



*In the Community to Serve®*

# Cascade Natural Gas

## 2014 Integrated Resource Plan Overview

September 10, 2015  
WUTC Presentation  
Olympia, Washington

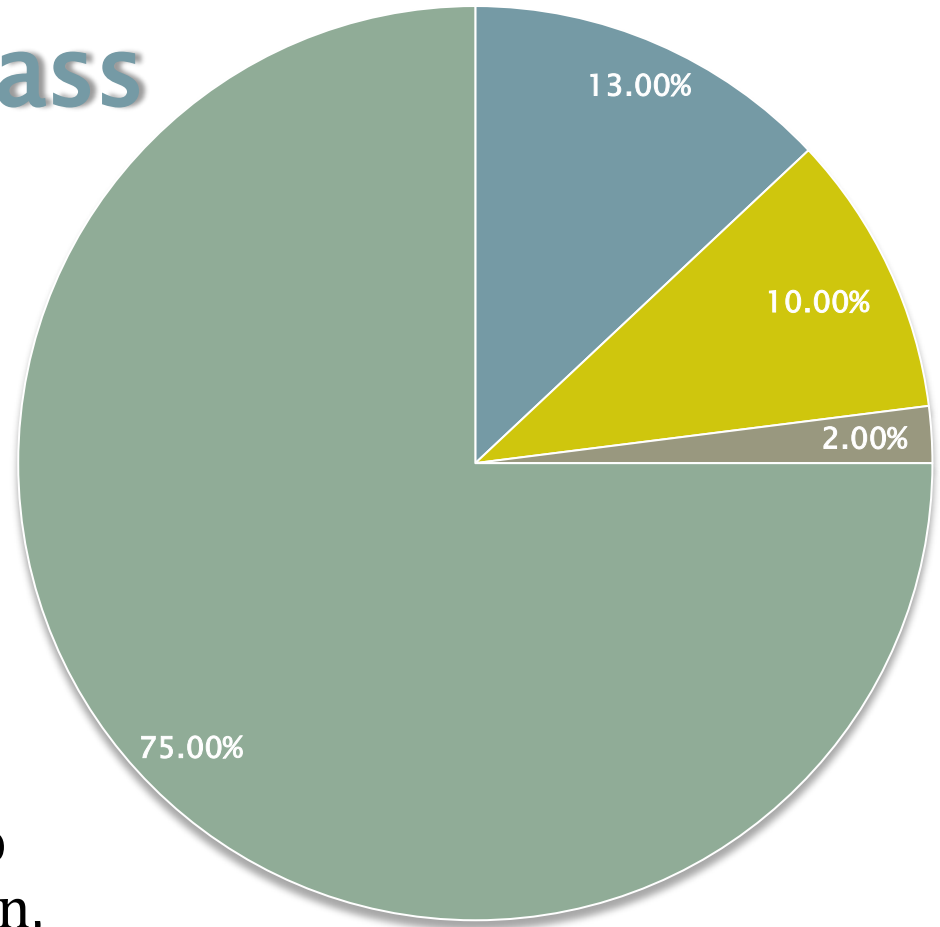
# Overview

- ▶ Introductions
- ▶ **2014 IRP**
  - **Demand Forecast** ↩
  - Distribution System Enhancements
  - Demand Side Management
  - Supply Side Resources
  - Resource Integration

**Two-Year Action Plan:** Action Items will be noted throughout.

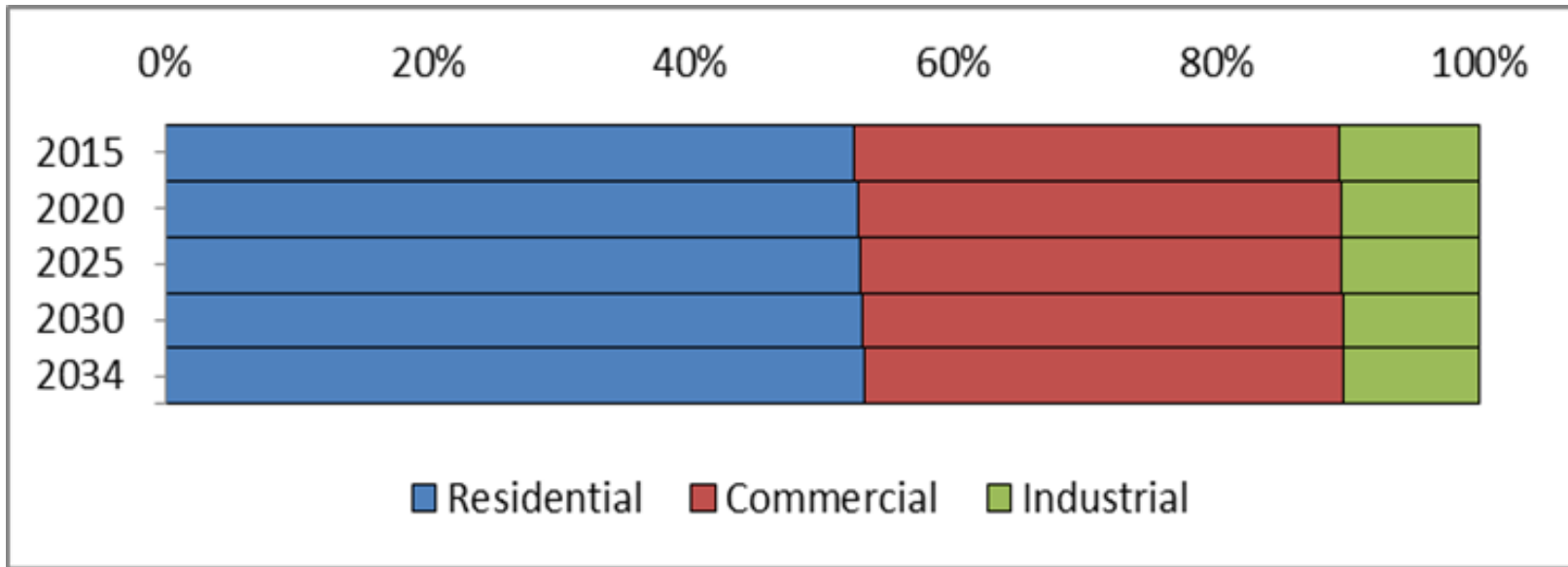
# Throughput By Class

- Residential
- Commercial
- Core Market Industrial
- Non Core Industrial



Cascade anticipates its **Core Customer Base** will continue to **grow** over the planning horizon, with annual throughput anticipated to increase **between 1.0% and 1.2% per year.**

# Demand Forecast Summary



	Residential	Commercial	Industrial	System
<b>2015 - 2019</b>	1.30%	1.14%	0.95%	1.20%
<b>2020 - 2024</b>	1.24%	1.09%	0.94%	1.16%
<b>2025 - 2029</b>	1.17%	1.04%	0.92%	1.09%
<b>2030 - 2034</b>	1.09%	0.98%	0.89%	1.03%
<b>2015 - 2034</b>	1.20%	1.06%	0.93%	1.12%

# Load Growth

Period	Low	Mid	High
2012	299,970,548	301,803,755	303,636,961
2020	310,390,084	321,795,524	333,666,127
2025	317,840,415	339,187,714	362,250,502
2030	326,362,761	357,990,520	393,367,474
2034	332,954,119	372,970,513	418,914,457
Deviation	<i>(40,016,394)</i>		<i>45,943,944</i>


# Peak Day Forecast: To ensure satisfaction of core customer demand on the coldest days

- Developed in conjunction with annual basis load forecasts.
- Enable Cascade to make prudent distribution system and peak capacity planning decisions to fulfill our responsibility to provide heating under all but force majeure conditions.
- Method:
  - ❖ Historically, Cascade developed peak day forecasts based on a 65 HDD day (0°F) to reflect the coldest day in Cascade's 60-year weather history.
  - ❖ In 2008, Cascade's IRP changed this practice to reflect the coldest day during the past 30 years. This record is held by December 21, 1990 at 61 HDDs.
  - ❖ In 2014, Cascade's IRP changed the HDD reference temperature to 60°F, therefore, a 60 HDD day is 0°F. The coldest day on record is still held by December 21, 1990 at 56 HDDs.
  - ❖ HDDs for the December 21, 1990 day is applied to each CityGates regression and escalated into the future at the forecasted therm usage annual growth rate.

# Peak Day Forecast:

- This method rests on the assumption that core market load shape does not significantly change throughout the forecast horizon.
- Cascade believes the peak day forecast conservatively overestimates peak day usage because the base forecast does not explicitly include future conservation measures implemented by customers that would act to increase energy efficiency and reduce daytime therm usage.

