

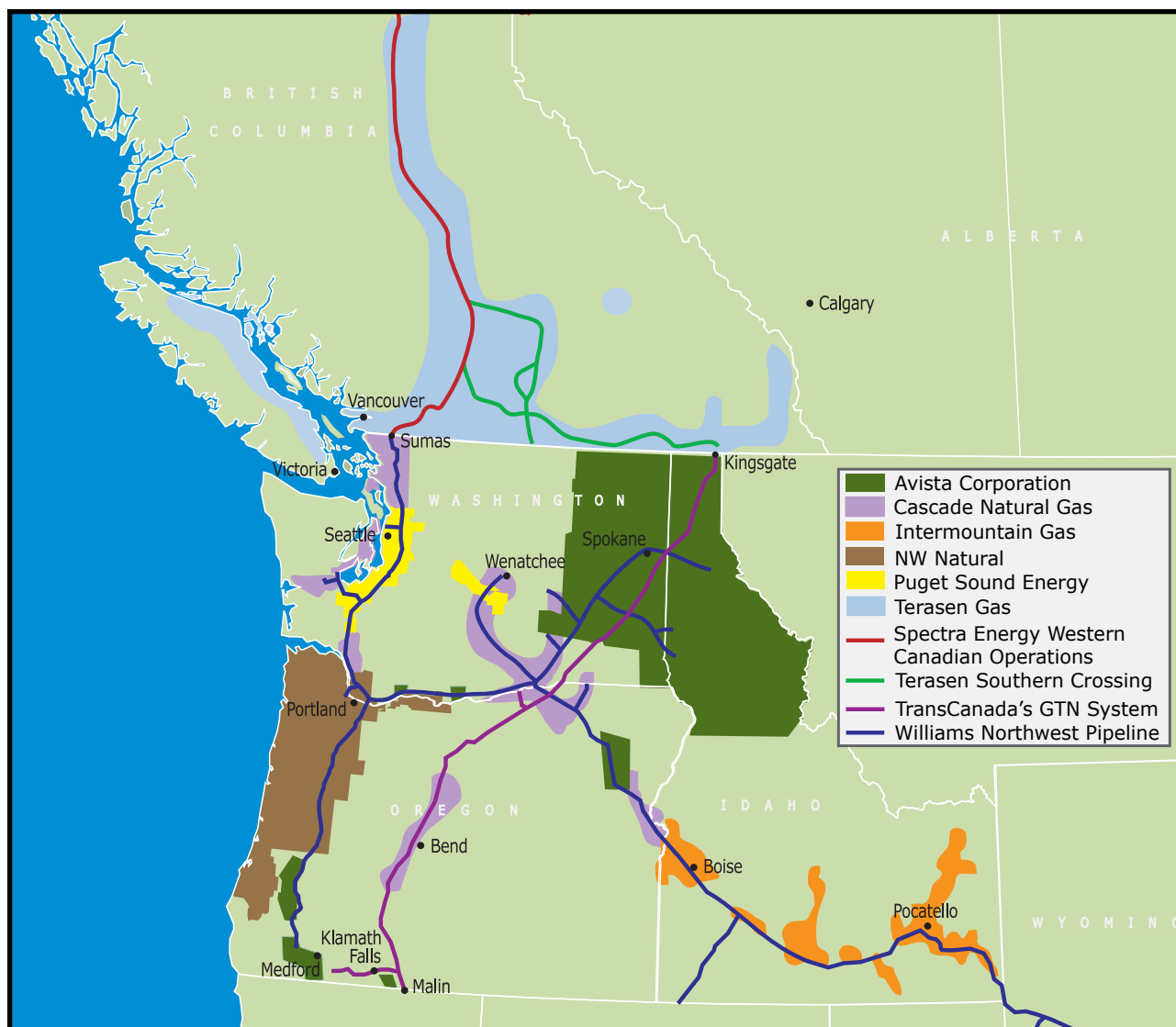


2010 GAS OUTLOOK

NATURAL GAS DEMAND, SUPPLY AND SERVICE CAPACITY IN THE PACIFIC NORTHWEST

PROJECTIONS THROUGH OCTOBER 2019

NWGA SERVICE AREA MAP



NWGA MEMBERS

Avista	(800) 227-9187	www.avistautilities.com
Cascade Natural Gas Corporation	(206) 624-3900	www.cngc.com
Intermountain Gas Company	(208) 377-6000	www.intgas.com
NW Natural	(503) 226-4211	www.nwnatural.com
Puget Sound Energy	(425) 454-6363	www.pse.com
Spectra Energy Transmission	(604) 691-5500	www.spectraenergy.com
Terasen Gas	(800) 773-7001	www.terasengas.com
TransCanada GTN System	(503) 833-4000	www.gastransmissionnw.com
Williams' Northwest Pipeline	(801) 583-8800	www.williams.com

ABOUT THE NORTHWEST GAS ASSOCIATION

The NWGA is a trade organization of the Pacific Northwest natural gas industry. It seeks to meaningfully shape policies to help increase the diversity, abundance and dependability of natural gas supply and infrastructure available to serve the Pacific Northwest. Its members include six natural gas utilities serving communities throughout Idaho, Oregon, Washington and British Columbia, and three transmission pipelines that transport natural gas from supply basins into and through the region.

Avista Utilities (www.avistautilities.com) – Serves over 310,000 natural gas customers in three Western states including northern Idaho, parts of southwestern and northeastern Oregon and eastern Washington.

Cascade Natural Gas Corporation (www.cngc.com) – Serves approximately 251,000 residential, commercial and industrial natural gas customers in 93 communities in Oregon and Washington.

Intermountain Gas Company (www.intgas.com) – Serves over 300,000 residential, commercial and industrial customers in 23 counties and 75 cities generally along the Snake River plain in southern Idaho.

NW Natural (www.nwnatural.com) – Serves 657,000 customers in Oregon and southwest Washington, including the Portland-Vancouver metropolitan area, the Willamette Valley, the northern Oregon coast and portions of the Columbia River Gorge.

Puget Sound Energy (www.pse.com) – The Pacific Northwest's largest energy utility provides electric and/or natural gas service to more than 1.2 million customers primarily in Washington State's Puget Sound region.

Spectra Energy Transmission (www.spectraenergy.com) – Delivers gas to markets in British Columbia (BC) and the Pacific Northwest via a 1,600-mile pipeline transmission system stretching from Fort Nelson in northeast BC and Gordondale at the BC/Alberta border to the BC/U.S. border at Huntingdon/Sumas. Spectra's system is capable of transporting approximately 1.7 billion cubic feet (Bcf) of Canadian gas to key markets daily.

Terasen Gas (www.terasengas.com) – The largest distributor of natural gas in the Pacific Northwest and the third largest gas utility in Canada, serving more than 900,000 customers in 125 communities across British Columbia.

TransCanada Gas Transmission Northwest (www.gastransmissionnw.com) – Serves markets in California and Nevada, delivers gas in the Pacific Northwest directly to customers off its mainline system and to local distribution companies in Idaho, Oregon and Washington. The GTN system is capable of transporting approximately 2.9 Bcf of Canadian and domestic gas per day.

Williams Northwest Pipeline (www.williams.com) – Serves customers in seven western states with a 4,000 mile bi-directional system that extends from the San Juan Basin in western Colorado/New Mexico state border to the U.S./Canadian border at Sumas. The system is capable of delivering up to 3.4 Bcf of peak-day gas from key supply points such as the Rockies, San Juan Basin and Western Canada Sedimentary Basin. Northwest also has working natural gas storage capacity of approximately 12.4 Bcf.

TO OUR READERS:

Throughout this report we have used terminology specific to the natural gas industry. This includes the most common units of energy used to describe natural gas a measure of volume, and therms a measure of energy (or heat). When discussing the specifics of natural gas demand, supply or capacity, we have tried to be consistent about using the same unit of energy throughout a related section.

Here are some basic definitions for the various units of energy discussed to help our readers make comparisons should the need arise. While the energy content of natural gas varies according to its specific composition, we have generally used the value of 1,030 British thermal units (Btus) per cubic foot of natural gas when making conversions.

Btu	British thermal unit – a measure of energy content (non-metric).
1 Btu	The energy required to increase the temperature of one pound of water one degree Fahrenheit under standard (defined) conditions.
MMBtu	One million Btus – the typical unit by which natural gas is bought and sold (e.g. “the spot price of natural gas is \$7.00 per MMBtu”).
J	Joule – a measure of energy content (metric).
GJ	One trillion joules; .9478 MMBtu
1 J	The energy required to lift a small apple (102 grams) one meter against Earth’s gravity.
cf	Cubic foot – a measurement typically used to describe natural gas volumes, as in reserves, deliveries, storage levels, etc.
1 cf	Approximately 1,030 Btus; the energy content of natural gas varies by its source. This document uses 1,030 Btus/cf as a general rule.
Mcf	1,000 cubic feet. Equivalent to 1.03 MMBtu.
MMcf	1 million cubic feet. Equivalent to 1.03 MDth.
Bcf	1 billion cubic feet. Equivalent to 1.03 MMDth.
Bcf/d	1 billion cubic feet per day
Tcf	1 trillion cubic feet.
Therm	A unit of heat equal to 100,000 Btus.
Dth	Decatherm; Equivalent to 10 therms, 1 million Btus or 0.975 Mcf.
MDth	1,000 Decatherms. Equivalent to 0.975 MMcf.
MMDth	1 million Decatherms. Equivalent to 0.975 Bcf.
W	Watt – a measure of electrical energy.
kw	Kilowatt or 1,000 watts.
kWh	Kilowatt-hour, a measurement of electrical energy used over time. (Ten 100w light bulbs burning for one hour would use 1 kWh.)
1 kWh	3,413 Btus.
hp	Horsepower – a measure of mechanical energy. One horsepower equals 550 foot-pounds per second.
1 hp	746 watts.
hp-hr	Horsepower-hour.
1hp-hr	2,545 Btus.

TABLE OF CONTENTS

Executive Summary	ES1
The Role of Natural Gas in the Northwest	
How Recent History Shaped Today's Market	
Summary of Key Conclusions	
Regional Natural Gas Demand	1
Key Conclusions	
Recent Demand	
Projected Demand	
Trends in Demand Growth	
Sidebar: How New Energy Policies are Driving Natural Gas Demand	
What This Means	
Regional Natural Gas Supply	9
Key Conclusions	
A Closer Look	
What This Means	
Sidebar: Potential Sources of Additional Supply	
Regional System Capacity	15
Key Conclusions	
A Closer Look	
Peak Day Analysis	
Proposed New Pipelines	
Proposed LNG Import Terminals and Pipelines	
Storage Facility Expansions	
What This Means	
Regional Natural Gas Prices	22
Key Conclusions	
A Closer Look	
What This Means	
Appendix - Data Tables	24

FIGURES

1. PACIFIC NORTHWEST NATURAL GAS DEMAND - 1994-2008	2
2. PROJECTED REGIONAL DEMAND BY SECTOR - BASE CASE, 2009-2019.....	3
3. PROJECTED TOTAL ANNUAL NATURAL GAS DEMAND GROWTH, BASE CASE 2009-2019.....	4
4. PROJECTED ANNUAL DEMAND BY GROWTH CASE, 2009-2019	4
5. CHANGE IN DEMAND COMPOSITION, 1999 ACTUAL - 2008 ACTUAL	5
6. PRODUCTION AREAS IN THE NORTHWEST.....	9
7. WCSB GAS PRODUCTION FORECASTS	10
8. ROCKIES GAS PRODUCTION FORECASTS.....	10
9. NORTH AMERICAN NATURAL GAS FLOWS.....	11
10. U.S. NATURAL GAS SUPPLY BY SOURCE, 1990-2030 (TCF).....	12
11. KEY INFRASTRUCTURE SERVING THE NORTHWEST.....	15
12. CAPACITY OF PIPELINES AND STORAGE TO MEET I-5 CORRIDOR PEAK DEMAND	16
13. 2018-2019 WINTER ANALYSIS (BASE HIGH CASE DEMAND) - MODERATELY COLD YEAR.....	17
14. PIPELINE PROJECTS PROPOSED TO SERVE THE NORTHWEST.....	18
15. PROPOSED LNG TERMINALS AND ASSOCIATED PIPELINES.....	19
16. NWPCC NATURAL GAS PRICE FORECAST FOR SIXTH POWER PLAN	22
17. INDUSTRY TOOLS TO MANAGE PRICES	23

TABLES

1. PROJECTED REGIONAL DEMAND GROWTH.....	2
2. EXISTING PACIFIC NORTHWEST STORAGE AND LNG FACILITIES	20

APPENDIX: DATA TABLES

A1. REGION-WIDE PEAK DAY SUPPLY	25
A2. ANNUAL DEMAND BY REGION AND SECTOR, BASE CASE	26
A3. ANNUAL DEMAND BY REGION AND SECTOR, HIGH CASE.....	27
A4. ANNUAL DEMAND BY REGION AND SECTOR, LOW CASE.....	28
A5. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - BASE CASE.....	32
A6. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - HIGH CASE	33
A7. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - LOW CASE.....	34
A8. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - BASE CASE	35
A9. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - HIGH CASE.....	36
A10. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - LOW CASE	37

EXECUTIVE SUMMARY

Compiled annually by the Northwest Gas Association (NWGA) and its members, this report provides a consensus industry perspective of the Pacific Northwest's current and projected natural gas demand, supply, delivery capability and prices. For purposes of this report, the Pacific Northwest is defined as Oregon, Washington, Idaho and British Columbia (BC). This forecast covers the period beginning Nov. 1, 2009, and ending Oct. 31, 2019.

Information and data for the report were provided by NWGA member companies and drawn from various public and internal planning documents (e.g., integrated resource plans, least-cost plans, etc.), then compiled and analyzed to arrive at a composite regional perspective.

Regional, national and continental statistics were obtained from a variety of sources, including the Energy Information Administration (EIA), Northwest Power and Conservation Council (NWPCC), National Energy Board (NEB) – Canada, Statistics Canada (StatCan) and others as cited.

By sharing information about the dynamics of the regional natural gas industry, the Association intends to:

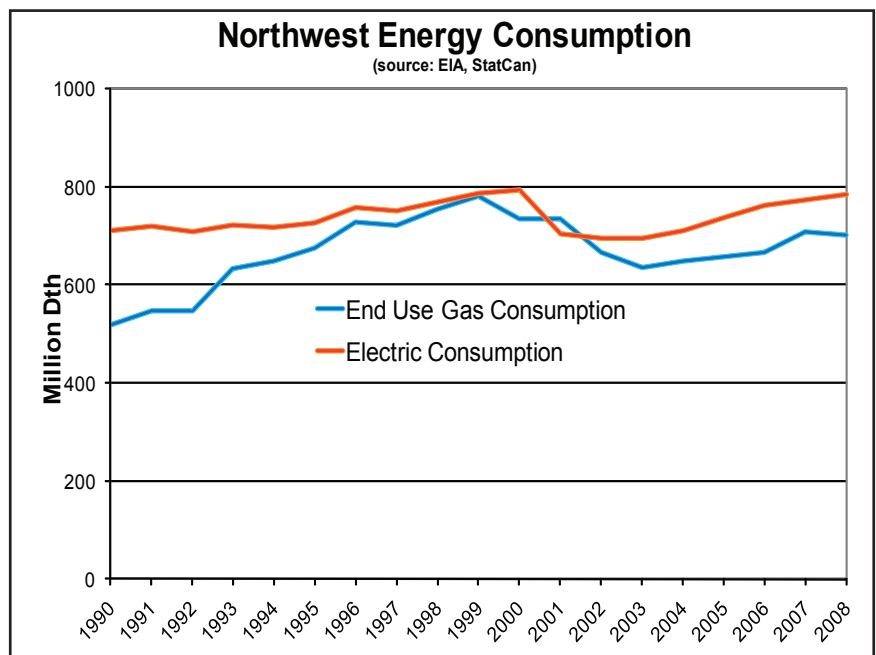
- Establish shared priorities for addressing future challenges; particularly, ensuring a reliable supply of natural gas to serve regional demand.
- Promote public policies and industry and consumer actions that will ensure the wise and most cost-effective use of natural gas.
- Build a broad-based awareness of the role natural gas will play in reducing greenhouse gas (GHG) emissions and helping the region achieve its environmental goals.

Understanding the natural gas market and how best to use this valuable resource is particularly important today as the region joins energy users across the globe to address climate change. As the cleanest burning fossil fuel, natural gas is already playing a central role in emerging policies and energy industry initiatives to protect our environment.

THE ROLE OF NATURAL GAS IN THE NORTHWEST

Natural gas is an integral part of the Pacific Northwest energy portfolio:

- Natural gas burned directly for residential space and water heat, and for commercial and industrial processes (i.e., “end use”) accounts for almost as much energy as the region consumes via electricity (see chart).
- According to the NWPCC, natural gas fuels 24 percent of the region's power generation capability – a larger share than any resource except hydropower, which makes up 48 percent.
- The number of natural gas customers in the region grew by almost 18 percent between 2000 and 2008, despite a regional economic downturn and volatile natural gas prices.



Despite recent economic turmoil, regional demand for natural gas continues to grow.

HOW RECENT HISTORY HAS SHAPED TODAY'S MARKET

The last decade has been punctuated by events that have significantly changed the Pacific Northwest energy market. Skyrocketing energy costs as a result of the Western energy crisis early this decade had far-reaching and, in some cases, permanent impacts on the region's economy, including the almost complete loss of an entire industry (aluminum) and thousands of good paying jobs. More recently, the national credit crisis, collapse of the housing market and high unemployment have plagued North America and the Northwest, again dampening energy demand.

The more interesting story may be what is happening on the supply side of the equation. Improved technologies have made the recovery of vast reserves of "unconventional" natural gas throughout North America feasible, especially those found in shale formations. In June of 2009, the Potential Gas Committee (PGC) increased its estimate of U.S. natural gas reserves by more than 40 percent over 2008: the largest single year increase in reserves since the PGC began issuing its annual report. That's the equivalent of more than 100 years of supply at today's consumption rates.

The rising tide of new supplies coupled with dampened demand gave consumers a welcome respite from the high natural gas prices they have experienced in recent years. The fall of 2009 brought some of the lowest gas prices in years.

As we move into 2010, emerging energy policies aimed at reducing carbon and other GHG emissions, encouraging conservation and promoting the wise and efficient use of existing energy resources will significantly shape the regional energy market. State, provincial, regional and national plans already in force or under consideration prioritize conservation and renewable energy sources. But policymakers recognize that these alone will not cover our growing energy needs and a truly comprehensive plan must take a multi-pronged approach. It is apparent that any plan to build a foundation for our energy future must include a significant role for abundant, clean and efficient natural gas.

