NWGA
NORTHWEST GAS ASSOCIATION

2012 GAS OUTLOOK

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

PROJECTIONS THROUGH OCTOBER 2021

This report, compiled by the Northwest Gas Association (NWGA) and its members, provides a consensus industry perspective of the Pacific Northwest's current and projected natural gas supply, demand, prices and delivery capabilities through 2021. The Pacific Northwest in this case includes British Columbia (BC) and the U.S. states of Washington, Oregon and Idaho. Additional information, including white papers on specific natural gas topics, can be found at www.nwga.org.

WHAT'S NEW

The abundance of natural gas across North America continues to be a game-changer – transforming the energy landscape as well as the direction of public policy. Continental supply continues to grow as producers bring increasing quantities of natural gas (primarily shale gas) to market.

U.S. Natural Gas Strategy

"We have a supply of natural gas that can last America nearly 100 years, and my administration will take every possible action to safely develop this energy. The development of natural gas will create jobs and power trucks and factories that are cleaner and cheaper, proving that we don't have to choose between our environment and our economy."

-- President Barack Obama, *State of the Union speech*, Jan. 24, 2012.

North America's vast and economic supply of natural gas coupled with lower commodity prices is causing a shift in thinking about the role of natural gas in our economy. The dramatic swing in North America's natural gas supply picture has also affected the global gas market – slashing the need for liquefied natural gas (LNG) imports while providing market incentives to explore exports.

Regionally, expectations are that economic recovery will remain moderate across the U.S. Pacific Northwest, tempering natural gas demand growth for the next few years. (BC was less affected by the recent economic downturn and is poised for quicker recovery.) Meanwhile, Northwest consumers are benefitting as regional gas distribution companies (LDCs) pass the lower cost of natural gas through to their customers.

PUTTING IT ALL TOGETHER

Since natural gas is a fundamental economic input (e.g. used in industrial and commercial processes, as a fuel to generate electricity and for space and water heating in new home construction), the economy remains the key driver influencing natural gas demand in the Pacific Northwest and across North America. The speed at which an economic recovery occurs will dictate how quickly demand grows over the next 10 years, as well as federal, state and provincial efforts to maximize the benefits of this abundant resource (boosting energy independence, creating jobs), and actions taken by energy industry participants and energy consumers to comply with carbon-reducing energy policy mandates. This, in turn, will influence decisions to expand or invest in additional delivery infrastructure such as pipelines and storage facilities.

British Columbia's Natural Gas Strategy

"We will advance natural gas actions and strategies to help fuel BC's economy for the next decade and beyond."

-- Rich Coleman – BC Minister of Energy and Mines

"[T]here are new and expanded uses of natural gas in North America and British Columbia, including transportation, fuel switching from coal to natural gas for power generation, and as a feedstock to make other products."

-- BC's Natural Gas Strategy, Feb. 3, 2012

For example, in Oregon and Washington, we are already seeing large investments in renewable wind power, which may lead to future investment in new fast-start gas-fired generation plants to balance intermittent wind generation. In addition, the announced closure of two regional coal plants (in Boardman, Oregon, and Centralia, Washington) portends additional gas demand for electric generation. Both plant operators have publicly expressed their intentions to replace at least some of that generation capacity with gas-fired generation.

U.S. energy independence grows stronger

The U.S. has increased the proportion of energy demand met from domestic sources (oil and natural gas) over the last six years to an estimated 81 percent through the first 10 months of 2011, according to data compiled by Bloomberg from the U.S. Department of Energy (DOE). The transformation, which could see the country become the world's top energy producer by 2020, has implications for the economy and national security – boosting household incomes, jobs and government revenue; cutting the trade deficit; enhancing manufacturers' competitiveness; and allowing greater flexibility in dealing with unrest in the Middle East.

Source: Bloomberg, Feb. 6, 2012, *Americans gaining energy independence with U.S. as top producer.*

At the same time, the low price of North American natural gas is itself playing an important role in economic recovery by stimulating growth of industries that use natural gas[1,2] and, because global prices are much higher, by bringing overseas manufacturing jobs back to North America.

One thing is certain: thanks to the vast shale gas reserves unlocked by breakthroughs in drilling technologies, the natural gas resource available to serve our energy needs is abundant, secure and accessible across North America. And with plentiful supply comes a mandate to responsibly produce and use natural gas.

Directly heating homes, buildings and water with natural gas is one way to optimize its use. It is also an economic feedstock and process fuel that can help revitalize regional industry. In addition, natural gas is a reliable, low carbon fuel for generating electricity. It's a safe, clean and more affordable fuel than gasoline or diesel for fueling fleet vehicles like garbage trucks and transit buses, long-haul trucks, even ferries.

Regional stakeholders can capture the benefits of this newly plentiful resource and help to ensure supply viability for the long-term by encouraging its use.

[1] Shale-gas production is spurring construction of plants that make chemicals, plastics, fertilizer, steel and other products. A report issued in early 2012 by PricewaterhouseCoopers LLC estimated that such investments could create a million U.S. manufacturing jobs over the next 15 years. From *Shale Gas Boom Spurs Race,* Wall Street Journal (WSJ), Dec. 21, 2011. http://online.wsj.com/article/SB10001424052970204844504577100421253005122.html. See also: *Oil and Gas Boom Lifts U.S. Economy*, WSJ, Feb. 8, 2012.

[2] A recent study by the American Chemistry Council noted the potential for 17,000 new knowledge-intensive, high-paying jobs in the U.S. chemical industry, another 400,000 jobs outside the chemical industry and more than $132 billion in U.S. economic output – all associated with the shale gas revolution. http://www.americanchemistry.com/Policy/Energy/Shale-Gas%20

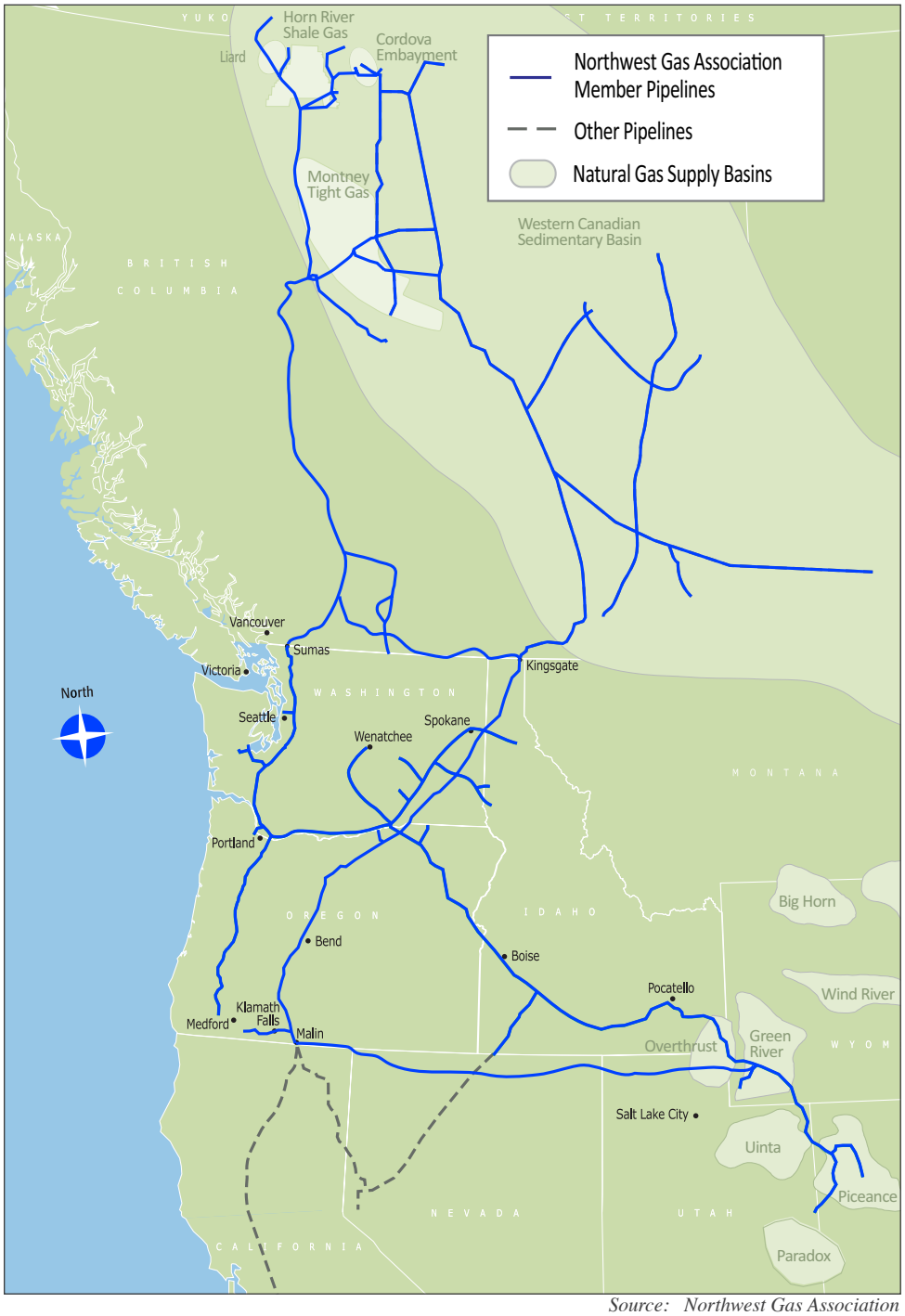
2012 GAS OUTLOOK - SUPPLY SERVING THE REGION

KEY CONCLUSIONS

- The innovative application of decades-old production technologies has unlocked vast reserves of natural gas that were previously inaccessible or uneconomic. This dramatic supply shock has fundamentally changed the nature of the natural gas market. Scarcity and declining production have given way to abundance for decades to come.