# Overview

- ▶ Introductions
- ▶ 2014 IRP
  - Demand Forecast
  - **Distribution System Enhancements** 
  - Demand Side Management
  - Supply Side Resources
  - Resource Integration

**Two-Year Action Plan:** Action Items will be noted throughout.




# Distribution System pipeline, gate station, and other related projects

## 2015-2019 SPECIFIC PROJECTS

2015 Direct Cost	2016 Direct Cost	2017 Direct Cost	2018 Direct Cost	2019 Direct Cost	Total Direct
\$ 41,140,277.59	\$ 55,462,695.75	\$ 54,878,529.67	\$ 26,037,915.63	\$ 20,477,377.43	\$ 197,996,796.07

# Overview

- ▶ Introductions
- ▶ 2014 IRP
  - Demand Forecast
  - Distribution System Enhancements
  - **Demand Side Management** 
  - Supply Side Resources
  - Resource Integration

**Two-Year Action Plan:** Action Items will be noted throughout.



*In the Community to Serve®*

# Washington Demand Side Management

Presented by Monica Cowlshaw  
Manager, Energy Efficiency and Community Outreach

# AGENDA:



*In the Community to Serve®*

## ➤ Highlights

- ❑ Nexant Potential Study
  - EM&V
  - Inputs & Assumptions
  - Model
  - Inputs & Assumptions
  - Outcome
  - Incentive Level Scenarios
- ❑ Political & Technological Frontier
- ❑ Low Income Program Status
- ❑ Action Plan

# HIGHLIGHTS



*In the Community to Serve®*

- ▶ Separation of Oregon & Washington
- ▶ Nexant Study

# AGENDA:



*In the Community to Serve®*

- ✓ Highlights
- **Nexant Potential Study**
- **EM&V**
  - Inputs & Assumptions
  - Model
  - Outcome
  - Incentive Level Scenarios
- Political & Technological Frontier
- Low Income Program Status
- Action Plan

# EM&V

Table 3-2: Total Participant vs. Billing Analysis Subsample Summary

Source	Metric	Residential		Commercial <sup>17</sup>	
		DHW	Furnace	Furnace	Boiler
Cascade Participant Database	Participants	83	833	18 (Census)	23 (Census)
	Equipment Eff. Installed	65%	90%	Assumed 91%	Assumed 90%
	Average Savings (Therms per Measure)	24	86	272	2644
Qualified Billing Analysis Participants	# of participants	50	53	8	5
	Confidence / Precision	90/8	90/11	90/20	90/30
	Avg. Equipment Eff. Installed	67%	95%	95%	91%
	Average Savings (Therms per Measure)	33	111	349 <sup>18</sup>	1566
Actual Savings vs. Projected		39%	29%	28%	-41%

# AGENDA:



*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
- ✓ EM&V

## ➤ **Inputs & Assumptions**

- Model
- Final Program Goals Outcome
- Incentive Level Scenarios
- Political & Technological Frontier
- Low Income Program Status
- Action Plan



# INPUTS & ASSUMPTIONS



*In the Community to Serve®*

- 20 year volume & customer figures by rate class
- Load Profile
- 2014 Avoided Costs
- Long-term Discount Rate = 4.17%
- Inflation Rate = 2%
- Transmission Loss Rate = 0.1959%
- Incentive level = 30%
- UCT under UG 121207
  - Cost effectiveness  $\geq$  0.90

# AGENDA:

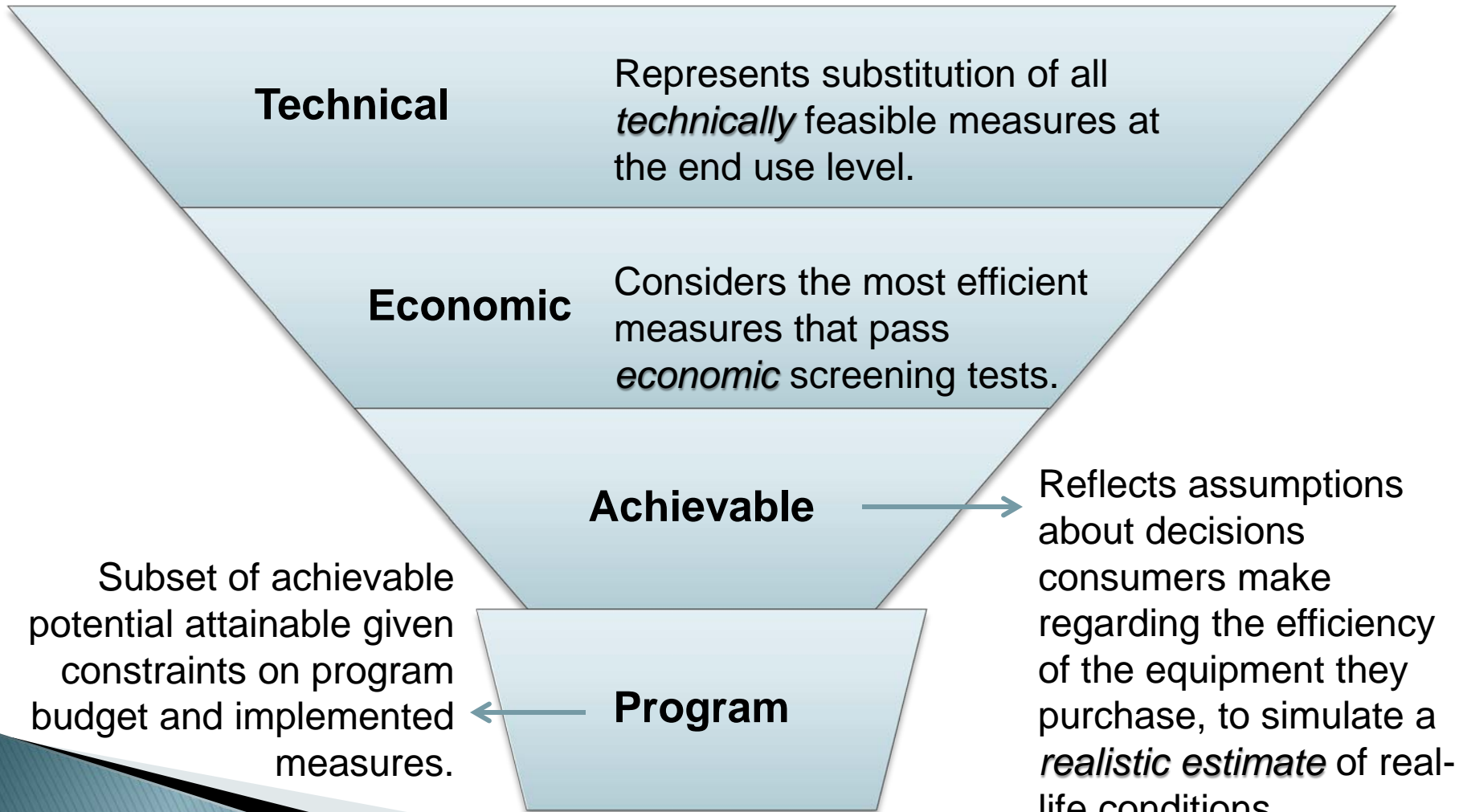


*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - **Model**
    - Outcome
    - Incentive Level Scenarios
- Political & Technological Frontier
- Low Income Program Status
- Action Plan

# MODEL

*In the Community to Serve<sup>®</sup>*



# AGENDA:



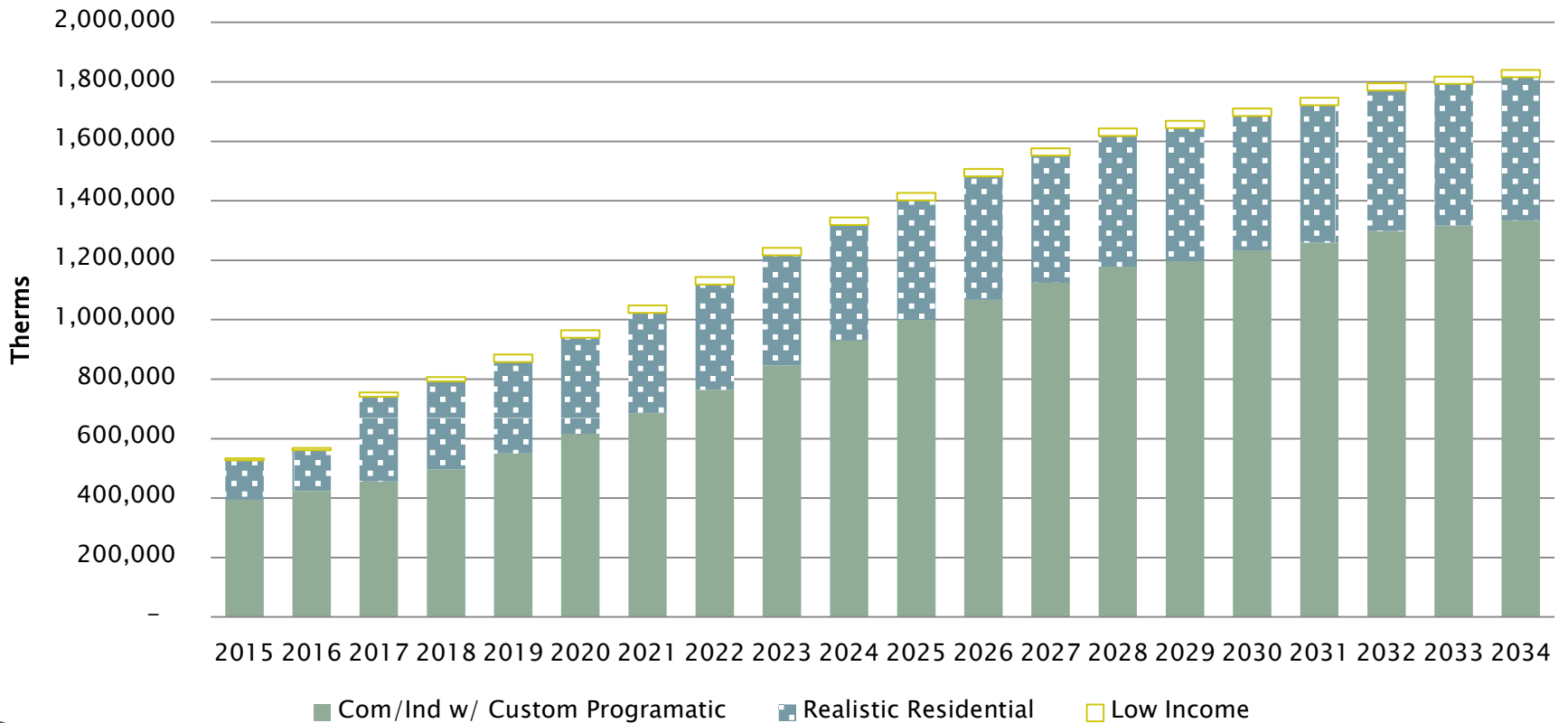
*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - ✓ Model