This report looks at how this changing energy paradigm affects future natural gas demand, supply, infrastructure and prices in our region.

SUMMARY OF KEY CONCLUSIONS

The Pacific Northwest has a strong environmental ethic. Policymakers in some jurisdictions have set decidedly ambitious goals to reduce GHG emissions and promote energy production from renewable resources. Achieving these objectives will require collaboration and a concerted effort. The Pacific Northwest natural gas industry is committed to helping the region meet its environmental mandates by encouraging the most efficient use of natural gas, acquiring necessary supply, and building the infrastructure needed to sustain a balanced market and stabilize prices. Policymakers will have a significant impact on the demand for, and availability and price of, natural gas in the future through the energy laws they implement. Consumers too will contribute by the actions they take at home and at work. We offer this report to help inform and guide the region's efforts.

The following summarizes key conclusions drawn from the data and discussion contained in this report:

DEMAND

- Natural gas consumption (as measured by energy content, or decatherms - Dth) in the Pacific Northwest is expected to grow an average of 1 percent per year, with a cumulative projected growth of 8.5 percent, through 2019. Most of this increase will be driven by demand for gas-fired electrical generation and continued growth in residential demand.

BLUE FOUNDATION FOR A GREEN ENERGY FUTURE

As the cleanest burning fossil fuel with abundant supplies across the globe, natural gas will help the Pacific Northwest achieve its environmental goals.

Natural gas demand will grow in the region as new energy policies encourage its use, both for gas-fired electrical generation and directly heating homes, buildings and water.

- Peak day demand remains about the same as that projected in the 2008 Outlook. Annual loads start from a lower base in 2009-10 (2009-10 projection of 800 MMDth vs. 900 MMDth actual demand in 2008) due primarily to lower industrial loads, fewer customers and lower consumption per customer caused by the recession.
- Energy policies are encouraging greater use of clean-burning natural gas to help reduce GHG emissions and complement development of renewable energy resources.

- Energy efficiency and conservation, intrinsic to the region's energy values, are the cornerstones of emerging regional and national energy plans. This further supports using natural gas for its most efficient purposes – directly heating homes, buildings and water.

SUPPLY

- Natural gas supplies are plentiful across North America and the world and include a variety of sources. Improved production technologies and market economics have recently spurred unprecedented recoverable natural gas discoveries across the continent.
- The Pacific Northwest market continues to benefit from its proximity to the Western Canadian Sedimentary Basin (WCSB) and the U.S. Rockies, two large and prolific gas-producing regions.
- Competition for the supplies upon which the Northwest depends is intensifying as producers seek more lucrative markets and those markets seek access to lower-priced supplies – and pipelines are built to connect the two.

Natural gas supplies are plentiful, but the Northwest is increasingly competing for them with other markets.

CAPACITY

- The region's growing dependence on natural gas to help meet its environmental goals will drive the need for additional infrastructure to access more gas from our traditional sources and from new sources.

Eventually, the region will require new delivery infrastructure to serve growing demand.

- During extreme weather events (peak days), the existing system of natural gas pipelines and storage facilities serving the Northwest is efficiently utilized with little redundancy.
- Infrastructure developers have responded to the region's emerging need by proposing several projects to deliver more supplies to the region from a diversity of sources, which can be built as market conditions dictate.

PRICES

- Natural gas prices reflect the balance between demand and supply, which shifted significantly in the past year. High natural gas daily spot prices in North America during the summer of 2008 (~\$13/Dth) contrast sharply with the low daily spot prices experienced during the summer and fall of 2009 (at one point, less than \$2/Dth).
- Policymakers can and will influence natural gas prices depending on whether and how they address critical issues affecting the supply/demand balance, including access to new sources of supply, infrastructure development and efficient use of natural gas.

High natural gas prices dropped to seven-year lows in the past year, reflecting the fluctuating balance between demand and supply.

This page was intentionally left blank.

REGIONAL NATURAL GAS DEMAND

KEY CONCLUSIONS

1. Natural gas consumption (as measured by energy content, or decatherms - Dth) in the Pacific Northwest is expected to grow an average of 1 percent per year, with a cumulative projected growth of 8.5 percent through 2019. Much of this increase will be driven by demand for gas-fired power generation and continued growth in residential demand.
2. Peak day demand remains about the same as that projected in the 2008 Outlook. Annual loads start from a lower base in 2009-10 (2009-10 projection of 800 MMDth vs. 900 MMDth actual demand in 2008) due primarily to lower industrial loads, fewer customers and lower consumption per customer caused by the recession.
3. Energy policies are encouraging greater use of clean-burning natural gas to reduce greenhouse gas (GHG) emissions and complement development of renewable energy resources.
4. Energy efficiency and conservation, intrinsic to the region's energy values, are the cornerstones of emerging regional and national energy plans. This further supports using natural gas for its more efficient purposes – directly heating homes, buildings and water.

A CLOSER LOOK

RECENT DEMAND

Before the global economic downturn in 2008, natural gas demand in the Pacific Northwest was growing steadily. Although the energy crisis of 2000-01 caused a temporary hiccup in demand for most consumer groups (the effect on industrial consumption was more significant), aggregate demand for natural gas subsequently grew by 14 percent between 2003 and 2008 (almost 3 percent annually).¹

The following is a look at natural gas consumption patterns during this period for different customer groups:

Residential and commercial consumers used 15 percent more natural gas in 2008 than in 2003, growth of more than 3 percent annually. Sometimes referred to as the core market, gas demand in this sector varies widely with the weather. In our region, cold weather is the primary driver of core market demand. The price of natural gas – which is passed through directly to consumers without markup by the local gas company – can also affect core demand. Efficient and affordable appliances, good building codes and improved weatherization of existing homes have all affected core demand in recent years. According to the American Gas Association, residential consumers use 32 percent less gas today on a per-customer basis than they did in 1980.

Industrial consumption of natural gas grew about 1.5 percent from 2003 to 2008. Weather has less effect on the industrial sector as most manufacturing processes run year-around regardless of weather conditions. The industrial sector is highly price-sensitive however, since energy costs are usually a large portion of the overall cost of production. Industrial consumers were especially hard hit during the earlier energy crisis, causing some companies to close plants and merge operations. These changes, along with aggressive implementation of energy conservation measures, have permanently changed the region's industrial base. Industrial consumption of natural gas in 2008 was 42 percent lower than at its apex in 1998.

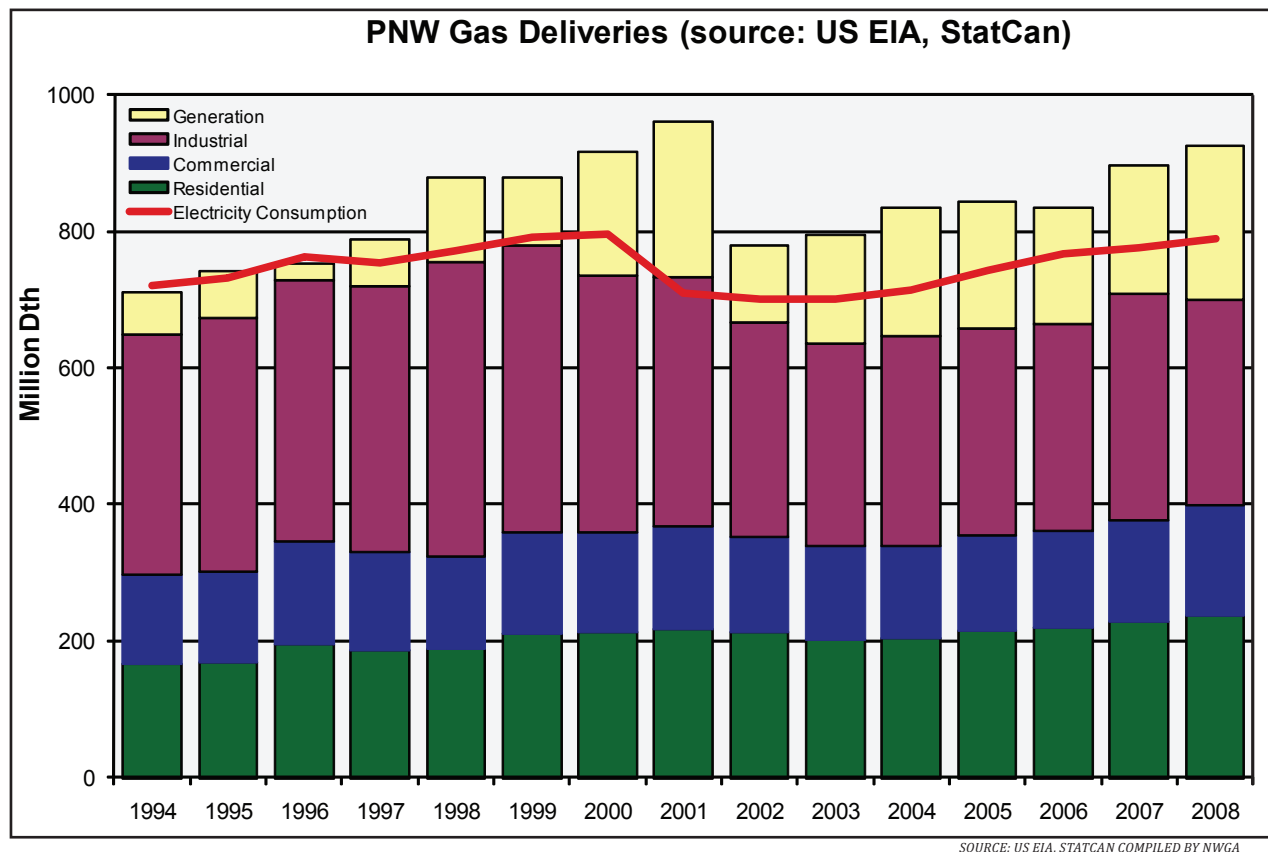
Power generation demand has been volatile, reflecting the many variables that can affect it. These include weather, the availability of hydropower and the cost of natural gas and oil. Public policies that have restricted the development of other resources (e.g. nuclear, hydropower, coal) and promoted development of renewable resources also affect gas-fired generation demand.

To manage demand growth so it does not outpace supply, policymakers and the industry need to aggressively pursue additional conservation and wise-use initiatives.

¹ US Energy Information Administration (EIA), *Annual Natural Gas Consumption By End Use*; Statistics Canada, Tables 129-0003 and 131-0001.

Currently, natural gas is the primary fuel for 24 percent of the region's power generating capability. The region's gas-fired fleet is capable of delivering 9,100 average megawatts (aMW) of power.² Gas demand for generation peaked in 2001 due to the energy crisis, dropped by half the following year and then grew more than 12 percent annually through 2008 to once again approach 2001 levels.

FIGURE 1. PACIFIC NORTHWEST NATURAL GAS DEMAND - 1994-2008



PROJECTED DEMAND

Natural gas demand in the Pacific Northwest is expected to grow 1 percent annually, for a total of 8.5 percent through 2019, given normal weather conditions and expected economic and population growth (called "base case;" see Table 1). Demand growth by residential/commercial customers eclipsed that of gas-fired power generation facilities in past years, but changing energy policies have spurred an increase in anticipated generation demand.

TABLE 1. PROJECTED REGIONAL DEMAND GROWTH

09 OUTLOOK UPDATE	Low Demand Growth		Expected (Base) Demand Growth		High Demand Growth	
	Average Annual %	Cumulative	Average Annual %	Cumulative	Average Annual %	Cumulative
TOTAL	0.3%	2.8%	1.0%	8.5%	1.3%	11.0%
Residential	0.5%	4.5%	1.1%	9.4%	1.8%	14.6%
Commercial	0.2%	2.1%	0.8%	6.9%	1.4%	11.8%
Industrial	0.6%	4.8%	0.7%	6.2%	0.7%	6.2%
Generation	-0.1%	-0.5%	1.3%	10.8%	1.4%	11.4%

SOURCE: NWGA

Base case projections reflect the current recessionary economy and an expected slow recovery, which some economists believe has begun. The low growth case assumes slower than expected economic growth while high growth considers a more rapid economic expansion. Projected gas prices also figure into the respective forecasts.

² NWPCC, draft *Sixth Northwest Power Plan*, September 2009.

In the base case, near-term growth will be less than the average annual 1 percent projection for some customer groups – e.g., residential growth will be slower initially as new home construction slowly rebounds – but is expected to accelerate in later years. Since natural gas is a good value for home heating, it remains the fuel of choice for space and water heat in most new single-family home construction and many older electric furnaces and water heaters are being replaced with natural gas units.

Commercial and industrial demand, dampened by the recent economic downturn, is expected to recover – with industrial demand projected to grow slightly faster than in recent years. Power generation demand is anticipated to grow 10.8 percent over the next decade (base case), because of growing requirements for gas-fired generation. As mentioned previously, this demand can be volatile because of weather, stream flows in the Northwest hydro system, availability of new renewable electricity sources, fuel prices and a host of other factors.

Figure 2 illustrates projected growth by sector in the base case, while Figure 3 shows projected total annual base case demand growth for each of the next 10 years. Figure 4 depicts projected annual demand under each of the three growth scenarios. All three figures demonstrate the effect of the recent recession, reflecting a decline of a little over 10 percent in the reference case from 2008 actual demand to 2009-10 projected demand.

Infrastructure developments are typically driven by peak day loads – the highest volumes a system may be expected to carry – which have held steady even as annual loads dropped due to the recession.