- Pacific Northwest natural gas consumers benefit from proximity to the prolific Western Canadian Sedimentary Basin (WCSB) and U.S. Rocky Mountain (Rockies) natural gas-producing regions.

Figure 1. Supply Serving the Pacific Northwest



Source: Northwest Gas Association

A CLOSER LOOK

Shale. What is it and why do we care? Shale rock formations several thousand feet below the surface of the earth are the source of hydrocarbons like oil and natural gas. Low permeability of shale means natural gas does not flow readily, but advances in horizontal drilling and hydraulic fracturing have provided economic access.

As a result, natural gas from shale rock formations has changed the conversation from one of limited and declining supplies just a handful of years ago, to one of abundance and opportunity. According to the Potential Gas Committee (PGC),[3] continental natural gas resources are now estimated at well over 100 years' supply at current consumption rates. Importantly, shale formations are geographically widespread (Figure 2).

Already, shale plays are producing more than 20 percent of U.S. natural gas supply, and are expected to make up nearly 50 percent by 2035.[4] During 2011 alone, U.S. natural gas production grew more than 7 percent, the largest year-over-year volume increase in history.[5]

Figure 2. North American Shale Plays

Prepared by Spectra Energy based on information provided by the U.S. Energy Information Administration (EIA).

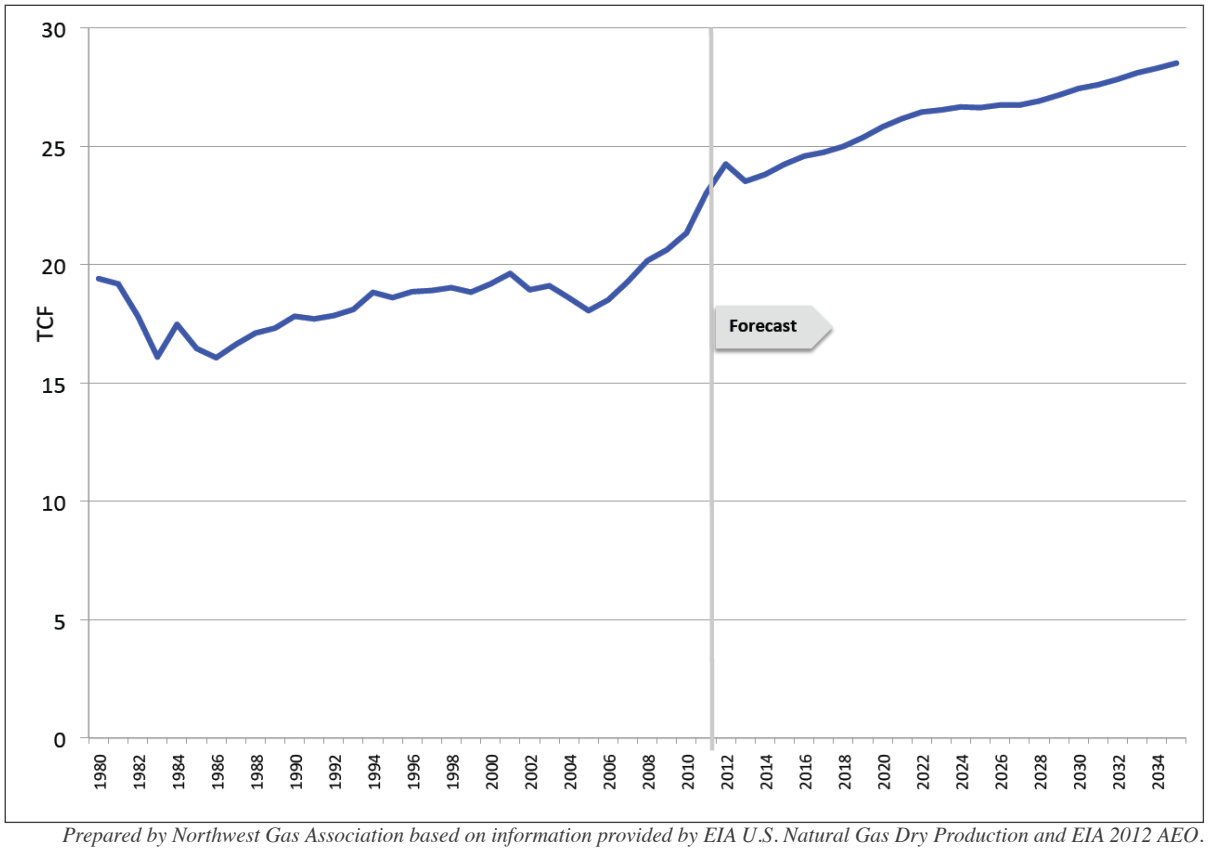
Current gas supplies are plentiful and continue to increase. Figure 3 illustrates that production increases have occurred in spite of a slow economy and lower commodity prices and are being sustained because the economics of shale gas drilling are improving. For instance, individual rigs become more productive over time as producers dial in the best methods of producing each individual field. Perhaps more importantly, sustained high oil prices make it extremely attractive to drill for oil (of which natural gas is often a byproduct) as well as drill for natural gas in liquid rich areas, from which more valuable commodities can be extracted. Finally, land lease agreements often encourage timely well development.

Closer to home, the Northwest is immediately adjacent to and supplied by two large natural gas production areas. The WCSB includes the Canadian provinces of BC and Alberta and provides about 60 percent of the natural gas consumed in the Northwest. The Rockies region provides the rest of the gas consumed here.[6] Combined, the two production areas produced an average of about 27 billion cubic feet per day (Bcf/d) in 2010[7] – more than one third of North America's natural gas supply. To put this into perspective, the

[3] Affiliated with the Colorado School of Mines, the nonprofit PGC provides biennial resource assessments.
[4] U.S. Energy Information Administration (EIA) *2012 Annual Energy Outlook – Early Release*, Jan. 23, 2012.
[5] EIA *Short-Term Energy Outlook*, Dec. 2011.
[6] The primary states in the Rockies producing natural gas include Colorado, New Mexico, Utah and Wyoming.
[7] StatisticsCanada Table 131-0001- Supply and Disposition of Natural Gas, Total Marketable Production Alberta/British Columbia (converted from cubic meters), Dec, 2010; EIA Natural Gas Annual 2010 Table 2 – Natural Gas Production...By State, Dec, 2011.

Northwest uses a little more than 3 Bcf/d on average through the winter months (November through March), although that number can go significantly higher when the weather becomes unusually cold.

Figure 3. U.S. Natural Gas Production



Prepared by Northwest Gas Association based on information provided by EIA U.S. Natural Gas Dry Production and EIA 2012 AEO.

Production from these two areas is expected to approach 30 Bcf/d by 2021, due primarily to anticipated growth in shale and tight sands production in northeast BC (Figure 4) and continued production growth in the Rockies (Figure 5). These forecasts reflect development of the large Montney and Horn River plays in northeast BC and continued development of Niobrara shale in the U.S. Rockies.

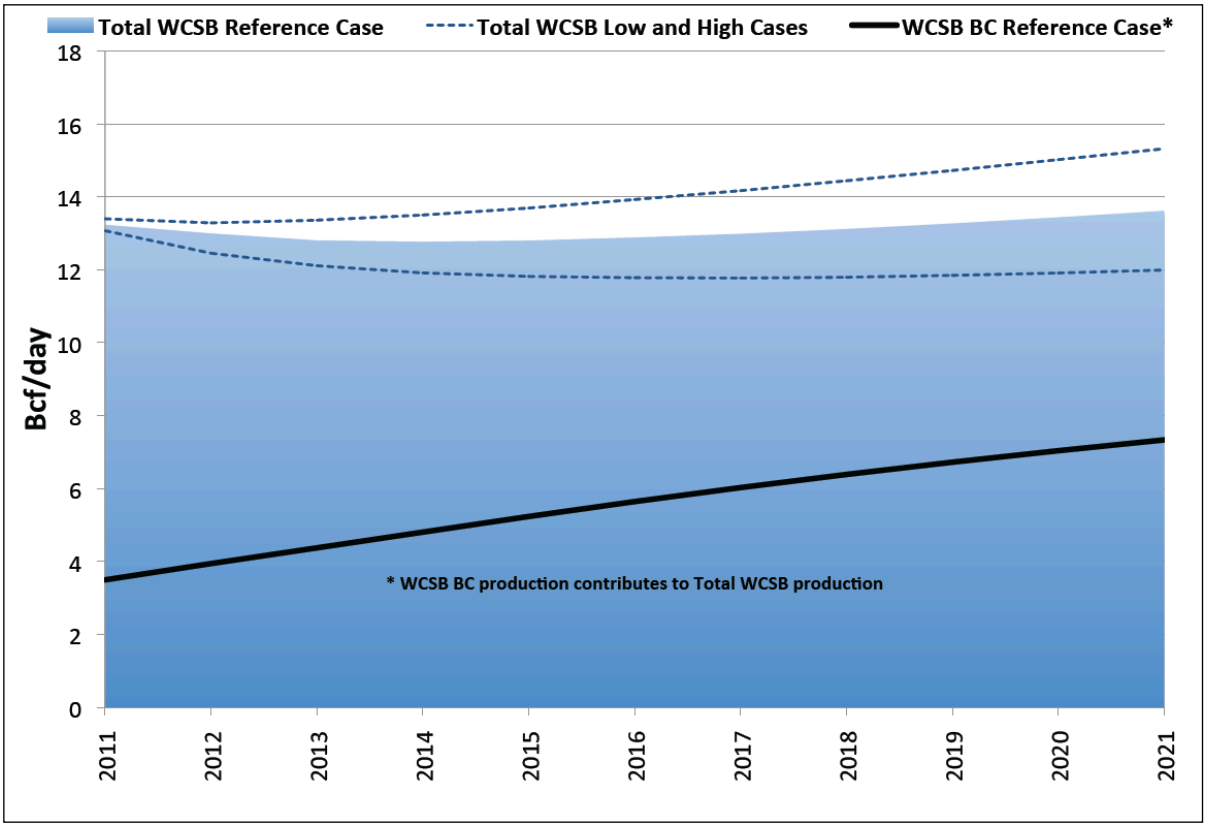
NOTES ON NATURAL GAS SUPPLIES

The natural gas supply picture is a rosy one today and is expected to remain that way for the foreseeable future. However, NWGA members are monitoring a number of evolving issues that could affect supplies, including:

- The impact environmental concerns may have on natural gas production.
- Whether volumes are sustained as producers shift away from dry gas production toward more profitable oil and other liquid hydrocarbon plays.
- The effect domestically if North American natural gas is exported to more lucrative global markets (e.g. Asia).