## ➤ **Final Programmatic Plan**

- Incentive Level Scenarios
- Political & Technological Frontier
- Low Income Program Status
- Action Plan

## Annual Incremental Energy Savings Program Goal Forecast 2015–2034



# AGENDA:



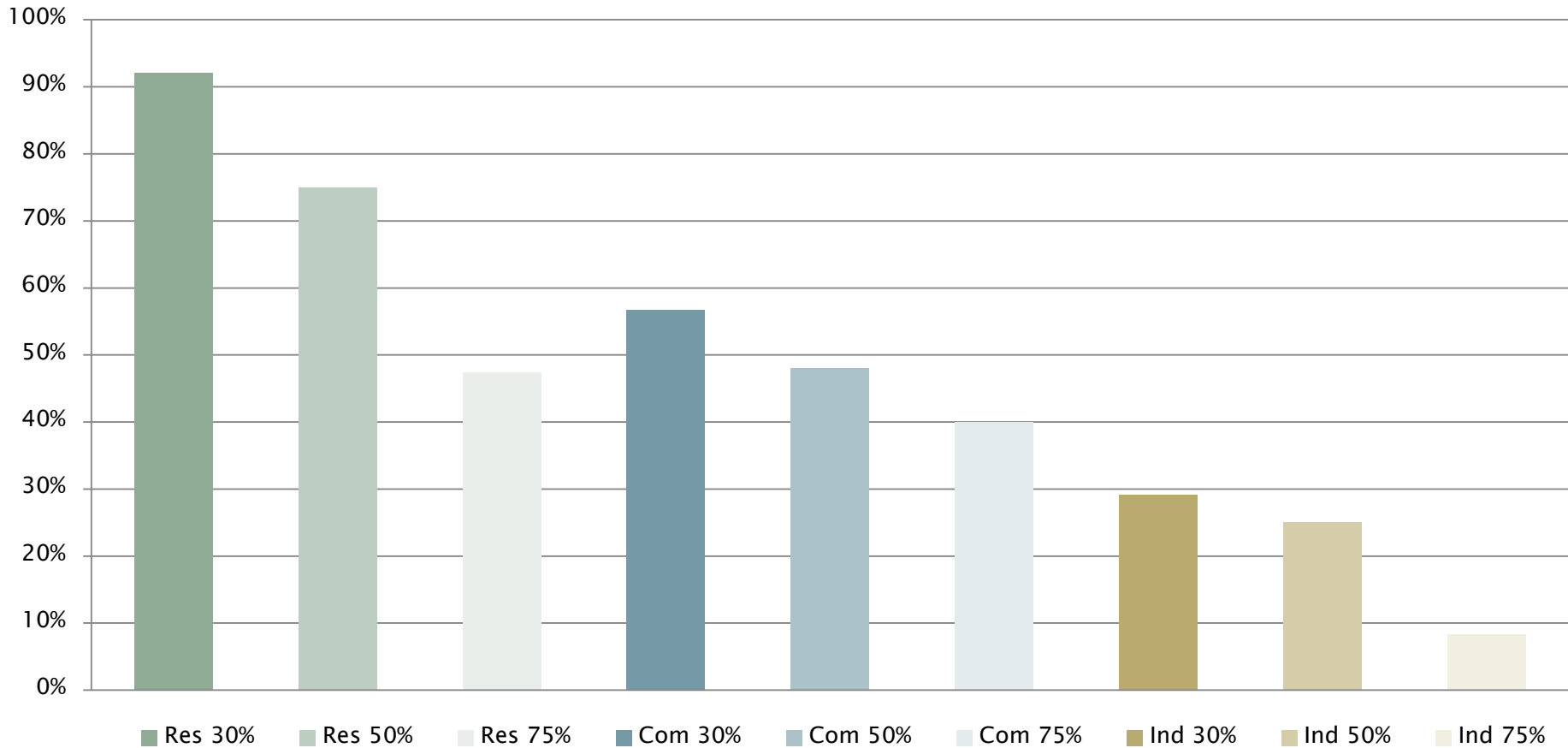
*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - ✓ Model
  - ✓ Final Program Goals Outcome
- **Incentive Level Scenarios**
  - Political & Technological Frontier
  - Low Income Program Status
  - Action Plan

# INCENTIVE LEVEL MEASURE IMPACTS



*In the Community to Serve®*



**Current Measures Passing Cost-Effectiveness by Incentive Level**

# AGENDA:



*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - ✓ Model
  - ✓ Final Program Goals Outcome
  - ✓ Incentive Level Scenarios

## ➤ **Political & Technological Frontier**

- Low Income Program Status
- Action Plan



# TECHNOLOGICAL FRONTIER



*In the Community to Serve®*

- Energy code changes
  - Water Heaters
  - Air Sealing
  - Furnaces
- NWPCC Building Forecast
- Emerging Technologies & NEEA Results
- Incorporation of new measures

# POLITICS



*In the Community to Serve®*

- ▶ State Legislation
  - SB 5854
- ▶ DOC Biennial Energy Report
- ▶ WCI GHG Cap & Trade Design
- ▶ Federal legislation traction
- ▶ CO<sub>2</sub>/GHG Tax Options

# AGENDA:



*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - ✓ Model
  - ✓ Final Program Goals Outcome
  - ✓ Incentive Level Scenarios
- ✓ Political & Technological Frontier
- **Low Income Program Status**
- Action Plan

# LOW INCOME



*In the Community to Serve®*

- Declining trend in weatherization for Low-Income Natural Gas Heated Homes
  - US DOE-WAP Priority Guidelines
  - Current Low Income Weatherization Environment
- 2015 Therm savings projection is similar to 2014 therm savings achieved.
- The company has decreased expected savings from the 2012 IRP estimates due to these factors.

# AGENDA:



*In the Community to Serve®*

- ✓ Highlights
- ✓ Nexant Potential Study
  - ✓ EM&V
  - ✓ Inputs & Assumptions
  - ✓ Model
  - ✓ Final Program Goals Outcome
  - ✓ Incentive Level Scenarios
- ✓ Political & Technological Frontier
- ✓ Low Income Program Status
- **Action Plan**

# ACTION PLAN



- ❑ Reducing DSM chapter and transitioning to Conservation Plan in December, 2015.
- ❑ Support communities participating in the GUEP.
- ❑ Collaborate with NEEA to promote market transformation, technology research and implementation strategies.
- ❑ Discuss alternative incentive level options and potential tariff revisions with our CAG.

# Questions?



*In the Community to Serve®*

**Monica Cowlshaw**

Manager, Energy Efficiency  
& Community Outreach


[Monica.Cowlshaw@cngc.com](mailto:Monica.Cowlshaw@cngc.com)

**Amanda Sargent**

Conservation Analyst II

[Amanda.Sargent@cngc.com](mailto:Amanda.Sargent@cngc.com)

# Overview

- ▶ Introductions
- ▶ 2012 IRP
  - Demand Forecast
  - Distribution System Enhancements
  - Demand Side Management
  - **Supply Side Resources** 
  - Resource Integration