FIGURE 2. PROJECTED REGIONAL DEMAND BY SECTOR – BASE CASE, 2009-2019

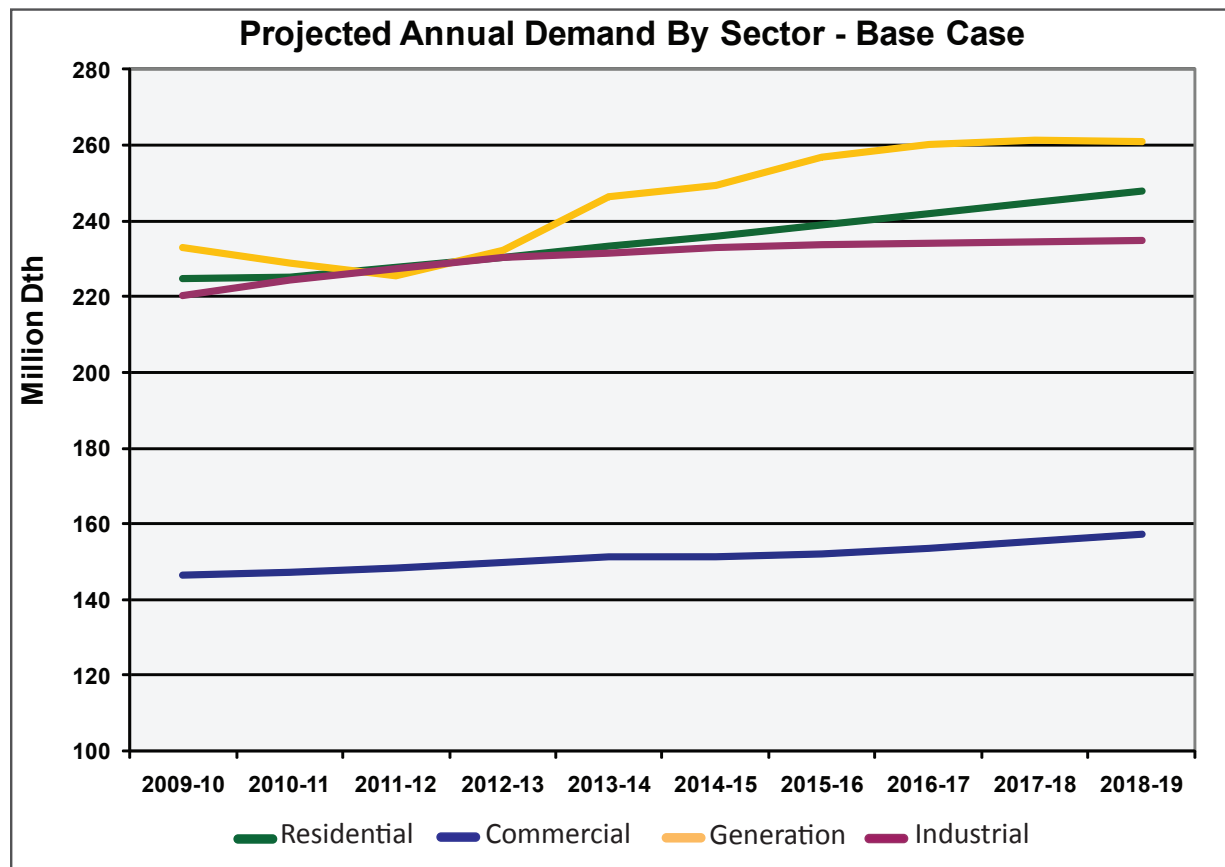


FIGURE 3. PROJECTED TOTAL ANNUAL NATURAL GAS DEMAND GROWTH, BASE CASE 2009-2019

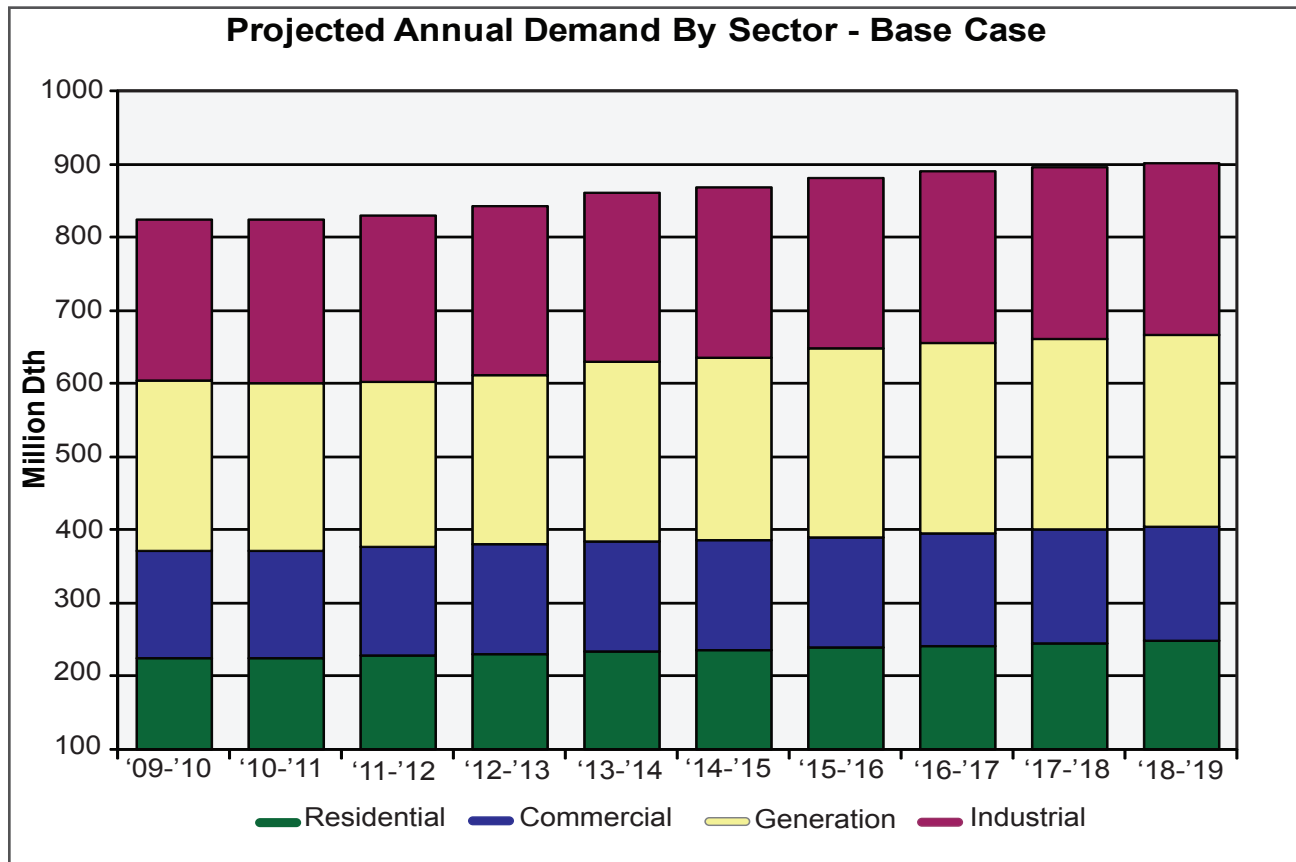
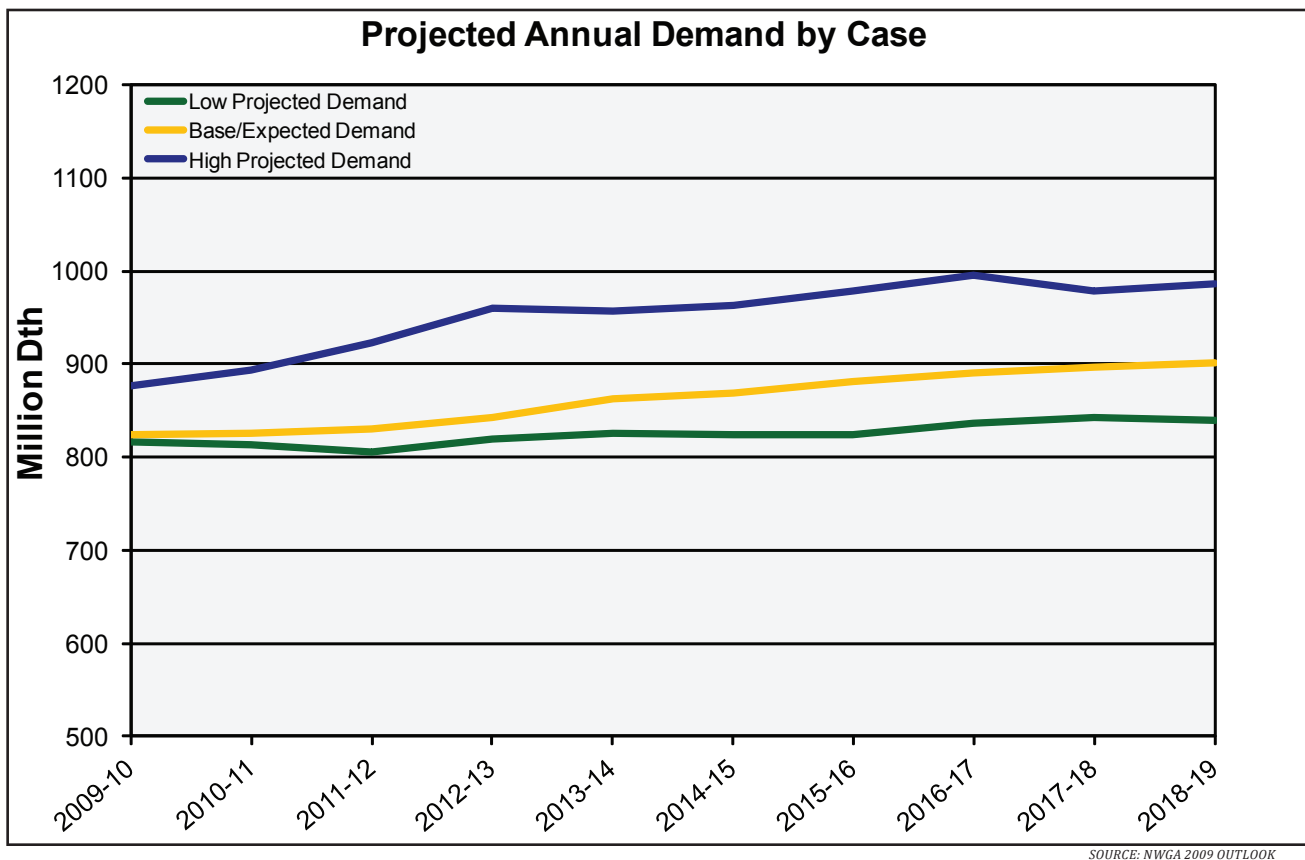


FIGURE 4. PROJECTED ANNUAL DEMAND BY GROWTH CASE, 2009-2019

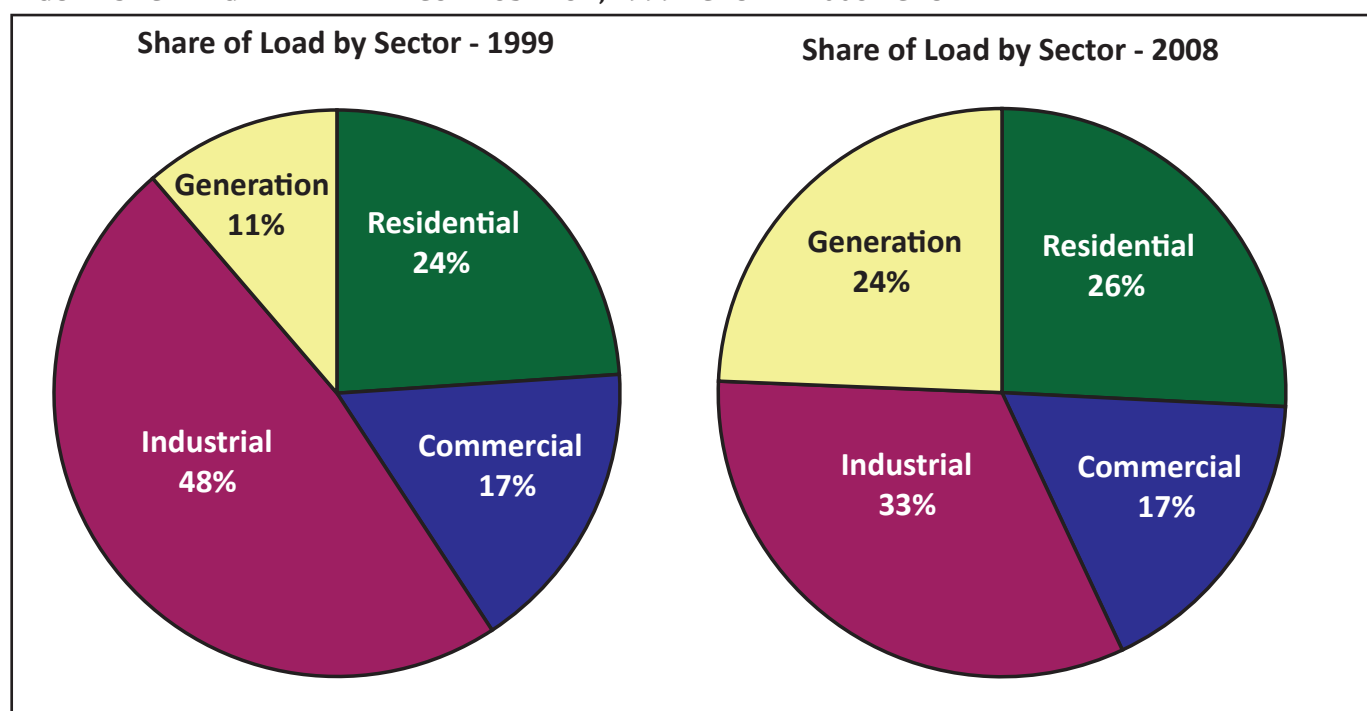


TRENDS IN DEMAND GROWTH

While the region's natural gas consumption continues to grow, the nature of that consumption has changed in recent years. Increased energy conservation efforts triggered by recent high energy prices have not only slowed the rate of demand growth, but changed customer load profiles and composition (see Figure 5). Year-round or baseload demand (e.g., industrial processes only nominally affected by weather, including chemical processing, lumber-drying kilns and food processing boilers) are growing more slowly than peak demand triggered by weather or other short-term factors (e.g., home heating).

New energy policies and plans focused on reducing carbon and other GHG emissions will likely intensify this trend. We expect the region will require additional power resources to serve growth in electric baseload demand as well as weather-driven demand in the summer (air conditioning) and winter (electric heating). While energy efficiency/conservation efforts and renewable resources are figuring prominently in emerging policies and plans, those resources are primarily used to address baseload demand for power. To meet peak demand, particularly in the near term, it is generally recognized that natural gas resources are the cleanest, most economical and most reliable option.

FIGURE 5. CHANGE IN DEMAND COMPOSITION, 1999 ACTUAL - 2008 ACTUAL



SOURCE: NWGA

This change has important implications for the natural gas industry since it affects the region's infrastructure and purchasing requirements. For instance, storage facilities are a cost-effective method of meeting seasonal or short-term surges in natural gas demand, while pipelines are usually built to serve steadier, year-round loads. (See Chapter 3, Regional System Capacity.) What mix of infrastructure the region requires in the future will be dictated in part by these demand trends.

HOW NEW ENERGY POLICIES ARE DRIVING NATURAL GAS DEMAND

As policymakers continue to address climate change and enact laws that shape how we produce and use energy, all energy market participants are beginning to feel the impact. Whether policies mandate change (by requiring energy producers to reduce GHG emissions) or encourage it (through consumer grants or tax credits), they will increasingly determine the energy choices we make. And natural gas, as the cleanest-burning fossil fuel, will serve an important and growing role in these efforts.

FEDERAL POLICIES

The U.S. and Canadian federal governments are pursuing new comprehensive energy policies to encourage emissions reductions and development of “green energy” through a combination of directives and incentives. In the U.S. Congress, the proposed American Clean Energy and Security Act of 2009 (H.R. 2454, called “Waxman-Markey” for the bill’s primary sponsors) was passed by the House of Representatives in June 2009. It calls for an 83 percent reduction in carbon emissions from 2005 levels by 2050. Meanwhile, the U.S. Senate is considering its own Cleaner, Secure, Affordable Thermal Energy Act (S. 1643) which offers, among other incentives, a 30 percent tax credit to help energy consumers convert a home heating system from fuel oil to a natural gas.³ (According to the EIA, such a conversion reduces GHG emissions by 27 percent.) From the two bills, a new law is expected to emerge from Congress by 2010.

At the same time, the U.S. Environmental Protection Agency (EPA) has declared carbon dioxide and five other GHGs as “dangerous pollutants.” This formal endangerment finding obligates the agency to regulate GHG emissions, even if Congress does not pass an energy bill.

In Canada, the House of Commons is considering a Climate Change Accountability Act (Bill C-311) which calls for GHG emission cuts of 80 percent below 1990 levels by 2050. Meanwhile, Canada’s Regulatory Framework for Industrial Greenhouse Gas Emissions, finalized in 2008, already requires industrial emitters to reduce their emission intensities 18 percent below 2006 levels beginning in 2010, with 2 percent continuous improvement every year following.⁴

“It is clear that, after conservation and renewables, natural gas-fired generation is the most cost-effective resource option for the region in the near-term.”

-- NWPCC, draft Sixth Northwest Power Plan.

STATE/PROVINCIAL POLICIES AND REGIONAL PLANS

Regionally, Pacific Northwest policymakers in the U.S. and Canada are already blazing trails to reduce GHG emissions. In the U.S., Washington and Oregon have both enacted standards requiring significant proportions of electricity to be generated by renewable resources. Both states also adopted standards that limit the emission of greenhouse gases by any new power generation resources to those of state-of-the-art gas-fired generation technology. Idaho enacted a two-year moratorium precluding the construction of any new coal-fired generation in the state. While the moratorium has since expired, the message was effectively delivered. Project developers in other jurisdictions have also canceled or slowed the development of coal-fired facilities due to the regulatory risk associated with GHG and mercury emissions.

In Canada, British Columbia (BC) issued an Energy Plan in 2007 that requires existing thermal generation plants to reach zero net GHG emissions by 2016 and all new power generation to have zero net emissions. The goal is to ensure clean or renewable power generation continues to account for at least 90 per cent of total generation. In 2008, BC became the first jurisdiction in North America to enact a consumer-based tax on carbon emissions. Local governments in BC have also signed on to a BC Climate Action Charter to make municipal operations carbon neutral by 2012.

To coordinate these efforts, seven Western states (including Oregon and Washington) and four Canadian provinces (including BC) are collaborating through the Western Climate Initiative, which has set an overall regional (aggregate) goal of reducing GHG by 15 percent below 2005 levels by 2020.

Reflecting these policies, the NWPCC unveiled its draft Sixth Northwest Power Plan in September, 2009. The plan calls for aggressive pursuit of conservation measures throughout the region, coupled with investment in renewable generation “as required by state renewable portfolio standards.” It also expects the Northwest will require new natural gas-fired generating resources to help meet future power demand – to provide reliable 24/7 power until the renewables industry matures (e.g., methods to store erratic sources, such as wind power, are developed) and beyond, possibly to replace coal facilities if they are phased out due to GHG regulations.

³ <http://www.aga.org/ClimateEnergyPolicy.htm>

⁴ http://www.ec.gc.ca/doc/virage-corner/2008-03/pdf/541_eng.pdf

WHAT THIS MEANS

While energy conservation and developing environmentally friendly energy resources are central to emerging strategies to reduce GHG emissions, natural gas is repeatedly called upon to keep our homes and businesses heated and industries humming while these measures are phased in. Even after we've captured energy savings and technology progresses to make renewable resources more reliable, clean-burning gas is expected to continue to heat buildings, fire industrial processes and fuel power generation facilities for the foreseeable future.

The challenge is to ensure this valuable resource is used wisely. While natural gas is abundant, the process for extracting it from the ground is becoming more expensive. (See Chapter 2, Regional Natural Gas Supply.) Consumers should prioritize putting natural gas to its most environmentally beneficial and cost-effective uses.

Right Fuel, Right Use:
Direct use of natural gas – for space and water heating, cooking, and to fuel vehicles – is the most environmentally beneficial and cost-effective way to use it.

We also need to step up efforts to make the direct use of natural gas even more efficient. Customers have already significantly curbed their natural gas usage in the region by installing more efficient furnaces, programmable thermostats and appliances, and weatherizing their homes and businesses. But the potential for more savings – directly or indirectly, as through electricity conservation – is significant. (The NWPCC estimates some 1,400 average megawatts (aMW) in energy savings can be captured in our region in the next five years through aggressive conservation efforts, equivalent to the power usage of more than one million homes.)

As important as conservation and energy efficiency efforts are to the region, so are innovative rate structures that help utilities carry out these efforts. Because traditional rate structures recover fixed costs on a sales volume basis, they provide little incentive for utilities to invest funds that promote energy efficiency. New rate structures that break the link between the volume of gas or electricity sold and recovery of fixed costs, called “decoupling,” have already enabled several regional utilities to invest in technology and programs that further promote energy efficiency.

By encouraging the most efficient uses of natural gas through these programs, but also maintaining a natural gas system that can serve fluctuating power generation needs, the regional natural gas industry is committed to help the region achieve the ambitious new environmental standards set by state/provincial and federal energy laws.

The role natural gas can play in mitigating climate changes is discussed further in the white paper *Natural Gas and Climate Change in the Pacific Northwest*, posted at www.nwga.org.

This page was intentionally left blank.

REGIONAL NATURAL GAS SUPPLY

KEY CONCLUSIONS

1. Natural gas supplies are plentiful across North America and the world and include a variety of sources. Improved production technologies and market economics have recently spurred unprecedented recoverable natural gas discoveries across the continent.
2. The Pacific Northwest market continues to benefit from its proximity to the Western Canadian Sedimentary Basin (WCSB) and the U.S. Rockies (see Figure 6), two large and prolific gas-producing regions.
3. Competition for the supplies upon which the Northwest depends is intensifying as producers seek more lucrative markets and those markets seek access to lower-priced supplies – and pipelines are built to connect the two.

A CLOSER LOOK

North America is in the midst of a dramatic natural gas supply surge. Recent advances in drilling technology, coupled with higher natural gas prices in recent years, have made production of “unconventional” gas reserves economically viable. This has spurred development of plentiful shale gas reserves across the continent, as well as gas found in “tight sands” and coal bed methane (CBM) reserves. As a result, we have more supply available within the continent than projected even a year ago, with current estimates at more than 100 years worth of gas at current consumption levels.

According to the Potential Gas Committee (PGC, administered by the Colorado School of Mines), the U.S. sits on top of massive reservoirs of natural gas – an estimated 1,836 trillion cubic feet (Tcf), of which shale gas accounts for one third.⁵ That represents more energy than all the oil in Saudi Arabia. According to the Province of BC, northeastern BC alone contains more than 700 Tcf of unconventional gas potential, including some 250 Tcf of potential shale gas in the Horn River and Montney basins.⁶ (Later estimates in 2009 project as much as 500 Tcf of potential shale gas in the Horn River region alone.⁷) Recoverable reserves from these sources are expected to be from 10 to 25 percent.

This is good news for Pacific Northwest gas consumers, because much of that growth is occurring in the two production areas already serving the region – the WCSB and Rockies. Currently, total annual natural gas production in these two areas is almost 26 billion cubic feet per day (Bcf/d). According to some estimates this could approach or even exceed 30 Bcf/d by 2019, largely due to unconventional gas development. Forecasts for production from the Rockies suggest continued strong growth. The average of Rockies production forecasts represents an increase of almost 16 percent, or 1.7 percent annually, through 2019.⁹

FIGURE 6 - PRODUCTION AREAS IN THE NORTHWEST



The Pacific Northwest currently relies on natural gas produced in the WCSB and the U.S. Rockies. More than half of the gas consumed in the region comes from the portion of the WCSB located in northeast BC and Alberta.

