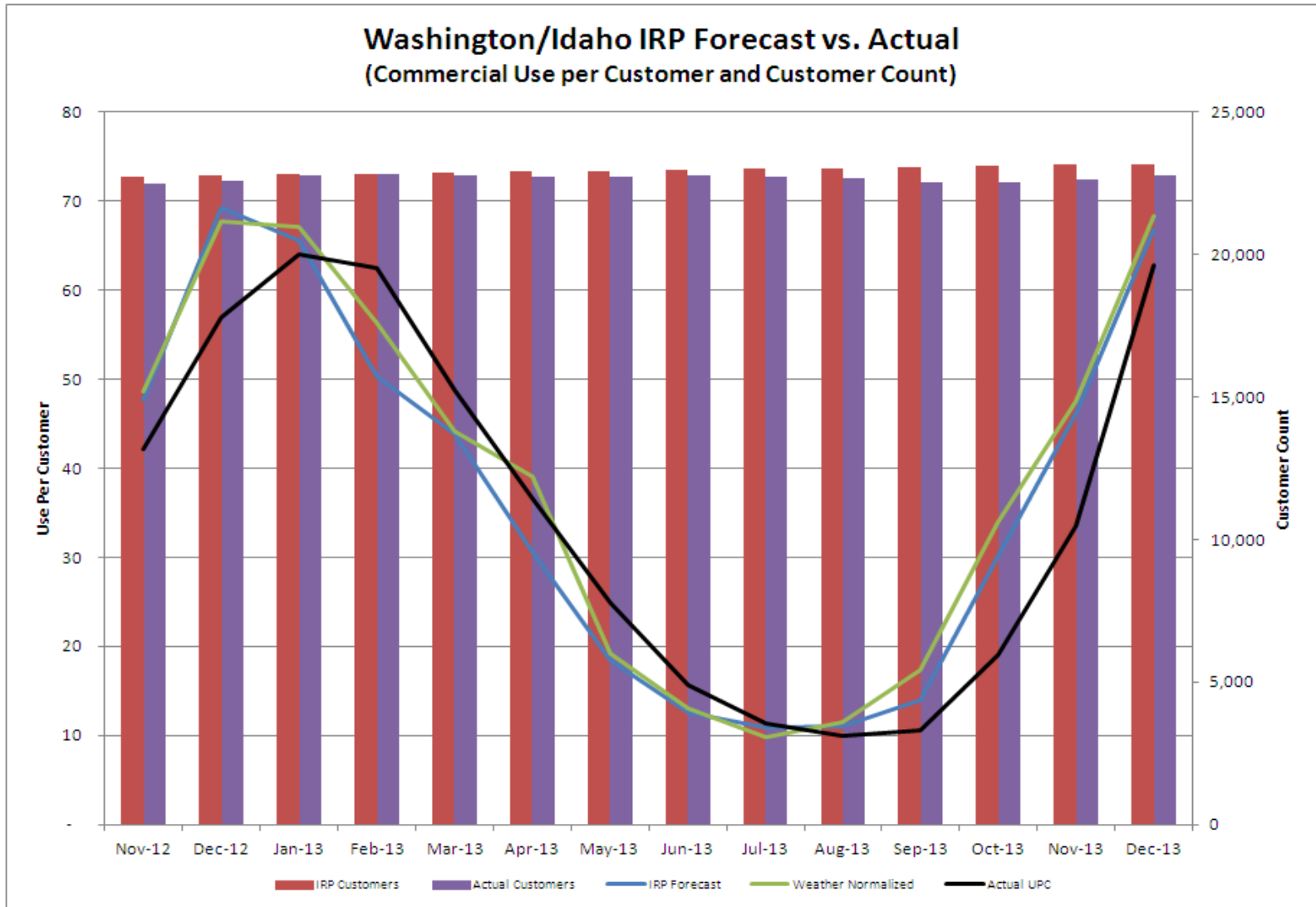


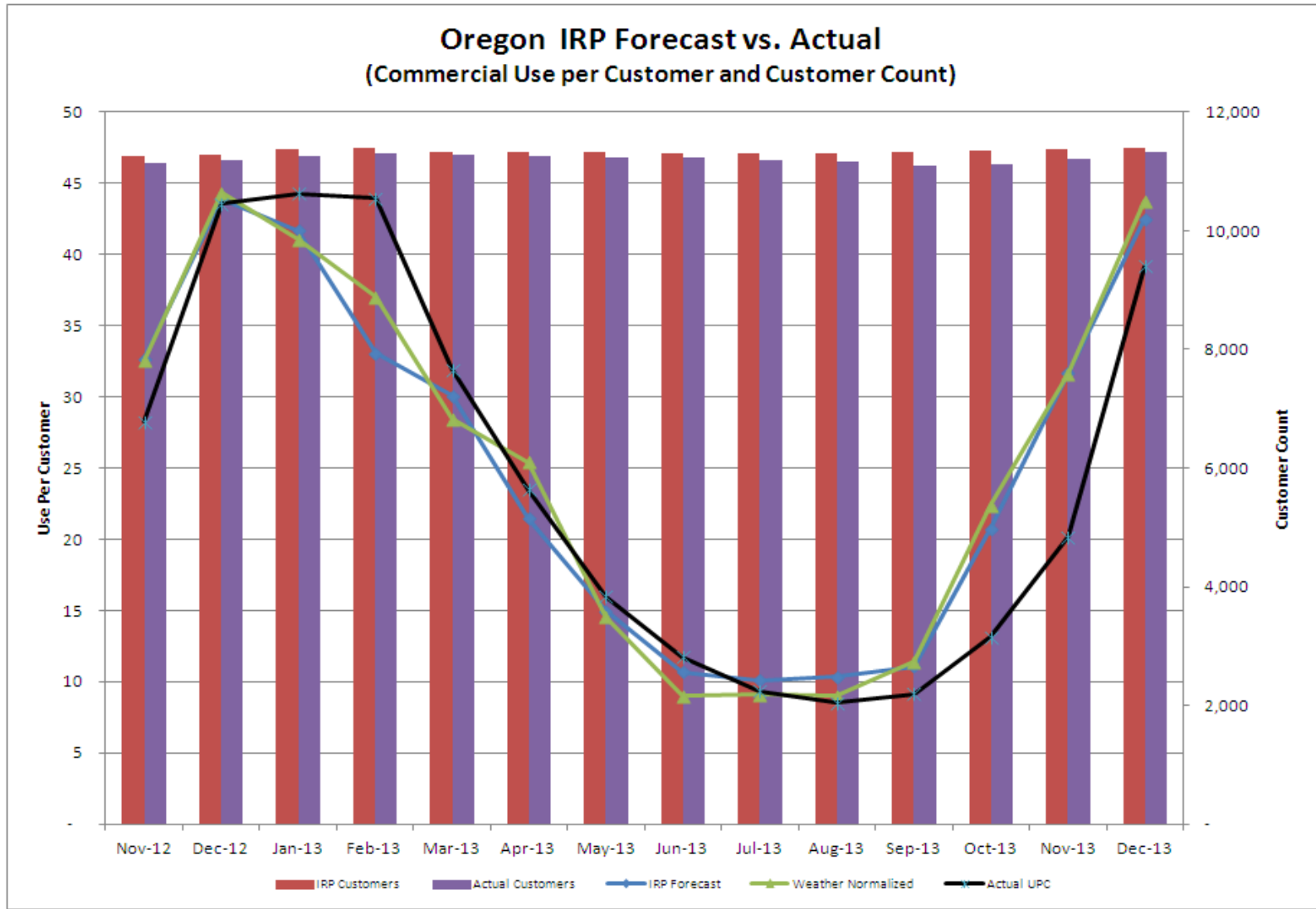
# Avista's 2012 Natural Gas IRP Re-Visited

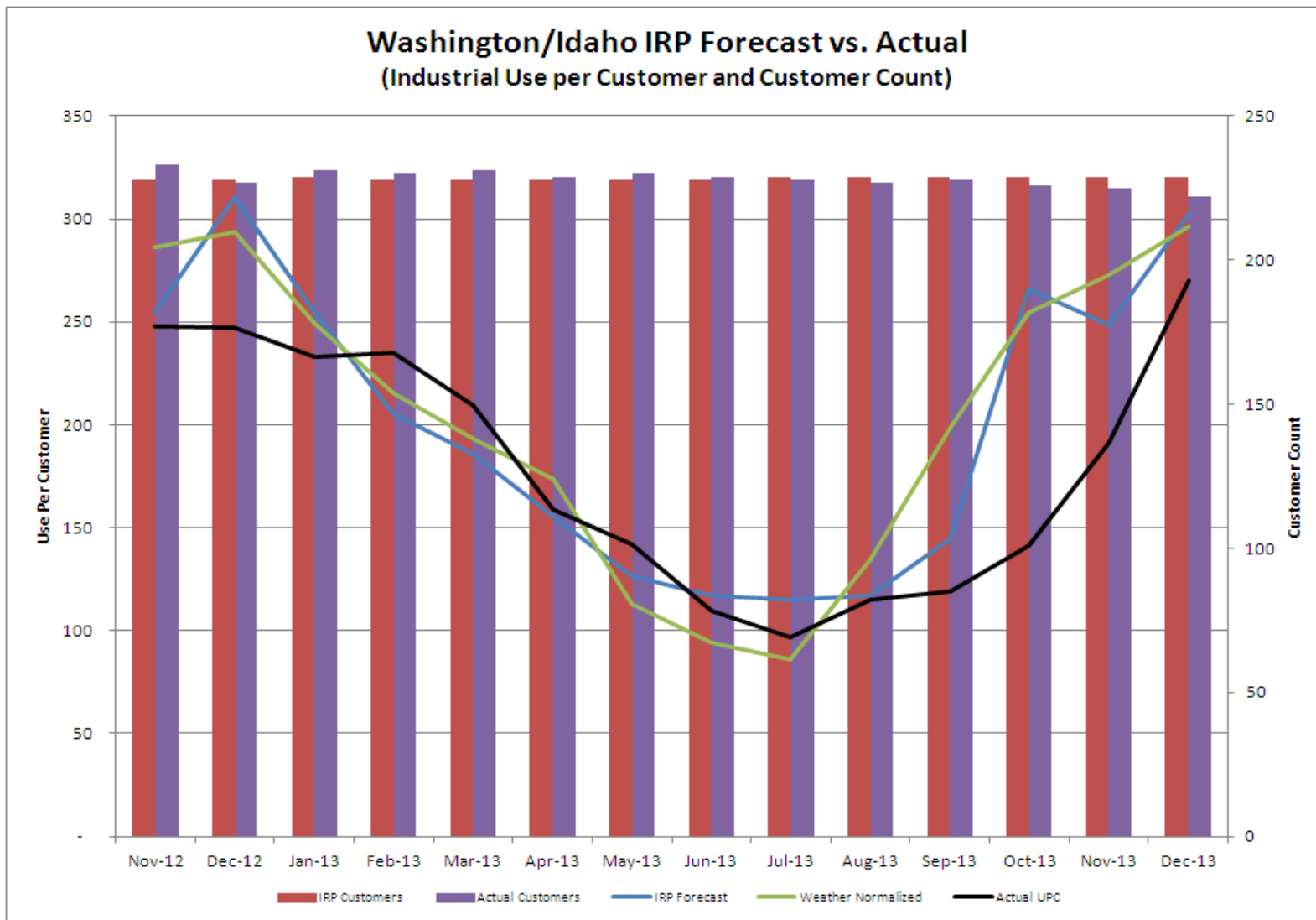


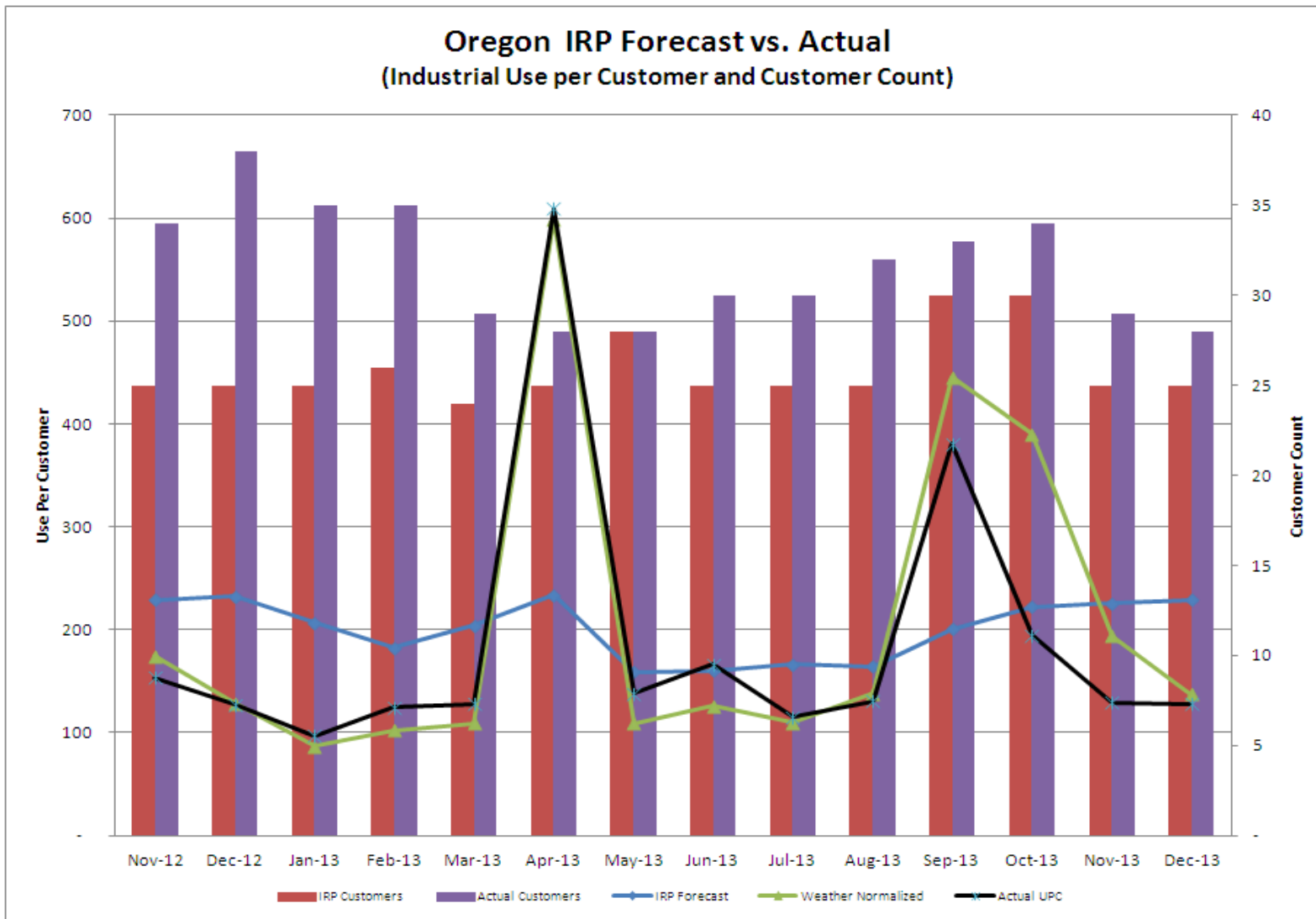






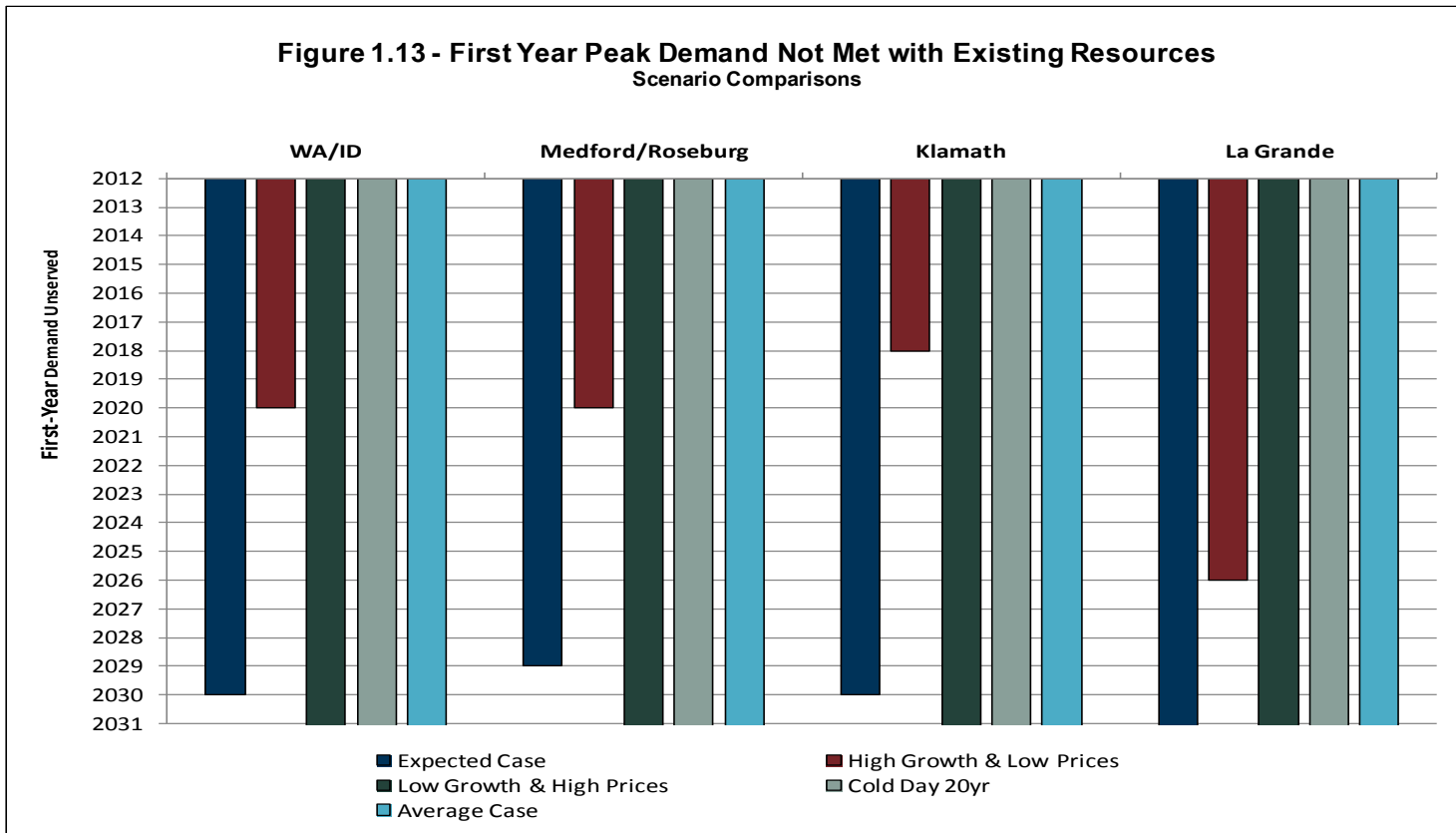






# Year First Unserved

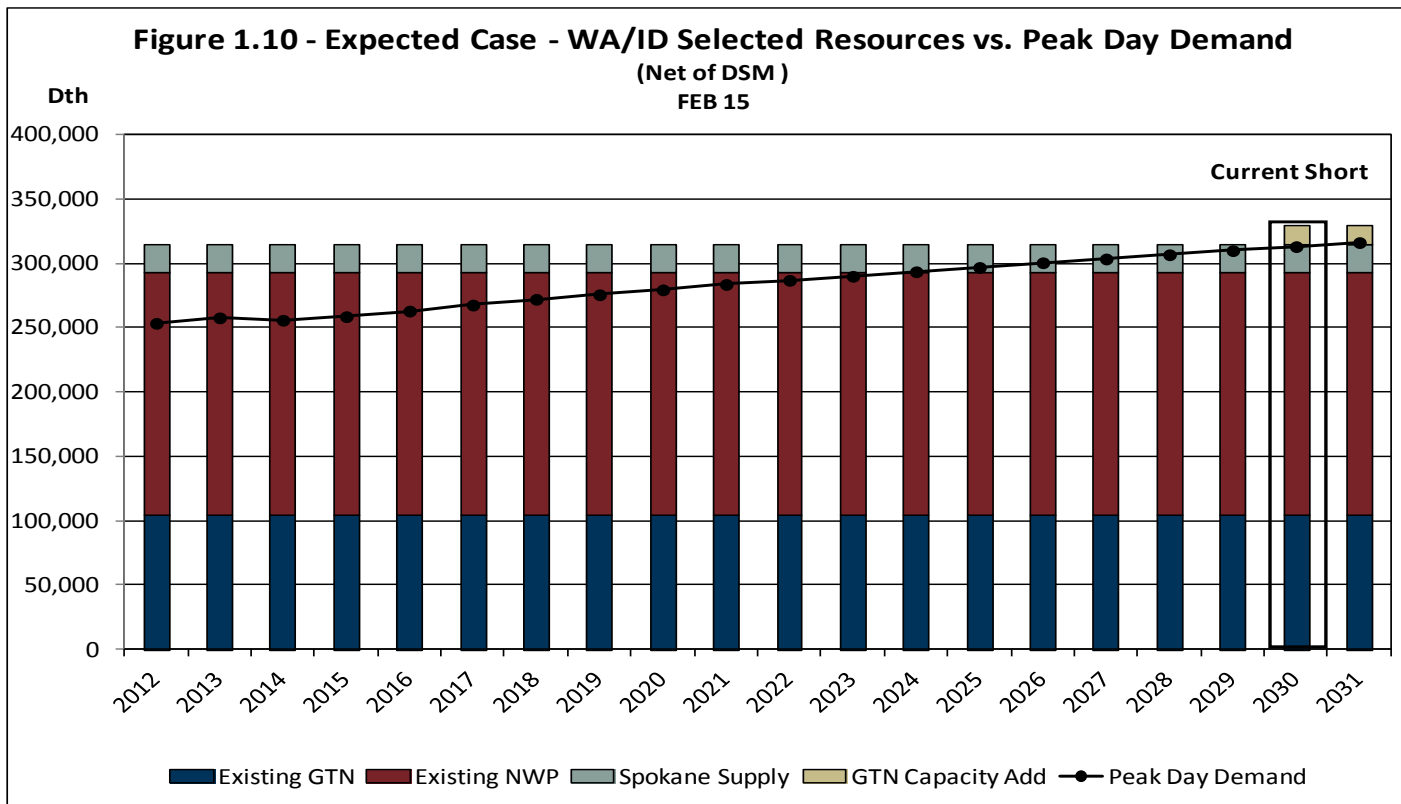
## Scenario Comparisons





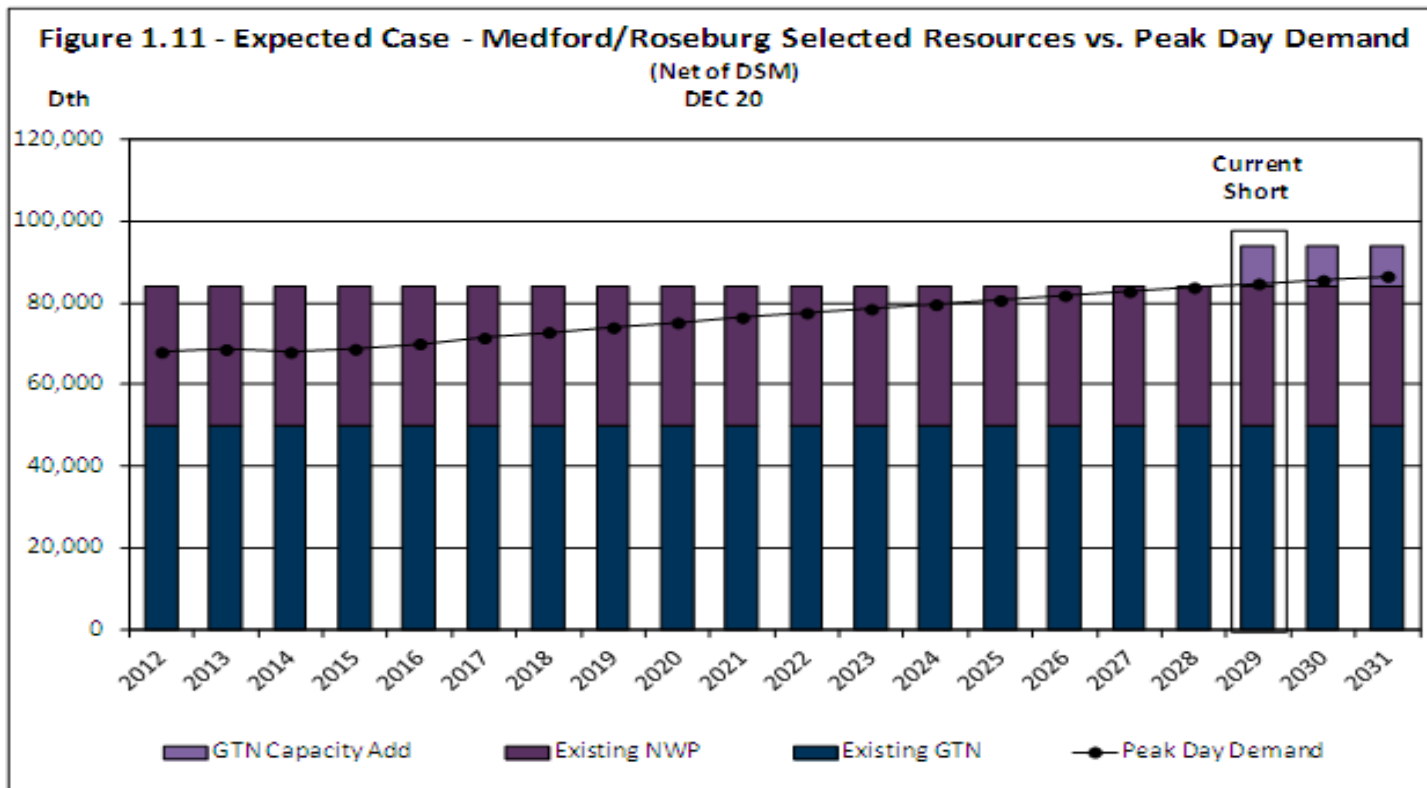
# Best Cost/Risk Resources

## Expected Case – WA/ID



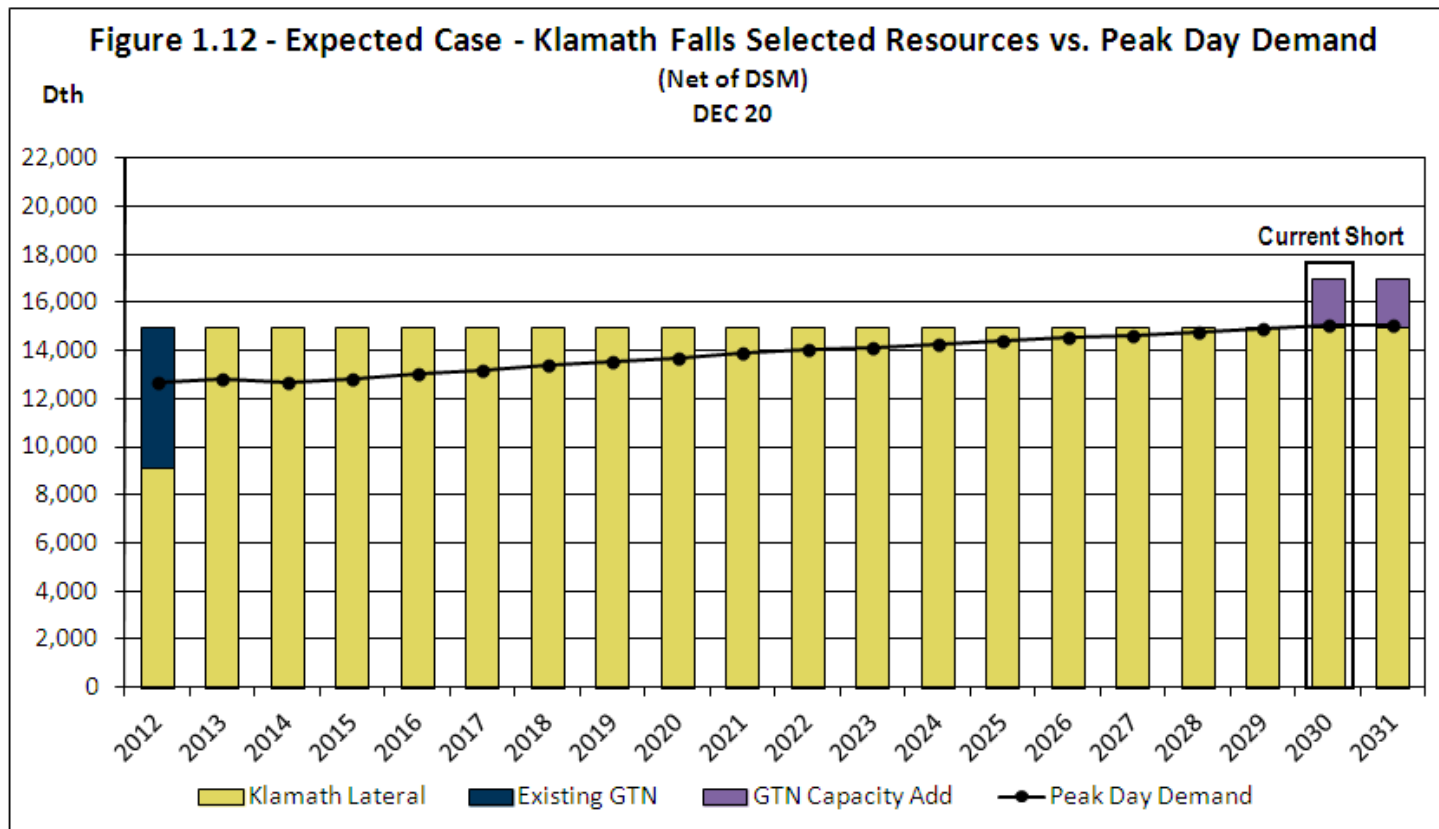
# Best Cost/Risk Resources

## Expected Case – Medford/Roseburg

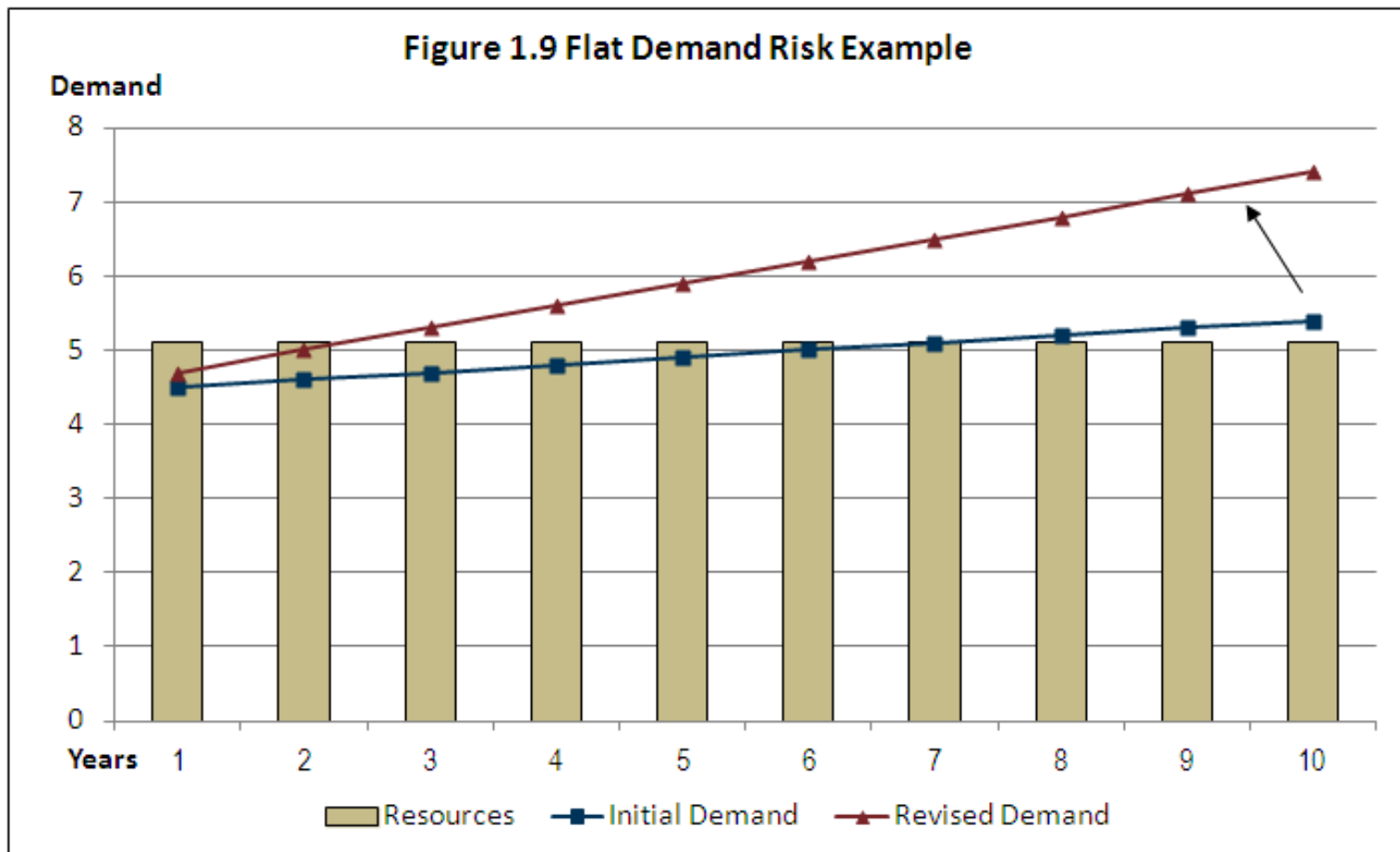


# Best Cost/Risk Resources

## Expected Case – Klamath Falls



# Our Biggest Risk Last IRP “Flat Demand” Risk



## December 8, 2013 Cold Weather Stats

Area	Actual HDD	Peak HDD	Actual Demand (Dth/d)	Forecasted Peak Demand (Dth/d)
Klamath Falls	72	72	12,656	12,830
LaGrande	65	74	6,709	7,310
Medford	52	61	48,060	53,120
Roseburg	44	55	13,058	13,930
Washington/Idaho	57	82	218,178	257,650

*Note: Klamath Falls and Medford set record high loads. LaGrande and Roseburg had second highest demand days.*

## Near Term Action Items

- Demand trend monitoring
- Demand side management cost effectiveness and targets
- Gate station analysis

## On-going Action Items

- Price elasticity study inquiry
- NGV/CNG and other demand potential
- Supply side resource trends/availability
- Meet regularly with Commission Staff



# Economic Outlook and Customer Forecast Development

Grant D. Forsyth, Ph.D.  
Chief Economist  
[Grant.Forsyth@avistacorp.com](mailto:Grant.Forsyth@avistacorp.com)

# Load Forecasts-Two Step Process

- First, forecast customers (C) by month by schedule (s) by residential (r), commercial (c), industrial (i)—for example,  $C_{t,y,s,r}$
- Forecast use per customer (U) by month by schedule by class—for example,  $U_{t,y,s,r}$
- Load forecast (L) is the product of the two:

$$L_{t,y,s,r} = C_{t,y,s,r} \times U_{t,y,s,r}$$

For non-IRP years, forecast is run out 5-yrs.

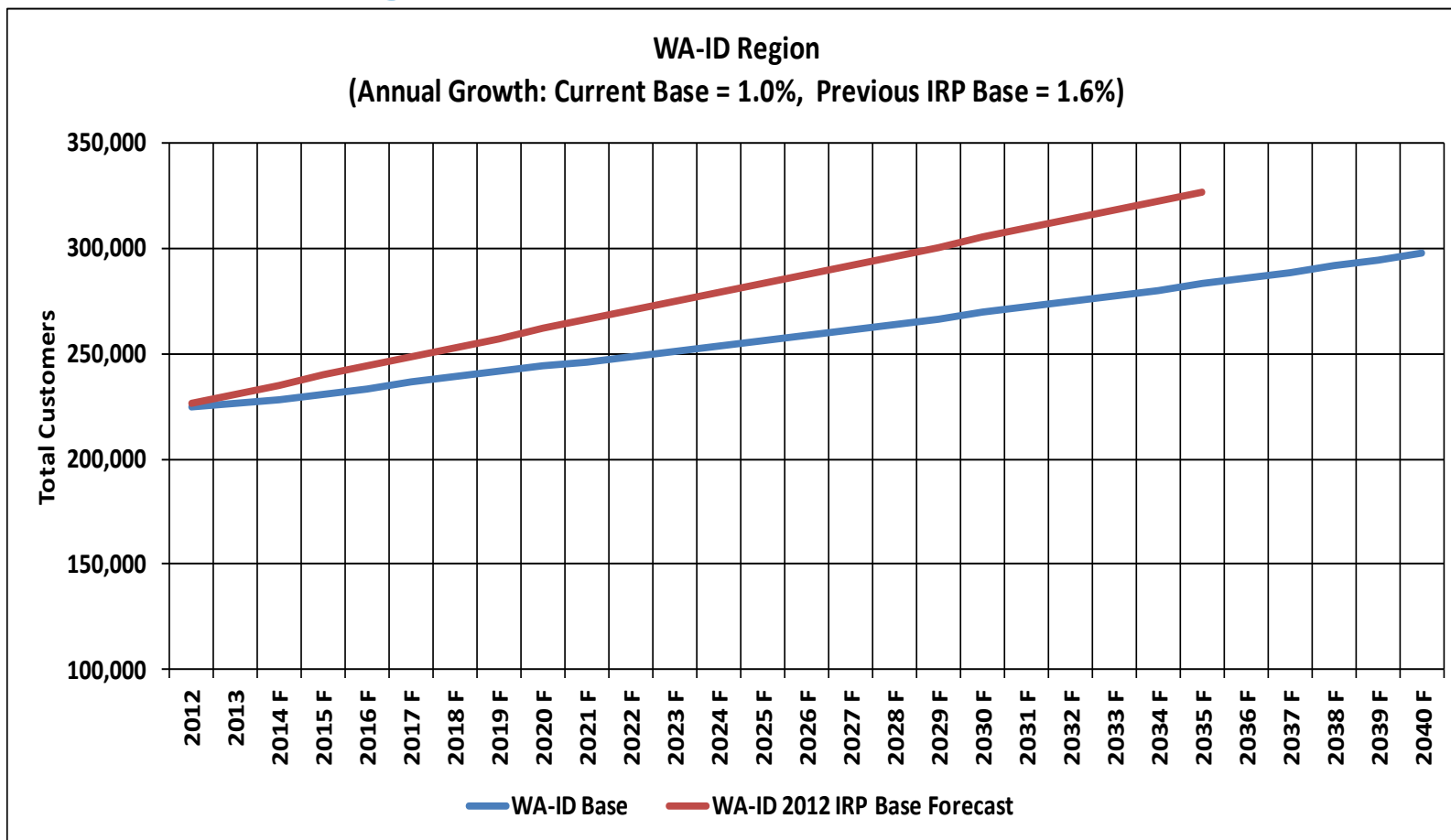
For weather sensitive schedules a 20-yr MA defines normal weather.



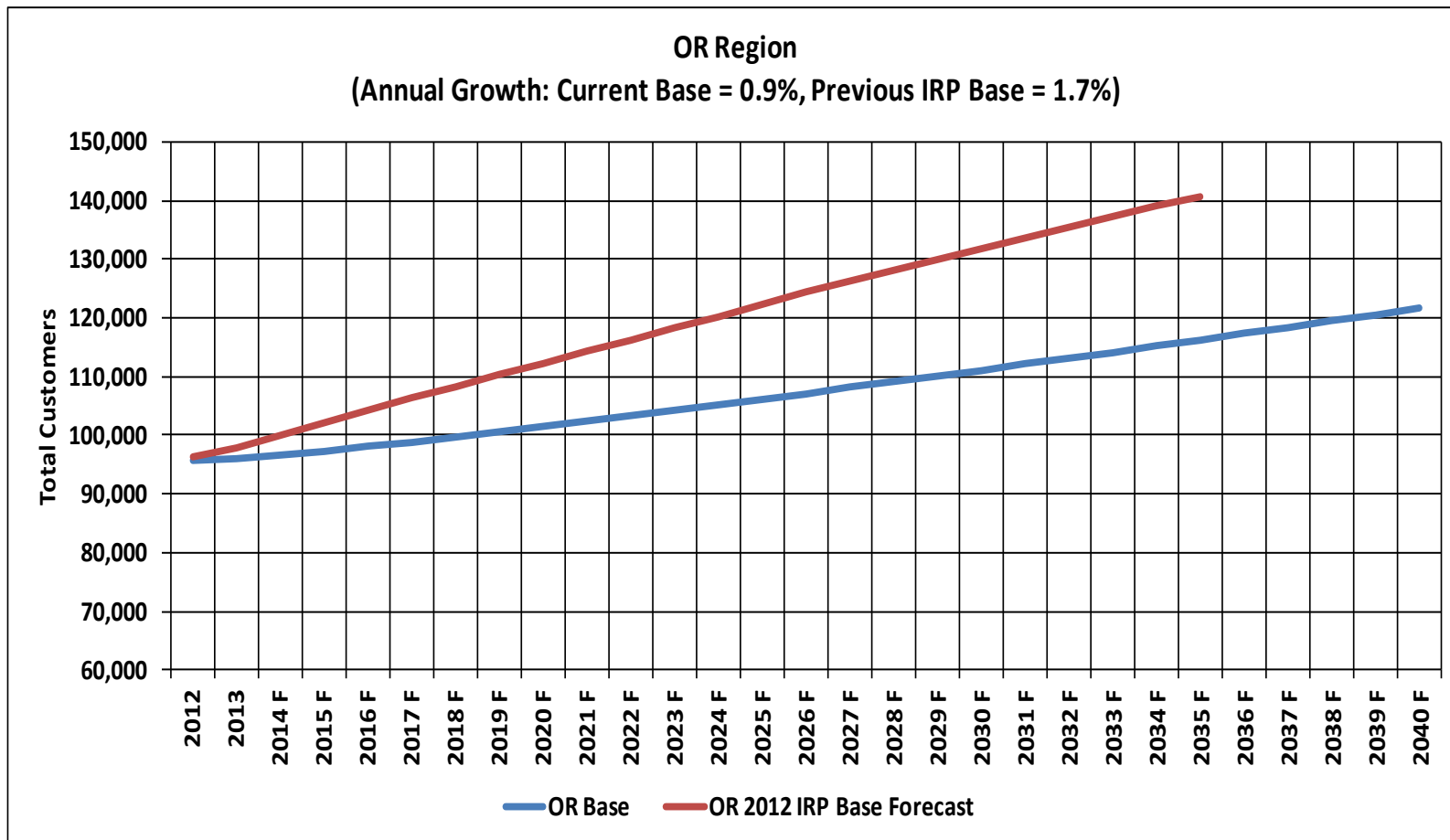
# Forecast Method—Methodology Change

- **5-year out forecasts: ARIMA based models with economic drivers and traditional smoothing models.**
- **For IRP years, will push out 5-year forecasts based on longer-run growth assumptions and historical relationships.**
- **SAS/ETS software.**
- **Also consider external analysis such as the University of Oregon's Regional Economic Indexes. Framing forecast in a broader economic context.**
- **Model building is dynamic and model improvements/changes constant.**
- **Forecast is lower than last IRP...Why?**

# WA-ID Region: 2014 IRP and 2012 IRP



# OR Region: 2014 IRP and 2012 IRP



# The Relationship Between Classes

Residential customer growth is approximately equal to population growth in the long-run.

Commercial customer growth is highly correlated with and approximately equal to residential growth in the long-run.

Year-over-year Growth, Gas Correlations by Class, Jan. 2006-May 2013

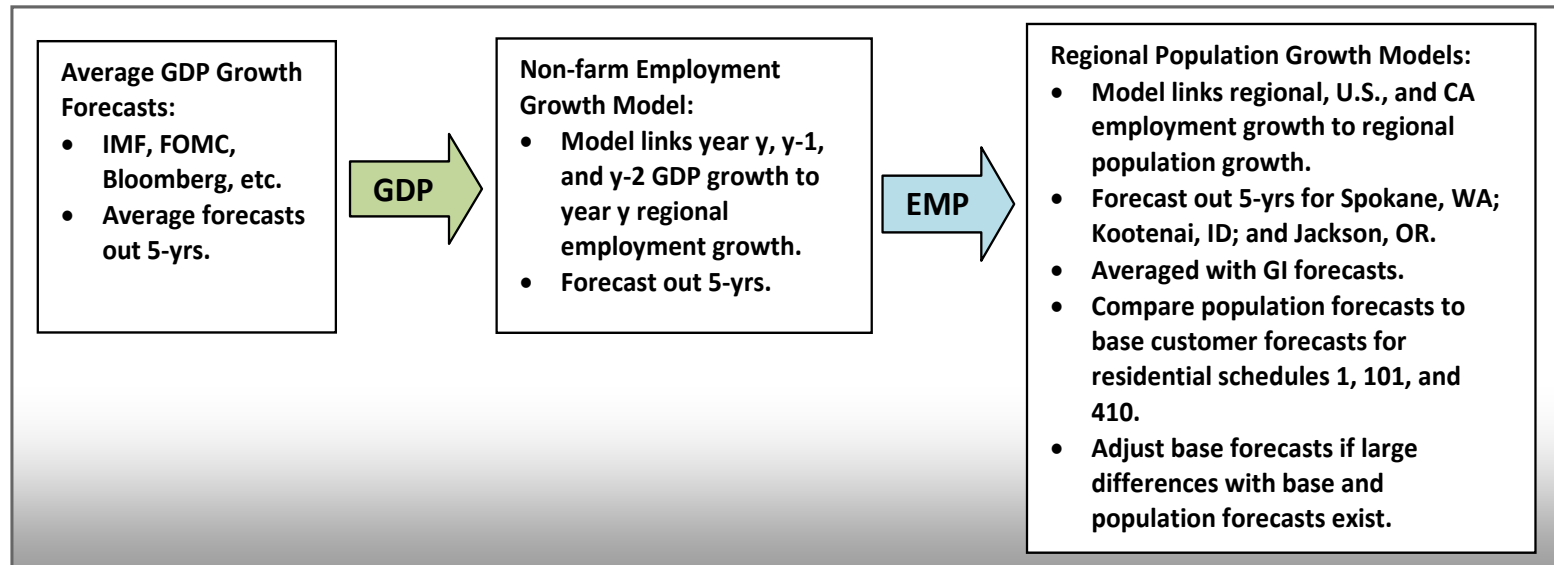
Customers	Residential	Commercial	Industrial		Load	Residential	Commercial	Industrial
Residential	1.00				Residential	1.00		
Commercial	0.83	1.00			Commercial	0.94	1.00	
Industrial	-0.44	-0.35	1.00		Industrial	0.33	0.34	1.00

Industrial's correlation to residential is lower and negative. Customer numbers stable or slightly declining.

- (1) Estimate with historical data:  $C_{t,y,WA101.r} = \alpha_0 + \omega_{SD}D_{t,y} + ARIMA\epsilon_{t,y}(10,1,0)(0,0,0)_{12}$
- (2) 5-yr forecasts of  $C_{t,y,WA101.r}$  adjusted (post-forecast) for forecasted population growth to get  $C^*_{t,y,WA101.r}$
- (3) Estimate with historical data:  $C_{t,y,WA101.c} = \alpha_0 + \alpha_1 C_{t,y,WA101.r} + \omega_{SD}D_{t,y} + ARIMA\epsilon_{t,y}(12,1,0)(0,0,0)_{12}$
- (4) 5-yr forecasts of  $C_{t,y,WA101.c}$  are generated by using  $C^*_{t,y,WA101.r}$  in the estimate of (3).

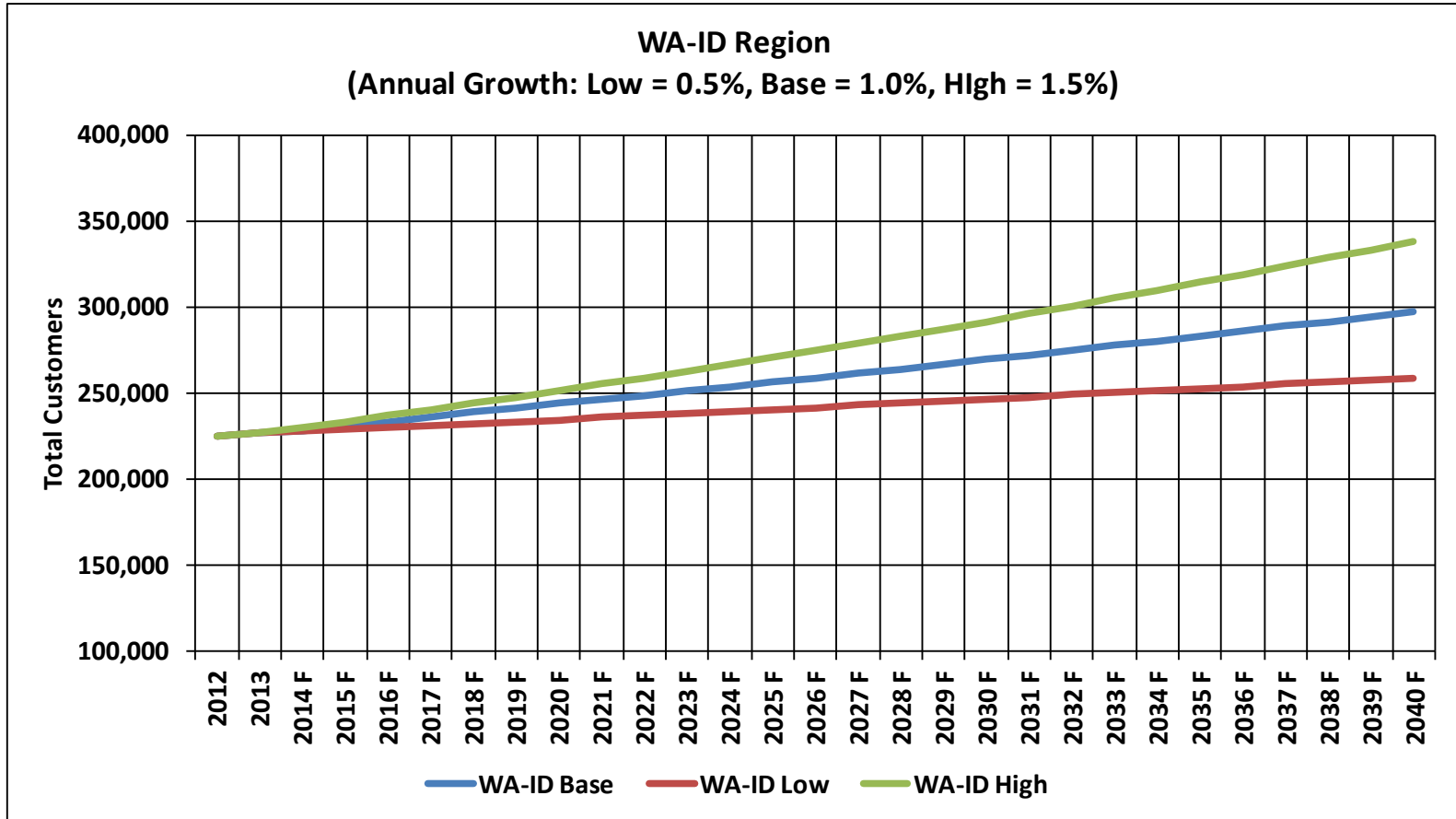


# Getting to Population as a Driver

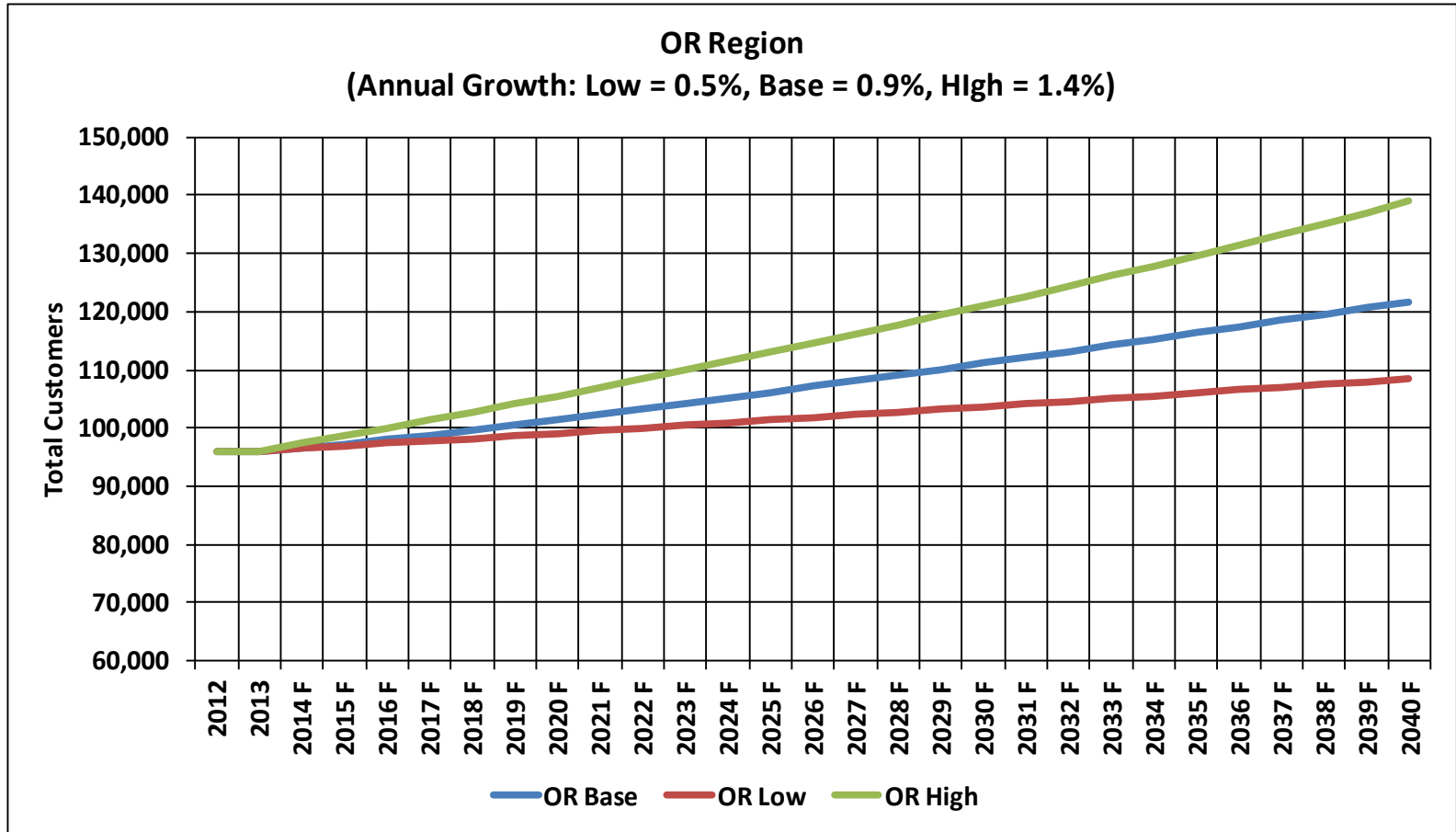


**By assuming different long-run values for regional employment growth, we can obtain long-run residential and commercial customer growth rates for base, low, and high cases.**

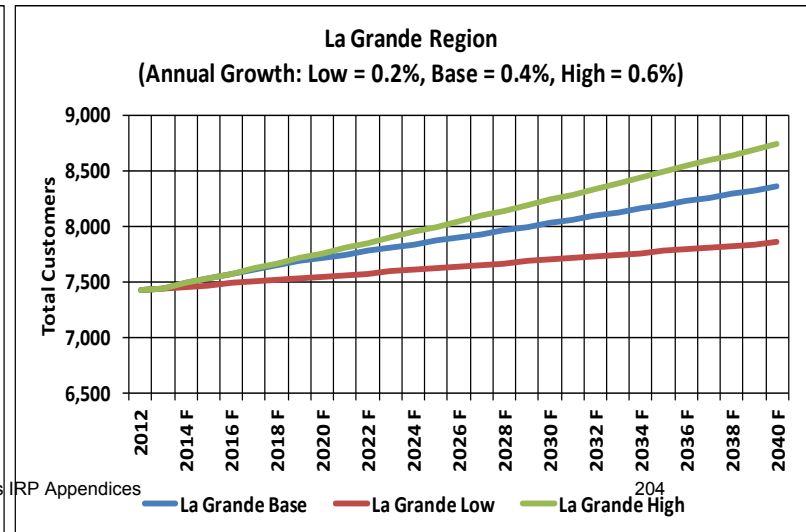
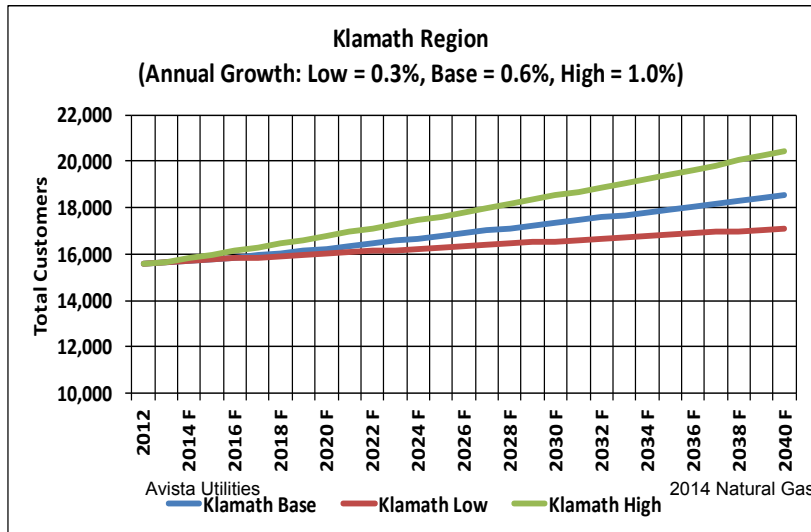
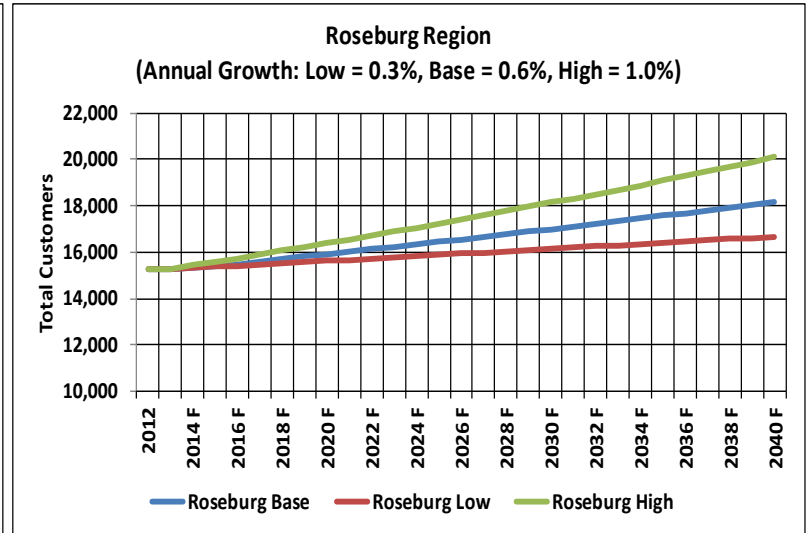
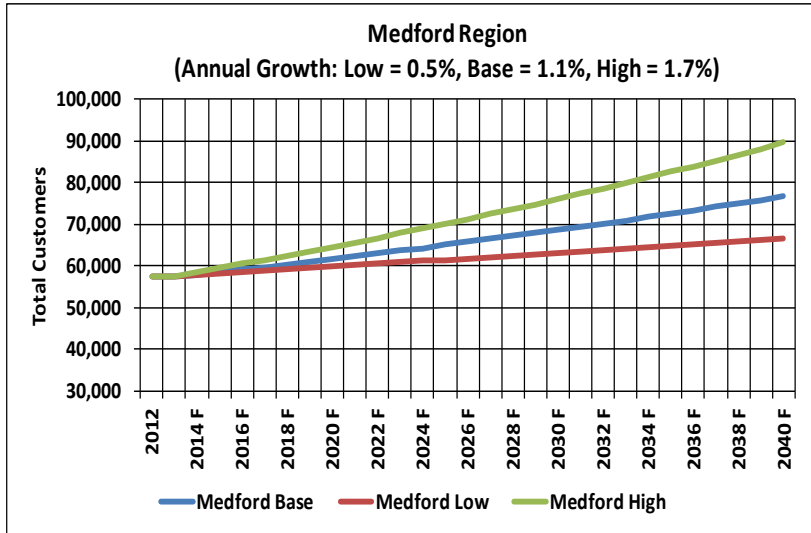
# WA-ID Region, 2012-2040



# OR Region, 2012-2040



# OR by Individual Region, 2012-2040

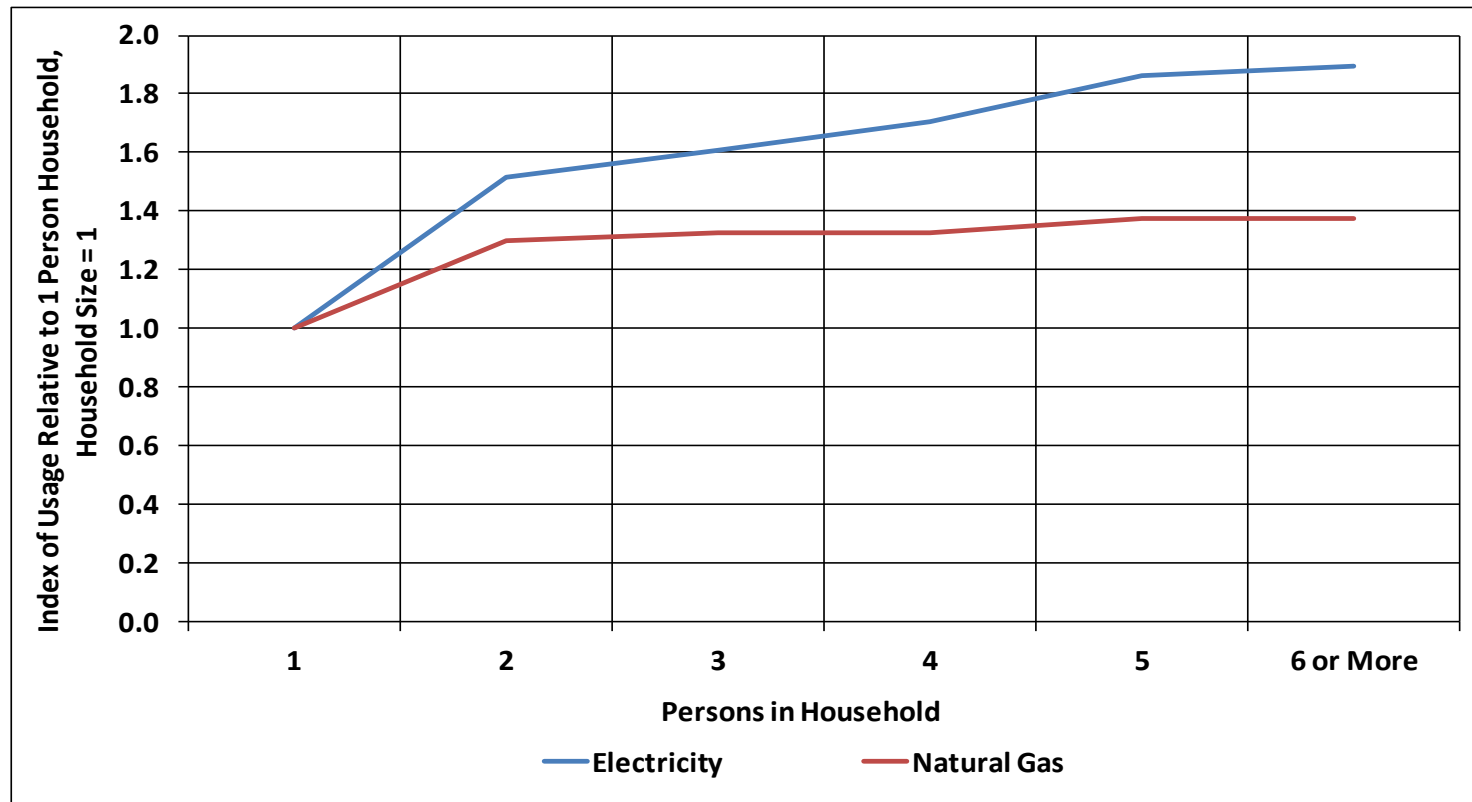




## Future Modeling

- Attempt to integrate employment and/or population directly into the residential customer model.
- Continue to explore the best way to model price, household income, and household size.