**Two-Year Action Plan:** Action Items will be noted throughout.

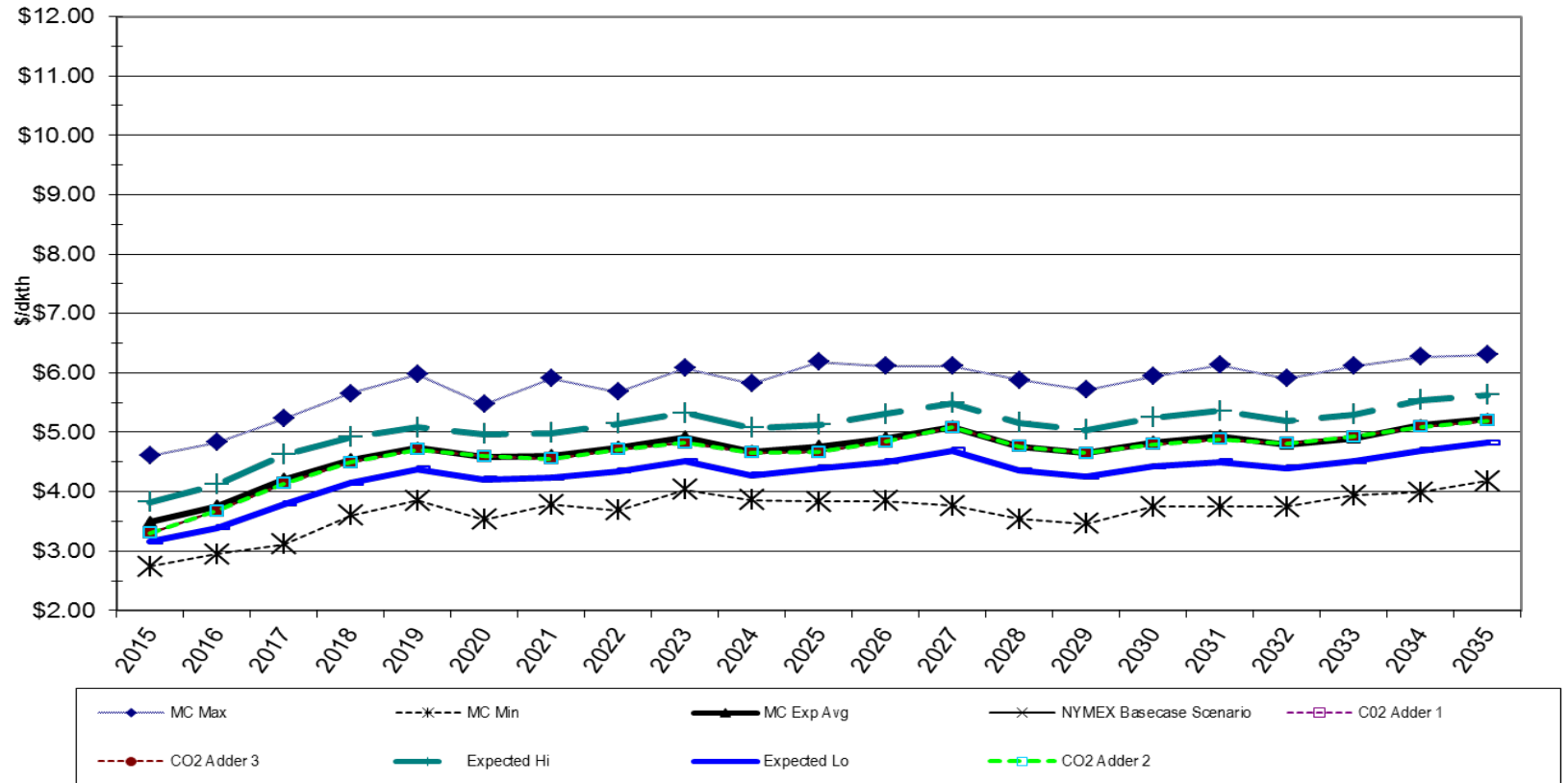


# GSOC & Risk Management

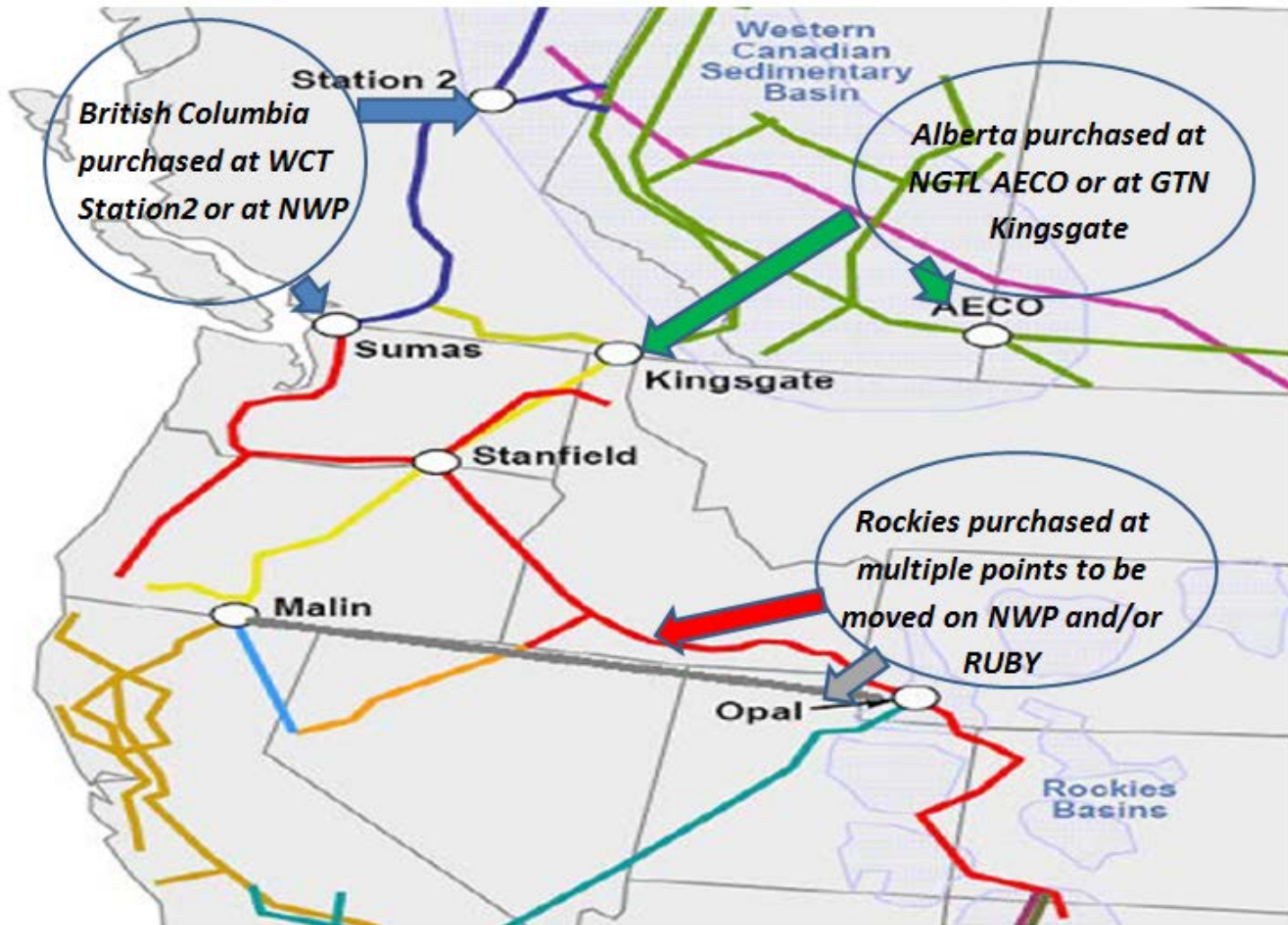
- ▶ In the 2014 IRP, Cascade has assumed that current forward price curves for natural gas are comparatively low and expected to remain in the \$3-6 range.
- ▶ Approximately Year 1: 70-80% of annual requirements; Year 2: 40%, Year 3: 20%. GSOC should consider a modification from portfolio if: 1) reasonable concerns exist regarding the availability of supply in a particular basin; 2) the outer year 3 year forward price is 20% higher/lower than the front month over a reasonably sustained period.
- ▶ Due to expected lack of prolonged or significant price volatility, no financial derivatives are to be included in the portfolio. Hedging in the portfolio is through fixed priced physical gas supply contracts.

# Price Picture

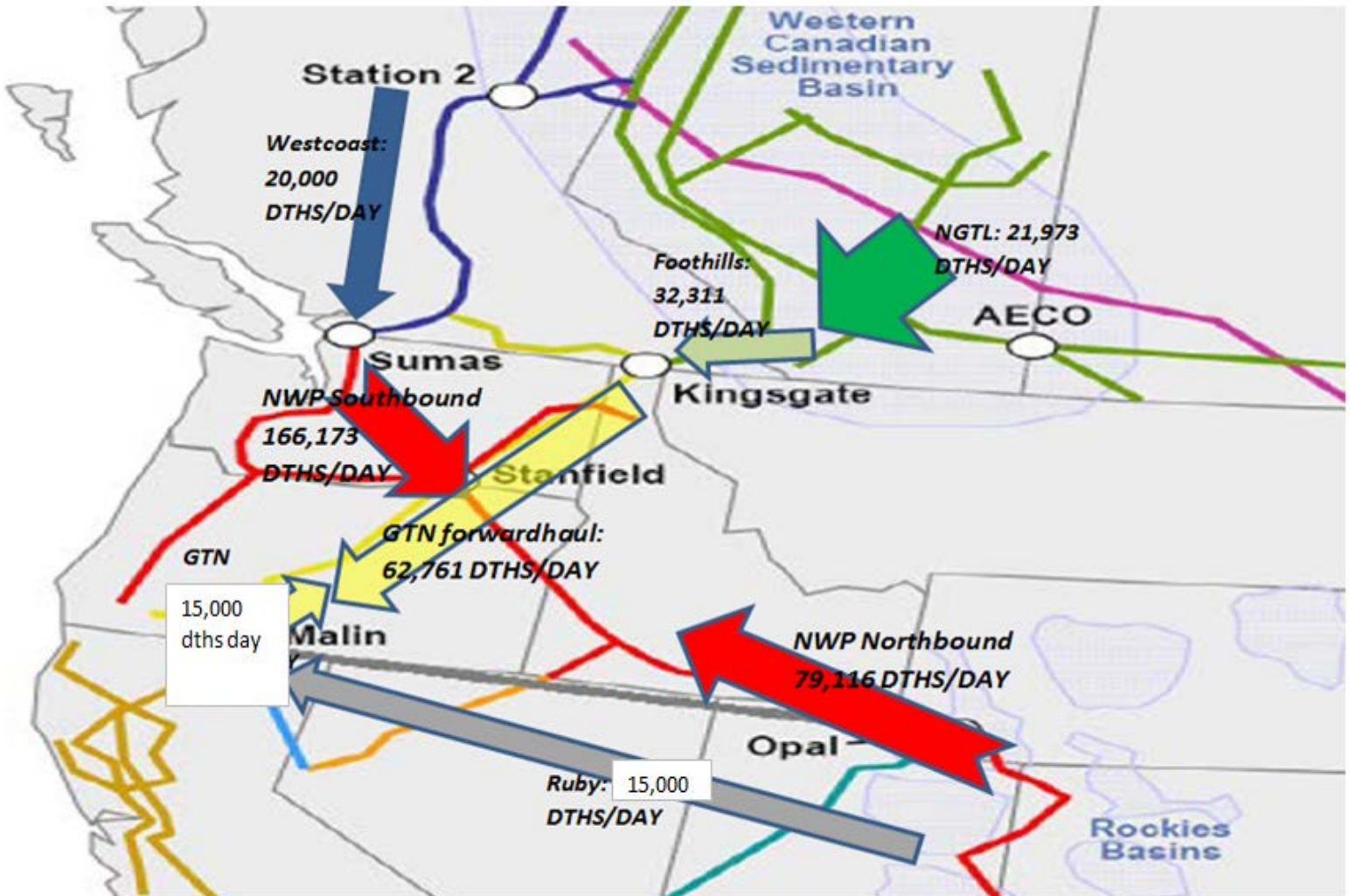
**FIGURE 7-H  
PRICE FORECAST-NYMEX  
Average Annual Price**