⁵PGC Potential Supply of Natural Gas in the United States, Dec 31, 2008.

⁶Province of BC, Ministry of Energy, Mines and Petroleum Resources, *An Overview of Shale Gas Potential in Northeast BC*, presentation during the 10th Western Canada Sedimentary Basin Workshop, June 2009, Victoria, BC.

⁷Reuters news release, *Encana says Horn River ranks high as shale gas find*, Sept. 9, 2009.

Figures 7 and 8 illustrate production forecasts in each area. As Figure 7 illustrates, there are a variety of production projections for the WCSB. TransCanada (an NWGA member) represents a middle path, projecting WCSB production to grow about 5 percent over the forecast period. In every case, the development of significant shale gas resources mitigates conventional production declines in the WCSB.

FIGURE 7. WCSB GAS PRODUCTION FORECASTS⁸

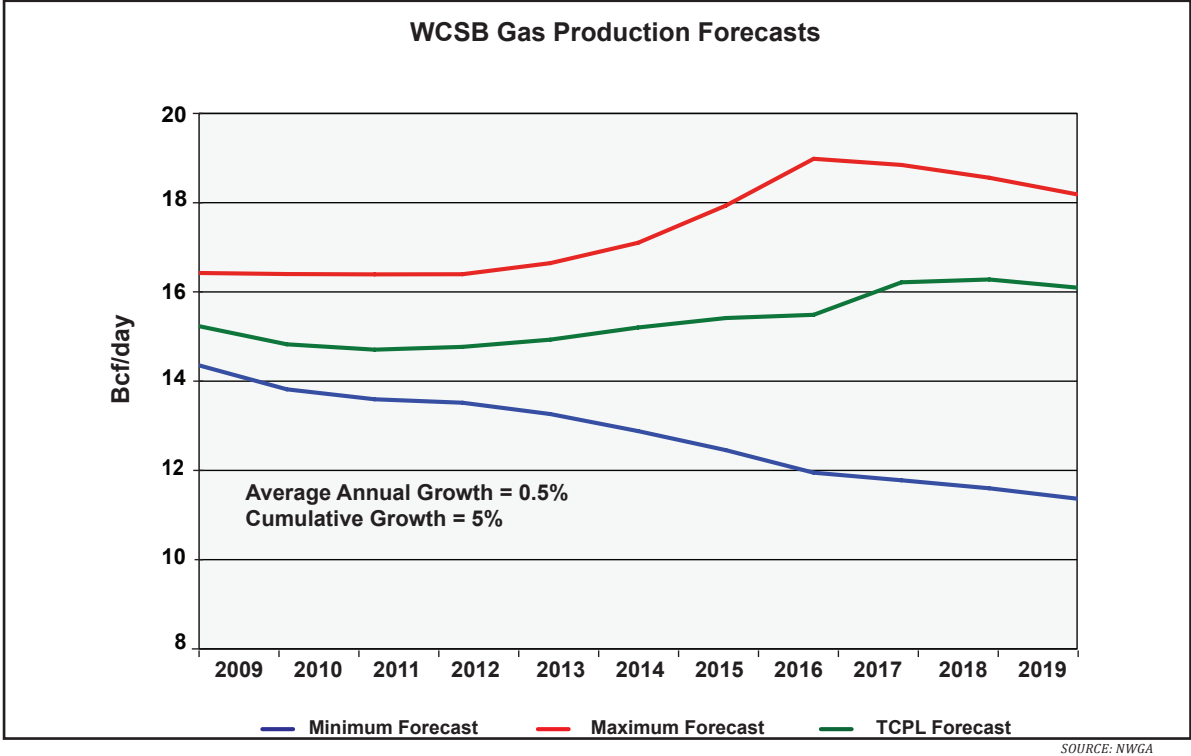
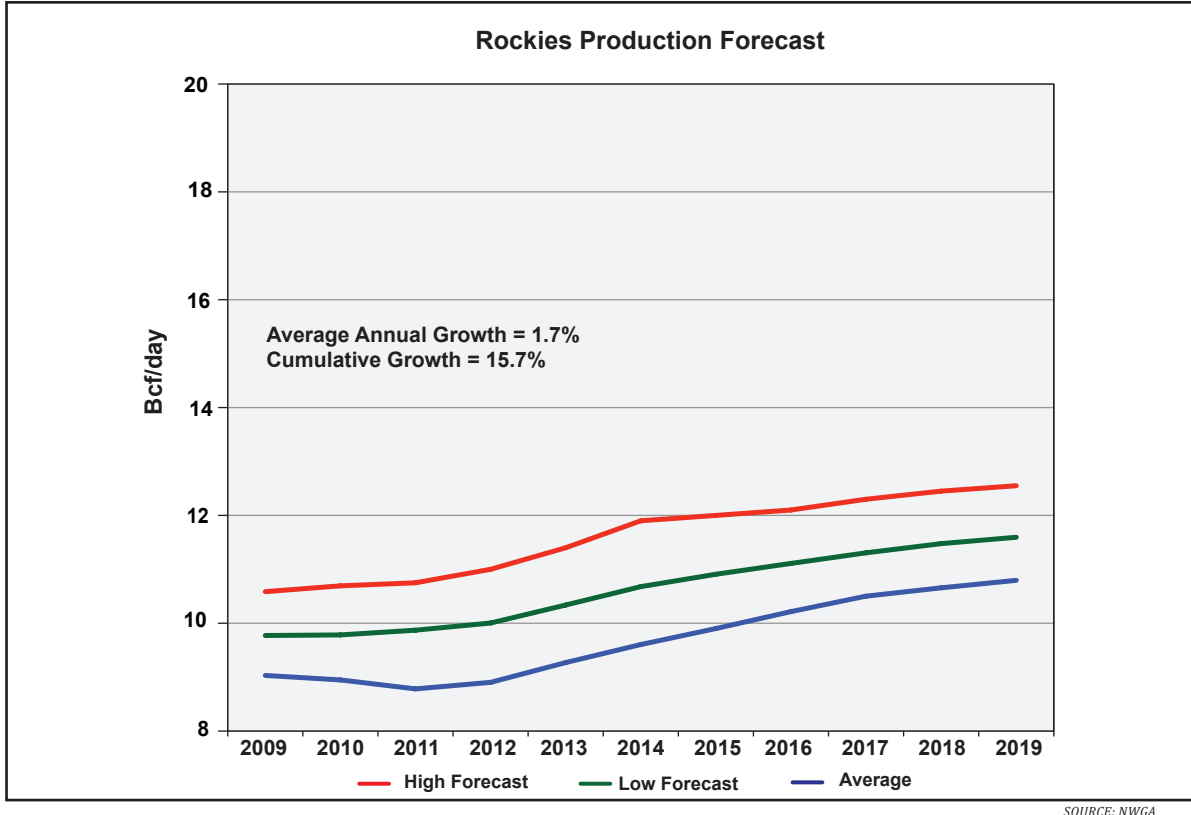


FIGURE 8. ROCKIES GAS PRODUCTION FORECASTS



⁸The high and low data points in Figures 7 and 8 represent projections by professional forecasting services available from proprietary sources.

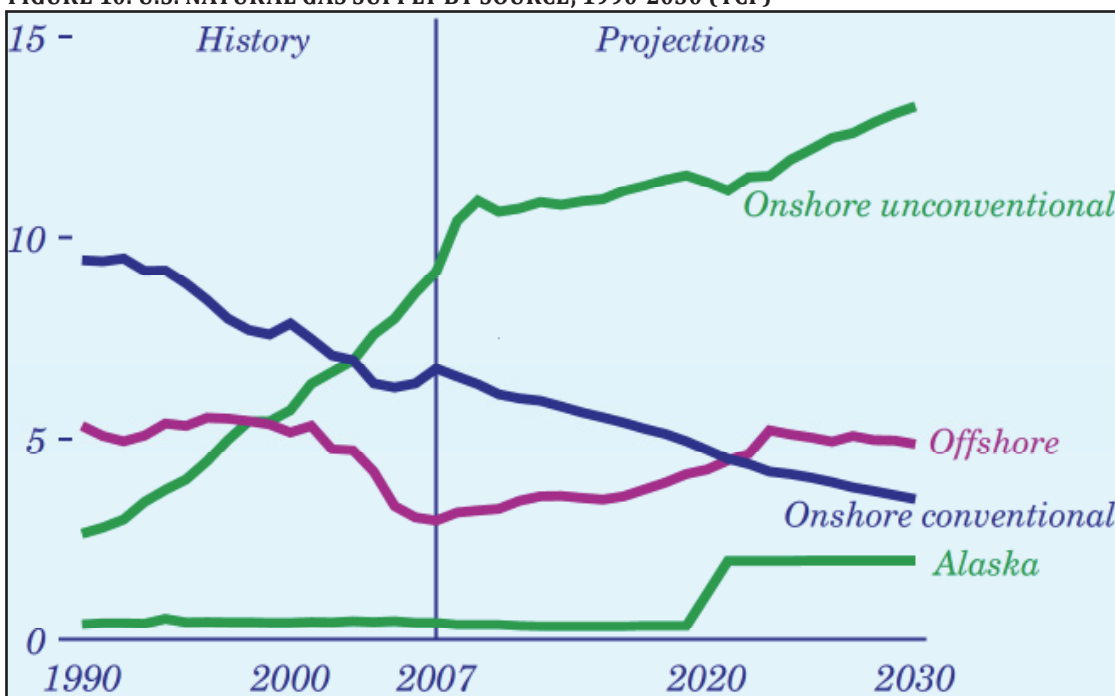
WHAT THIS MEANS

Natural gas consumers in the Pacific Northwest will continue to benefit from the region's location adjacent to two robust natural gas production areas for many years to come. Development of unconventional gas supplies in these areas has only made the situation better, although we are also facing more competition for those resources.

But wise consumers take a long-term view. What may be true now – plentiful supplies and low prices – can't be counted on to last, particularly in a market that is influenced by so many factors, including the economy (local and global) and the weather.

To stabilize our energy future, and ensure access to a variety of cost-effective resources, some market players are already pursuing access to other sources of natural gas. Besides unconventional gas development, options being pursued include offshore resources, frontier gas access and LNG imports. (See sidebar on page 13.) The EIA's projections for natural gas supply from each of these resources (excluding imported LNG) are shown in Figure 10.

FIGURE 10. U.S. NATURAL GAS SUPPLY BY SOURCE, 1990-2030 (TCF)¹⁰



Historically, many hurdles have slowed gas producers from exploring new development, including regulatory barriers and localized opposition. As the environmentally friendly attributes of clean-burning natural gas have become better understood, however, the tide of public opinion has changed, driving policymakers to address some of these obstacles (e.g., lifting offshore drilling moratoria).

Thanks to new drilling technology and changing policies, we may soon have diverse options for balancing future natural gas supply with growing demand, resulting in a cost-effective and environmentally sound mix of natural gas resources to serve future generations.

¹⁰ EIA, 2009 Annual Energy Outlook (March 2009), Figure 66.

POTENTIAL SOURCES OF ADDITIONAL SUPPLY

In addition to unconventional (shale, tight sands and CBM) natural gas resources, the region's future natural gas portfolio could include:

Frontier gas supplies – The Mackenzie River Delta (Canada) and the Alaska North Slope contain some 65 Tcf¹¹ and 35 Tcf¹² in reserves, respectively. Pipelines are being proposed that could potentially bring this gas to the lower 48 within the next decade.

Offshore resources – An estimated 420 Tcf of natural gas sits immediately offshore in the U.S., and another 43 Tcf off the BC coast, but drilling restrictions made them inaccessible. Both the U.S. and Canadian governments have recently taken steps to allow limited offshore development, reversing years of moratoria.

Liquefied natural gas (LNG) – Proven natural gas reserves elsewhere around the globe approach 4,000 Tcf.¹³ Currently, LNG imports serve 1.5 percent of U.S. natural gas requirements. But technology improvements and growing worldwide demand for clean-burning natural gas have made the full-cycle cost of LNG more competitive, spurring development of new global LNG capacity. Dozens of new import terminals have been proposed across North America, including three in Oregon.

North American supply developments notwithstanding, LNG will serve a key role in the continental and regional energy picture over the long term. In the U.S., LNG imports are expected to increase from 500 Bcf in 2009 to nearly 1 Tcf by 2015.¹⁴

¹¹ National Energy Board (NEB), Canada.

¹² U.S. Department of Energy (DOE), Office of Fossil Energy.

¹³ EIA 2009 International Energy Outlook (IEO). (World reserves estimated at 6,254 Tcf, minus 2,500 Tcf estimated within U.S. and Northeastern BC, equals approx. 3,754 Tcf throughout rest of world.)

¹⁴ EIA *Updated 2009 Annual Energy Outlook* (April 2009)

This page was intentionally left blank.

REGIONAL SYSTEM CAPACITY

KEY CONCLUSIONS

1. The region's growing dependence on natural gas to help meet its environmental goals will drive the need for additional infrastructure to access more gas from traditional and new sources.
2. During extreme weather events (peak days), the existing system of natural gas pipelines and storage facilities serving the Northwest is efficiently utilized with little redundancy.
3. Infrastructure developers have responded to the region's emerging need by proposing several projects to deliver more supplies to the region from a diversity of sources, which can be built as market conditions dictate.

A CLOSER LOOK

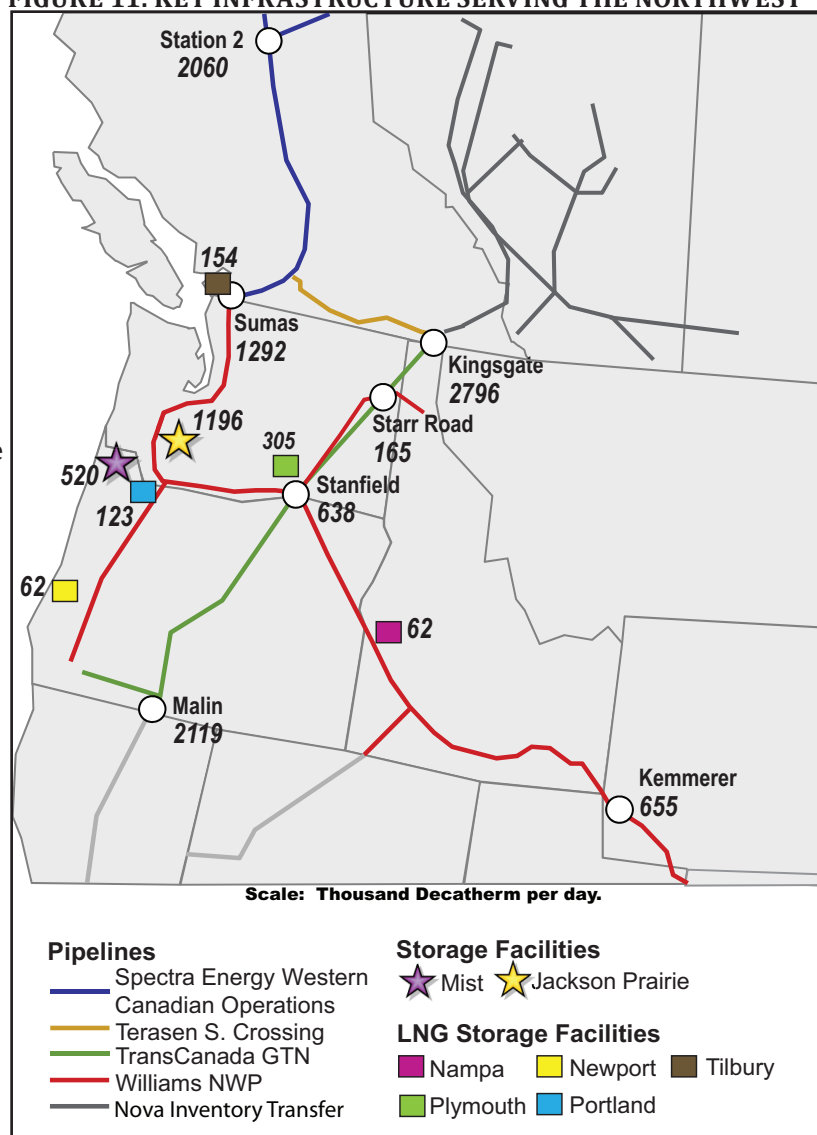
Currently, pipelines and storage facilities serving the Pacific Northwest are capable of delivering more than 6.3 million Dth/day of natural gas at peak capacity. The region's 44,000-mile network of transmission and distribution pipelines is designed to meet the Northwest's baseload demand requirements on an ongoing basis, while underground and LNG storage assets provide a cost-effective means of meeting intermittent weather-driven needs (e.g., winter heating loads). Together, pipelines and storage give the industry flexibility in serving dynamic customer demand.

Figure 11 shows the current delivery capacity of pipelines and storage facilities serving the region in thousands of Decatherms per day (MDth/day). The region's pipeline operators completed major pipeline expansions in the 1990s through 2003 and are now exploring additional expansions (detailed later in this chapter).

In addition, completed and ongoing storage expansions will increase the region's peak day delivery capacity to almost 6.5 million Dth/day by 2012. As the region's peak demand continues to grow faster than baseload demand, the ability to store gas in the region becomes more and more valuable as a cost-effective means of meeting peak market needs.

If demand for natural gas grows as expected (per this Outlook's "base case" scenario), this regional network of infrastructure appears sufficient to serve average regional needs for the next few years. While the pipeline carrying gas west from the Rockies' production area is fully contracted, pipes carrying WCSB gas south to the region are not. However, available capacity on these pipelines is more fully utilized during high demand periods. The pipeline flowing south through central BC, for example, has reached full capacity during peak demand periods in recent years.

FIGURE 11. KEY INFRASTRUCTURE SERVING THE NORTHWEST



Eventually the region will need to build additional capacity to serve growing demand, including natural gas for power generation – an important component of the region’s climate change strategy.

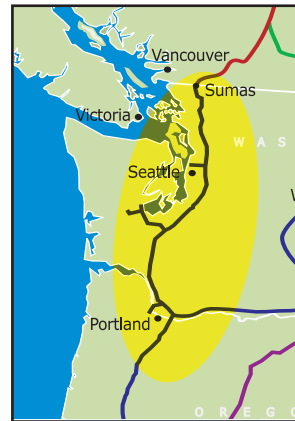
PEAK DAY ANALYSIS

The NWGA studied potential region-wide and area-specific peak capacity needs in the event of extreme events (e.g., extremely cold weather or low-water years that restrict hydropower availability) to assess when existing infrastructure could be stretched to its limits.

If the coldest days planned for by each NWGA member (called peak or design days) occurred simultaneously across the region, the resulting peak demand would be the highest possible – a “perfect storm.”