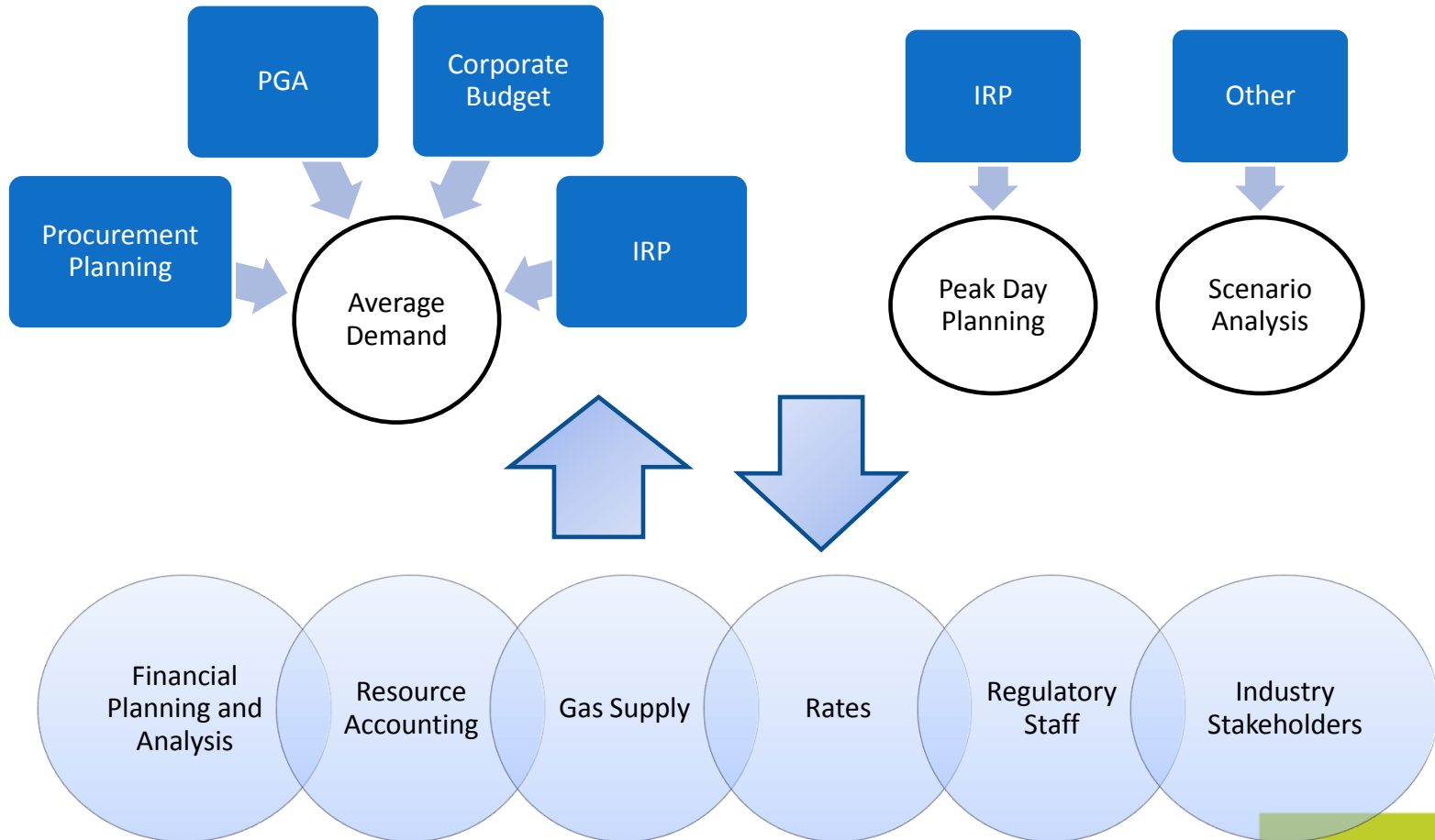
# Example: West Household Size and Usage, 2009 RECS



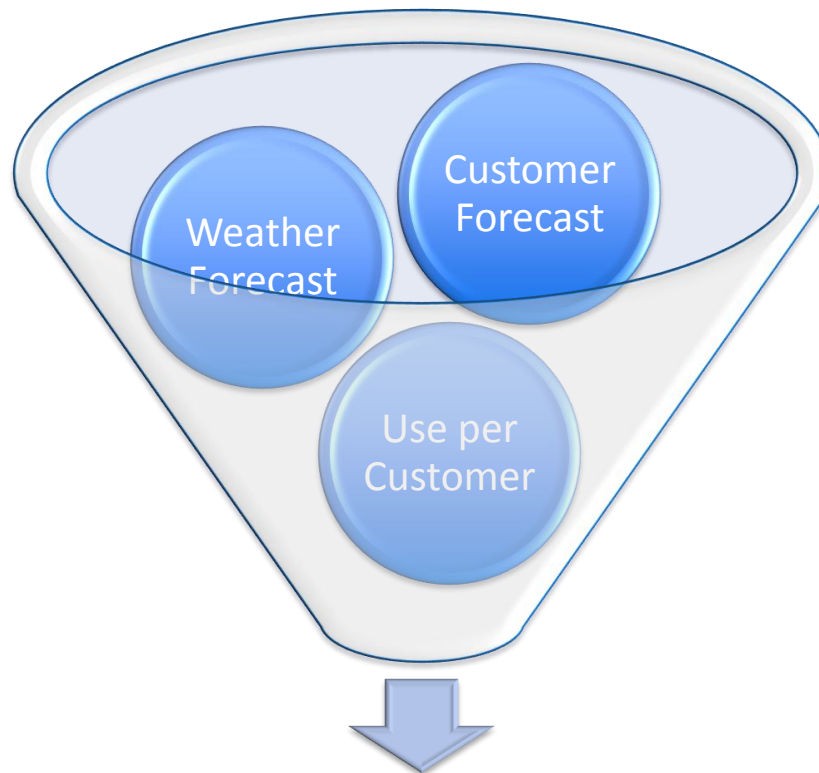


# Demand Forecast Methodology

# Natural Gas Demand Forecasting

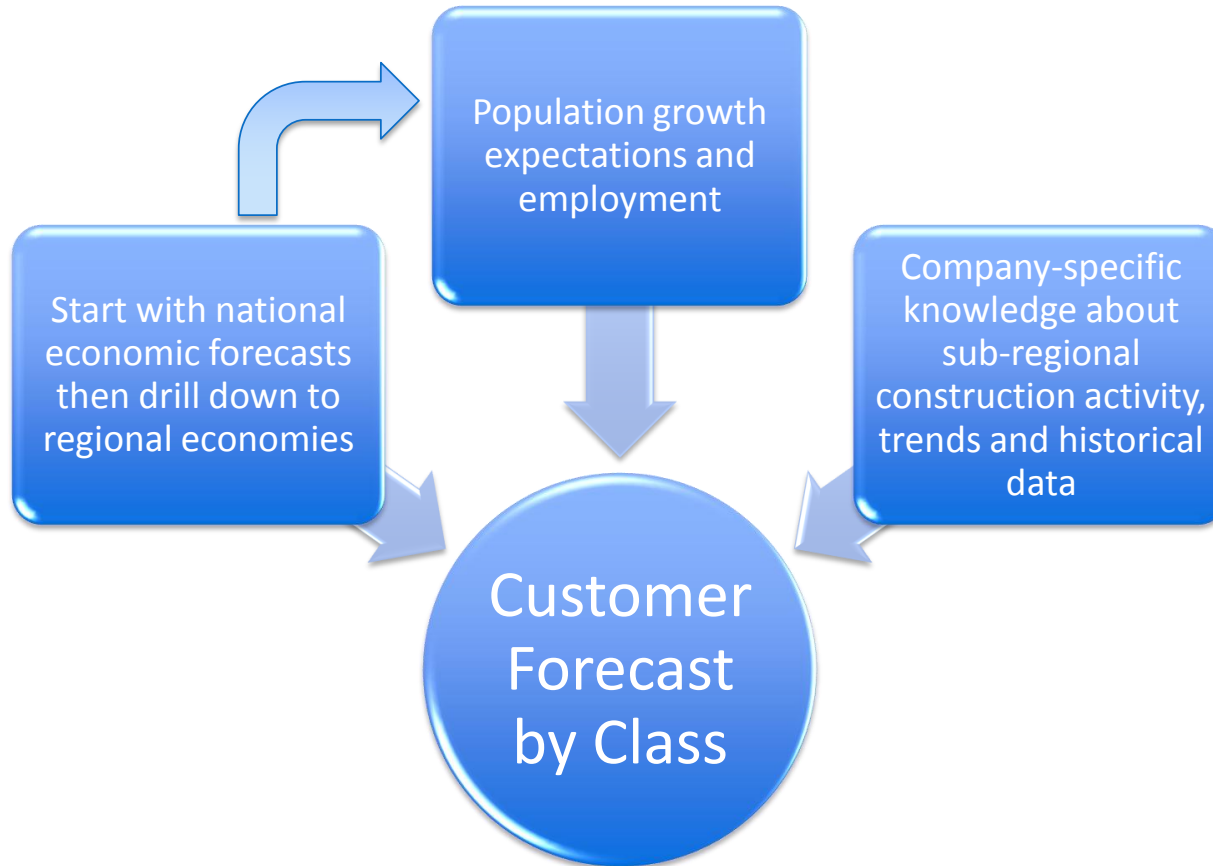


# What goes into the Natural Gas Demand Forecast?

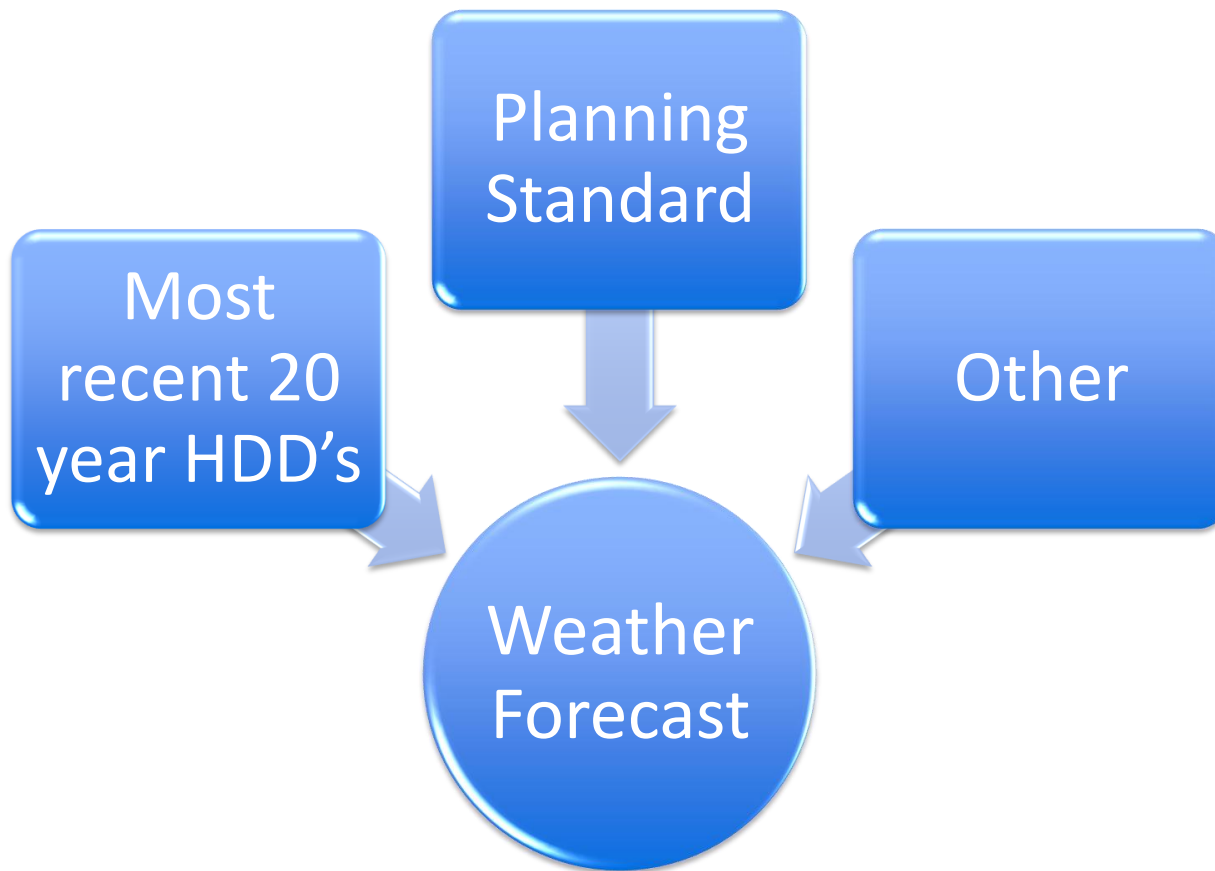


Natural Gas Demand Forecast

# The Customer Forecast



# The Weather Forecast

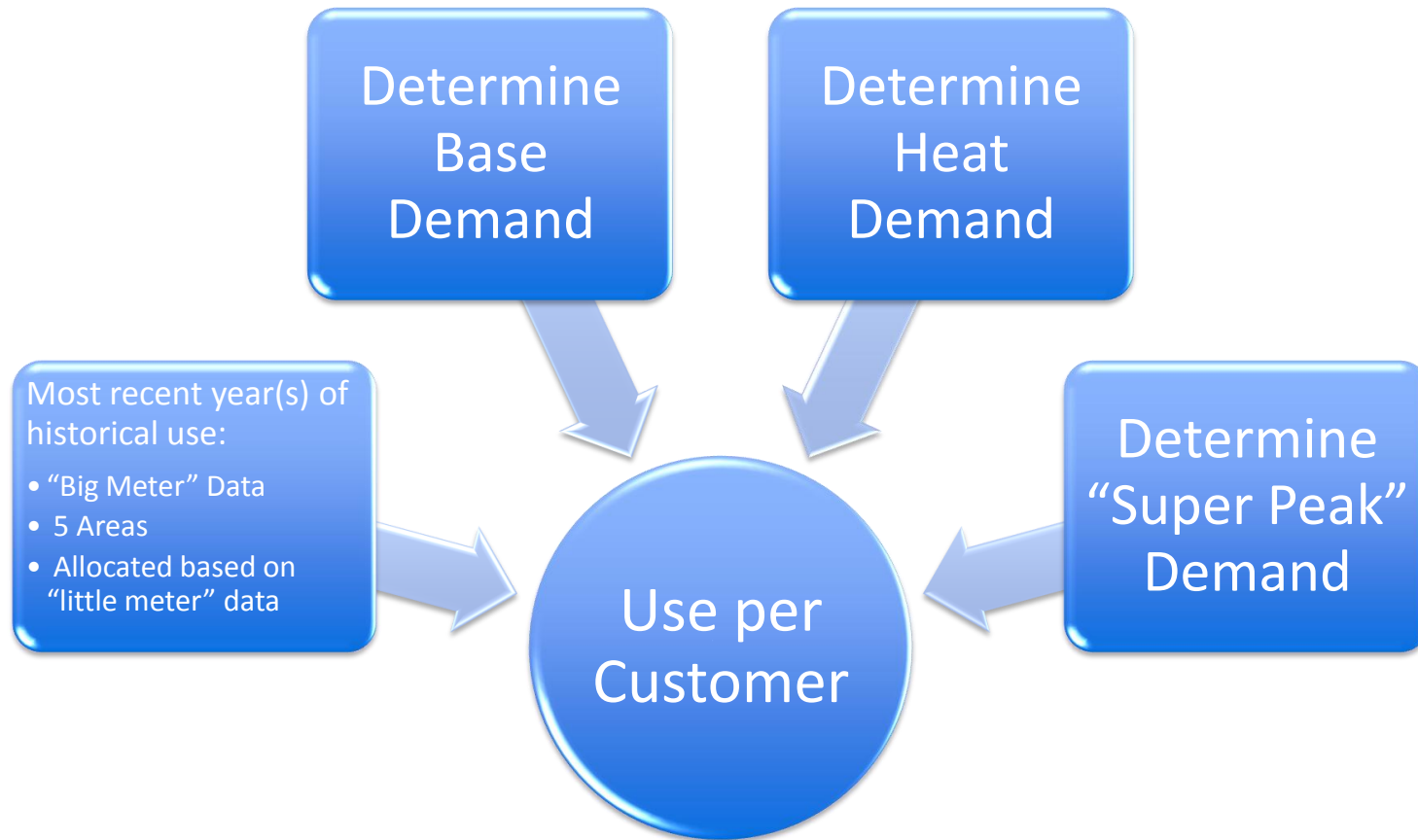


# Weather

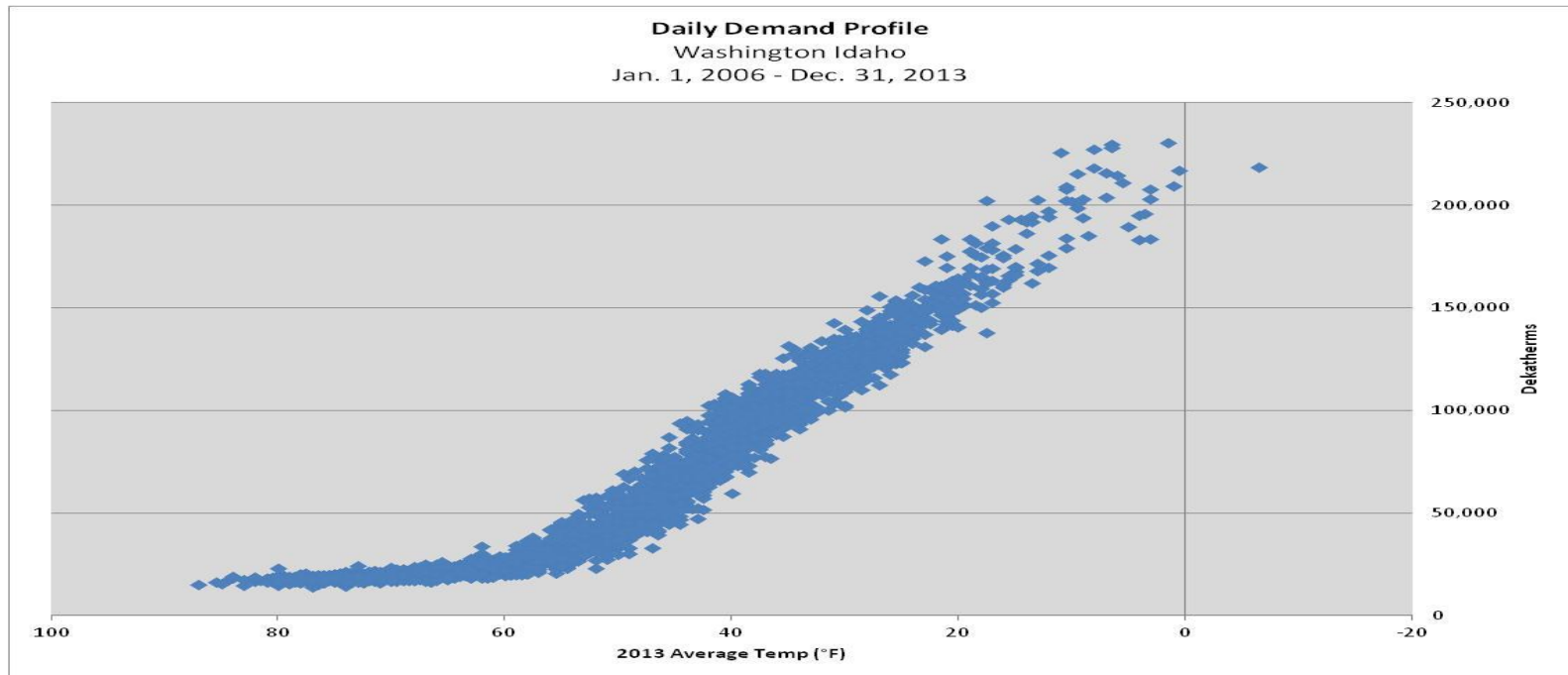
- NOAA 20 year actual average daily HDD's (1994-2013)
- Peak weather includes two winter storms (5 day duration), one in December and one in February
- Planning Standard – coldest day on record
- Sensitivity around planning standard including
  - Normal/Average
  - Coincidental vs. Non-coincidental
  - Coldest in 20 years
  - Monte Carlo simulation



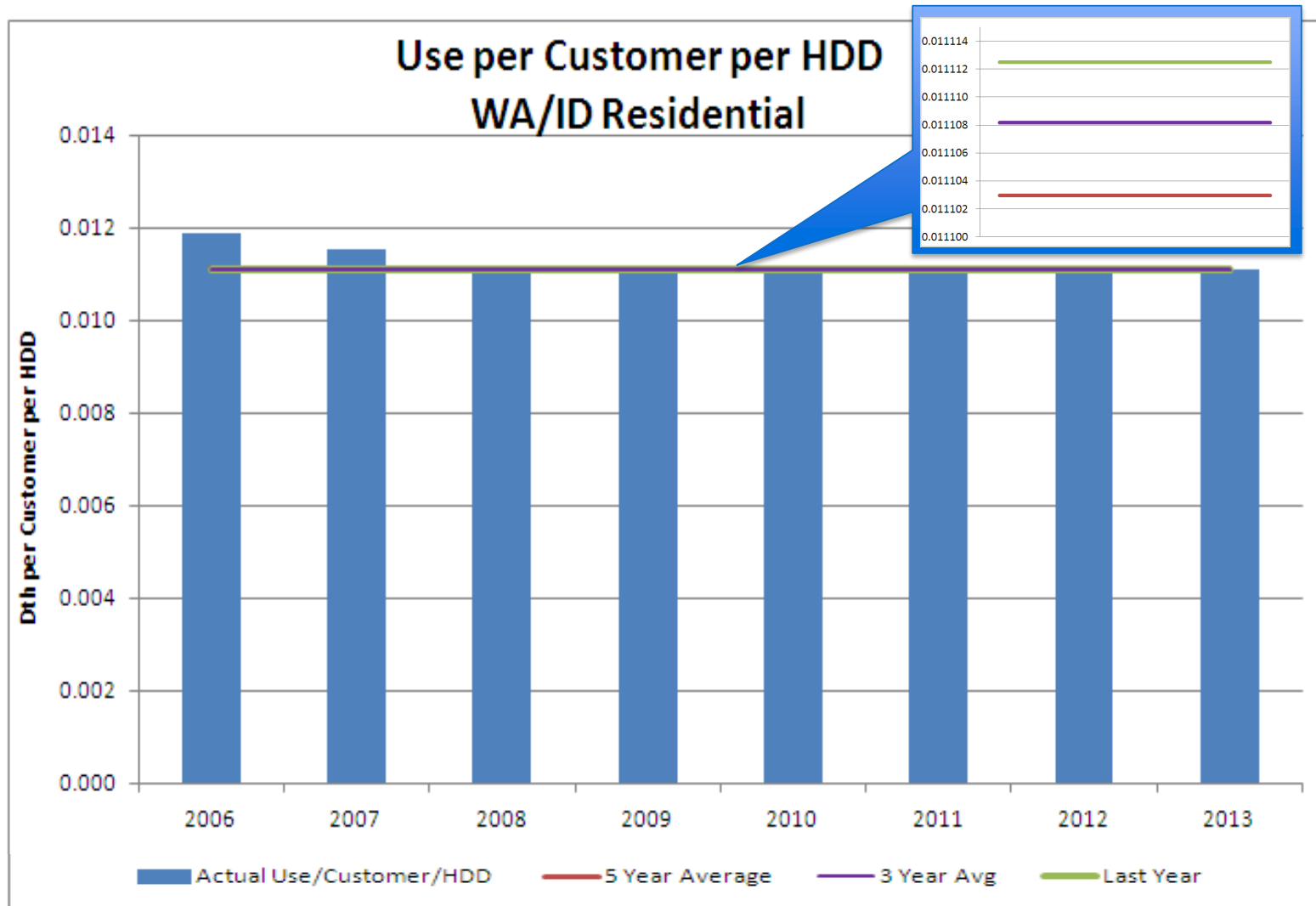
# The Use per Customer Forecast

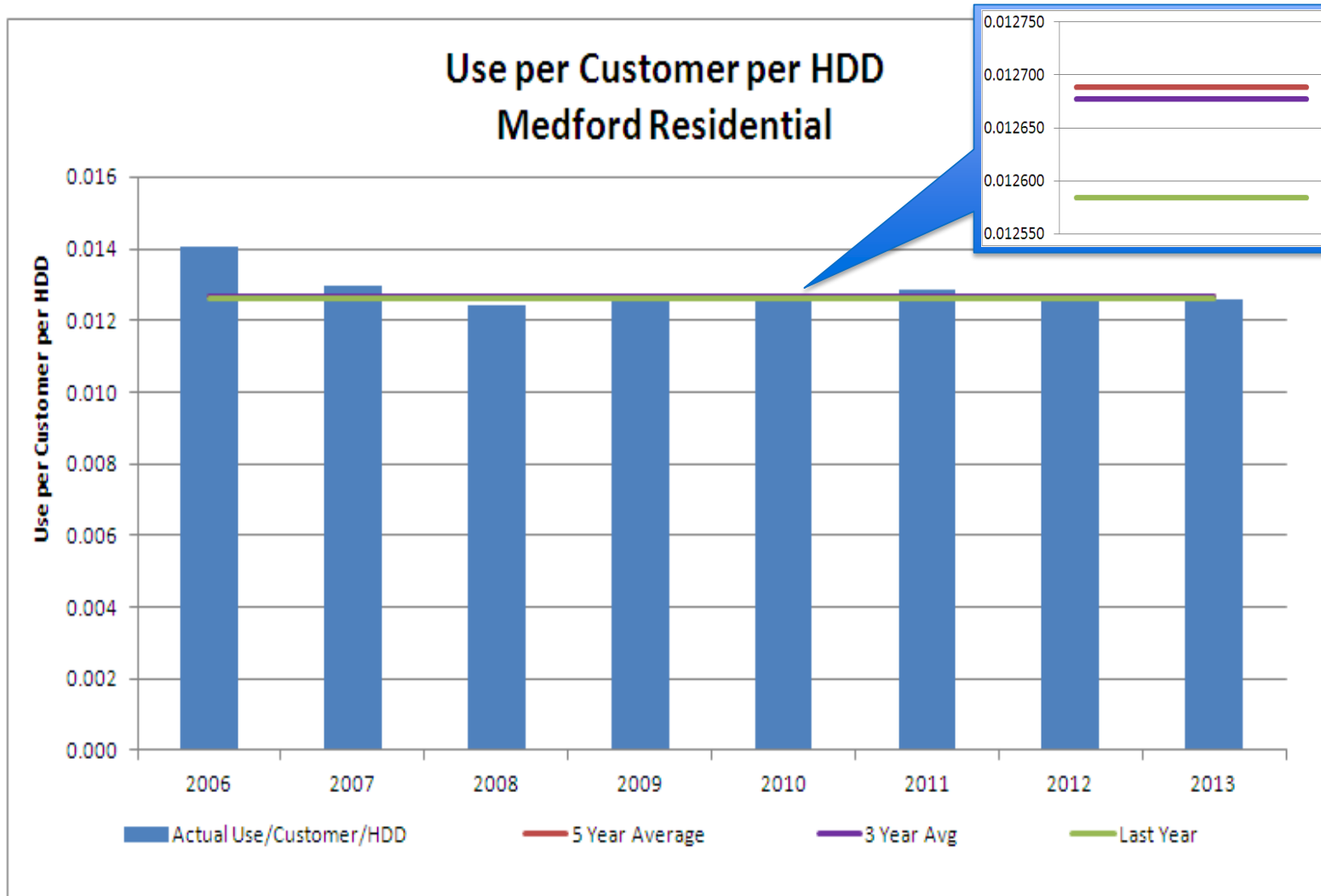


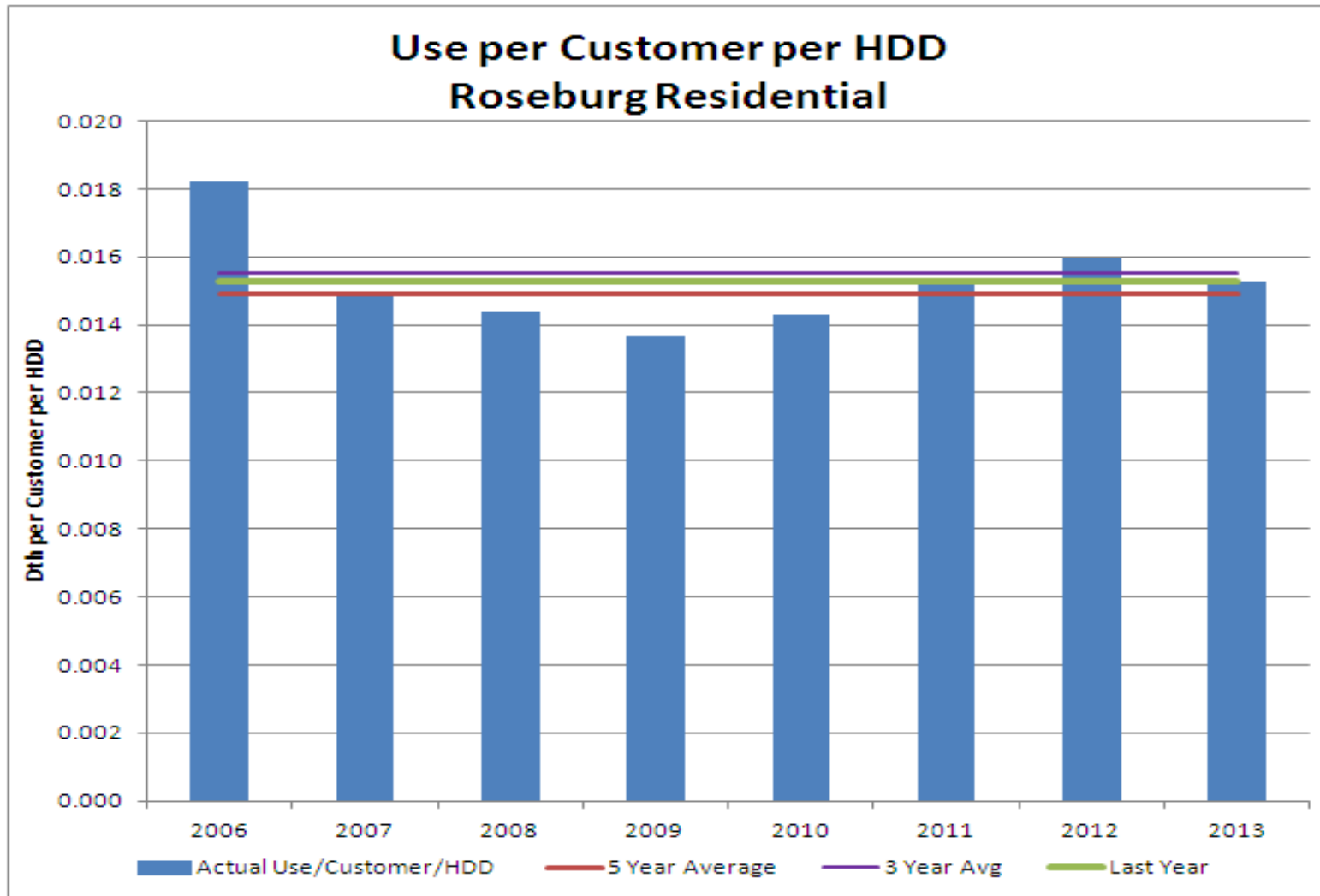
# The Use per Customer Forecast cont.

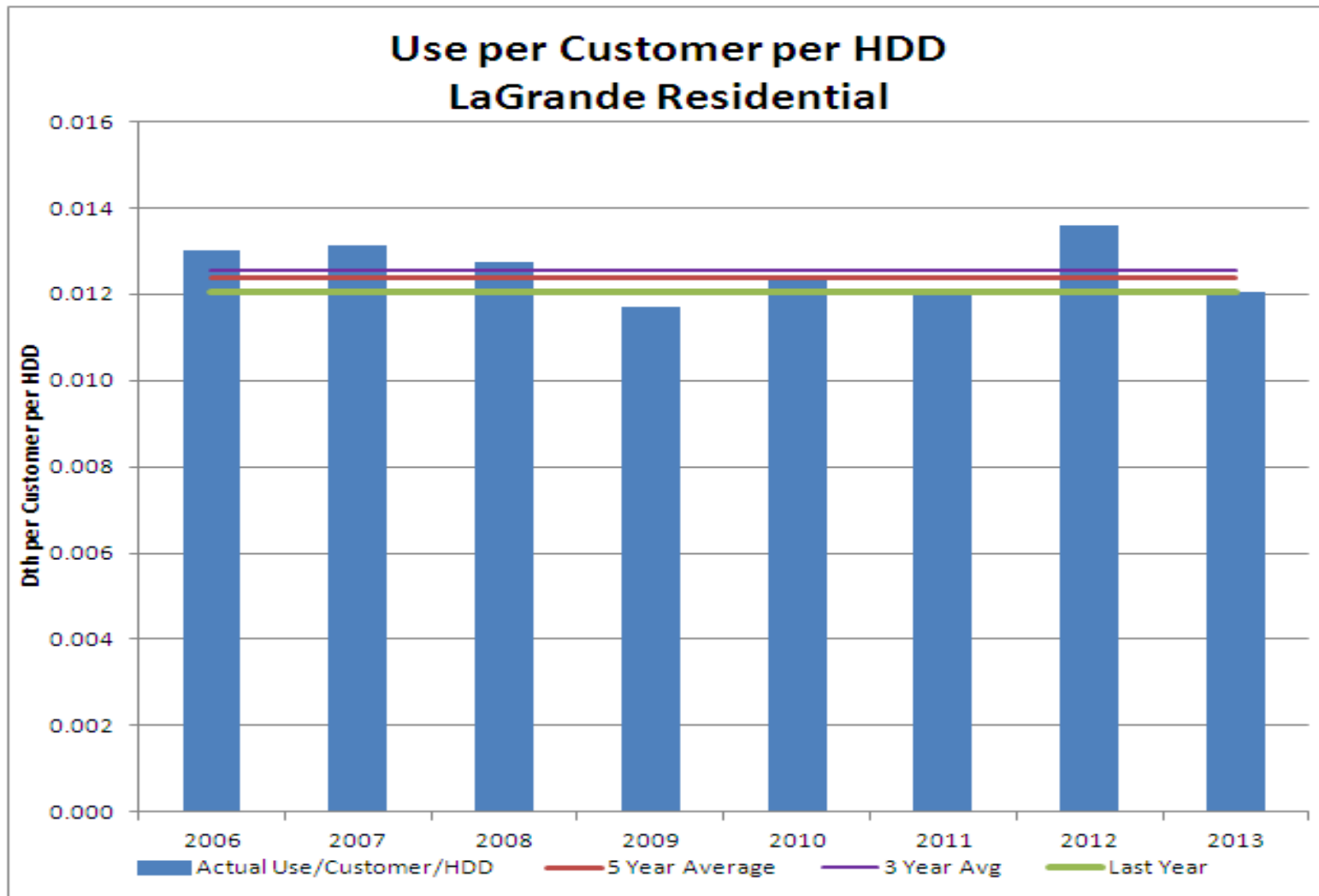


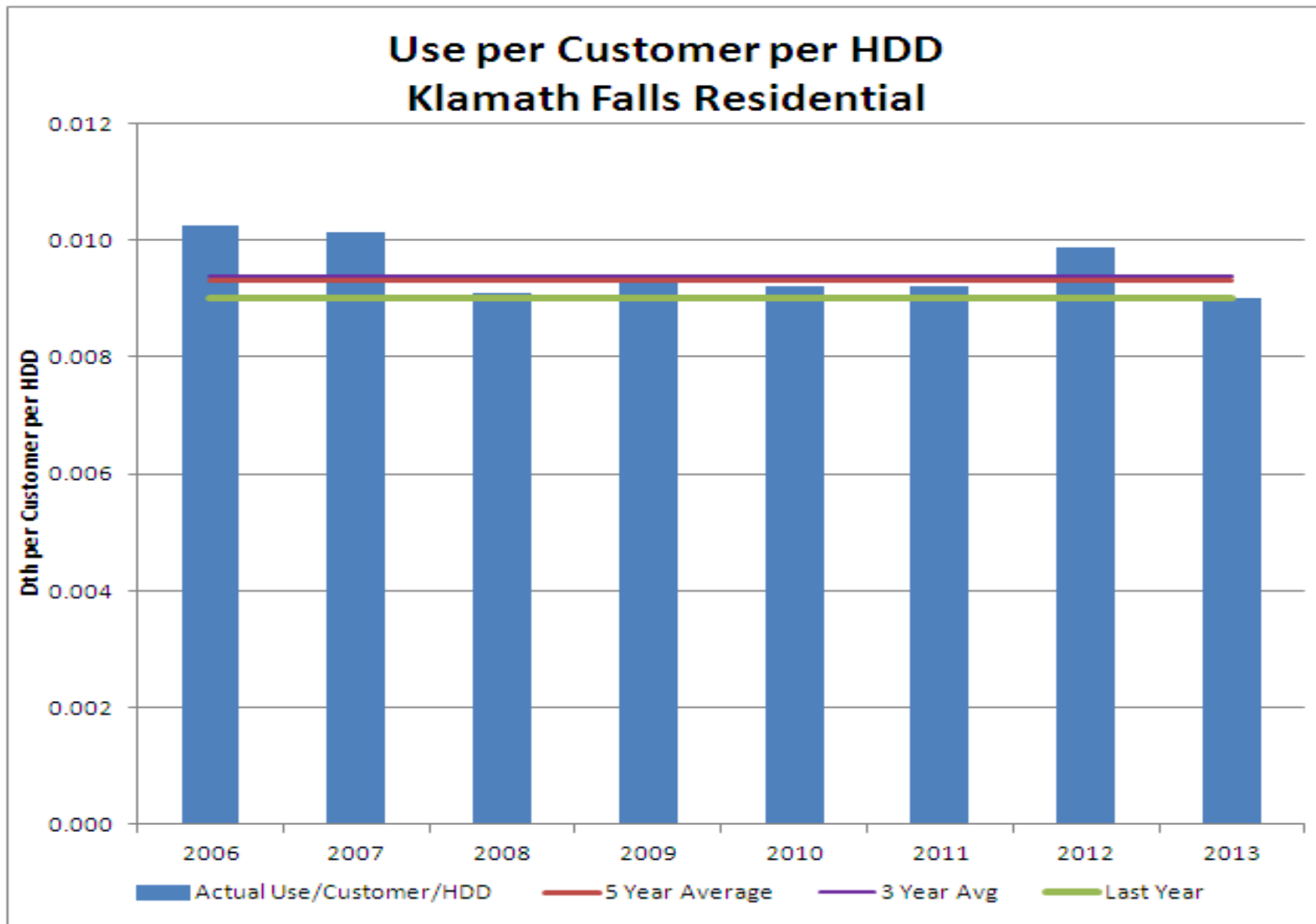
- Historical data is used to determine initial base and heat coefficients.
- Adjustments are made to incorporate DSM and price elastic responses.











# Demand Modeling Equation – a closer look

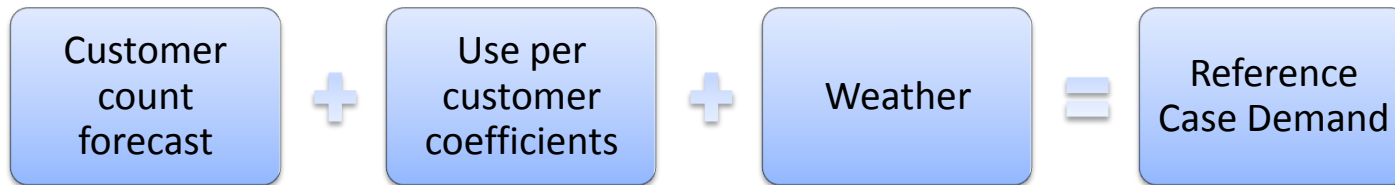
SENDOUT® requires inputs expressed in the below format to compute daily demand in dekatherms. The **base** and **weather sensitive** usage (degree-day usage) factors are developed outside the model and capture a variety of demand usage assumptions.

**Table 3.2 Basic Demand Formula**

$$\begin{aligned} & \# \text{ of customers } \times \text{ Daily } \mathbf{base} \text{ usage} / \text{ customer} \\ & \mathbf{Plus} \\ & \# \text{ of customers } \times \text{ Daily } \mathbf{weather \ sensitive} \text{ usage} / \text{ customer} \end{aligned}$$



# Developing a Reference Case



## 1. Customer annual growth rates:

	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>
<b>Washington - Idaho</b>	<b>1.0%</b>	<b>1.0%</b>	<b>-0.53%</b>
<b>Klamath Falls</b>	<b>0.66%</b>	<b>0.66%</b>	<b>0.0%</b>
<b>LaGrande</b>	<b>0.40%</b>	<b>0.40%</b>	<b>0.0%</b>
<b>Medford</b>	<b>1.1%</b>	<b>1.1%</b>	<b>0.0%</b>
<b>Roseburg</b>	<b>0.8%</b>	<b>0.02%</b>	<b>0.0%</b>

2. Use per customer coefficients – Flat all classes, 5 year, 3 year or last year average use per HDD per customer
3. Weather planning standard – coldest day on record
  - WA/ID 82; Medford 61; Roseburg 55; Klamath 72; La Grande 74



# Dynamic Demand Methodology

# Dynamic Demand Methodology

## Demand Influencing

- Conditions that **DIRECTLY** affect core customer volume consumed

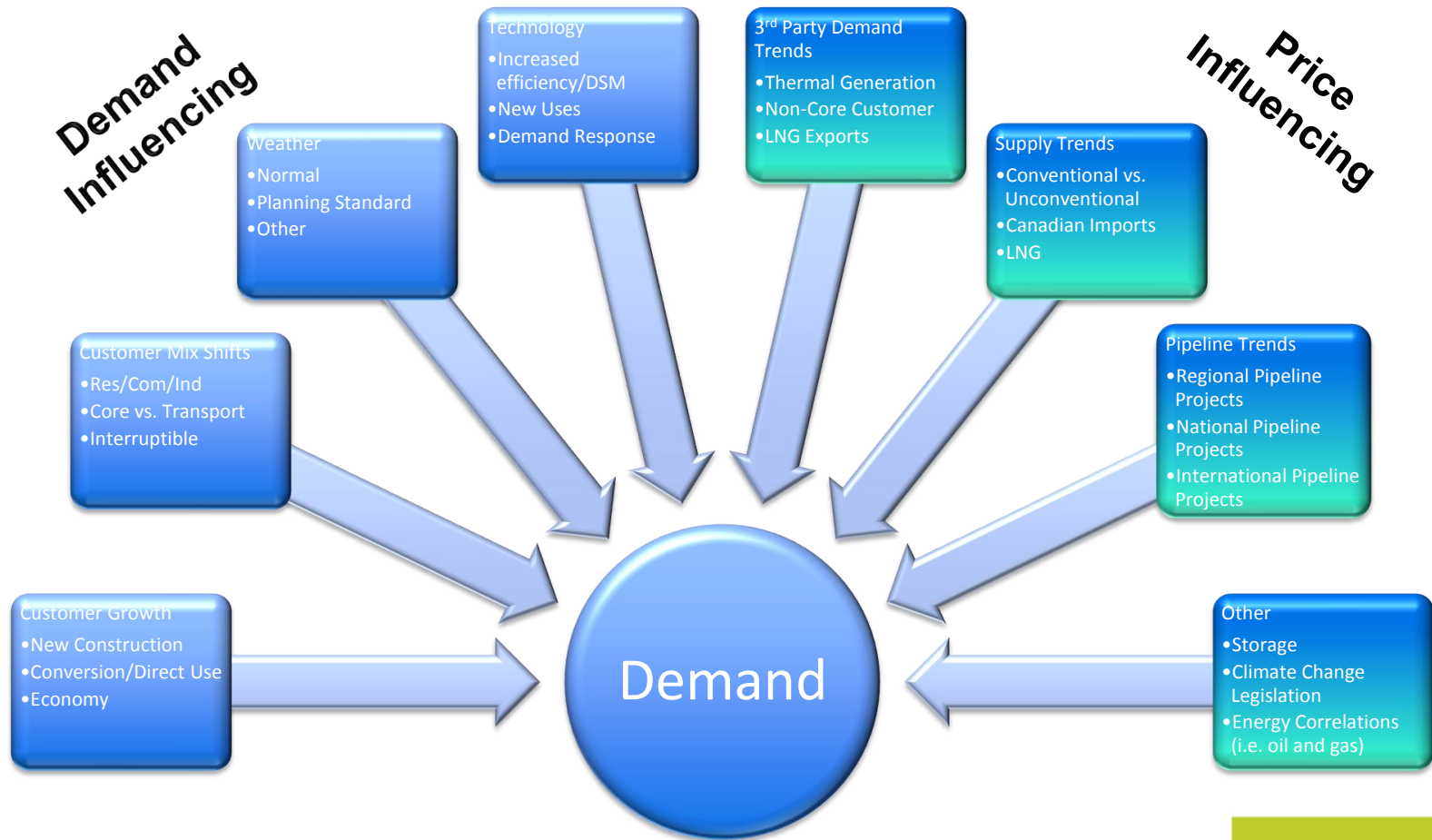


## Price Influencing

- *PRICE SENSITIVE* conditions that, through price elasticity, **INDIRECTLY** affect core customer volume consumed



# Demand Drivers



# Customer Growth and Mix – Demand Influencing

- Key driver in demand growth
- Can change the timing and/or location of resource needs
- Currently we model expected, high, and low growth scenarios
- New construction vs. conversions
- Residential/Commercial/Industrial vs. Transportation
- New uses – CNG/NGV

## Weather Standard – Demand Influencing

- Has the potential to significantly change timing of resource needs
- Significant qualitative considerations
  - No infrastructure response time if standard exceeded
  - Significant safety and property damage risks
- Current Peak HDD Planning Standards
  - WA/ID 82
  - Medford 61
  - Roseburg 55
  - Klamath 72
  - LaGrande 74

# Global Warming – Demand Influencing

- There is a lack of studies or information on the affect global warming has on peak weather conditions
- Uncertain whether any change in timing of resource needs
- Peak and trough weather appears more volatile – does not influence the peak
- Will reduce annual consumption over time for LDC but could increase consumption for thermal generation
- Proposing to remove global warming adjustment

## Technology – Demand Influencing

- Demand side management initiatives will reduce demand **HOWEVER**, it is dependent upon customers willingness/ability to participate.
- Development of new uses for natural gas
  - CNG
  - NGV
  - LNG
  - ???NG
- Demand response (Smart Grid)
- New technologies in Demand Side Management



## Price Elasticity Factors Defined

- Price elasticity is usually expressed as a numerical factor that defines the relationship of a consumer's consumption change in response to price change.
- Typically, the factor is a **negative** number as consumers normally **reduce** their consumption in response to **higher** prices or will **increase** their consumption in response to **lower** prices.
- For example, a price elasticity factor of -0.13 means:
  - A 10% price **increase** will prompt a 1.3% consumption **decrease**
  - A 10% price **decrease** will prompt a 1.3% consumption **increase**

# Price Elasticity

- Establishes factors for use in other price influencing scenarios
- Very complex relationship – we use historical data however.....
  - Historical data has DSM, rate changes (PGA, general rate, etc.), economic conditions, technological changes, etc.
  - History is not necessarily the best predictor of future behavior

# 2007 AGA Study Results

- **American Gas Assn Study**
  - National results
    - Short-run -0.09
    - Long-run -0.18
  - Pacific & Mtn Region results
    - Short-run -0.07 & -0.07
    - long-run -0.12 & -0.10
  - Min-Max range
    - Short-run +0.01 to -0.13
    - Long-run -.01 to -.29
- **Avista Specific Results**
  - Oregon
    - Short-run -0.08
    - long-run -0.13
  - Idaho
    - Short-run -0.05
    - long-run -0.10
  - Washington
    - Short-run -0.12
    - long-run -0.14

# Price Elasticity Assumptions From 2012 IRP

Elasticity Assumption	Real Price annual increase within 30%
High	Negative .20
Expected	Negative .13
Low	No response

## 3<sup>rd</sup> Party Demand Trends – Price Influencing

- Gas fired generation – the largest contributor to future growth
- Coal plant retirements driving gas for power
- CNG/NGV Transportation Fleets
- Export LNG
- Non-firm customer trends

## Supply Trends – Price Influencing

- Not all its “Frack-ed” up to be or “Fracking” Awesome
- Shale is Everywhere
- O’ Canada vs. Canada Dry
- LNG Export
- Basis - Location, location, location

# Pipeline Trends – Price Influencing

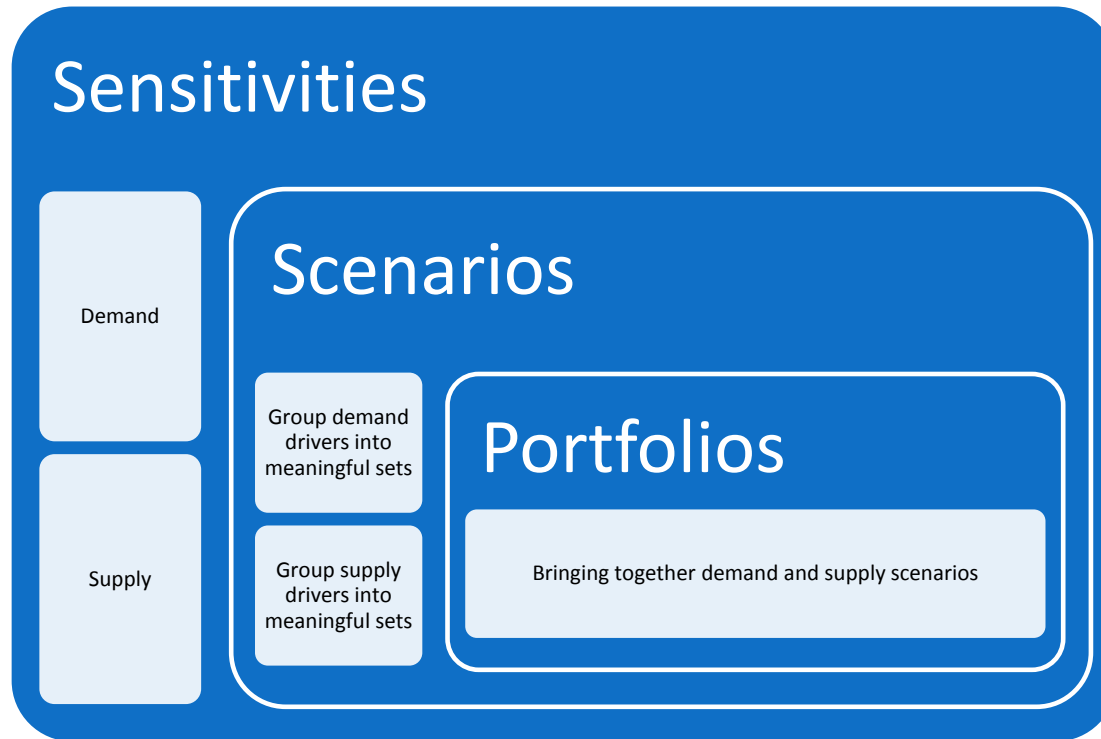
- Regional Pipeline Proposals
  - N-Max/Palomar – cross Cascades pipeline (NWN, GTN and NWP)
  - Pacific Connector – from Jordan Cove LNG to various interconnects in the Pacific Northwest (Williams, Fort Chicago Energy Partners, and PG&E)
- National Pipeline Proposals
- International Pipeline Proposals

# Other Supply Issues – Price Influencing

- Storage
- Climate Change and Carbon Legislation
- Energy Correlations



# Sensitivities, Scenarios, Portfolios



# Demand Sensitivities from 2012 IRP

			DEMAND INFLUENCING - DIRECT							PRICE INFLUENCING - INDIRECT				
INPUT ASSUMPTIONS	Reference	Reference	Low Cust	High Cust	CNG/NGV	Alternate	DSM	Peak plus	Alterante	Expect	Low	High	Carbon	Exported
	Case	Plus Peak												
<b>Customer Growth Rate</b>														
Residential WA/ID														
Residential Medford														
Residential Roseburg														
Residential Klamath			40%	60%										
Residential La Grande			Decrease	Increase										
Commercial WA/ID			in Cust	in Cust										
Commercial Medford			Growth	Growth										
Commercial Roseburg			Rates	Rates										
Commercial Klamath														
Commercial La Grande														
<b>Use per Customer</b>	3 Year	3 Year	3 Year	3 Year	15% Growth	3 Year	3 Year	3 Year	5 Year	3 Year	3 Year	3 Year	3 Year	3 Year
	Historical	Historical	Historical	Historical	Cumulative	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical	Historical
<b>Weather</b>														
Planning Standard	Normal plus	Coldest on	Coldest on	Coldest on	Coldest on	Coldest 20yrs	Normal plus	Coldest on	Coldest on	Coldest on	Coldest on	Coldest on	Coldest on	Coldest on
	GW Adj	Record	Record	Record	Record		GW Adj	Record	Record	Record	Record	Record	Record	Record
<b>Demand Side Management</b>														
Programs Included	No	No	No	No	No	No	Yes	Yes	No	No	No	No	No	No
<b>Prices</b>														
Price curve	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Low	High	Expected	Expected
Price curve adder (\$/Dth)	None	None	None	None	None	None	None	None	None	None				\$ .50 Adder After 5yrs
Elasticity	None	None	None	None	None	None	None	None	None	Expected	Expected	Expected	Expected	Expected
Carbon Adder (\$/Ton)	None	None	None	None	None	None	None	None	None					\$14-\$22 starting in 2022
<b>RESULTS</b>														
<b>FIRST YEAR UNSERVED</b>														
WA/ID	N/A	2023	N/A	2020	2024	2026	N/A	2023	2023	2021	2029	N/A	N/A	N/A
Medford	N/A	2023	N/A	2020	2023	N/A	N/A	2024	2023	2029	2028	N/A	2030	2030
Roseburg	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Klamath	N/A	2022	N/A	2019	2022	2023	N/A	2023	2022	2031	2028	N/A	2031	2031
La Grande	N/A	N/A	N/A	2027	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A

## What do we want to consider for 2014?

Avista Utilities

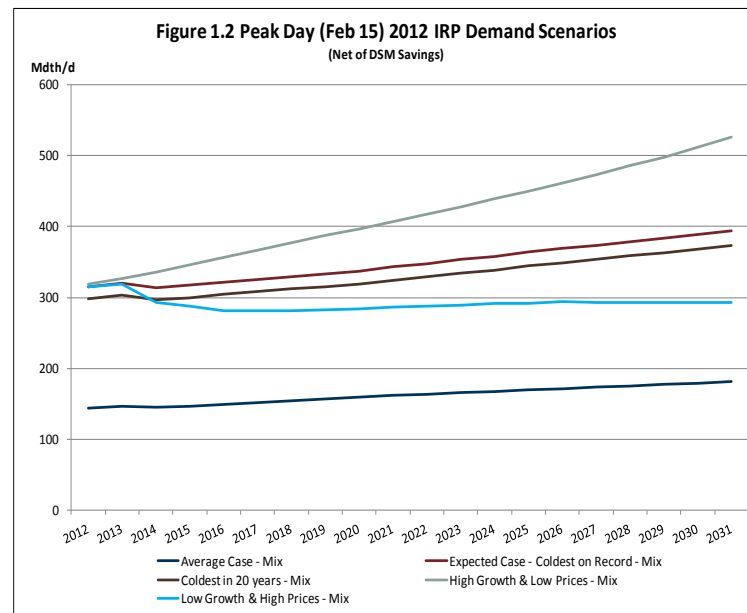
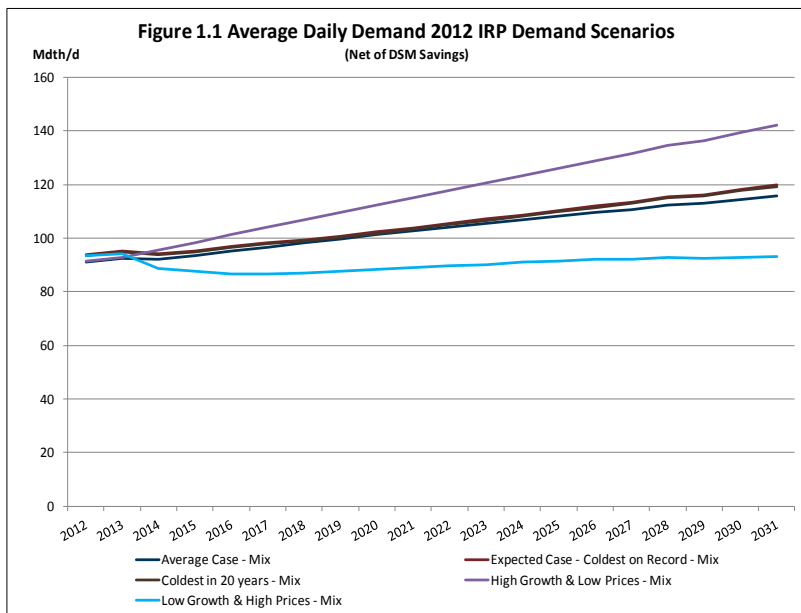
2014 Natural Gas IRP Appendices



# Mix and Match to Make Scenarios



# The Goal – A Bunch of Meaningful Lines



# Forecast Methodology Considerations

- Know the goal – what is the purpose of the forecast?
- Know your data – what you have, what you need
- Is there sufficient quantitative data available?
- Is the change small or large?
- Is there conflict among decision makers?
- Are the relationships among variables complicated?
- Have there been similar situations?



# Demand Side Management

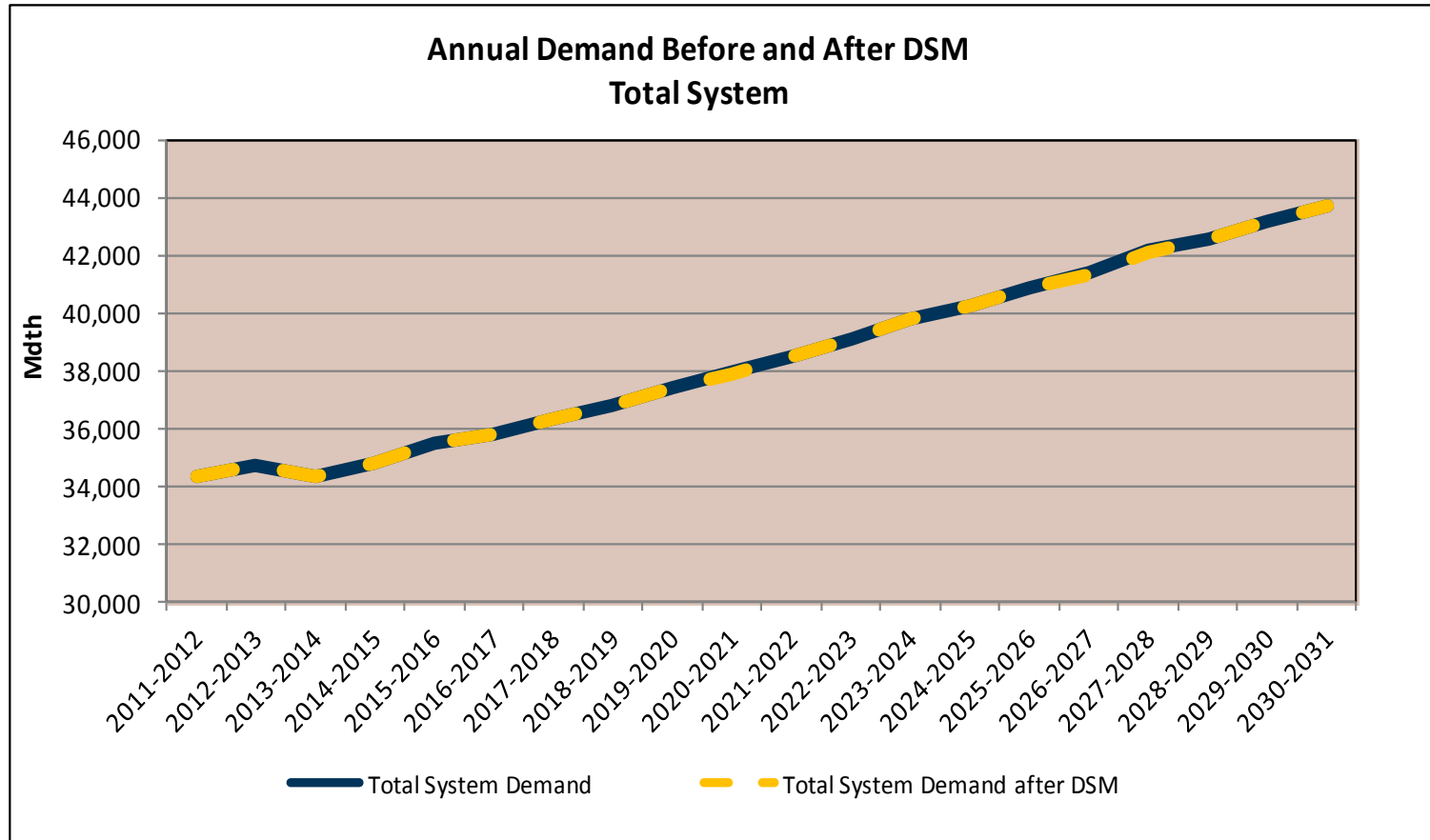
Lori Hermanson  
Utility Resource Analyst

# Agenda

- DSM in the last IRP
  - Target/Acquisition
- What's happened since the last IRP
  - Cost-effectiveness comparison
- What's different with avoided costs?
- Proposed DSM modeling methodology
- Business planning process

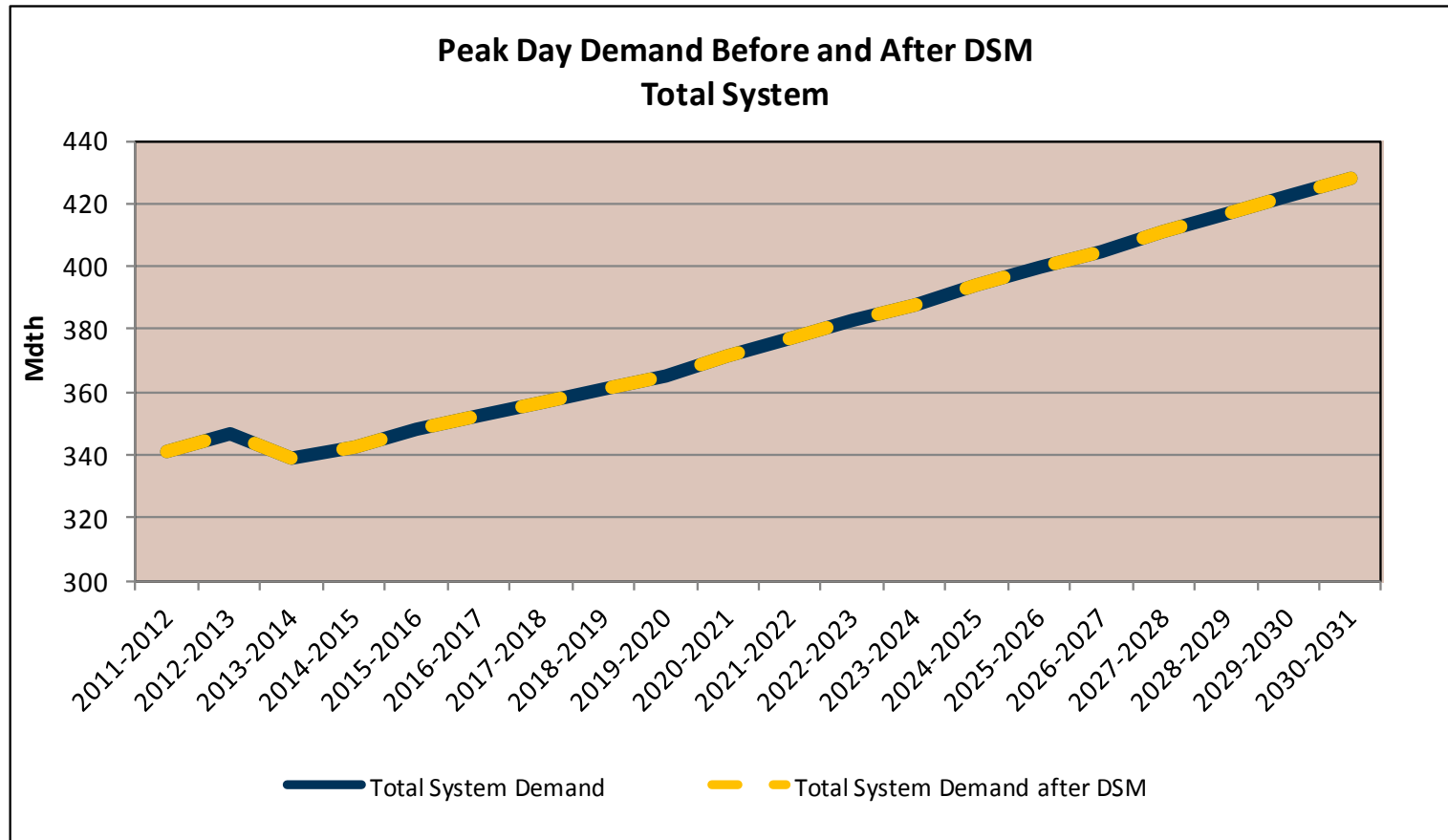


# DSM in the 2012 IRP - Annual





# DSM in the 2012 IRP – Peak Day



## 2012 IRP DSM Targets

- 2013 targets & (Unverified) acquisition (achievable potential)

State	Therms	Target	% Achieved
Idaho	18,804	364,000	5.17
Oregon	217,177	289,000	75.14
Washington	595,614	893,000	66.70

- OPUC established “minimum” target

Therms	Target	% Achieved
217,177	225,000	96.52

# Recap of Recent History



- Idaho – Schedule 190 suspended effective 10/1/12
- Oregon – two year cost-effectiveness pass and revised savings expectation for 2013-2014
- Washington – WUTC adopted the gross UCT as the cost-effectiveness test for natural gas DSM

# Cost-effective Test Comparison

- Total Resource Cost (TRC) =  
 (avoided costs +  
 non-energy benefits)  


---

 (customer incremental  
 cost +  
 non-incentive utility costs)
- Utility Cost Test (UCT) =  
 avoided costs  


---

 incentives +  
 non-incentive utility costs

# TRC vs UCT

## TRC

- Traditional cost-effectiveness metric
- Includes non-energy benefits
- Results in programs that influence customer decisions

## UCT

- Customer costs are ignored
- Incentives are reduced in order to offer programs below avoided costs
- Ignore free-riders in order to be cost-effective

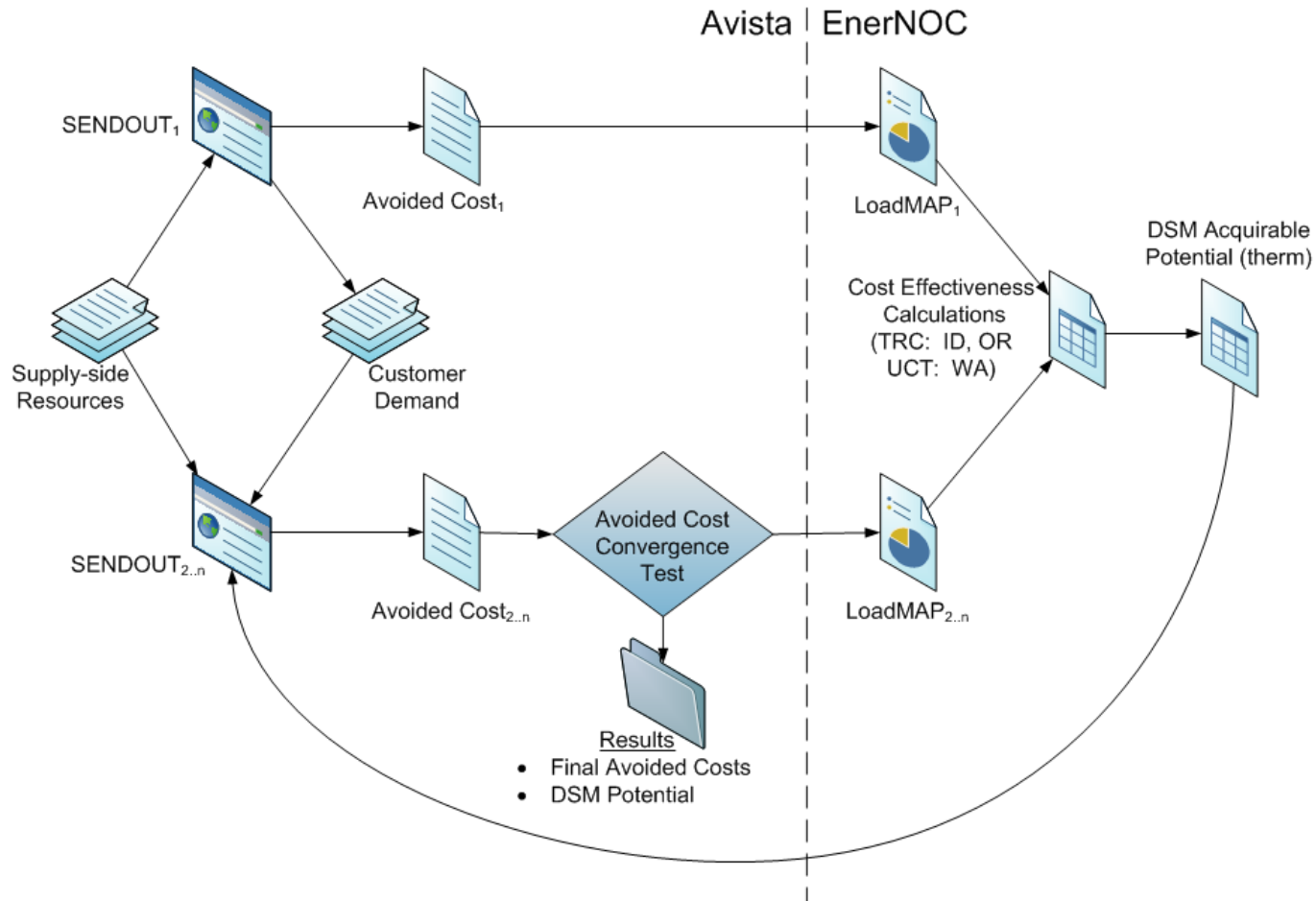
## Avoided Costs (2013 \$)

	<i>2009 IRP</i>		<i>2012 IRP</i>		<i>2014 IRP*</i>	
	Annual	Winter	Annual	Winter	Annual	Winter
WA/ID	\$12.56	\$12.88	\$5.31	\$5.40	??	??
OR	\$12.74	\$13.18	\$5.34	\$5.45	??	??