# Principle supply and transport paths



# Transport paths at time of 2014 IRP

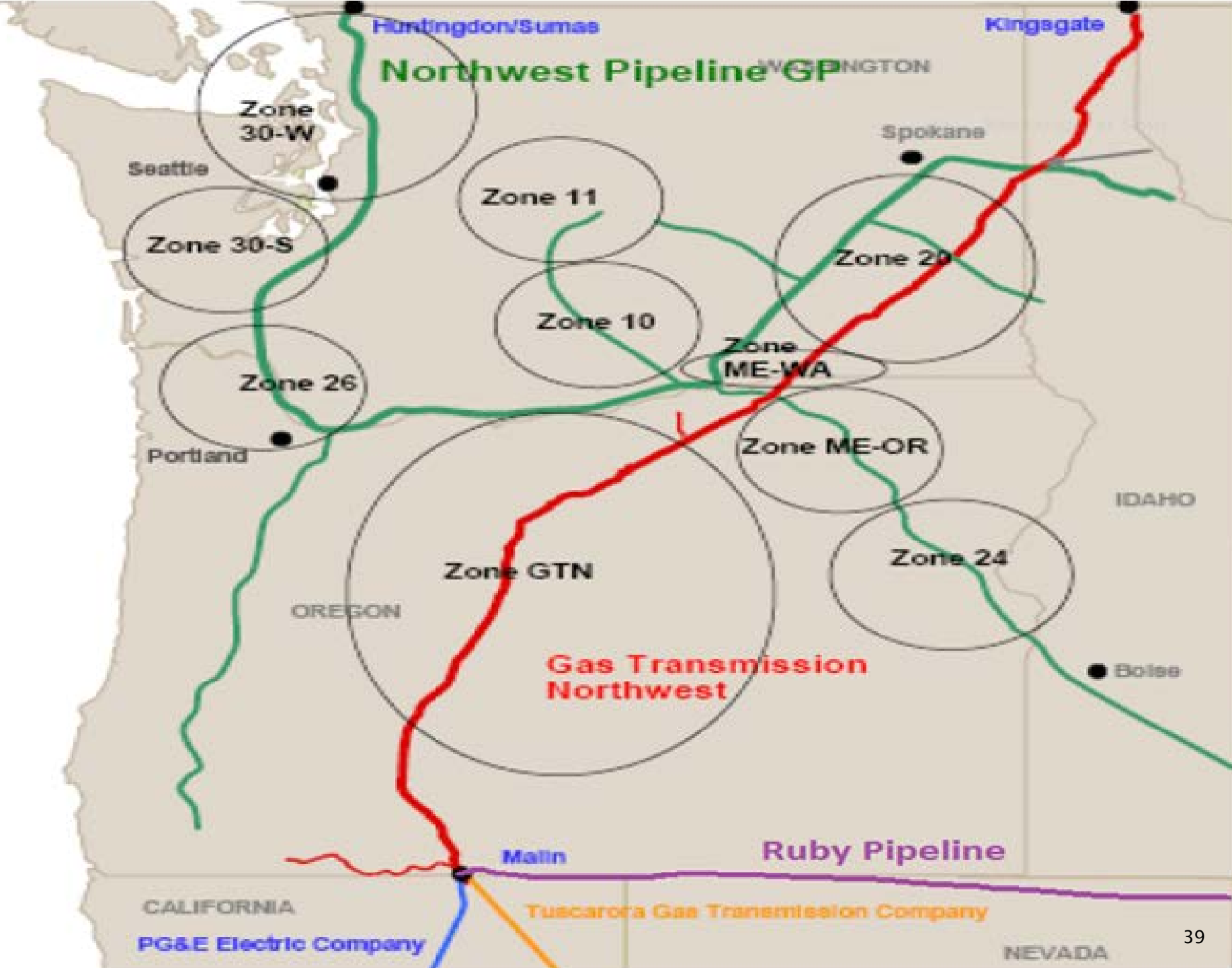




# Storage Services

	<b>Storage Capacity (therms)</b>	<b>Withdrawal (therms/day)</b>
<b>Jackson Prairie (Principle)</b>	6,043,510	167,890
<b>Jackson Prairie (Expansion)</b>	3,500,000	300,000
<b>Plymouth LNG</b>	5,622,000	600,000
<b>Jackson Prairie (new - 2012)</b>	<b>2,812,420</b>	<b>95,770</b>

- ▶ Both of the Jackson Prairie facilities and Plymouth are located directly on NWP's transmission system.
- ▶ Because of that, storage withdrawal rates can be changed several times during an individual gas day to accommodate weather driven changes in core customer requirements.