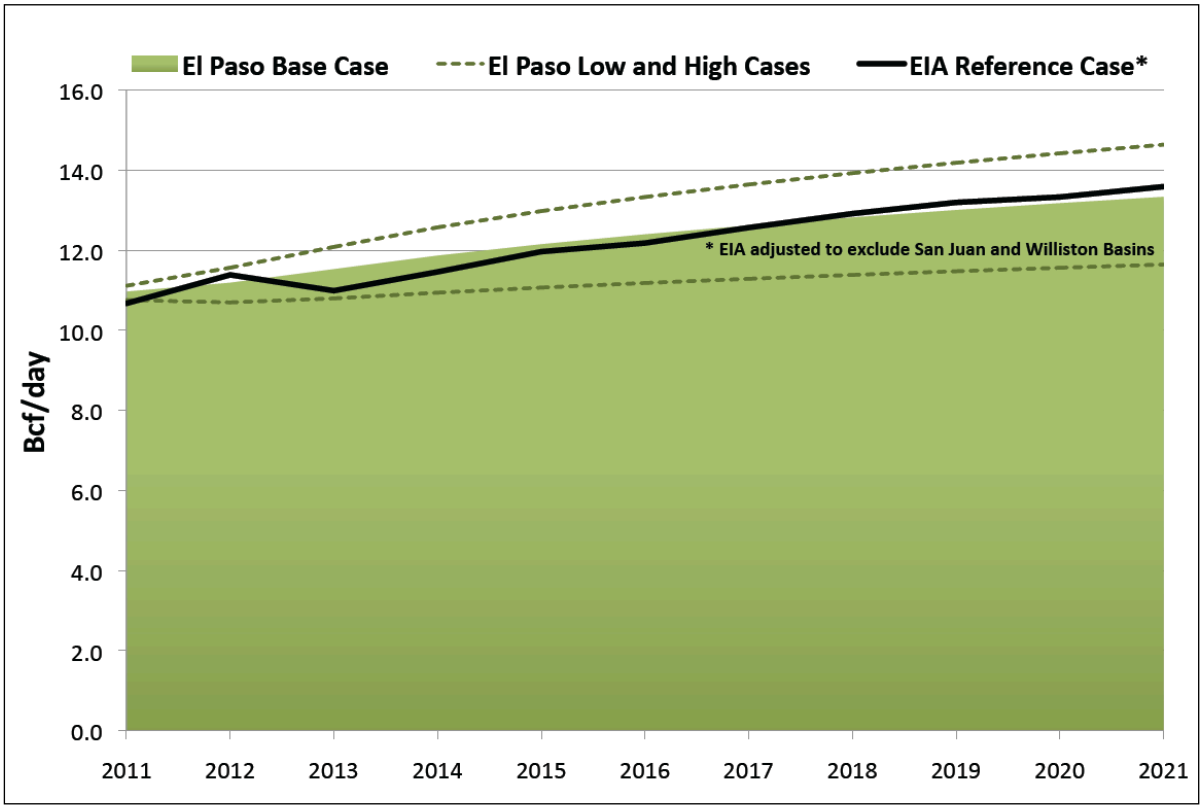
(For a comprehensive look at natural gas supply issues, including the rapidly growing role of shale gas, view the NWGA's White Paper, "Natural Gas Supply Serving the Pacific Northwest," available at www.nwga.org. Click on the Documents & Media tab and then select NWGA White Papers and Studies.)

Figure 4. WCSB Production Forecast[8]



Source: Canada National Energy Board

Figure 5. US Rockies Production Forecast[9]



Source: El Paso Western Pipelines, U.S. Energy Information Administration (EIA).

[8] National Energy Board, Canada's Energy Future – Table A4.2-4 Natural Gas Production, Nov. 2011.
[9] El Paso Pipelines, 2011-2021 Rockies Production Forecast; U.S. Energy Information Administration (EIA) *2012 Annual Energy Outlook – Early Release (adjusted to exclude San Juan and Williston Basins)*, Jan 23, 2012.

2012 GAS OUTLOOK - REGIONAL NATURAL GAS DEMAND

KEY CONCLUSIONS

- Over the next 10 years, natural gas consumption in the Pacific Northwest is expected to grow an average of 0.9 percent per year (see Table 1). Cumulative projected growth through 2021 is 8.1 percent.
- Peak day demand will grow on a year-over-year basis but is lower overall than was projected in the 2008 Outlook. Weather-driven residential and power generation loads continue to grow as a proportion of overall load, implying more variability in demand.
- Natural gas use to generate electricity will grow over the next decade. How much, how quickly and the nature of the demand for natural gas as a generation fuel is the subject of an ongoing dialogue between regional industry stakeholders.

Table 1. Project Regional Demand Growth through 2021[10]

	Low Demand Growth		Expected (base) Demand Growth		High Demand Growth	
	Average Annual	Cumulative	Average Annual	Cumulative	Average Annual	Cumulative
Total	**0.4%**	**3.2%**	**0.9%**	**8.1%**	**1.5%**	**12.3%**
Residential	0.3%	2.4%	1.1%	9.5%	1.9%	15.2%
Commercial	0.1%	1.1%	1.0%	8.9%	1.9%	15.2%
Industrial	0.6%	5.2%	0.6%	5.6%	0.7%	6.1%
Generation	0.4%	3.2%	1.0%	8.8%	1.6%	12.3%

Source: Northwest Gas Association

A CLOSER LOOK

Weak economic conditions continue to linger across the Pacific Northwest, affecting projections for the demand of natural gas across every sector. In fact, demand growth remains well short of NWGA forecasts made prior to the recession.

NWGA members are projecting positive year-over-year growth in demand, although the starting point for the base case demand forecast is about 13 percent lower than the 2008 Outlook (Figure 6). Most of the growth is expected to come from gas-fired electrical generation and modest but steady growth in core market demand (residential, commercial) as the economy recovers (Figure 7). Additional growth could come from fuel-switching by industrial customers and increasing deployment of natural gas vehicles (NGVs).

Residential – New housing construction, long a bastion of dependable growth for the natural gas industry in the Pacific Northwest, remains sluggish at 1.1 percent average annual growth (Table 1). Consumers are also using less natural gas as they install more efficient appliances, weatherize their homes or simply turn down the thermostat.

Commercial – As goes the economy, so goes commercial demand for natural gas. Our projection of 1.0 percent average annual growth reflects the expectation that large institutions and other commercial consumers of natural gas will continue to pare back usage until the economy recovers and will remain cautious about adding new facilities.