\*Similar avoided costs levels anticipated from the upcoming IRP

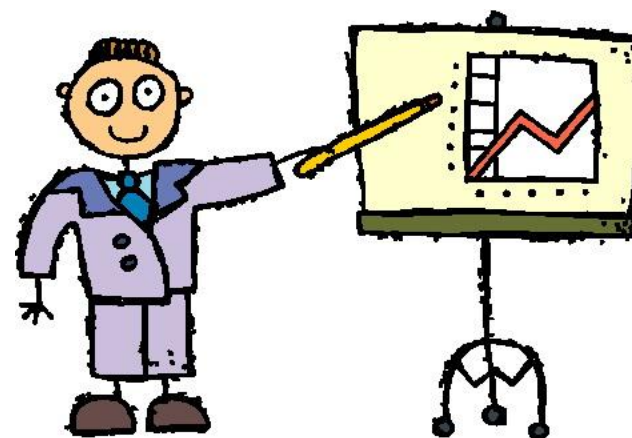


# Proposed DSM Modeling Methodology



# Business Planning Process

- IRP generated target (CPA achievable potential)
- Bottom-up evaluation of all measures regardless of cost-effectiveness
- Add in non-incentive utility costs
- Evaluate with final avoided costs
- Process results in updated operational plan





# Questions?



## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply/Infrastructure, Natural Gas Pricing, and Potential Case Discussion– *February 25*
  - Distribution Planning, SENDOUT® Preliminary Output Results and Further Case Discussion – *March 26*
  - SENDOUT® results – *April 23*
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document



# Tentative Agenda for the Next TAC Meeting

- Natural Gas Prices
- Supply Side Resources (Current and Future)
  - Transportation
  - Storage
  - Other
- Gate Station Analysis



# 2014 Avista Natural Gas IRP

Technical Advisory Committee Meeting 2  
February 25, 2014  
Portland, Oregon

# Agenda

- Introductions & Logistics
- Update from NWP and GTN
- Regional and Avista's Supply Side Resources/Resource Optimization
- Gate Station Analysis
- Solving Unserved Demand

## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - **Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – February 25**
  - Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26*
  - SENDOUT® results – *April 23*
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document



# Regional and Avista's Supply and Infrastructure

# NWP Presentation

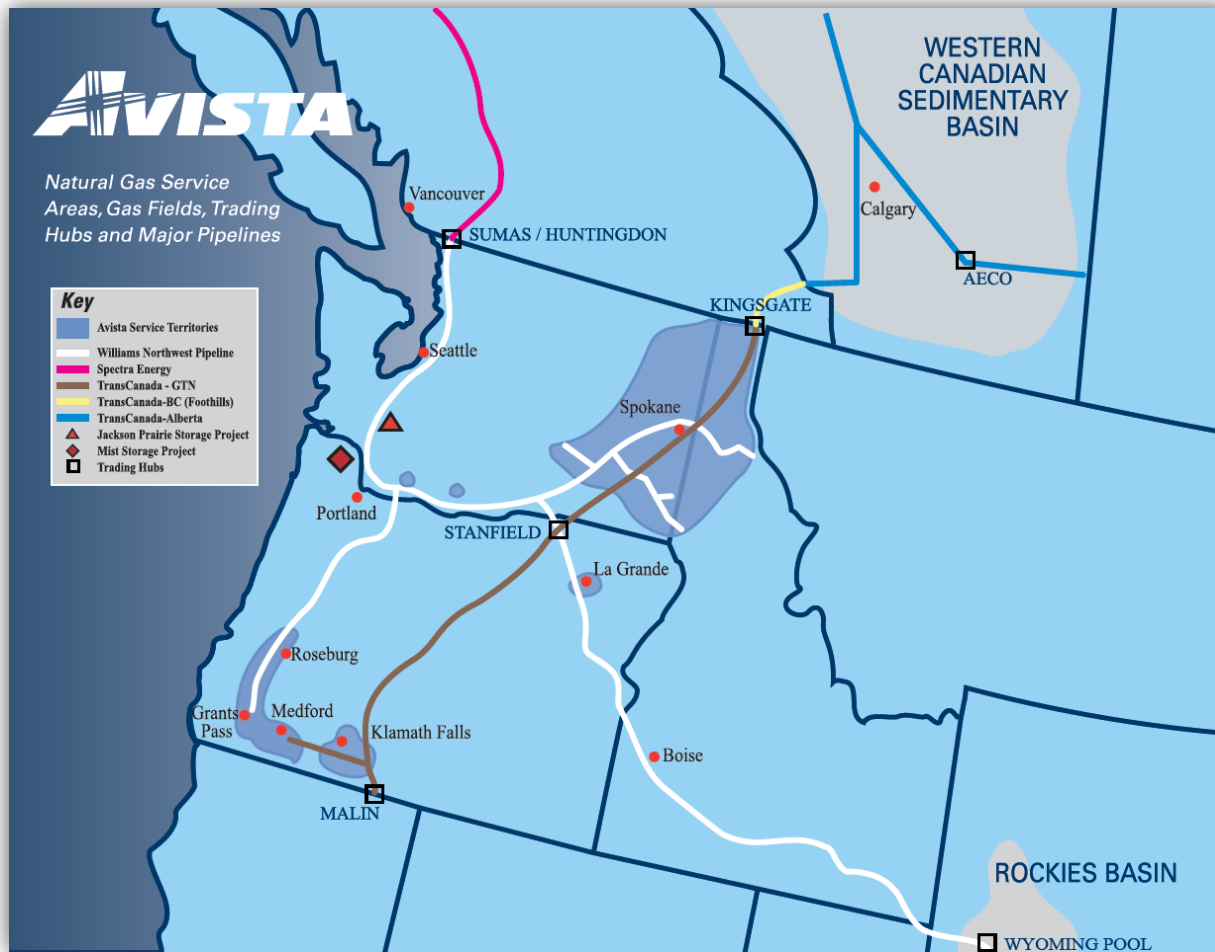




# GTN Presentation



# Connecting Supply and Storage with Customers



## Storage – A valuable asset

- Peaking resource
- Improves reliability
- Enables capture of price spreads between time periods
  - Inter seasonal spreads
  - Intra seasonal spreads
- Enables efficient counter cyclical utilization of transportation (i.e. summer injections)
- May require transportation to service territory
- In-service territory storage offers most flexibility

# Regional Natural Gas Storage Resources



**Jackson Prairie Natural Gas Facility  
Chehalis, Washington**

Facility	Owner	Type	Capacity <sup>1</sup> (MDth)	Max Withdrawal (MDth/day)
Jackson Prairie, WA	Avista, PSE, NW Pipeline	Underground	25,448	1,196 <sup>2</sup>
Mist, OR	NW Natural	Underground	16,100	520 <sup>2</sup>
<b>Underground Subtotal</b>			<b>41,548</b>	<b>1,716</b>
Plymouth, WA	NW Pipeline	LNG	2,388	305
Newport, OR	NW Natural	LNG	1,000	60
Portland, OR	NW Natural	LNG	600	120
Tilbury, B.C.	FortisBC Energy	LNG	591	155
Nampa, ID	Intermountain Gas	LNG	588	60
Gig Harbor, WA	PSE	LNG	13	3
Swarr Station, WA	PSE	LPG <sup>3</sup>	130	10
Mt. Hayes, B.C.	FortisBC Energy	LNG	1,530	153
<b>LNG/LPG Subtotal</b>			<b>6,858</b>	<b>866</b>
<b>Total Storage</b>			<b>48,406</b>	<b>2,582</b>

<sup>1</sup>Working gas capacity; gas that can be used to serve the market.  
<sup>2</sup>Start of season or full rate; storage withdrawal rates decline as working gas volumes decline below certain levels.  
<sup>3</sup>LPG= Liquid Propane Gas and Air mixture.

# Avista's Storage Resources

## **Washington and Idaho**

### **Owned Jackson Prairie**

- 7.7 Bcf of Capacity with approximately 346,000 Dth/d of deliverability

## **Oregon**

### **Owned Jackson Prairie**

- 823,000 Dth of Capacity with approximately 52,000 Dth/d of deliverability

### **Leased Jackson Prairie**

- 95,565 Dth of Capacity with approximately 2,654 Dth/d of deliverability

# Interstate Pipeline Resources

- The Integrated Resource Plan (IRP) brings together the various components necessary to ensure proper resource planning for reliable service to utility customers.
- One of the key components for natural gas service is interstate pipeline transportation. Low prices, firm supply and storage resources are rendered meaningless to a utility customer without the ability to transport the gas reliably during cold weather events.
- Acquiring firm interstate pipeline transportation provides the most reliable delivery of supply.

# Regional Transportation Resources

- **TransCanada Alberta (NOVA)**
  - Transporting gas out of Alberta, Canada
- **TransCanada BC (ANG)**
  - Transporting gas through BC, Canada to US
- **Spectra Energy (WestCoast)**
  - Transporting gas from western BC Canada to US
- **Gas Transmission Northwest (GTN)**
  - Transporting gas from Canada/US border to CA
- **Williams Pipeline West (NWP)**
  - Transporting gas from western BC and US Rockies
- **El Paso Ruby Pipeline**
  - Transporting gas from the Rockies to Malin



# Overview of Transportation



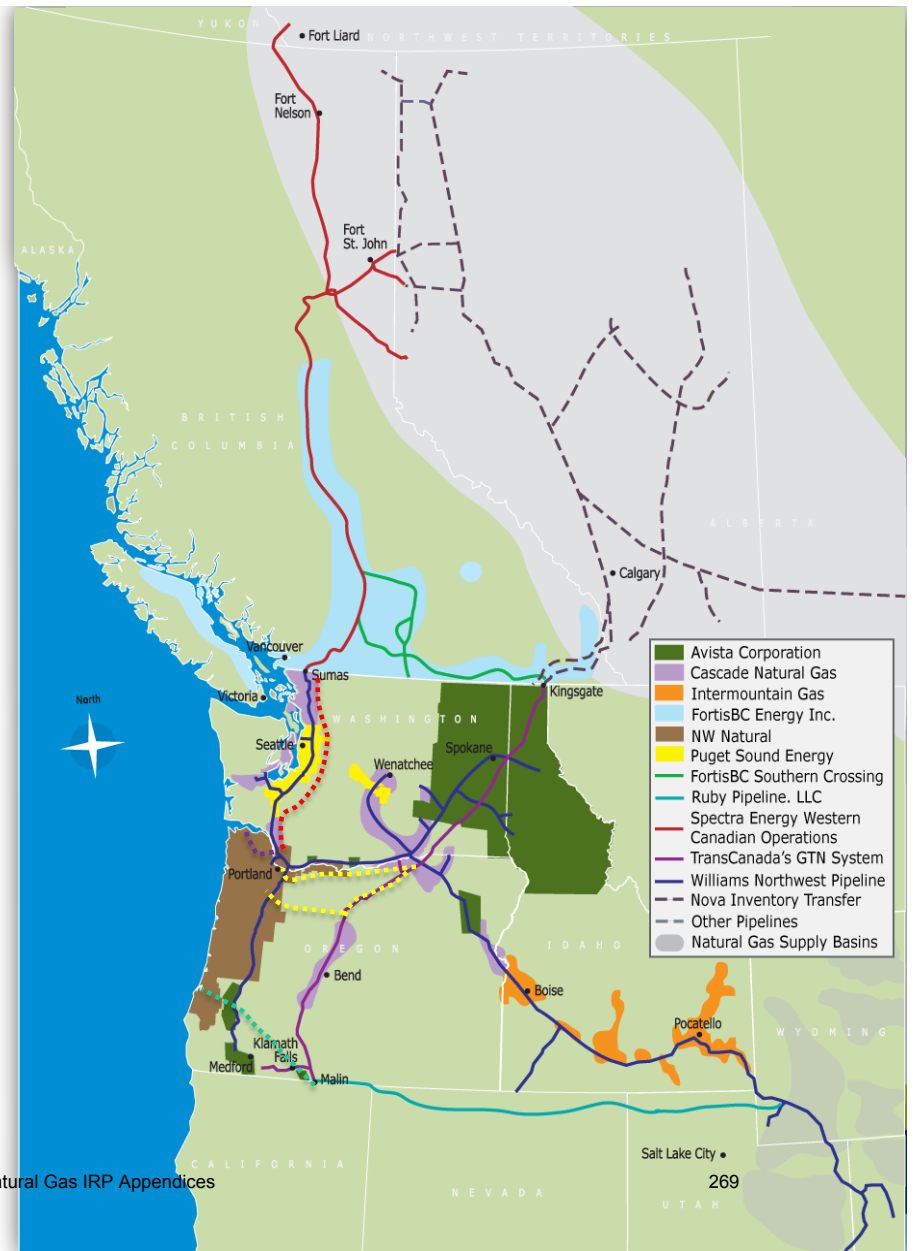
- AECO**
- Station 2**
- Sumas**
- Stanfield**
- Rockies**
- Jackson Prairie**
- Malin**
- Starr Rd**
- Kingsgate**





# Proposed Pipeline Infrastructure

- Pacific Connector/Jordan Cove
- N-Max/Palomar
- Washington Expansion
- Oregon LNG



Avista Utilities

2014 Natural Gas IRP Appendices

269

# Pipeline Contracting

Simply stated: The right to move (transport) a specified amount of gas from Point A to Point B



# Rate Structure

## Straight Fixed Variable (SFV)

- Pipeline charges a higher demand charge and a lower variable or commodity charge

## Enhanced fixed variable

- Pipeline charges a lower demand charge and a higher variable or commodity charge

## Postage Stamp Rate

- Pay the same demand and variable costs regardless of how far the gas is transported

## Mileage Based

- Pay a variable and demand charge based on how far the gas is transported

# Types of Pipeline Contracts

## Firm Transport

- Contractual rights to:
  - Receive
  - Transport
  - Deliver
- From point A to point B

## Interruptible Transport

- Contractual rights to:
  - Receive
  - Transport
  - Deliver
- From point A to Point B *AFTER FIRM TRANSPORT HAS BEEN SCHEDULED – and can be BUMPED later!*

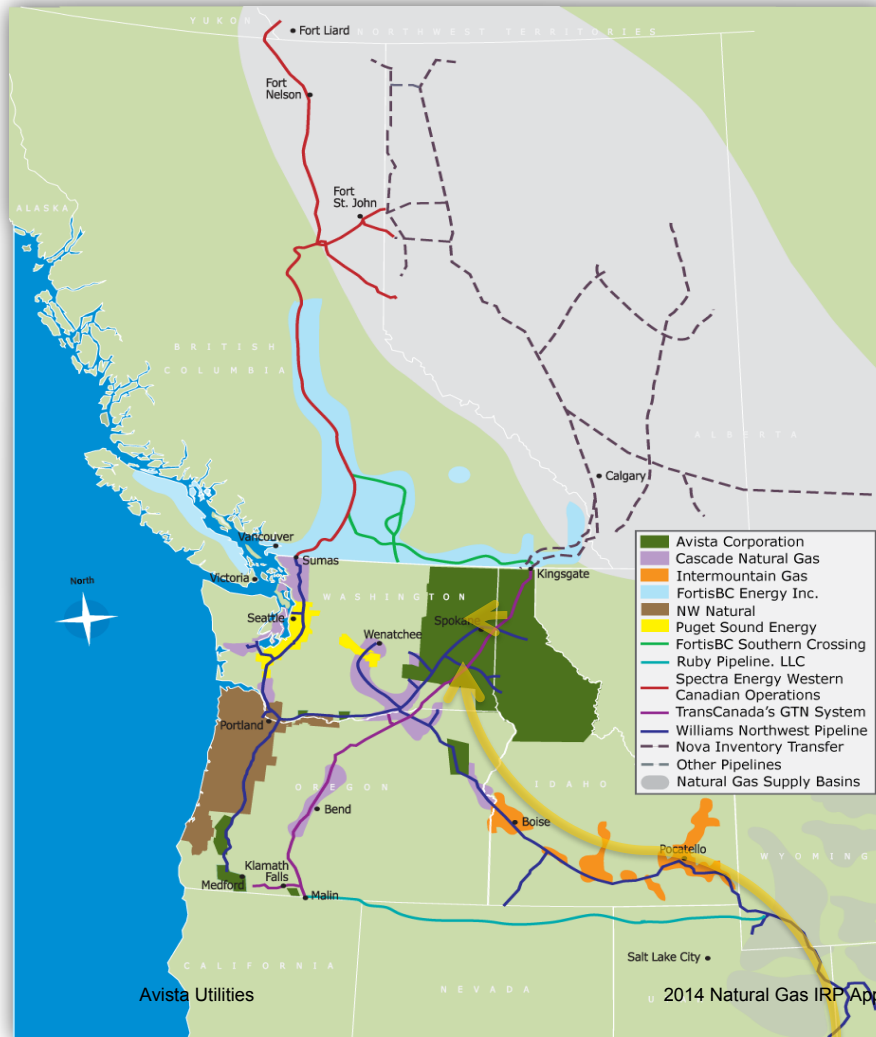
## Seasonal Transport

- Firm service available for limited periods (Nov-Mar) or for a limited amount (TF2 on NWP)
  - Usually matched, paired or utilized with storage.

## Alternate Firm Transport

- The use of firm transport outside of the primary path
- Priority rights below firm
- Priority rights above interruptible

# Postage Stamp Rate



Postage Stamp:  
Same costs  
regardless of  
distance or locations

Avista Utilities

2014 Natural Gas IRP Appendices

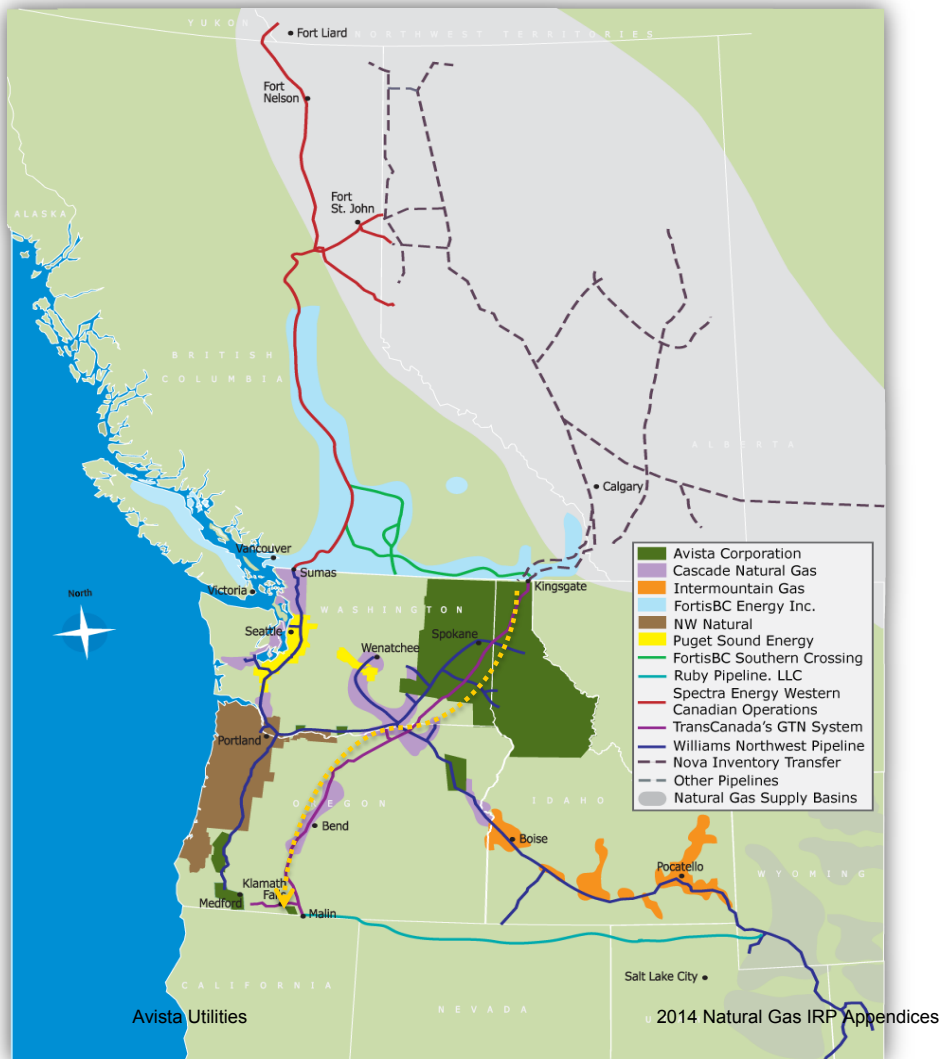


# Pipeline Revenue

## NWP Example: Postage Stamp

- Postage Stamp (NWP)
  - Pay \$0.37 to reserve the space
    - Whether you use it or not
  - Pay \$0.03 when used
    - Only when you use it
  - Net \$0.40
- Demand Charge = \$0.37
- Commodity Charge = \$0.03

# Mileage Rate



Mileage Base:  
Pay based on how far you move the gas



# Pipeline Revenue

## GTN Example: Mileage Based

- Mileage Based (GTN)
  - Pay \$0.01 per mile to reserve the space
    - Whether you use it or not
  - Pay \$0.002 per mile when used
    - Only when you use it
  - \$0.021 per mile when used
- Demand Charge = \$0.01
- Commodity Charge = \$0.002



## Interruptible Rates

- Pay as you go!
- Pay full firm rate for any gas transported (may be discounted)
  - Pay \$0.37 equivalent to cost to reserve the space
  - Pay \$0.03 variable charge when used
  - Net \$0.40 for all gas transported
    - So IT rate is \$0.40
- NO GUARANTEE it will flow.
- Can be “BUMPED” by Firm Shippers

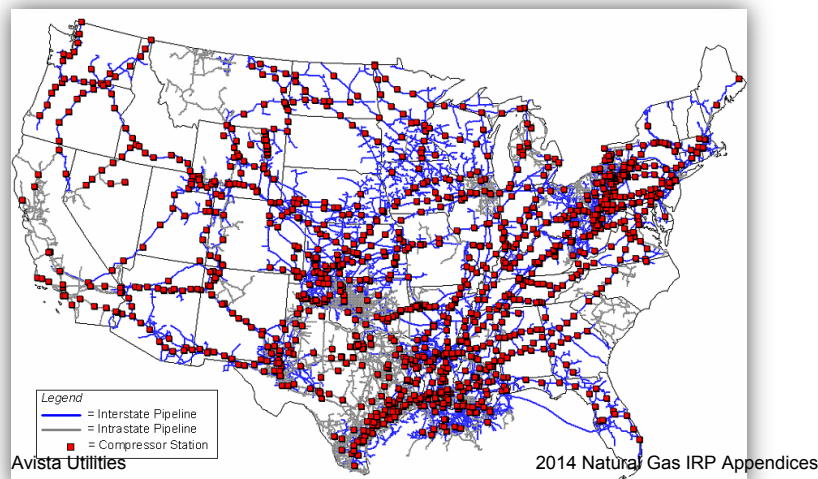
# Fuel Rates



To move gas through the pipelines the gas is compressed to a higher pressure.

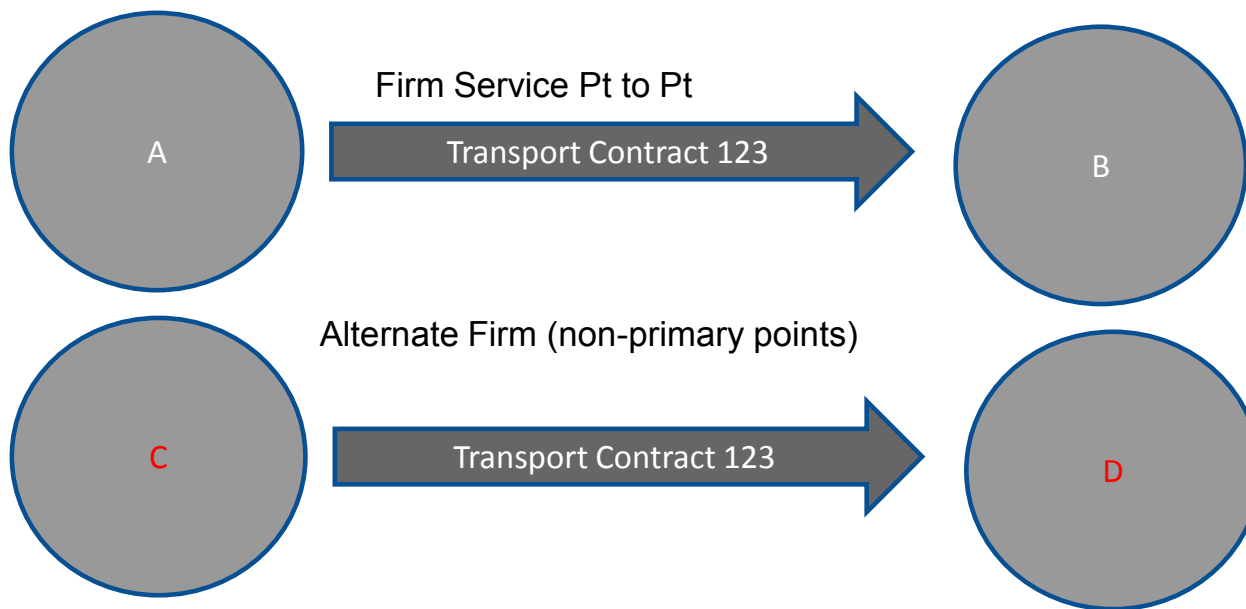
To run the compressors, the pipeline takes some of your gas – this is referred to as pipeline fuel. It is a percent of what you are transporting.

For example, if we purchase 1000 Dth in a supply basin, we will only receive 975 Dth at our gate station for the customers.

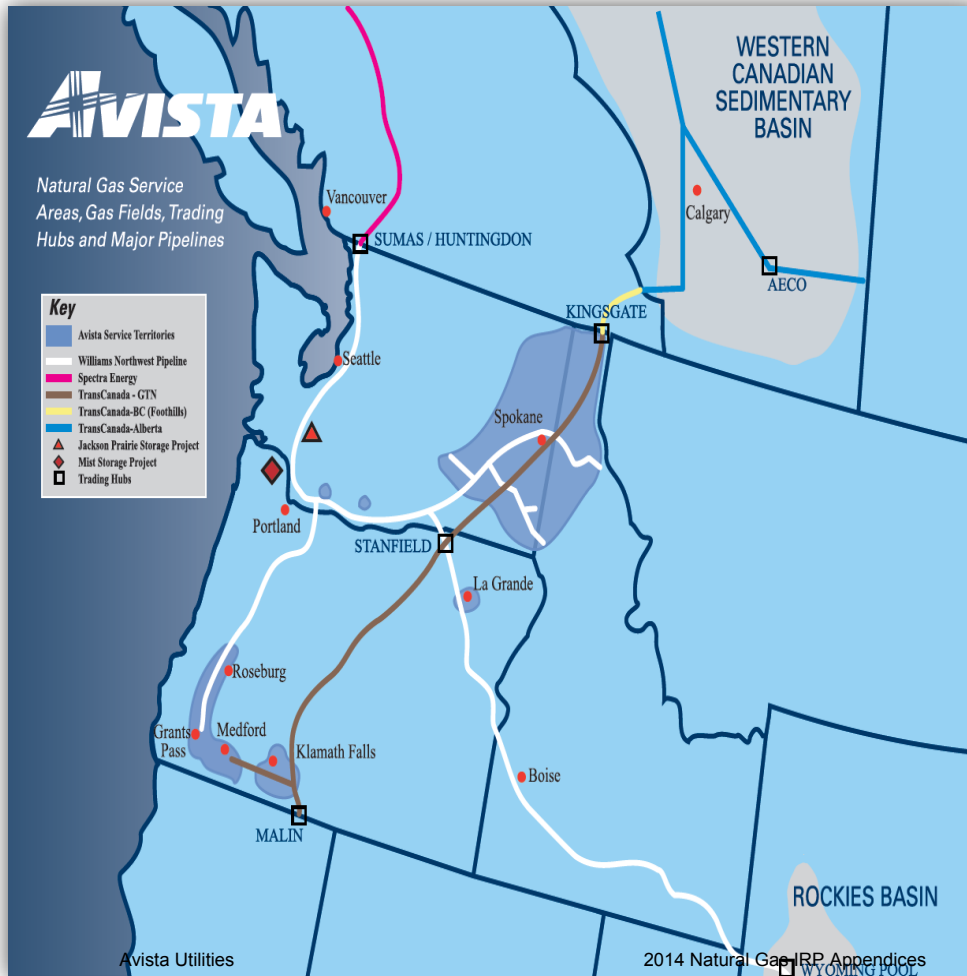


# Pipeline Contracting

Transport contract #123 with “primary” points A to B



# Capacity Firm or Not?



**Firm:**

- Primary Receipt
- Delivery Path

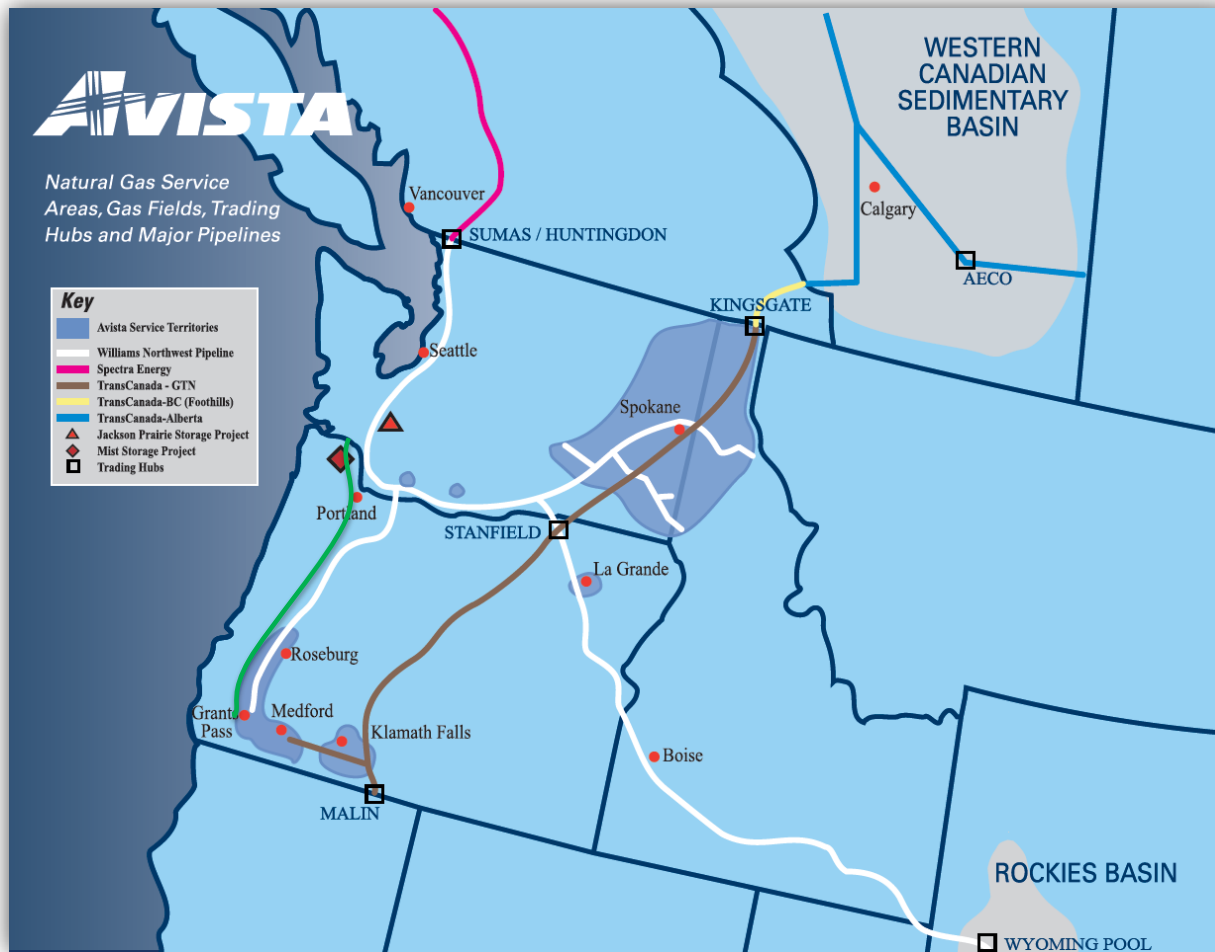
**Secondary:**

- Any part not firm
- Requires knowledge and experience to rely on interruptible

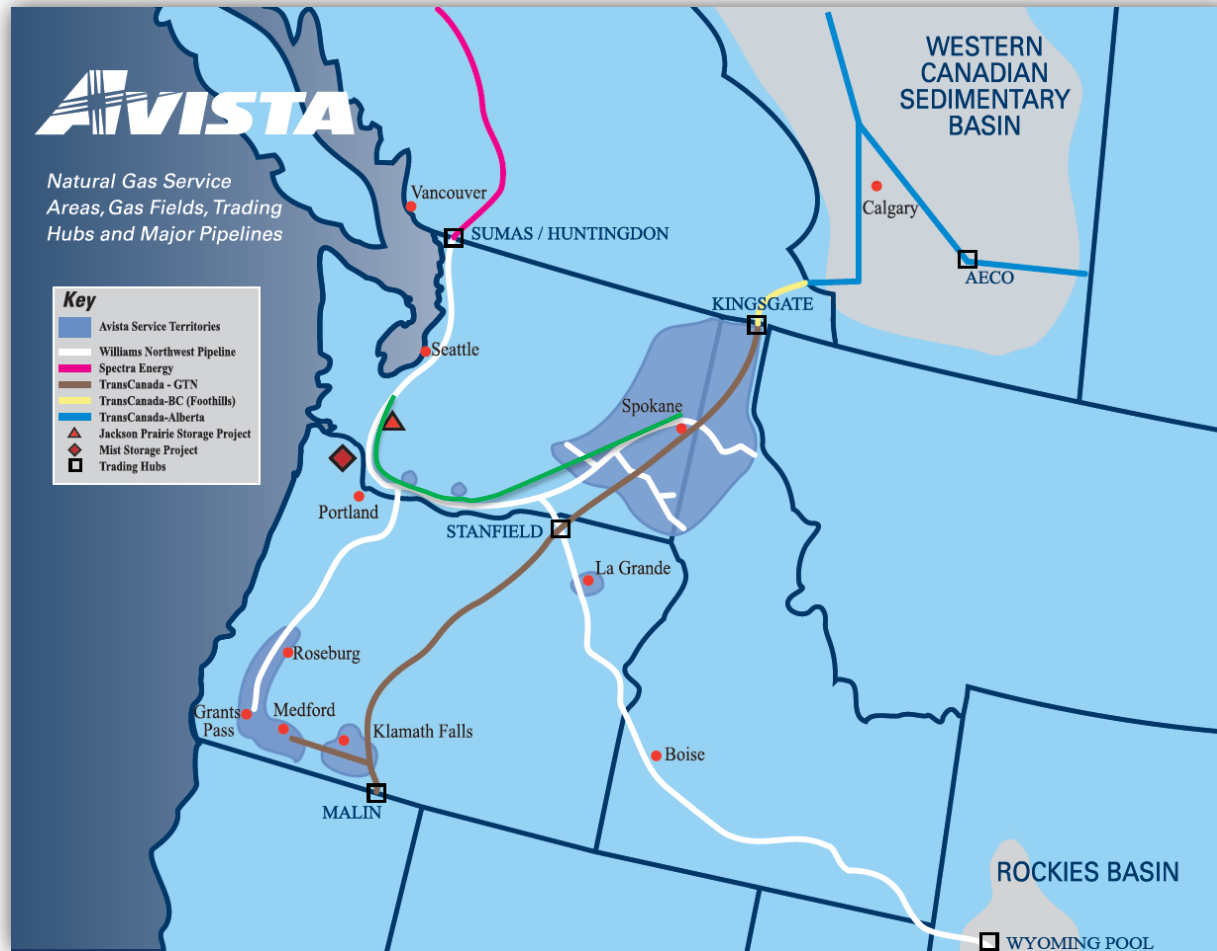
No on NWP  
Yes on GTN



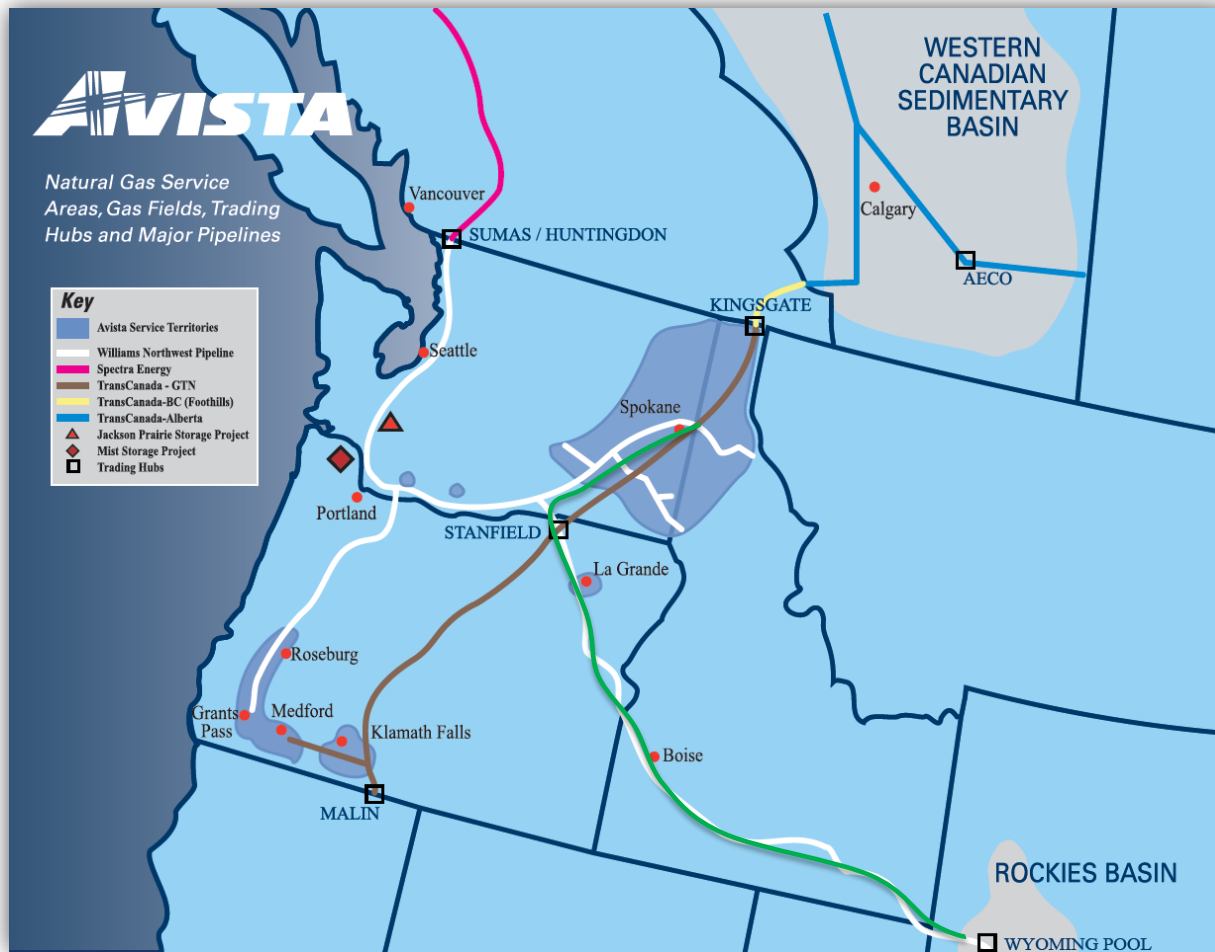
# Capacity Firm or Not?



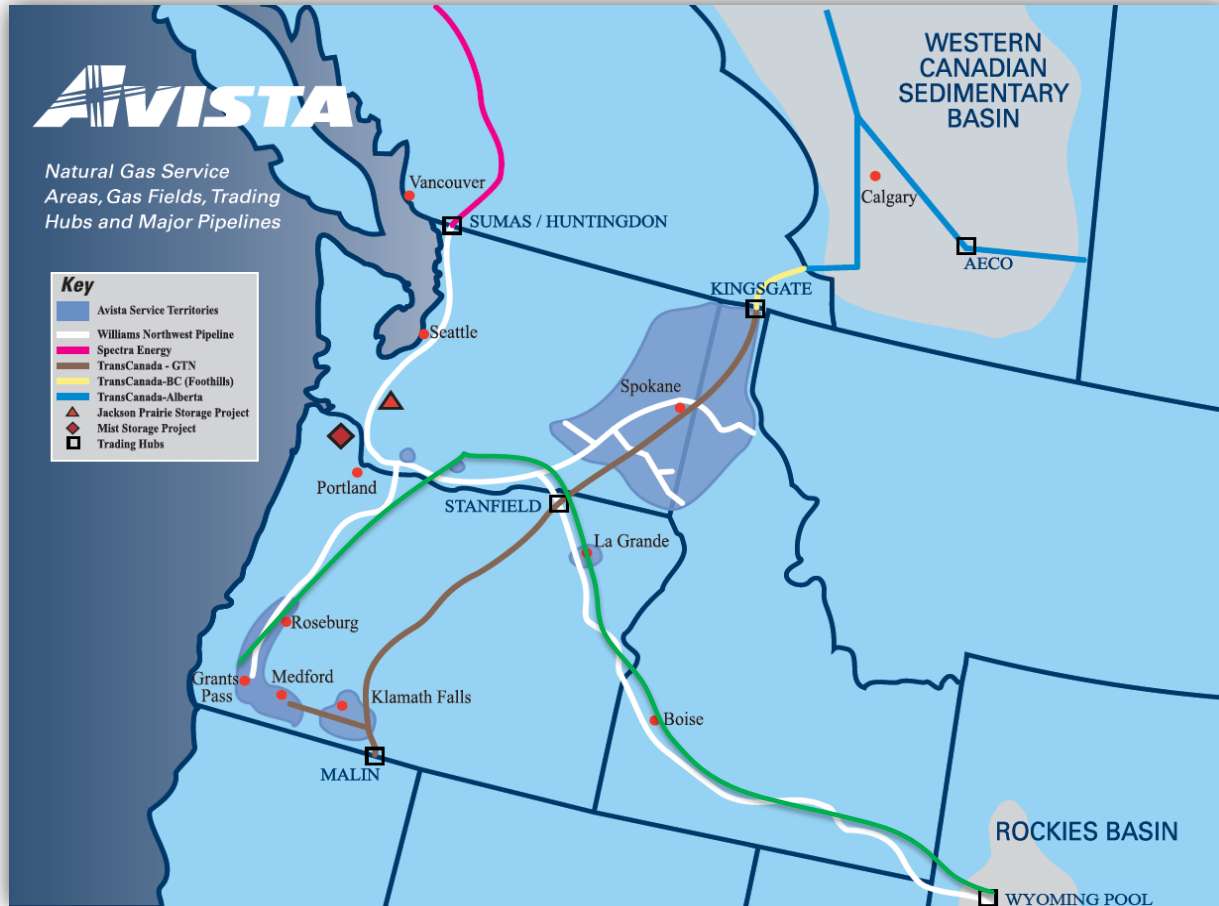
# Capacity Firm or Not?



# Capacity Firm or Not?



# Capacity Firm or Not?

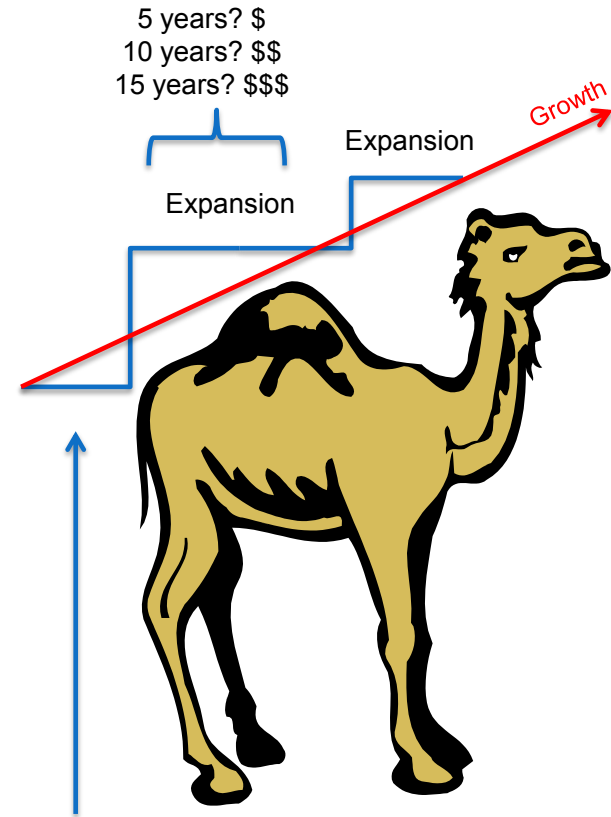
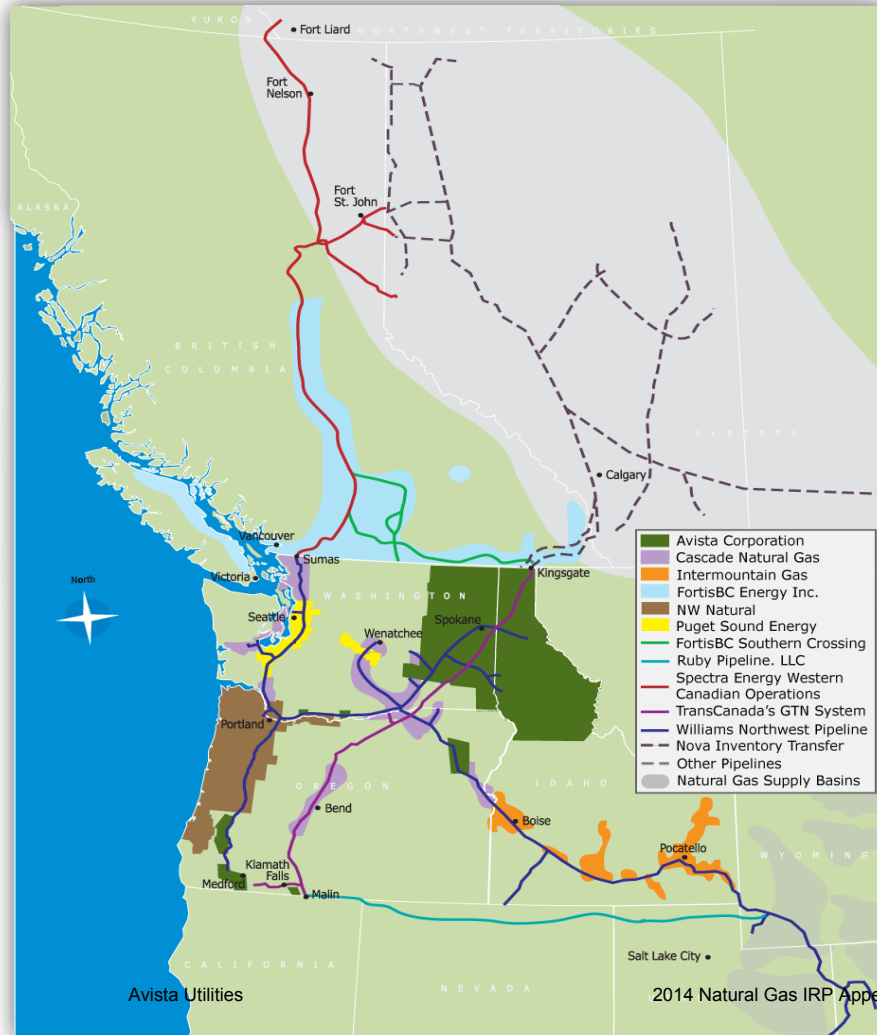


Alternate capacity – flex delivery point  
- Subject to cuts through constraints





# Pipeline Capacity can be “lumpy”

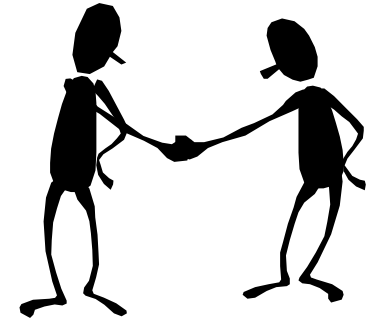


Alternatives can be expensive and timing unknown

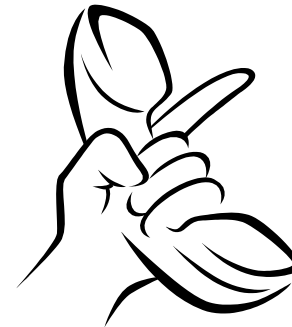


# How to Manage the “LUMPS”

- Transport Optimization
  - Contract Terms (seasonal)
  - Long term releases
  - Short term releases
  - Daily Optimization
  - Segmentation



Long Term



Short Term



Daily basin spread arbitrage

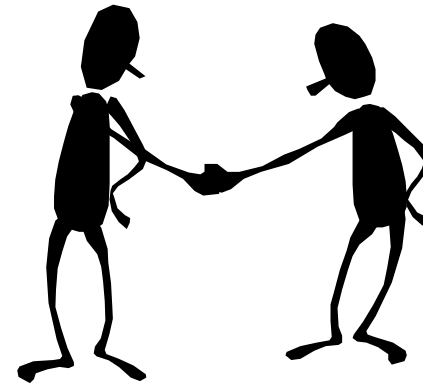


Segmentation



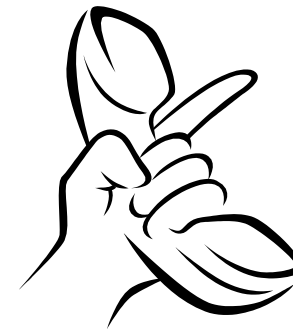
## Long Term Releases

- 1 year – 20 plus years
- Negotiated – but subject to bidding
- Can be subject to recall
- Cannot exceed Maximum Rate

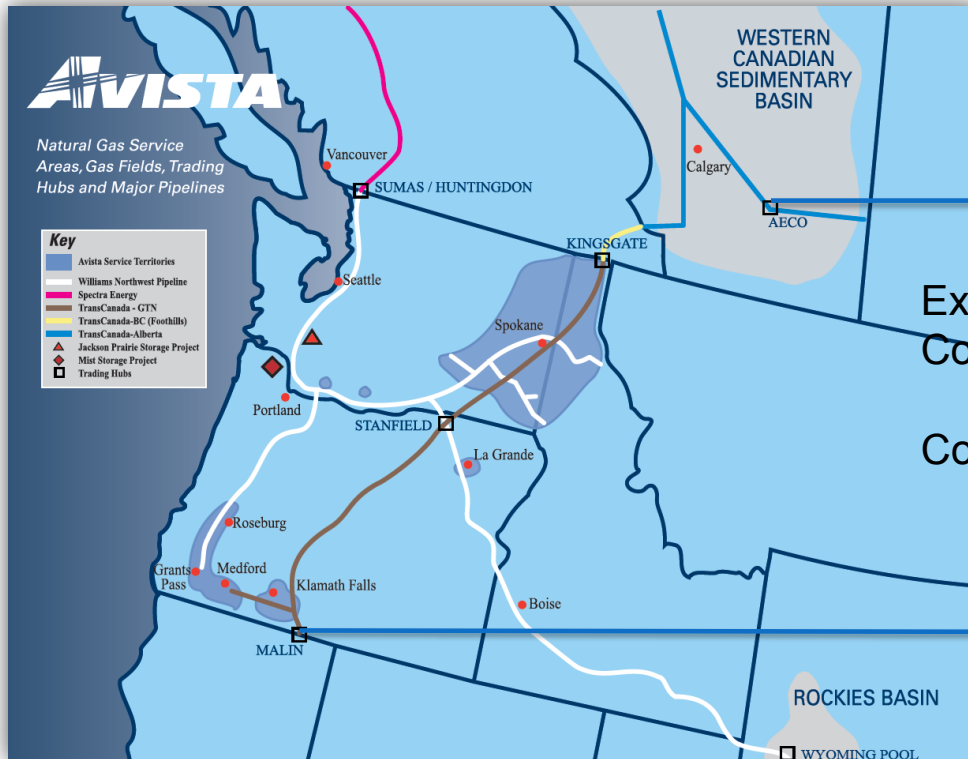


## Short Term Releases

- Less than 1 year (can be for 1 day)
- Negotiated – but subject to bidding
- Can be posted for bidding only
- “Sweet Heart” rules prevent rolling from term to term
- Can be higher than Max Rate



# Daily Transportation Optimization

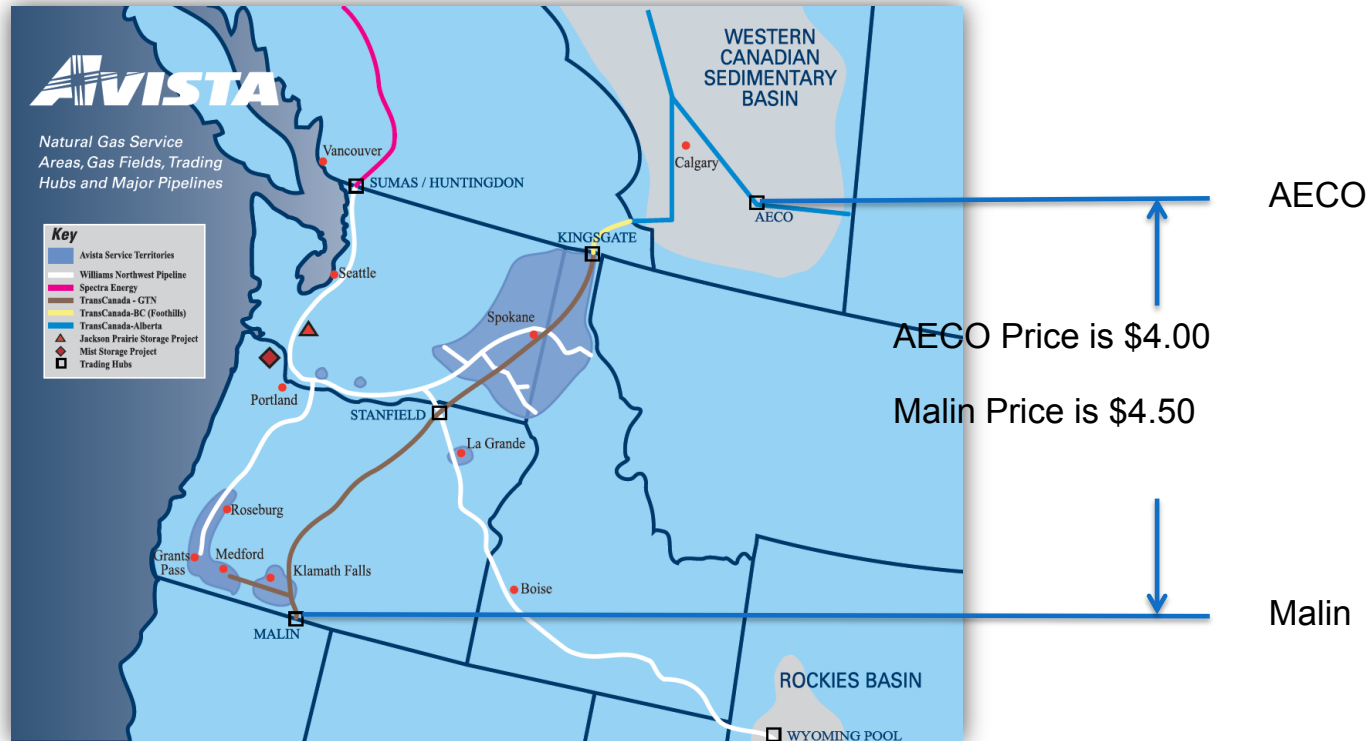


Example:  
 Cost to own transport is \$0.70  
 • Whether used or not (demand)  
 Cost to actually move gas is \$0.10

AECO

Malin

# Daily Transportation Optimization

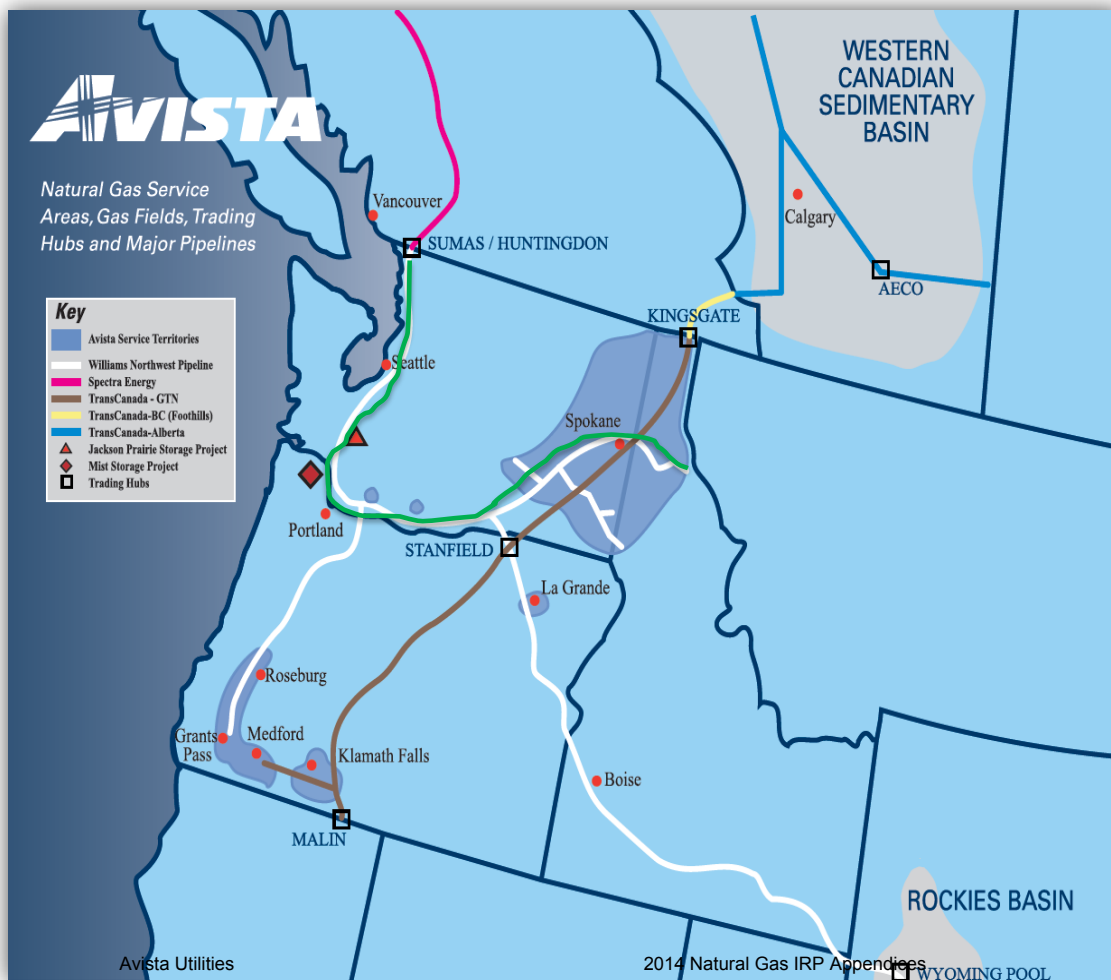


Buy AECO gas at \$4.00  
 Pay \$0.10 to transport it (fuel costs)  
 Sell Malin gas at \$4.50  
 Net is \$4.50-\$4.00 is \$0.50; less \$0.10 to transport yields \$0.40  
 We have reduced customer's costs by \$0.40

Avista Utilities 2012 Natural Gas IRP Appendices



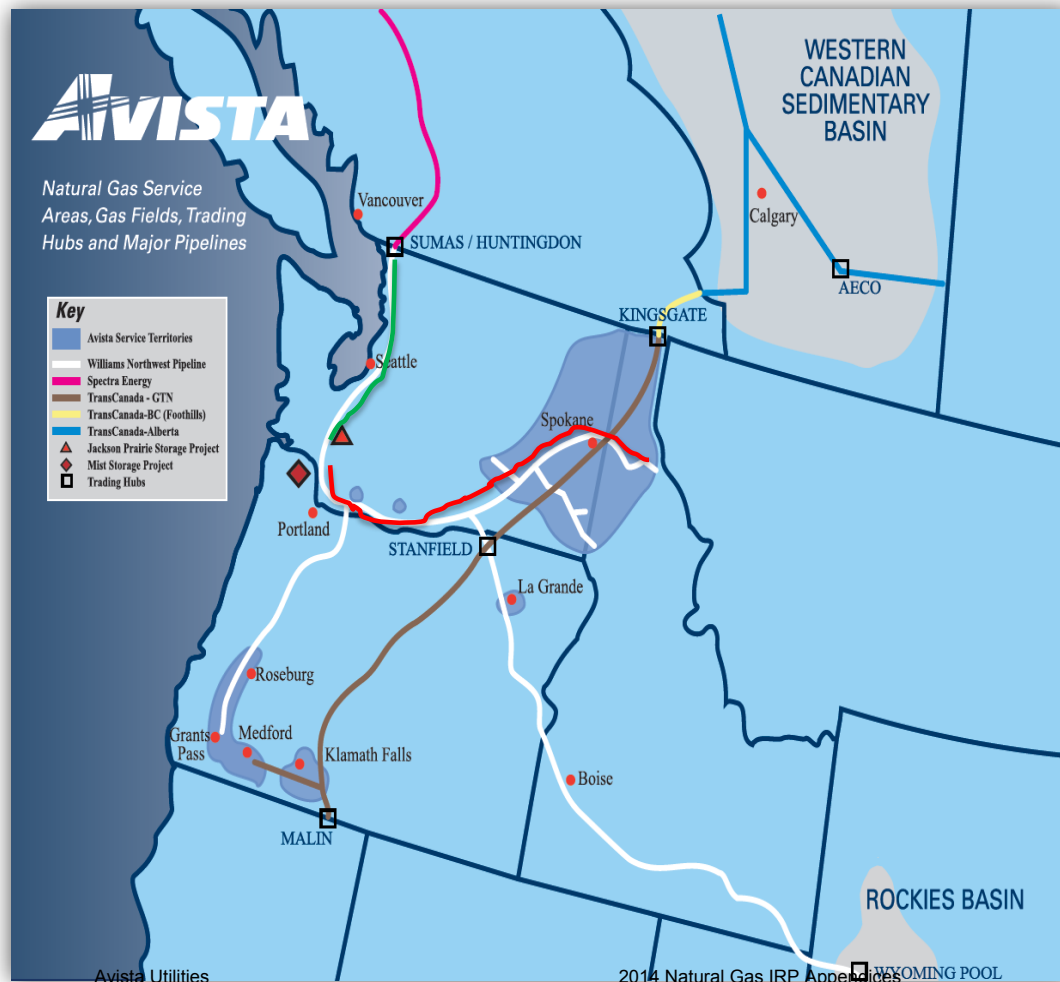
# Segmentation



**Primary Path:**  
Sumas to CDA  
10,000 Dth/day  
Guaranteed Delivery



# Segmentation

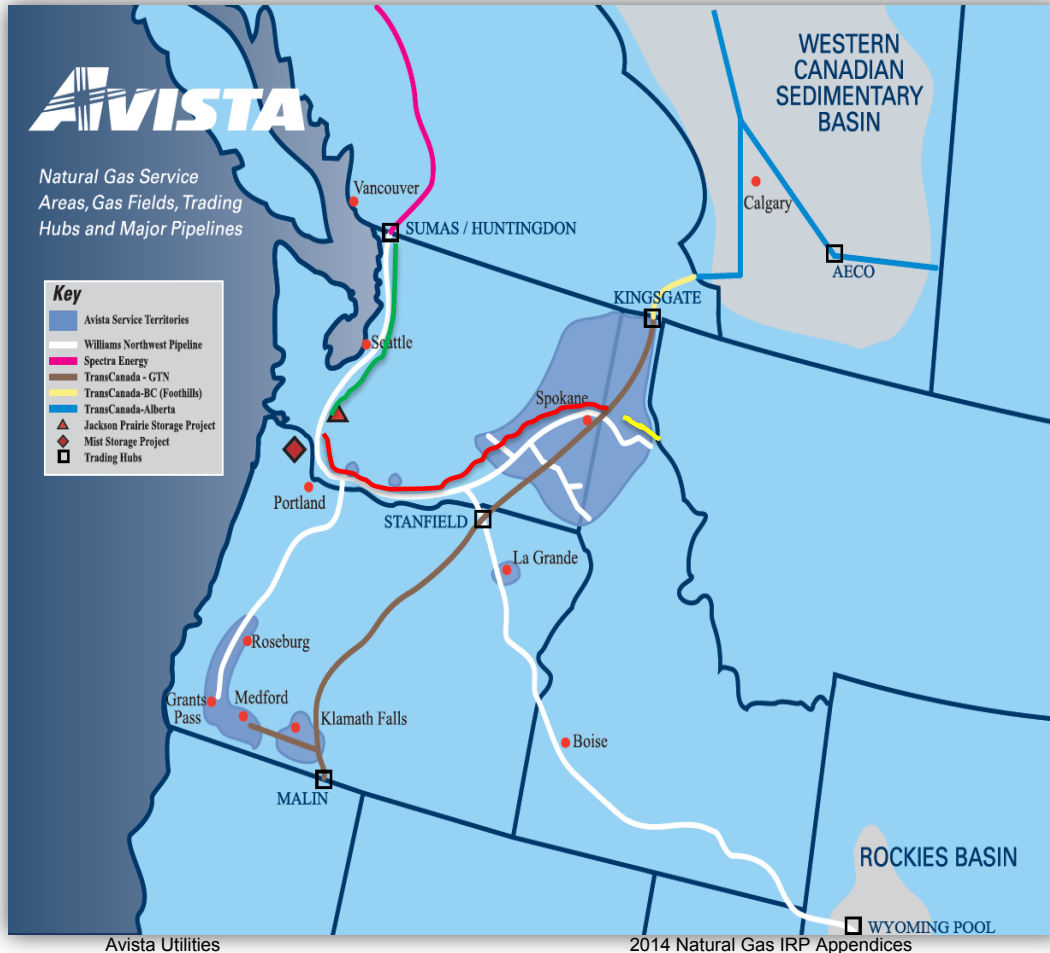


**Segment:**  
Sumas to JP – FIRM  
10,000 Dth/day

JP to CDA – FIRM  
10,000 Dth/day



# Segmentation



**Segment:**

Sumas to JP – FIRM  
10,000 Dth/day

JP to Spokane – FIRM  
10,000 Dth/day

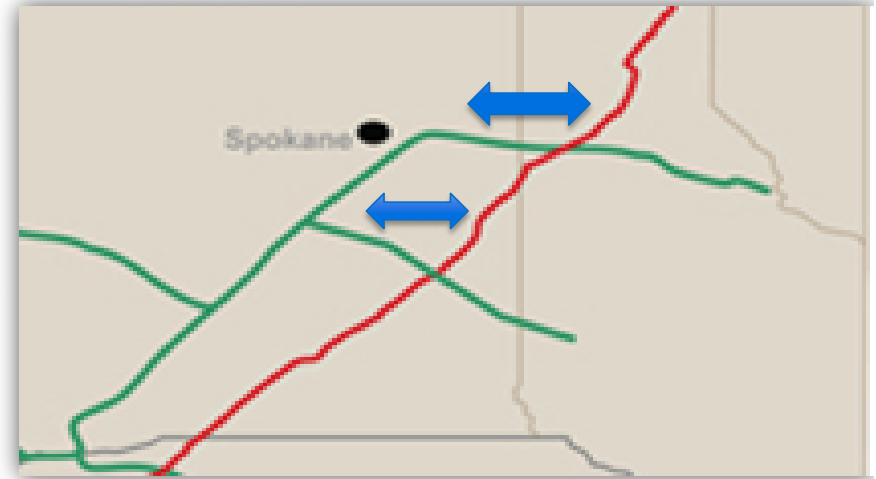
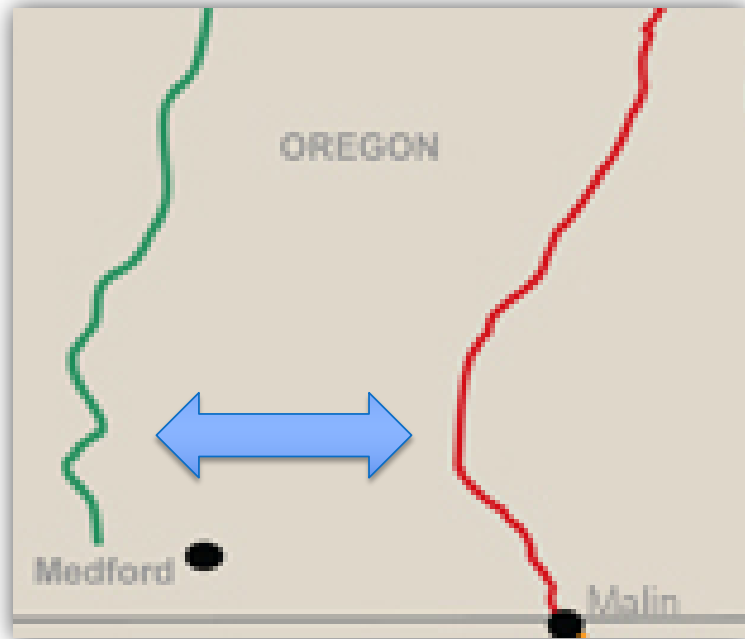
Starr Rd to CDA – FIRM  
10,000 Dth/day

One payment  
3 x capacity

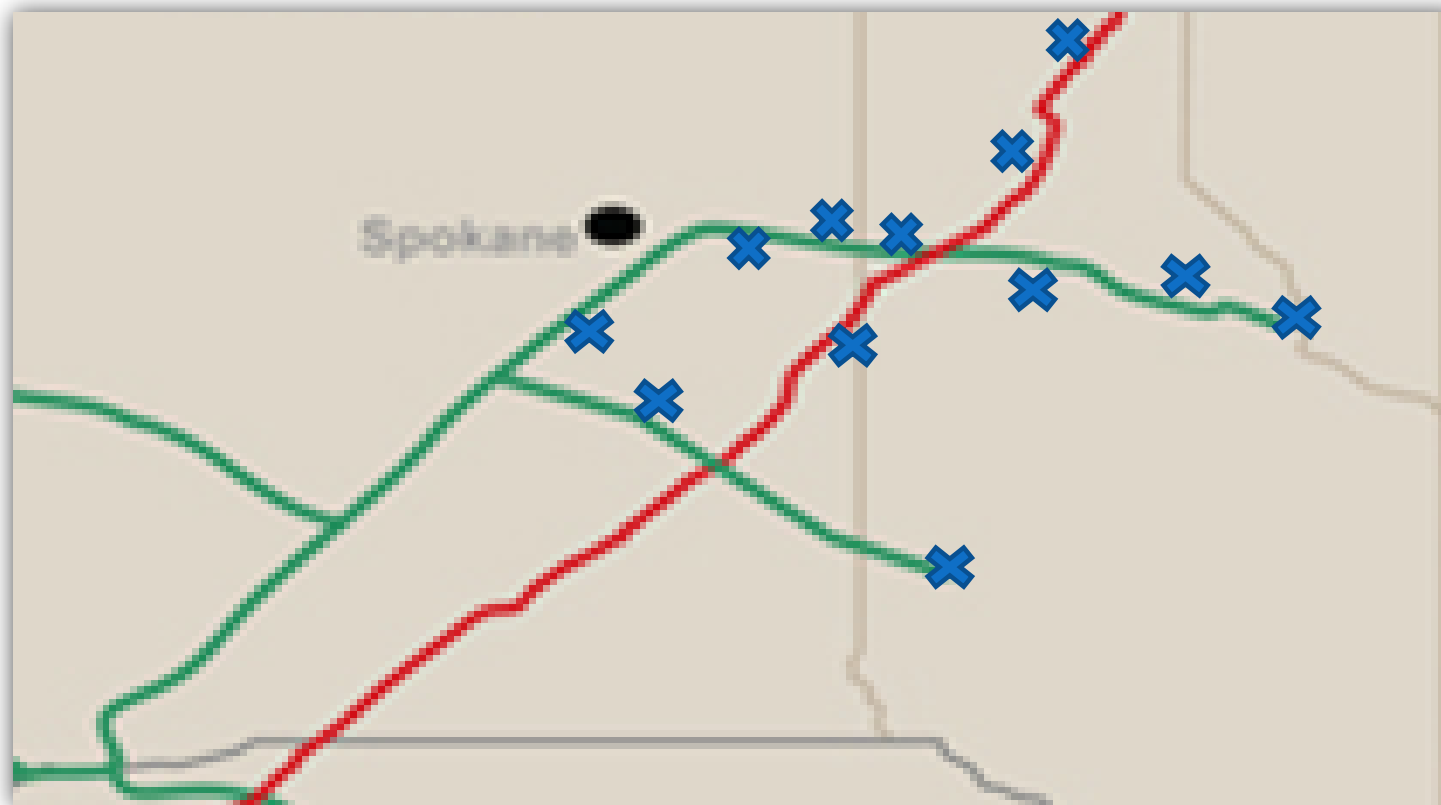




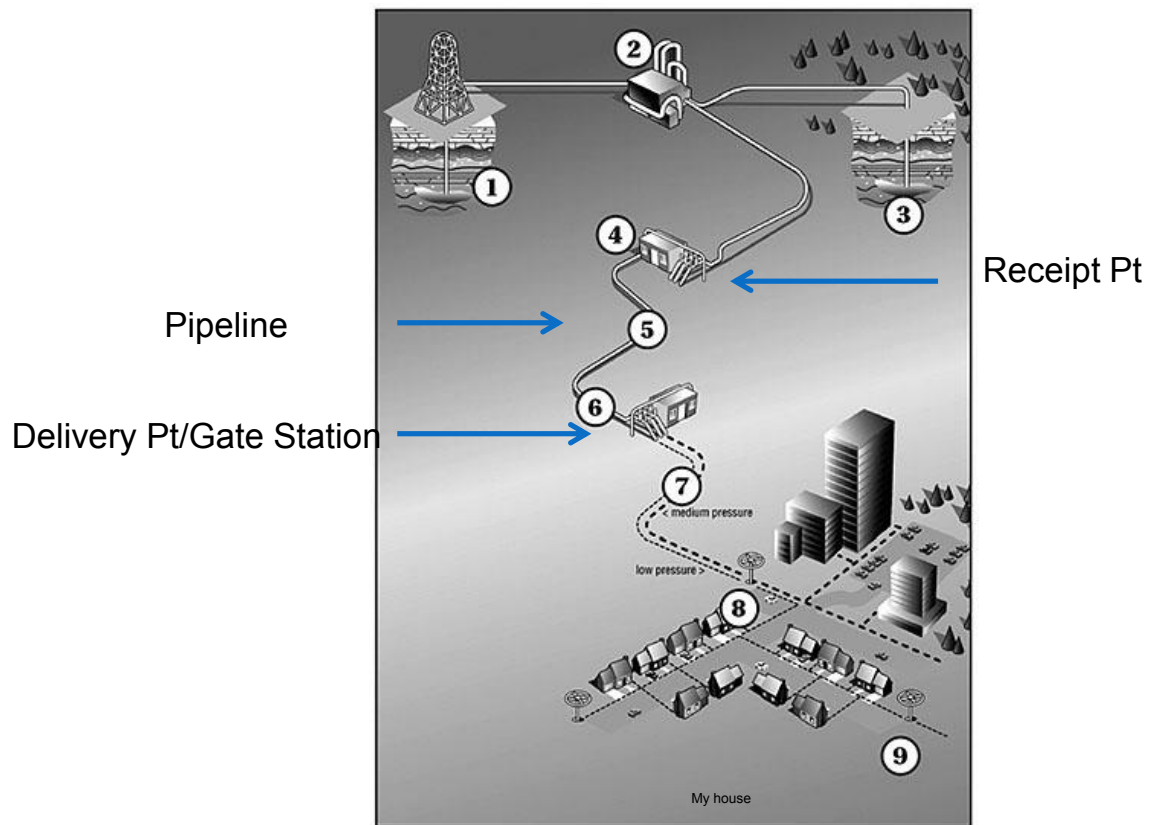
# Pipeline Optimization



# Points Along the Pipe



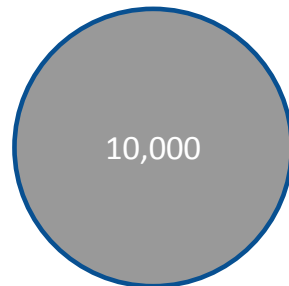
# Gate Stations



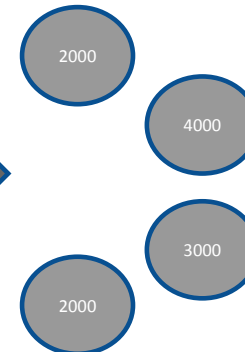
# Pipeline Contracting

Gate stations may have the ability to deliver volume in excess of contract demand. This may be a result for future growth and construction efficiencies.