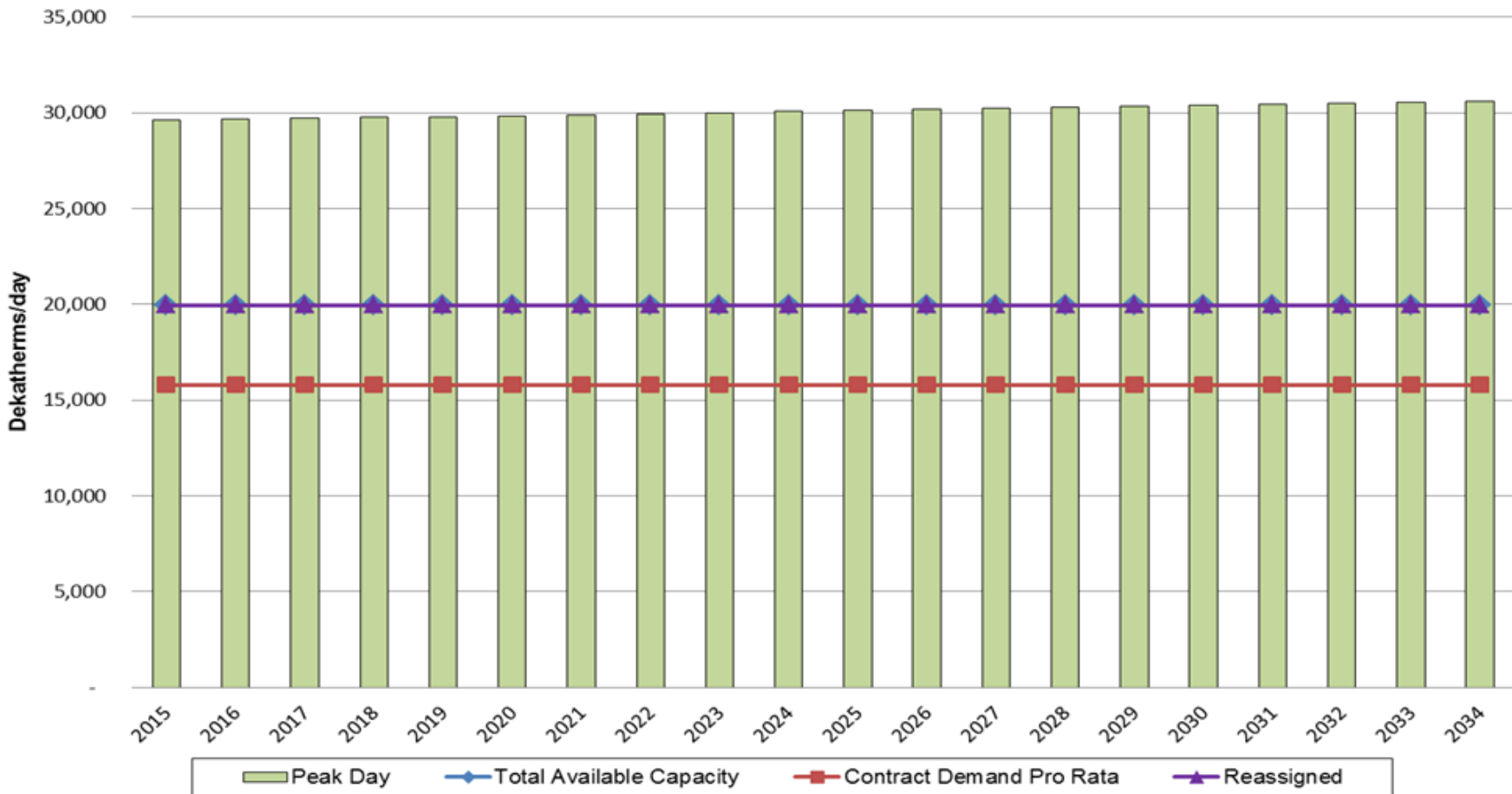






Gate

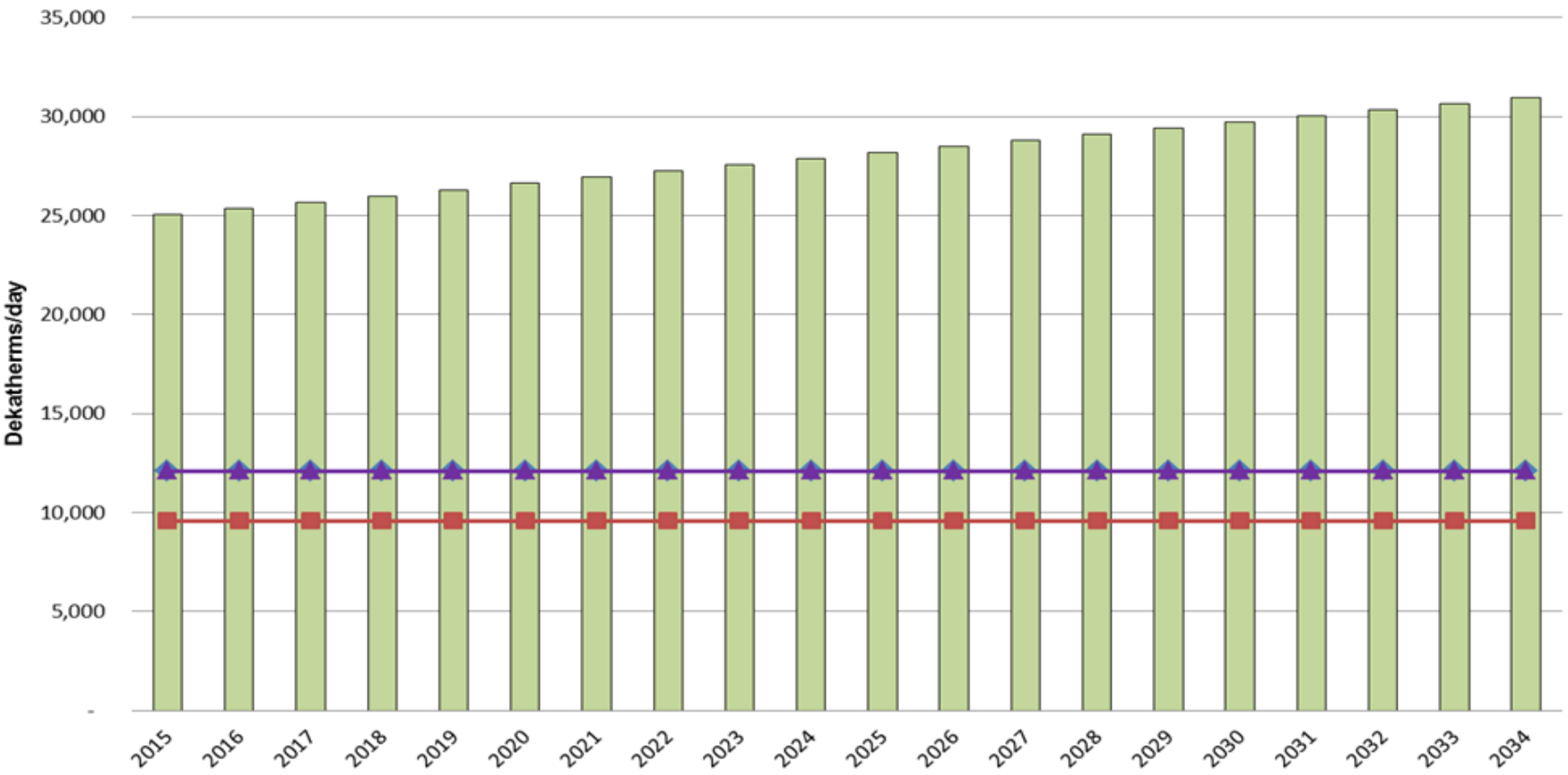
### Projected MDDO Contract Demand for Yakima/Union Gap



Year

Gate

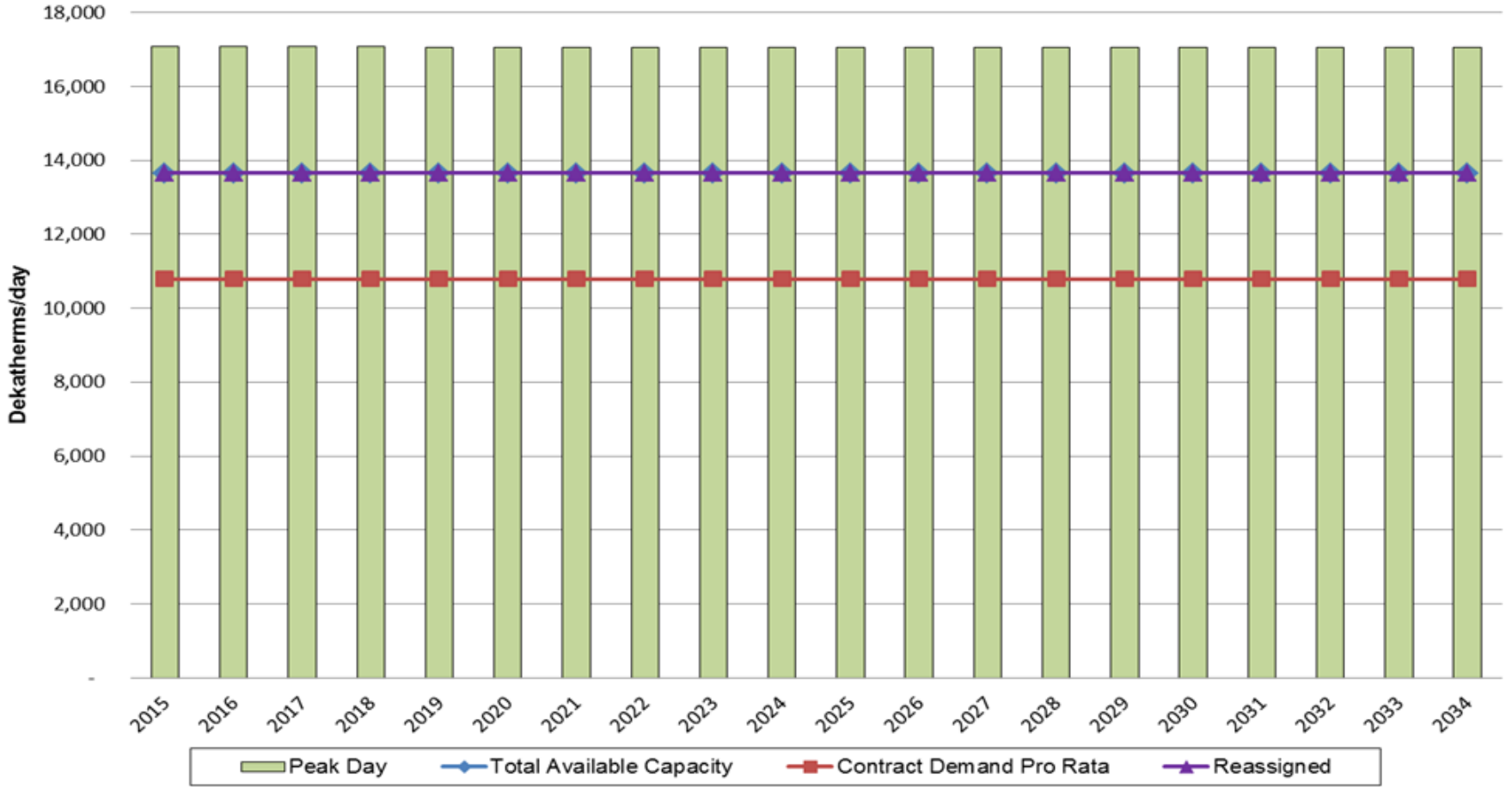
### Projected MDDO Contract Demand for Kennewick



Year

Gate

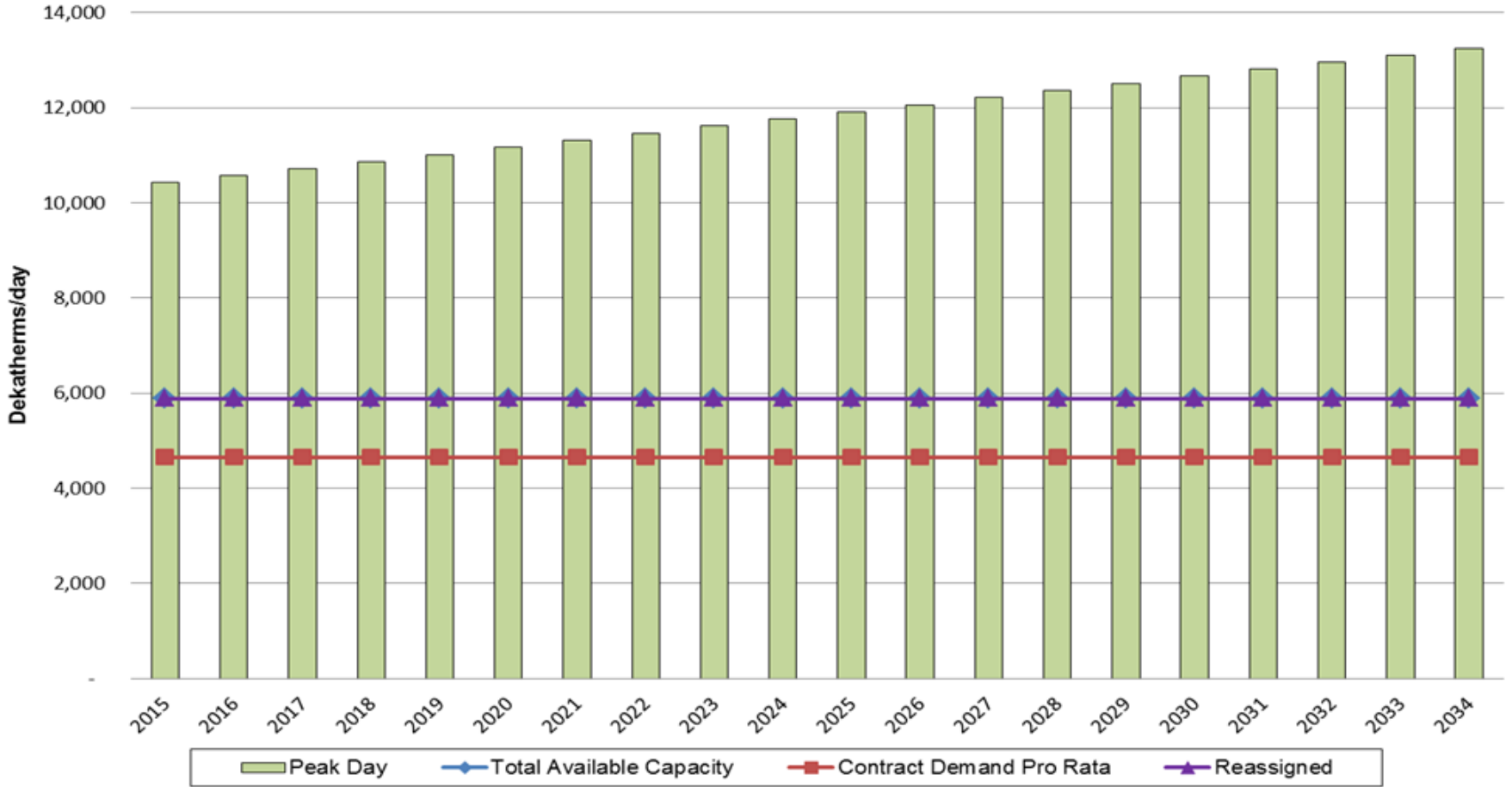
### Projected MDDO Contract Demand for Walla Walla