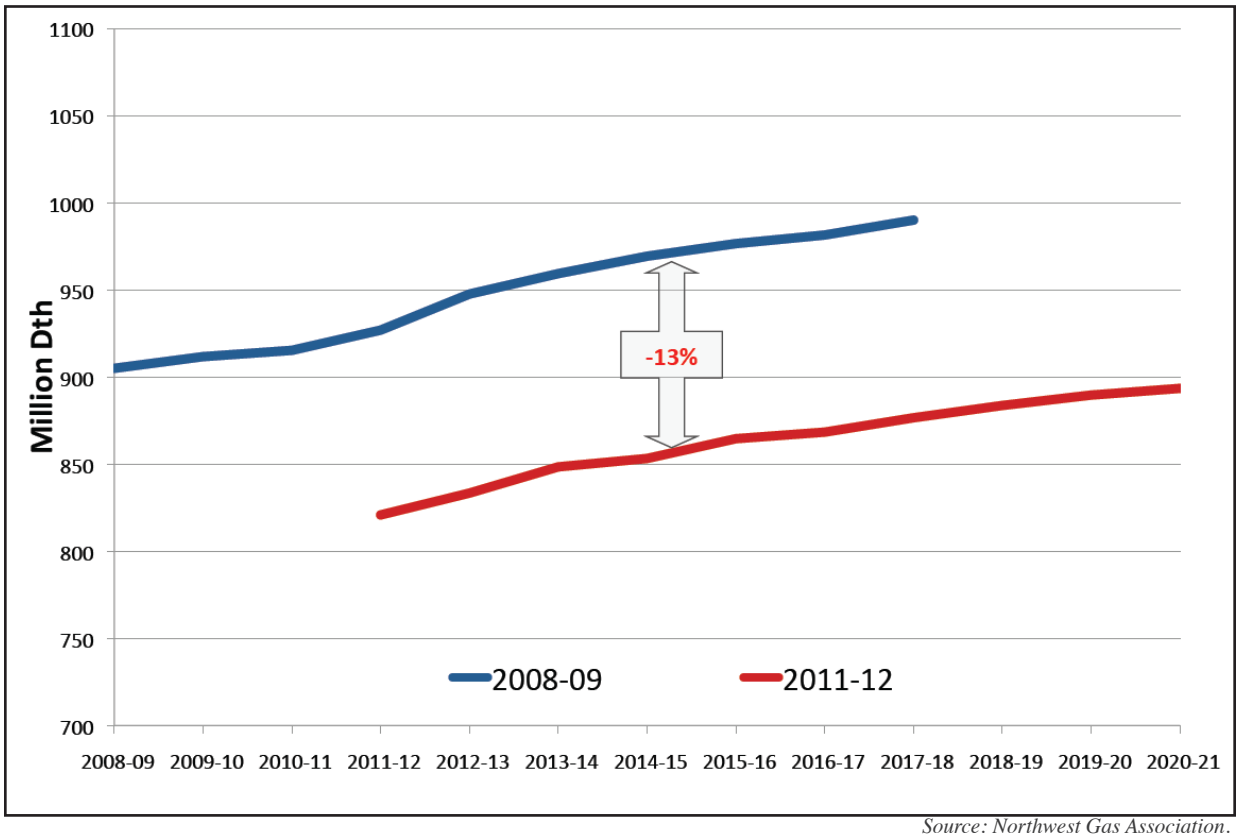
Industrial –The region lost almost 15 percent of its industrial gas load during the 2008-09 recession (Figure 8). Looking ahead, we are projecting 0.6 percent average annual growth in industrial gas demand. As illustrated in Figure 7, the increase in industrial demand accelerates as the economy recovers through 2013-14, due in large part to existing industry resuming pre-recession production levels and/or switching to natural gas.

Generation – Though subject to weather and the availability of other resources (hydro,[11] coal, wind, nuclear), overall the region is using more natural gas to generate electricity (Figure 8). This trend is expected to continue; we are forecasting an average annual growth rate of 1 percent in gas use for generation.

[10] Demand includes natural gas NWGA members project will be consumed in the region by the economic sectors referenced. Expected (base) demand growth reflects a delayed and modest economic recovery. Low demand growth assumes slower recovery, while high demand growth considers a more rapid economic expansion. Projected gas prices also influence the respective forecasts. The possibility of LNG exports from the region is not reflected in any of the demand cases.

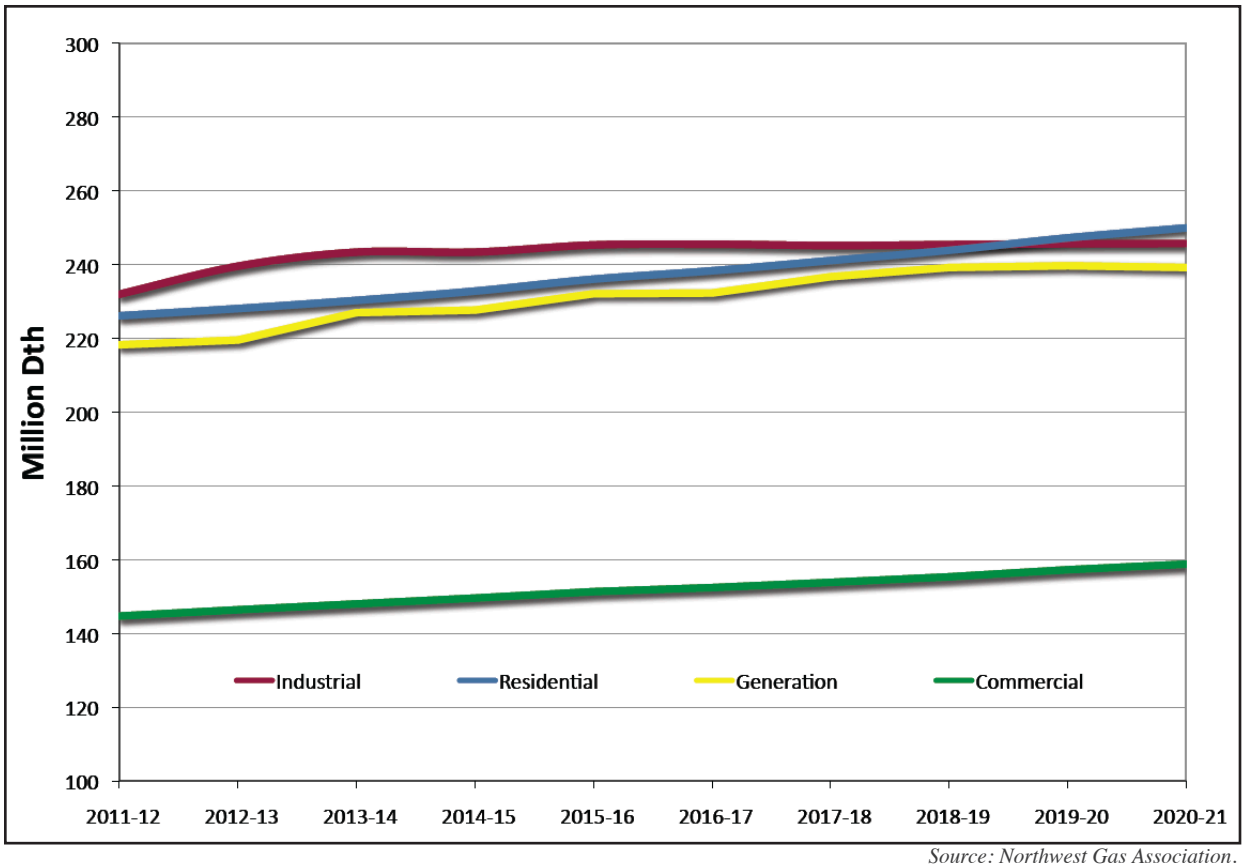
[11] 2011 provided an extreme example: near hydro record conditions in the Pacific Northwest significantly reduced gas demand for generation.

Figure 6. Pre-Recession Outlook Forecast Comparison (Base Case)



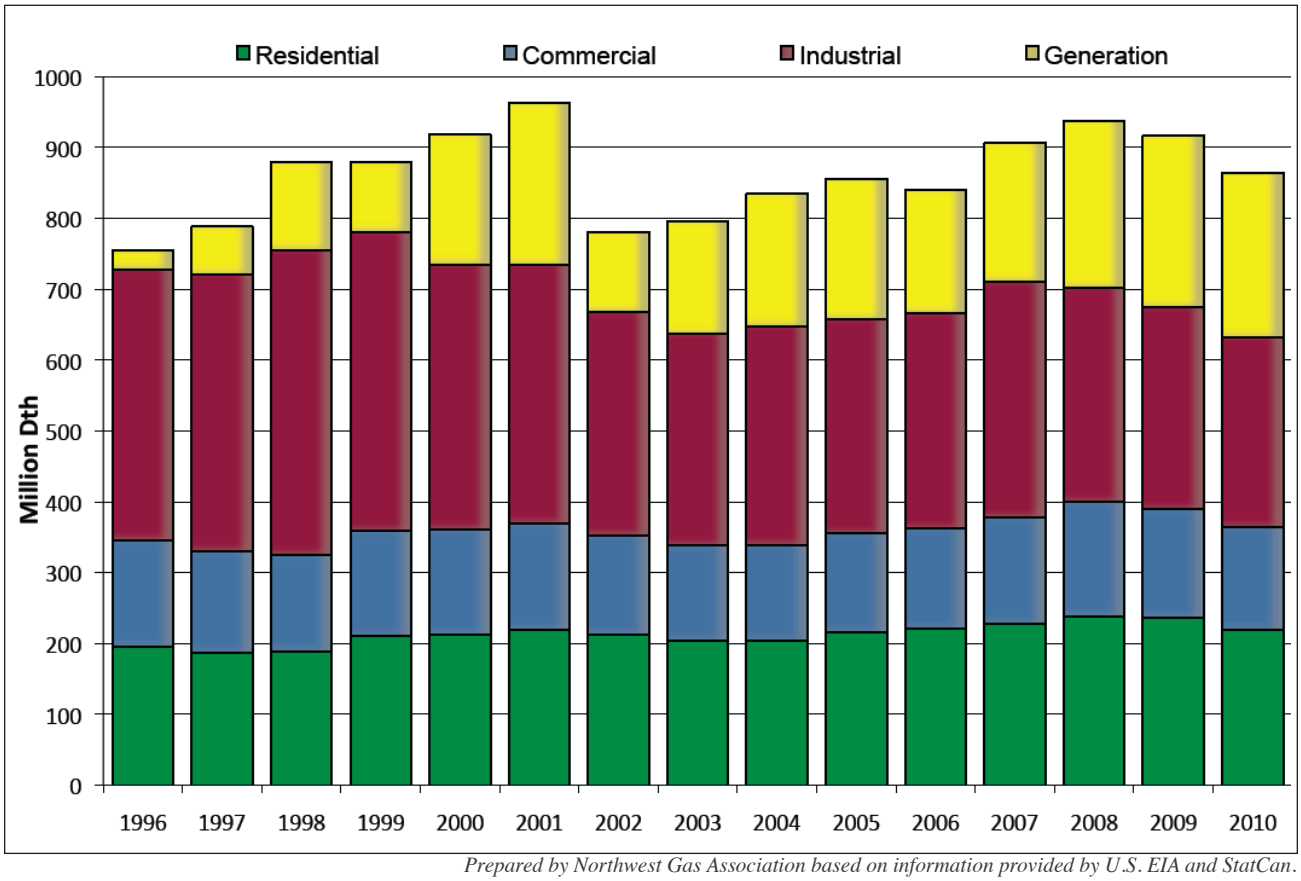
Source: Northwest Gas Association.