Contract Demand: 10,000

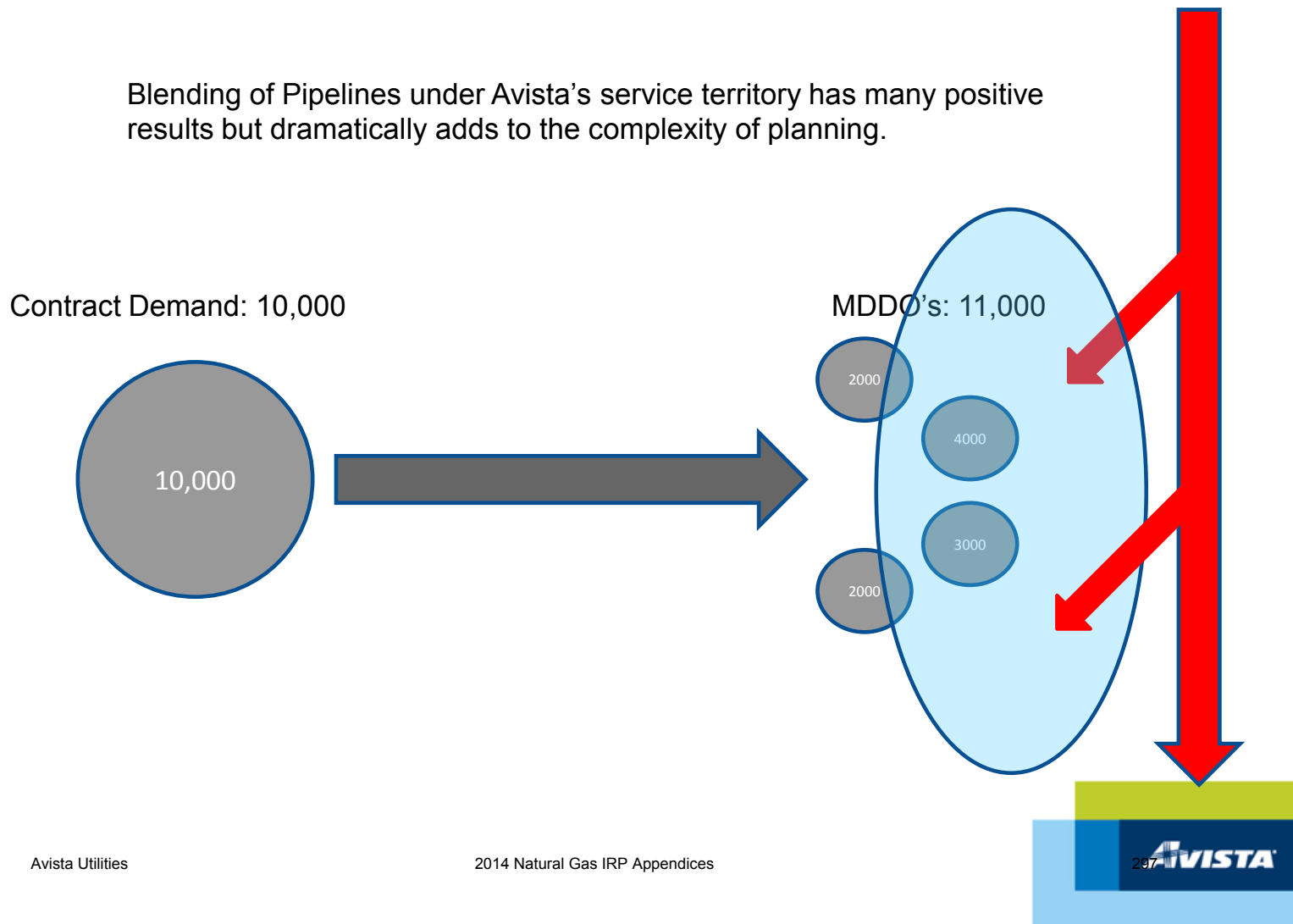


MDDO's: 11,000

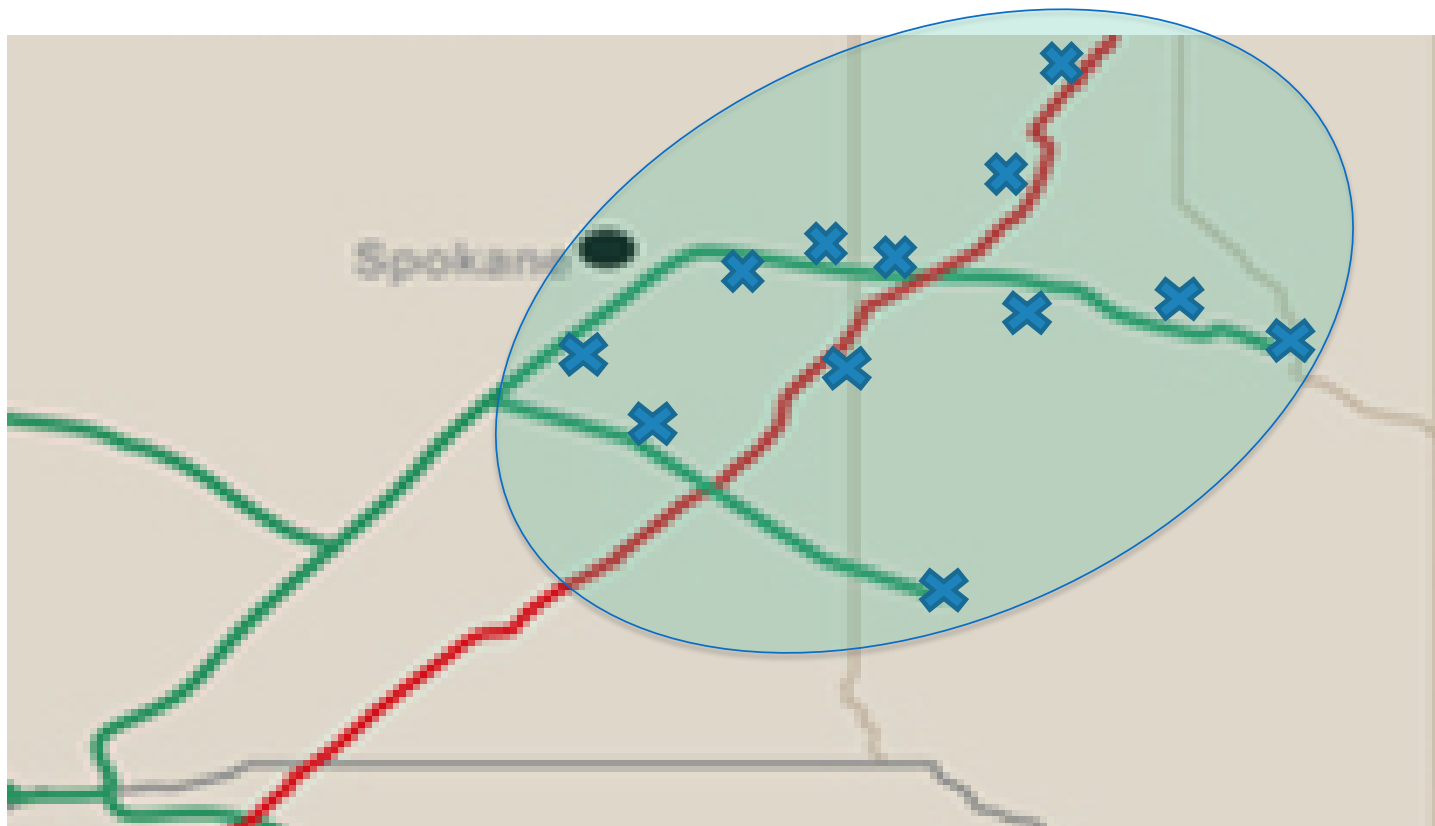


# Pipeline Contracting

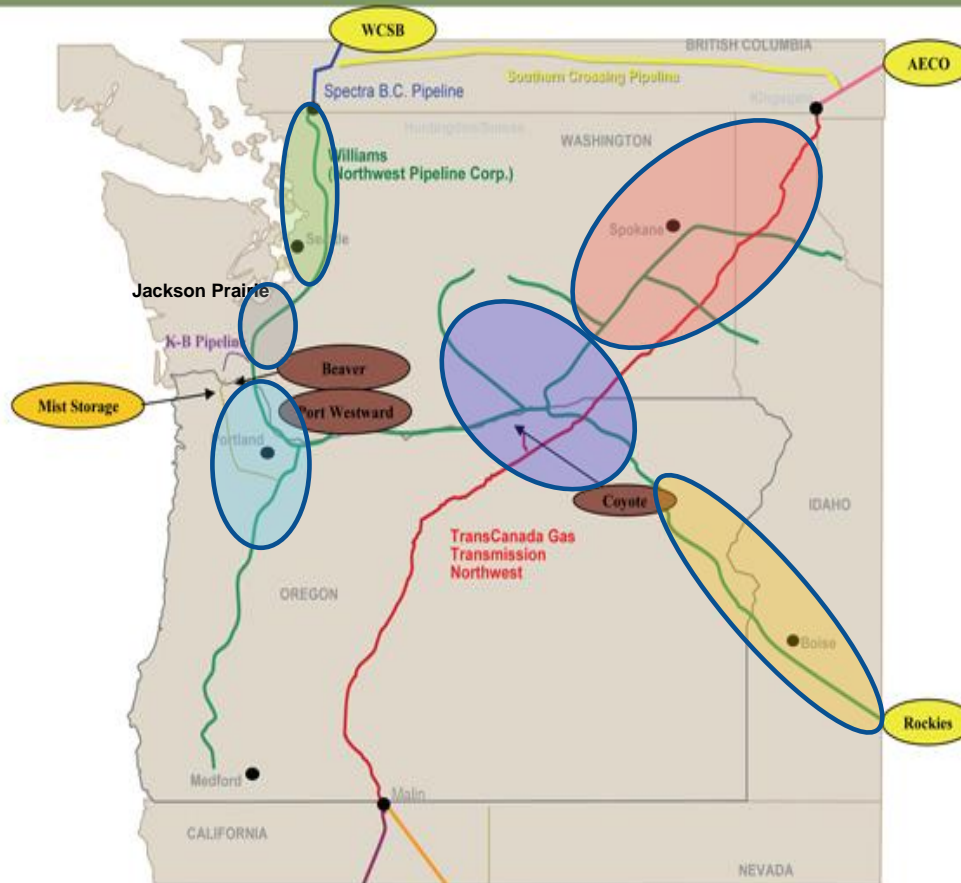
Blending of Pipelines under Avista's service territory has many positive results but dramatically adds to the complexity of planning.



# Zones Along the Pipe



# Natural Gas Transportation



## Modeling Transportation In SENDOUT®

- Start with a point in time look at each jurisdiction's resources
  - Contracts – Receipt and Delivery Points
  - Rates
- Contractual vs. Operational
  - Contractual can be overly restrictive
  - Operational can be overly flexible
- Incorporating operational realities into our modeling can defer the need to acquire new resources.
- Gas Supply's job is to get gas from the supply basin to the pipeline citygate.
- Gas Engineering/Distribution's job is to take gas from the pipeline gate to our customers.
- The **major** limiting factor is receipt quantity – how much can you bring into the system?



# Modeling Challenges

- Supply needs to get gas to the gate.
- Contracts were created years ago, based on demand projections at that point in time.
- Stuff happens (i.e. growth differs from forecast).
- Sum of receipt quantity and aggregated delivery quantity don't identify resource deficiency for quite some time however.....
- The aggregated look can mask individual city gate issues, and the disaggregated look can create deficiencies where they don't exist.
- In many cases operational capacity is greater than contracted.
- Transportation resources are interconnected (two pipes can serve one area).
- WARNING – we need to be mindful of the modeling limitations.

## What is in SENDOUT® ?

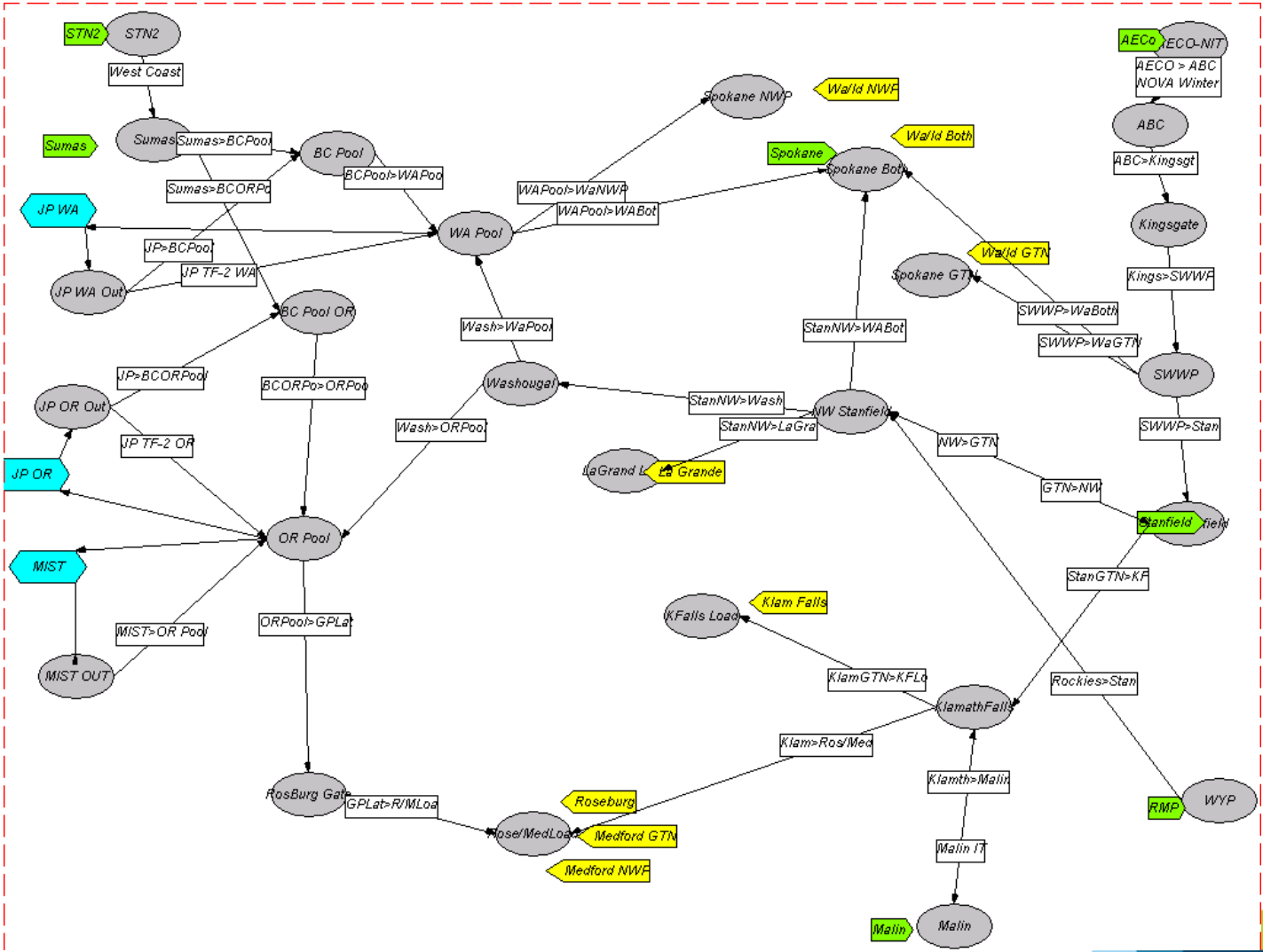
### Inside:

- Demand forecasts at an aggregated level
- Existing transportation resources and current rates
  - Receipt point to aggregated delivery points/“zone”
  - Jurisdictional considerations
  - Long term capacity releases
- Potential resources, both supply and demand side

## What is outside SENDOUT®?

### Outside:

- Gate station analysis
  - Forecasted demand behind the gate
    - Growth rates consistent with IRP assumptions
    - Actual hourly/daily city gate flow data
- Gate station MDDO's
- Gate station operational capacities





# City Gate Analysis

## City Gate Analysis Issues to Address

- MDQ vs. MDDO
- Our gate vs. Pipeline gate
- Operational capacity vs. contracted capacity
- Pipeline differences
  - Zonal vs. Point Specific
  - Laterals and Mainlines

# Forecasting Demand Behind the Gate

- Our IRP desire has always been to forecast to as granular a level as possible using the available data.
- Attempts to forecast demand behind the gate using existing forecasting methodology has been challenging.
  - Revenue data does not have daily meter reads for core customers making regression analysis on a use per HDD per customer difficult.
  - DSM would become more burdensome than it already is.
  - Some towns can be served by multiple pipelines and the mix can change over time.

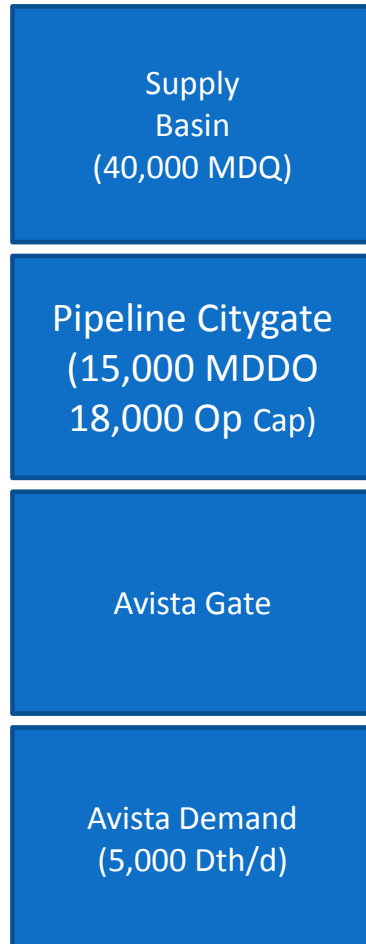
## Forecasting Demand Behind the Gate cont.

While there are challenges, there is modeling that we can do to help identify more granular city gate deficiencies.

- Utilize daily/hourly pipeline flow data from each meter station to estimate what demand could be on a peak day or any heating degree day.
- Apply growth factors to estimate what the demand could grow to consistent with IRP assumptions/methodology.

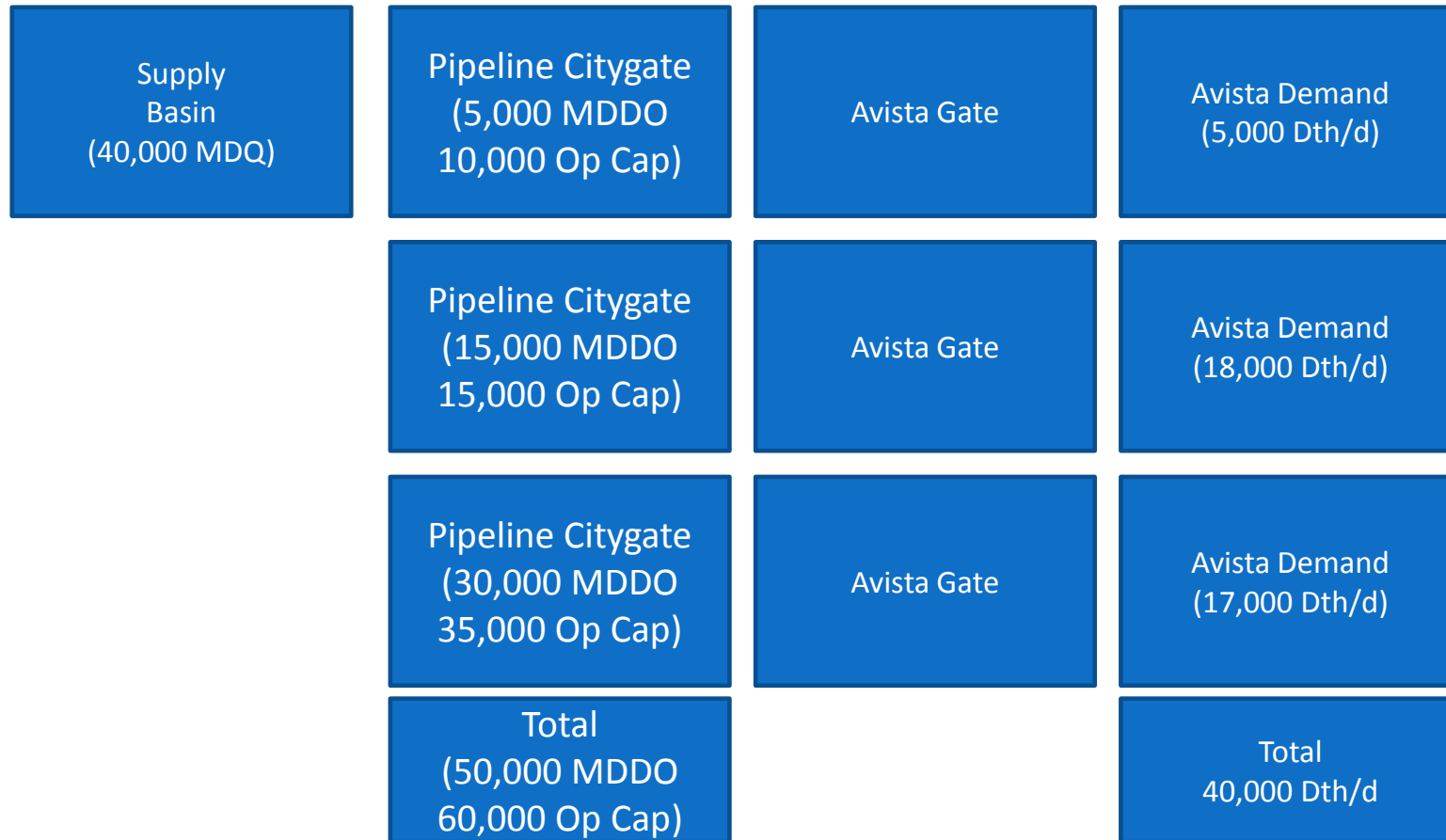


## The Pieces and Parts

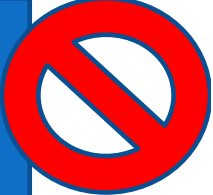


- Contracted MDQ
  - Basis for billing (i.e. what we pay for)
- 
- Contracted MDDO
  - Operational Capacity
  - Not always the same volumes, provides flexibility on the system
- 
- Point where the gas enters the LDC's system
- 
- What's behind the gate?

# From Supply Basin to Meet Demand



# Not all gates are created equal

Supply Basin (40,000 MDQ)	Pipeline Citygate (5,000 MDDO 10,000 Op Cap)	Avista Gate	Avista Demand (5,000 Dth/d)	OK
	Pipeline Citygate (15,000 MDDO 15,000 Op Cap)	Avista Gate	Avista Demand (18,000 Dth/d)	
	Pipeline Citygate (30,000 MDDO 35,000 Op Cap)	Avista Gate	Avista Demand (17,000 Dth/d)	OK
	Total (50,000 MDDO 60,000 Op Cap)		Total 40,000 Dth/d	OK

# Where is the deficiency?

Interstate Pipeline Issue		Avista Distribution Issue	
Supply Basin (40,000 MDQ)	Pipeline Citygate (5,000 MDDO 10,000 Op Cap)	Avista Gate	Avista Demand (5,000 Dth/d)
	Pipeline Citygate (15,000 MDDO 15,000 Op Cap)	Avista Gate	Avista Demand (18,000 Dth/d)
	Pipeline Citygate (30,000 MDDO 35,000 Op Cap)	Avista Gate	Avista Demand (17,000 Dth/d)
	<b>Total</b> (50,000 MDDO 60,000 Op Cap)		<b>Total</b> 40,000 Dth/d



# Where is the deficiency?

## Pipeline Issue

<p>Supply Basin (40,000 MDQ)</p>	<p>Pipeline Citygate (5,000 MDDO 10,000 Op Cap)</p>
<p>Pipeline Citygate (15,000 MDDO 15,000 Op Cap)</p>	<p>Pipeline Citygate (30,000 MDDO 35,000 Op Cap)</p>
<p>Total (50,000 MDDO 60,000 Op Cap)</p>	

- Can they get you the supply you have contracted for?
- Can they get it through the gate?

### Solutions

- Mainline expansion
- Upgrade the meter station
- Realignment of MDDO



## Where is the deficiency?

- Do you have enough mainline capacity?
- Is it a gate station design issue?
- What is your demand behind the gate?

### Solutions

- Distribution system enhancements
  - High pressure looping
  - New gate station
- Recall capacity releases
- Acquire additional pipeline capacity
  - Existing
  - Expansion
- Storage
  - On system vs. Off System
- Peaking agreements

### Avista Issue

Avista Gate	Avista Demand (5,000 Dth/d)
Avista Gate	Avista Demand (18,000 Dth/d)
Avista Gate	Avista Demand (17,000 Dth/d)
	Total 40,000 Dth/d



# Solving Unserved Demand

# When unserved demand does show up.....

There are few questions we need to ask:

1. Why is the demand unserved?
2. What is the magnitude of the short? (i.e Are we 1 Dth or 1000 Dth's short?)
3. What are my options to meet it?



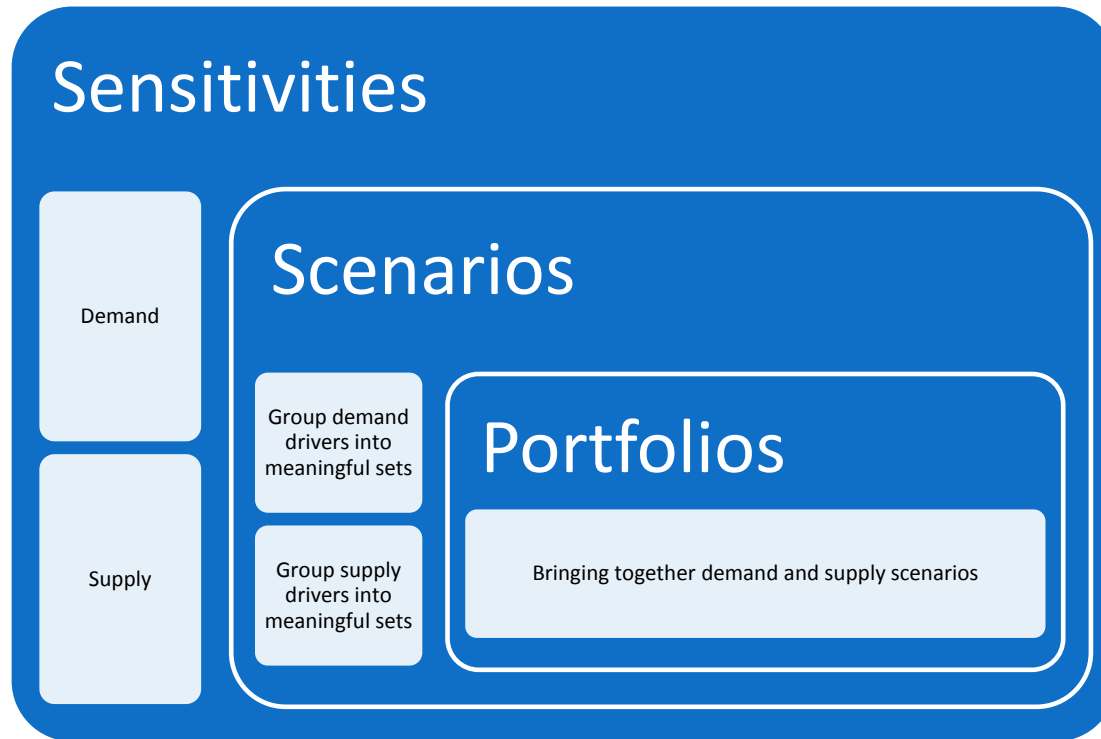
## When current resources don't meet demand what do we consider?

- Transport capacity release recalls
- “Firm” backhauls
- Contract for existing available transportation
- Expansions of current pipelines
- Peaking arrangements with other utilities (swaps/mutual assistance agreements) or marketers
- In-service territory storage
- Satellite/Micro LNG (storage inside service territory)
- Large scale LNG with corresponding pipeline build into our service territory
- Structured products/exchange agreements delivered to city gates
- Biogas
- Avista distribution system enhancements
- Demand side management

# New Resource Risk Considerations

- Does it get supply to the gate?
- Is it reliable/firm?
- Does it have a long lead time?
- How much does it cost?
  - New build vs. depreciated cost
  - The rate pancake
- Is it a base load resource or peaking?
- How many dekatherms do I need?
- What is the “shape” of resource?
- Is it tried and true technology, new technology, or yet to be discovered?
- Who else will be competing for the resource?

# Sensitivities, Scenarios, Portfolios



# Supply Scenarios from the 2012 IRP

<b>Table 5.2</b>
<b>Supply Scenarios</b>
<b>Existing Resources</b>
<b>Existing + Expected Available</b>
<b>GTN Fully Subscribed</b>

# Supply Scenarios for the 2014 IRP

Supply Scenarios
?????
?????
?????
?????

- Do they get gas to the gate?
- Does this affect pricing at the basins?
- Rank the risk of these scenarios.



# Questions?



## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – *February 25*
  - **Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26***
  - SENDOUT® results – *April 23*
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document





# 2014 Avista Natural Gas IRP

Technical Advisory Committee Meeting 3  
March 26, 2014  
Coeur d'Alene, ID



# Agenda

- Introductions & Logistics
- Distribution System Planning
- CNG/NGV Initiatives
- Natural Gas Prices
- Procurement Planning
- Preliminary Results and Scenario Discussion

## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – *February 25*
  - **Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26***
  - DSM CPA results, further SENDOUT® results and Stochastic analysis – *April 23*
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document





# Distribution System Planning

## Terrence Browne, Senior Gas Planning Engineer

Natural Gas Technical Advisory Committee  
March 26, 2014

# Mission

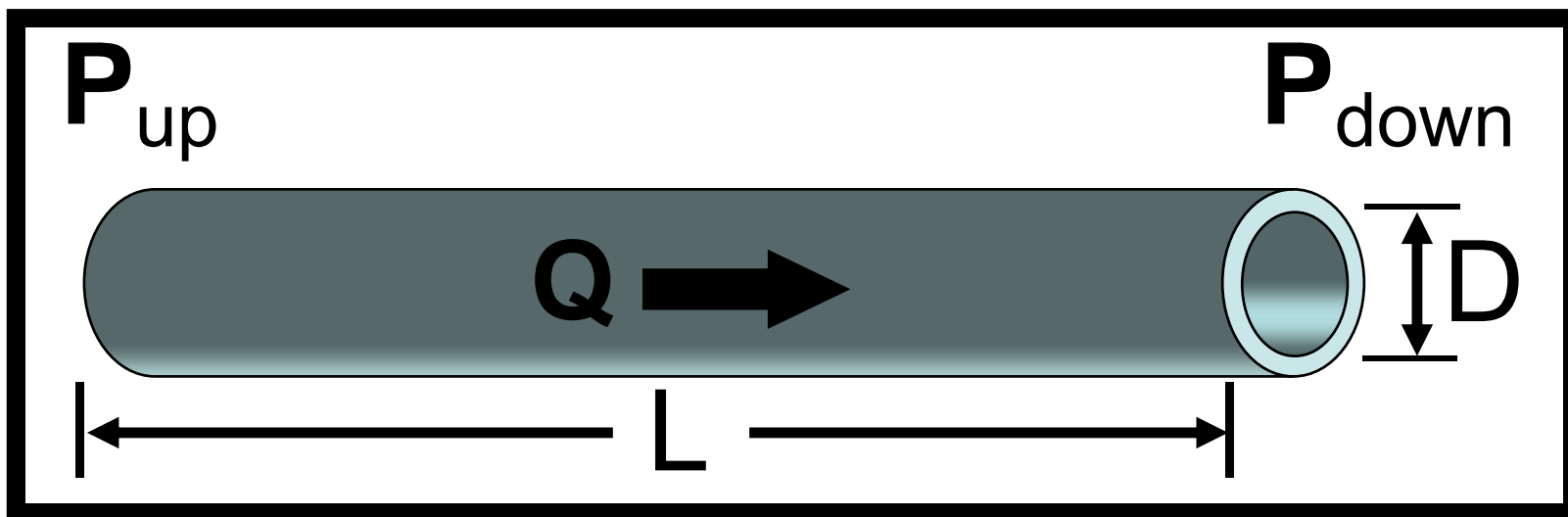
- Using technology to plan and design a safe, reliable, and economical distribution system



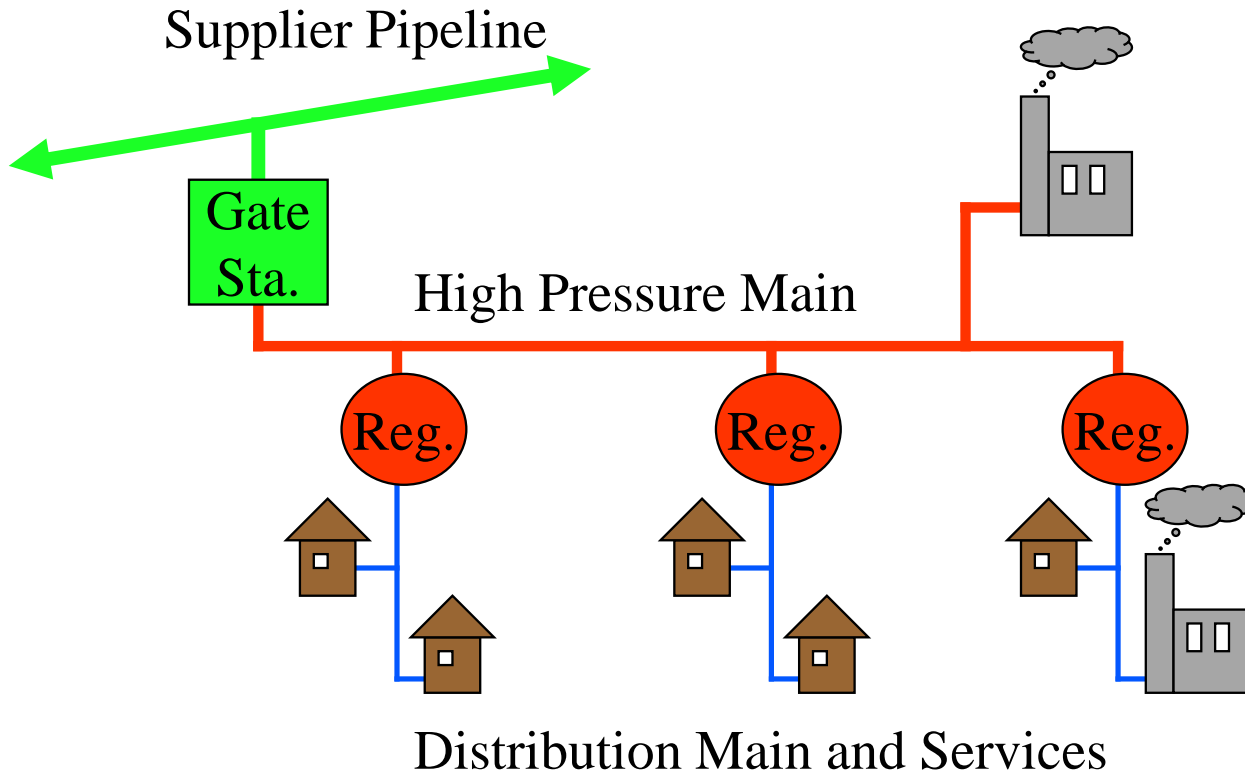
# Gas Distribution Planning Overview

- Scope of Gas Distribution Planning
- SynerGEE Load Study
  - Preparing a Load Study
  - Balancing Model
  - Validating Model
- Planning Criteria
- Interpreting Results
- Long-term Planning Objectives
- Sharing Load Study Results
- Electronic Pressure Recorders
- Project Examples

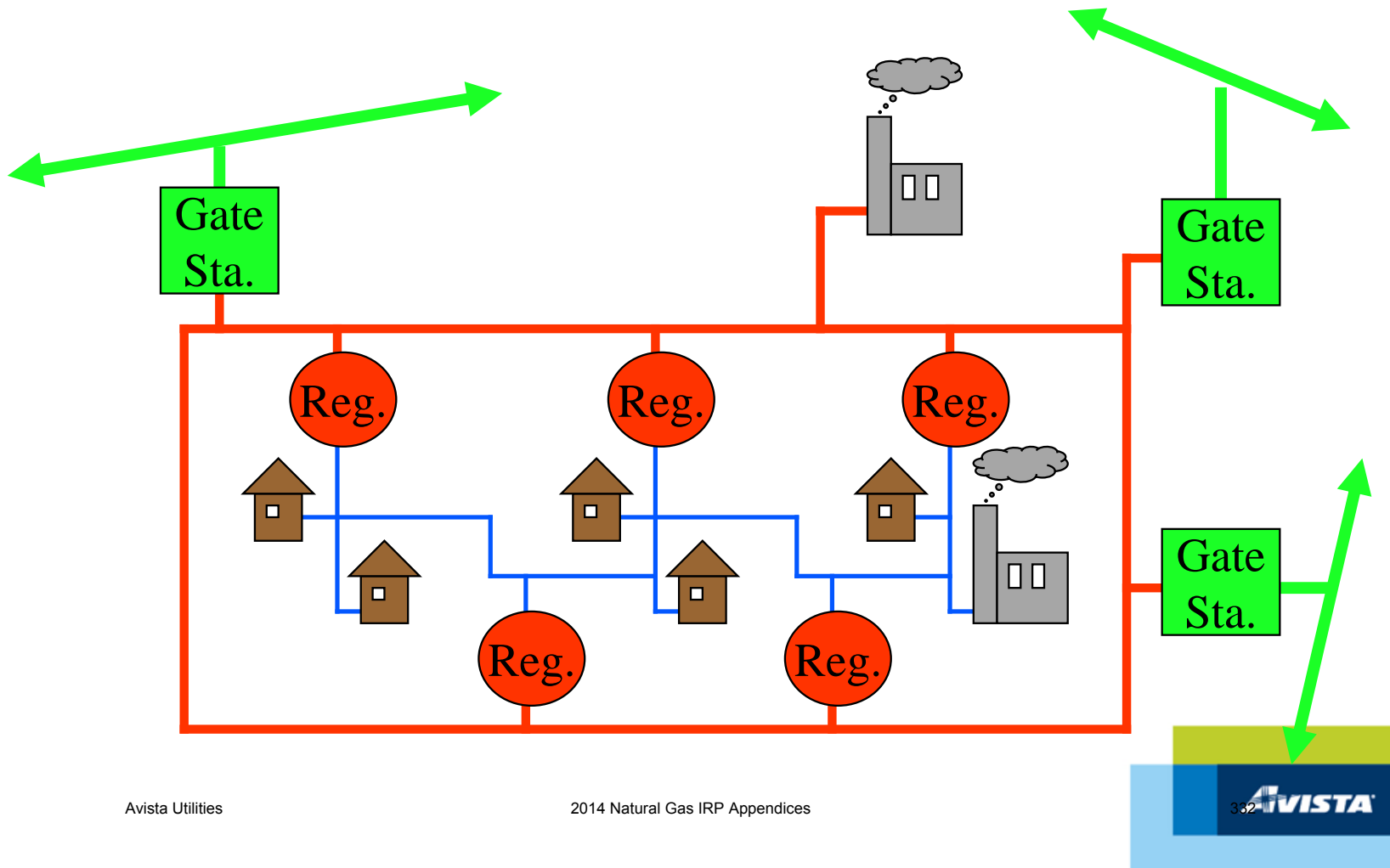
## 5 Variables for Any Given Pipe



# Scope of Gas Distribution Planning



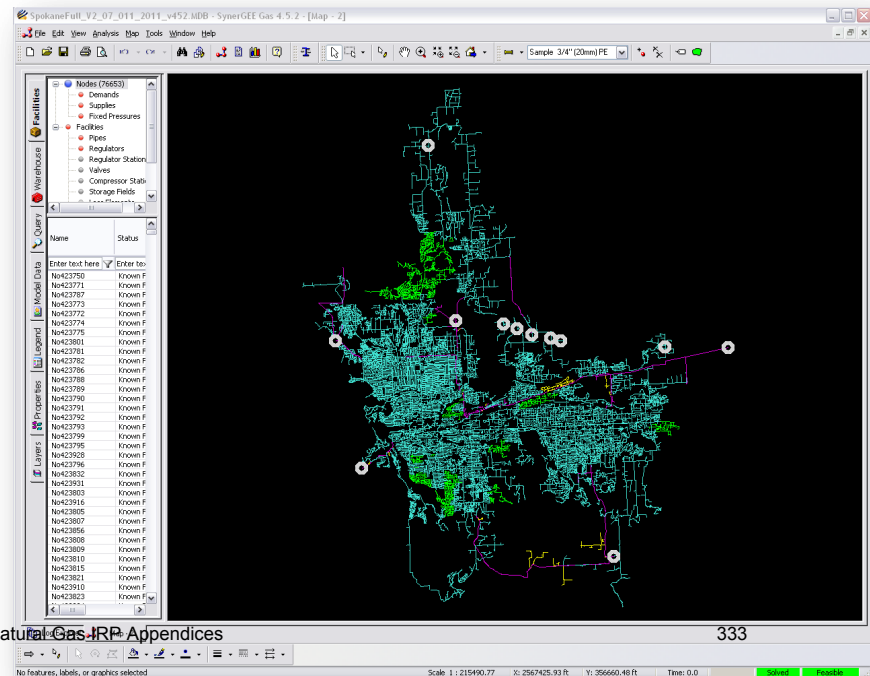
# Scope of Gas Distrib. Planning cont.

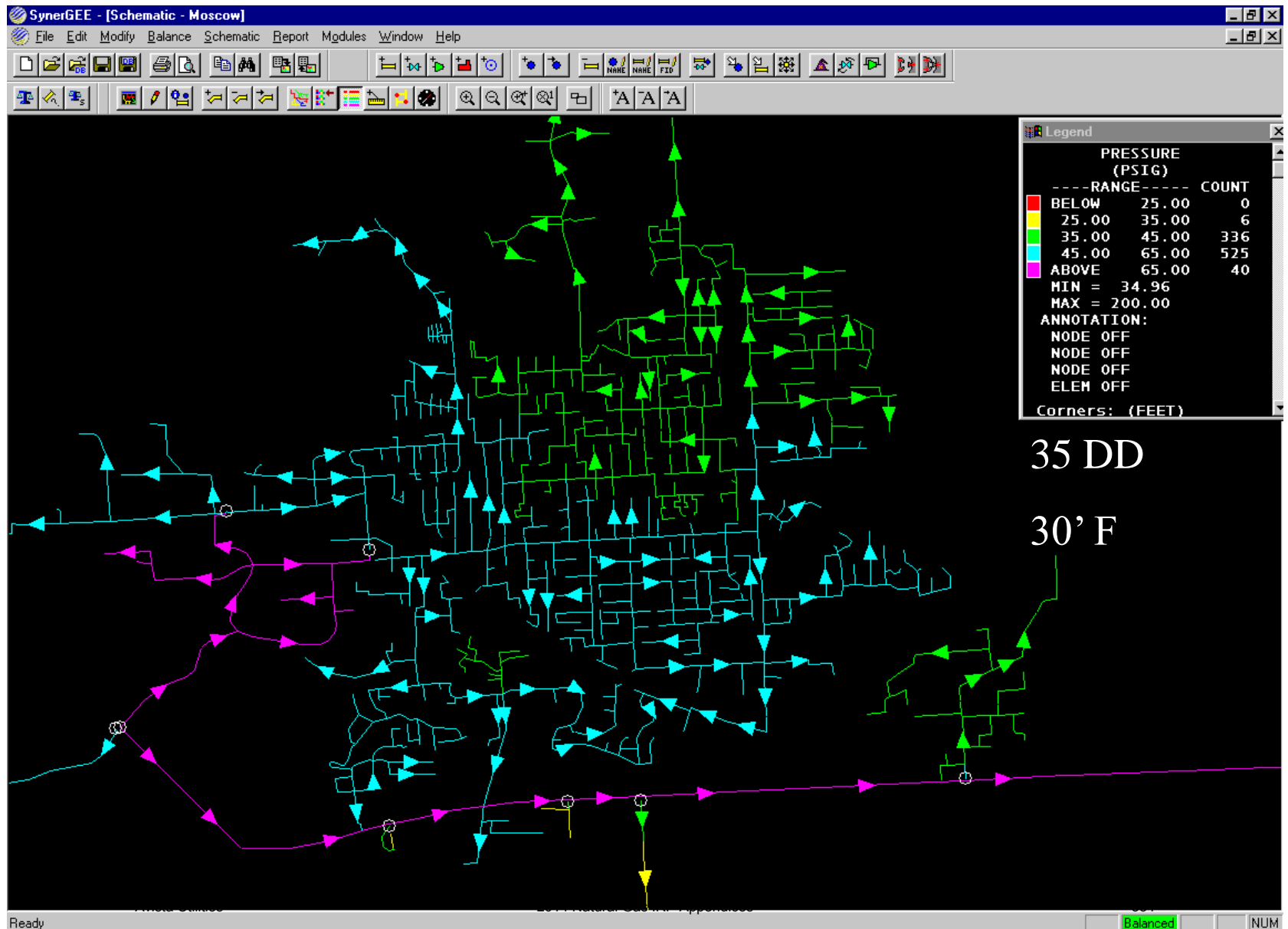




# SynerGEE Load Study

- Simulate distribution behavior
- Identify low pressure areas
- Coordinate reinforcements with expansions
- Measure reliability





# Preparing a Load Study

- Estimating Customer Usage
- Creating a Pipeline Network
- Join Customer Loads to Pipes
- Convert to Load Study



# Estimating Customer Usage

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



# Estimating Customer Usage cont.

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

Avg. Daily Temperature ('Fahrenheit)	Heating Degree Days (HDD)	Cooling Degree Days (CDD)
85		20
80		15
75		10
70		5
<b>65</b>	<b>0</b>	<b>0</b>
60	5	
55	10	
50	15	
45	20	
40	25	
35	30	
30	35	
25	40	
20	45	
15	50	
10	55	
5	60	
4	61	
0	65	
-5	70	
-10	75	
-15	80	
-17	82	

A	B	C	D	E	F	G	H	I
Begin Date	Read Date	RBC	Dys Svc	Deg Dys	Usage	Therm/Day	*DD/day	mcfh/day
01-23-2002	02-22-2002	RR	30	971	2775	92.5	32.36667	0.58
12-21-2001	01-23-2002	RR	33	1195	2567	77.78788	36.21212	0.49
11-20-2001	12-21-2001	RR	31	1028	2547	82.16129	33.16129	0.51
10-24-2001	11-20-2001	RR	27	586	1379	51.07407	21.7037	0.32
09-24-2001	10-24-2001	RR	30	491	1208	40.26667	16.36667	0.25
08-22-2001	09-24-2001	RR	33	67	715	21.66667	2.030303	0.14
07-24-2001	08-22-2001	RY	29	19	432	14.89655	0.655172	0.09
06-22-2001	07-24-2001	RR	32	41	611	19.09375	1.28125	0.12
05-24-2001	06-22-2001	RR	29	219	736	25.37931	7.551724	0.16
04-23-2001	05-24-2001	RY	31	368	1301	41.96774	11.87097	0.26
03-23-2001	04-23-2001	RR	31	734	1913	61.70968	23.67742	0.39
02-22-2001	03-23-2001	RR	29	826	2538	87.51724	28.48276	0.55
01-24-2001	02-22-2001	RY	29	1113	3153	108.7241	38.37931	0.68
12-19-2000	01-24-2001	RY	36	1347	3668	101.8889	37.41667	0.64
11-16-2000	12-19-2000	RY	33	1340	3573	108.2727	40.60606	0.68
10-18-2000	11-16-2000	RR	29	884	2424	83.58621	30.48276	0.52
09-20-2000	10-18-2000	RR	28	408	1738	62.07143	14.57143	0.39
08-22-2000	09-20-2000	RY	29	169	1139	39.27586	5.827586	0.25

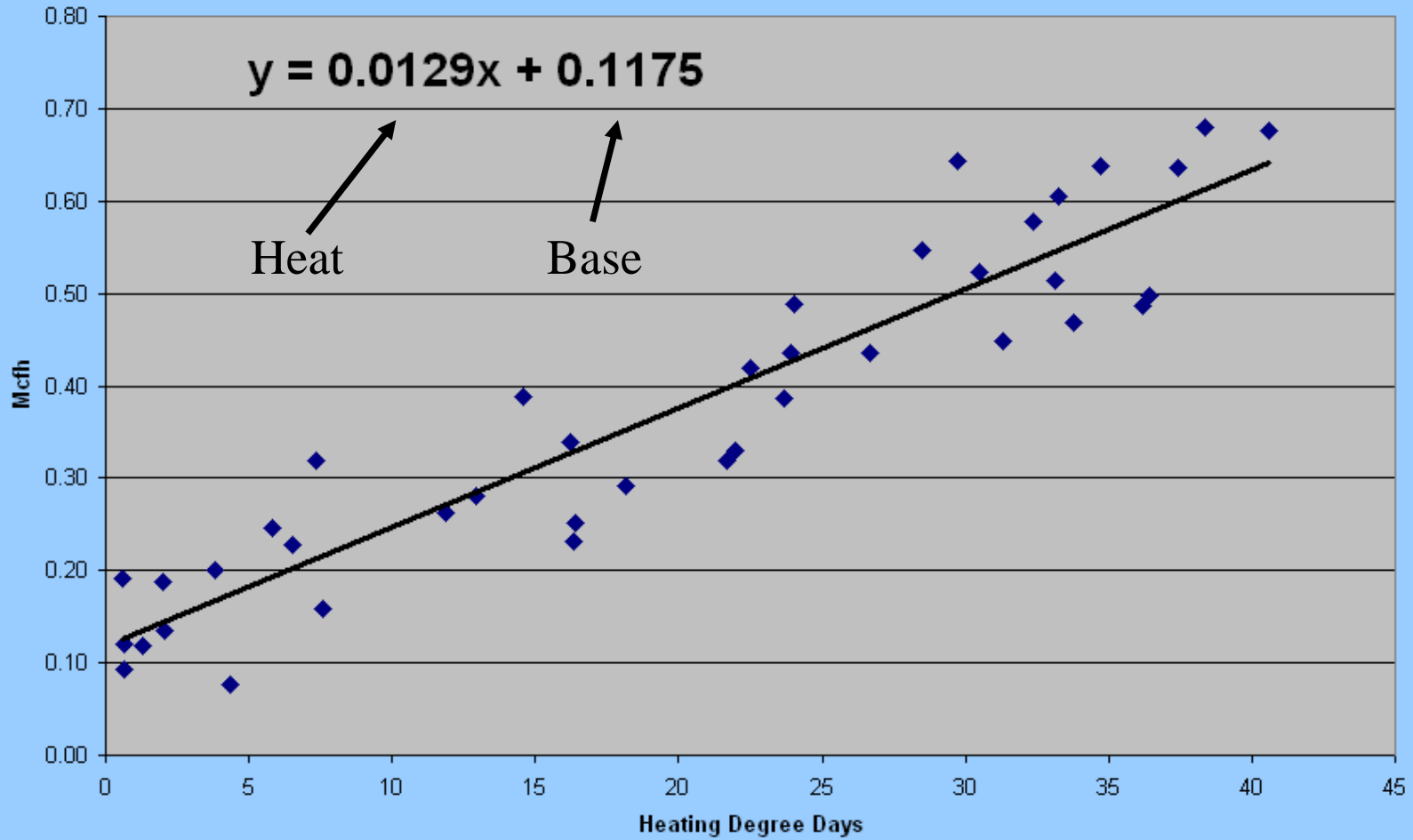
Avista Utilities

2014 Natural Gas IRP Appendices

338

Summary / 109735 / 103678 / 114268 / 114279 / Chart1 / 133049 / 156920 / 161549 / 208478 /

### Load vs. Temperature



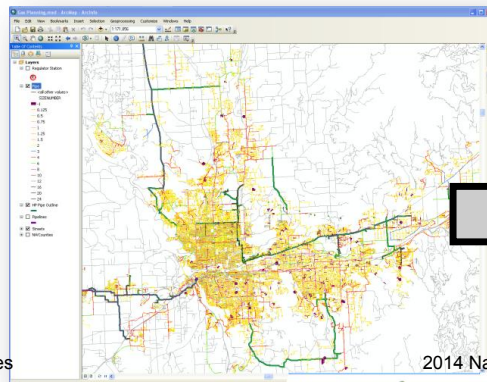
## Estimating Customer Usage cont.

- Peaking Factor
  - Peaking Factor = 6.25% of daily load
  - “Observed ratio” of greatest hourly flow to total daily flow at Gate Stations
- Industrial Customers
  - Model maximum hourly usage per Contractual Agreement
  - Firm Transportation customers only
  - Low Temperature-Usage correlation



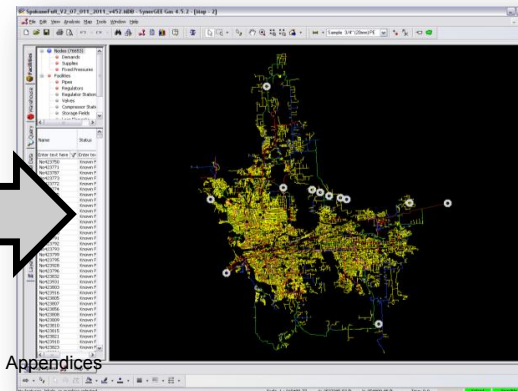
# Creating a Pipeline Network

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



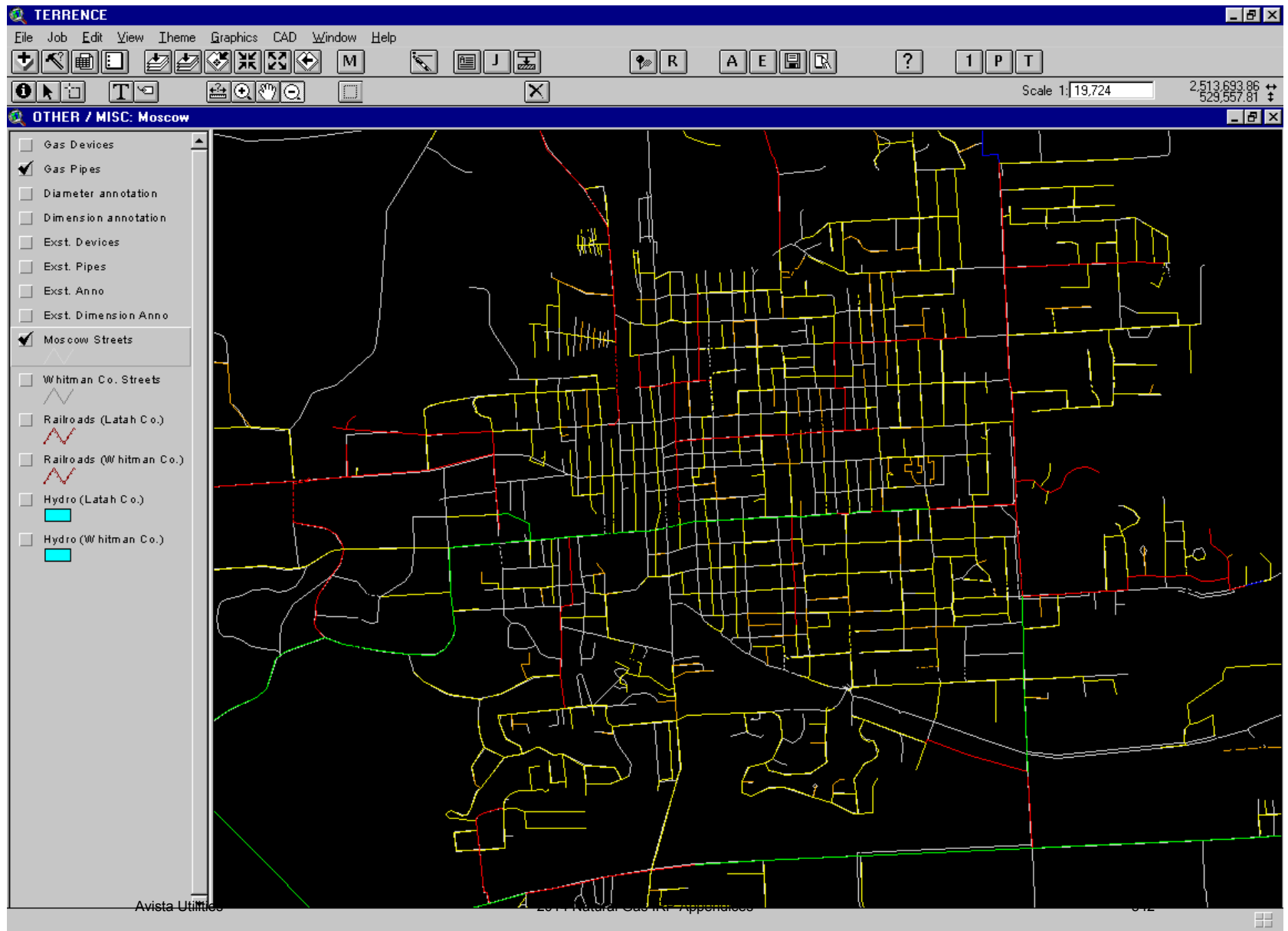
Avista Utilities

2014 Natural Gas IRP Appendices



341

AVISTA



**TERRENCE**

File Job Edit View Theme Graphics CAD Window Help

Scale 1: 26,170 2,526,466.09 532,193.61

**Attributes of Gas Pipes**

Length	Gas	Gas_id	Equip_type	Equip_sub	Equipment	Cased_ind	Lock_id	Phase_id	Object_id	Ver_id	Ver_end	Did	Diameter	Year_inst	Joint_use	
608.82431	4	1	GLS	MPLN	650089771	N	0	0	0	0	0	0	4.00	1999	JT/N	
679.06094	5	1	GLS	MPLN	650089772	N	0	0	0	0	0	0	2.00	1999	JT/N	
1463.75313	6	1	GLS	MSLN	650089774	N	0	0	0	0	0	0	2.00	1999	JT/N	
193.35819	6	1	GLS	MSLN	650089775	N	0	0	0	0	0	0	2.00	1999	JT/N	
435.19989	9	2	GLS	MPLN	650089776	N	0	0	0	0	0	0	2.00	1999	JT/N	
1090.20677	10	1	GLS	MPLN	650089781	N	0	0	0	0	0	0	4.00	1999	JT/N	
522.75341	11	2	GLS	MPLN	650089782	N	0	0	0	0	0	0	2.00	1999	JT/N	
1255.57481	12	2	GLS	MPLN	650089783	N	0	0	0	0	0	0	4.00	1999	JT/N	
822.95617	13	3	GLS	MPLN	650089784	N	0	0	0	0	0	0	4.00	1999	JT/N	
845.53503	14	2	GLS	MSLN	650089785	N	0	0	0	0	0	0	2.00	1999	JT/N	
269.16499	15	3	GLS	MSLN	650089786	N	0	0	0	0	0	0	2.00	1999	JT/N	

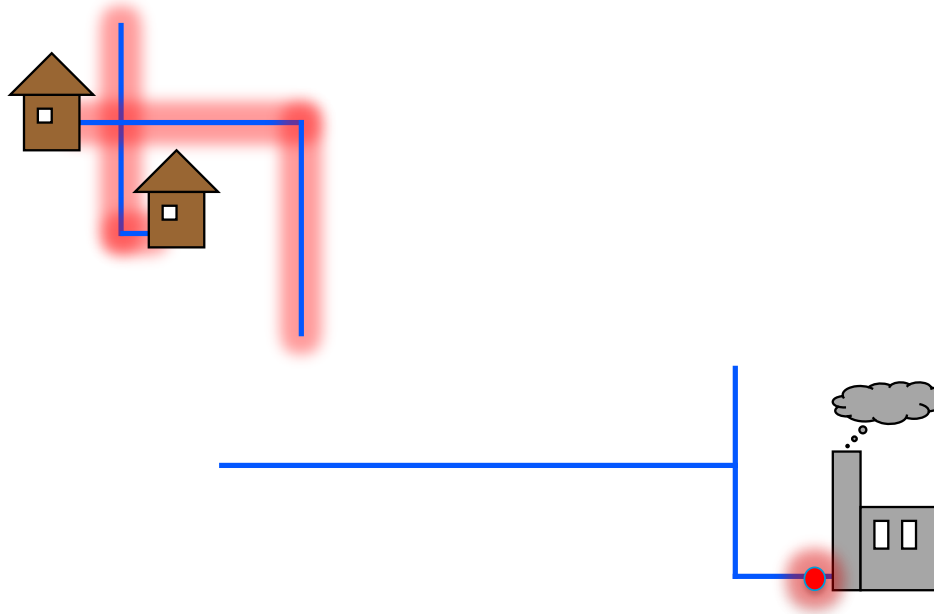
**OTHER / MISC: Moscow**

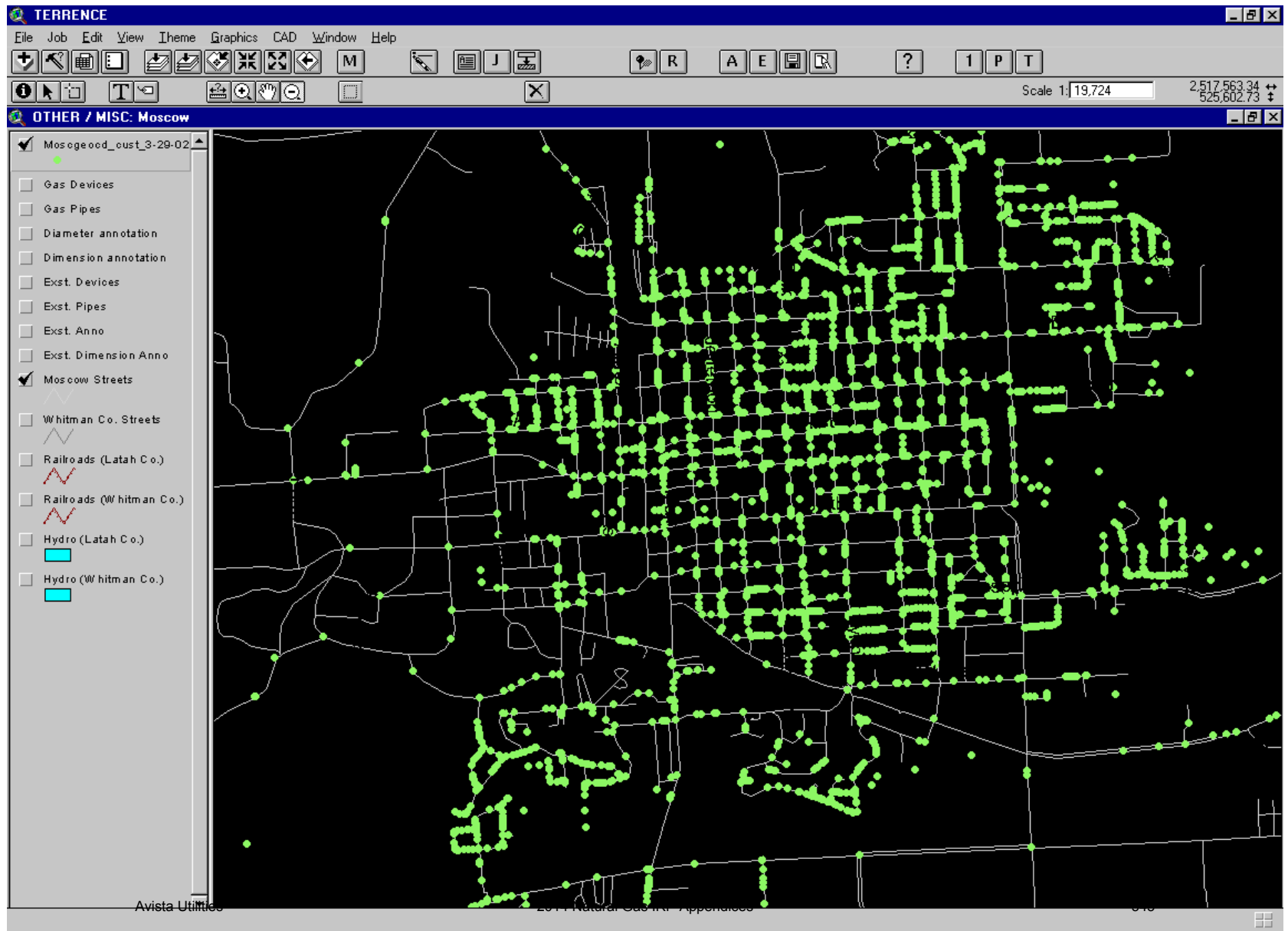
- Gas Devices
- Gas Pipes
- Diameter annotation
- Dimension annotation
- Exst. Devices
- Exst. Pipes
- Exst. Anno
- Exst. Dimension Anno
- Moscow Streets
- Whitman Co. Streets
- Railroads (Latah Co.)
- Railroads (Whitman Co.)
- Hydro (Latah Co.)
- Hydro (Whitman Co.)