Year

Gate

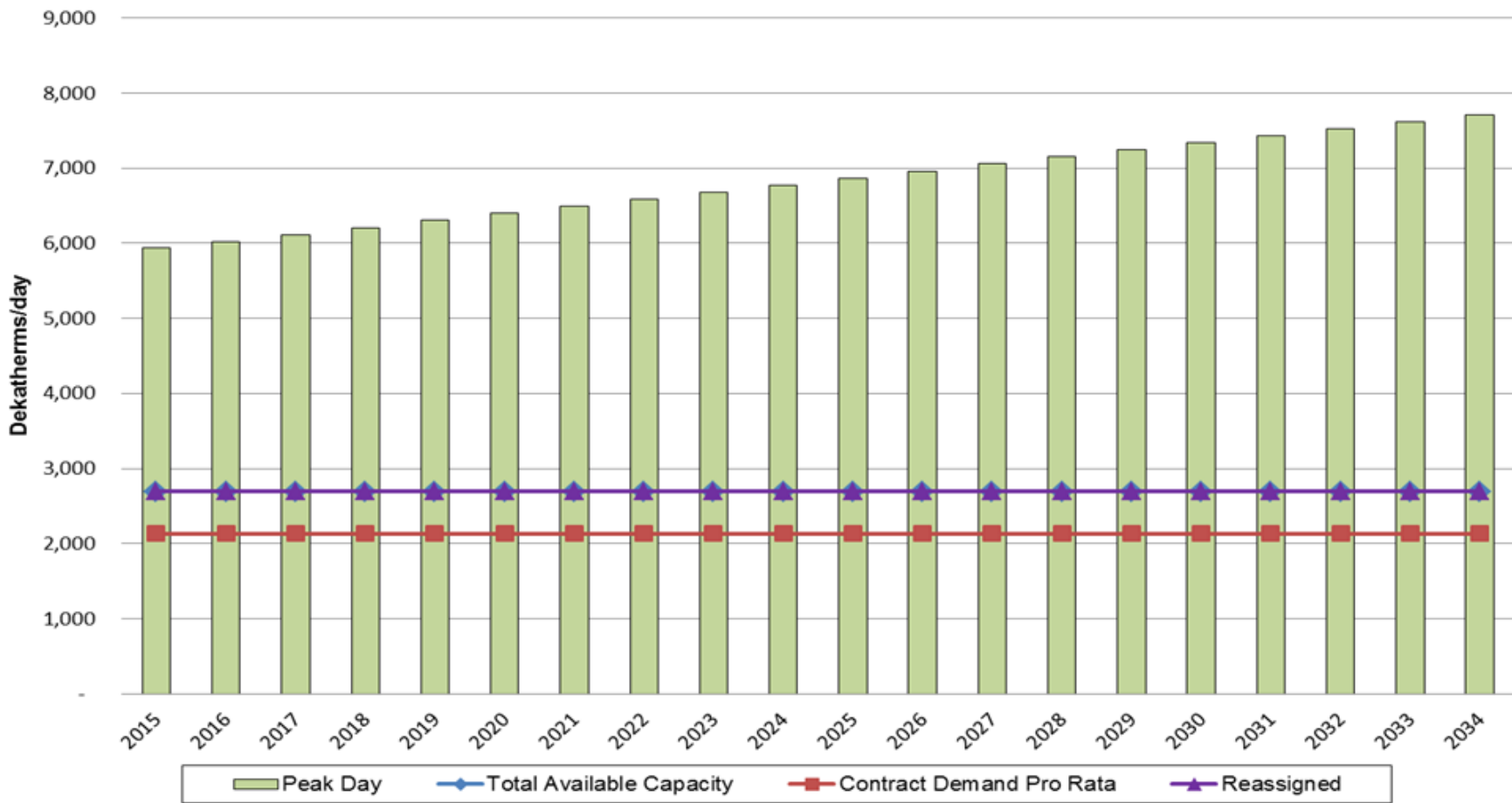
## Projected MDDO Contract Demand for Mount Vernon



Year


Gate

## Projected MDDO Contract Demand for Arlington



Year

# Overview

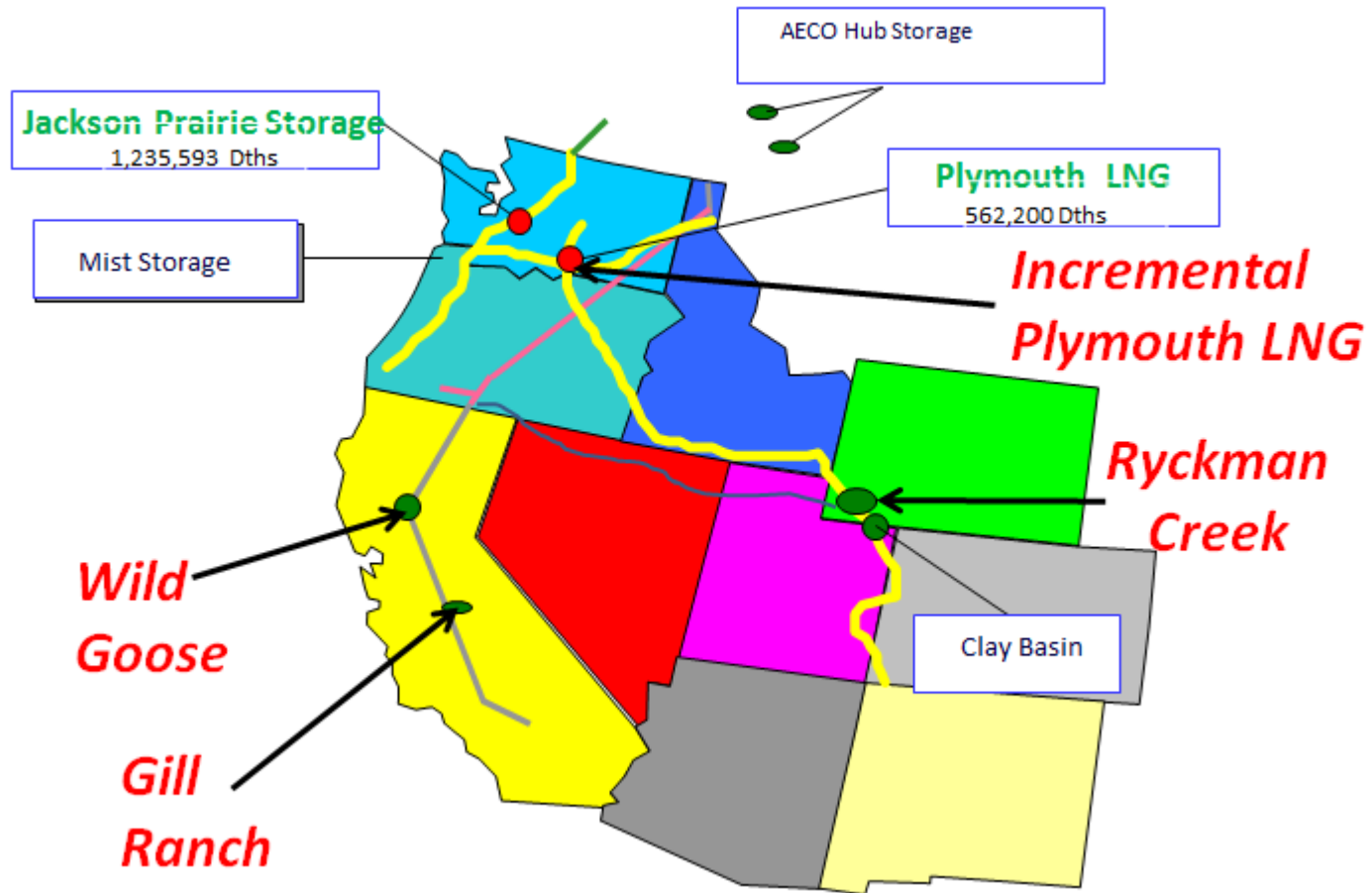
- ▶ Introductions
- ▶ 2012 IRP
  - Demand Forecast
  - Distribution System Enhancements
  - Demand Side Management
  - Supply Side Resources
  - **Resource Integration** 