Figure 7. Base Case Demand Forecast by Sector



Source: Northwest Gas Association.

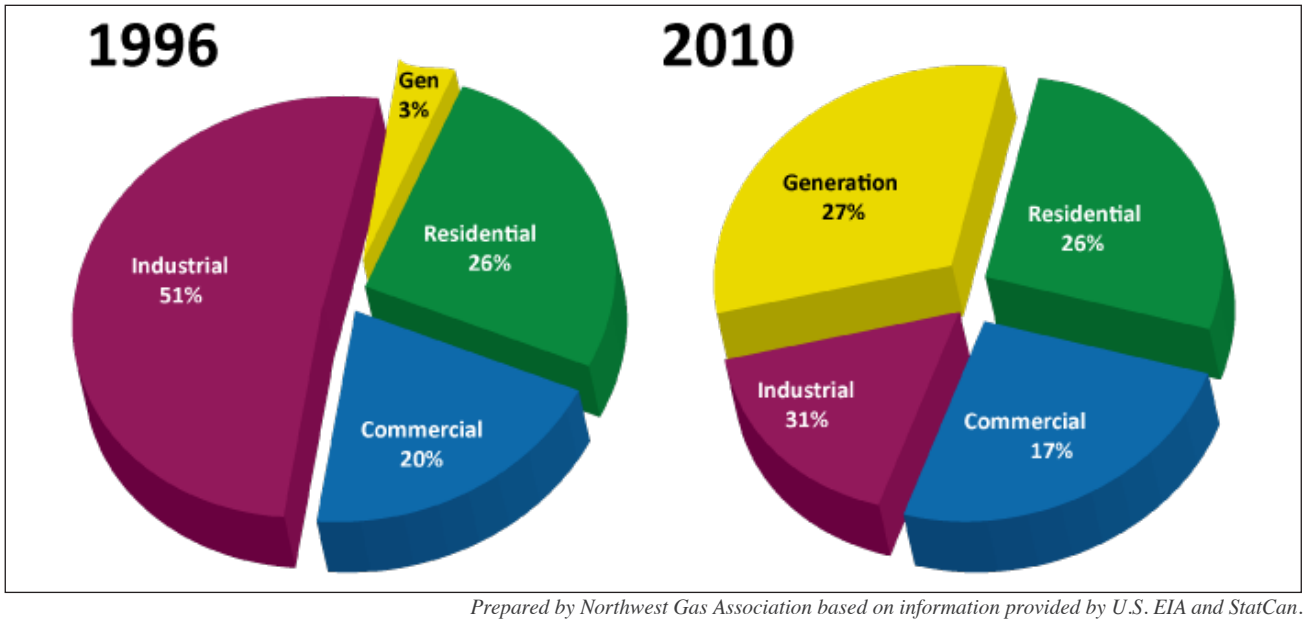
Figure 8. Historic Natural Gas Demand by Sector



Prepared by Northwest Gas Association based on information provided by U.S. EIA and StatCan.

One trend worth noting is the changing nature of the region's load profile. Whereas industrial load once comprised more than half of regional natural gas demand, it is less than one third today (31 percent; Figure 9). This is important because industrial load is generally constant year-around, regardless of weather conditions. Conversely, gas-fired generation – a load that can be quite variable depending on weather and other market conditions – once represented a small portion of natural gas demand in the region. It claimed more than 25 percent annual demand in 2010. Residential and commercial loads are also largely weather driven and hover around the same proportionate shares of annual demand.

Figure 9. Changing Demand Composition

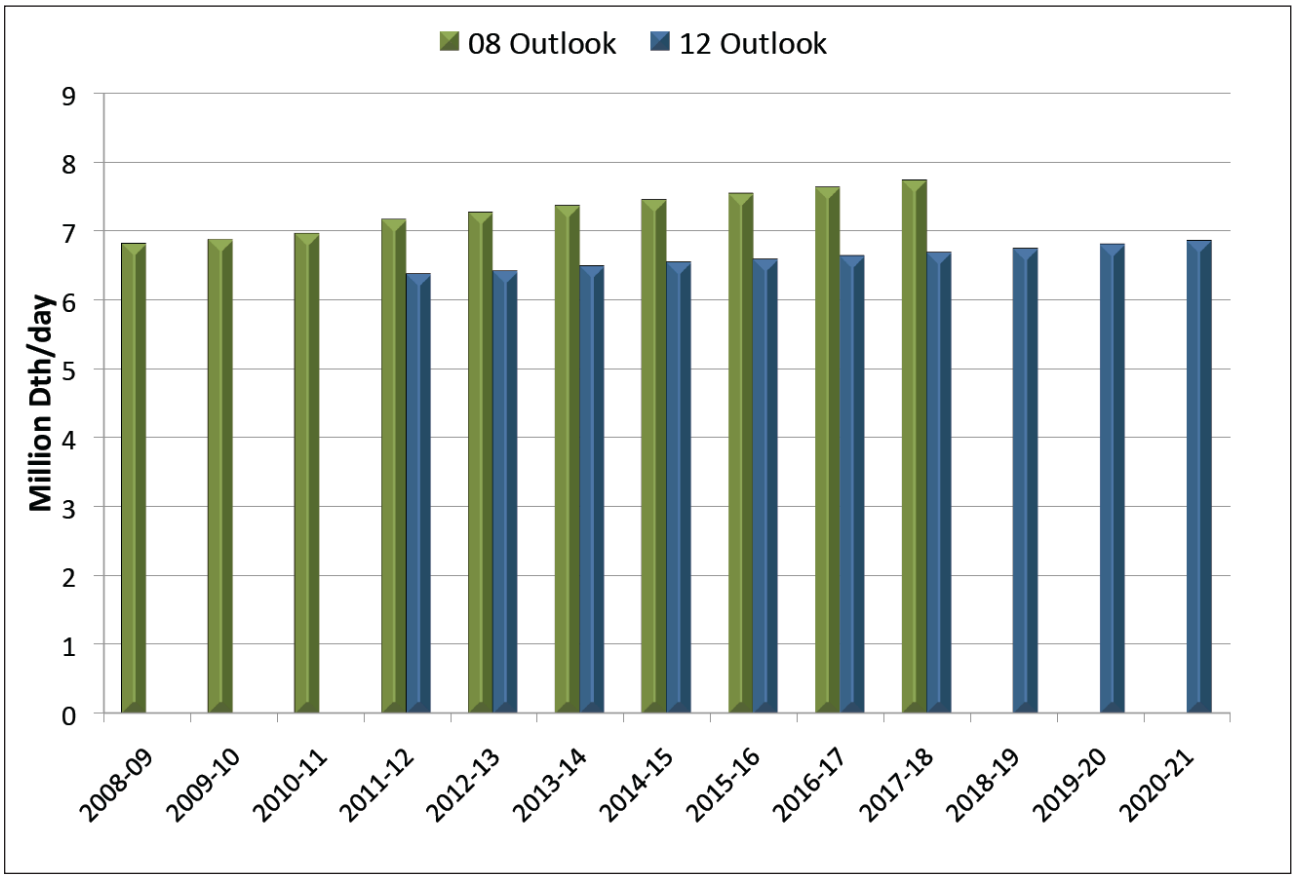


Prepared by Northwest Gas Association based on information provided by U.S. EIA and StatCan.

It is important to note that NWGA member companies plan beyond average or annual demand. To ensure customers are served during extreme weather conditions, planning standards address meeting demand on the coldest day that could occur in their service territory. These "peak" or "design" days are based on an actual 24-hour average temperature recorded at some point in the past.

Projected growth in peak day loads of NWGA member companies has declined a bit compared to forecasts issued prior to the recent recession (Figure 10), due to both the recession and effective energy efficiency measures, but the trend toward more variable, weather-dependent loads bears watching.

Figure 10. Regional Aggregated Peak Day Projection Comparison (Base Case)



Prepared by Northwest Gas Association based on the 2008 Outlook and the 2012 Outlook.

NOTES ON NATURAL GAS DEMAND

Understanding demand – how much, when, where and for what duration natural gas is needed – defines the type and size of infrastructure required to serve it. Regional growth in the use of natural gas has historically been driven by the construction of new housing, commercial and institutional facilities and new industry. The demand projections in this Outlook anticipate a slowly recovering economy.

However, forecast data don't always reflect what's occurring in real-time. The demand for natural gas in the region is changing and NWGA members are watching a number of demand drivers that are yet to be quantified:

- The magnitude and nature of the growing use of natural gas to generate electricity in the region, both to serve growing power demand and balance electrical systems as more intermittent renewable energy resources come online.
- The possibility of new industrial loads due to sustained lower natural gas commodity costs. This may include new industry as well as fuel-switching by existing industry.
- The use of natural gas as a transportation fuel in a variety of applications. (For more information about natural gas vehicles, click here to view the NWGA whitepaper series.)