Aviata Utilities 2014 Natural Gas IRP Appendices 343

# Join Customer Loads to a Model

- Residential and commercial loads are assigned to ***pipes***
- Industrial or other large loads are assigned to ***nodes***





**TERRENCE**

File Job Edit View Theme Graphics CAD Window Help

Scale 1: 26,170 2,512,479.69 533,887.53

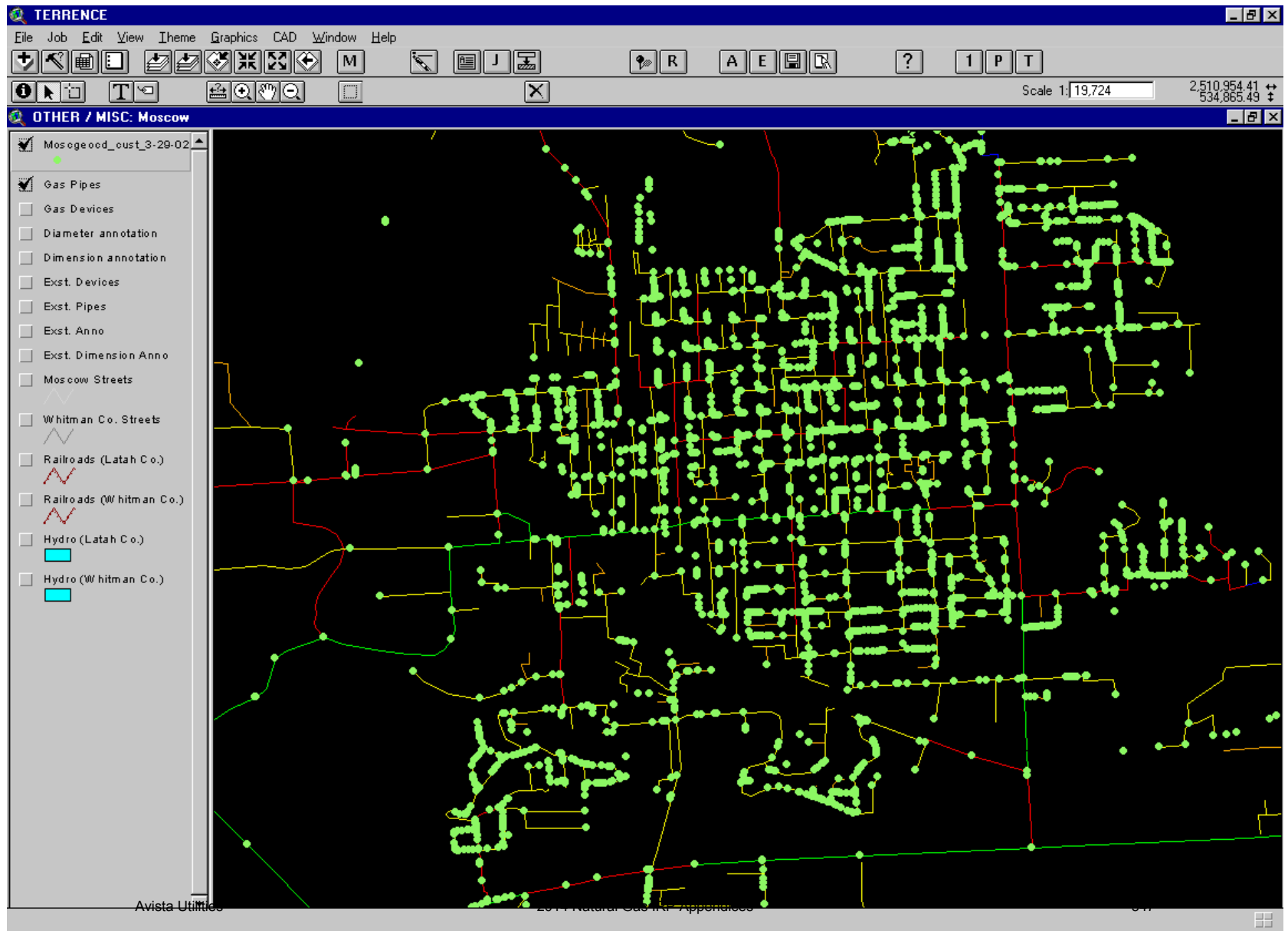
Attributes of Moscgeood\_cust\_3-29-02.shp

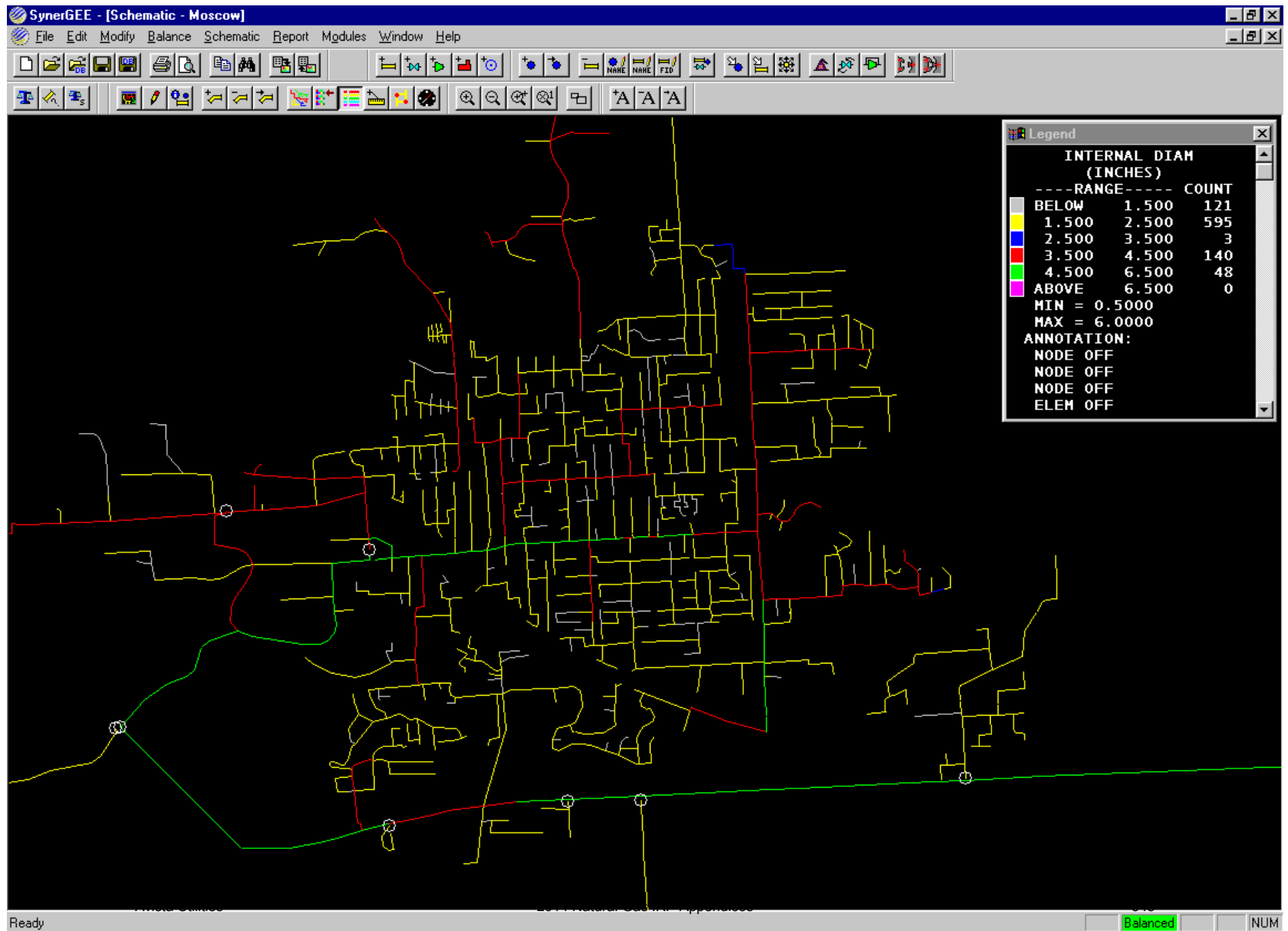
Matched_id	Customer_n	House_num	Street_name	Rural_sry	G	Geocod_g	Aug_usage	Aug_days_o	Aug_degree	Aug_date
False	U OF I			U OF I LIFE SCIENCE BLDG	G		586.000000	31.000000	32.000000	2001-08-27 01
False	U OF I			MINES 7TH ST & LINE ST	G		0.000000	31.000000	32.000000	2001-08-27 01
False	U OF I			ART & ARCH BLDG	G		210.000000	31.000000	32.000000	2001-08-27 01
False	UNIVERSITY OF IDAHO			ANIMAL DISEASE RESEARCH	G		4558.000000	31.000000	32.000000	2001-08-27 01
False	U OF I			AQUACULTURE INSTITUTE	G		92.000000	31.000000	32.000000	2001-08-27 01
False	U OF I			POULTRY	G		0.000000	31.000000	32.000000	2001-08-27 01
False	U OF I			KIBBIE STADIUM	G		688.000000	31.000000	32.000000	2001-08-27 01
False	B P O E NO 249	3080	HIGHWAY 8		G		6.000000	28.000000	17.000000	2001-08-20 01
False	B P O E NO 249	3080	HIGHWAY 8		G		71.000000	28.000000	17.000000	2001-08-20 01
False	U OF I			MACHINE SHED	G		0.000000	29.000000	17.000000	2001-08-20 01
False	JAMESON COMMERCIAL PR			PEPPERMILL/DR BOWEN	G		9.000000	23.000000	32.000000	2001-08-07 01

**OTHER / MISC: Moscow**

- Moscgeood\_cust\_3-29-02
- Gas Devices
- Gas Pipes
- Diameter annotation
- Dimension annotation
- Exst. Devices
- Exst. Pipes
- Exst. Anno
- Exst. Dimension Anno
- Moscow Streets
- Whitman Co. Streets
- Railroads (Latah Co.)
- Railroads (Whitman Co.)
- Hydro (Latah Co.)
- Hydro (Whitman Co.)

Aviata Utilities 2014 Natural Gas IRP Appendices 346



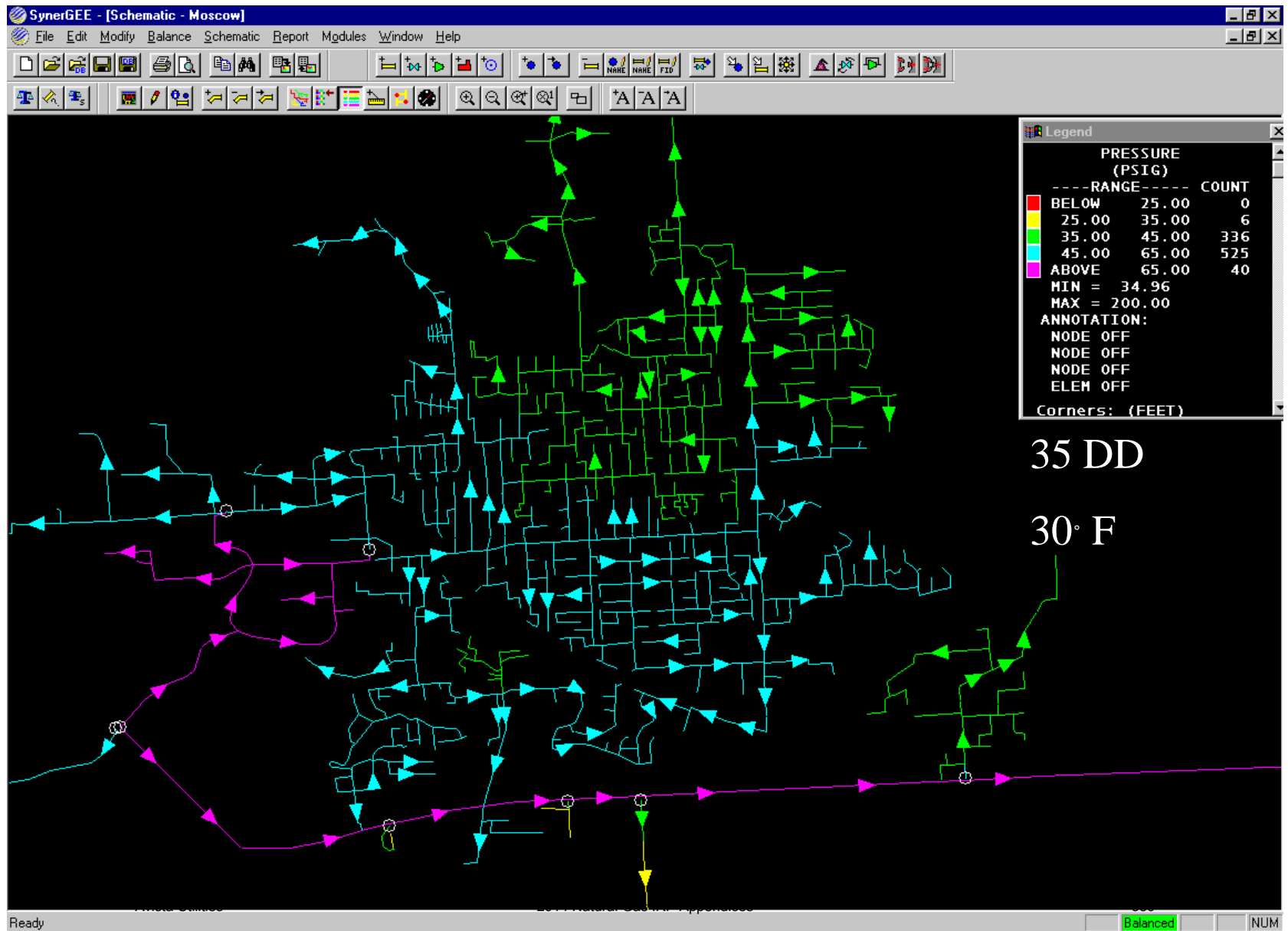




# Balancing Model

- Simulate system for any temperature
  - HDD's
- Solve for pressure at all nodes

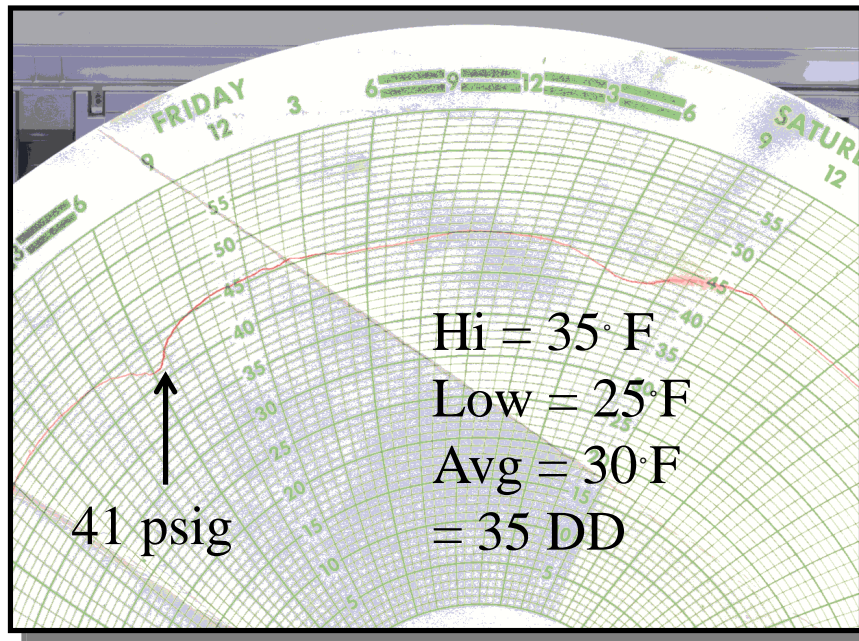
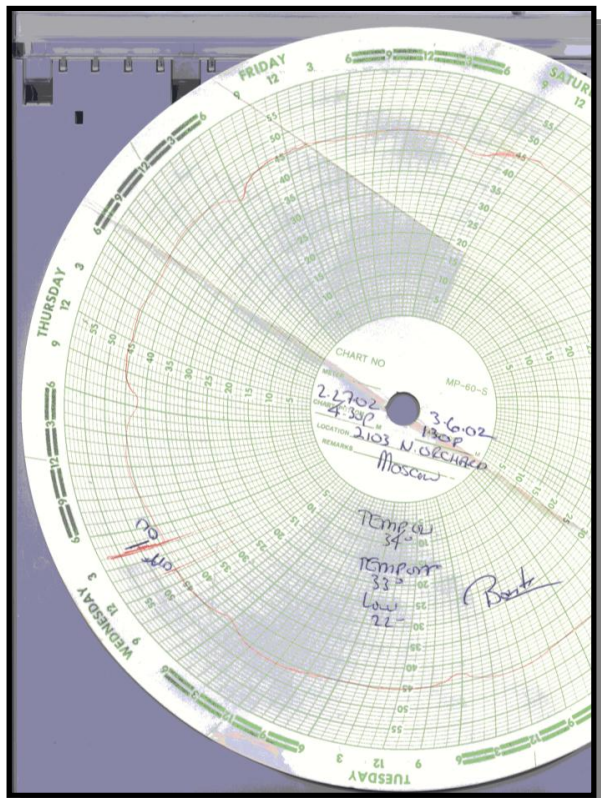




# Validating Model

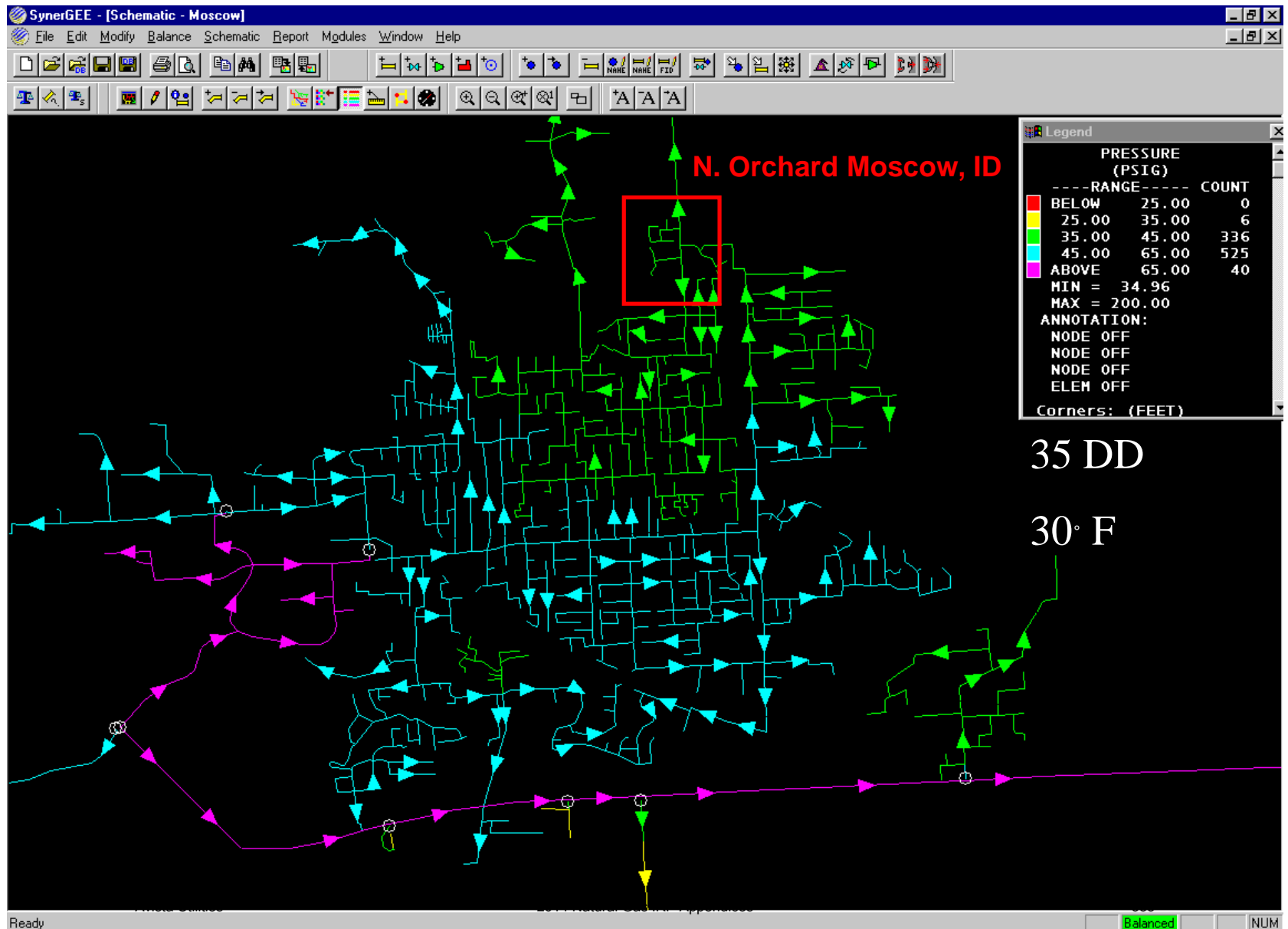
- Simulate recorded condition
- Pressure Recorders
  - Do calculated results match field data?
- Gate Station Telemetry
  - Do calculated results match source data?
- Possible Errors
  - Missing pipe
  - Source pressure changed
  - Industrial loads

# Validating Model cont.



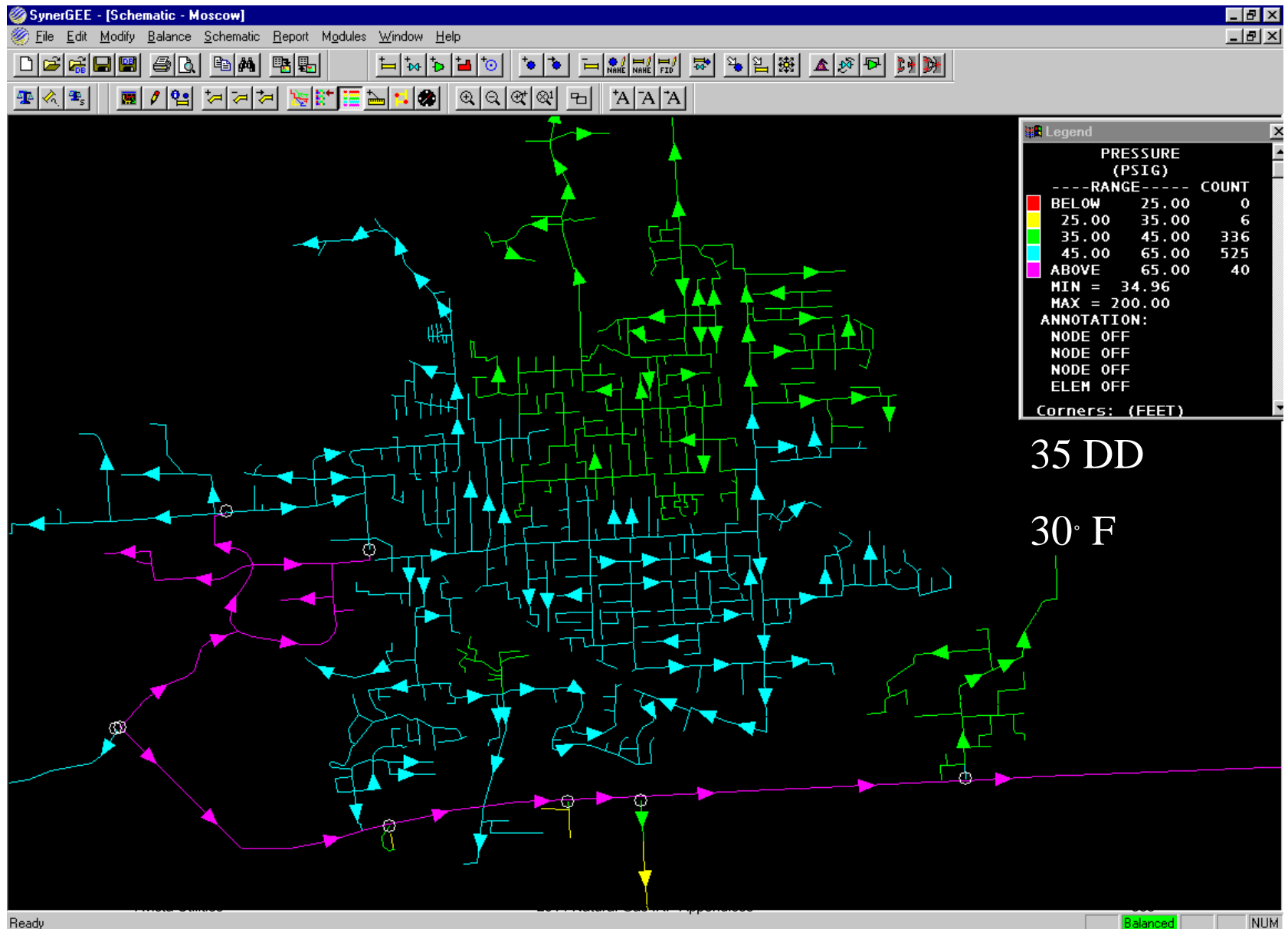
Location: N. Orchard, Moscow ID

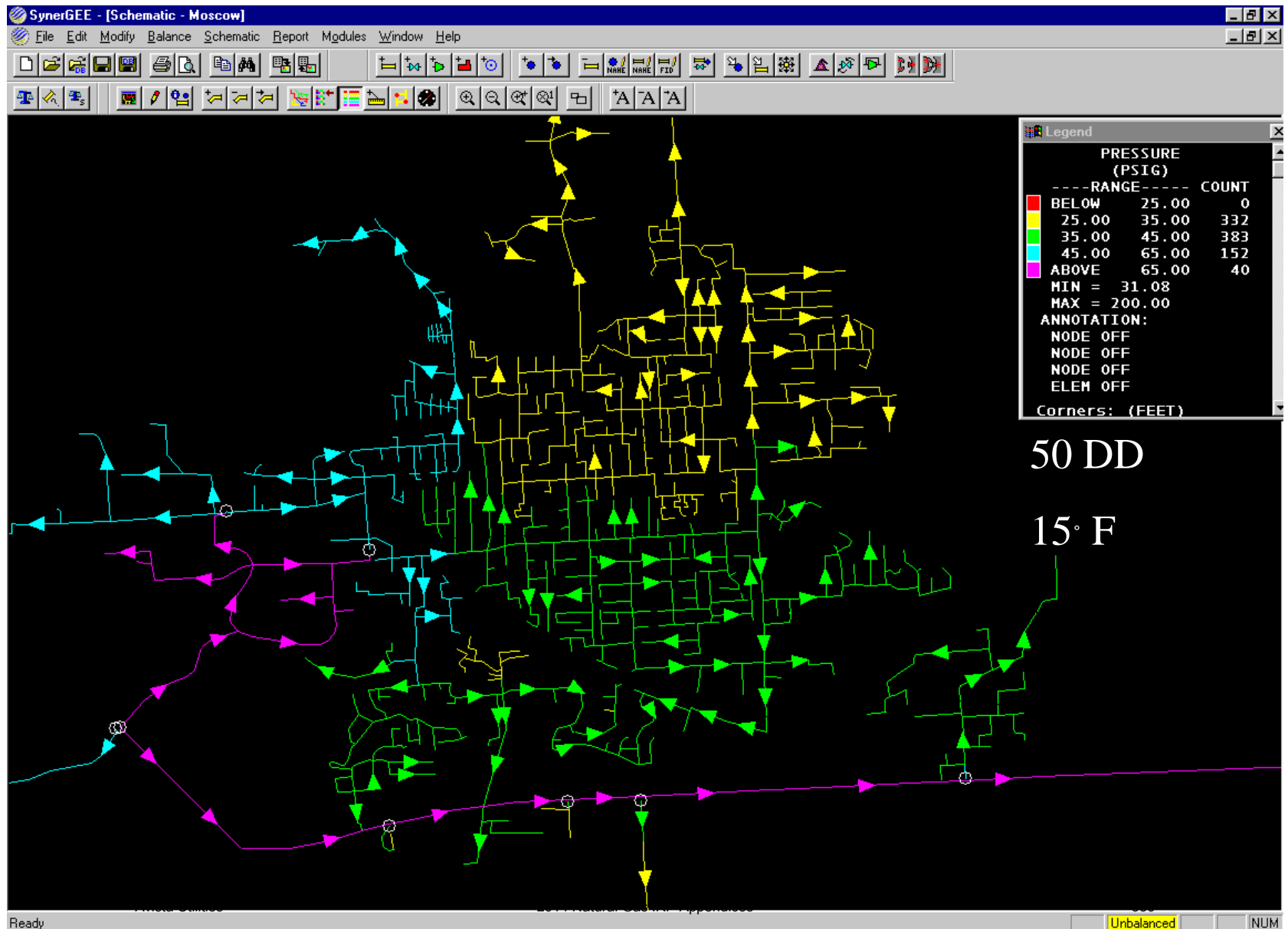
Observation Date: Friday, March 1st



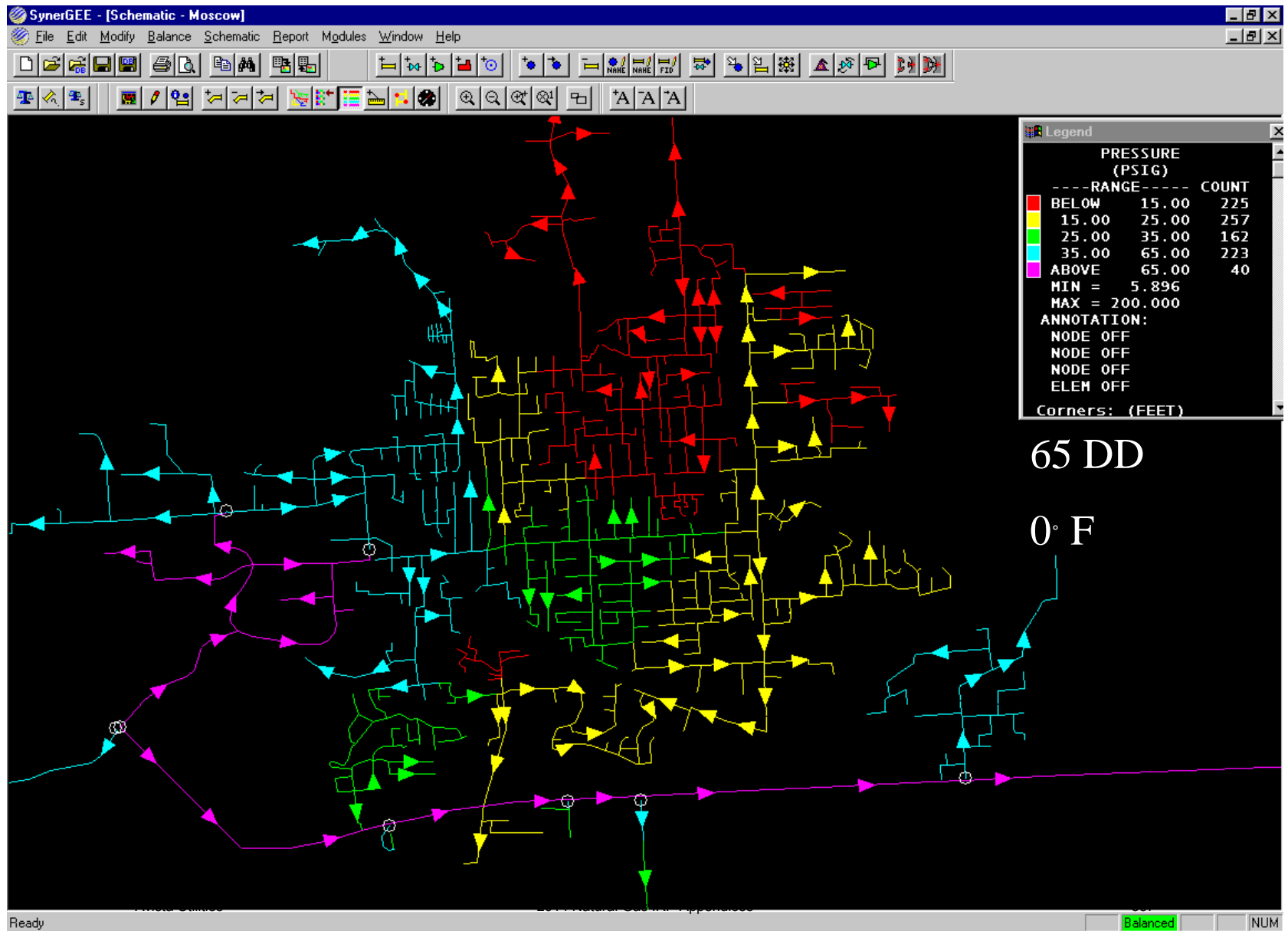
# Planning Criteria

- Reliability during design HDD
  - Spokane 82 HDD
  - Medford 61 HDD
  - Klamath Falls 72 HDD
  - La Grande 74 HDD
  - Roseburg 55 HDD
- Maintain minimum of 15 psig in system at all times
  - 5 psig in lower MAOP areas





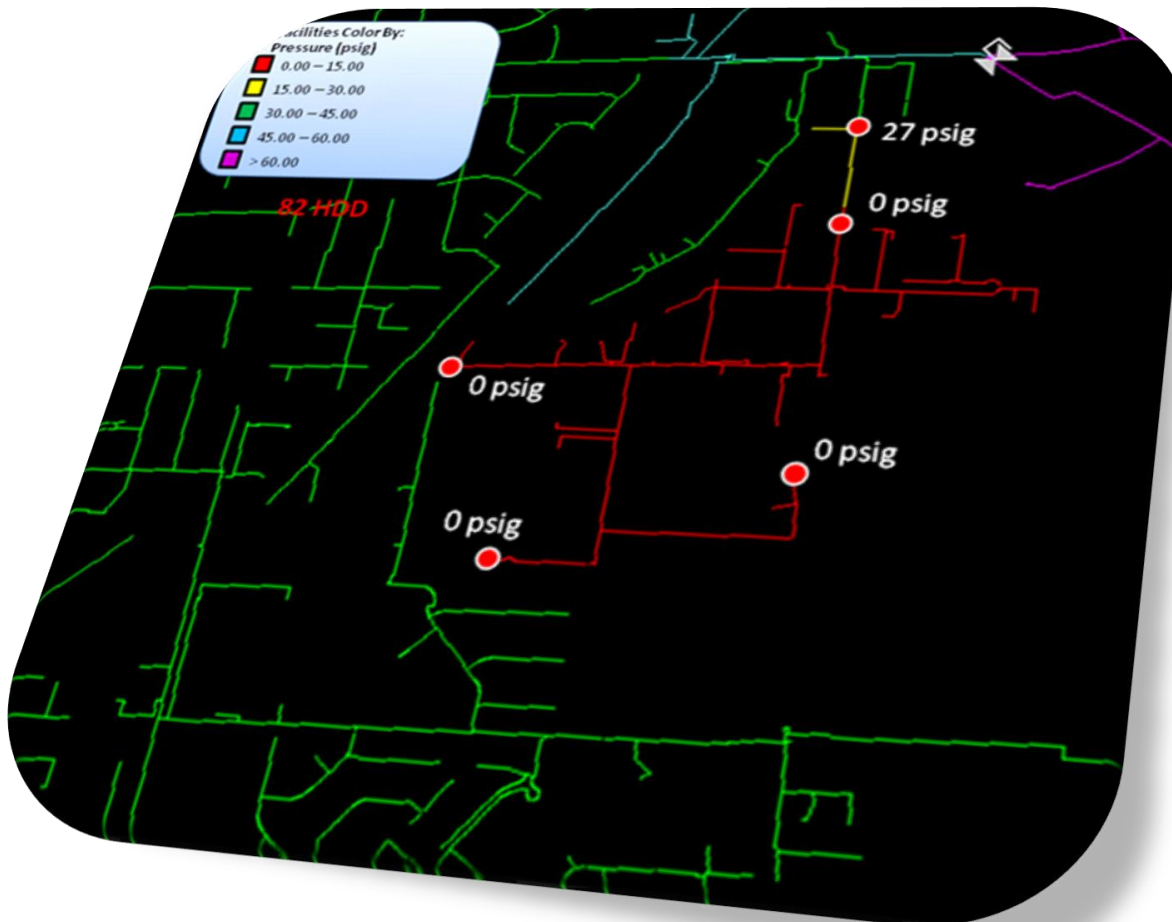


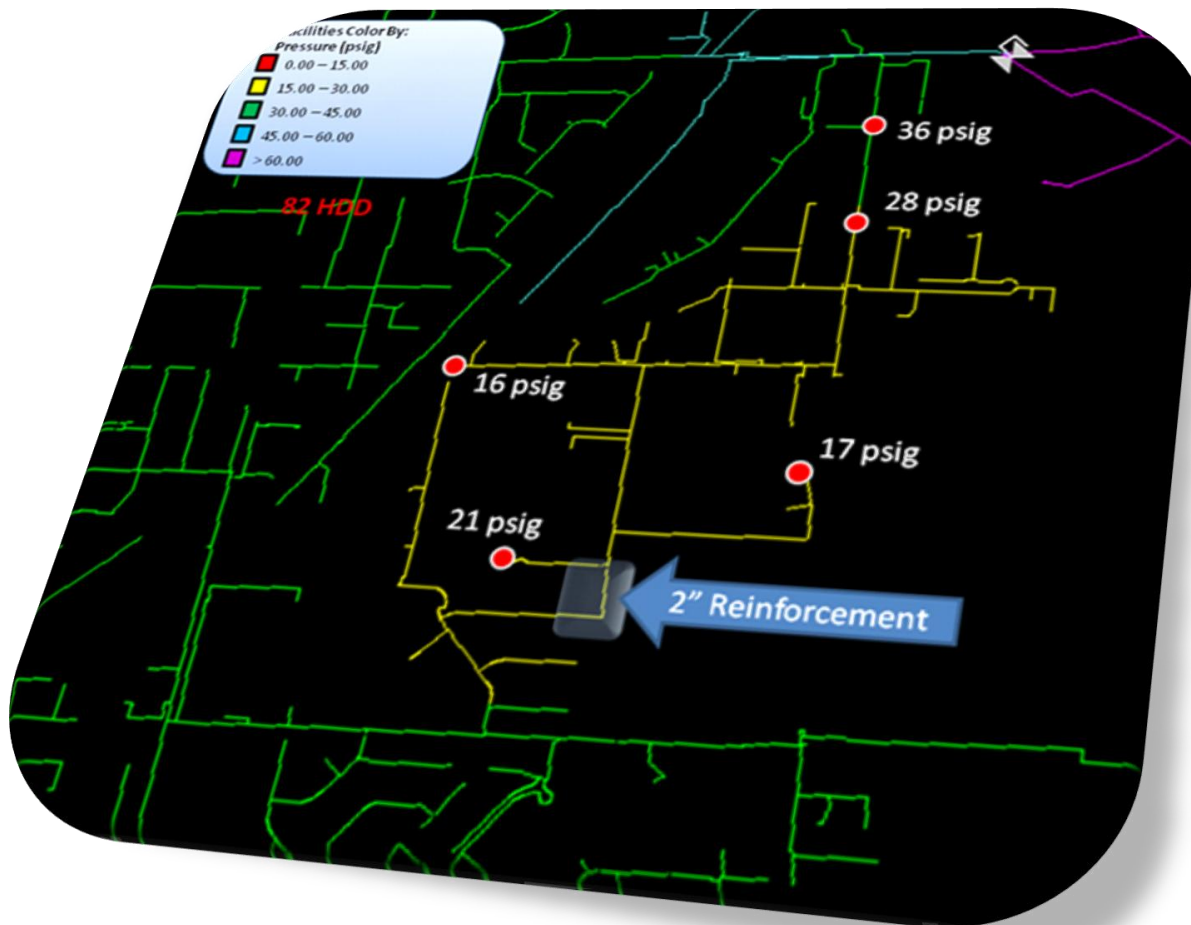


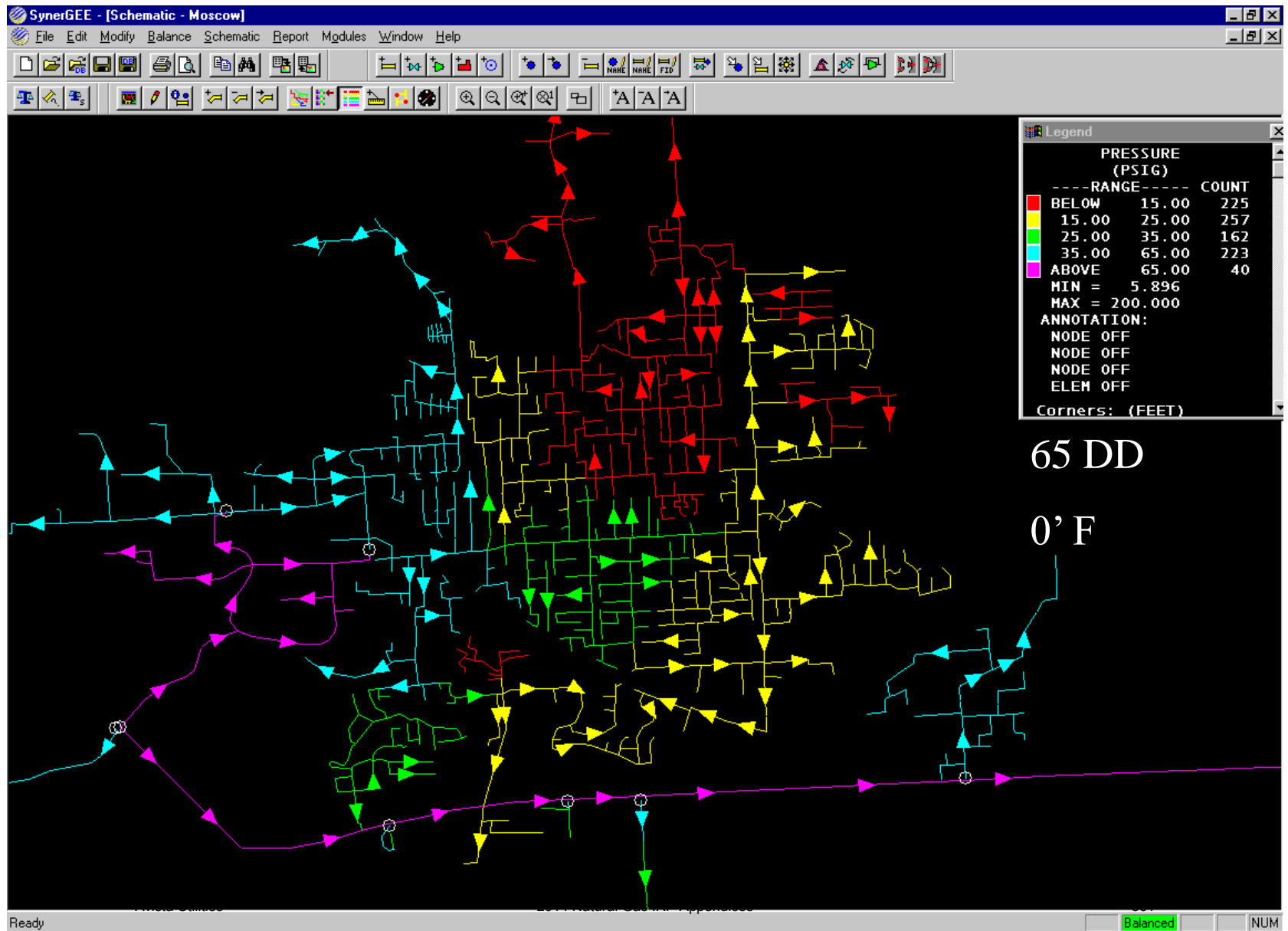
# Interpreting Results

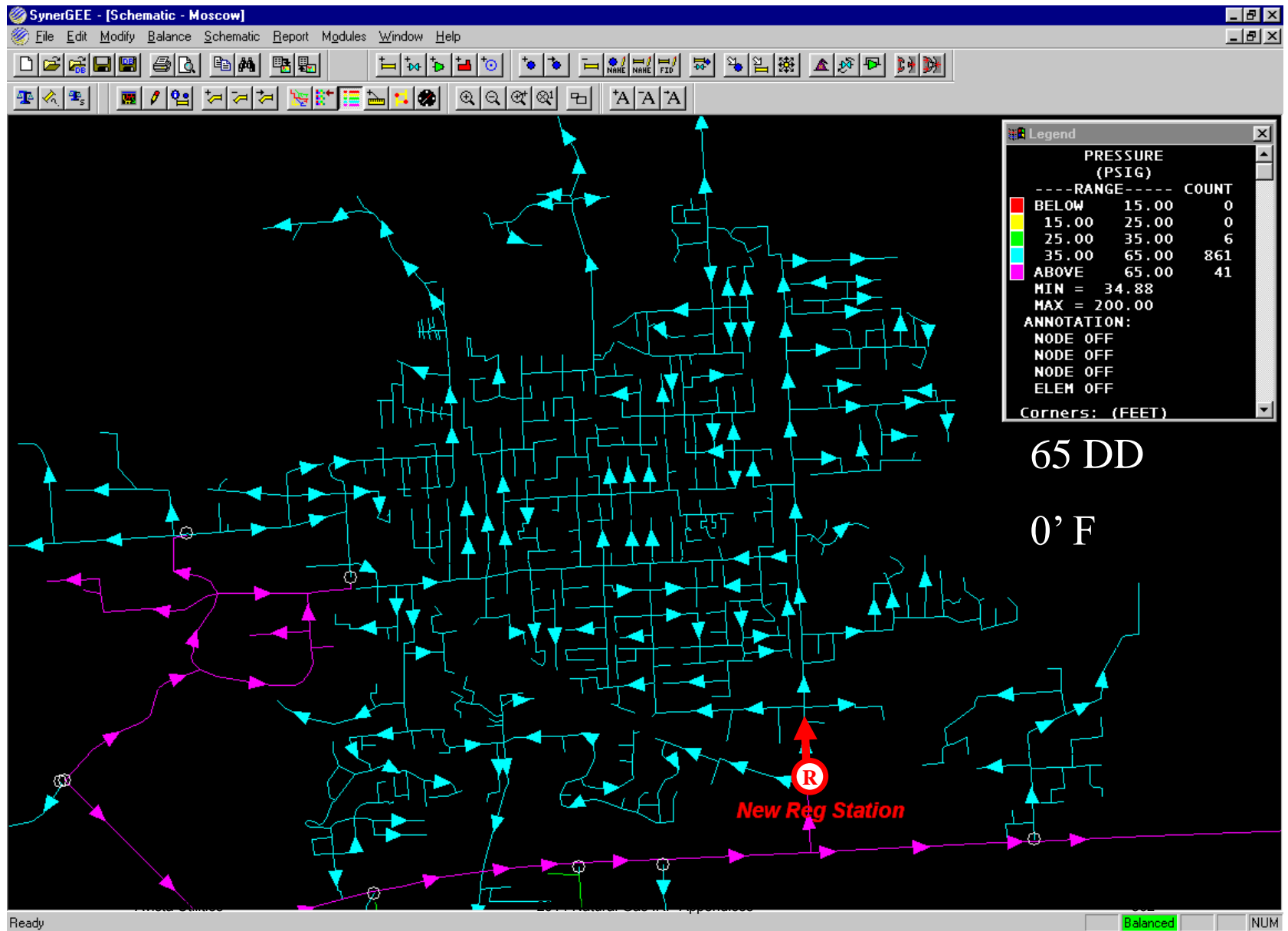
- Identify Low Pressure Areas
  - Number of feeds
  - Proximity to source
- Looking for Most Economical Solution
  - Length (minimize)
  - Construction obstacles (minimize)
  - Customer growth (maximize)

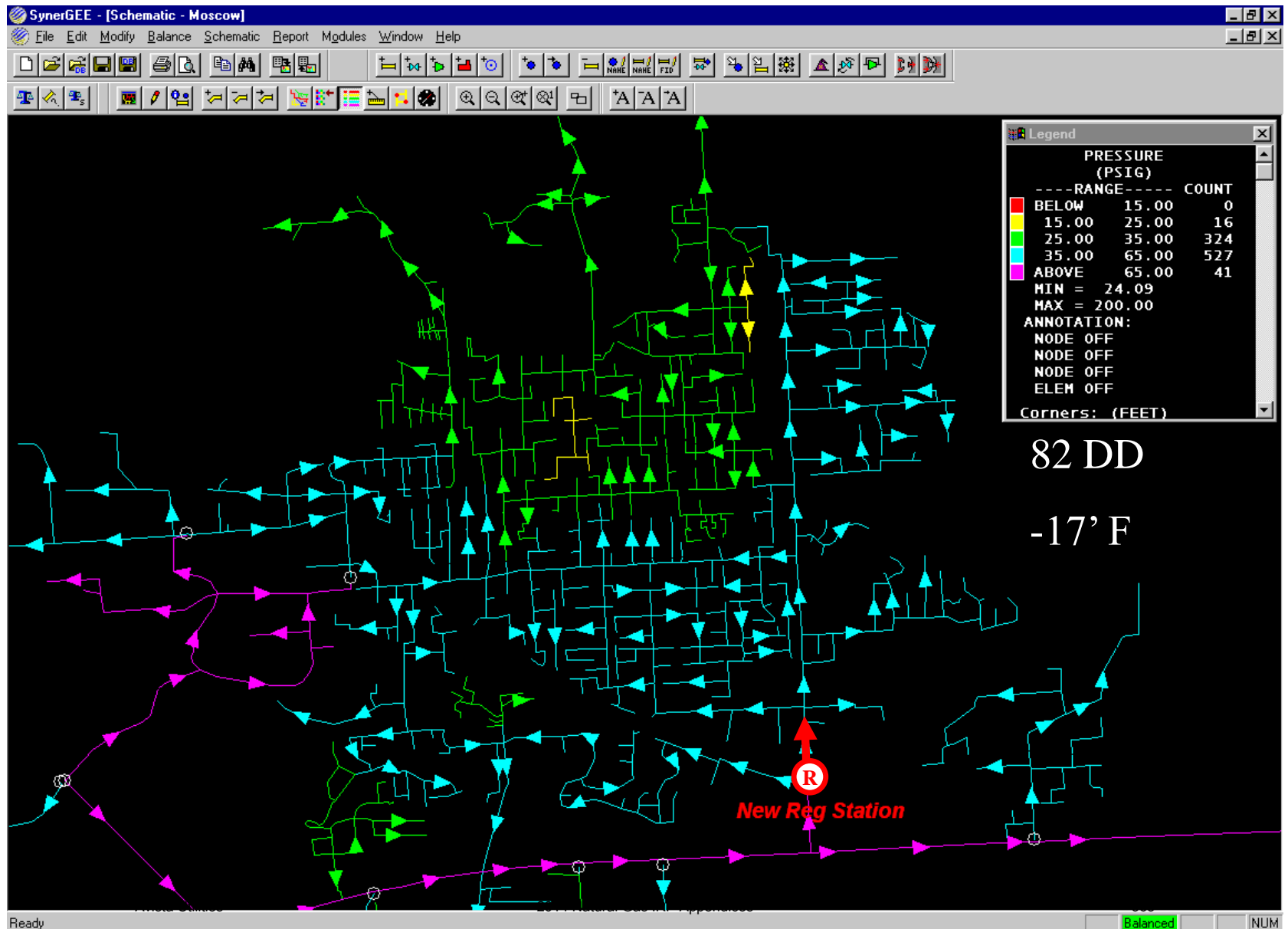












# Long-term Planning Objectives

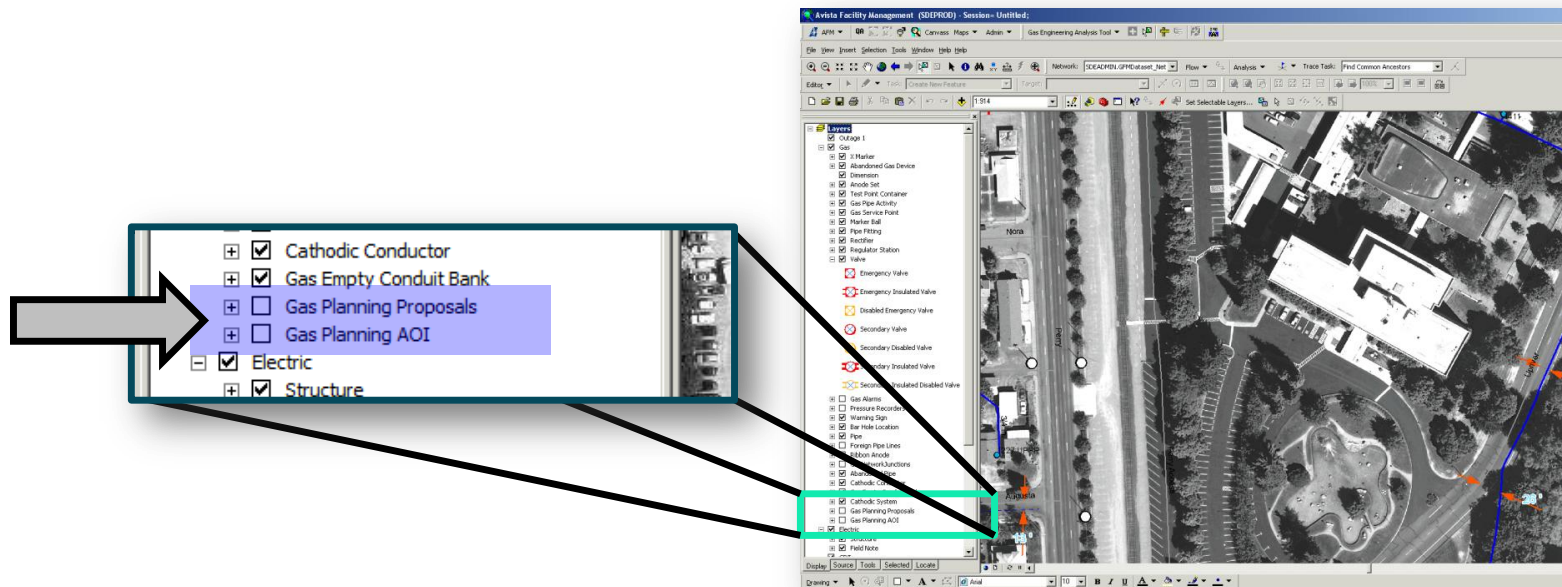
- Future Growth/Expansion
- Design Day Conditions
- Facilitate Customer Installation Targets





# Sharing Load Study Results

- Gas Planning Proposals
- Gas Planning AOI

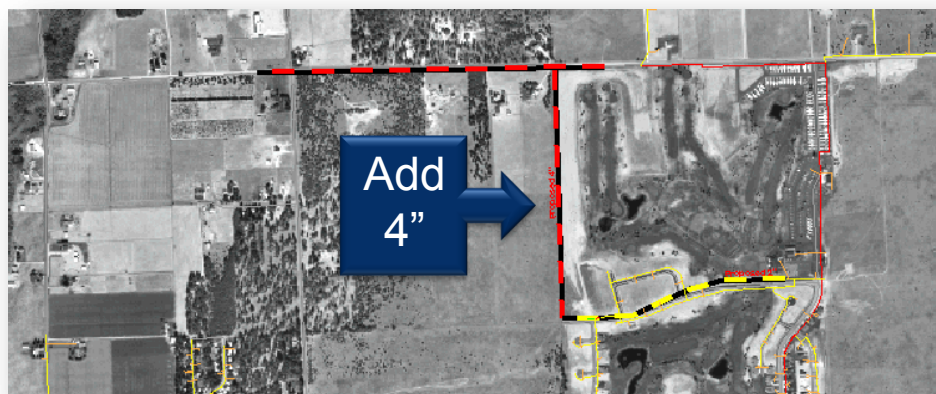


# Gas Planning Proposals

- Proposed pipe - dashed line



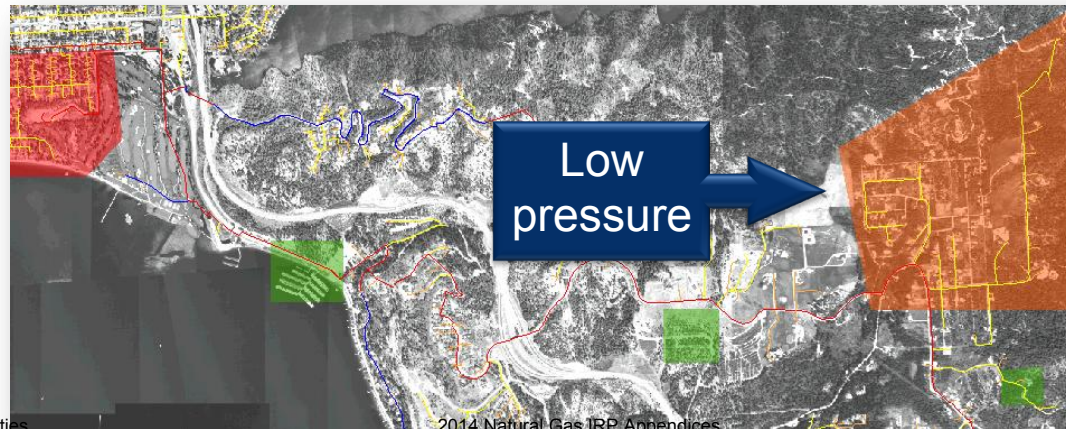
- Gas Planning recommendations for main extensions



# Gas Planning AOI

- Different colors to show the types of areas
- Geographic-specific information to help make decisions

- Gas Planning AOI
- Area Type
- Critical Pressure
- Low Pressure
- Miscellaneous
- New Developments



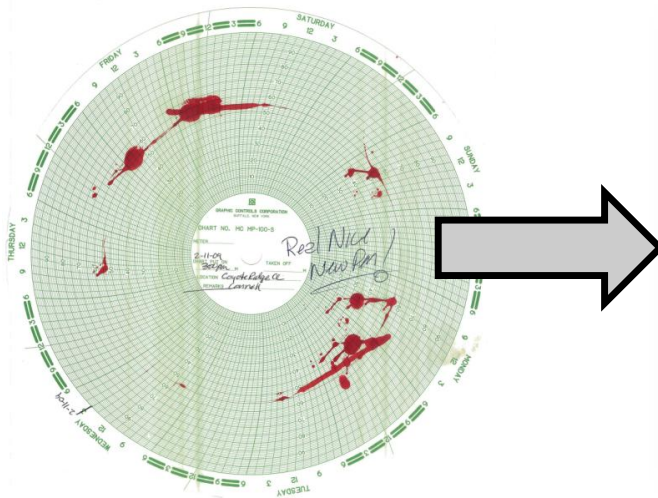
Avista Utilities

2014 Natural Gas IRP Appendices

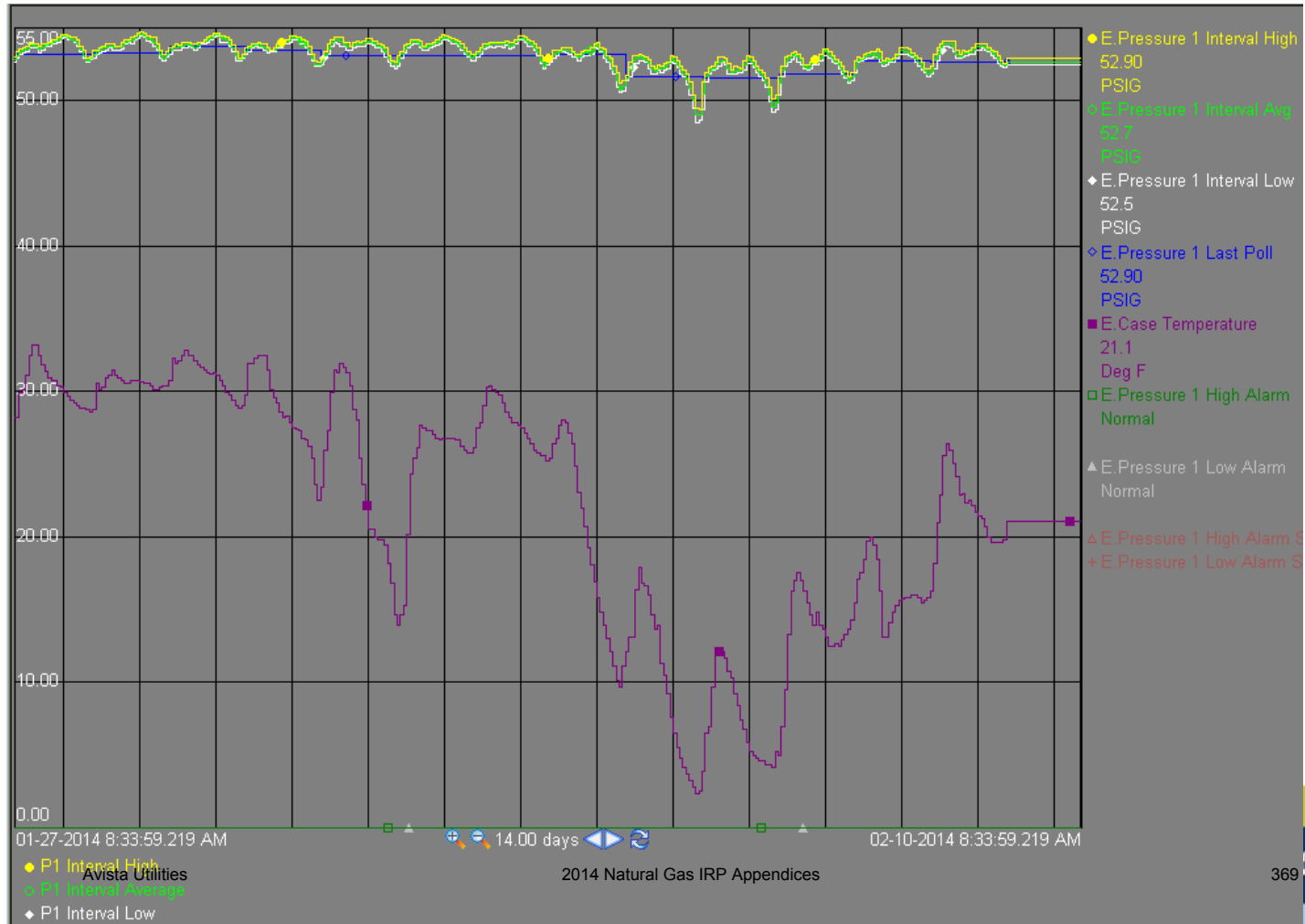


# Electronic Pressure Recorders

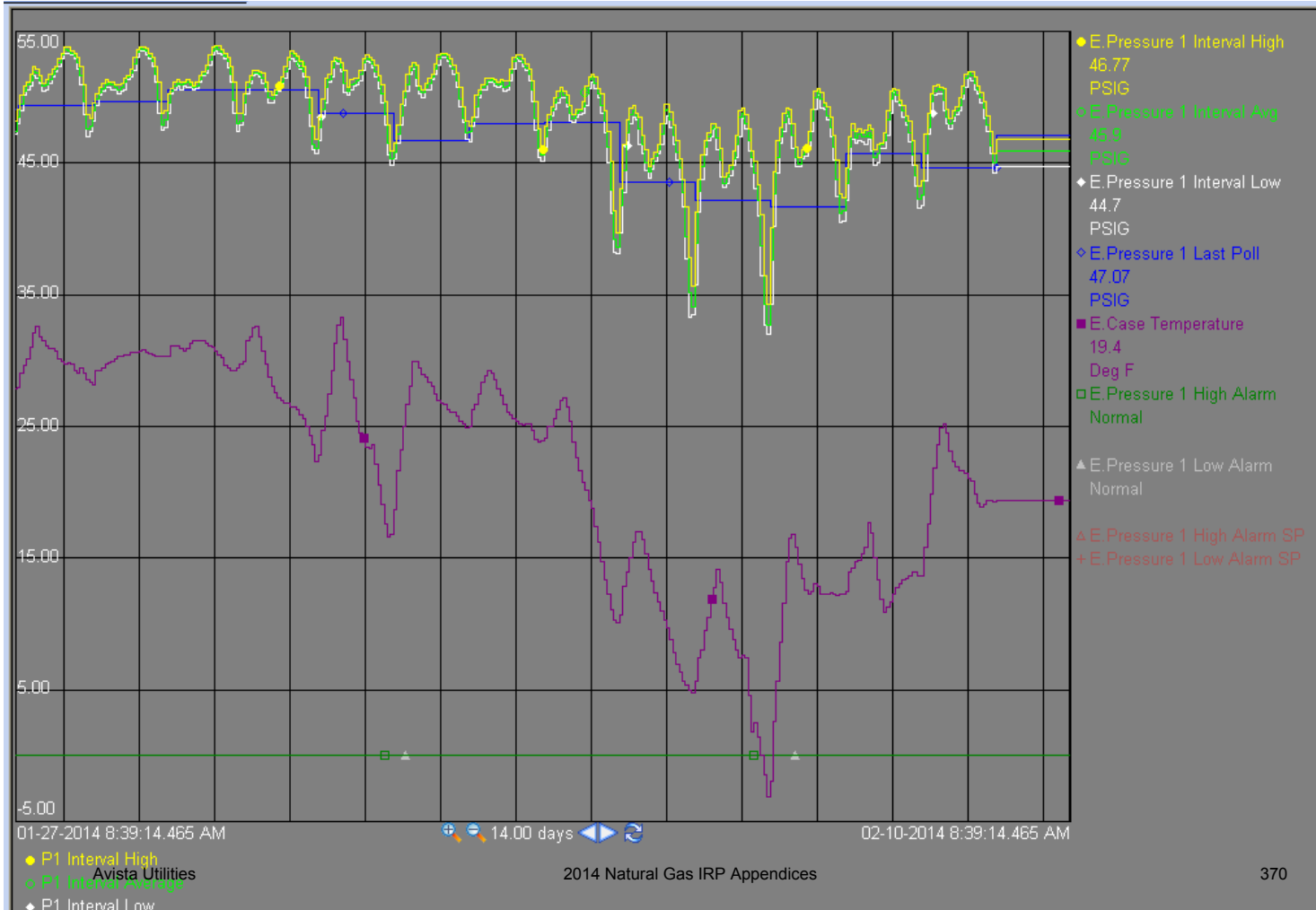
- Daily Feedback
- Real time if necessary