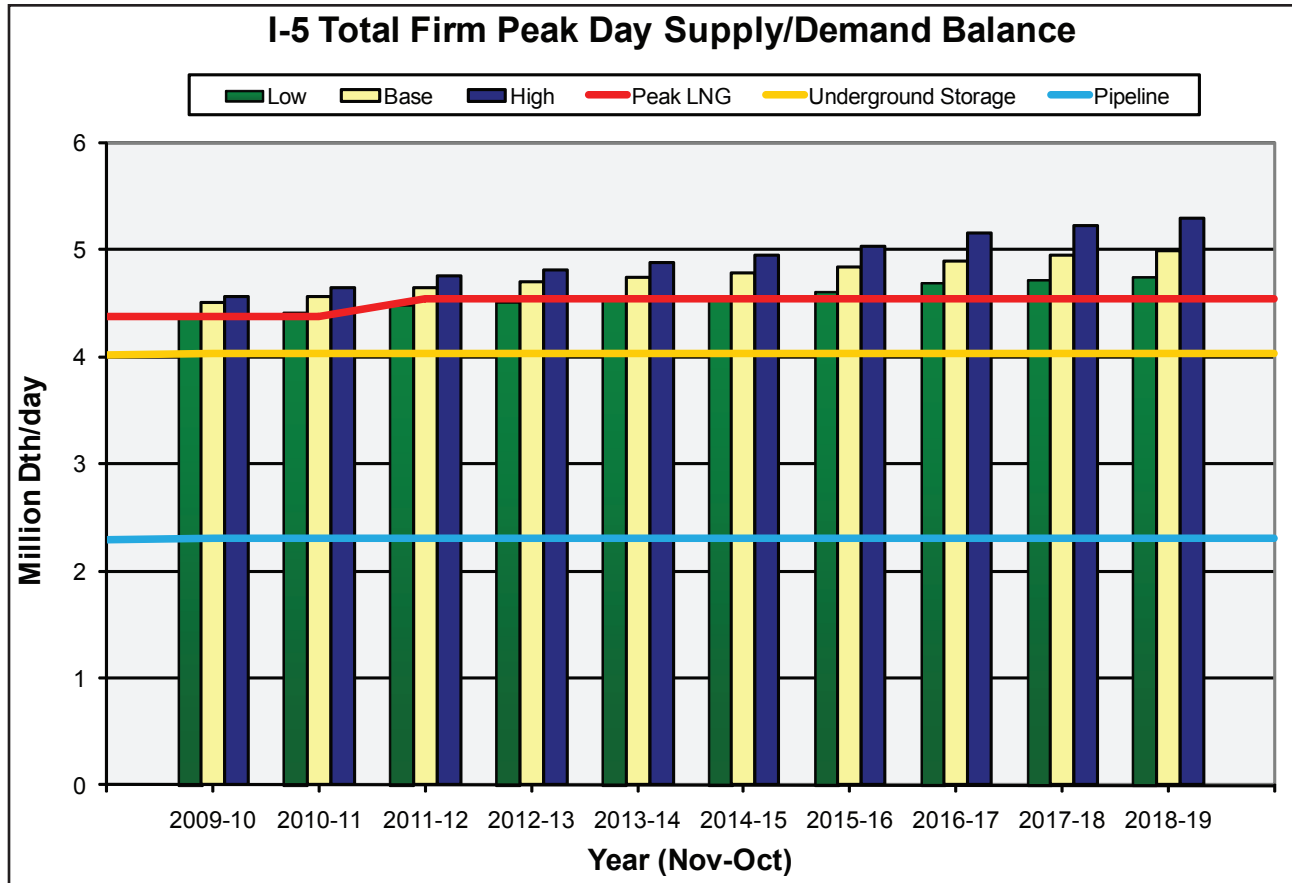
Since weather patterns tend to roll across the Northwest, however, it is improbable that the entire region would experience respective design days simultaneously.

It is more likely that the I-5 Corridor (the area that includes most of the region’s demand – see adjacent map) could experience extremely cold weather all at once. To replicate that scenario, the NWGA examined capacity levels needed if design days occur coincidentally across this sub-region. Assuming all facilities are available and working, Figure 12 shows that the system is efficiently utilized with no excess capacity for significant new demand – one factor driving recent and proposed capacity expansions in the region.



Of course, extreme weather is more likely to affect only parts of the region and usually in succession, not simultaneously. It is important to note that utilities include worst case scenarios in their planning to ensure that residential and commercial customers get the gas they need even in extreme circumstances. There is a chance, however, that during such events industrial customers or electricity generators without firm service agreements could face service curtailments.

FIGURE 12. CAPACITY OF PIPELINES AND STORAGE TO MEET I-5 CORRIDOR PEAK DEMAND



SOURCE: NWGA

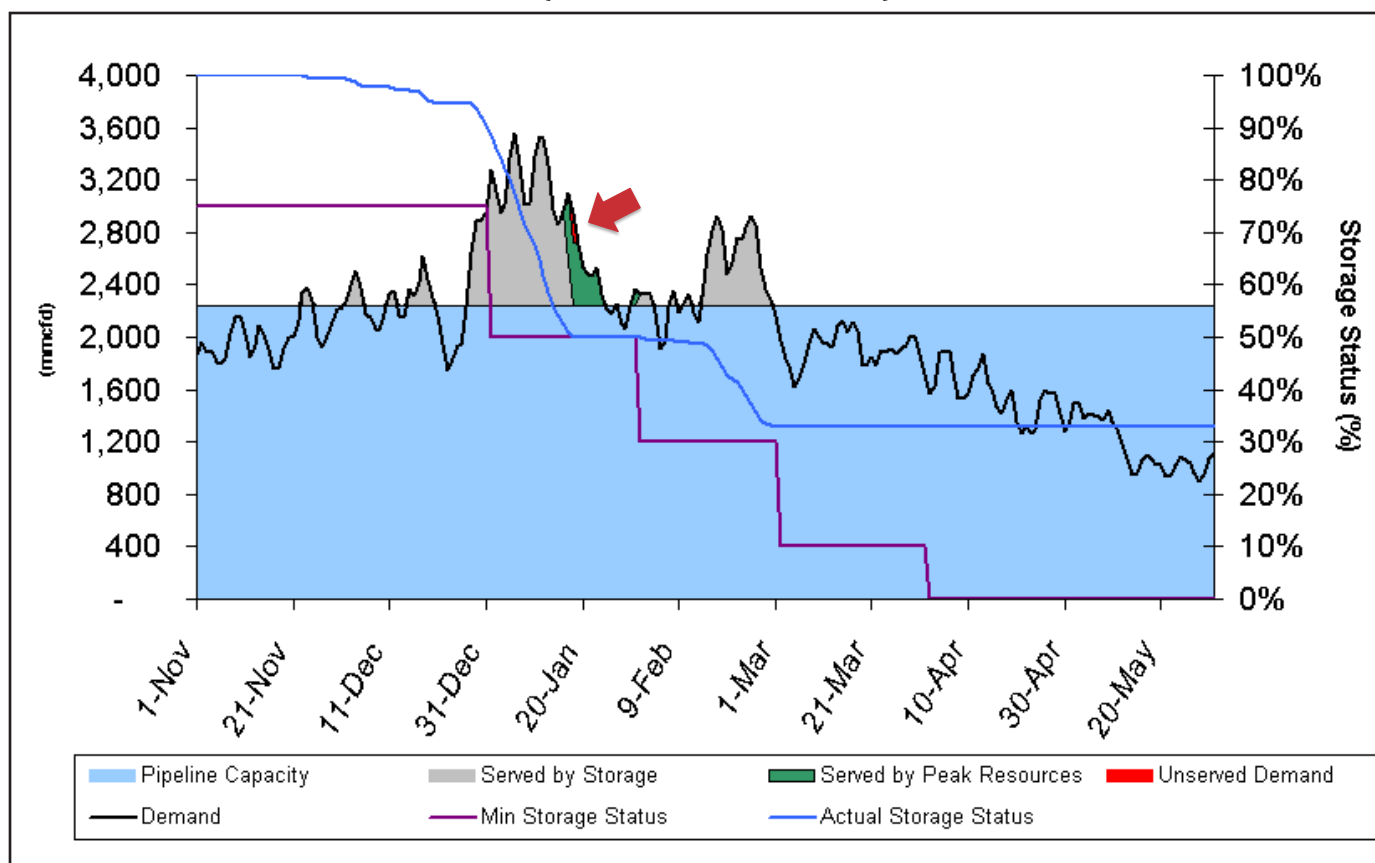
I-5 Corridor Extended Winter Analysis

The NWGA also conducted analyses of winter supply and demand for normal, moderately cold, and low-hydro years in the I-5 Corridor over this Outlook planning horizon, under a range of potential regional growth scenarios. The temperature in a moderately cold year differs depending on the specific region but occurs 15 percent of the time, or once every seven or eight years. A low-hydro year is one in which lower than average stream flows reduce hydroelectric generation and increase demand for gas-fired electric generation. The low-hydro year in this analysis was based on data from 2001, a near-critical water year.

For each of the scenarios, the low, base and high demand growth cases were plotted against pipeline capacity, underground storage and peaking resources such as LNG storage to gauge the adequacy of delivery capacity. The shapes of the winter demand curves were derived using analyses performed in 2004 and updated with the latest forecast of core, industrial and power generation demand included in the Demand chapter of this Outlook. The shape of core and power generation demand are different for a moderately cold year than for a normal or low-hydro year, while that for industrial load is the same.

Results of the analyses demonstrate that under normal weather conditions, existing infrastructure appears sufficient to meet demand under each growth case through the winter of 2018-19, assuming the I-5 Corridor's delivery capacity remains available at present levels, with no interruption of deliverability over the winter. However, Figure 13 plots projected demand from the high demand case against capacity resources for a moderately cold year at the end of the forecast horizon, indicating a small possibility of unserved demand (red area).

FIGURE 13. 2018-2019 WINTER ANALYSIS (BASE HIGH CASE DEMAND) – MODERATELY COLD YEAR



SOURCE: NWGA

"Unserved demand" in this analysis represents a decision point for system operators, who must determine how best to continue serving the most customers possible. They may decide to impose operational flow orders (OFOs), curtail customers using interruptible transport capacity, or ask for voluntary plant shutdowns. Some large customers with the ability to switch to other fuels for short periods may do so, although it is uncertain how much demand could be curtailed in this way. It is unlikely, however, that residential and commercial customers would experience service interruptions.

INFRASTRUCTURE PROJECTS AND EXPANSIONS

As the above analyses demonstrate, the region will eventually need new natural gas infrastructure. Already seeing the market signs of this need, infrastructure developers are pursuing several projects to add or expand delivery capacity. These efforts are expected to result in a mix of new pipelines, storage capacity and import terminals to serve the Northwest in the future. They will provide access to more gas from the abundant supply areas traditionally serving the region, and also the possibility of accessing new and emerging supplies across the continent and globe.

PROPOSED NEW PIPELINES

Four pipeline projects have been proposed to serve the region. (See Figure 14.) One, the Ruby pipeline, would expand western access to Rockies production areas. Sunstone, another project that would move gas west from the Rockies, was recently placed on hold until market conditions improve. The other three projects – Blue Bridge, the Southern Crossing Pipeline Extension and Palomar – are proposed to increase natural gas availability within the I-5 Corridor. Market dynamics will dictate which projects are ultimately built. Here is a brief look at each of the active proposals:

Blue Bridge Pipeline – Williams/Northwest Pipeline is proposing this project, which includes building up to 119 miles of looping pipeline and installing additional compression. Project design continues to evolve, but is expected to deliver up to 300 MMcf/d from Plymouth, Wash., to the I-5 Corridor. The project would generally follow Northwest Pipeline's existing pipeline corridor for most of its route. FERC recently held public meetings on the project.

Palomar Pipeline – A partnership between NW Natural and TransCanada, Palomar Gas Transmission is proposing a 217-mile, 36-inch-diameter pipeline that would extend from TransCanada's GTN system near Madras, Ore., to the Columbia River near Clatskanie, Ore., where it would interconnect with the proposed Bradwood Landing LNG terminal. It would be a bi-directional pipeline with initial capacity of up to 1 Bcf/d. The project is configured as two segments. The Cascade segment would stretch from GTN to a point near Molalla (southeast of Portland), Ore., where it would connect with NW Natural's large-diameter system. The Willamette segment would run from Molalla to the Columbia River. The project's partners intend to build the Cascade segment irrespective of whether the LNG facility comes online. Federal approval to build is expected in late 2010.

Ruby Pipeline – El Paso Natural Gas is proposing to build this 675-mile, 42-inch diameter pipeline from Opal, Wyo., to Malin, Ore, with an initial design capacity of up to 1.5 Bcf/d. The project application has been filed with the Federal Energy Regulatory Commission (FERC); construction is expected to begin pending financing and final regulatory and environmental clearances.

FIGURE 14. PIPELINE PROJECTS PROPOSED TO SERVE THE NORTHWEST



Southern Crossing Pipeline Extension – Terasen Gas is exploring options to extend its Southern Crossing Pipeline from Oliver to Kingsvale, BC. Initial design capacity would be 200 MMcf/d, expandable to 400 MMcf/d. The project is bi-directional, allowing new production coming from northern BC to move into the eastern part of the region via the GTN system or move Alberta gas into the I-5 Corridor via the Spectra Energy system during peak periods.

PROPOSED LNG IMPORT TERMINALS AND PIPELINES

There are three LNG import terminal projects proposed in the region, all in Oregon: Bradwood Landing on the Columbia River near Clatskanie; Oregon LNG in Warrenton, and Jordan Cove in Coos Bay. In addition, Kitimat LNG is proposing an export terminal in Northwest BC to capitalize on new supply sources there.

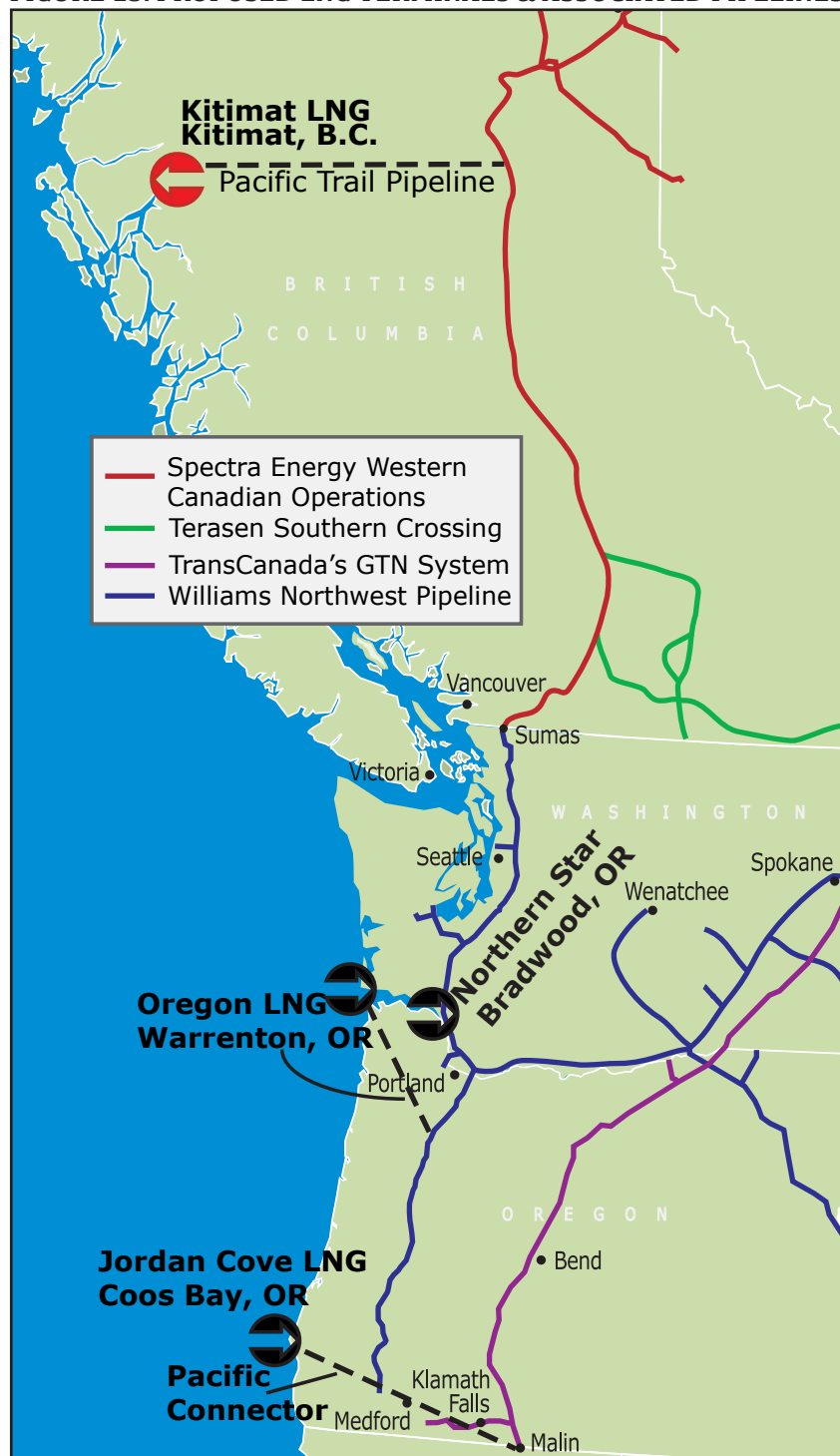
Each LNG project includes one or more proposed pipelines that will be built if the associated terminal is built, including:

- The 291-mile Pacific Trail Pipeline would connect natural gas from Spectra Energy Transmission's pipeline at Summit Lake, north of Prince George, BC, to the proposed Kitimat LNG export terminal in BC's Bish Cove.
- A 117-mile pipeline would connect Oregon LNG's proposed terminal in Warrenton, Ore., to the existing NW Natural and Williams Northwest Pipeline systems near Molalla.
- The 231-mile Pacific Connector Gas Pipeline would extend from the proposed Jordan Cove LNG terminal in Coos Bay, Ore., across southwest Oregon to the California border at Malin, Ore., to serve the Pacific Northwest and California markets.

STORAGE FACILITY EXPANSIONS

Currently, the region is served by almost 40 million Dth of working gas capacity (gas available to the marketplace – see Table 2) in underground natural gas storage facilities and over 5 million Dth of capacity in above-ground LNG peaking storage facilities (not to be confused with the larger scale LNG import facilities discussed earlier). Combined with regional pipeline delivery capacity, these storage facilities enable utilities and other market participants to serve the entire region's peak requirements for almost a week under all but the most extreme conditions.