2012 GAS OUTLOOK - REGIONAL PRICES

KEY CONCLUSIONS

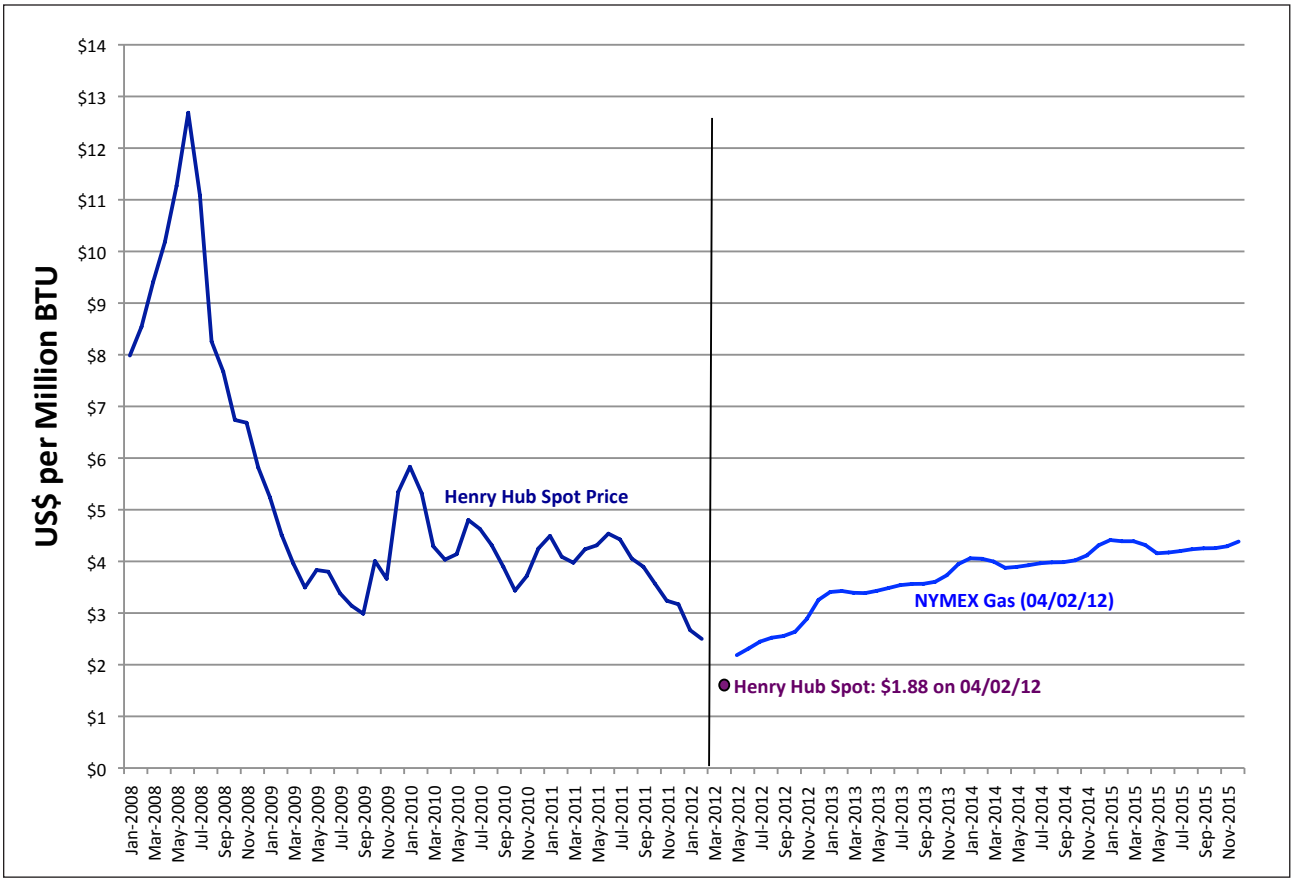
- Natural gas prices in the Pacific Northwest continue to reflect abundant supply availability. Daily spot prices through 2011 averaged a little less than $4 per million British thermal units (MMBtu), according to the EIA, compared to an average of almost $9/MMBtu in 2008.

- Depending on the pace of economic recovery and supply/demand growth, most forecasts project prices to average between $4 and $7/MMBtu through 2021 when adjusted for inflation.

A CLOSER LOOK

Down dramatically from the highs experienced in 2008, natural gas prices are at historic lows (Figure 11), and are expected to hover around current levels until the economy begins a sustained recovery when supply and demand will become more balanced. In response, utilities in the region, which pass through purchased gas costs to customers without markup, have been able to lower commodity rates for the benefit of customers. Even factoring in a growing economy, prices are not expected to rise substantially due to the shale gas dynamics described earlier (Figure 12).

Figure 11. Henry Hub Prices, Historic and Futures[12]

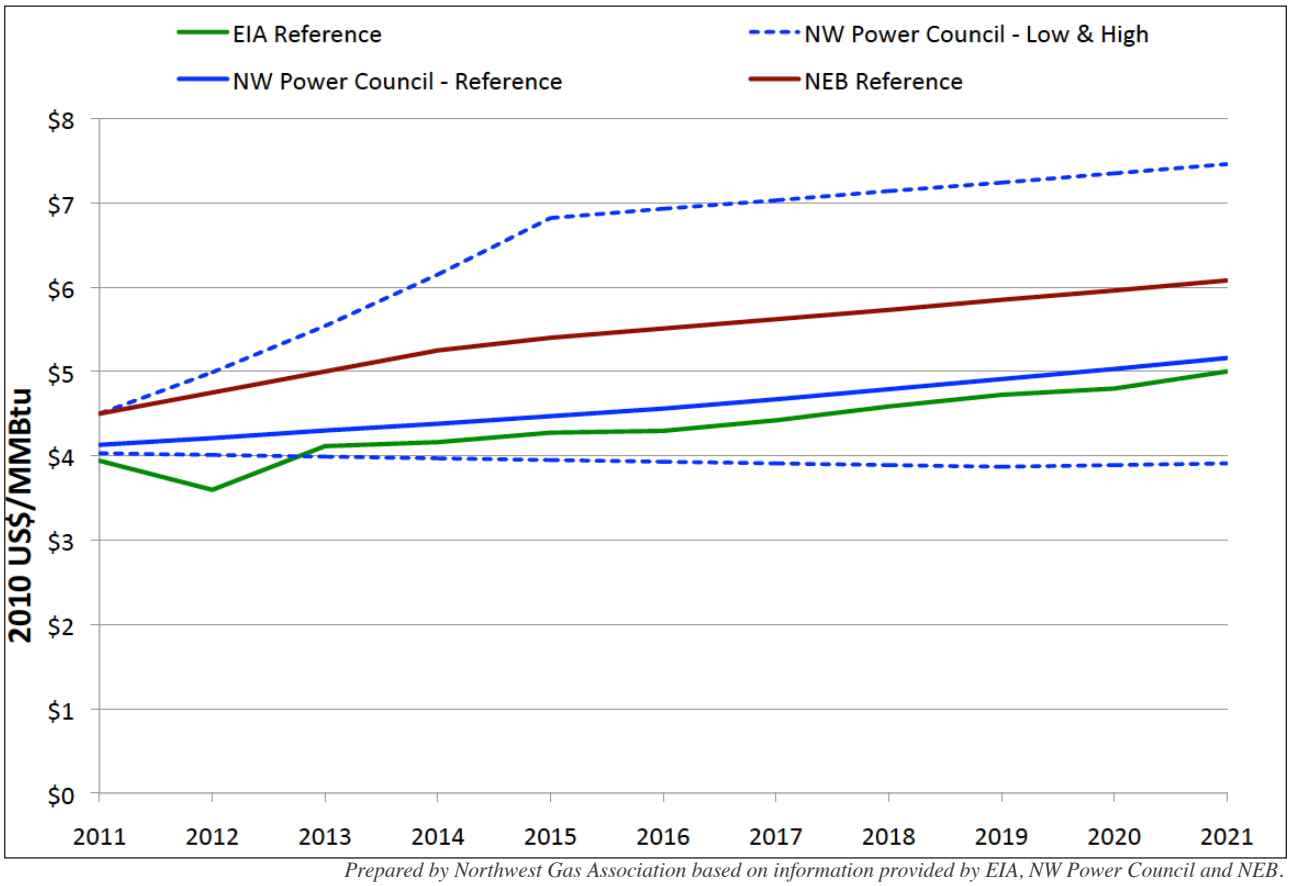


Prepared by Northwest Gas Association based on information provided by EIA Monthly NatGas Report; EIA Short Term Energy Outlook; NYMEX.

In addition to delivering price-lowering volumes to the market, shale gas has another benefit: geographically diverse sources of supply across the continent. Shorter distances between production and consumption reduce transportation costs and mitigate pricing risks from far-flung conventional sources subject to disruptions.

[12] Natural gas is bought and sold at several locations throughout North America. The Henry Hub in Louisiana is the benchmark against which prices at all other trading hubs are compared. Futures contracts bought and sold on the New York Mercantile Exchange (NYMEX) are also transacted at the Henry Hub.

Figure 12. Long-Term Henry Hub Natural Gas Price Forecasts[13, 14]



Prepared by Northwest Gas Association based on information provided by EIA, NW Power Council and NEB.

NOTES ON NATURAL GAS PRICES

Given the continuing abundance of continental supply, consumers are likely to benefit from moderate natural gas prices for the foreseeable future. Still, NWGA members are tracking some market changes that could influence natural gas prices in the future:

- Shifting investment away from dry gas production to oil and other liquid hydrocarbons.
- The impact of increased regulation on production practices and access to viable reserves.
- The pace of economic growth across North America.
- The accelerated adoption of natural gas as a fuel for generating electricity, and as an alternative to petroleum-based fuels in the transportation and industrial sectors.
- The inter-regional price impacts of changing natural gas flows across North America.
- The benefits and costs of exporting North American natural gas to premium overseas markets.