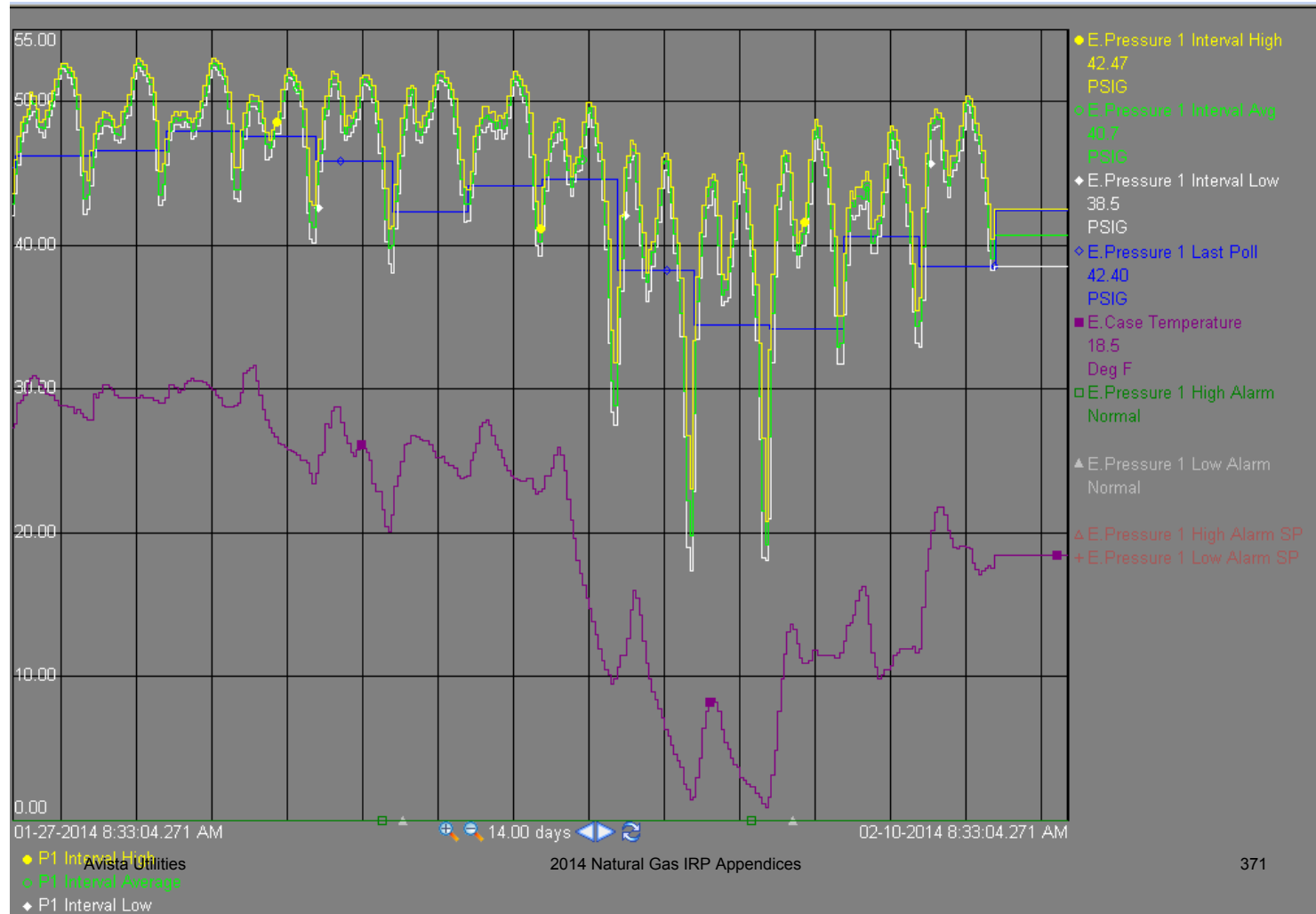
# Post Falls State Line



# Hayden Lake



# South Hayden Lake





# Compressed Natural Gas Services

Marc Schaffner, Strategic Initiatives Manager

Natural Gas Technical Advisory Committee  
March 26, 2014



# Natural Gas Reserves and Utilization

## U.S. Natural Gas Reserves

- The U.S.'s total recoverable resource base at 2,384 trillion cubic feet
- Projected to meet total domestic demand over the next 100 years
- This year's estimates rose significantly at 22.1 percent since 2010

*Source: Potential Gas Committee (PGC)*

## Natural Gas Vehicles (NGV) Worldwide

- Estimated 15 million natural gas vehicles (NGVs)
- Asia and Middle East 8.8M, South America 4.3 M, Africa .16M and North America .14M

## NGVs on U.S. Highways

- Estimated 120,000 NGVs on U.S. highways
- Estimated 15,000 NGVs were added to U.S. highways in 2012

*Source: American Clean Skies*

## The Future of NGVs

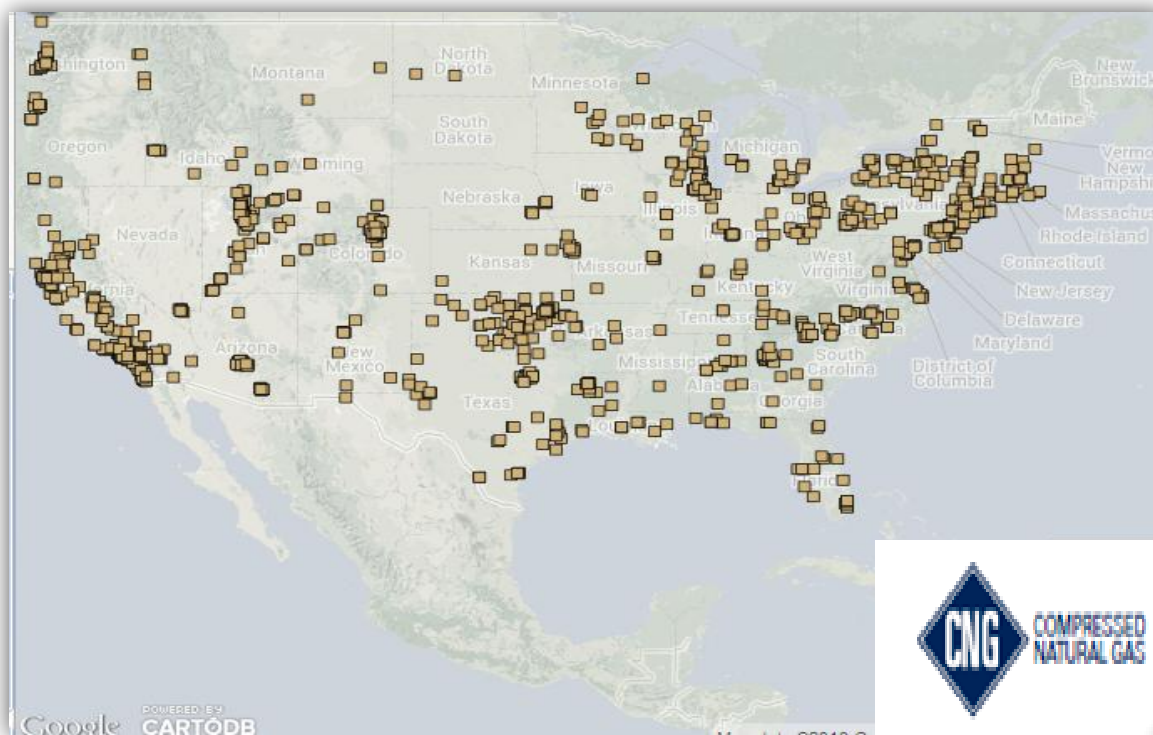
- Since 2003, the use of natural gas for vehicles has doubled in the U.S.
- The number of natural gas fueling stations is expected to more than double by 2015
- Natural gas is projected to overtake oil as the most-used fuel in the U.S. by 2030

*Source: IEA World Outlook Report*



# U.S. CNG Infrastructure 1,334 Private and Public Refueling Stations

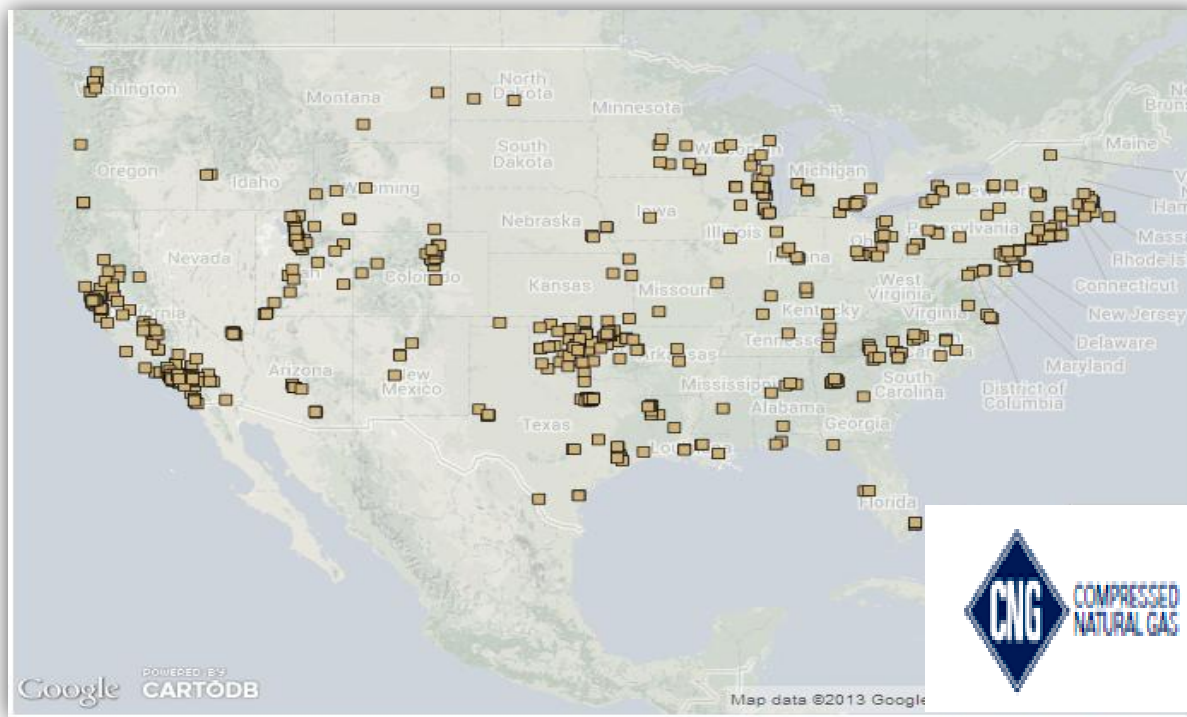
<5% in Oregon, Washington  
and Idaho



Source: U.S. Department of Energy, February 2014  
Avista Utilities 2014 Natural Gas IRP Appendices



# U.S. CNG Infrastructure 585 Public Refueling Stations



Source: U.S. Department of Energy, March 2013  
Avista Utilities 2014 Natural Gas IRP Appendices



# Avista's Investment in Compressed Natural Gas

## Environmentally responsible

- It's clean and efficient
- 25% less CO2 emissions than gasoline or diesel
- A vital part of an alternative transportation portfolio

## Cost effective

- Lowers fuel costs
- Tax credits and incentives

## Reduces dependency on imported fuel sources

- Natural gas is an abundant, domestic resource

## A clean fueling solution across an increasing range of NGV classes

- Extends benefits to commercial fleets and private operators

## Mobilizes safe and reliable CNG equipment

- Vehicles
- Public fueling infrastructure



## Avista CNG – Yesterday and Today

- Over the past 25 years Avista has fueled light duty vehicles, service continuity equipment and fork lifts with CNG
- Ten of our gas operating centers have maintained private CNG refueling infrastructure over that time period
- 2011, we began devising plans to upgrade CNG infrastructure at our highest volume service centers in Idaho, Oregon and Washington
- 2012, we completed construction of a new refueling station at our Mission Avenue service center in Spokane, WA
- 2013, we completed a second Spokane refueling station at our Dollar Road gas service center
- Q2 of 2014 we intend to start on construction of a new refueling station at our Coeur d' Alene, ID and begin upgrading an existing station at Klamath Falls, OR
- Q4 of 2014 construction of a new refueling station at White City, OR is projected to begin



**Spokane Refueling Stations**  
**Mission Avenue (top)**  
**Dollar Road (bottom)**



## Avista's CNG Station Schedule

CNG Refueling Location	Project Status	Compression Capability	Storage Capacity	Public Access *
Mission Avenue SC Spokane, Wash.	Completed 2012	125 HP Compressor 202 SCFM	280 GGE at 4500 psi	
Dollar Road SC Spokane, Wash.	Completed 2013	125 HP Compressor 202 SCFM	280 GGE at 4500 psi	X
Coeur d'Alene SC Coeur d'Alene, Idaho	Construction 2014	(2) 50 HP Compressors 75 SCFM	280 GGE at 4500 psi	X
Klamath Falls SC Klamath Falls, Ore.	Upgrade 2013-14	30 HP Compressor 60 SCFM	90 GGE at 4500 psi	
White City Industrial Medford, Ore.	Construction 2014-15	200 HP Dual Compressor 300 SCFM	450 GGE at 4500 psi	X

\* Public access subject to regulatory approval

## CNG Investment Recovery

### **CNG fueling equipment can be effectively treated like conventional utility infrastructure**

- gas pipe and regulators, power poles and transformers
- compressors, storage vessels and dispensers

### **The financial tests and investment recovery mechanisms are familiar**

- standard service agreements may be offered to anchor fleet operators with special provisions that define annual consumption minimum, schedule and deficiency requirements

### **However...**

CNG fueling infrastructure offers an average operating life of 20 years

The service life of commercial grade NGVs ranges from 5 to 10 years

## Investment Recovery Illustration

Avista's Investment station	\$1M capital to fund a turn key CNG
Consumption minimum annually*	350k gas gallon equivalents (GGE)
Consumption schedule	10 years
CNG Rate	\$2.00 per GGE



\* e

Avista Utilities



ste hauling vehicles  
Dollar Road

CNG Fuel Dispenser

2014 Natural Gas IRP Appendices





## Natural Gas Vehicle Investment Recovery

### Waste Hauling NGV

Customer Investment	\$35,000 per vehicle
Miles per gallon	3
Annual mileage	25,000
CNG per gallon	\$2.00
Diesel per gallon	\$4.00
Estimated payback	25 months
Annual fuel savings	\$16,800
Five-year ROI	238%



## Make or Buy Decisions

### **CNG Station Maintenance and Service Continuity**

- Technical expertise and equipment monitoring systems
- Planned maintenance - resources and costs
- Unplanned repairs and restoration - resources and costs
- Outage response and service continuity

### **Point of Sale Customer Billing**

- Availability of full service providers
- Transaction processors
- Billing cost per unit of measure
- Required menu of services



## Avista Contributors

Energy Solutions      Account  
Executives

Regulatory  
Rates & Tariffs

Customer Solutions  
Regional Business Managers

Treasury  
Billing Analysis

Government Relations  
Lobbyists

Financial Planning & Analysis

Legal Counsel                      Risk  
Real Estate

Facilities  
Project Management

Contract Administration

Fleet  
NGV Management  
CNG Infrastructure Maintenance

Real Estate  
Legal  
Property Acquisition

Distribution Infrastructure  
Gas Engineering



# Organizational Capability

## What are we learning?

- The value of broad-based collaboration occurring across a dynamic natural gas for transportation marketplace. Private & public sector customers, industry associations, government, contractors and vendors

## What skills are we developing?

- NGV acquisition and maintenance
- CNG fueling infrastructure planning, construction and maintenance
- CNG/NGV consultation

## What value does Avista's CNG capability provide our employees, customers and business community?

- A more robust portfolio of energy offerings
- Enhanced revenue and cost saving opportunities for regional businesses
- An innovative, sustainable way to positively affect environmental quality and energy independence

# Thank You





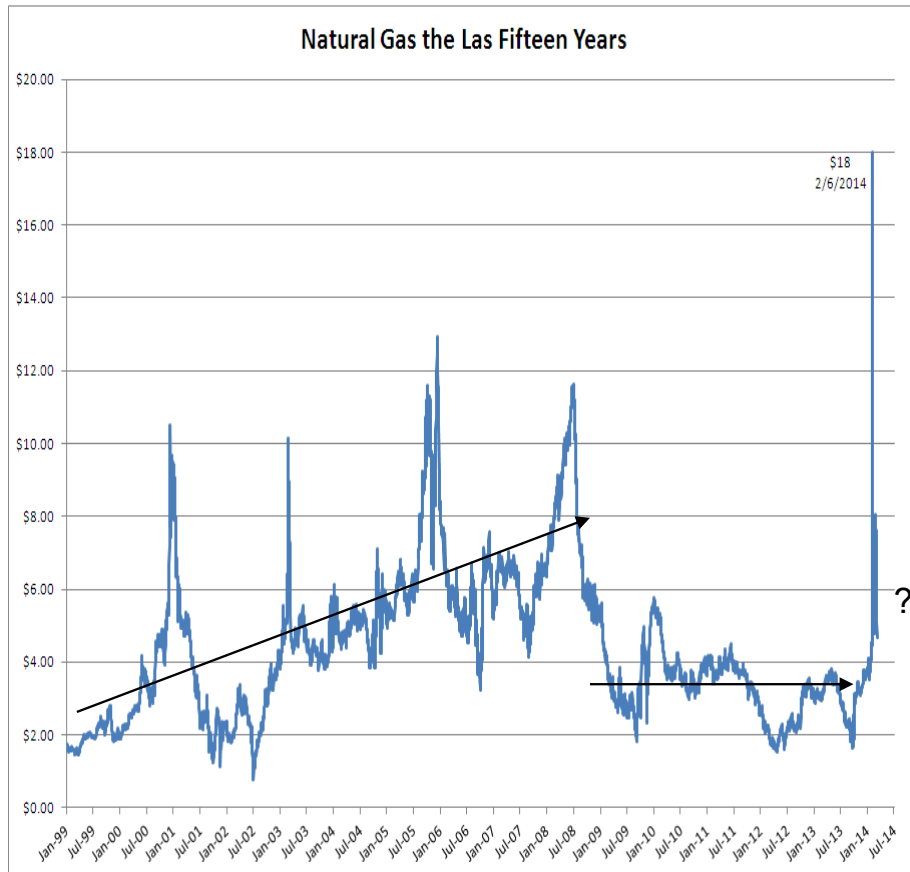
# Natural Gas Prices

Kelly Fukai, Manager of Natural Gas Planning

Natural Gas Technical Advisory Committee  
March 26, 2014

# What Drives the Natural Gas Market?

## *Natural Gas Spot Prices (Henry Hub)*



### ► Supply

- Type: Conventional vs. Non-conventional
- Location
- Cost

### ► Demand

- Residential/Commercial/Industrial
- Power Generation
- Natural Gas Vehicles

### ► Legislation

- Environmental

### ► Energy Correlations

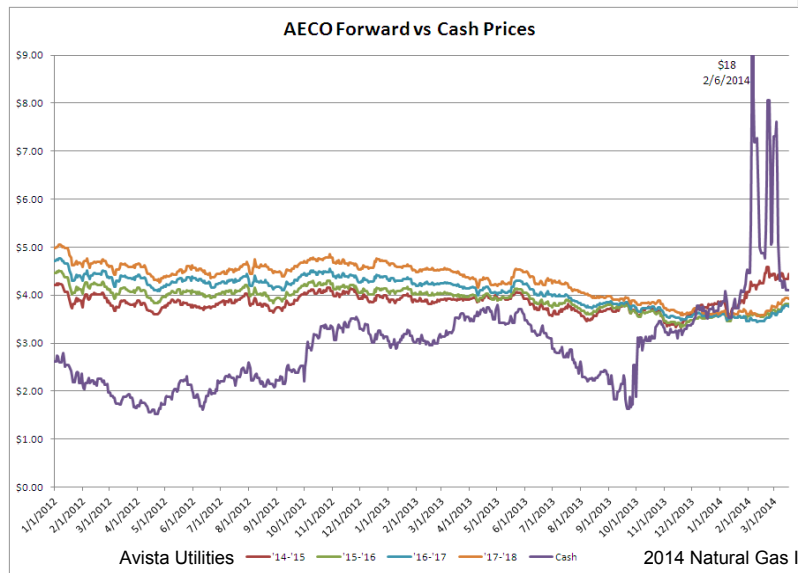
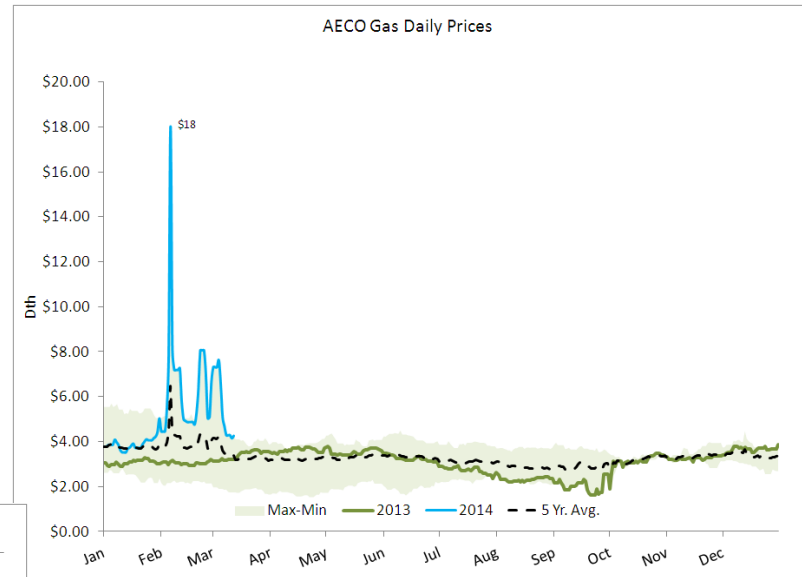
- Oil vs. Gas
- Coal vs. Gas
- Natural Gas Liquids

### ► Weather

### ► Storage



# Short Term Market Perspective





# The Long Term Fundamentals

## Demand

- Economy (Recession, Depression, Inflation, etc.)
- Industrial Demand
- Power Generation
- Any NG (LNG, NGV, CNG)

## US Natural Gas Supply and Production

- Resource Base
- Drilling Efficiency
- Associated Gas

## Global Dynamics – LNG Imports and Exports

## North American Storage Capacity

## Correlation (or lack thereof) with other energy products

## The Environment

- Carbon Legislation
- The “F” Word – FRACKING
- Renewable Portfolio Standards

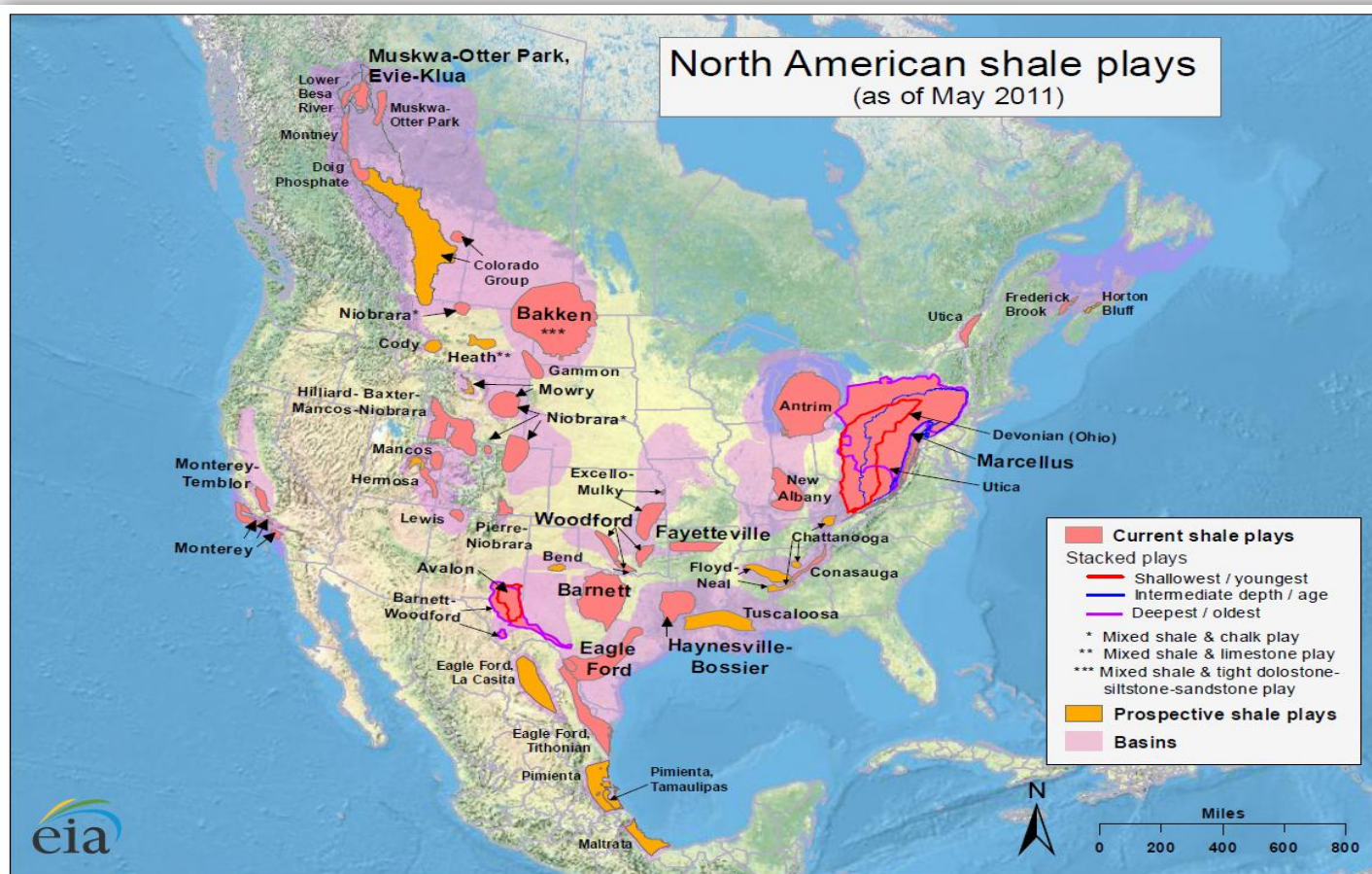
Avista Utilities

2014 Natural Gas IRP Appendices



389

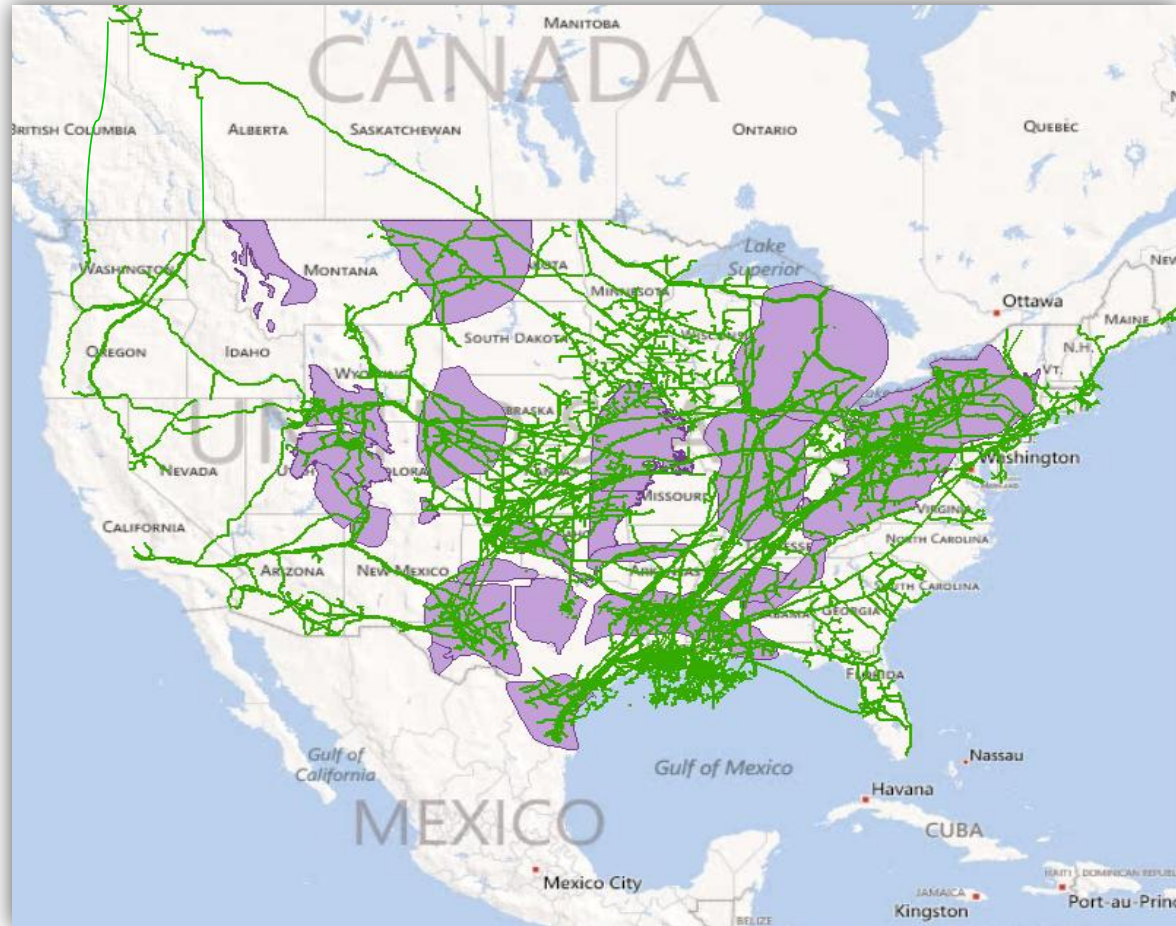
# Shale is almost EVERYWHERE



Source: U.S. Energy Information Administration based on data from various published studies. Canada and Mexico plays from ARI. Updated: May 9, 2011



# Changing the Flow Dynamics



## NGL's Impact on the Cost to Produce

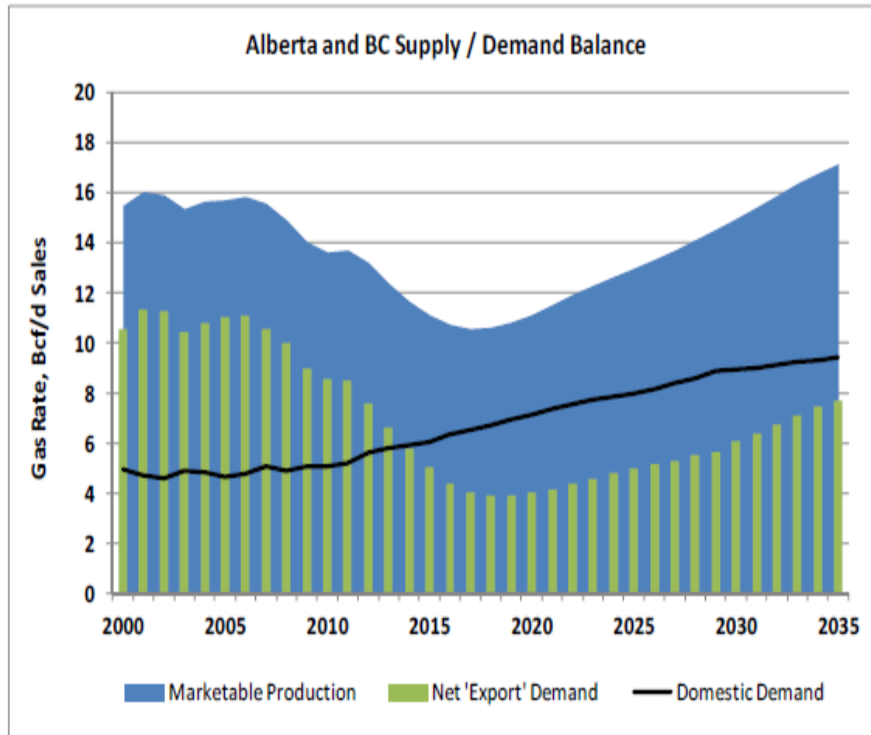
NGL's enhance the production economics for producers. NGL's are a main contributor to understanding why gas production companies continue to produce even with gas prices at very low levels.

The following table illustrates how the economics can improve with a credit for NGL's.

Shale Play	Cost to Produce without NGL's Credit	Cost to Produce including NGL's Credit
Marcellus	\$4.81	\$2.83
Montney	\$3.85	\$0.57
Barnett	\$5.39	\$2.41

*Note: These costs are indicative of the historical impact. The costs can vary from play to play and company to company and will change as market conditions change.*

# Canada Dry vs. Canada Not Dry

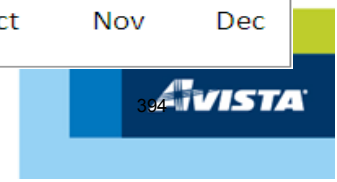
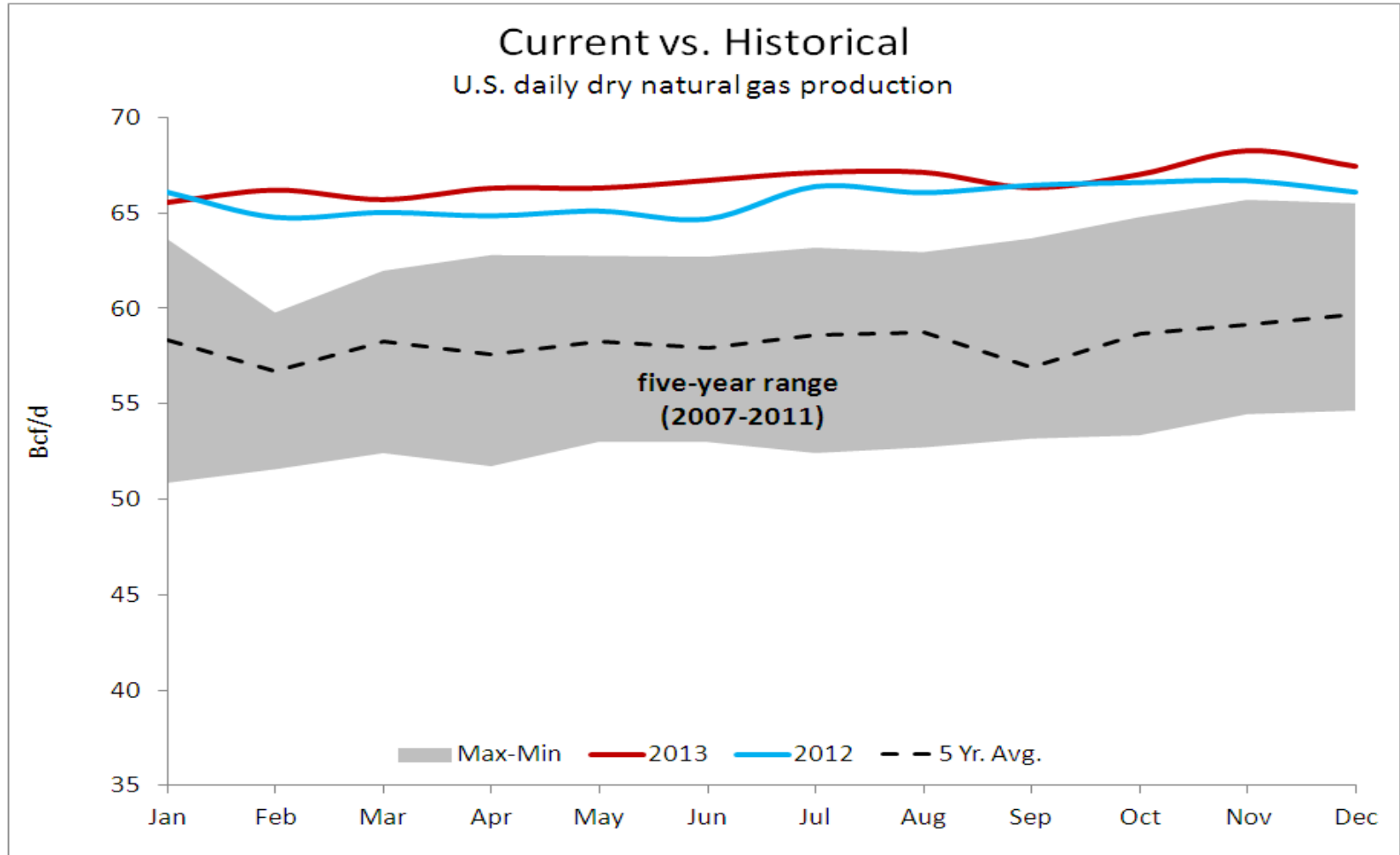


Source: NEB Canada's Energy Future 2013

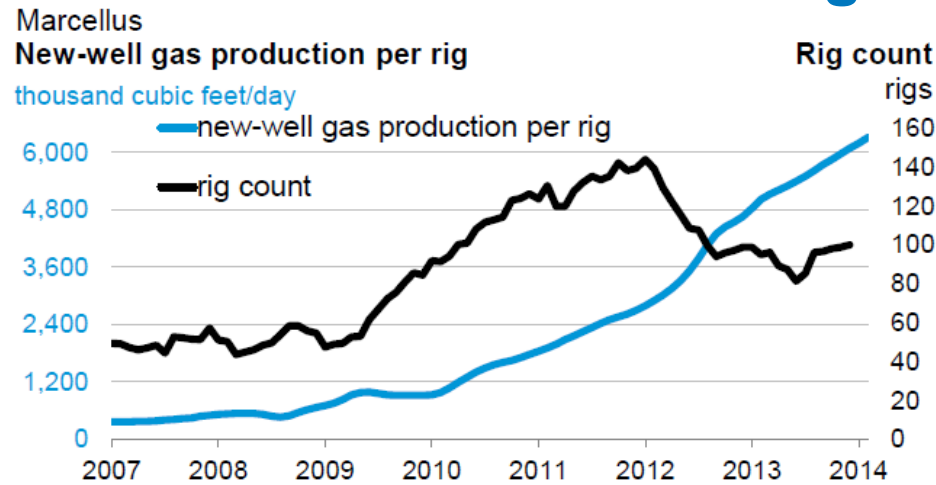
## Why won't Canada be dry?

- Tons of JV money
- IP rates are proving to be better than anticipated.
  - Horn River IP rates have increased 150%
- Economics are pretty good too.
  - Duverney in particular is liquids rich.

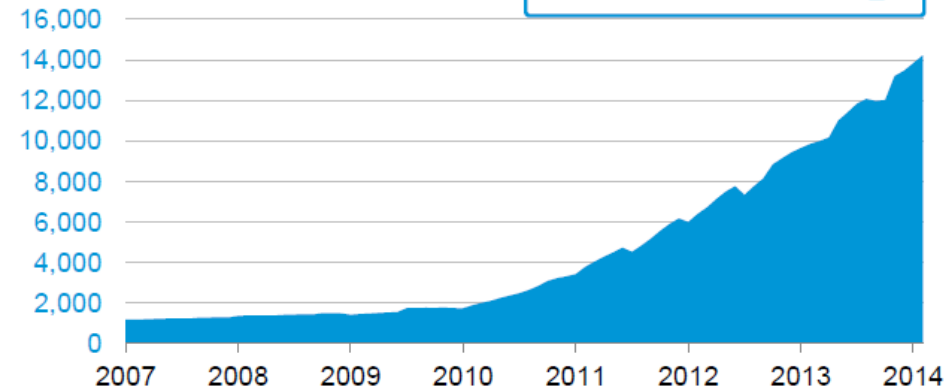
# Current vs. Historical US Dry Gas Production



# The Learning Curve



Marcellus Natural gas production  
million cubic feet/day



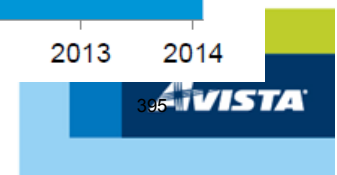
**Gas +388**  
million cubic feet/day  
month over month



Source: EIA January Drilling Productivity Report

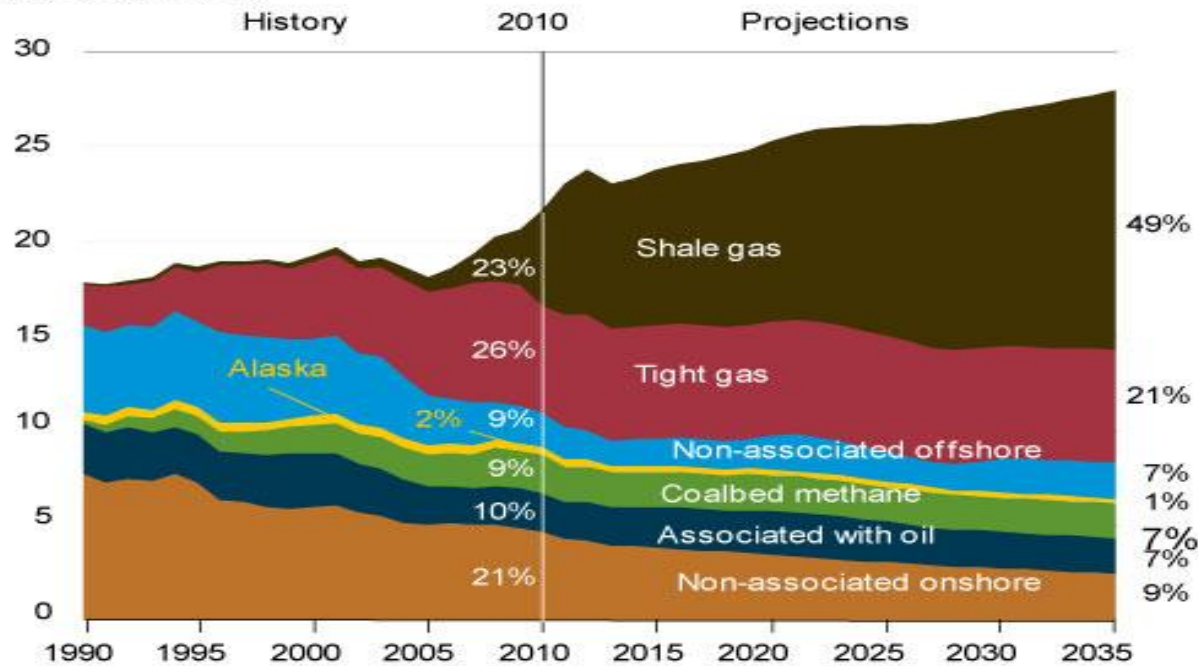
Avista Utilities

2014 Natural Gas IRP Appendices



# Forecasted Natural Gas Production

**Figure 2. U.S. natural gas production, 1990-2035**  
(trillion cubic feet)





# Oil and Gas Production are like Peas and Carrots

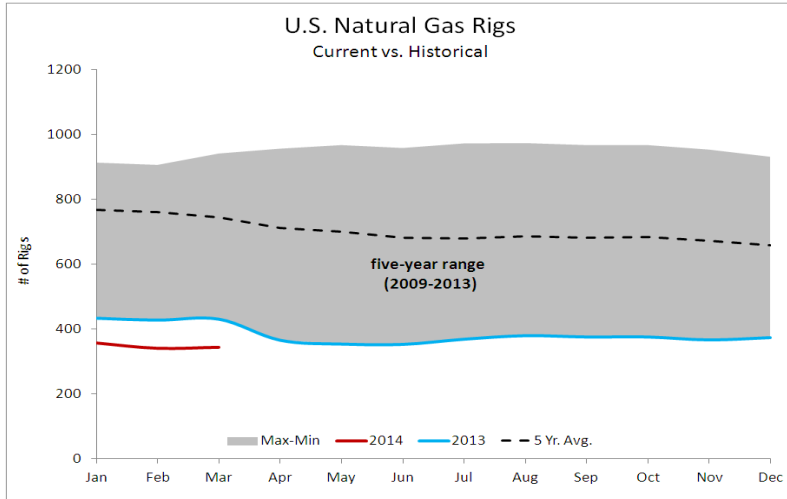
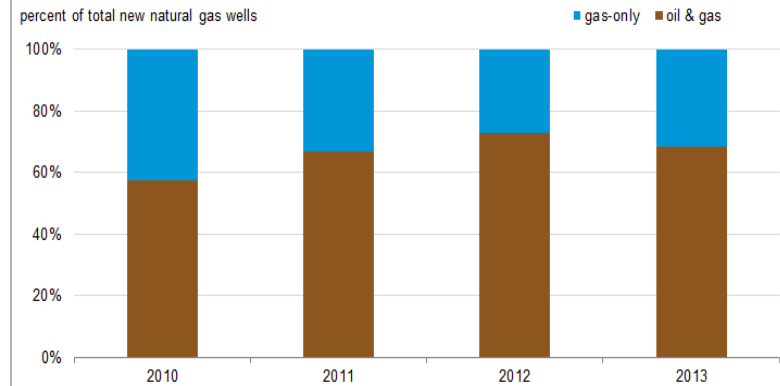
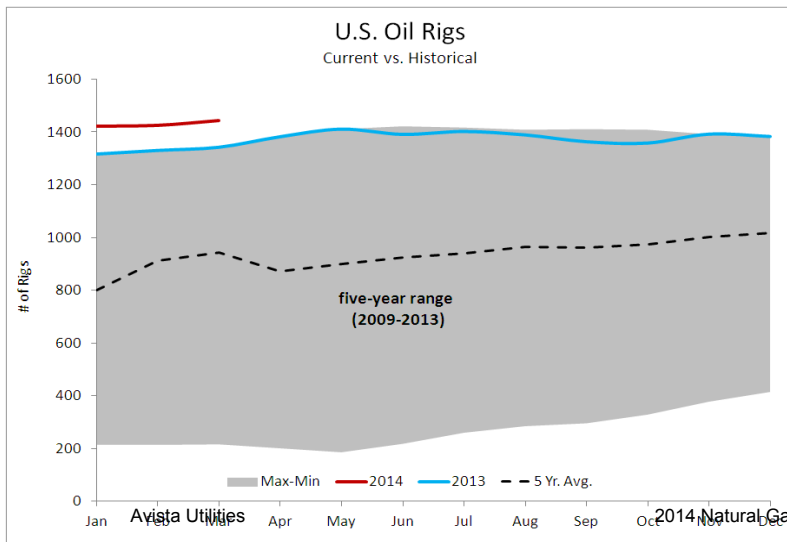


Figure 4: New natural gas producing wells by type 2010-13



Source: U.S. Energy Information Administration calculations based on data from Drillinginfo.  
Note: Data exclude wells in Alaska and offshore fields. As with Figure 3, the new production breakout is only available through June 2013. Gross withdrawals data from Figure 2 are compared with each basin's breakout between gas only and gas and oil wells to estimate data through December 2013.

More oil = More gas



Avista Utilities

2014 Natural Gas IRP Appendices



# Carbon Prices

- Currently our consultant forecasts include carbon tax adders to the Henry Hub gas price.
  - Adders start in early 2020's
  - Modest adders
- One will drop carbon in next long term forecast.
- Primarily a demand effect
  - Can result in demand change due to price elastic response, however tax must be significant enough to trigger.
  - Could possibly trigger increased usage due to fuel switching.
  - May increase the DSM potential.
- Changes total portfolio costs but does not necessarily change the resource mix.

## How prices affect IRP Planning?

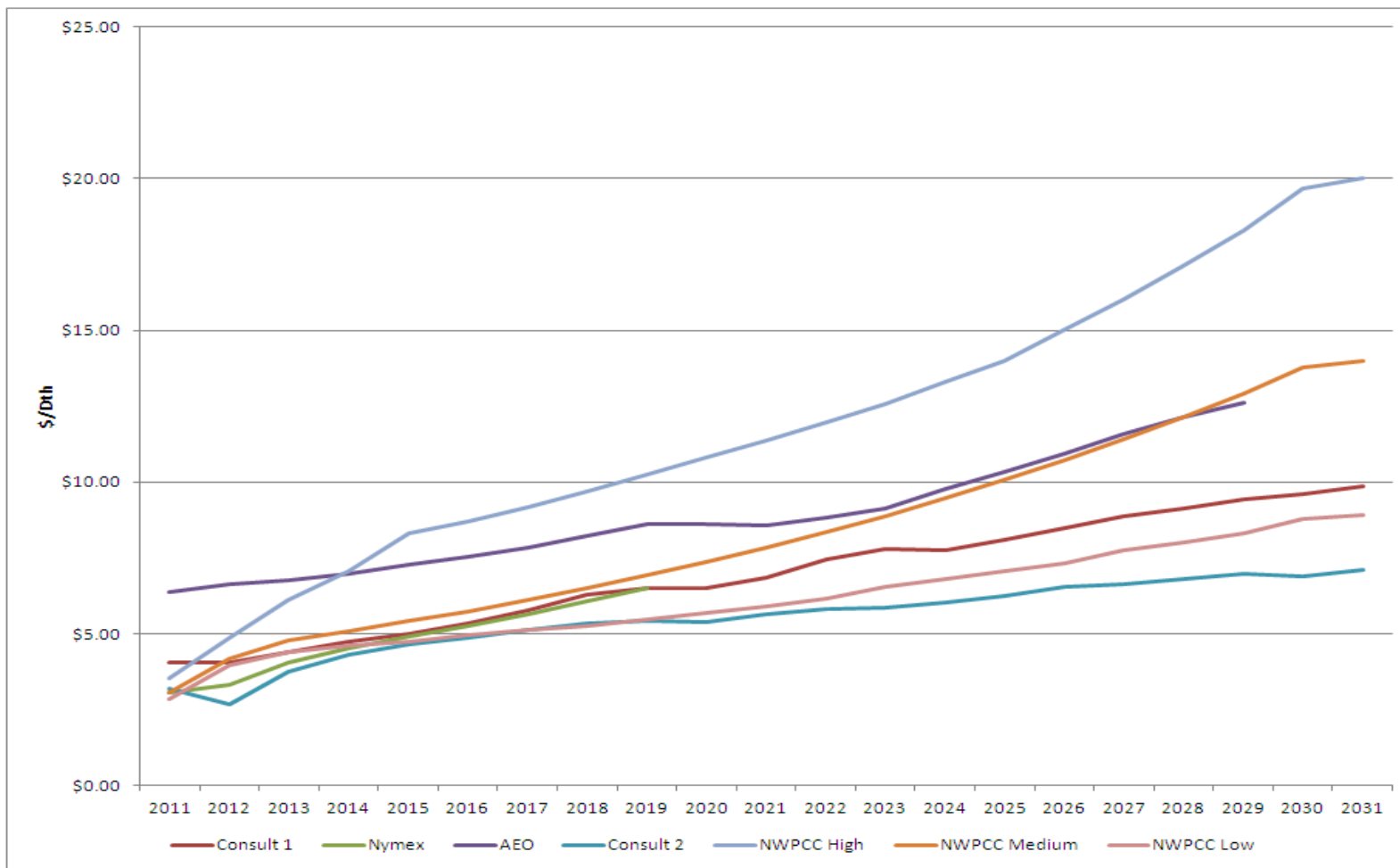
- Major component of the total cost
- Change in price **can** trigger price elastic response
- **THE** major piece of avoided costs and therefore cost effectiveness of DSM
- Can change resource selection based on basin differentials
- Storage utilization

## IRP Natural Gas Price Forecast Methodology

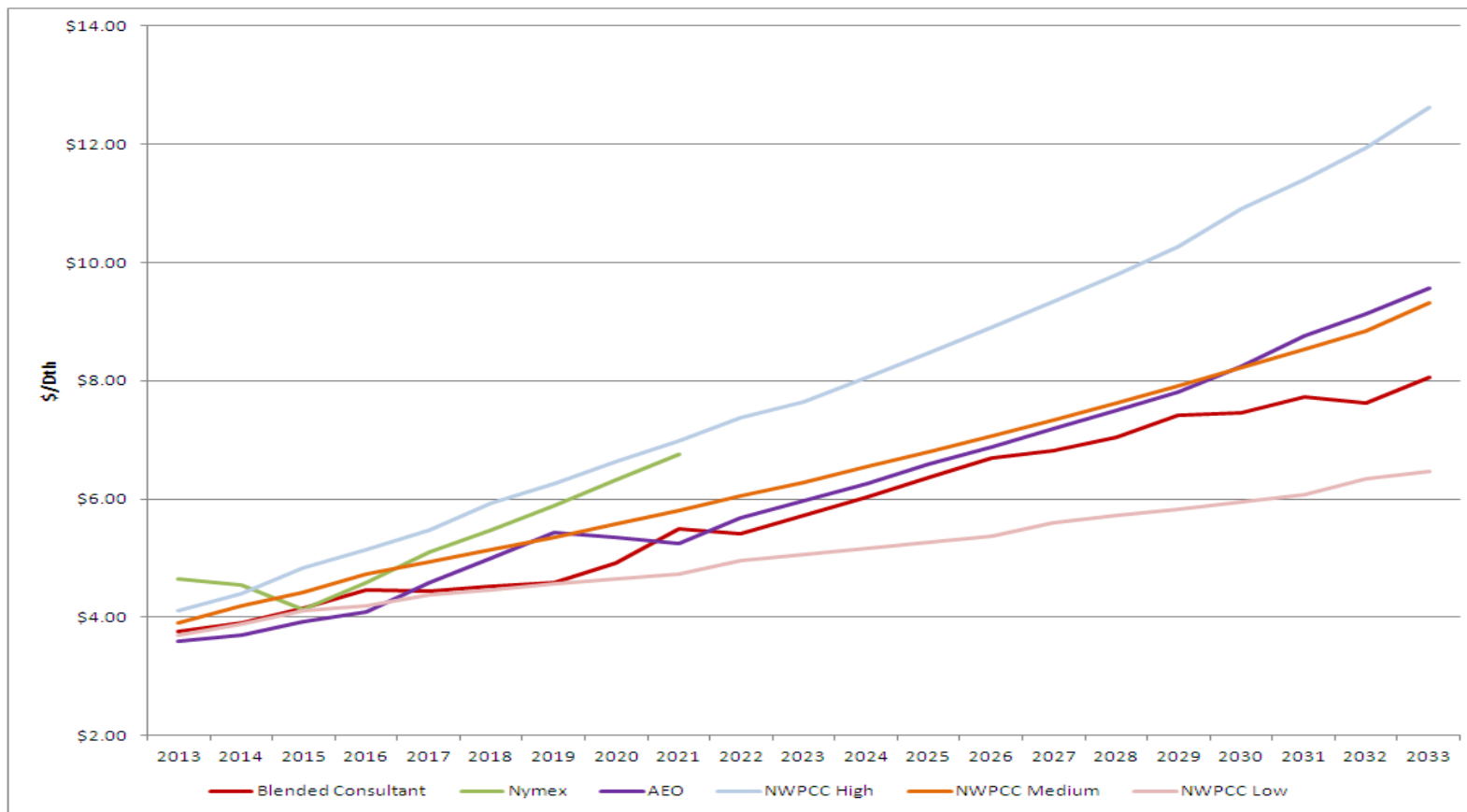
1. Examine fundamental forecasts (Consultant #1, Consultant #2, EIA, etc.)
2. Forward prices
3. Carbon legislation adder beginning in 2022 (\$8.49/ton grows to \$15.24/ton)
4. Basin adjusted based on forecasted
5. Monthly shape set based on forecasted
6. 50% Nymex, 50% blended Consultants Year 1
7. 40% Nymex, 60% blended Consultants Year 2
8. 30% Nymex, 70% blended Consultants Year 3
9. 20% Nymex, 80% blended Consultants Year 4
10. 10% Nymex, 90% blended Consultants Year 5
11. 100% blended Consultants Year 6 – 18
12. 100% Consultant #1 year 18 - 20



# 2012 IRP Forecasted Prices

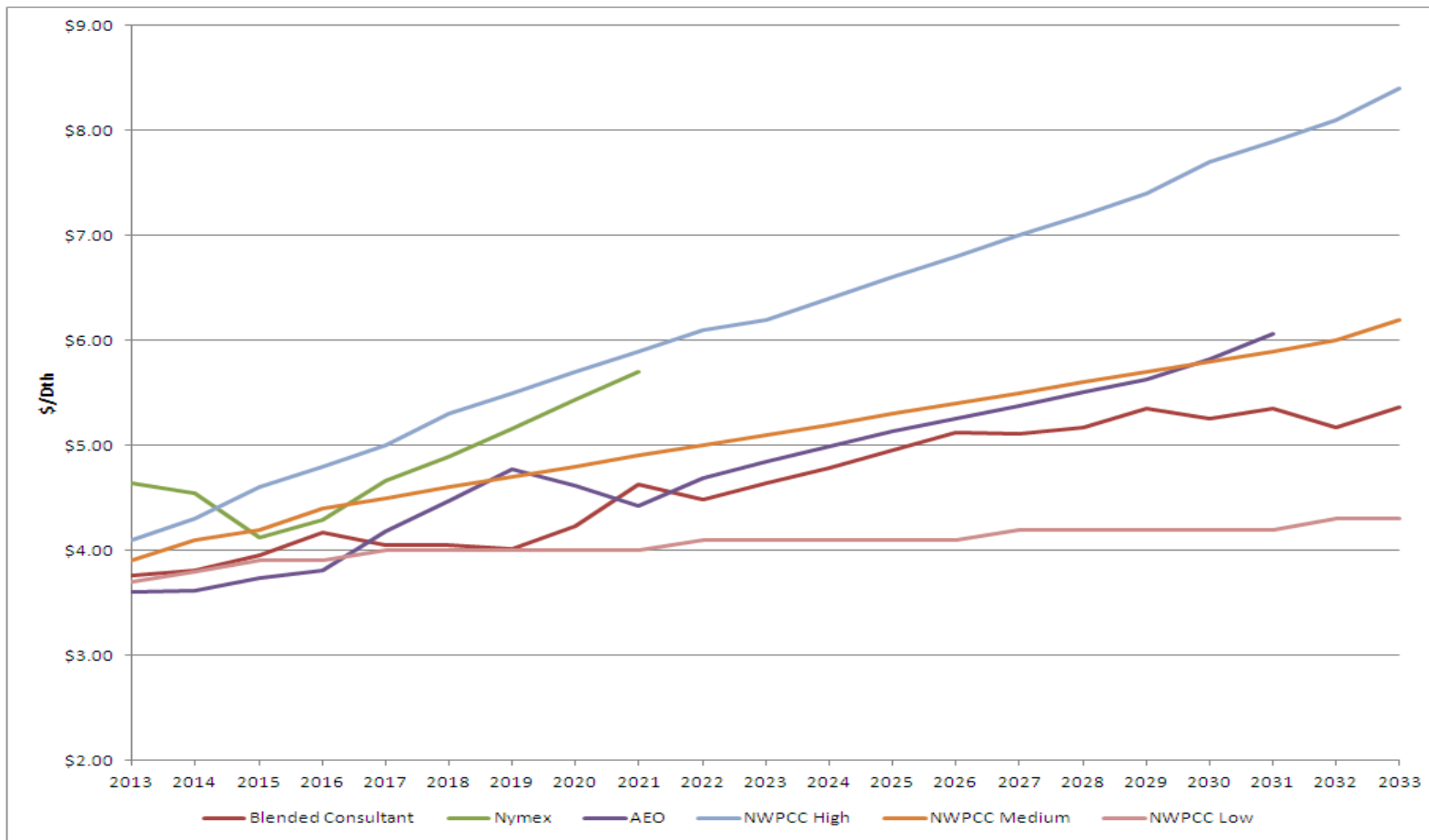


# Current Long Term Henry Hub Forecasts **NOMINAL**



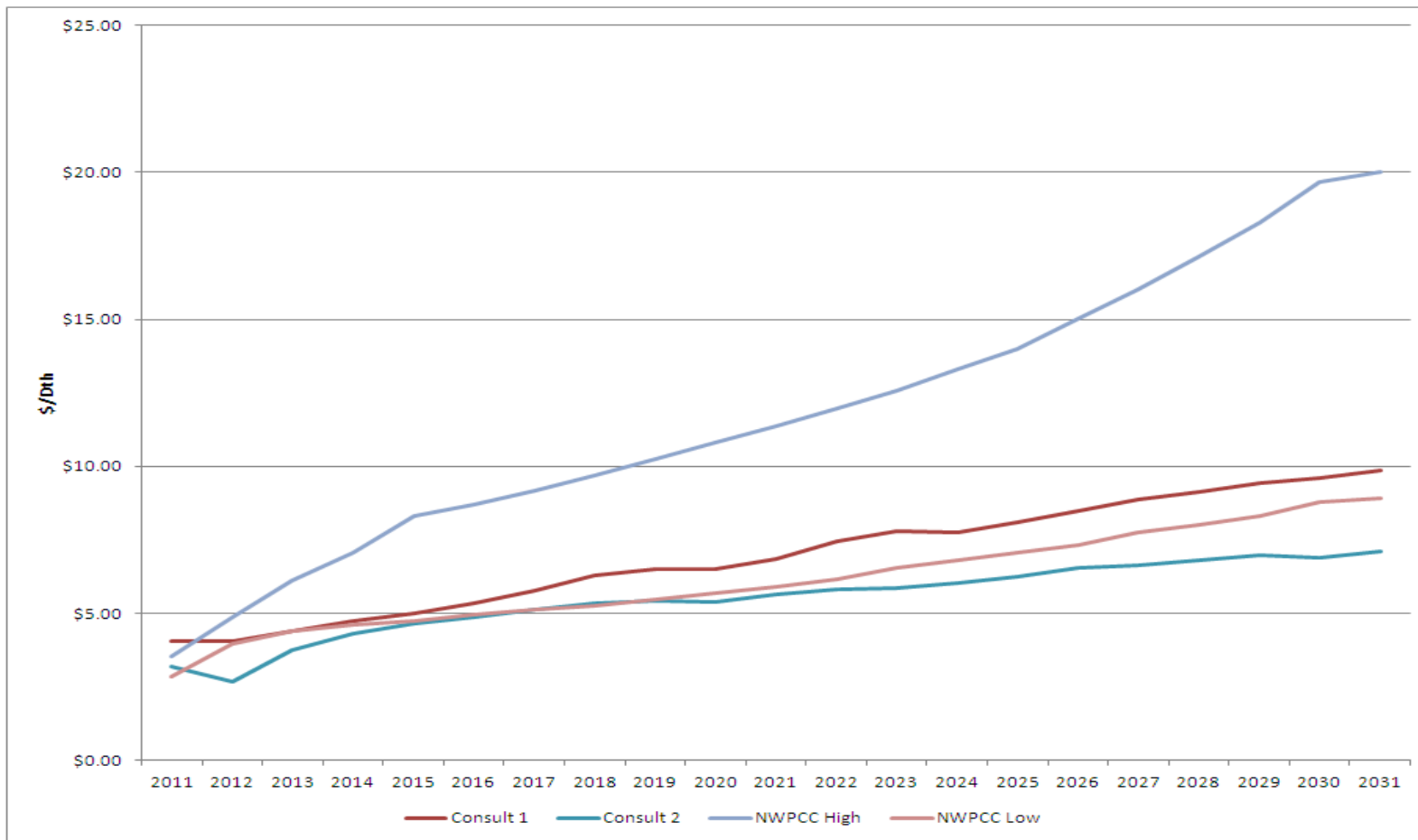
# Current Long Term Henry Hub Forecasts

## REAL



# Low – Med – High from 2012 IRP

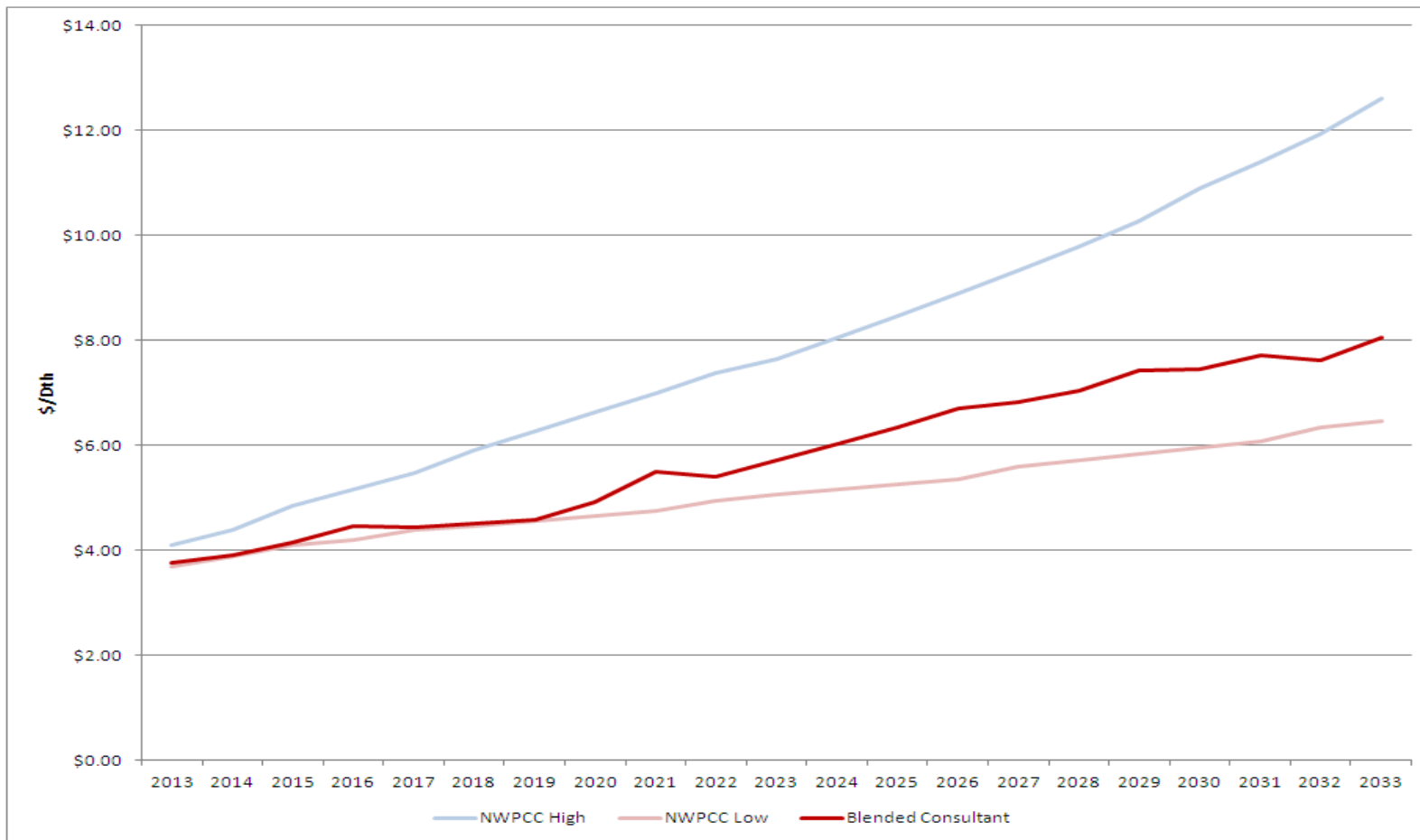
## NOMINAL





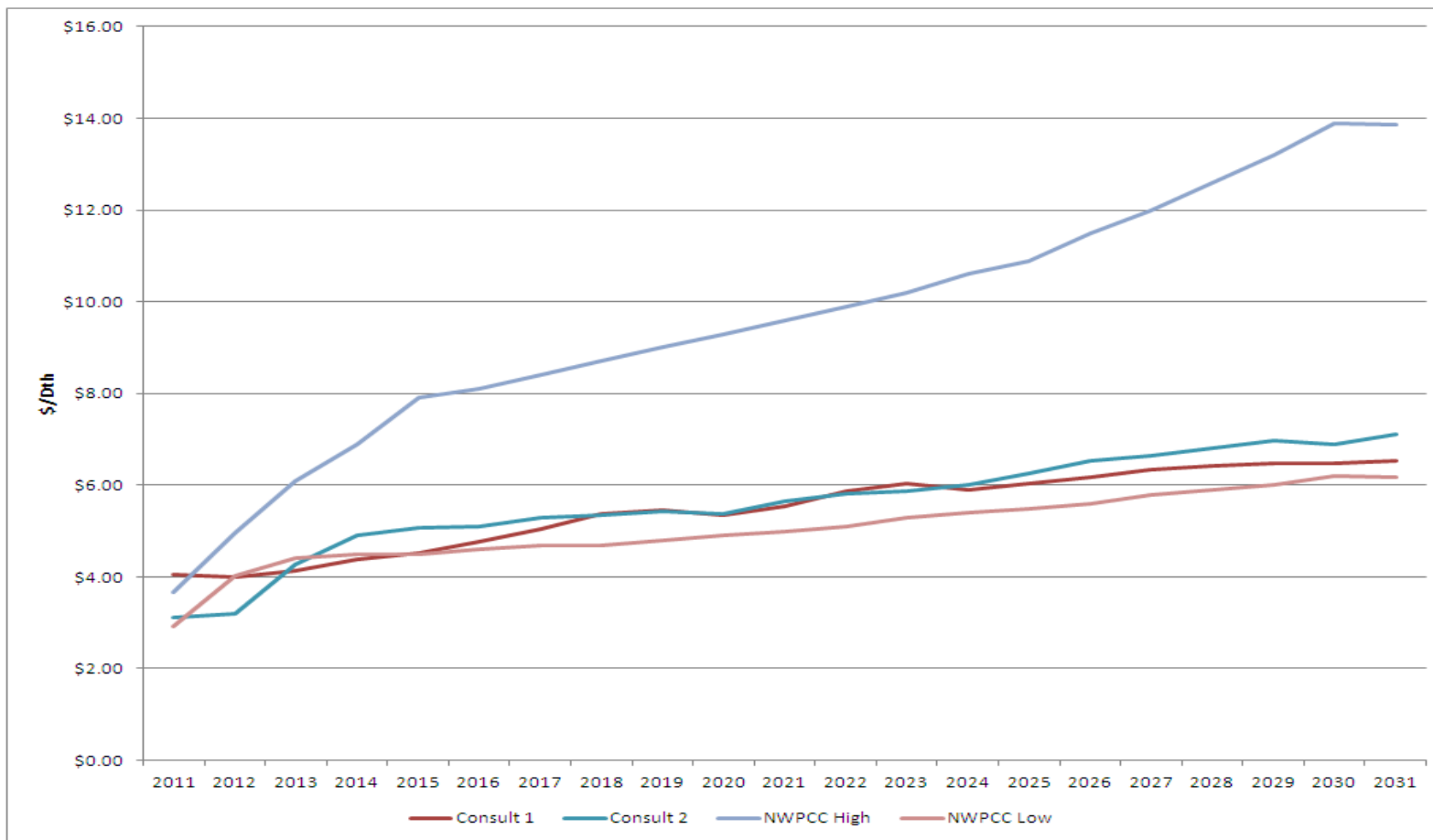
# Proposed Price Forecasts

## NOMINAL



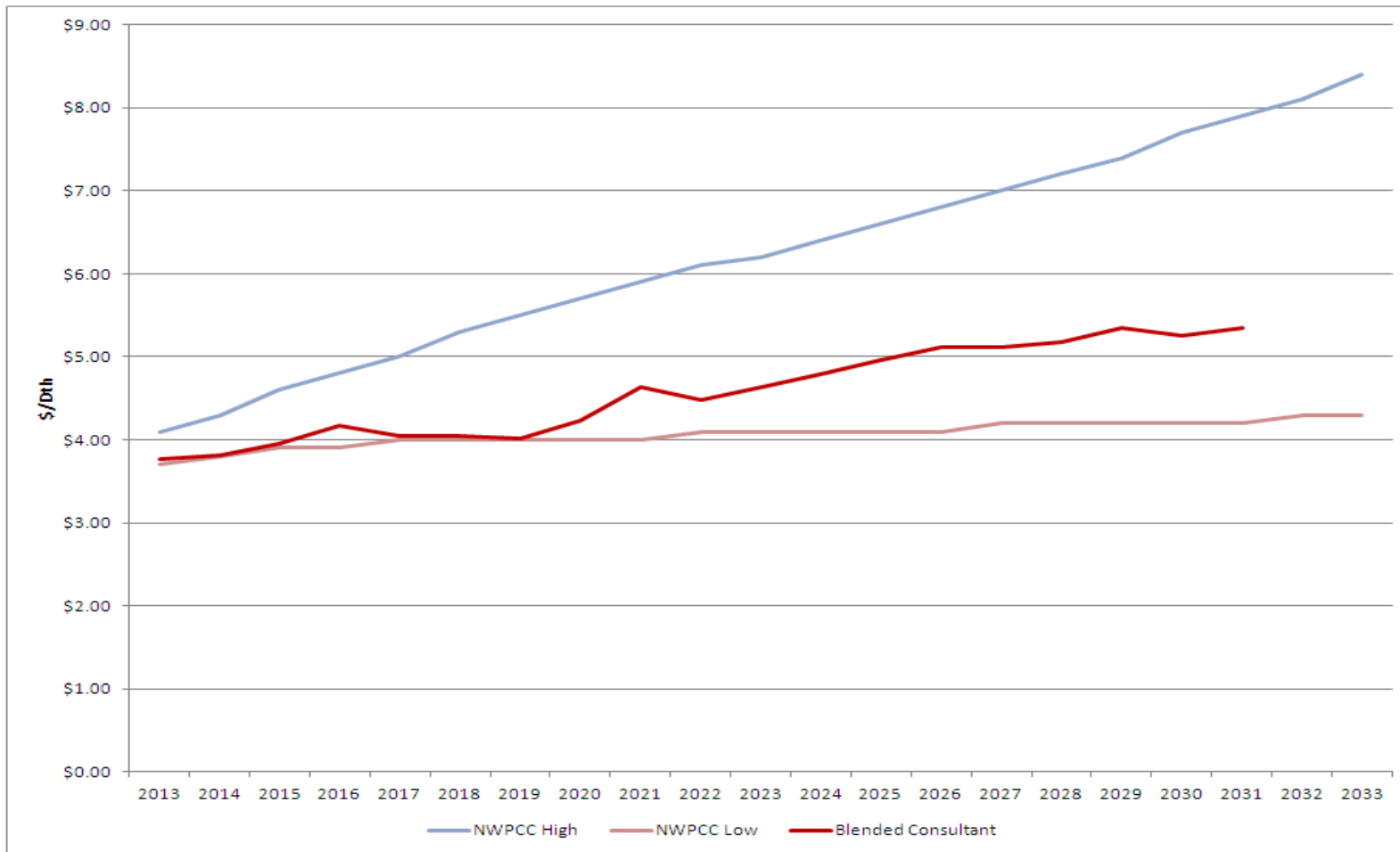
# Low – Med - High from 2012 IRP

## REAL



# Proposed Price Forecasts

## REAL



## Regional Price Assumptions

Regional Price as a percent of Henry Hub Price					
	AECO	Sumas	Rockies	Malin	Stanfield
Consultant1 Forecast Average	84.0%	92.0%	90.6%	95.4%	93.2%
Consultant2 Forecast Average	88.5%	94.4%	95.1%	97.0%	95.0%
Historic Cash Three Yr Average	87.4%	98.4%	96.9%	99.2%	97.5%
Prior IRP	87.0%	88.3%	89.4%	91.1%	90.2%

## Monthly Price Shape

Monthly Price as a percent of Average Price						
	Jan	Feb	Mar	Apr	May	Jun
Consult1	104.7%	104.2%	96.8%	95.9%	96.6%	98.2%
Consult2	101%	101.6%	101.5%	98.9%	98.8%	98.5%
Prior IRP	102%	101.5%	98.5%	98.0%	98.5%	100.5%
	Jul	Aug	Sep	Oct	Nov	Dec
Consult1	99.2%	99.7%	98.9%	99.4%	101%	105.2%
Consult2	99.3%	99.3%	100.3%	99.3%	100.5%	101.1%
Prior IRP	101.5%	102.0%	98.5%	98.5%	99.0%	103%



# Procurement Planning

Kelly Fukai, Manager of Natural Gas Planning

Natural Gas Technical Advisory Committee  
March 26, 2014

# Procurement Plan Philosophy

## Mission

*To provide a diversified portfolio of reliable supply and a level of price certainty in volatile markets.*

We cannot accurately predict what natural gas prices will do, however we can use experience, market intelligence, and fundamental market analysis to structure and guide our procurement strategies.