**Two-Year Action Plan:** Action Items will be noted throughout.

# Sampling of citygates with peak day upstream pipeline capacity concerns

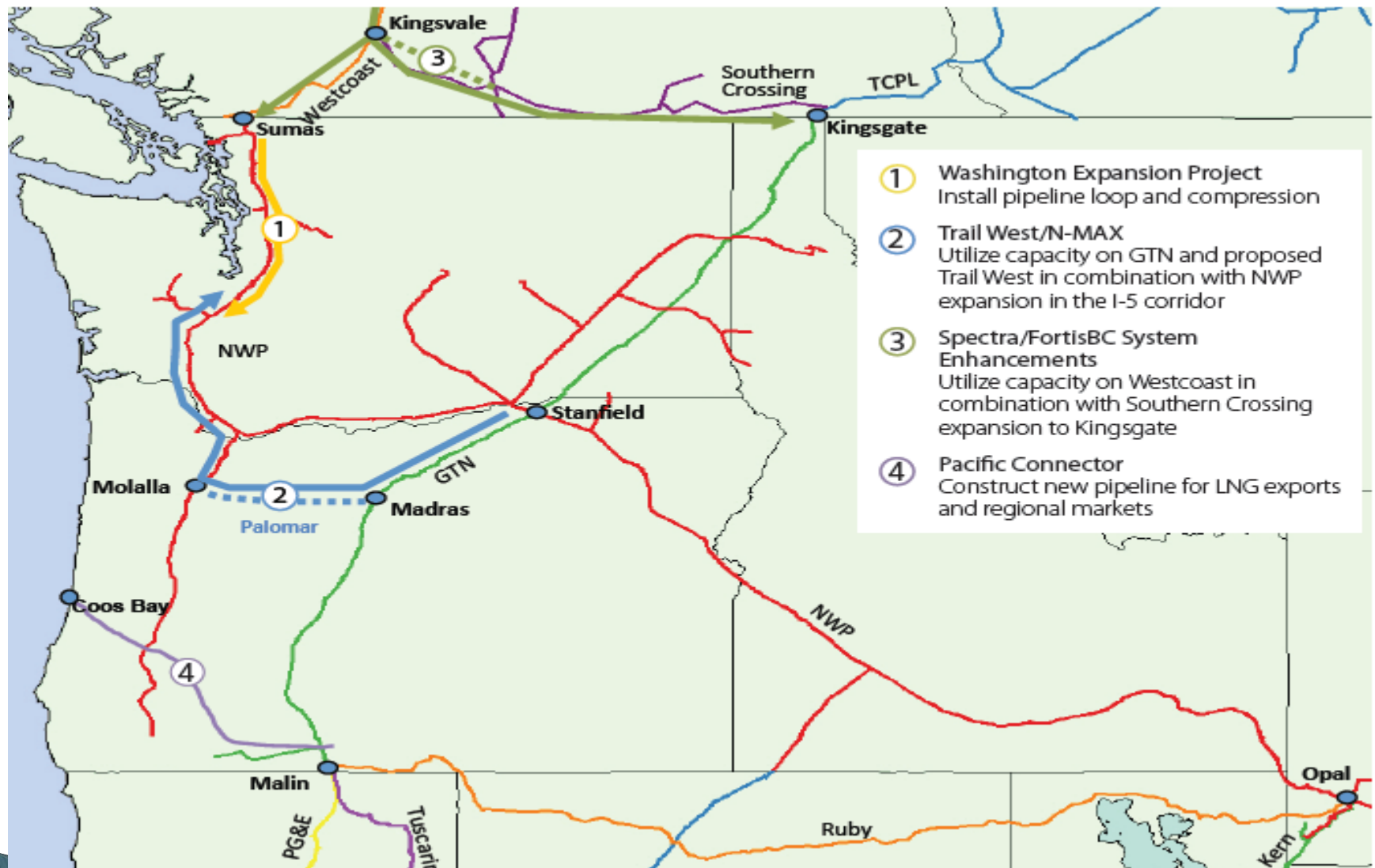
Citygate	2021 Capacity Under-utilized/(Short) on Peak Day	2026 Capacity Under-utilized/(Short) on Peak Day	2031 Capacity Under-utilized/(Short) on Peak Day	2032 Capacity Under-utilized/(Short) on Peak Day	2033 Capacity Under-utilized/(Short) on Peak Day
Arlington	-3,795	-4,266	-4,735	-4,829	-4,922
Beauchene Rd (Moxee)	-1,335	-1,373	-1,410	-1,418	-1,425
Bend	-5661	-7516	-9355	-9722	-10087
East Stanwood	-578	-658	-738	-753	-770
Kennewick	-14,842	-16,408	-17,954	-18,262	-18,568
Madras	-1272	-1366	-1463	-1482	-1502
Mount Vernon	-5,428	-6,179	-6,925	-7,074	-7,222
North Pasco	-7,136	-7,675	-8,207	-8,313	-8,418
Oak Harbor/Stanwood	-3,980	-4,673	-5,365	-5,503	-5,640
Redmond	-7510	-8590	-9662	-9875	-10088
S. Bend	-8800	-11156	-13495	-13960	-14425
Stearns	-2485	-3071	-3652	-3767	-3883
Walla Walla	-3,414	-3,409	-3,408	-3,408	-3,408
Yakima/Union Gap	-9,942	-10,210	-10,480	-10,533	-10,587

# Area Storage





# Alternative Resources- another view (source: NWGA)



# Addressing Resource Concerns

Peak Day Capacity shortfalls at Arlington, East Stanwood, Mount Vernon, Oak Harbor:

- Best met through the participation in NWP's Sumas Expansion, with an expected 2018 start date.
- In the interim we the company will continue to work with NWP to better align MDDOs with contract demand, acquire additional contract demand (receipt rights).

Peak Day capacity shortfalls regarding Kennewick, North Paso, Walla Walla, and Yakima and in part Central Oregon (Bend, South Bend, Redmond, Stearns, Madras:

- Seems most prudent to work with NWP to look at a combination of incremental Plymouth LNG and segmented NWP capacity to help serve the area lateral.
- Cascade is currently working with several parties, including NWP, whereby our secondary subordinate scheduling priority under TF-2 will be elevated to primary firm based on unutilized corridor rights.
- Essentially make improve reliability to use Plymouth to delivery gas not just to Washington but also to deliver storage volumes to Stanfield and onto GTN to help meet serve load in Central Oregon (Bend, Madras, Redmond, South Bend, Sterns). We plan to secure this arrangement within the next year.

# Addressing Resource Concerns

This will still leave approximately 10-15,000 dths/ of peak load shortfall in Central Oregon that will need to be addressed

- Modeling suggests that 350,000 dths of working inventory at Ryckman Creek beginning in 2018, combined with existing Ruby and GTN capacity can be utilized to meet these needs and provide arbitrage opportunities.
- Uncertain at this time as concerns regarding reliability at Ryckman
- On a parallel path to work with NGTL, Foothills and GTN pipelines to secure incremental capacity to move AECO supplies to serve Central Oregon. We are working with NGTL and Foothills on potential expansions beginning in 2018
- A decision regarding which of these options to aggressively pursue will be made during the 2016-2017 timeframe.

The Company will continue to explore options to incorporate biogas into its portfolio, as specific projects are identified in our service territory. A few potential projects have been proposed by outside parties. We are currently evaluating these proposals and considering appropriate tariff and operating guidelines.

# 20 Year Portfolio Costs NPV

SCENARIO NAME	IN \$000s	AVG. COST PER THEM
As Is Scenario	\$ 5,198,207	\$ 0.609505
<i>Base Case</i>	<i>\$ 5,198,207</i>	<i>\$ 0.609505</i>
All in Case	\$ 5,199,687	\$ 0.609835
Ryckman Creek	\$ 5,209,426	\$ 0.620024
Limited Canadian Imports	\$ 5,212,722	\$ 0.620410
Mist	\$ 5,247,142	\$ 0.624446
All Storage Options	\$ 5,265,794	\$ 0.626633
T-South Enhancement with incremental Sumas (WA Expansion)	\$ 5,281,914	\$ 0.628523
T-South Enhancement/Southern Crossing	\$ 5,292,254	\$ 0.629736
Pacific Northwest Regional (NMAX, WA Expansion)	\$ 5,293,561	\$ 0.629889
Wild Goose	\$ 5,294,807	\$ 0.630035
Gill Ranch	\$ 5,313,505	\$ 0.632228

# Questions?



*In the Community to Serve®*

## ↪ Contact Information:

- **Mark Sellers-Vaughn**, Manager of Supply Resource Planning  
509-734-4589, [Mark.Sellers-Vaughn@cngc.com](mailto:Mark.Sellers-Vaughn@cngc.com)
- **Brian Robertson**, Supply Resource Planning Analyst II  
509-734-4546, [Brian.Robertson@cngc.com](mailto:Brian.Robertson@cngc.com)
- **Monica Cowlshaw**, Manager, Energy Efficiency & Community Outreach  
360-788-2357, [Monica.Cowlshaw@cngc.com](mailto:Monica.Cowlshaw@cngc.com)
- **Amanda Sargent**, Conservation Analyst II  
360-788-2347, [Amanda.Sargent@cngc.com](mailto:Amanda.Sargent@cngc.com)
- **Jeremy Ogden**, Director, Engineering Services  
509-734-4509, [Jeremy.Ogden@cngc.com](mailto:Jeremy.Ogden@cngc.com)
- **Jon Whiting**, Director of Gas Supply and Control,  
(509) 7340-4549, [Jon.Whiting@cngc.com](mailto:Jon.Whiting@cngc.com)