FIGURE 15. PROPOSED LNG TERMINALS & ASSOCIATED PIPELINES



To meet growing peak demand, several storage expansions were recently completed or are being considered in the near future. For example, NW Natural completed an expansion of its Mist gas storage field in northwest Oregon in 2007, adding new injection and withdrawal wells. Mist's storage capacity is now 16.3 million Dth. The facility also increased throughput to 530 MDth of gas per day.

In addition, the Jackson Prairie owners (Avista, Puget and Northwest Pipeline) are expanding the Jackson Prairie storage facility in southwest Washington. The facility's working capacity is expected to grow to 25.6 million Dth by 2012. Its withdrawal capability was increased from 884 MDth/d to 1,196 MDth/d in 2008.

TABLE 2. EXISTING PACIFIC NORTHWEST STORAGE AND LNG FACILITIES

Existing PNW Storage and LNG Facilities				
Facility	Owner	Type	Capacity ¹ (MDth)	Max Withdrawal (MDth/day)
Jackson Prairie, WA	Avista, PSE, NW Pipeline	Underground	24,300	1,196 ²
Mist, OR	NW Natural	Underground	16,300	530 ²
	Underground Subtotal		40,600	1,726
Plymouth, WA	NW Pipeline	LNG	2,388	305
Newport, OR	NW Natural	LNG	1,000	60
Portland, OR	NW Natural	LNG	600	120
Tilbury, BC	Terasen Gas	LNG	616	154
Nampa, ID	Intermountain Gas	LNG	588	60
Gig Harbor, WA	PSE	LNG	31	3
Swarr Station, WA	PSE	LPG ³	130	10
Mt. Hayes, BC ⁴	Terasen Gas	LNG	1,540	154
	LNG/LPG Subtotal		5,353	712
TOTAL STORAGE (as of Sept. 30, 2009)			45,953	2,438

¹ Working gas capacity; gas that can be used to serve the market.
² Represents start of season or full rate; storage withdrawal rates vary with working gas volumes.
³ LPG = Liquid Propane Gas and Air mixture
⁴ Under construction; in-service date of 2011; volumes not included in totals

Meanwhile, Terasen Gas broke ground in 2008 on its Mt. Hayes LNG storage facility designed to serve peak demand on Vancouver Island and BC's lower mainland region by winter of 2011-12. This facility will supplement several smaller LNG storage facilities already serving the region with peaking capacity.

WHAT THIS MEANS

Much like arteries in the human body, the region's natural gas pipelines serve a living, breathing market that is never static. Storage facilities serve as energy reserves to be called upon as needed. Together, the system keeps natural gas flowing to customers throughout the year and under a variety of conditions.

Growing regional demand for natural gas, now spurred by environmental mandates, is beginning to approach the limits of infrastructure available to serve it on peak days. At the same time, as noted in the Supply chapter, the region is facing more competition for its traditional supplies from other markets across North America. To keep gas flowing, we will eventually need to expand the capacity available to serve our market region. But these projects take time – at least three to five years.

Market participants have already responded to market signals that new capacity is needed by proposing a mix of solutions. And ultimately market players – industry participants, consumers, regulators and policymakers – will decide which projects move forward. The goal is a natural gas system that allows more choice and flexibility to optimize resources – to take advantage of the best value at any given time – and will ultimately benefit consumers with more stable prices (discussed in next chapter).

Capacity expansions take time – three to five years from initial planning to completion – and involve numerous steps, including assessing market interest, gathering public input, obtaining permits and financing, environmental mitigation, construction, safety inspections, remediation and more. Because of the time and complexity involved in putting these projects together, it's important to get started before the need physically exists. *(See the NWGA white paper on infrastructure at www.nwga.org for a more robust discussion of infrastructure development.)*

This page was intentionally left blank.

REGIONAL NATURAL GAS PRICES

KEY CONCLUSIONS

1. Natural gas prices reflect the balance between demand and supply, which shifted significantly in the past year. High natural gas daily spot prices in North America during the summer of 2008 (~ \$13/Dth) contrast sharply with the low daily spot prices experienced during the summer and fall of 2009 (at one point less than \$2/Dth).
2. Policymakers can and will influence natural gas prices depending on whether and how they address critical issues affecting the supply/demand balance, including access to new sources of supply, infrastructure development and efficient use of natural gas.

A CLOSER LOOK

The economic recession that arrived with a fury in North America and across the rest of the globe during the past year had far-reaching impacts on natural gas demand. As businesses and homeowners economized, demand fell and prices followed. Hastening the descent of prices was a growing inventory of gas supply. Recent higher gas prices made it economical to develop more difficult-to-access resources (discussed in Chapter 3, Regional System Capacity), spurring a significant increase in production.

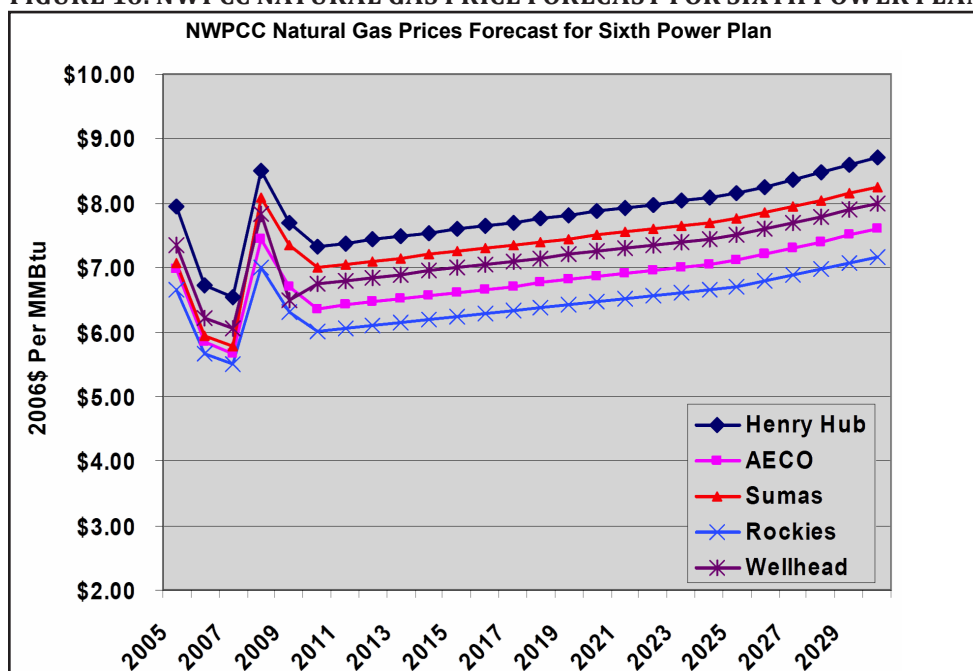
The result? The high natural gas prices of summer 2008 plummeted, bottoming out at less than \$2/Dth (\$1.85 at the Henry Hub trading point in September) before recovering slightly to spend most of the fall in the \$3.50/Dth range.

Balancing growing demand with additional supplies is important to maintain price stability.

While this was good news for consumers in the short-term, the steep descent in prices poses a dilemma for the natural gas market in the next few years. Producers have already responded to lower demand and prices by cutting back drilling and delaying new investments. In time, this will drive prices back up. Pacific Northwest consumers are not immune to these market dynamics, because we compete with other regions for what used to be our own “bubble” of supply. Prices could rebound quickly if all markets across the continent recover at the same time.

Figure 16 shows the NWPCC’s most recent “medium case” natural gas price forecast at several trading points as developed for its 2009 draft Sixth Northwest Power Plan. The NWPCC reviews a variety of sources and consults with a diverse group of regional stakeholders through its Natural Gas Advisory Committee to derive its Fuel Price Forecast. The forecast is then used in NWPCC models to project the reference (or expected) mix of sources of future electrical generation in the region (e.g., gas-fired combined cycle turbines, wind energy, coal, etc.).

FIGURE 16. NWPCC NATURAL GAS PRICE FORECAST FOR SIXTH POWER PLAN

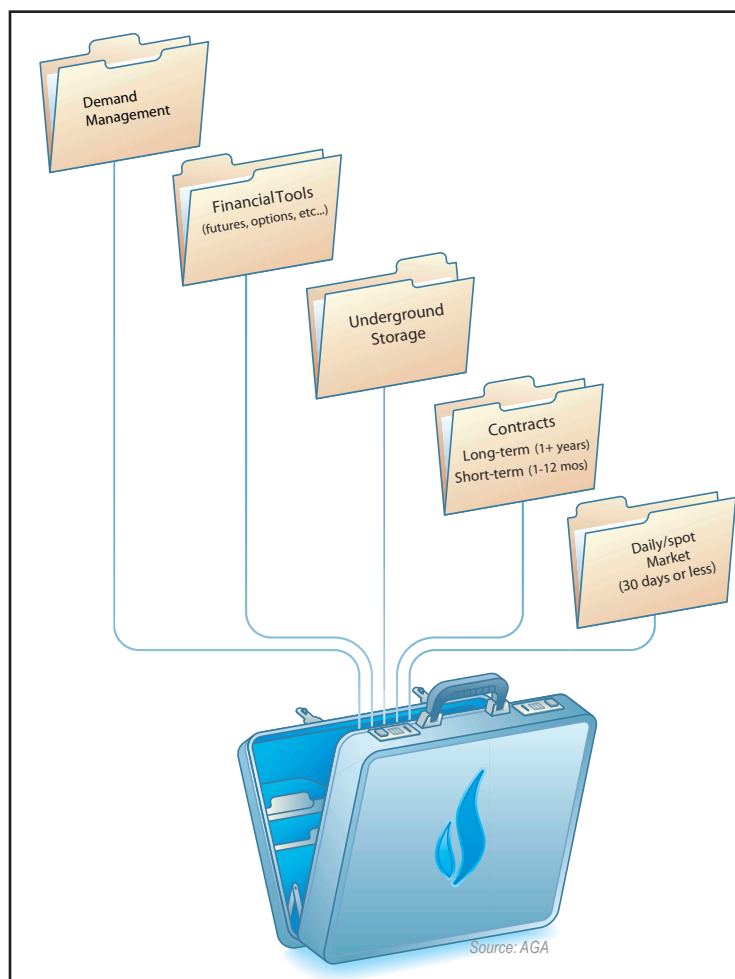


While no one can accurately predict weather events and global crises that affect energy prices, certain market influences can be foreseen. For example, we discuss in preceding chapters how energy policies aimed at reducing GHG emissions are expected to boost demand for natural gas because conservation and renewable energy sources alone cannot meet growing electricity demand. This will result in construction of more natural gas-fired generation. How this will affect Northwest gas prices will depend on natural gas production levels and whether our regional infrastructure expands appropriately to bring that gas here.

The supply side of the picture has also changed markedly over the last year. Shale gas potential in our region (NE BC) and across North America holds great promise for natural gas consumers.

To manage prices, local distribution companies (utilities) and power generators use portfolio management activities that mix short- and long-term purchases to balance risk. This allows them to acquire reliable resources to meet customer demand while minimizing price fluctuations and securing the most reasonable prices. Figure 17 illustrates a typical portfolio of resources.

FIGURE 17. INDUSTRY TOOLS TO MANAGE PRICES



WHAT THIS MEANS

Strategic planning by the natural gas industry cannot, itself, mitigate the higher prices being felt by Pacific Northwest and other North American natural gas consumers. The cost of finding and developing new supplies will establish new price floors that could be higher than historical prices. Further, public policies and the regulatory environment heavily influence the industry's ability to operate effectively – either expediting market flexibility or posing serious hurdles that can skew the demand/supply balance – and therefore can play a huge role in future gas prices.

Demand can change quickly – and will in response to new climate change policies – but it can take several years for new natural gas production and the infrastructure required to deliver it to come online. The licensing and construction of new infrastructure can be a three- to five-year effort.

Moderating future gas prices will require additional proactive steps by the industry and policy-makers on both sides of the equation – not only reshaping demand in more efficient and environmentally friendly ways – but encouraging development of and access to additional supply from diverse sources.

Additional information on prices, including key price drivers, can be found in the July 2008 white paper, *Natural Gas Prices in the Pacific Northwest*, posted on the NWGA Web site: www.nwga.org.

APPENDIX DATA TABLES

A1. REGION-WIDE PEAK DAY SUPPLY

Northwest Gas Association 2009 Natural Gas Outlook Peak Day Supply

SUPPLY	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	40118	40148	40179
Pipeline Interconnects	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890	3,898,890
WCSB via TCPL/GTN	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625	1,420,625
Stanfield (NWP from GTN)	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000
Starr Rd (NWP from GTN)	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
Palouse (NWP from GTN)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
GTN Direct Connects	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000
Kingsgate/Yahk BC Interior from TCPL	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625
Rockies via NWP	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000	495,000
NWP north from NWP south	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000
Max Demand on Reno Lateral	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)
WCSB via DEGT	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265	1,983,265
T-South to Huntingdon	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
T-South to BC Interior	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705
T-South to Kingsvale	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500
Southern Crossing to Huntingdon	-	-	-	-	-	-	-	-	-	-
Storage	2,442,088	2,442,088	2,596,588	2,596,588	2,596,588	2,596,588	2,596,588	2,596,588	2,596,588	2,596,588
Jackson Prairie (NWP from JP)	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000
(includes deliverability expansion of 312,000 Dth/day in service 2008-09)										
Mist Storage (NWN)	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450
(includes deliverability expansion of 51,310 Dth/day in service 2007-08)										
Plymouth (NWP from LNG)	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300
Newport/Portland LNG (NWN)	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000
Nampa LNG (IGC)	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Gig Harbor Satellite LNG (PSE)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Swarr Stn Propane (PSE)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Tilbury LNG (TGI)	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338
Vancouver Island LNG (permitted, provisional)	-	-	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500
Total Available Supply	6,340,978	6,340,978	6,495,478	6,495,478	6,495,478	6,495,478	6,495,478	6,495,478	6,495,478	6,495,478

A2. ANNUAL DEMAND BY REGION AND SECTOR, BASE CASE

Northwest Gas Association 2009 Natural Gas Outlook Annual Demand Summary (Dth) - Base Case

Region/Sector	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Lower Mainland & Van. Island	143,531,064	143,582,590	143,730,427	143,908,052	144,097,739	142,464,491	141,741,912	141,985,944	142,175,925	142,373,352
Residential	53,304,319	52,960,224	52,635,233	52,311,649	51,989,674	51,576,685	51,441,383	51,372,506	51,287,482	51,208,289
Commercial (Sales)	38,743,909	39,156,976	39,597,083	40,042,280	40,497,931	39,191,920	38,690,296	38,986,038	39,261,043	39,537,663
Industrial (Transport & Interruptible)	32,058,370	31,946,142	31,978,863	32,034,874	32,090,886	32,176,638	32,090,984	32,108,151	32,108,151	32,108,151
Power Generation	19,424,467	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248
W. Washington	257,942,363	259,986,095	261,042,084	267,777,572	273,067,703	277,704,015	287,547,011	290,798,116	291,689,281	294,808,259
Residential	68,588,736	69,484,466	71,169,290	72,508,524	74,284,490	76,064,710	77,860,720	79,602,462	81,287,337	82,842,153
Commercial (Sales)	42,116,261	42,455,464	42,212,528	42,293,556	42,663,106	43,169,419	43,802,048	44,463,602	45,178,457	45,877,996
Industrial (Transport)	73,604,409	73,232,978	72,952,723	72,897,723	72,836,434	72,820,439	72,850,466	72,905,186	72,946,986	73,025,171
Power Generation	73,632,957	74,813,188	74,707,544	80,077,769	83,283,674	85,649,447	93,033,777	93,826,866	92,276,502	93,062,938
W. Oregon	118,130,747	120,800,069	124,401,210	127,389,155	128,940,436	130,435,688	132,246,901	133,281,626	134,401,509	135,469,911
Residential	37,410,595	37,799,359	38,642,952	39,265,435	40,027,552	40,786,527	41,884,857	42,621,892	43,507,553	44,397,426
Commercial (Sales)	23,973,033	24,049,268	24,334,961	24,380,834	24,456,522	24,537,857	24,818,399	24,898,044	25,057,506	25,222,056
Industrial (Transport & Interruptible)	38,176,360	40,701,441	43,173,297	45,492,887	46,206,362	46,861,305	47,293,645	47,511,690	47,586,450	47,600,428
Power Generation	18,570,759	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000
BC Interior	44,300,721	44,127,069	44,509,923	44,894,595	45,262,104	45,968,407	46,224,324	46,368,174	46,452,419	46,524,562
Residential	16,395,274	16,244,945	16,318,911	16,476,065	16,637,526	16,560,670	16,523,731	16,524,784	16,483,775	16,432,907
Commercial (Sales)	10,352,860	10,546,511	10,742,088	10,942,647	11,148,111	11,209,422	11,295,964	11,438,762	11,564,016	11,687,027
Industrial (Transport & Interruptible)	17,552,587	17,335,613	17,448,924	17,475,883	17,476,467	18,198,316	18,404,628	18,404,628	18,404,628	18,404,628
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	86,693,760	85,344,139	84,686,877	85,475,309	86,085,819	87,116,716	87,126,692	88,505,653	90,026,407	90,422,493
Residential	19,006,181	18,781,816	18,795,354	18,895,236	19,057,678	19,235,714	19,095,938	19,191,761	19,330,164	19,486,445
Commercial (Sales)	14,041,407	14,170,534	14,386,123	14,628,548	14,909,239	15,198,030	15,297,003	15,526,258	15,786,337	16,058,035
Industrial (Transport & Interruptible)	28,797,212	29,060,644	29,321,389	29,532,820	29,748,070	29,960,302	30,159,539	30,347,072	30,543,696	30,745,716
Power Generation	24,848,960	23,331,146	22,184,011	22,418,705	22,370,833	22,722,670	22,574,211	23,440,562	24,366,209	24,132,296
E. Oregon & Medford	116,543,750	113,205,167	111,868,510	113,122,115	113,449,592	114,220,150	114,714,948	116,640,603	118,786,974	118,099,143
Residential	8,053,453	8,127,858	8,296,766	8,490,965	8,691,394	8,894,899	9,045,686	9,242,408	9,433,222	9,615,629
Commercial (Sales)	5,737,392	5,790,141	5,870,720	5,957,818	6,035,384	6,108,330	6,155,159	6,223,806	6,292,402	6,357,917
Industrial (Transport & Interruptible)	8,530,653	8,684,099	8,869,358	8,952,583	9,014,300	9,037,917	9,055,026	9,070,614	9,087,807	9,104,282
Power Generation	94,222,252	90,603,069	88,831,666	89,720,749	89,708,514	90,179,005	90,459,077	92,103,775	93,973,544	93,021,314
S. Idaho	57,308,594	58,505,773	59,382,107	59,969,910	71,308,190	71,685,271	72,091,989	72,546,384	73,006,719	73,473,072
Residential	22,051,636	21,756,538	22,053,135	22,346,572	22,602,080	22,848,047	23,116,481	23,416,381	23,720,203	24,027,996
Commercial (Sales)	11,359,934	11,207,914	11,360,706	11,511,870	11,643,496	11,770,206	11,908,490	12,062,984	12,219,498	12,378,058
Industrial (Transport & Interruptible)	21,726,837	23,341,322	23,768,266	23,911,467	23,949,115	23,953,518	23,953,518	23,953,518	23,953,518	23,953,518
Power Generation	2,170,187	2,200,000	2,200,000	2,200,000	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500
PNW Annual Demand - Base	824,450,999	825,550,902	829,621,137	842,536,708	862,211,584	869,594,739	881,693,776	890,126,499	896,539,234	901,170,790
Residential	224,810,194	225,155,206	227,911,640	230,294,446	233,290,393	235,967,251	238,968,796	241,972,195	245,049,736	248,010,846
Commercial (Sales)	146,324,796	147,376,807	148,504,209	149,757,553	151,353,789	151,185,184	151,967,361	153,599,493	155,359,259	157,118,752
Industrial (Transport & Interruptible)	220,446,427	224,302,239	227,512,820	230,298,237	231,321,633	233,008,433	233,807,806	234,300,859	234,631,237	234,941,895
Power Generation	232,869,582	228,716,651	225,692,469	232,186,472	246,245,769	249,433,870	256,949,813	260,253,952	261,499,003	261,099,296