Our goal is to develop a plan that utilizes customer resources (storage and transportation), layers in pricing over time for stability (time averaging), allows discretion to take advantage of pricing opportunities should they arise, and appropriately manages risk.

# Comprehensive Review of Previous Plan

Review conducted with SOG includes:

- Mission statement and approach
- Current and future market dynamics
- Hedge percentage
- Resources available (i.e. storage and transportation)
- Hedge windows (how many, how long)
- Long term hedging approach
- Storage utilization
- Analysis (volatility, past performance, scenarios, etc.)





# A Thorough Evaluation of Risks



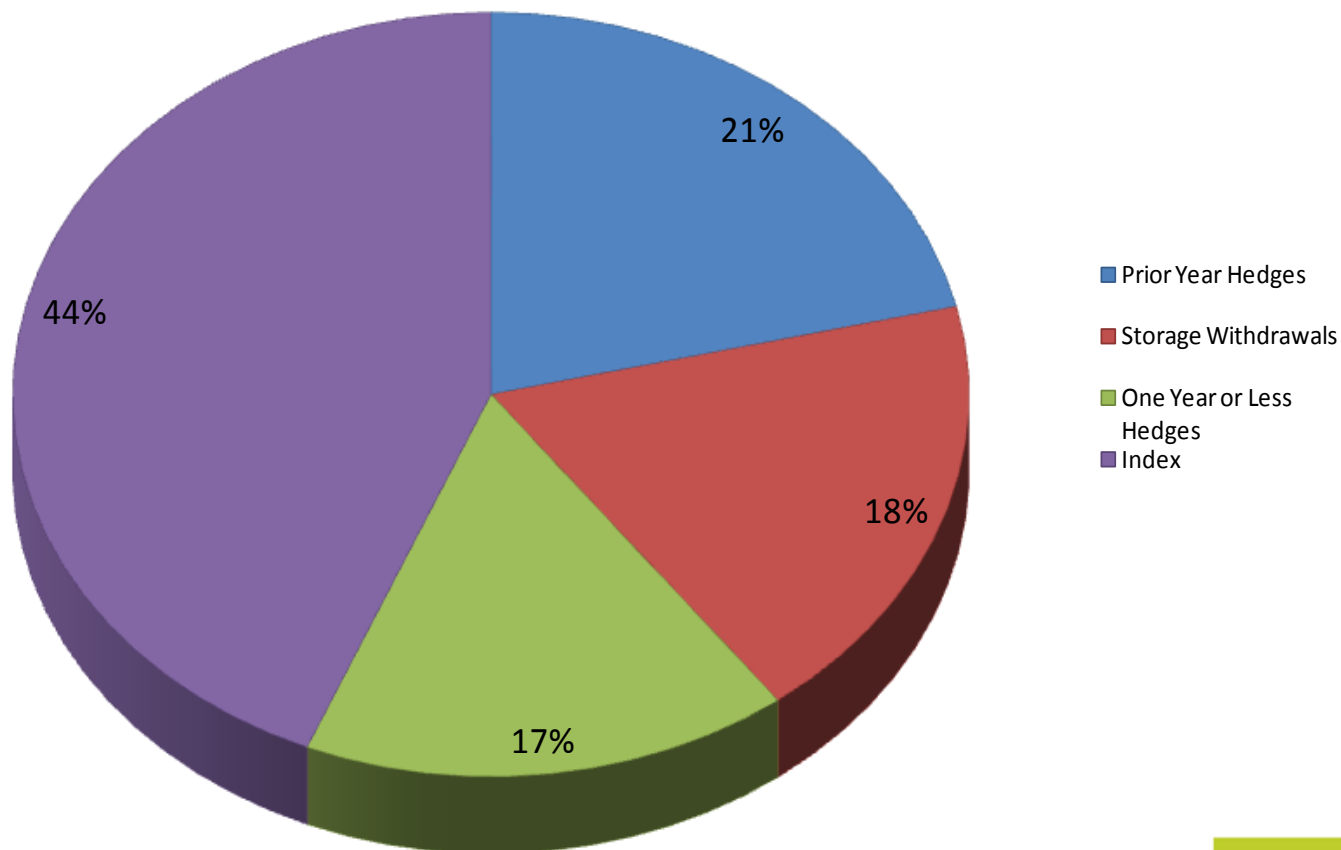
## Procurement Plan Structure

The procurement plan incorporates a portfolio approach that is diversified in terms of:

- **Components:** The plan utilizes a mix of index, fixed price, and storage transactions.
- **Transaction Dates:** Hedge windows are developed to distribute the transactions throughout the plan.
- **Supply Basins:** Plan to primarily utilize AECO, execute at lowest price basis at the time.
- **Delivery Periods:** Hedges are completed in annual and/or seasonal timeframes. Long-term hedges may be executed.

Transactions are executed pursuant to a plan and process; however, the procurement plan allows Avista to be flexible to market conditions and opportunistic when appropriate.

## 2014-2015 Procurement Plan Components All Jurisdictions



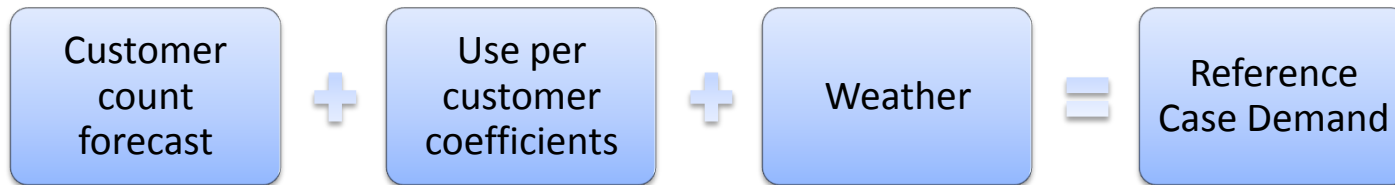


# Preliminary Modeling Results

Kelly Fukai, Manager of Natural Gas Planning

Natural Gas Technical Advisory Committee  
March 26, 2014

# Developing a Reference Case



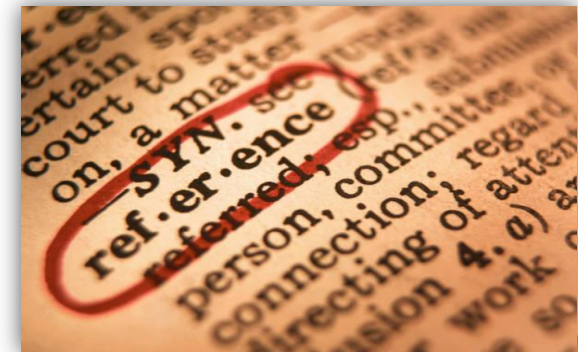
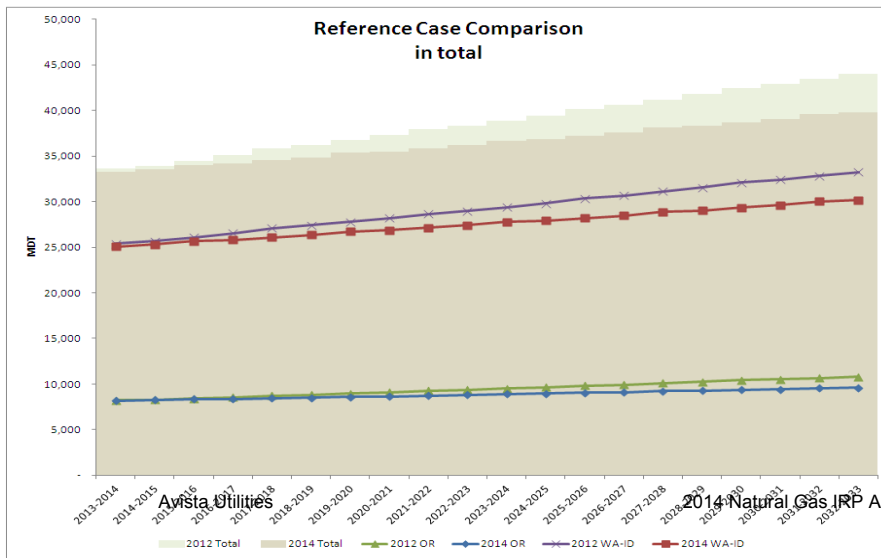
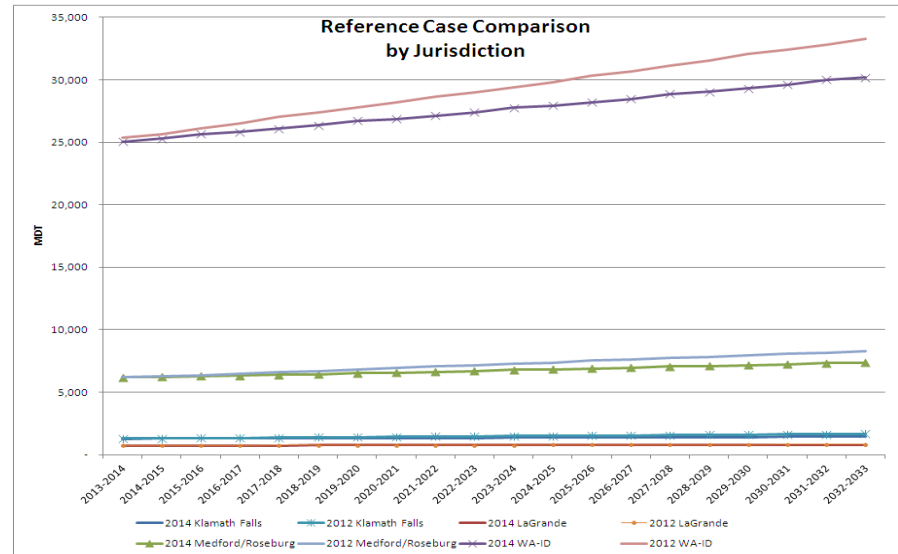
## 1. Customer annual growth rates:

	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>
<b>Washington - Idaho</b>	<b>1.0%</b>	<b>1.0%</b>	<b>-0.53%</b>
<b>Klamath Falls</b>	<b>0.66%</b>	<b>0.66%</b>	<b>0.0%</b>
<b>LaGrande</b>	<b>0.40%</b>	<b>0.40%</b>	<b>0.0%</b>
<b>Medford</b>	<b>1.1%</b>	<b>1.1%</b>	<b>0.0%</b>
<b>Roseburg</b>	<b>0.8%</b>	<b>0.02%</b>	<b>0.0%</b>

2. Use per customer coefficients –3 year average use per HDD per customer
3. Weather planning standard – coldest day on record
  - WA/ID 82; Medford 61; Roseburg 55; Klamath 72; La Grande 74

# Reference Demand Case

Year	2012	2014	Delta
1	33,603	33,249	-1%
2	33,929	33,538	-1%
3	34,475	33,996	-1%
4	35,074	34,174	-3%
5	35,796	34,520	-4%
6	36,235	34,850	-4%
7	36,765	35,335	-4%
8	37,311	35,513	-5%
9	37,948	35,849	-6%
10	38,342	36,189	-6%
11	38,902	36,693	-6%
12	39,460	36,878	-7%
13	40,198	37,228	-8%
14	40,617	37,582	-8%
15	41,195	38,106	-8%
16	41,775	38,300	-9%
17	42,495	38,664	-10%
18	42,897	39,032	-10%
19	43,456	39,577	-10%
20	44,015	39,779	-11%

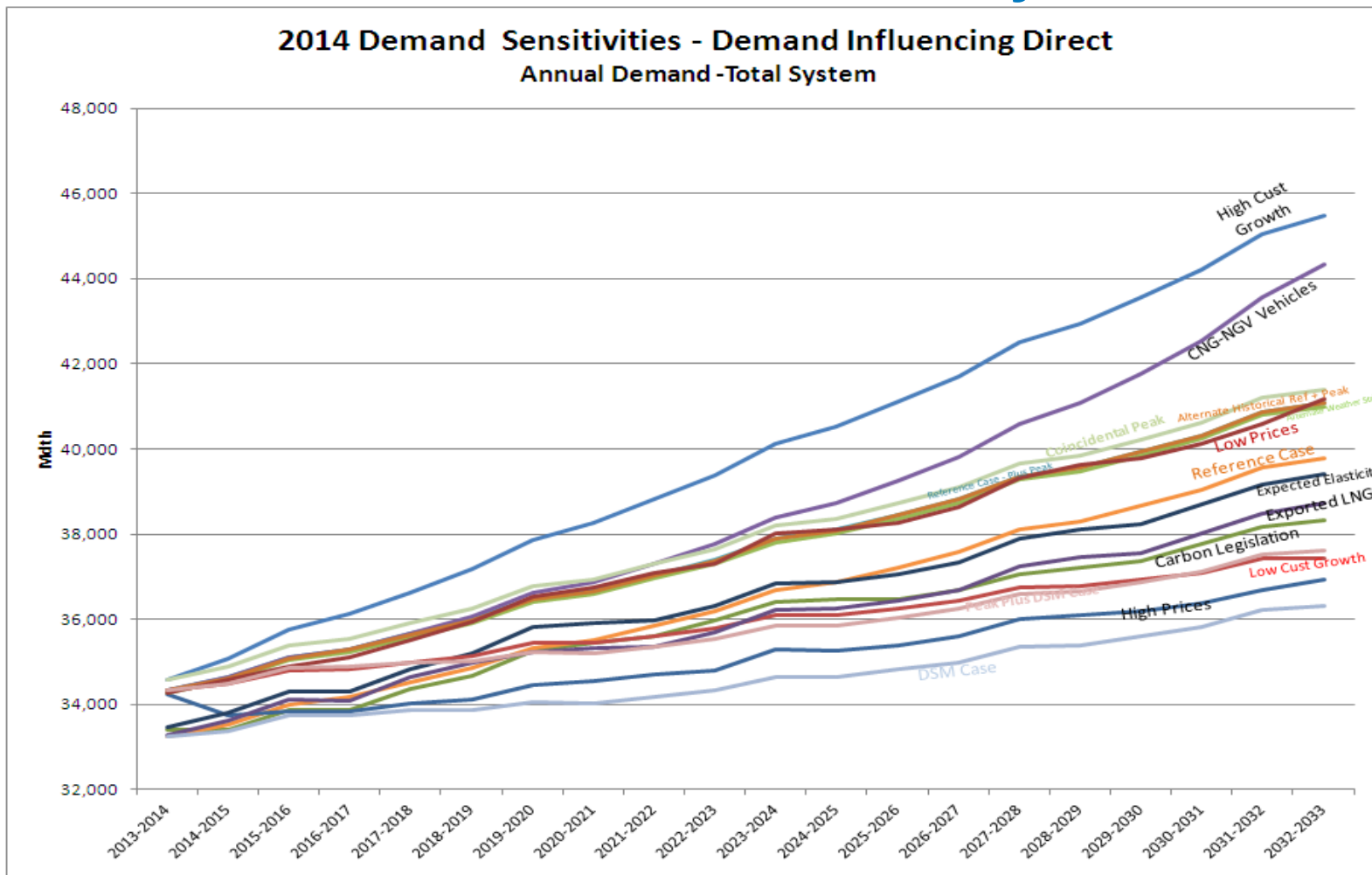


# Demand Sensitivities

Model Sensitivities		DEMAND INFLUENCING - DIRECT									PRICE INFLUENCING - INDIRECT					
		Reference Case	Reference Plus Peak Case	Low Cust Growth	High Cust Growth	CNG/NGV Vehicles	Alternate Weather Std	DSM Case	Peak plus DSM Case	Alterante Historical UPC Case	Expect Elasticity	Low Prices	High Prices	Carbon Legislation	Exported LNG	
INPUT ASSUMPTIONS																
<b>Customer Growth Rate</b>																
Residential	WA/ID			40% Decrease in Cust Growth Rates	60% Increase in Cust Growth Rates											
Residential	Medford															
Residential	Roseburg															
Residential	Klamath															
Residential	La Grande															
Commercial	WA/ID															
Commercial	Medford															
Commercial	Roseburg															
Commercial	Klamath															
Commercial	La Grande															
<b>Use per Customer</b>		3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	15% Growth Cumulative	3 Year Historical	3 Year Historical	3 Year Historical	5 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	3 Year Historical	
<b>Weather</b>																
Planning Standard		20 Year Normal	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest 20yrs	Normal	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	Coldest on Record	
<b>Demand Side Management</b>																
Programs Included		No	No	No	No	No	No	Expected	Expected	No	No	No	No	No	No	
<b>Prices</b>																
Price curve		Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Expected	Low	High	Expected	Expected	
Price curve adder (\$/Dth)		None	None	None	None	None	None	None	None	None					\$ 5.50 Adder After 5yrs	
Elasticity		None	None	None	None	None	None	None	None	None	Expected	Expected	Expected	Expected	Expected	
Carbon Adder (\$/Ton)		None	None	None	None	None	None	None	None	None					\$5 starting in 2022	



# Demand Sensitivities- Preliminary Results





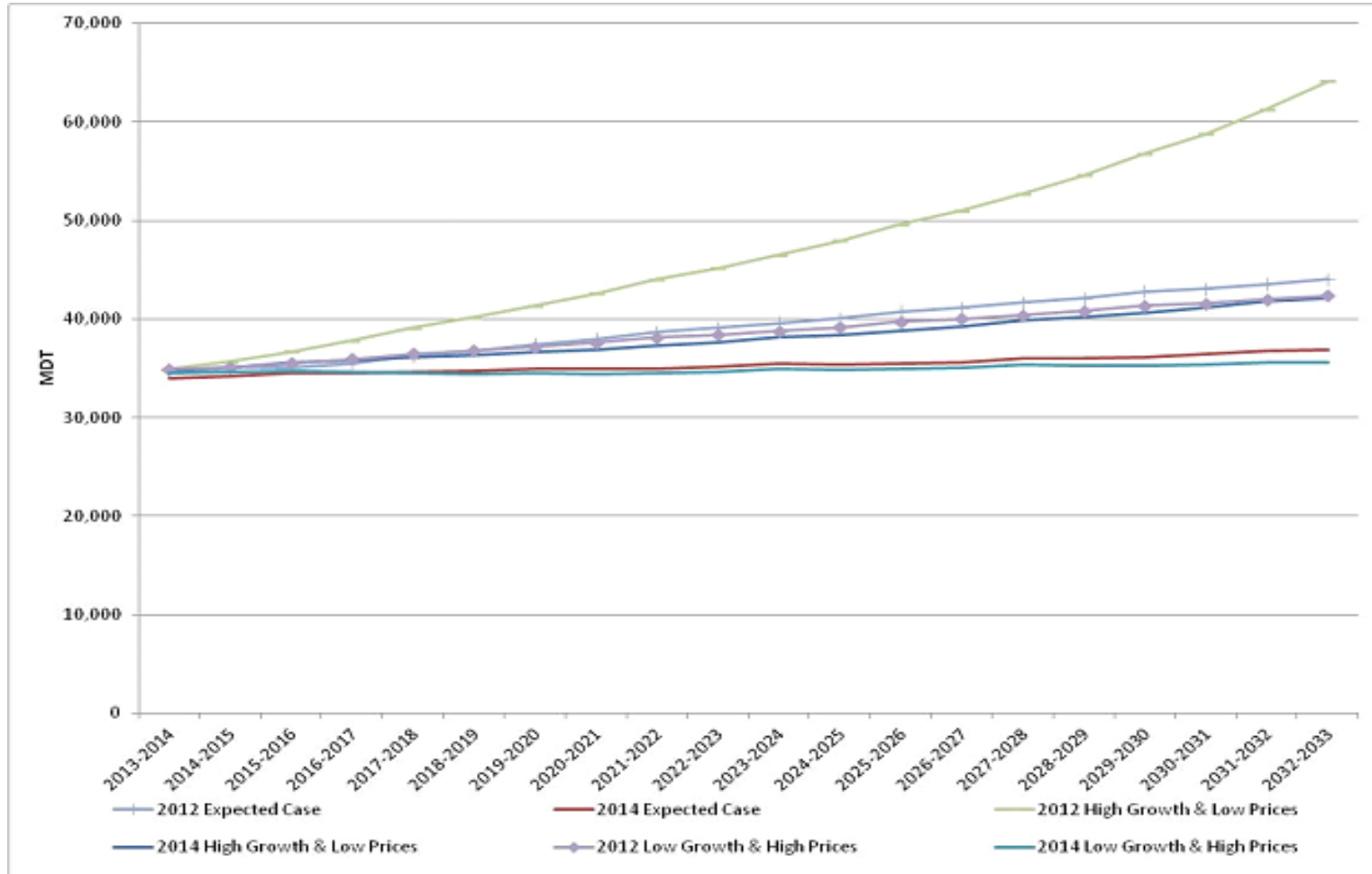
# Mix and Match to Make Scenarios



## Demand Scenarios – Proposed

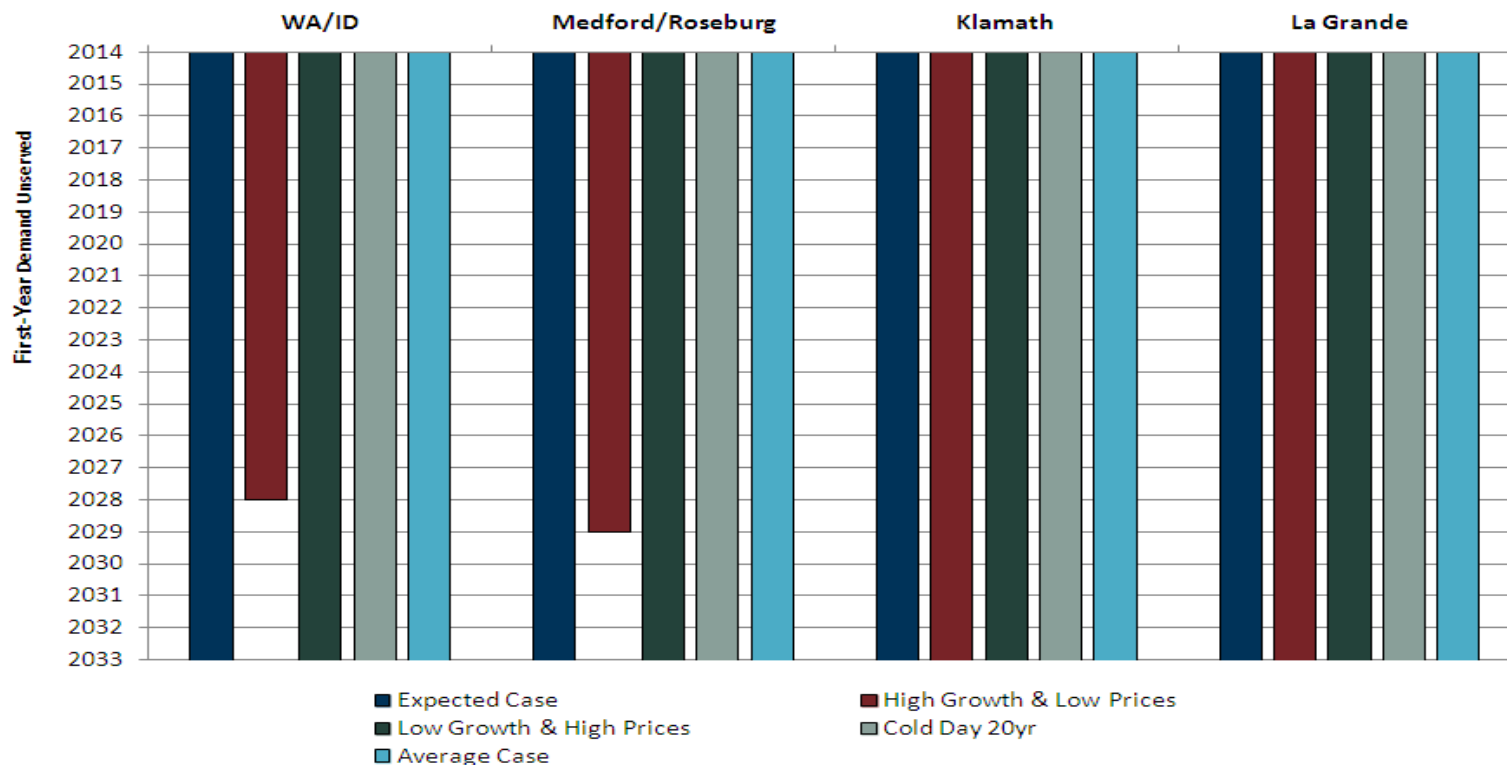
<b>Proposed Scenarios</b>	Expected <u>Case</u>	High Growth & Low Prices	Low Growth & High Prices	Cold Day 20yr <u>Weather Std</u>	Average <u>Case</u>
INPUT ASSUMPTIONS					
<b>Customer Growth Rate</b>	Reference Case Cust Growth Rates	60% Increase in Cust Growth Rates	40% Decrease in Cust Growth Rates	Reference Case Cust Growth Rates	Reference Case Cust Growth Rates
<b>Use per Customer</b>	3 yr Flat + Price Elast.	3 yr Flat + Price Elast. + CNG/NGV	3 yr Flat + Price Elast.	3 yr Flat + Price Elast.	3 yr Flat + Price Elast.
<b>Demand Side Management</b>	Yes	Yes	Yes	Yes	Yes
<b>Weather Planning Standard</b>	Coldest Day	Coldest Day	Coldest Day	Alternate Planning Standard	Normal
<b>Prices</b>					
Price curve	Expected	Low	High	Expected	Expected
Elasticity	Expected	None	Expected	Expected	Expected
Carbon Adder (\$/Ton)	\$5	None	\$5	\$5	\$5
RESULTS					
<b>First Gas Year Unserved</b>					
	WA/ID	N/A	2027	N/A	N/A
	Medford	N/A	2029	N/A	N/A
	Roseburg	N/A	N/A	N/A	N/A
	Klamath	N/A	N/A	N/A	N/A
	La Grande	N/A	N/A	N/A	N/A

# Demand Scenarios – Preliminary Results



# First Year Unserved – Preliminary Results

**Figure 1.13 - First Year Peak Demand Not Met with Existing Resources**  
Scenario Comparisons



## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – *February 25*
  - Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26*
  - **DSM CPA results, further SENDOUT® results and Stochastic analysis – April 23**
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document





# 2014 Avista Natural Gas IRP

Technical Advisory Committee Meeting 4  
April 23, 2014  
Spokane, WA

# Agenda

- Introductions & Logistics
- Demand Side Management Potential
- Assumptions Review
- Demand Sensitivities and Scenarios Updates
- Supply Side Resource Options
- Stochastic Analysis
- Key Issues & Document Discussion

## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – January 24
  - Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – *February 25*
  - Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26*
  - **DSM CPA results, further SENDOUT® results and document discussion – *April 23***
- **May 30, 2014** – Draft of IRP document to TAC
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document





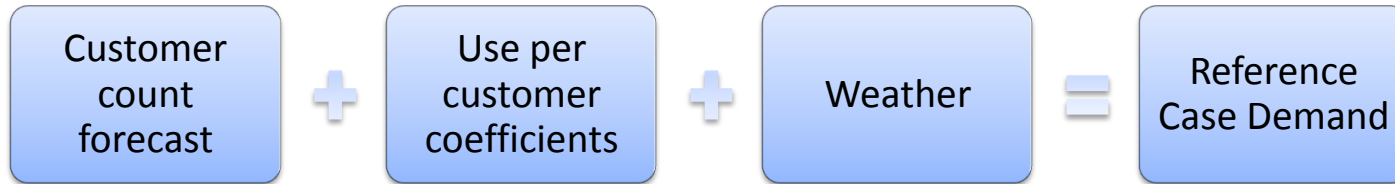


# Demand Side Management CPA Results



# Assumptions Review

# Developing a Reference Case

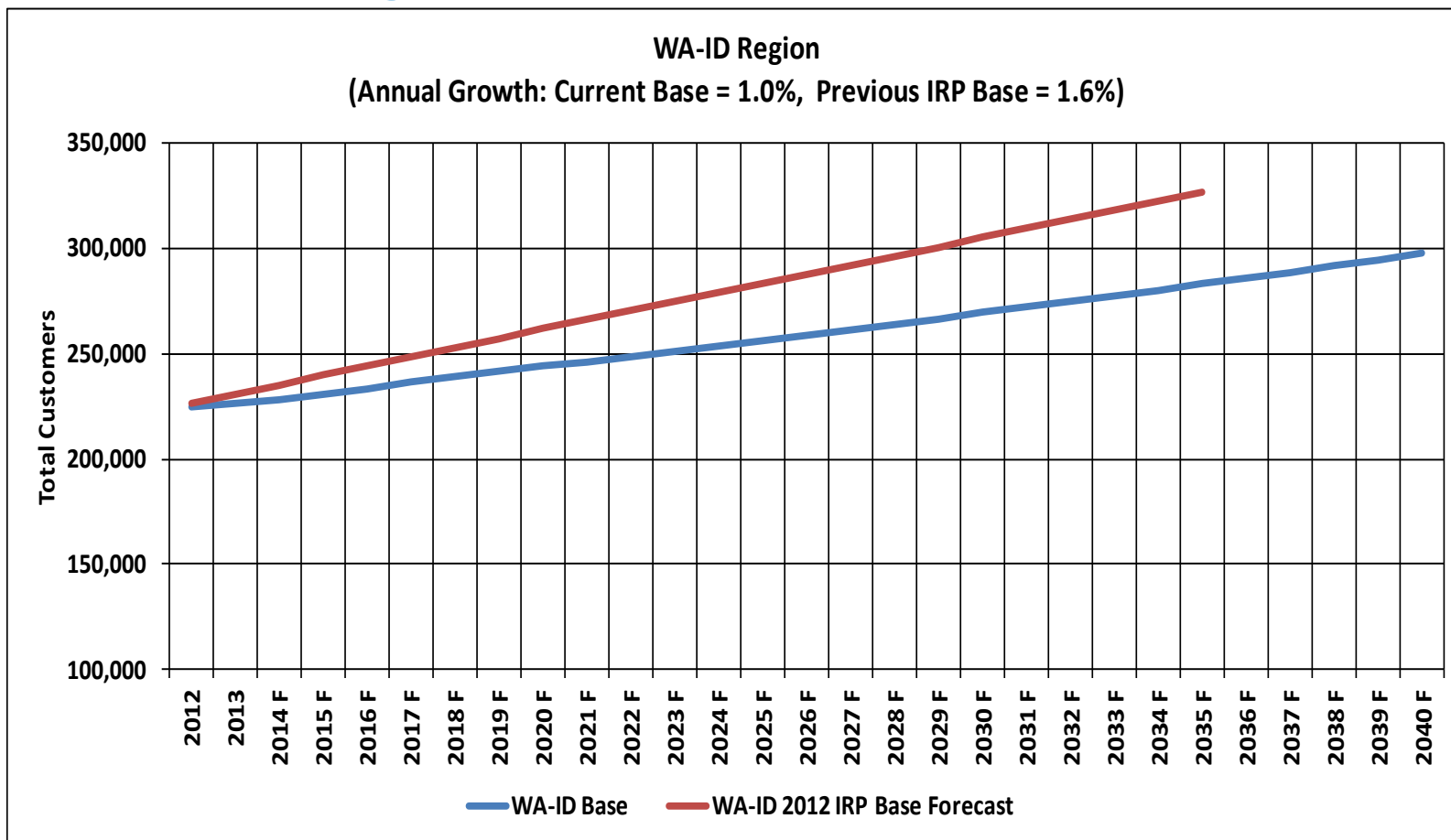


## 1. Customer annual growth rates:

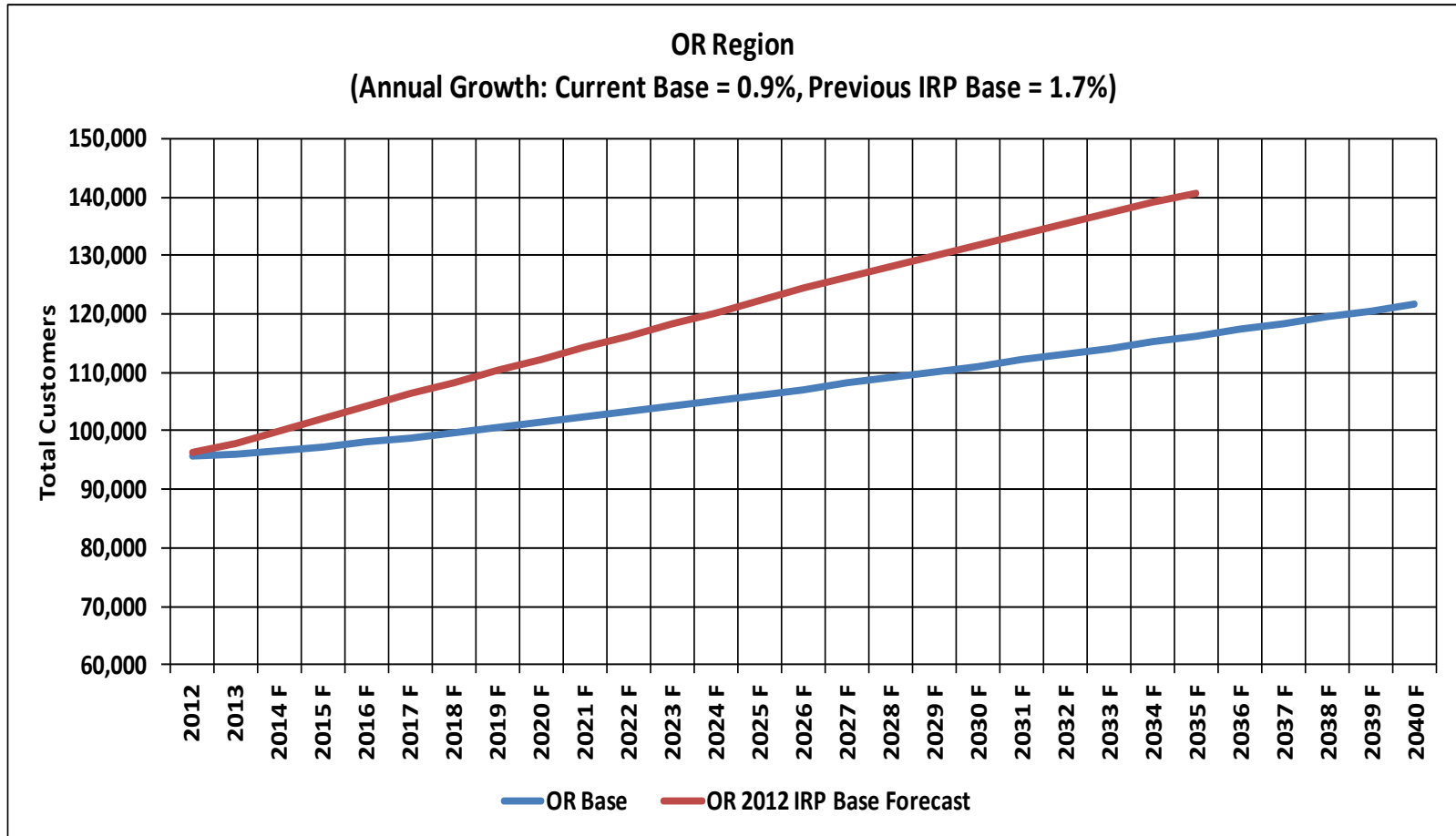
	<b>Residential</b>	<b>Commercial</b>	<b>Industrial</b>
<b>Washington - Idaho</b>	<b>1.0%</b>	<b>1.0%</b>	<b>-0.53%</b>
<b>Klamath Falls</b>	<b>0.66%</b>	<b>0.66%</b>	<b>0.0%</b>
<b>LaGrande</b>	<b>0.40%</b>	<b>0.40%</b>	<b>0.0%</b>
<b>Medford</b>	<b>1.1%</b>	<b>1.1%</b>	<b>0.0%</b>
<b>Roseburg</b>	<b>0.8%</b>	<b>0.02%</b>	<b>0.0%</b>

2. Use per customer coefficients – 3 year historical use per customer by class
3. Weather planning standard – coldest day on record
  - WA/ID 82; Medford 61; Roseburg 55; Klamath 72; La Grande 74

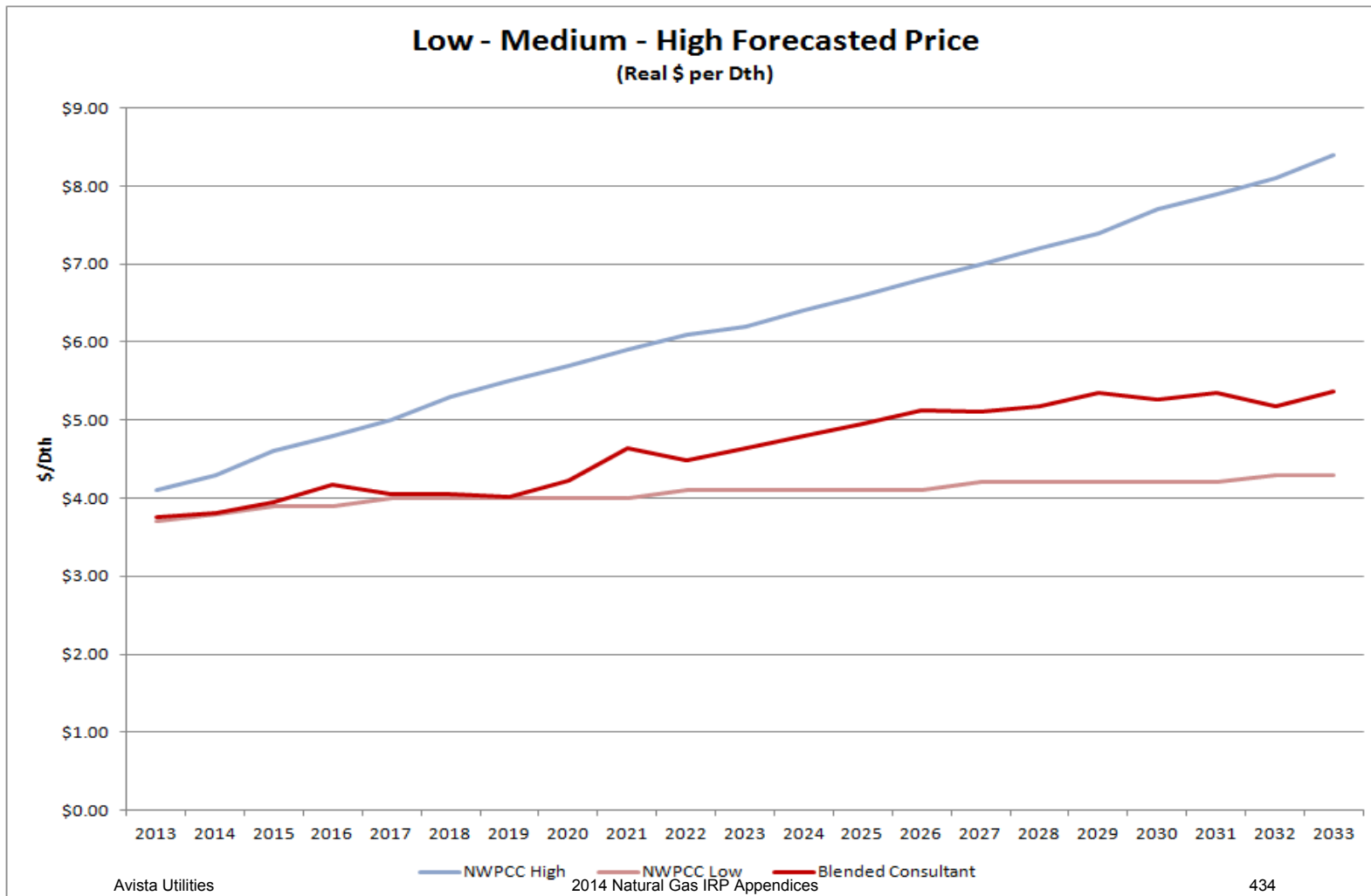
# WA-ID Region: 2014 IRP and 2012 IRP



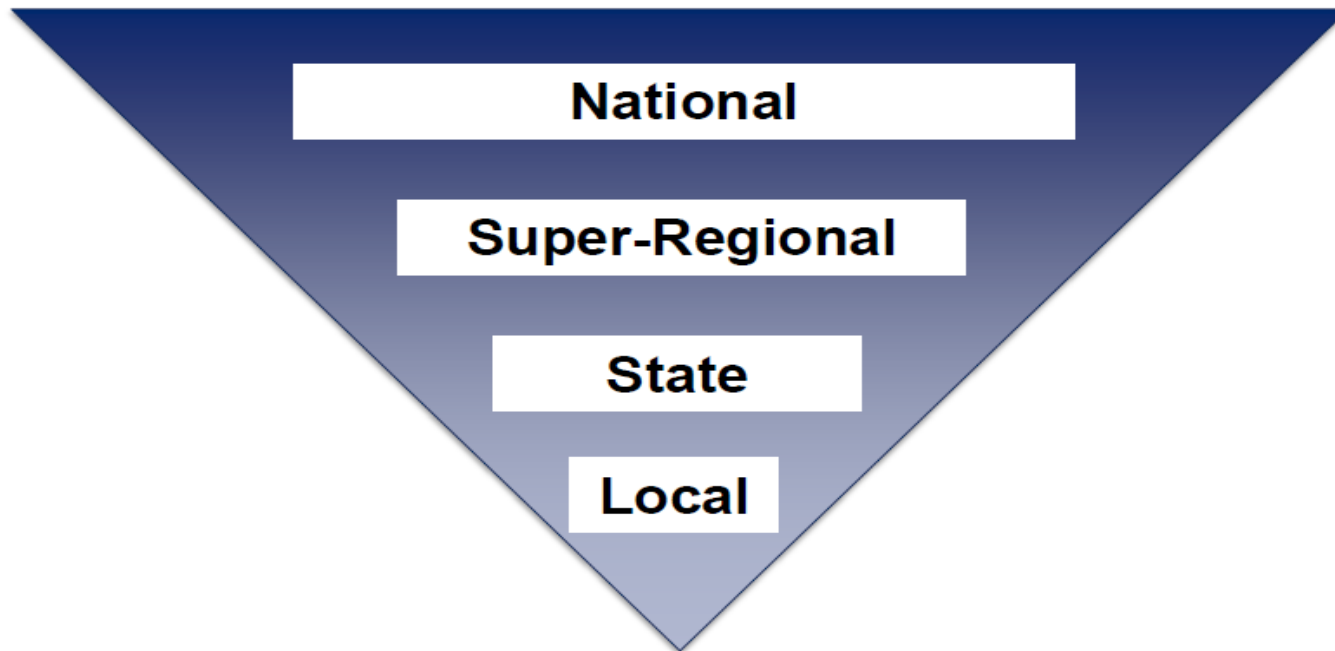
# OR Region: 2014 IRP and 2012 IRP



# Natural Gas Prices



# Price Elasticity: What does the research show?



**Statistical significance of own-price becomes more uncertain as geographic area of measurement shrinks.\***

**\*Bernstein, M.A. and J. Griffin (2005). *Regional Differences in Price-Elasticity of Demand for Energy*, Rand Corporation**

Avista Utilities

2014 Natural Gas IRP Appendices



# Price Elasticity Proposed Assumptions

- The data is a mixed bag at best:
  - 8 of 9 super regions have statistically significant short and long run elasticities.
  - At a state level only 10 of 50 show statistical significant elasticities.
  - In some cases, the estimated elasticities are positive.

We incorporated a  $-.15$  price elastic response for our expected elasticity assumption.



# Carbon Legislation Sensitivities

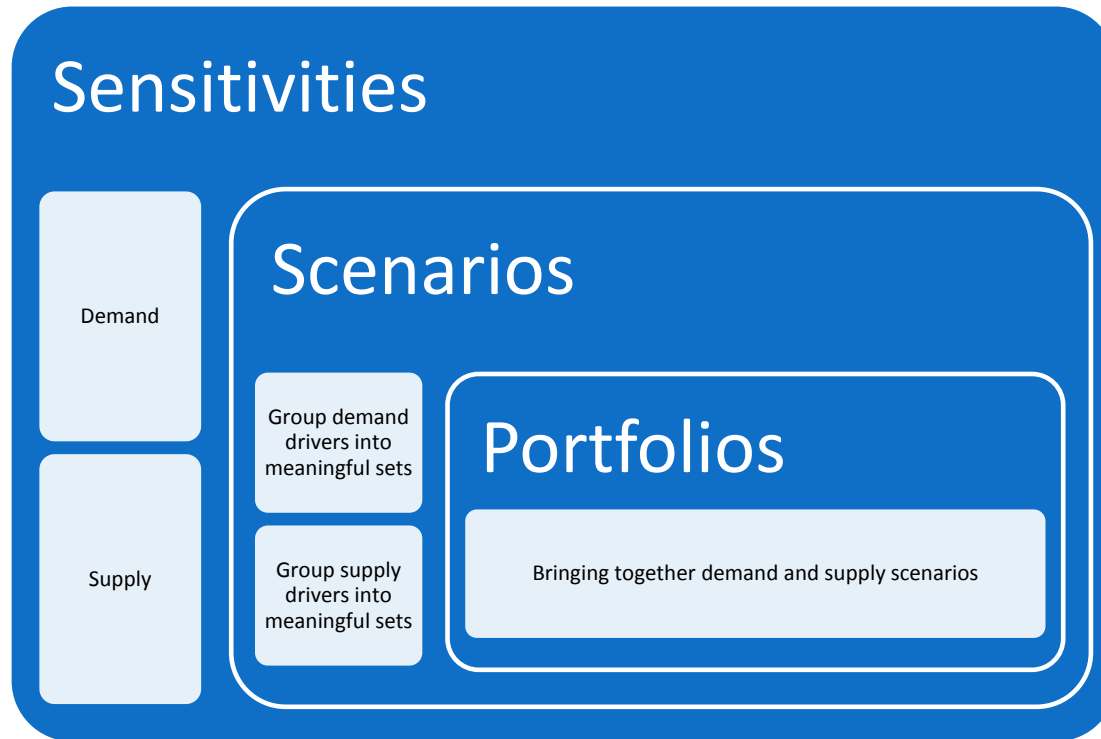
Carbon Legislation Case	2013	2033
Low	\$ 5.00	\$ 5.00
Medium	\$ 8.32	\$ 14.83
High	\$ 16.00	\$ 28.00