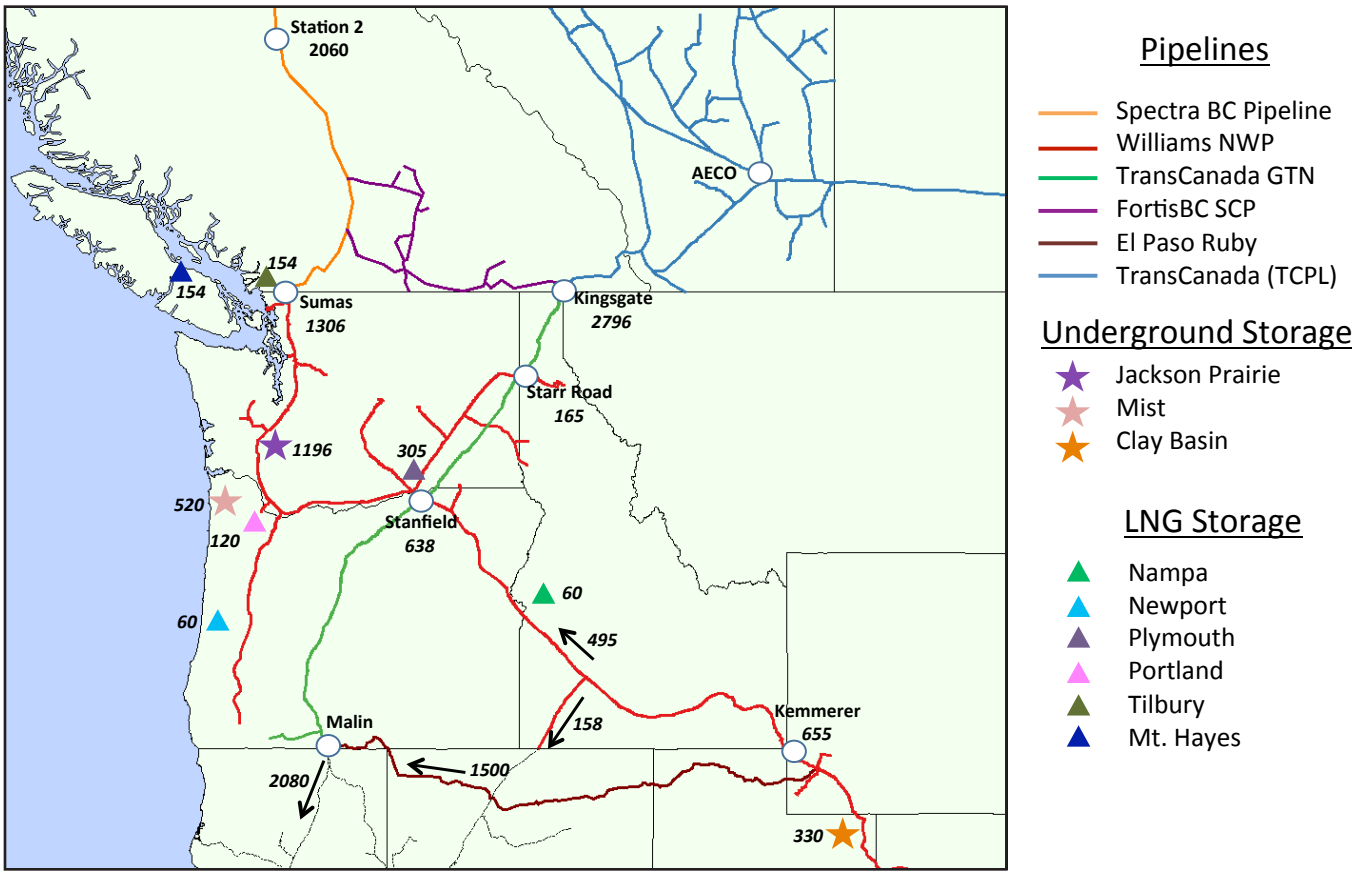
[13] Northwest Power Conservation Council, *Update to the Council's Forecast of Fuel Prices*, Aug. 2011; Canada NEB, *Canada's Energy Future: Energy Supply and Demand Projections to 2035*, Nov. 2011; US EIA, *2012 Annual Energy Outlook (Early Release)*, Jan. 2012.
[14] Each forecast is adjusted for inflation in constant 2010 US$.

2012 GAS OUTLOOK - REGIONAL SYSTEM CAPACITY

KEY CONCLUSIONS

- The existing system of natural gas pipelines and storage facilities in the Northwest has reliably served the load requirements of the region. A number of regional pipeline and storage expansions have been undertaken when needed to maintain reliability.
- Based on current data and assumptions, peak day demand could approach or exceed the region's infrastructure capacity within the forecast horizon.
- The changing nature of the region's natural gas demand will have implications for how existing gas infrastructure is utilized and the timing and type of expansions or additions.

Figure 13. Key Infrastructure in the Pacific Northwest



Source: Northwest Gas Association - Numbers indicate delivery or takeaway capacities in MDth.

A CLOSER LOOK

The Pacific Northwest's 48,000-mile network of transmission and distribution pipelines safely and reliably serves more than 3.2 million natural gas customers. Combined with underground and peak storage facilities (Table 2), the region's natural gas infrastructure is currently capable of delivering more than 6.5 million Dth/day of gas at peak capacity.

Because natural gas utilities are committed to preventing service disruptions regardless of the circumstances, they design their systems to accommodate extreme but still possible weather conditions (peak or design days).

Figure 14 aggregates the design days of NWGA members located in the I-5 Corridor and BC (where most of the region's population resides) and plots them against available capacity. Under the base and high cases, peak day demand could begin to stress the system, approaching or exceeding the region's infrastructure capacity within the forecast horizon.

A few notes are in order concerning Figure 14. While the probability of design days occurring in every system across the region on the same day ("coincidental peak day") is small, the possibility of very cold weather occurring simultaneously along the I-5 Corridor is reasonably high. Furthermore, Figure 14 assumes that existing capacity in the region is operating at 100 percent deliverability.[15] Figure 14 also assumes that gas will not flow on a peak day to customers without firm pipeline transportation contracts (typically industrial users or electricity generators with alternate fuels).

[15] Regional capacity includes all existing facilities, including Fortis BC's Mt. Hayes peak LNG facility, which came online in 2011. Proposed projects are not included in capacity.

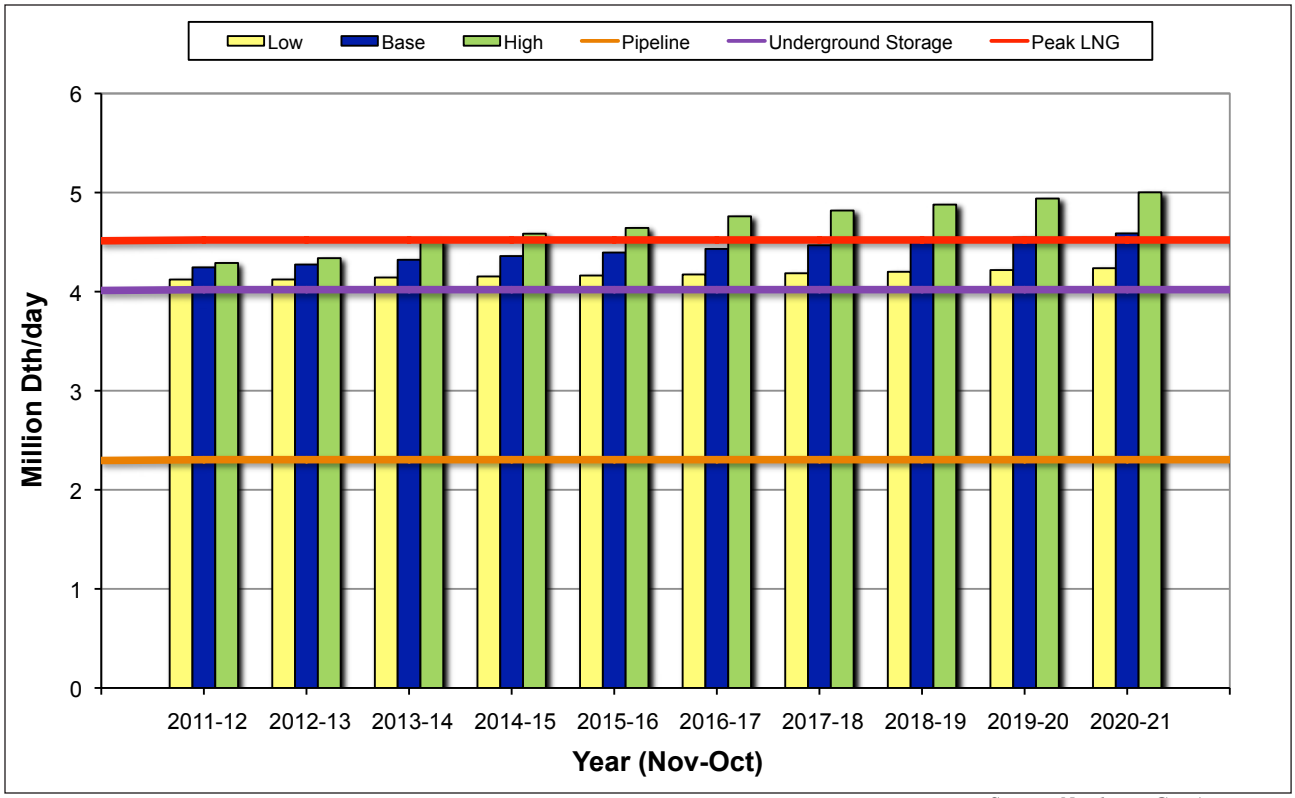
Table 2. Regional Storage Facilities

Facility	Owner	Type	Capacity[1] (MDth)	Max Withdrawal (MDth/day)
Jackson Prairie, WA	Avista, PSE, NW Pipeline	Underground	25,448	1,196 [2]
Mist, OR	NW Natural	Underground	16,100	520 [2]
	Underground Subtotal		41,548	1,716
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	FortisBC Energy	LNG	585	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	FortisBC Energy	LNG	1,540	154
	LNG/LPG Subtotal		6,862	866
	TOTAL STORAGE		**48,410**	**2,582**

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

Source: Northwest Gas Association

Figure 14. I-5 Peak Day



Source: Northwest Gas Association

Finally, the states of Oregon and Washington have negotiated two coal plant closures in the region within the planning horizon (Boardman in 2020 and Centralia in two phases, 2020 and 2025). Plant owners have announced their intent to use natural gas-fired generation to replace some or all of the output of those plants. The replacement plants are not included in Figure 14 because utilities have just begun their planning and the type and size of the plants that may be built have not been determined. However, if these plants are built, they will represent significant gas volumes that would require capacity within the forecast period.