A3. ANNUAL DEMAND BY REGION AND SECTOR, HIGH CASE

Northwest Gas Association 2009 Natural Gas Outlook Annual Demand Summary (Dth) - High Case

<u>Region/Sector</u>	<u>2009-10</u>	<u>2010-11</u>	<u>2011-12</u>	<u>2012-13</u>	<u>2013-14</u>	<u>2014-15</u>	<u>2015-16</u>	<u>2016-17</u>	<u>2017-18</u>	<u>2018-19</u>
BC Lower Mainland & Van. Island	143,915,518	143,967,332	144,115,649	144,293,782	144,484,028	142,843,600	144,002,741	144,252,463	144,447,210	144,649,589
Residential	53,526,953	53,181,421	52,855,072	52,530,137	52,206,817	51,792,103	52,731,720	52,661,115	52,573,958	52,492,779
Commercial (Sales)	38,905,728	39,320,521	39,762,466	40,209,523	40,667,077	39,355,612	39,660,789	39,963,949	40,245,852	40,529,411
Industrial (Transport & Interruptible)	32,058,370	31,946,142	31,978,863	32,034,874	32,090,886	32,176,638	32,090,984	32,108,151	32,108,151	32,108,151
Power Generation	19,424,467	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248
W. Washington	281,521,073	290,897,678	302,884,614	332,261,849	310,349,778	311,431,273	313,539,529	327,389,894	306,258,820	311,237,267
Residential	69,374,429	70,914,146	73,108,022	74,949,916	77,247,105	79,583,778	81,961,627	84,291,587	86,574,009	88,785,595
Commercial (Sales)	42,879,760	43,882,015	43,902,892	44,214,960	44,787,240	45,503,273	46,356,933	47,248,461	48,201,216	49,149,982
Industrial (Transport)	75,446,221	75,202,583	74,961,433	74,846,681	74,807,216	74,843,162	74,918,687	75,011,322	74,976,138	75,076,602
Power Generation	93,820,663	100,898,934	110,912,266	138,250,291	113,508,217	111,501,060	110,302,282	120,838,524	96,507,457	98,225,088
W. Oregon	121,094,003	124,159,905	128,454,321	132,198,756	134,441,286	136,632,331	139,209,852	140,960,319	142,793,515	144,551,902
Residential	38,711,067	39,260,318	40,434,186	41,128,025	42,570,627	43,715,930	45,249,521	46,393,312	47,689,500	48,980,378
Commercial (Sales)	24,636,214	24,824,344	25,310,334	25,563,105	25,836,904	26,108,822	26,603,005	26,877,289	27,233,984	27,589,047
Industrial (Transport & Interruptible)	39,175,963	41,825,243	44,459,801	46,957,626	47,783,755	48,557,580	49,107,326	49,439,717	49,620,031	49,732,477
Power Generation	18,570,759	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000
BC Interior	51,133,665	51,077,745	51,330,443	51,689,651	52,058,108	52,379,338	53,005,711	53,153,170	53,239,528	53,313,480
Residential	16,463,752	16,312,794	16,387,069	16,544,880	16,707,015	16,629,839	16,938,206	16,939,285	16,897,248	16,845,103
Commercial (Sales)	10,396,100	10,590,560	10,786,954	10,988,351	11,194,673	11,256,239	11,579,308	11,725,688	11,854,084	11,980,180
Industrial (Transport & Interruptible)	24,273,813	24,174,391	24,156,420	24,156,420	24,156,420	24,493,260	24,488,197	24,488,197	24,488,197	24,488,197
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	93,976,306	95,300,655	102,038,463	102,731,913	104,507,030	106,816,787	113,101,588	111,593,353	113,496,424	114,573,116
Residential	19,304,980	19,280,266	19,523,625	19,876,685	20,300,292	20,743,060	21,120,064	21,478,490	21,886,565	22,317,318
Commercial (Sales)	14,402,914	14,722,153	15,120,815	15,550,951	16,022,761	16,505,138	16,944,676	17,367,159	17,827,735	18,304,332
Industrial (Transport & Interruptible)	29,508,826	29,784,656	30,057,008	30,279,932	30,508,045	30,733,435	30,946,490	31,146,663	31,357,087	31,574,145
Power Generation	30,759,587	31,513,580	37,337,014	37,024,345	37,675,933	38,835,153	44,090,359	41,601,042	42,425,037	42,377,321
E. Oregon & Medford	124,406,756	125,642,481	129,701,628	132,571,967	135,125,211	136,321,877	138,409,906	139,211,786	139,370,116	136,802,592
Residential	6,921,074	7,086,952	7,355,252	7,657,352	7,970,504	8,287,894	8,612,115	8,932,204	9,250,101	9,569,779
Commercial (Sales)	5,242,005	5,360,141	5,499,505	5,648,678	5,793,698	5,939,467	6,086,348	6,228,750	6,368,250	6,508,238
Industrial (Transport & Interruptible)	8,868,521	9,026,637	9,216,775	9,305,125	9,371,961	9,400,986	9,424,100	9,445,179	9,468,267	9,490,787
Power Generation	103,375,156	104,168,751	107,630,096	109,960,812	111,989,049	112,693,530	114,287,343	114,605,652	114,283,497	111,233,788
S. Idaho	61,055,075	62,772,760	63,726,132	64,607,316	76,235,645	76,988,919	77,871,595	78,856,344	79,726,351	80,615,894
Residential	22,750,588	22,662,484	23,183,536	23,745,793	24,207,680	24,694,942	25,215,002	25,776,596	26,350,801	26,937,899
Commercial (Sales)	11,720,000	11,674,613	11,943,034	12,232,681	12,470,623	12,721,637	12,989,547	13,278,852	13,574,655	13,877,100
Industrial (Transport & Interruptible)	24,414,299	26,235,662	26,399,562	26,428,841	26,443,841	26,458,841	26,553,547	26,687,396	26,687,396	26,687,396
Power Generation	2,170,187	2,200,000	2,200,000	2,200,000	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500
PNW Annual Demand - High	877,102,395	893,818,556	922,251,249	960,355,235	957,201,086	963,414,125	979,140,923	995,417,329	979,331,965	985,743,840
Residential	227,052,843	228,698,381	232,846,763	236,732,788	241,210,040	245,447,545	251,828,255	256,472,589	261,222,182	265,928,852
Commercial (Sales)	148,182,720	150,374,347	152,326,000	154,408,249	156,772,976	157,390,188	160,220,605	162,690,148	165,305,777	167,938,289
Industrial (Transport & Interruptible)	233,746,013	238,195,314	241,229,862	244,009,501	245,162,123	246,663,901	247,529,331	248,326,626	248,705,267	249,157,755
Power Generation	268,120,819	276,550,514	295,848,624	325,204,697	314,055,947	313,912,492	319,562,732	327,927,966	304,098,739	302,718,944

A4. ANNUAL DEMAND BY REGION AND SECTOR, LOW CASE

Northwest Gas Association 2009 Natural Gas Outlook Annual Demand Summary (Dth) - Low Case

<u>Region/Sector</u>	<u>2009-10</u>	<u>2010-11</u>	<u>2011-12</u>	<u>2012-13</u>	<u>2013-14</u>	<u>2014-15</u>	<u>2015-16</u>	<u>2016-17</u>	<u>2017-18</u>	<u>2018-19</u>
BC Lower Mainland & Van. Island	142,610,582	142,661,418	142,808,103	142,984,512	143,172,863	141,556,805	139,939,278	140,178,773	140,364,955	140,558,433
Residential	52,771,276	52,430,622	52,108,880	51,788,532	51,469,777	51,060,918	50,412,556	50,345,056	50,261,733	50,184,124
Commercial (Sales)	38,356,470	38,765,406	39,201,112	39,641,857	40,092,952	38,800,001	37,916,490	38,206,317	38,475,822	38,746,909
Industrial (Transport & Interruptible)	32,058,370	31,946,142	31,978,863	32,034,874	32,090,886	32,176,638	32,090,984	32,108,151	32,108,151	32,108,151
Power Generation	19,424,467	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248	19,519,248
W. Washington	254,342,111	255,170,887	255,531,871	269,058,275	265,364,564	265,533,013	266,329,880	276,591,305	279,803,460	278,010,525
Residential	67,838,543	68,180,654	69,559,130	70,639,216	72,079,101	73,479,818	74,888,215	76,216,192	77,494,943	78,631,046
Commercial (Sales)	41,560,149	41,420,346	40,916,874	40,785,145	40,963,278	41,275,072	41,704,476	42,155,021	42,656,962	43,139,161
Industrial (Transport)	71,893,690	71,321,434	70,913,637	70,843,035	70,712,145	70,674,565	70,683,861	70,653,025	70,715,877	70,729,123
Power Generation	73,049,729	74,248,453	74,142,231	86,790,879	81,610,040	80,103,558	79,053,328	87,567,066	88,935,678	85,511,195
W. Oregon	117,613,676	119,873,003	122,857,623	125,166,399	126,119,699	127,025,785	128,267,156	128,699,637	129,222,800	129,704,109
Residential	37,194,220	37,378,916	37,888,858	38,140,779	38,577,294	39,016,778	39,803,427	40,203,176	40,746,308	41,293,653
Commercial (Sales)	23,837,903	23,780,105	23,869,598	23,708,976	23,611,471	23,526,912	23,650,386	23,562,824	23,556,962	23,559,754
Industrial (Transport & Interruptible)	38,010,793	40,463,982	42,849,167	45,066,644	45,680,933	46,232,095	46,563,343	46,683,636	46,669,530	46,600,702
Power Generation	18,570,759	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000	18,250,000
BC Interior	50,754,466	50,697,932	50,946,809	51,300,946	51,664,201	51,985,651	51,751,499	51,892,472	51,975,032	52,045,732
Residential	16,231,321	16,082,495	16,155,722	16,311,305	16,471,150	16,395,064	16,193,257	16,194,288	16,154,099	16,104,249
Commercial (Sales)	10,249,331	10,441,046	10,634,667	10,833,221	11,036,630	11,097,327	11,070,045	11,209,987	11,332,736	11,453,286
Industrial (Transport & Interruptible)	24,273,813	24,174,391	24,156,420	24,156,420	24,156,420	24,493,260	24,488,197	24,488,197	24,488,197	24,488,197
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	85,026,554	83,031,880	79,096,335	77,154,076	76,456,186	76,231,502	76,032,224	76,589,422	76,974,170	76,895,612
Residential	18,942,560	18,782,481	18,038,143	17,305,251	17,145,588	17,071,740	16,945,269	16,805,443	16,702,727	16,614,162
Commercial (Sales)	13,930,689	14,032,059	13,768,754	13,497,732	13,564,453	13,679,452	13,758,438	13,823,368	13,913,616	14,012,671
Industrial (Transport & Interruptible)	28,100,534	28,354,439	28,604,448	28,805,273	29,011,054	29,213,038	29,403,282	29,581,743	29,768,197	29,959,458
Power Generation	24,052,772	21,862,901	18,684,989	17,545,821	16,735,091	16,267,272	15,925,235	16,378,868	16,589,632	16,309,321
E. Oregon & Medford	111,592,848	106,955,971	100,754,075	98,859,118	97,438,497	96,127,749	95,815,193	96,783,066	97,293,696	96,062,883
Residential	7,889,659	7,941,827	7,899,821	7,860,548	7,934,555	8,025,091	8,115,155	8,198,468	8,277,653	8,350,061
Commercial (Sales)	5,621,286	5,643,845	5,606,786	5,573,221	5,590,210	5,611,211	5,632,409	5,648,977	5,665,016	5,678,054
Industrial (Transport & Interruptible)	8,201,097	8,351,353	8,531,828	8,610,200	8,668,141	8,688,006	8,701,741	8,713,600	8,726,901	8,739,454
Power Generation	89,880,806	85,018,946	78,715,639	76,815,149	75,245,591	73,803,441	73,365,889	74,222,021	74,624,125	73,295,314
S. Idaho	54,284,801	54,261,201	54,313,081	54,776,650	65,864,533	65,943,823	66,120,315	66,252,601	66,378,108	66,504,119
Residential	21,855,901	21,461,582	21,419,681	21,540,480	21,597,015	21,634,651	21,690,474	21,772,973	21,855,807	21,938,975
Commercial (Sales)	11,259,100	11,055,967	11,034,381	11,096,611	11,125,735	11,145,123	11,173,881	11,216,380	11,259,052	11,301,896
Industrial (Transport & Interruptible)	18,999,613	19,543,653	19,659,019	19,939,560	20,028,284	20,050,550	20,142,460	20,149,748	20,149,748	20,149,748
Power Generation	2,170,187	2,200,000	2,200,000	2,200,000	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500	13,113,500
PNW Annual Demand - Low	816,225,038	812,652,291	806,307,897	819,299,976	826,080,542	824,404,328	824,255,546	836,987,276	842,012,221	839,781,413
Residential	222,723,480	222,258,578	223,070,235	223,586,111	225,274,480	226,684,059	228,048,352	229,735,596	231,493,270	233,116,270
Commercial (Sales)	144,814,929	145,138,773	145,032,172	145,136,762	145,984,728	145,135,098	144,906,125	145,822,874	146,860,167	147,891,731
Industrial (Transport & Interruptible)	221,537,910	224,155,392	226,693,382	229,456,006	230,347,864	231,528,151	232,073,868	232,378,103	232,626,601	232,774,834
Power Generation	227,148,720	221,099,548	211,512,107	221,121,097	224,473,471	221,057,019	219,227,200	229,050,704	231,032,183	225,998,578

A5. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE – BASE CASE

Northwest Gas Association 2009 Natural Gas Outlook I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Base Case

DEMAND (Region/Sector)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Lower Main & Van. Island (I-5 Corridor)	1,415,517	1,422,444	1,428,928	1,435,224	1,441,329	1,447,476	1,455,099	1,462,388	1,469,160	1,476,229
Residential	620,310	624,901	628,386	631,745	634,977	638,248	644,008	648,453	652,657	656,943
Commercial (Firm Sales & Transport)	375,125	377,423	380,389	383,299	386,152	389,005	390,707	393,505	396,064	398,842
Industrial (Firm Sales & Transport)	158,485	158,523	158,556	158,583	158,602	158,625	158,786	158,832	158,842	158,846
Power Generation	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597
W. Washington (I-5 Corridor)	2,116,279	2,159,862	2,228,555	2,258,272	2,291,633	2,326,481	2,362,170	2,397,640	2,433,024	2,466,966
Residential	784,725	794,893	808,697	826,912	847,133	867,816	888,725	909,254	929,406	947,960
Commercial (Firm Sales & Transport)	334,715	342,123	343,452	348,196	354,288	361,399	368,964	376,523	384,221	391,910
Industrial (Firm Sales & Transport)	280,453	280,683	280,694	280,753	280,966	281,050	281,154	281,285	281,419	281,574
Power Generation	716,386	742,163	795,711	802,411	809,246	816,216	823,327	830,579	837,977	845,522
W. Oregon (I-5 Corridor)	979,754	982,105	990,923	1,000,016	1,007,205	1,014,214	1,026,319	1,036,697	1,044,444	1,053,587
Residential	546,664	550,405	558,681	567,855	576,046	584,080	595,268	605,819	614,872	624,756
Commercial (Firm Sales & Transport)	292,915	291,533	292,086	291,398	289,506	287,663	287,765	287,602	286,320	285,596
Industrial (Firm Sales & Transport)	53,176	53,166	53,156	53,763	54,653	55,472	56,287	56,276	56,252	56,234
Power Generation	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000
Total Peak (Design) Day Demand	4,511,551	4,564,410	4,648,406	4,693,513	4,740,166	4,788,170	4,843,588	4,896,725	4,946,627	4,996,781
SUPPLY										
Pipeline Interconnects	2,304,060	2,304,061	2,304,062	2,304,063	2,304,064	2,304,065	2,304,066	2,304,067	2,304,068	2,304,069
Max north flow on NWP @ Gorge	551,000	551,001	551,002	551,003	551,004	551,005	551,006	551,007	551,008	551,009
Huntingdon/Sumas	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
T-South to Huntingdon	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
Kingsvale to Huntingdon (via Southern Crossing)	-	-	-	-	-	-	-	-	-	-
Underground Storage	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450
Jackson Prairie (NWP from JP)	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000
(includes deliverability expansion of 312,000 Dth/day in service 2008-09)										
Mist Storage (NWN)	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450
(includes deliverability expansion of 51,310 Dth/day in service 2007-08)										
Peak LNG	350,338	350,338	504,838	504,838	504,838	504,838	504,838	504,838	504,838	504,838
Newport/Portland LNG (NWN)	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000
Gig Harbor Satellite LNG (PSE)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Swarr Stn Propane (PSE)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Tilbury LNG (TGI)	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338
Vancouver Island LNG (permitted, provisional)	-	-	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500
Total Supply	4,380,848	4,380,849	4,535,350	4,535,351	4,535,352	4,535,353	4,535,354	4,535,355	4,535,356	4,535,357
Supply Surplus/(Shortfall)	(130,703)	(183,561)	(113,056)	(158,162)	(204,814)	(252,817)	(308,234)	(361,370)	(411,271)	(461,424)