\*Real Dollars per Ton of CO<sub>2</sub>



# Demand Sensitivities & Scenarios Update

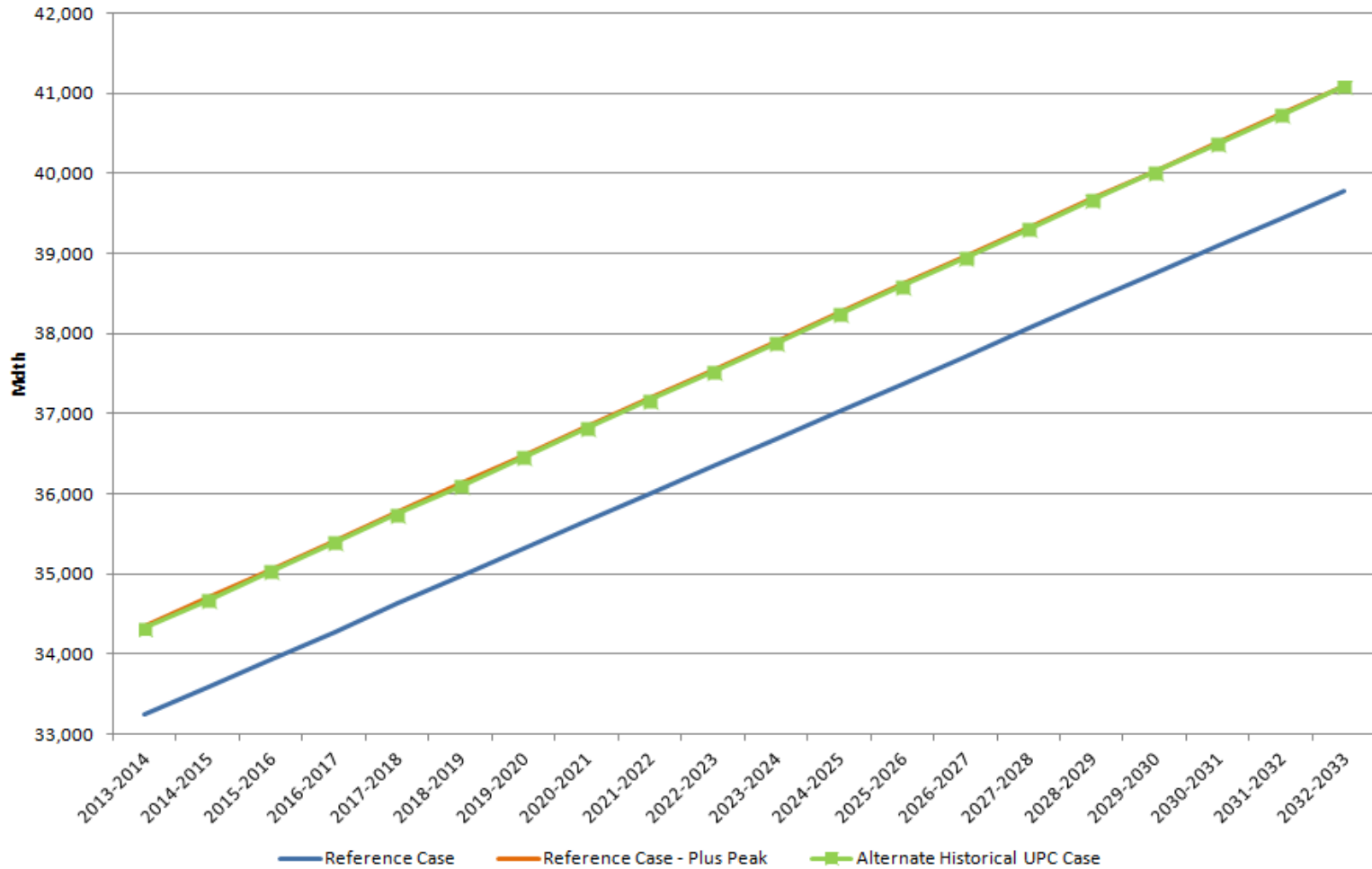
# Sensitivities, Scenarios, Portfolios



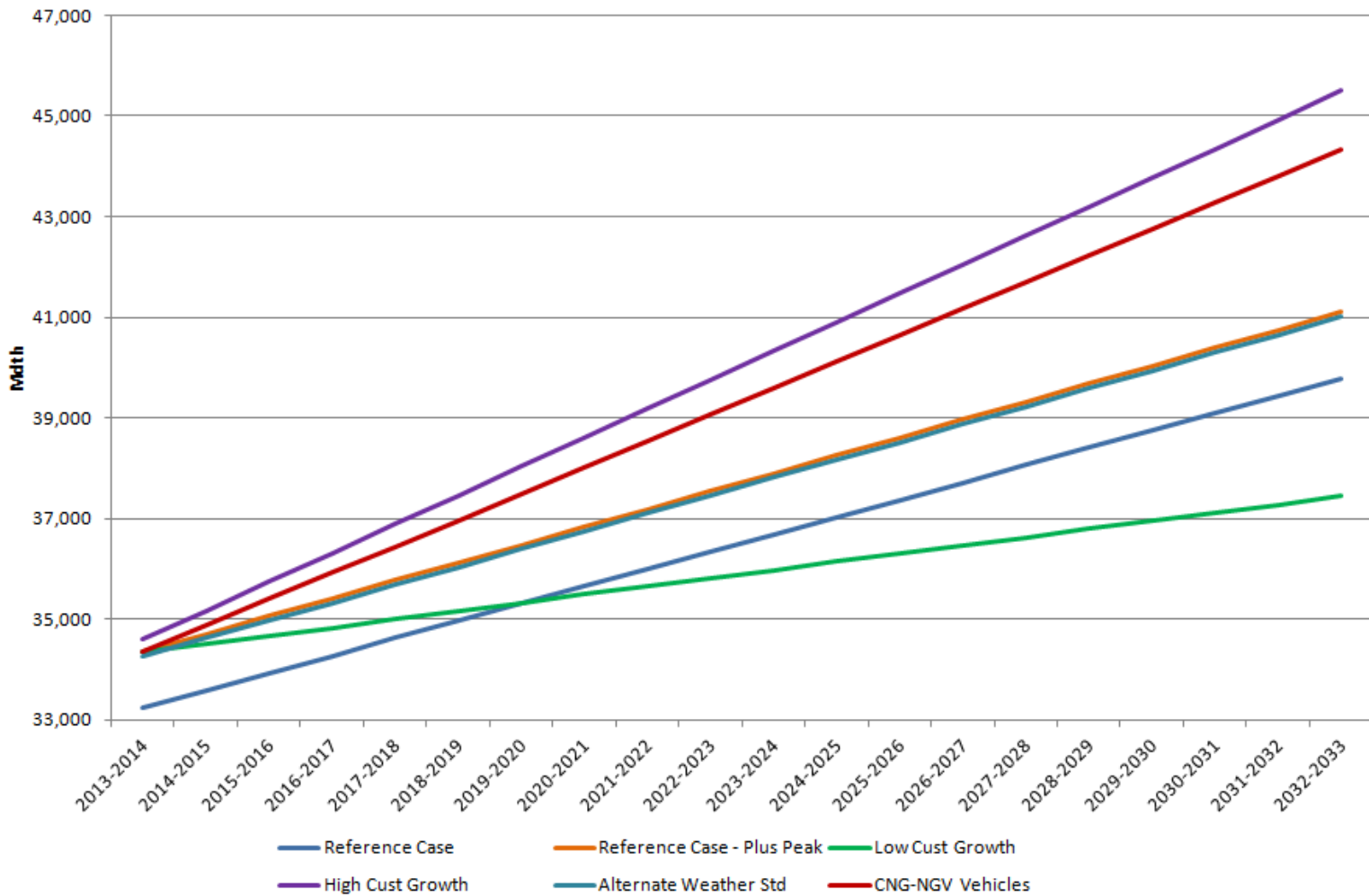
# Sensitivity Analysis



### 2014 Demand Sensitivities - Demand Influencing Direct Annual Demand - Total System



### 2014 Demand Sensitivity Analysis - Direct Annual Demand

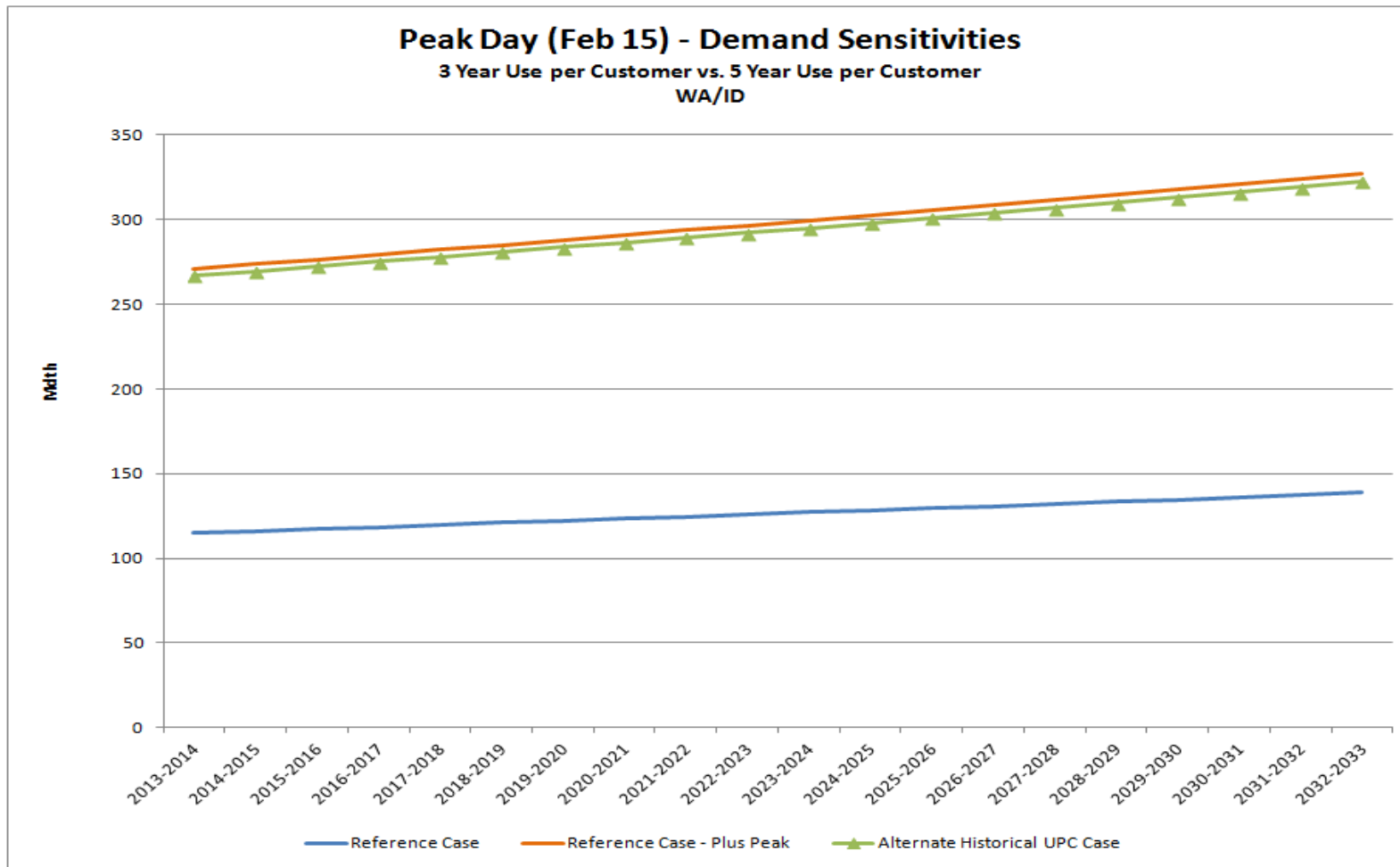


Avista Utilities

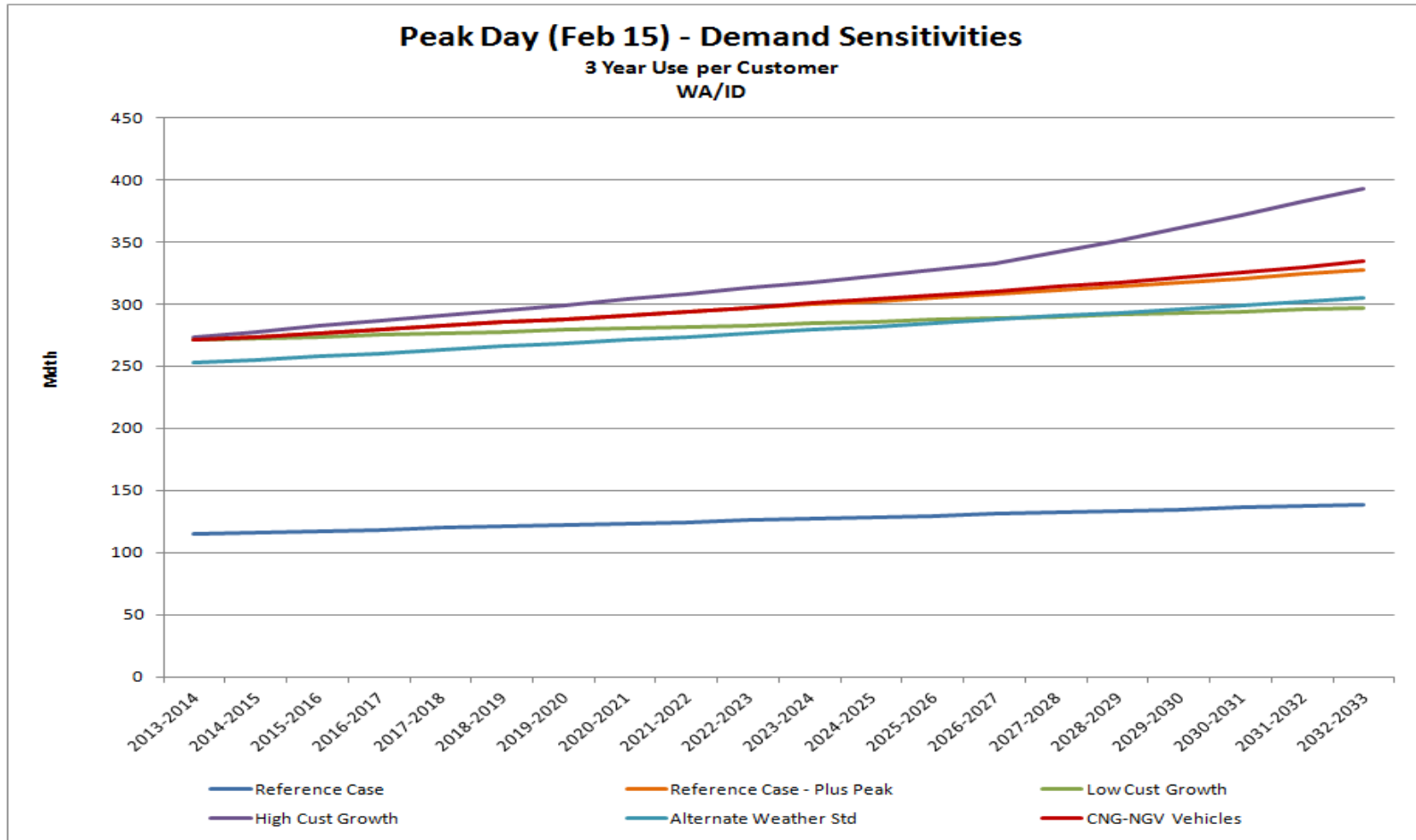
2014 Natural Gas IRP Appendices

442

## Demand Sensitivity Analysis – DIRECT Peak Day Demand

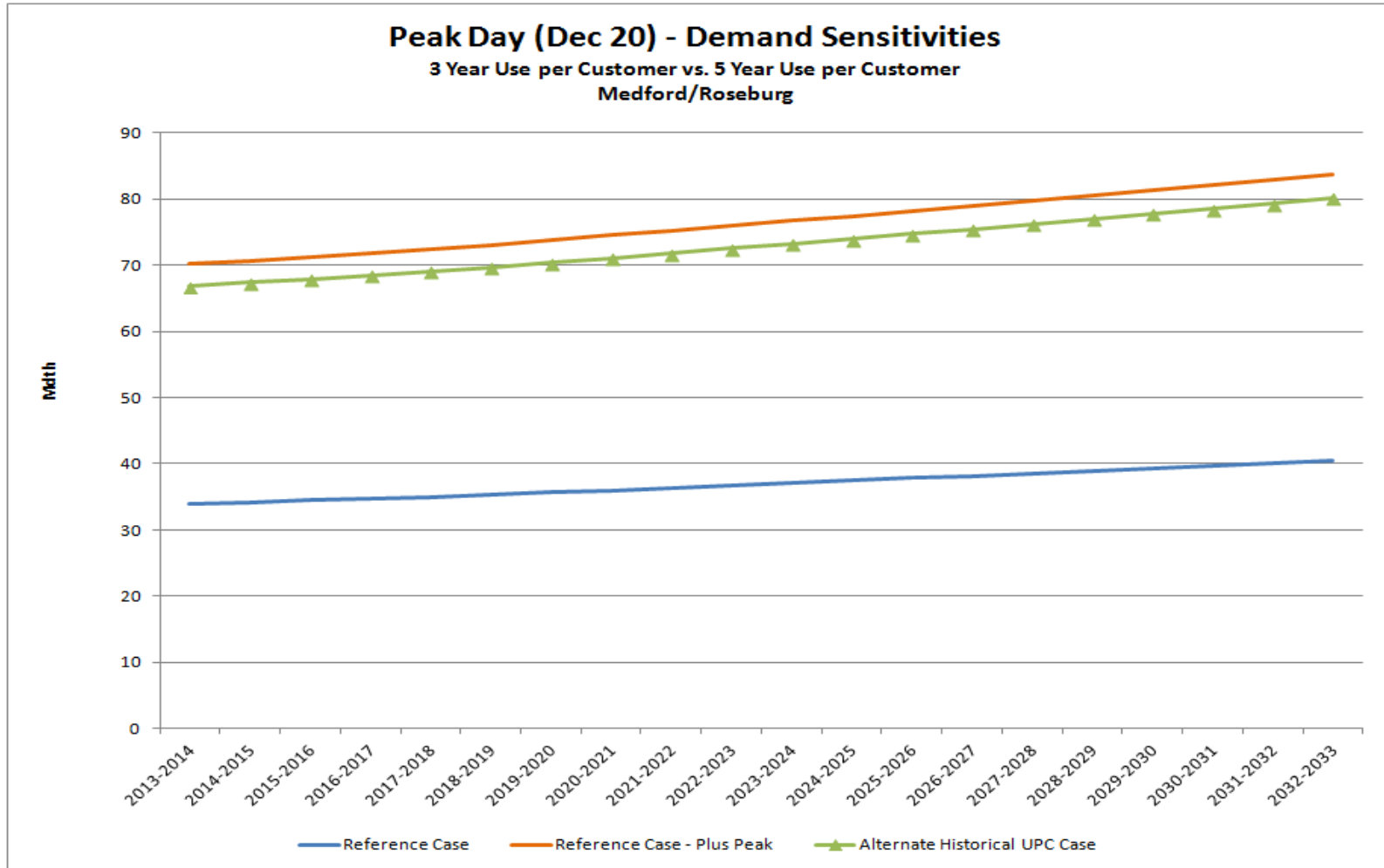


## Demand Sensitivity Analysis – DIRECT Peak Day Demand

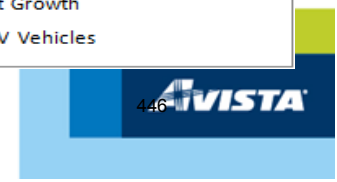
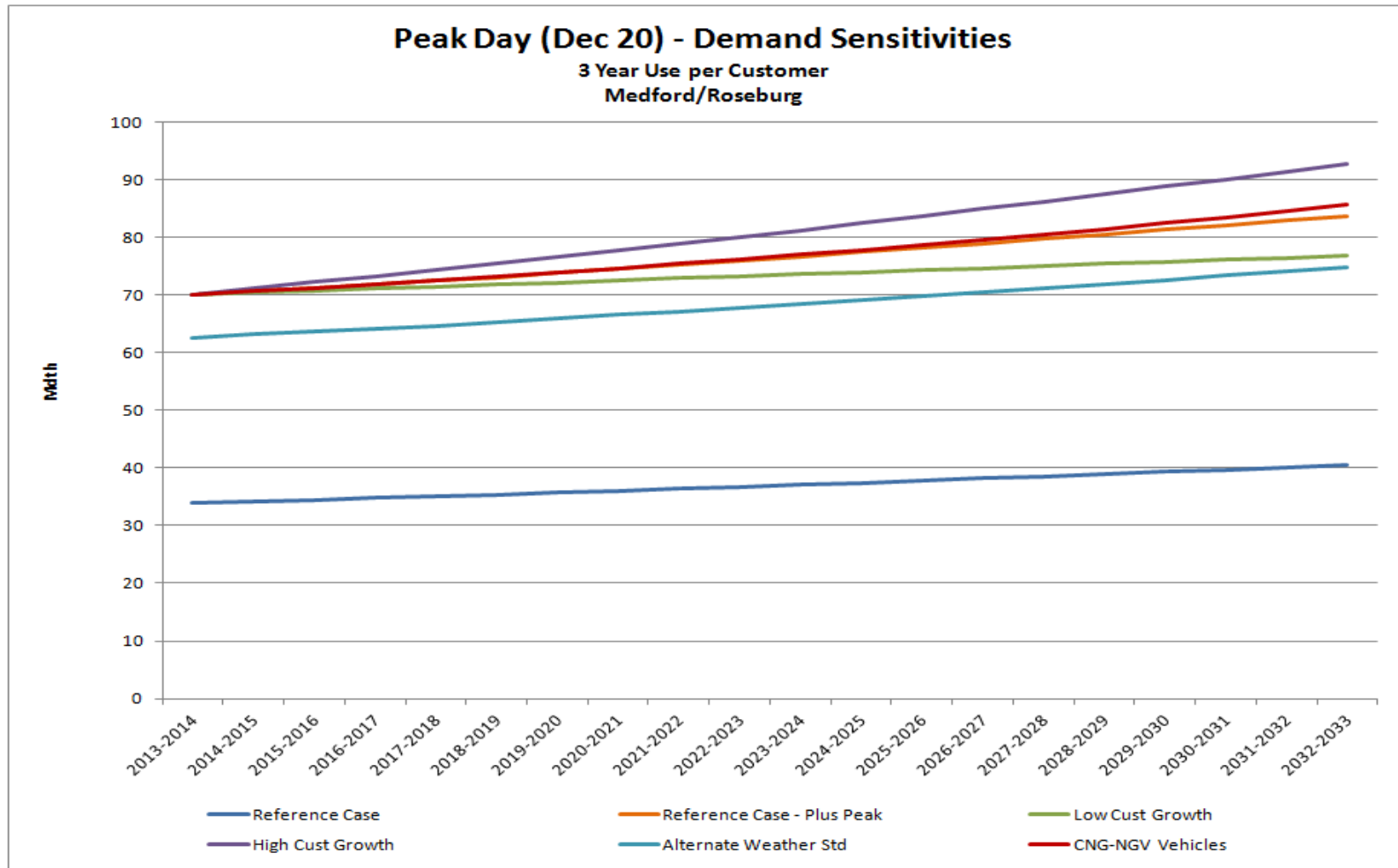




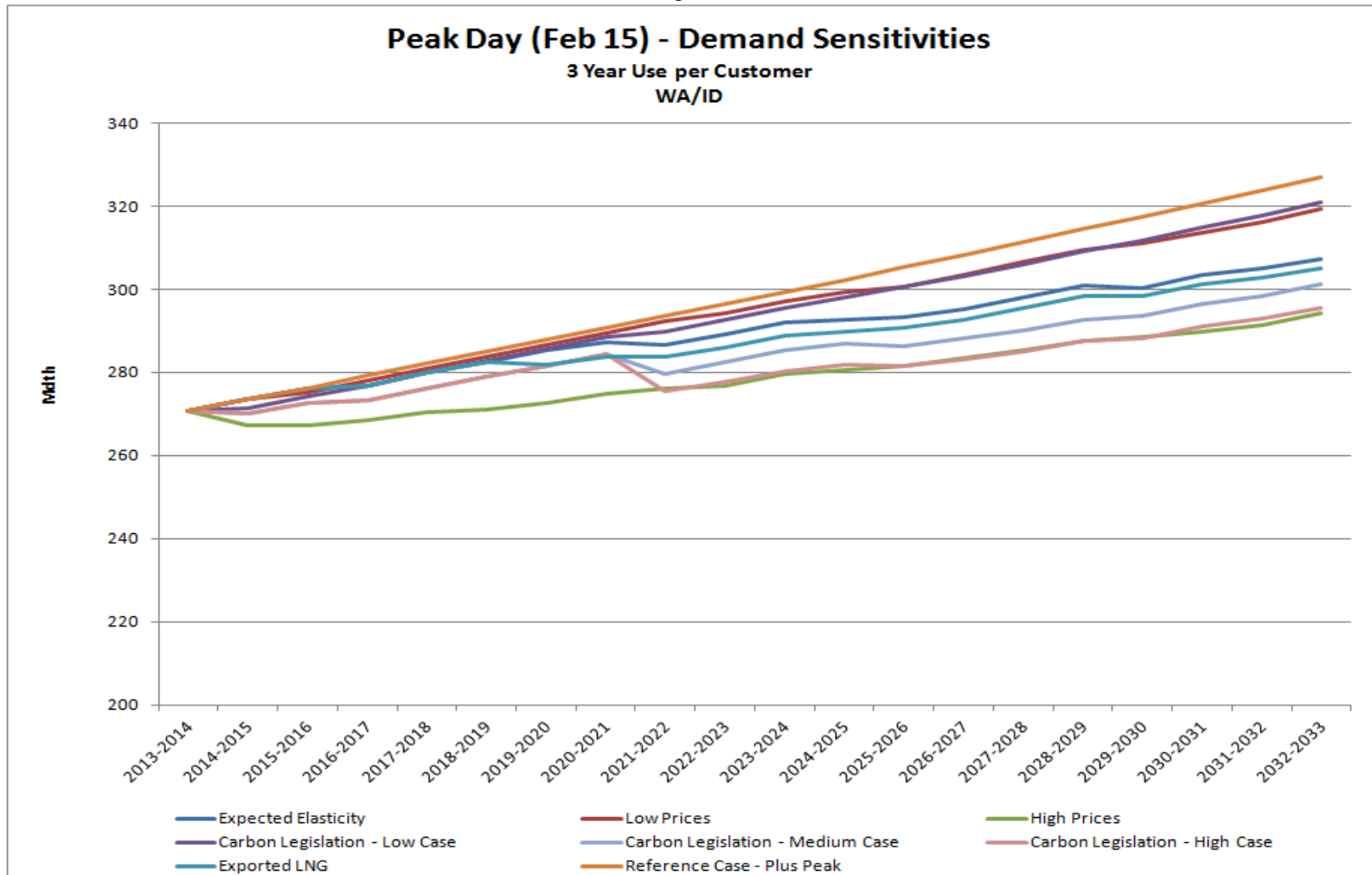
## Demand Sensitivity Analysis – DIRECT Peak Day Demand



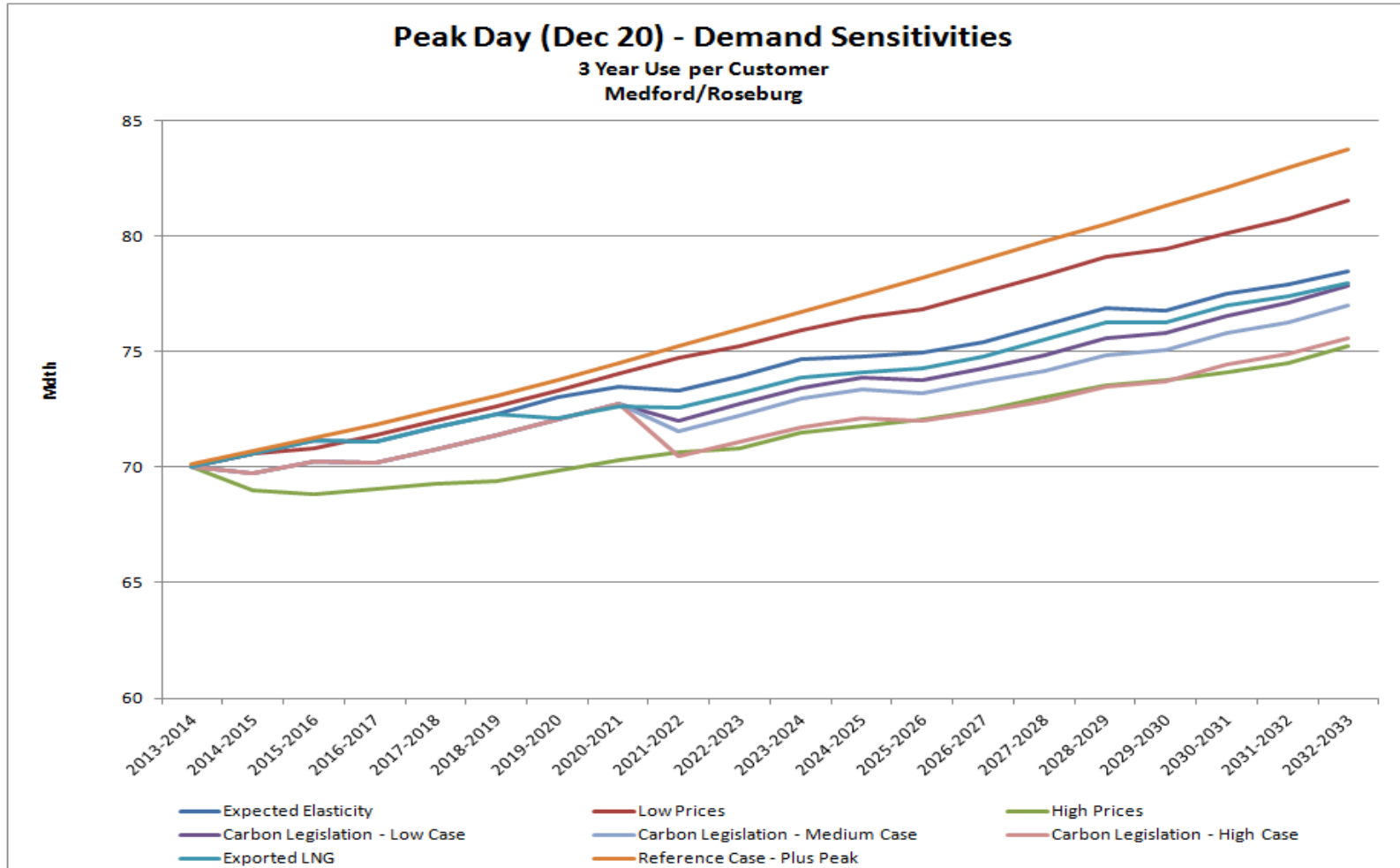
## Demand Sensitivity Analysis – DIRECT Peak Day Demand



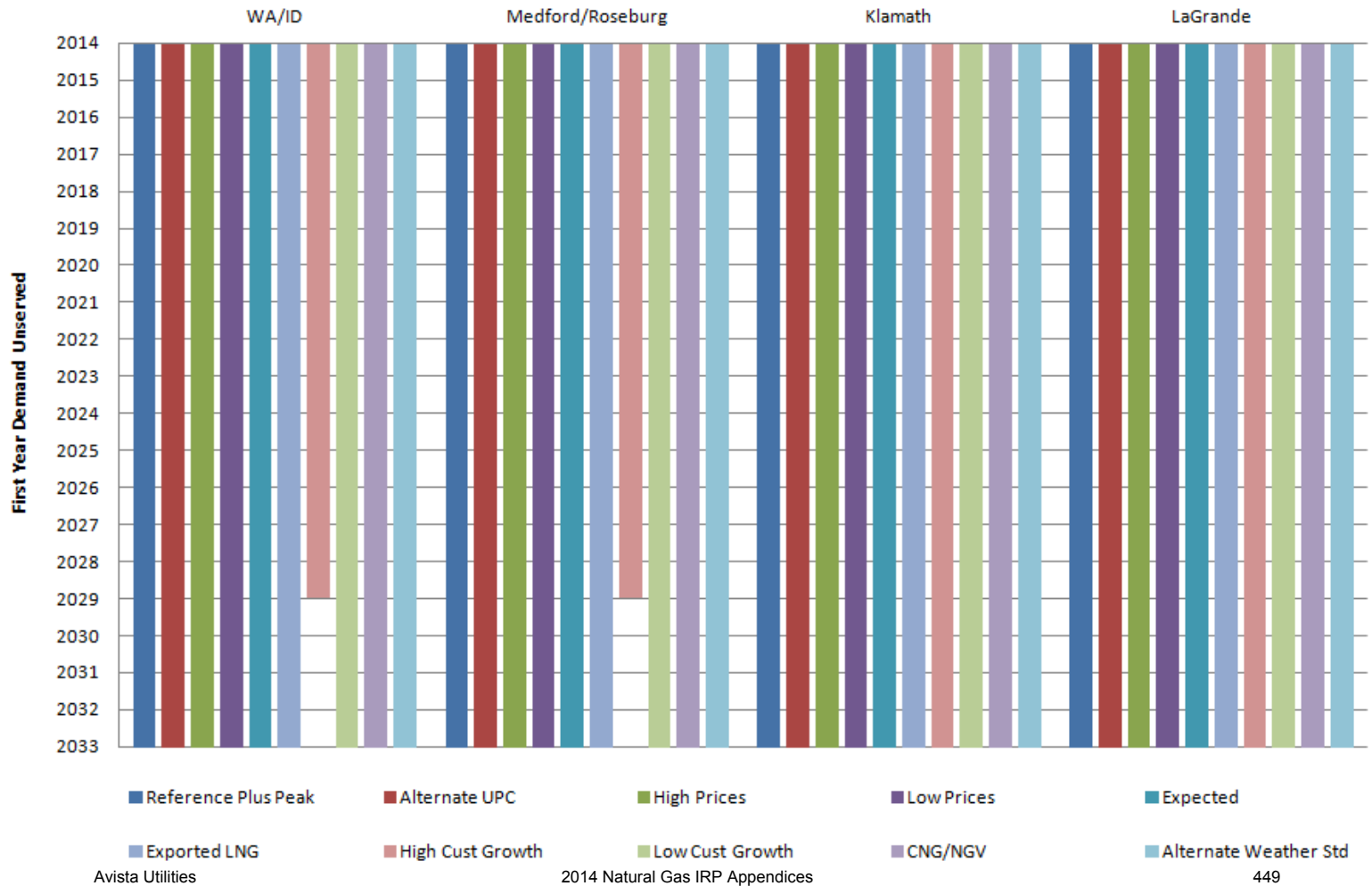
## Demand Sensitivity Analysis – INDIRECT Peak Day Demand



## Demand Sensitivity Analysis – INDIRECT Peak Day Demand



## First Year Peak Demand Not Met with Existing Resources Sensitivity Comparisons



Avista Utilities

2014 Natural Gas IRP Appendices

449

# Scenario Analysis

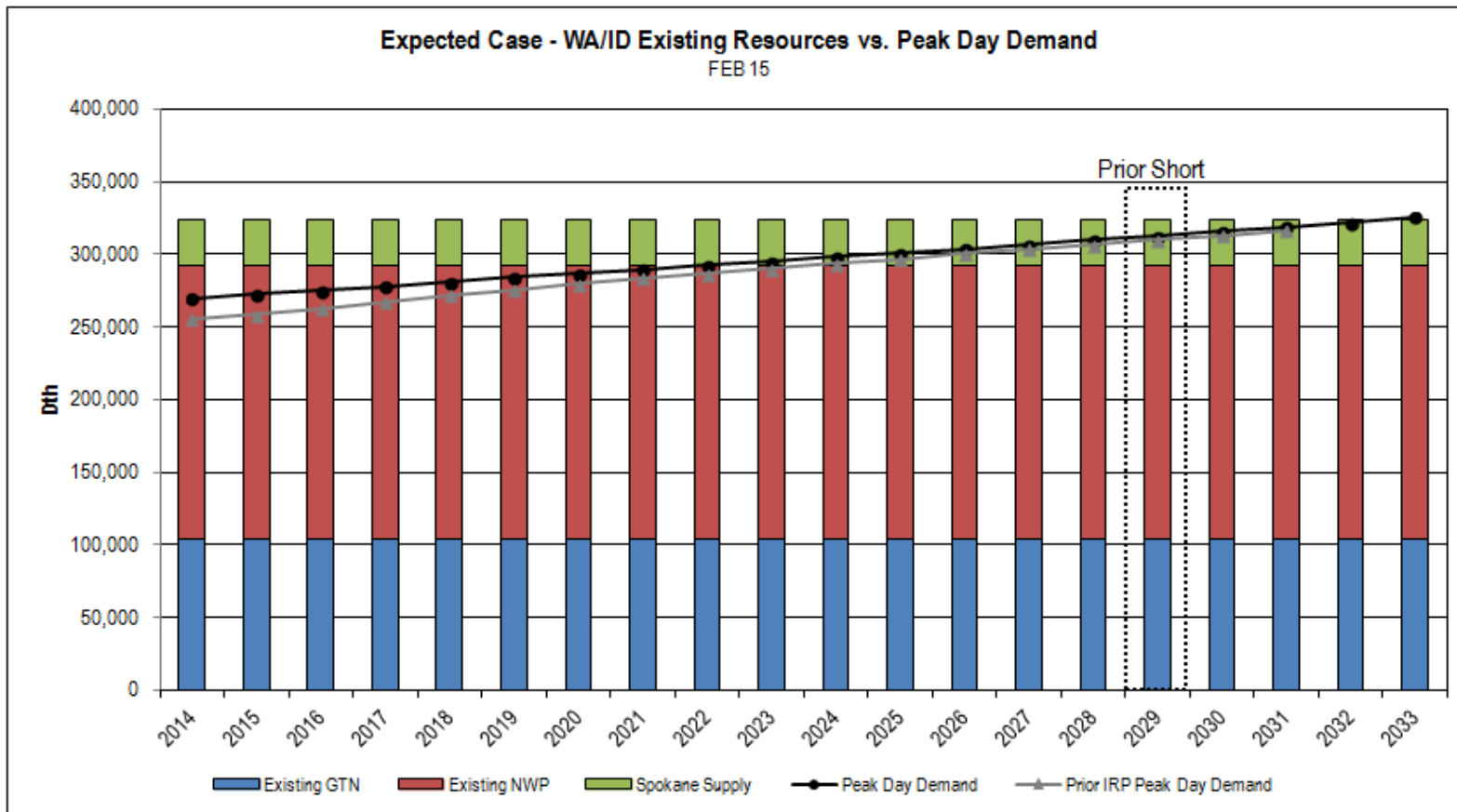


# Proposed Scenarios

<b>Proposed Scenarios</b>	Expected Case	High Growth & Low Prices	Low Growth & High Prices	Cold Day 20yr Weather Std	Average Case
<b>Input Assumptions</b>	Reference Case Cust			Reference Case	Reference Case
<b>Customer Growth Rate</b>	Growth Rates	High Growth Rate	Low Growth Rate	Growth Rate	Growth Rate
<b>Use Per Customer</b>	3 Yr Flat + Price Elast.	3 Yr Flat + Price Elast. + CNG/LNG	3 Yr Flat + Price Elast.	3 Yr Flat + Price Elast.	3 Yr Flat + Price Elast.
<b>Demand Side Management</b>	Yes	Yes	Yes	Yes	Yes
<b>Weather Planning Standard</b>	Coldest Day	Coldest Day	Coldest Day	Alternate Planning Std.	Normal
<b>Prices</b>					
Price curve	Expected	Low	High	Expected	Expected
Price curve adder (\$/Dth)	None	None	None	None	None
Elasticity	Expected	None	Expected	Expected	Expected
Carbon Adder (\$/Ton)	\$14-\$22		\$14-\$22	\$14-\$22	

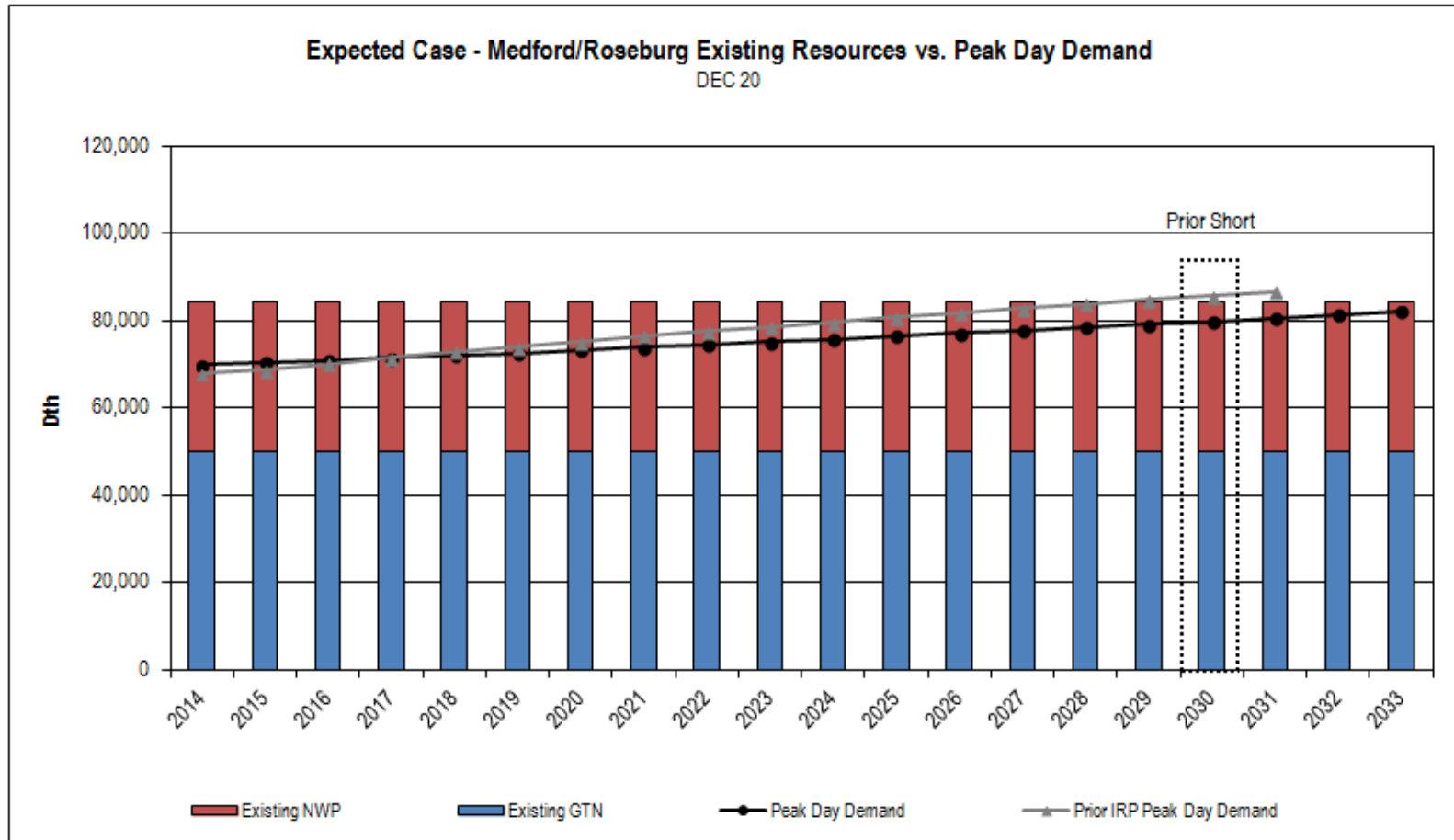


# Existing Resources vs. Peak Day Demand

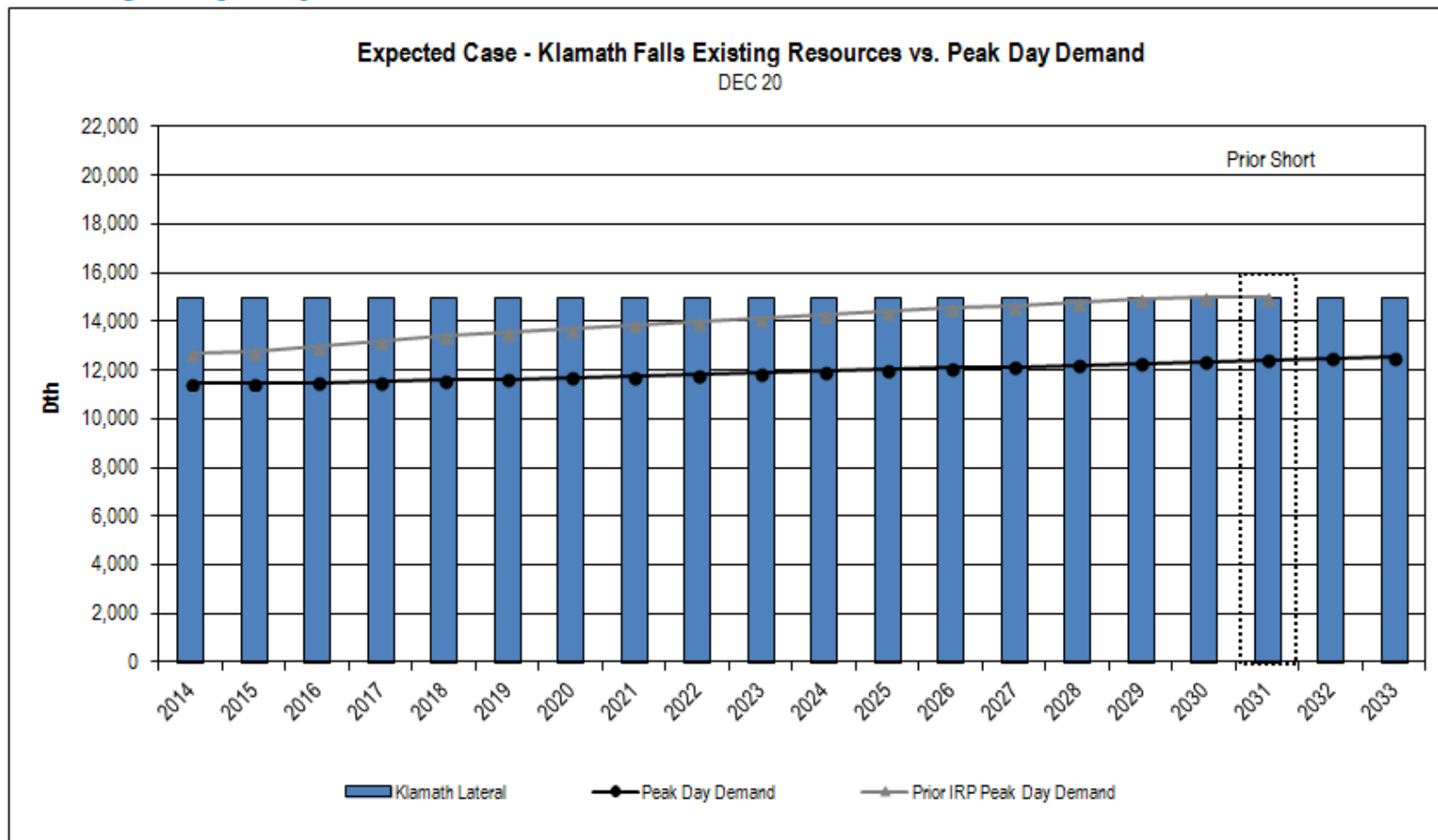




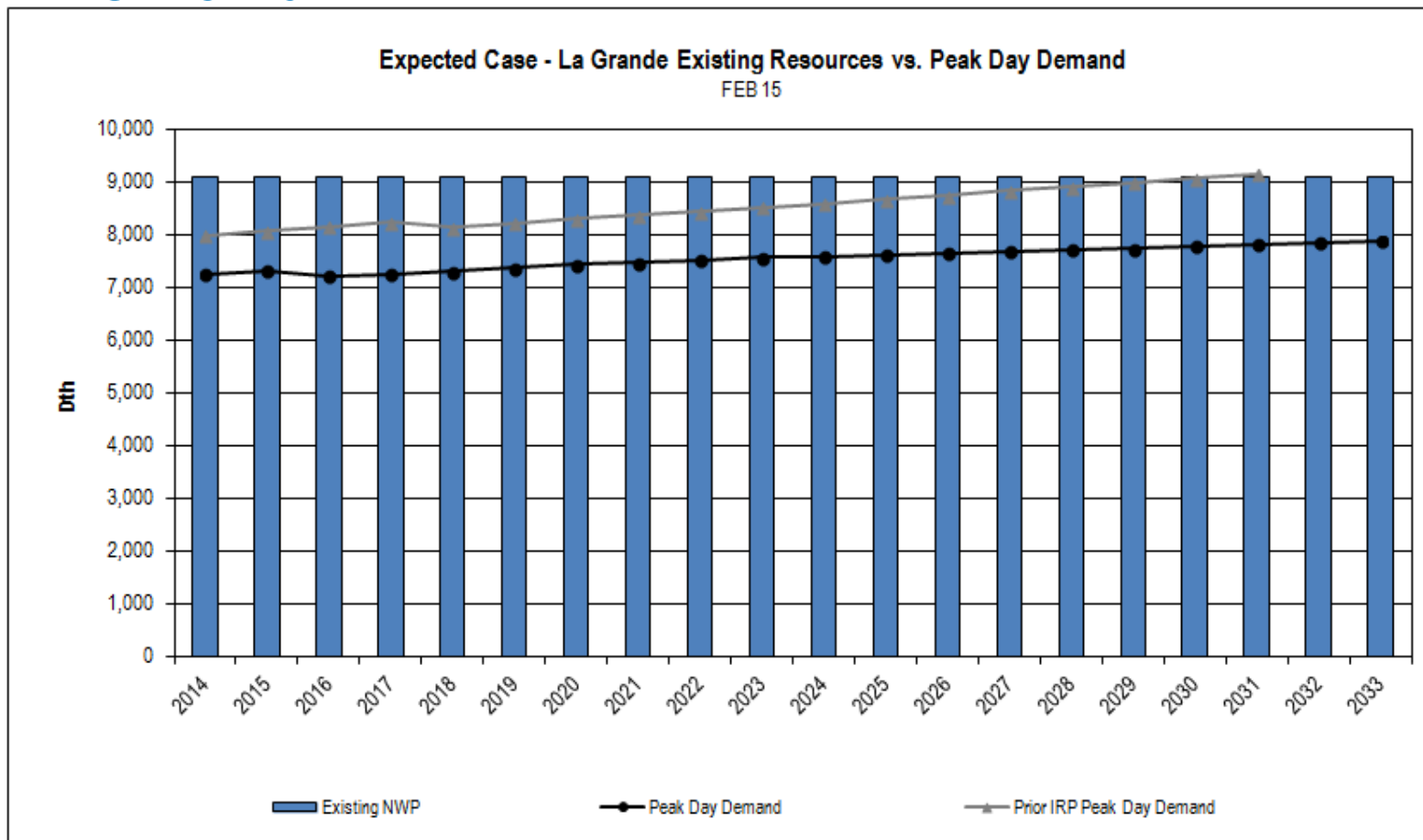
# Existing Resources vs. Peak Day Demand



# Existing Resources vs. Peak Day Demand

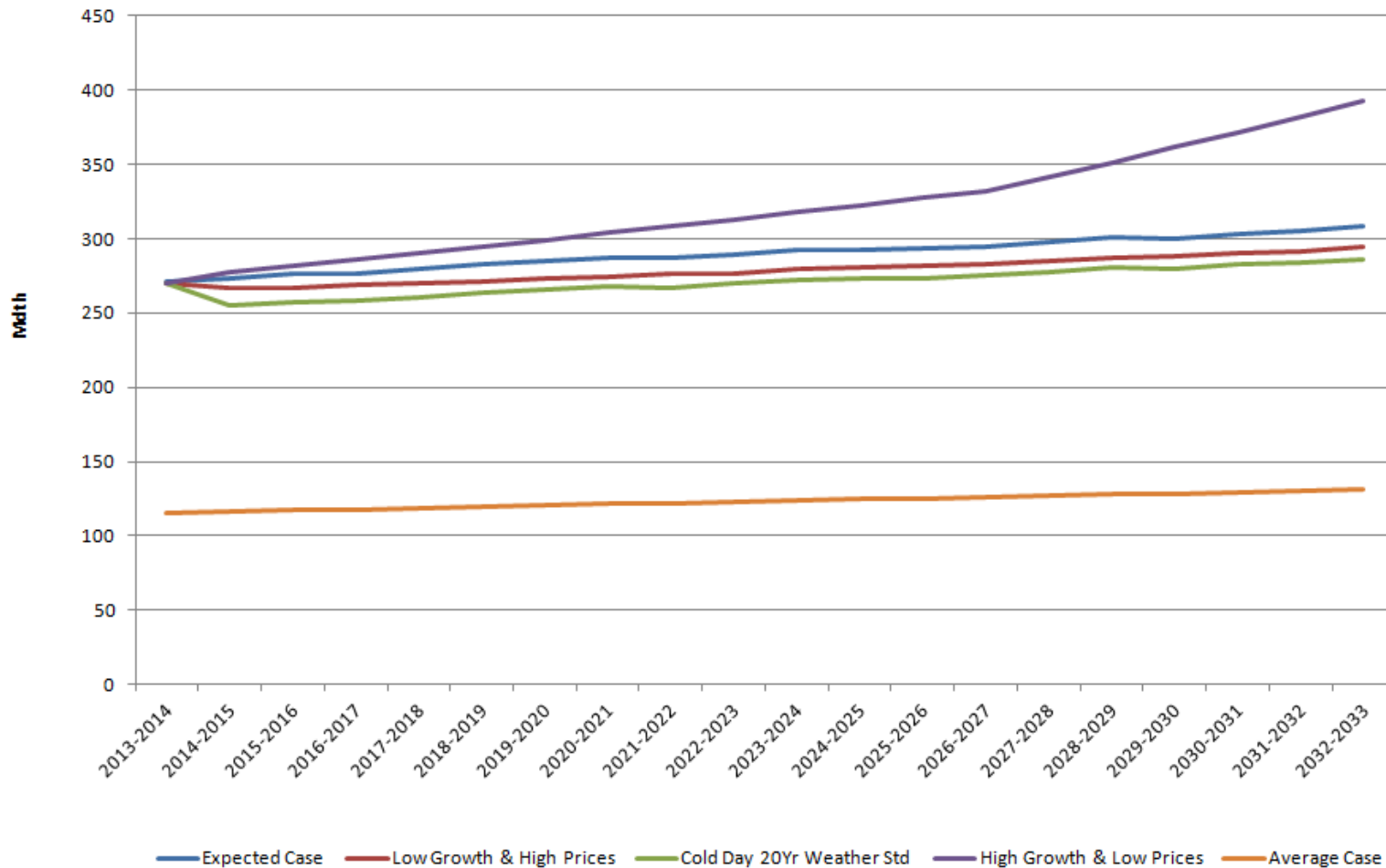


# Existing Resources vs. Peak Day Demand



### Peak Day (Feb 15) - 2014 IRP Demand Scenarios

WA/ID

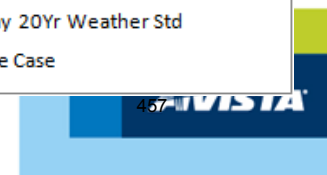
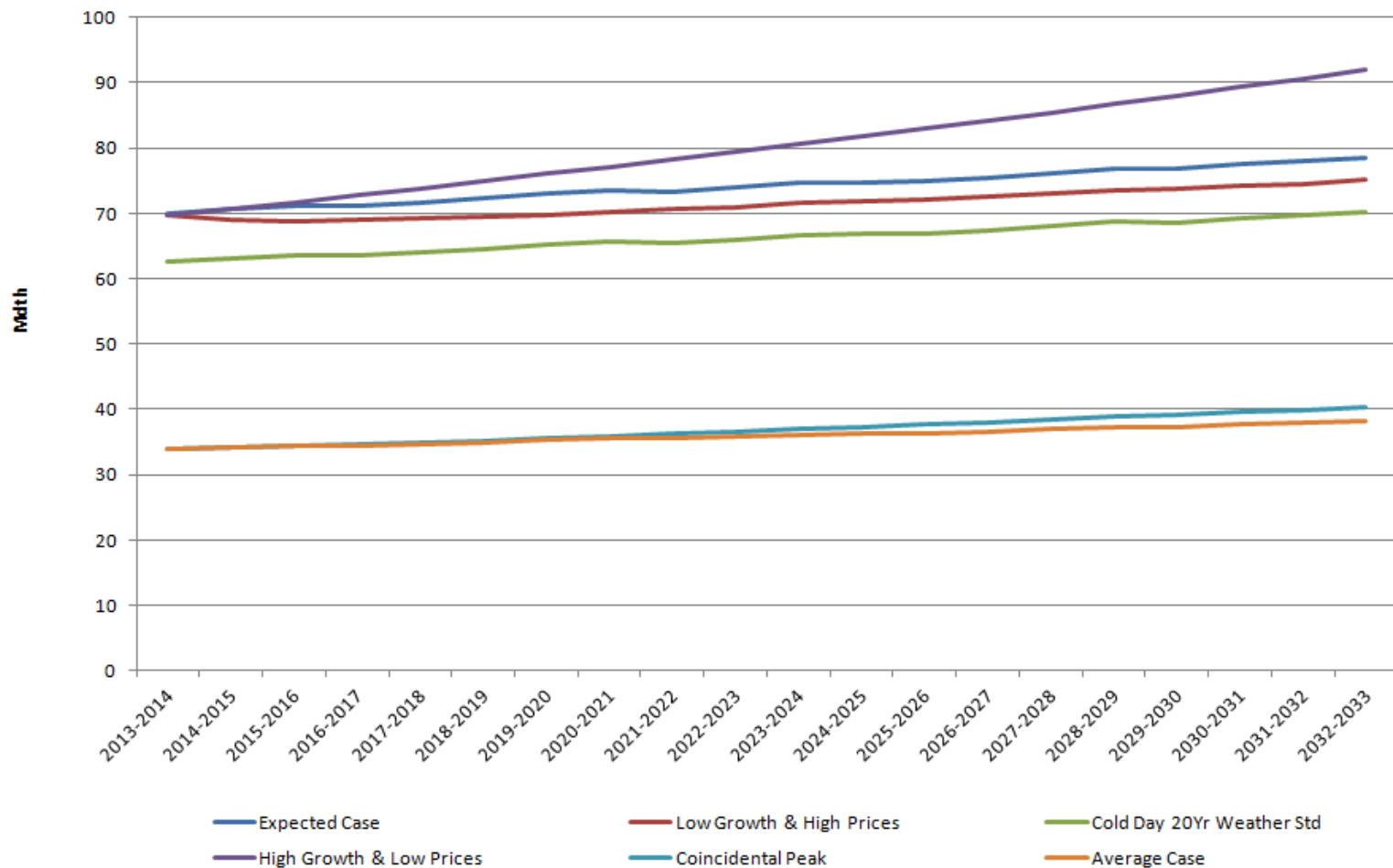


Avista Utilities

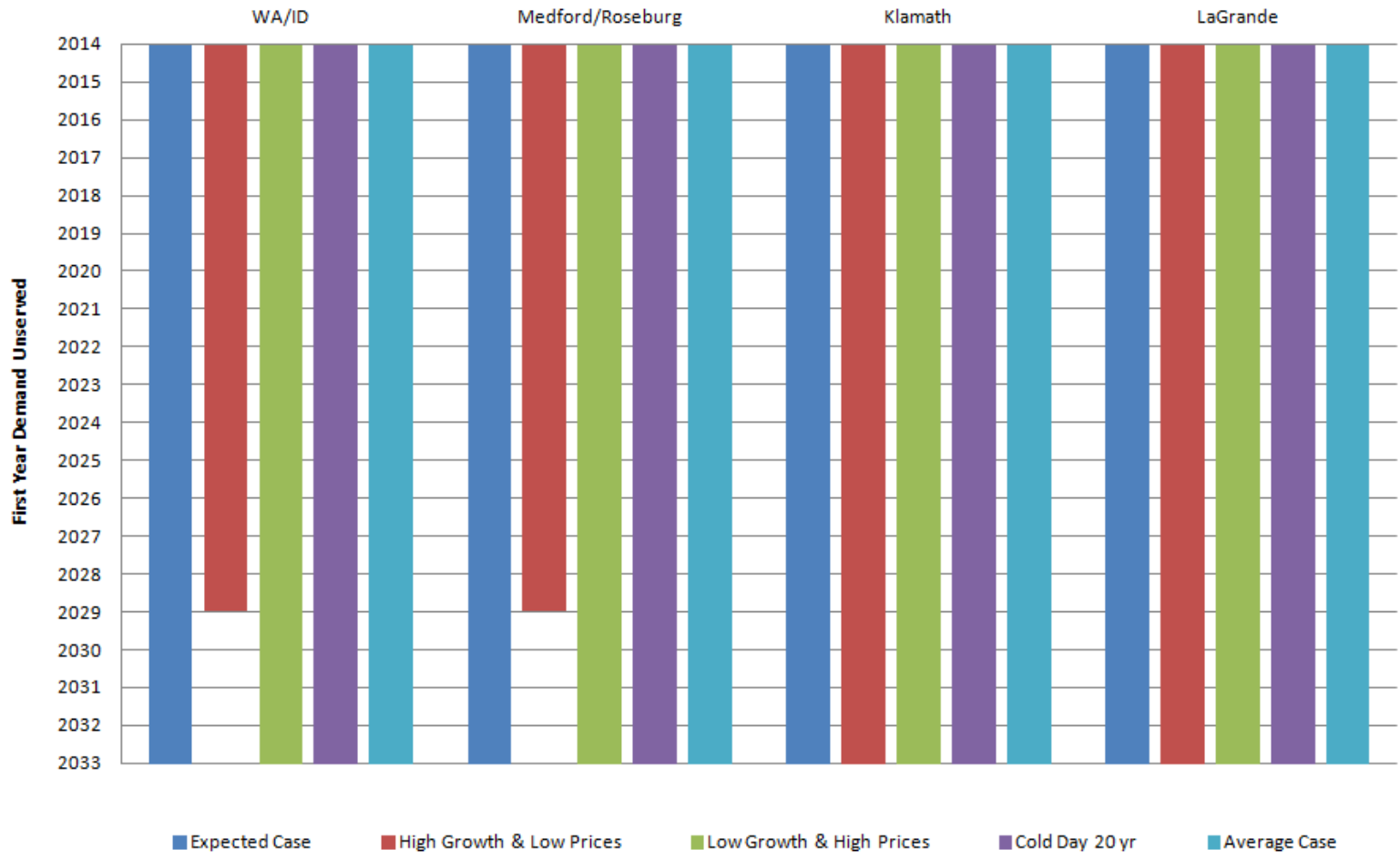
2014 Natural Gas IRP Appendices

456

### Peak Day (Dec 20) - 2014 IRP Demand Scenarios Medford/Roseburg



### First Year Peak Demand Not Met with Existing Resources



# Resource Options for Meeting Unserved Demand



# Potential New Supply Resources Considerations

- Availability
  - By Region – which region(s) can the resource be utilized?
  - Lead time considerations – when will it be available?
- Type of Resource
  - Peak vs. Baseload
  - Firm or Non-Firm
  - “Lumpiness”
- Usefulness
  - Does it get the gas where we need it to be?
  - Last mile issues
- Cost



# Supply Resources Available

Additional Resource	Size	Cost/Rates	Availability	Notes
Capacity Release Recall	30,000 Dth	NWPL Rate	2018	Recall of previously released capacity
Unsubscribed GTN Capacity	Up to 50,000 Dth	GTN Rate plus Upstream TCPL	Now	Currently available unsubscribed capacity from Kingsgate to Stanfield or Malin plus associated Alberta transport
NWP Expansion	Up to 50,000 Dth	NWPL Rate x 4	2016	Expansion from Sumas/JP to WA/ID or Sumas/JP to OR
Citygate Deliveries	Variable	Varies	Now	Represents the ability to buy a delivered product from another utility or marketer.  Limited counterparties
Satellite LNG	90,000 Dth w/30,000 Dth deliverability	\$6.5 Million capital cost plus \$350K O&M	2016	Provides for peaking services and alleviates the need for costly pipeline expansions.

# Supply Resources Available

Additional Resource	Size	Cost/Rates	Availability	Notes
Medford Lateral Exp	25,000 Dth	GTN Rate	2016	Additional compression to facilitate more gas to flow from mainline GTN to Medford.
Malin Backhauls	25,000	GTN Rate	Now	Currently available

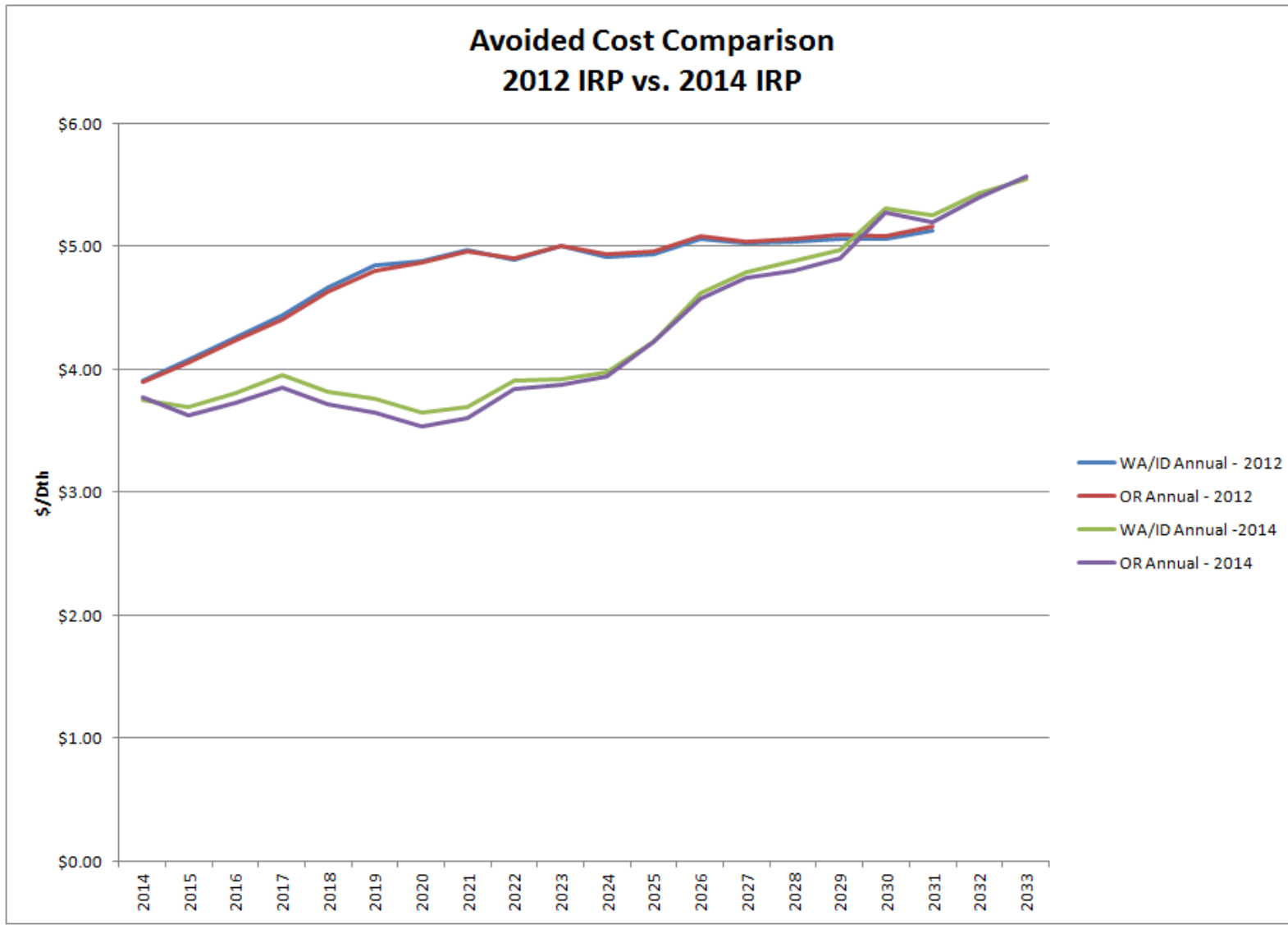
# Future Supply Resources

## Other Resources Considered

Additional Resource	Size	Cost/Rates	Availability	Notes
Co. Owned LNG	600,000 Dth w/ 150,000 of deliverability	\$75 Million plus \$2 Million annual O&M	2020	On site, in service territory liquefaction and vaporization facility
Various pipelines – Pacific Connector, Cross-Cascades, etc.	Varies	Precedent Agreement Rates	2018	Requires additional mainline capacity on NWPL or GTN to get to service territory
Large Scale LNG	Varies	Commodity less Fuel	2018	Speculative, needs pipeline transport
In Ground Storage	Varies	Varies	Varies	Requires additional mainline transport to get to service territory

## DSM Avoided Cost

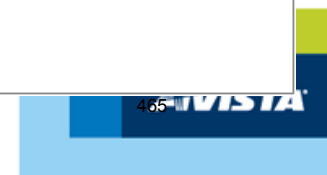
- Avoided cost determined by comparison to the marginal supply side resources to meet incremental demand, primarily commodity costs.
- Preliminary avoided costs were provided to Enernoc for cost effectiveness testing and development of the DSM acquirable potential.
- Potential is then input into SENDOUT® and avoided costs are re-evaluated.



Avista Utilities

2014 Natural Gas IRP Appendices

465





# Stochastic Analysis

## What is it?

- Stochastic vs. Deterministic
- Facilitates a statistical approach to analysis
- Reiterative runs of SENDOUT (e.g. 200 “Draws”)
- Utilizes statistically generated price curves and weather patterns derived from historical data
- Develops a distribution of the “draws” results
  - Normal and lognormal distribution

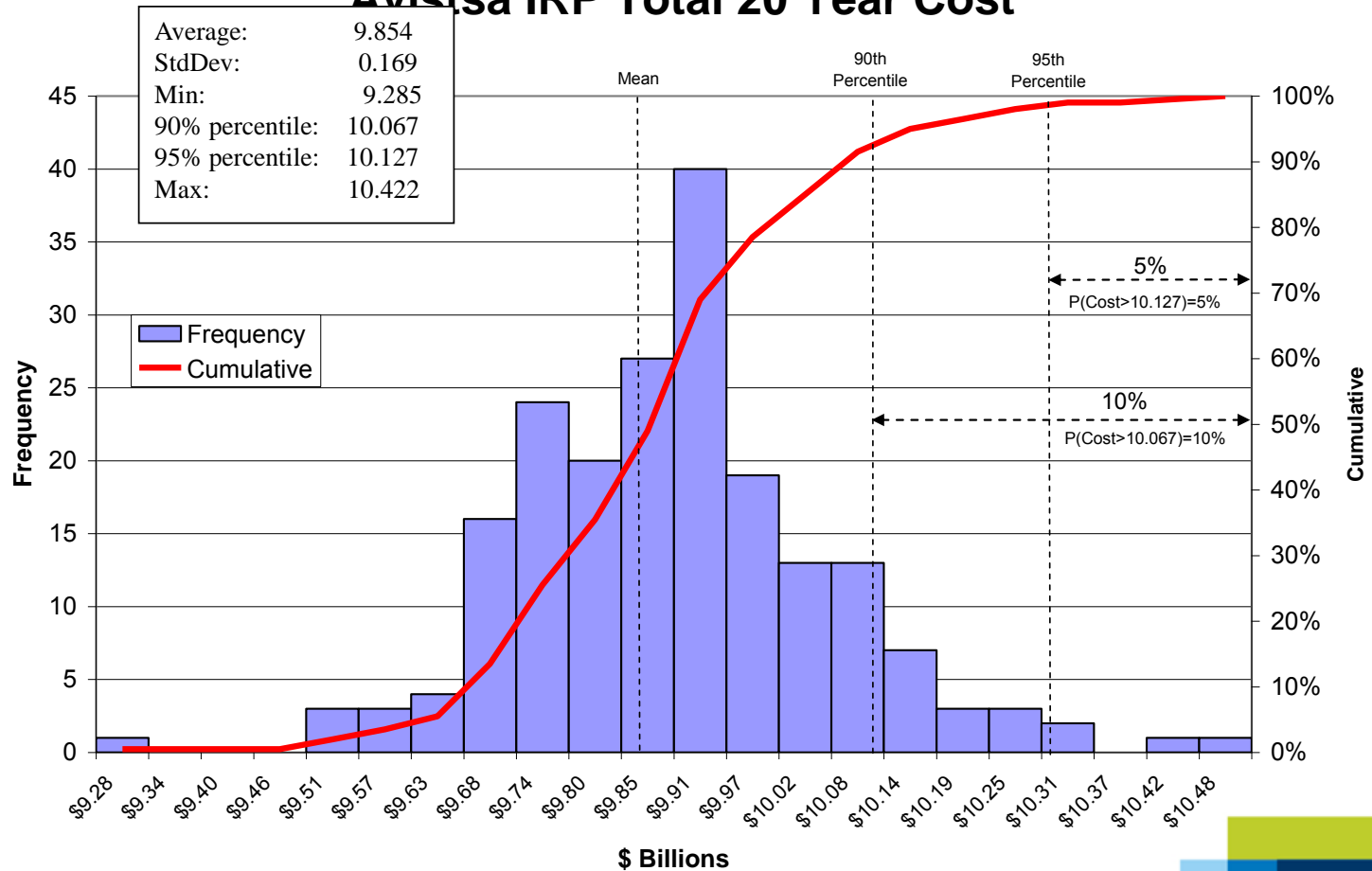
# Analytical Objectives

- Weather
  - Validate reasonableness of our weather planning standard
  - Compare demand and unserved results
  - Quantify potential alternate weather planning standards via comparison of alternate aggregate NPV portfolio costs
- Price
  - Substantiate preferred portfolio selection (commodity cost perspective)
  - Compare distribution of aggregate NPV cost to preferred portfolio



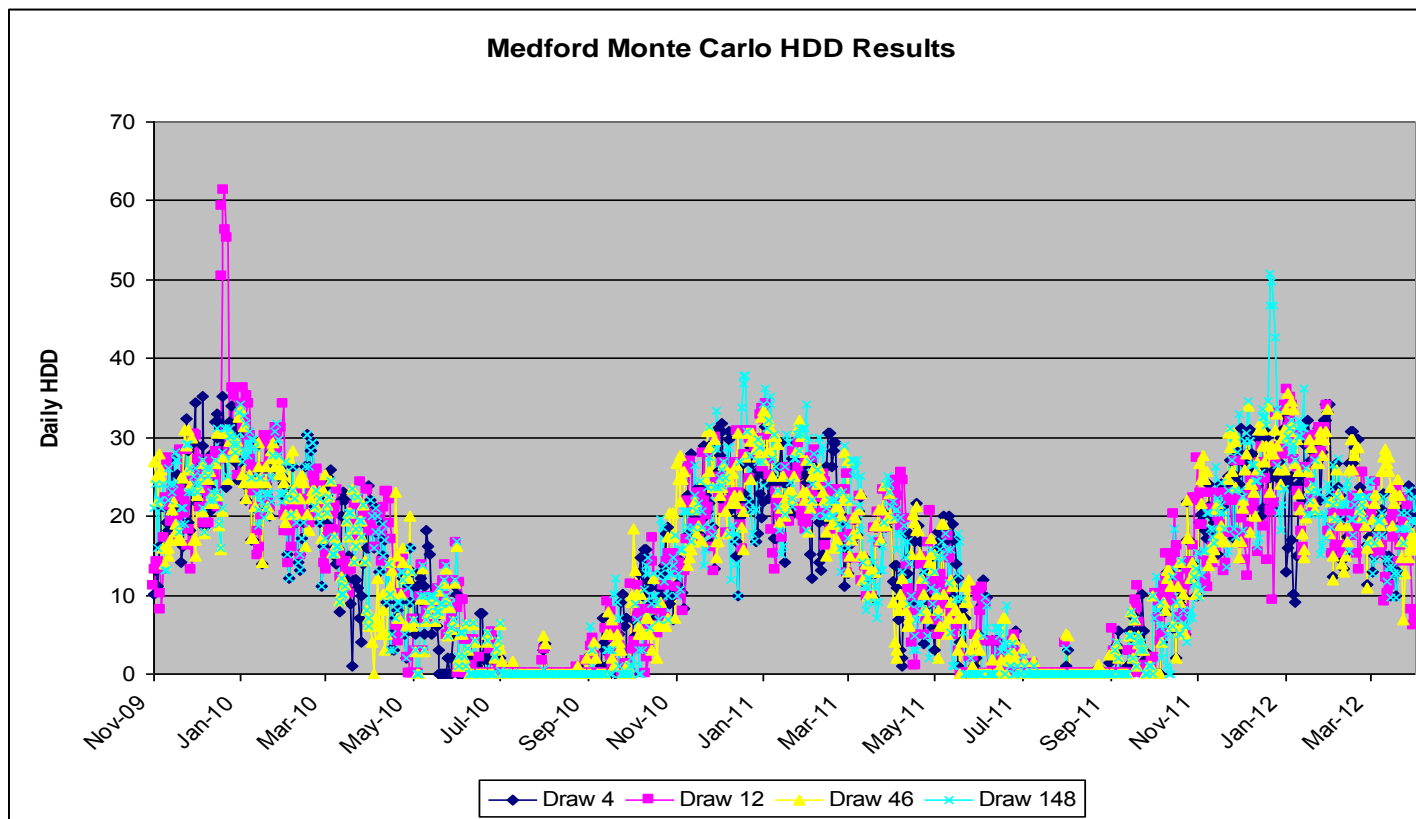
# VectorGas™ Reports EXAMPLE ONLY

## Avista IRP Total 20 Year Cost



# Sample Weather Pattern

## Medford HDDs - Four example draws





# Key Issues / Document Discussion

## Highlights of the 2014 IRP

- No near-term resource needs under most scenarios.
- Lower long term customer growth rates.
- 20 year rolling average is the new “normal”.
- No global warming adjustment.
- Updated DSM potential and resultant avoided costs.

# 2012 IRP Acknowledgement Comments

- Describe more clearly derivation of growth scenarios, including high and low in demand forecasting chapter.
- Use 5 year use per customer data set
- Provide a comparative avoided cost analysis in future IRP's
- Do an analysis and/or narrative describing the "trigger point" avoided cost value where conservation programs become cost-effective.
- Between IRP's compare modeling assumptions with actual demand.
- Include a Washington specific city gate analysis, including a narrative of its conclusions as a result of such analysis.

# 2012 IRP Acknowledgement Comments

- Include an easily identifiable progress report that relates new plan to previous plan.
- Reconcile inconsistencies between models used in demand forecasting and implementation and description of these models.
- Hold public outreach meetings in locations convenient for customers.

# 2012 IRP Acknowledgement Comments

- Continue DSM programs in Oregon to achieve minimum savings of 225,000 therms in 2013 and 250,000 therms in 2014.
- Provide results of the following:
  - Savings and cost effectiveness of DSM program.
  - Actions taken to reduce delivery costs, including admin and audit costs.
  - Actions taken to increase cost effective efficiency measures in the portfolio.
  - Analysis of non-natural gas benefits of existing and proposed measures.
  - Analysis of measure lives for all measures.
- Develop mechanism for allocating funding for a separate low-income energy efficiency program.
- Pursue possibility of regional elasticity study through NWGA or AGA.
- Assess potential demand impact from NGV/CNG vehicles and other new uses of natural gas.

# Key Issues

- Where's the Demand?
  - Even flatter demand – How long does this trend continue?
  - What impacts on consumption? Temporary or permanent change?
  - What is the demand boost?
- Resource Management
  - Prudent management of resource length
- “The Price is Right”
  - \$5 gas forever?
- Environmental Impacts
  - Carbon Tax?
  - Hydraulic Fracturing Bans



## 2014 IRP Timeline

- **August 31, 2013** – Work Plan filed with WUTC
- **January through April 2014** – Technical Advisory Committee meetings. Meeting topics will include:
  - Demand Forecast and Demand Side Management – *January 24*
  - Supply and Infrastructure, Gate Station Analysis, Supply Side Resources, Resource Optimization – *February 25*
  - Distribution Planning, Natural Gas Pricing, CNG/NGV, SENDOUT® Preliminary Results and Further Case Discussion – *March 26*
  - DSM CPA results, further SENDOUT® results and document discussion – *April 23*
- **May 30, 2014 – Draft of IRP document to TAC**
- **June 30, 2014** – Comments on draft due back to Avista
- **July 2014** – TAC final review meeting (if necessary)
- **August 31, 2014** – File finalized IRP document