A6. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE – HIGH CASE

Northwest Gas Association 2009 Natural Gas Outlook I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - High Case

DEMAND (Region/Sector)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Lower Main & Van. Island (I-5 Corridor)	1,419,208	1,429,687	1,439,581	1,449,217	1,458,587	1,467,831	1,478,519	1,488,884	1,498,619	1,508,565
Residential	622,479	629,162	634,653	639,976	645,132	650,243	657,857	664,145	670,132	676,149
Commercial (Firm Sales & Transport)	376,463	380,046	384,250	388,376	392,419	396,404	399,194	403,108	406,741	410,567
Industrial (Firm Sales & Transport)	158,668	158,881	159,081	159,268	159,438	159,587	159,870	160,034	160,149	160,252
Power Generation	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597
W. Washington (I-5 Corridor)	2,137,593	2,205,741	2,283,478	2,321,125	2,362,989	2,406,863	2,452,008	2,544,311	2,589,538	2,633,965
Residential	791,449	809,721	830,079	853,559	879,528	906,398	933,797	960,920	987,713	1,013,420
Commercial (Firm Sales & Transport)	337,309	346,517	349,888	356,762	365,066	374,472	384,450	394,527	404,852	415,280
Industrial (Firm Sales & Transport)	290,449	290,919	291,049	291,307	291,722	292,001	292,303	292,633	292,974	293,343
Power Generation	718,386	758,585	812,462	819,497	826,673	833,992	841,458	896,231	903,999	911,921
W. Oregon (I-5 Corridor)	1,005,489	1,011,509	1,027,651	1,045,039	1,060,577	1,075,722	1,096,664	1,115,637	1,131,520	1,148,784
Residential	561,023	567,058	580,066	594,706	608,536	622,153	639,460	656,046	670,892	686,566
Commercial (Firm Sales & Transport)	298,991	298,900	301,881	303,829	304,438	304,928	307,523	309,723	310,598	312,025
Industrial (Firm Sales & Transport)	58,475	58,551	58,704	59,504	60,604	61,640	62,682	62,868	63,030	63,193
Power Generation	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000	87,000
Total Peak (Design) Day Demand	4,562,290	4,646,937	4,750,709	4,815,381	4,882,153	4,950,416	5,027,191	5,148,832	5,219,677	5,291,313
SUPPLY										
Pipeline Interconnects	2,304,060	2,304,062	2,304,064	2,304,066	2,304,068	2,304,070	2,304,072	2,304,074	2,304,076	2,304,078
Max north flow on NWP @ Gorge	551,000	551,001	551,002	551,003	551,004	551,005	551,006	551,007	551,008	551,009
Huntingdon/Sumas	1,753,060	1,753,061	1,753,062	1,753,063	1,753,064	1,753,065	1,753,066	1,753,067	1,753,068	1,753,069
T-South to Huntingdon	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
Kingsvale to Huntingdon (via Southern Crossing)	0	1	2	3	4	5	6	7	8	9
Underground Storage	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450
Jackson Prairie (NWP from JP)	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000
(includes deliverability expansion of 312,000 Dth/day in service 2008-09)										
Mist Storage (NWN)	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450
(includes deliverability expansion of 51,310 Dth/day in service 2007-08)										
Peak LNG	350,338	350,338	504,838	504,838	504,838	504,838	504,838	504,838	504,838	504,838
Newport/Portland LNG (NWN)	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000
Gig Harbor Satellite LNG (PSE)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Swarr Stn Propane (PSE)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Tilbury LNG (TGI)	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338
Vancouver Island LNG (permitted, provisional)	-	-	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500
Total Supply	4,380,848	4,380,850	4,535,352	4,535,354	4,535,356	4,535,358	4,535,360	4,535,362	4,535,364	4,535,366
Supply Surplus/(Shortfall)	(181,442)	(266,087)	(215,357)	(280,027)	(346,797)	(415,058)	(491,831)	(613,470)	(684,313)	(755,947)

A7. I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE – LOW CASE

Northwest Gas Association 2009 Natural Gas Outlook I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Low Case

DEMAND (Region/Sector)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Lower Main & Van. Island (I-5 Corridor)	1,412,191	1,415,949	1,419,350	1,422,623	1,425,716	1,428,809	1,433,406	1,437,712	1,441,514	1,445,614
Residential	618,355	621,078	622,749	624,327	625,782	627,261	631,215	633,892	636,330	638,850
Commercial (Firm Sales & Transport)	373,919	375,071	376,917	378,728	380,483	382,221	382,848	384,568	386,054	387,757
Industrial (Firm Sales & Transport)	158,319	158,202	158,086	157,971	157,854	157,729	157,745	157,654	157,532	157,410
Power Generation	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597	261,597
W. Washington (I-5 Corridor)	2,027,544	2,068,713	2,130,828	2,154,826	2,181,160	2,208,336	2,236,111	2,310,468	2,337,466	2,362,987
Residential	778,909	781,066	790,907	806,284	822,484	838,575	854,723	870,244	885,329	898,858
Commercial (Firm Sales & Transport)	333,015	338,754	338,220	340,953	344,919	349,817	355,092	360,267	365,527	370,701
Industrial (Firm Sales & Transport)	271,147	270,965	270,553	270,076	269,751	269,317	268,914	268,526	268,152	267,802
Power Generation	644,473	677,928	731,148	737,513	744,005	750,628	757,383	811,431	818,458	825,626
W. Oregon (I-5 Corridor)	932,758	930,363	931,952	932,731	932,532	932,774	938,262	941,462	942,431	944,750
Residential	543,455	544,190	547,839	551,542	554,774	558,191	564,830	570,387	574,650	579,666
Commercial (Firm Sales & Transport)	291,251	288,258	286,345	282,981	278,843	275,036	273,266	271,085	267,971	265,442
Industrial (Firm Sales & Transport)	48,052	47,916	47,768	48,208	48,915	49,547	50,166	49,991	49,811	49,642
Power Generation	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000	50,000
Total Peak (Design) Day Demand	4,372,493	4,415,026	4,482,130	4,510,181	4,539,409	4,569,918	4,607,779	4,689,642	4,721,411	4,753,351
SUPPLY										
Pipeline Interconnects	2,304,060	2,304,061	2,304,062	2,304,063	2,304,064	2,304,065	2,304,066	2,304,067	2,304,068	2,304,069
Max north flow on NWP @ Gorge	551,000	551,001	551,002	551,003	551,004	551,005	551,006	551,007	551,008	551,009
Huntingdon/Sumas	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
T-South to Huntingdon	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060	1,753,060
Kingsvale to Huntingdon (via Southern Crossing)	-	-	-	-	-	-	-	-	-	-
Underground Storage	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450	1,726,450
Jackson Prairie (NWP from JP)	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000	1,196,000
(includes deliverability expansion of 312,000 Dth/day in service 2008-09)										
Mist Storage (NWN)	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450	530,450
(includes deliverability expansion of 51,310 Dth/day in service 2007-08)										
Peak LNG	350,338	350,338	504,838	504,838	504,838	504,838	504,838	504,838	504,838	504,838
Newport/Portland LNG (NWN)	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000	180,000
Gig Harbor Satellite LNG (PSE)	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000	3,000
Swarr Stn Propane (PSE)	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000	10,000
Tilbury LNG (TGI)	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338	157,338
Vancouver Island LNG (permitted, provisional)	-	-	154,500	154,500	154,500	154,500	154,500	154,500	154,500	154,500
Total Supply	4,380,848	4,380,849	4,535,350	4,535,351	4,535,352	4,535,353	4,535,354	4,535,355	4,535,356	4,535,357
Supply Surplus/(Shortfall)	8,355	(34,177)	53,220	25,170	(4,057)	(34,565)	(72,425)	(154,287)	(186,055)	(217,994)

A8. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - BASE CASE

Northwest Gas Association 2009 Natural Gas Outlook NON I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Base Case

DEMAND (Region/Sector)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Interior	434,720	438,231	441,716	445,143	448,510	451,746	455,380	459,290	462,321	465,182
Residential	208,939	211,030	213,100	215,126	217,109	219,006	221,324	223,545	225,169	226,677
Commercial (Sales)	115,011	116,428	117,843	119,244	120,630	121,973	123,254	124,945	126,353	127,707
Industrial (Transport & Interruptible)	110,770	110,773	110,774	110,773	110,771	110,768	110,802	110,800	110,799	110,797
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	686,186	685,084	690,725	696,649	702,597	708,575	708,748	714,555	720,580	726,613
Residential	203,380	200,976	203,192	205,615	208,001	210,400	209,156	211,469	213,864	216,265
Commercial (Sales)	145,955	147,324	150,711	154,154	157,633	161,119	162,446	165,875	169,392	172,906
Industrial (Transport & Interruptible)	94,813	94,746	94,784	94,842	94,924	95,018	95,108	95,172	95,286	95,405
Power Generation	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038
E. Oregon & Medford	603,858	607,163	612,063	617,676	623,392	629,119	633,730	639,543	645,353	651,160
Residential	89,224	90,178	92,185	94,777	97,488	100,204	102,162	104,916	107,617	110,278
Commercial (Sales)	57,662	58,255	59,298	60,422	61,484	62,508	63,132	64,138	65,129	66,118
Industrial (Transport & Interruptible)	44,025	43,984	43,997	44,021	44,054	44,093	44,134	44,161	44,210	44,259
Power Generation	412,947	414,747	416,583	418,456	420,366	422,314	424,301	426,329	428,396	430,505
S. Idaho	536,316	541,623	553,458	558,952	593,360	597,768	604,382	611,105	617,938	624,884
Residential	245,211	248,713	256,525	260,150	263,060	265,969	270,334	274,771	279,281	283,865
Commercial (Sales)	126,321	128,125	132,149	134,017	135,516	137,014	139,263	141,549	143,872	146,234
Industrial (Transport & Interruptible)	91,216	91,216	91,216	91,216	91,216	91,216	91,216	91,216	91,216	91,216
Power Generation	73,569	73,569	73,569	73,569	103,569	103,569	103,569	103,569	103,569	103,569
Total Peak (Design) Day Demand	2,261,080	2,272,101	2,297,963	2,318,420	2,367,858	2,387,208	2,402,240	2,424,492	2,446,192	2,467,839
SUPPLY										
Pipeline Interconnects	1,594,830	1,594,829	1,594,828	1,594,827	1,594,826	1,594,825	1,594,824	1,594,823	1,594,822	1,594,821
NWP- Stanfield (NWP from GTN)	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000
NWP - Starr Rd (NWP from GTN)	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
NWP - Palouse (NWP from GTN)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
GTN - Direct Connects	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000
Kingsgate/Yahk - BC Interior from TCPL	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625
Westcoast to BC Interior	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705
Westcoast to Kingsvale	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500
NWP - Kemmerer (NWP north from NWP south)	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000
NWP - Kemmerer to Reno	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)
Peak LNG	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300
Plymouth (NWP from LNG)	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300
Nampa LNG (IGC)	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Total Supply	1,960,130	1,960,129	1,960,128	1,960,127	1,960,126	1,960,125	1,960,124	1,960,123	1,960,122	1,960,121
Supply Surplus/(Shortfall)	(300,950)	(311,972)	(337,835)	(358,293)	(407,732)	(427,083)	(442,116)	(464,369)	(486,070)	(507,718)

A9. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - HIGH CASE

Northwest Gas Association

2009 Natural Gas Outlook

NON I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - High Case

DEMAND (Region/Sector)	2008-09	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18
BC Interior	436,088	440,903	445,667	450,353	454,959	459,367	464,112	469,225	473,294	477,025
Residential	209,812	212,733	215,617	218,443	221,212	223,851	226,875	229,854	232,128	234,178
Commercial (Sales)	115,491	117,368	119,235	121,083	122,910	124,671	126,346	128,471	130,258	131,933
Industrial (Transport & Interruptible)	110,785	110,801	110,815	110,827	110,837	110,845	110,891	110,900	110,908	110,915
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	700,736	704,007	714,420	725,217	736,104	747,047	756,586	767,558	778,917	790,358
Residential	207,510	207,317	212,227	217,439	222,669	227,930	232,295	237,583	243,030	248,516
Commercial (Sales)	150,685	154,108	159,470	164,895	170,362	175,848	180,812	186,325	192,009	197,719
Industrial (Transport & Interruptible)	100,503	100,543	100,685	100,846	101,036	101,232	101,441	101,613	101,841	102,085
Power Generation	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038
E. Oregon & Medford	588,532	598,171	604,545	611,955	619,432	627,045	634,729	642,592	650,563	658,574
Residential	76,548	78,499	81,241	84,900	88,633	92,445	96,250	100,198	104,163	108,157
Commercial (Sales)	52,946	54,237	55,878	57,590	59,246	60,913	62,612	64,321	66,051	67,747
Industrial (Transport & Interruptible)	46,091	46,098	46,161	46,234	46,316	46,405	46,498	46,576	46,681	46,787
Power Generation	412,947	419,337	421,265	423,231	425,237	427,282	429,369	431,498	433,669	435,883
S. Idaho	540,464	549,847	565,850	576,806	619,970	628,118	638,724	649,594	660,734	672,152
Residential	246,121	252,314	262,876	270,107	275,495	280,873	287,873	295,047	302,400	309,935
Commercial (Sales)	126,790	129,980	135,421	139,146	141,922	144,692	148,298	151,994	155,782	159,664
Industrial (Transport & Interruptible)	93,984	93,984	93,984	93,984	93,984	93,984	93,984	93,984	93,984	93,984
Power Generation	73,569	73,569	73,569	73,569	108,569	108,569	108,569	108,569	108,569	108,569
Total Peak (Design) Day Demand	2,265,820	2,292,928	2,330,482	2,364,331	2,430,465	2,461,578	2,494,152	2,528,969	2,563,509	2,598,109
SUPPLY										
Pipeline Interconnects	1,594,830	1,594,829	1,594,828	1,594,827	1,594,826	1,594,825	1,594,824	1,594,823	1,594,822	1,594,821
NWP- Stanfield (NWP from GTN)	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000
NWP - Starr Rd (NWP from GTN)	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
NWP - Palouse (NWP from GTN)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
GTN - Direct Connects	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000
Kingsgate/Yahk - BC Interior from TCPL	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625
Westcoast to BC Interior	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705
Westcoast to Kingsvale	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500
NWP - Kemmerer (NWP north from NWP south)	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000
NWP - Kemmerer to Reno	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)
Peak LNG	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300
Plymouth (NWP from LNG)	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300
Nampa LNG (IGC)	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Total Supply	1,960,130	1,960,129	1,960,128	1,960,127	1,960,126	1,960,125	1,960,124	1,960,123	1,960,122	1,960,121
Supply Surplus/(Shortfall)	(305,690)	(332,799)	(370,354)	(404,204)	(470,339)	(501,453)	(534,028)	(568,846)	(603,387)	(637,988)

A10. NON I-5 CORRIDOR PEAK DAY SUPPLY/DEMAND BALANCE - LOW CASE

Northwest Gas Association 2009 Natural Gas Outlook NON I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Low Case

DEMAND (Region/Sector)	2009-10	2010-11	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19
BC Interior	433,537	435,987	438,446	440,859	443,228	445,462	448,148	451,066	453,336	455,547
Residential	208,184	209,599	211,016	212,398	213,748	215,011	216,726	218,323	219,471	220,576
Commercial (Sales)	114,595	115,639	116,690	117,732	118,763	119,748	120,694	122,026	123,156	124,270
Industrial (Transport & Interruptible)	110,757	110,749	110,739	110,729	110,717	110,703	110,728	110,717	110,709	110,702
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	680,595	680,764	670,175	658,260	657,923	658,853	656,766	656,943	657,586	657,695
Residential	202,823	201,690	193,964	185,424	184,087	183,550	181,112	180,123	179,389	178,321
Commercial (Sales)	145,098	146,551	143,761	140,446	141,465	142,944	143,303	144,506	145,879	147,048
Industrial (Transport & Interruptible)	90,637	90,485	90,412	90,352	90,334	90,321	90,312	90,276	90,280	90,288
Power Generation	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038	242,038
E. Oregon & Medford	595,027	597,852	598,574	599,368	601,986	605,471	608,464	611,851	615,298	618,652
Residential	87,842	88,685	88,116	87,631	88,350	89,630	90,564	91,746	92,928	94,013
Commercial (Sales)	56,752	57,107	56,682	56,204	56,301	56,665	56,843	57,143	57,444	57,710
Industrial (Transport & Interruptible)	41,987	41,904	41,875	41,854	41,840	41,830	41,823	41,803	41,802	41,801
Power Generation	408,447	410,157	411,901	413,680	415,495	417,346	419,234	421,159	423,124	425,127
S. Idaho	472,538	474,468	482,392	484,798	505,580	506,998	510,467	513,968	517,499	521,063
Residential	244,615	245,888	251,118	252,706	253,222	254,158	256,448	258,758	261,089	263,441
Commercial (Sales)	126,014	126,670	129,364	130,182	130,448	130,930	132,109	133,299	134,500	135,712
Industrial (Transport & Interruptible)	85,470	85,470	85,470	85,470	85,470	85,470	85,470	85,470	85,470	85,470
Power Generation	16,440	16,440	16,440	16,440	36,440	36,440	36,440	36,440	36,440	36,440
Total Peak (Design) Day Demand	2,181,697	2,189,071	2,189,586	2,183,286	2,208,717	2,216,784	2,223,845	2,233,828	2,243,719	2,252,957
SUPPLY										
Pipeline Interconnects	1,594,830	1,594,829	1,594,828	1,594,827	1,594,826	1,594,825	1,594,824	1,594,823	1,594,822	1,594,821
NWP- Stanfield (NWP from GTN)	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000	638,000
NWP - Starr Rd (NWP from GTN)	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000	165,000
NWP - Palouse (NWP from GTN)	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000	20,000
GTN - Direct Connects	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000	415,000
Kingsgate/Yahk - BC Interior from TCPL	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625	182,625
Westcoast to BC Interior	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705	178,705
Westcoast to Kingsvale	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500	51,500
NWP - Kemmerer (NWP north from NWP south)	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000	655,000
NWP - Kemmerer to Reno	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)	(160,000)
Peak LNG	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300	365,300
Plymouth (NWP from LNG)	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300	305,300
Nampa LNG (IGC)	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000	60,000
Total Supply	1,960,130	1,960,129	1,960,128	1,960,127	1,960,126	1,960,125	1,960,124	1,960,123	1,960,122	1,960,121
Supply Surplus/(Shortfall)	(221,567)	(228,942)	(229,458)	(223,159)	(248,591)	(256,659)	(263,721)	(273,705)	(283,597)	(292,836)