Analyses such as the above help send signals to the market of an impending need for additional capacity. Market participants weigh the probability of disruptions and the costs of various infrastructure options to make decisions about what is needed and when.

In response to market signals, several projects have been proposed to accommodate future delivery capacity needs. The first completed – the 683-mile Ruby Pipeline built by El Paso Natural Gas – began operating in July 2011, connecting the Opal trading hub in southwestern Wyoming to the Malin trading hub at the California-Oregon border. Ruby's 1.5 Bcf/d capacity brings gas supply diversity to Northern California and Eastern Oregon and Washington by providing additional access to the prolific Rockies supply basin.

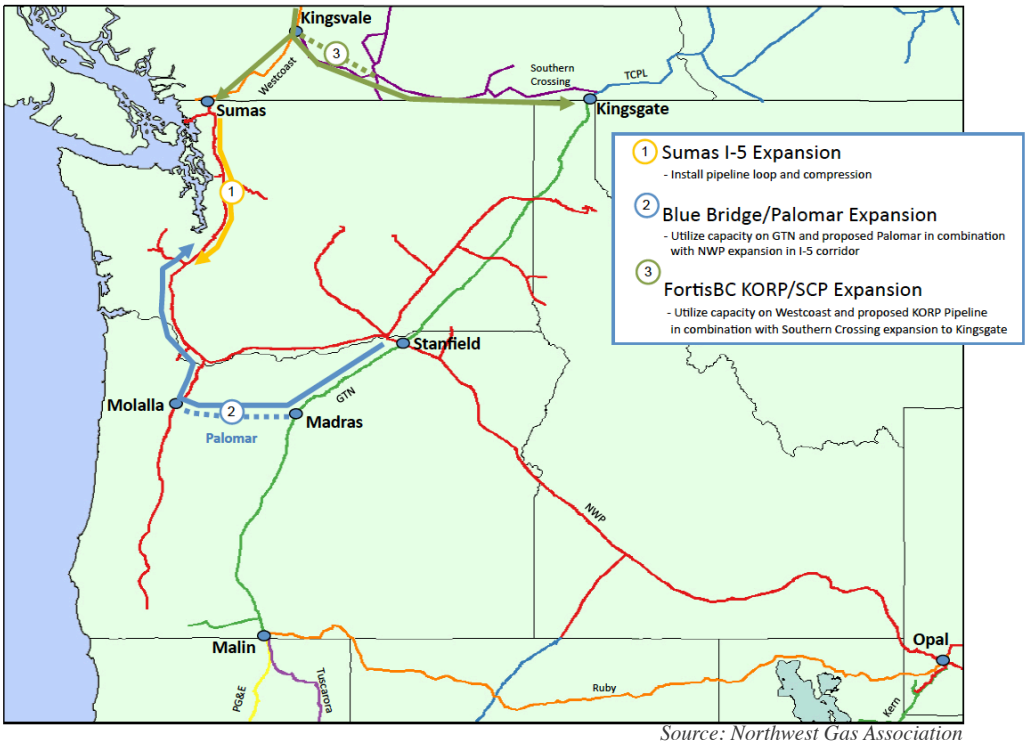
Reductions in projected demand and a slow economic recovery have canceled or deferred several of the other projects. However, it is only a matter of time before new capacity within the region will be required. Figure 15 illustrates the active proposals, which include:

Sumas I-5 Expansion - Williams Northwest Pipeline (NWP) continues to explore options to expand transportation service from Sumas, WA to markets along the I-5 corridor. The expansion would involve looping sections of 36-inch diameter pipeline with the existing pipeline, plus additional compression at existing compressor stations along the I-5 corridor. Actual miles of pipe and incremental compression added will depend on incremental volume and delivery pattern, but can be readily scaled to meet market demand.

Blue Bridge/Palomar Expansion –Williams Northwest Pipeline (NWP) is working with the current Palomar pipeline project sponsors – NW Natural and TransCanada GTN – to develop the Cascade (eastern) section of Palomar in conjunction with an expansion of the existing NWP system. The Cascade section of Palomar would consist of a 106-mile, 30-inch diameter pipeline that would run from GTN's mainline in central Oregon to a NW Natural/NWP hub near Molalla, Oregon – enhancing delivery capacity to the I-5 Corridor. Palomar would be a bi-directional pipeline with an initial capacity of approximately 300 million cubic feet per day (MMcf/d), expandable up to 750 MMcf/d. It would be linked to an expansion on the existing NWP system to deliver gas to other markets along the I-5 corridor.

FortisBC Kingsvale-Oliver Reinforcement Expansion – FortisBC and Spectra Energy are considering a 100-mile, 24-inch expansion project from Kingsvale to Oliver, BC to expand service to Pacific Northwest and California markets. Removing constraints will allow expansion of Spectra's T-South Enhanced Service offering, which provides shippers with the options of delivering to Sumas or the Kingsgate market. Expansion of the bi-directional Southern Crossing system would increase capacity at Sumas during peak demand periods. Initial capacity from the Spectra system to Kingsgate would be 300 MMcf/d, expandable to 450 MMcf/d. Expanded east-to-west flow capability will increase delivery of supply into Sumas to serve the I-5 Corridor by an additional 150 MMcf/d.

Figure 15. Proposed Pipeline Projects



Source: Northwest Gas Association

NOTES ON REGIONAL NATURAL GAS SYSTEM CAPACITY

NWGA members continuously monitor a number of dynamics to ensure that regional natural gas consumers have the gas they need when and where they need it, including:

- When, where and how much natural gas the region will require to generate electricity (and support intermittent renewable sources of generation).
- Impacts of the region's changing load profile on the existing natural gas infrastructure.
- Not if but when new or expanded infrastructure will be needed. Projects take time to develop, so foresight is imperative.

2012 Appendices

Northwest Gas Association
2012 Natural Gas Outlook
Peak Day Capacity

SUPPLY	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
Pipeline Interconnects	**3,942,149**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**	**3,932,459**
WCSB via TCPL/GTN	**1,463,884**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**	**1,454,194**
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	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*	*444,253*
Kingsgate/Yahk BC Interior from TCPL	*196,631*	*186,941*	*186,941*	*186,941*	*186,941*	*186,941*	*186,941*	*186,941*	*186,941*	*186,941*
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*
Storage	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**	**2,582,808**
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
Mist Storage (NWN)	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000
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 (FortisBC)	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466
Mt. Hayes LNG (FortisBC)	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042
Total Available Supply	6,524,957	6,515,267	6,515,267	6,515,267	6,515,267	6,515,267	6,515,267	6,515,267	6,515,267	6,515,267

Northwest Gas Association
2012 Natural Gas Outlook
Annual Demand Summary (Dth) - Base Case

Region/Sector	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Mainland & Van. Island	**144,230,428**	**142,889,136**	**143,254,955**	**143,656,480**	**143,954,063**	**144,262,632**	**144,591,862**	**144,938,228**	**145,302,383**	**145,685,006**
Residential	54,679,629	54,664,103	54,643,114	54,658,399	54,645,932	54,619,963	54,596,321	54,575,082	54,556,331	54,540,153
Commercial (Sales)	38,854,033	39,176,189	39,503,700	39,834,264	40,169,339	40,508,027	40,860,899	41,228,504	41,611,411	42,010,211
Industrial (Transport & Interruptible)	30,694,402	30,760,642	30,889,366	30,971,552	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770
Power Generation	20,002,364	18,288,202	18,218,774	18,192,265	18,166,022	18,161,871	18,161,871	18,161,871	18,161,871	18,161,871
W. Washington	**253,856,136**	**261,258,818**	**270,443,584**	**271,901,158**	**274,609,952**	**273,743,249**	**278,279,643**	**280,575,298**	**277,086,857**	**277,529,658**
Residential	70,337,163	71,868,314	73,351,825	74,786,049	76,474,212	77,592,772	78,976,039	80,367,645	82,089,987	83,286,772
Commercial (Sales)	42,518,235	43,494,798	44,392,511	45,172,592	45,950,960	46,361,902	46,921,653	47,521,674	48,343,097	48,853,277
Industrial (Transport)	74,979,764	78,807,932	79,595,016	79,566,825	79,598,815	79,372,283	79,253,224	79,139,977	79,119,262	78,978,516
Power Generation	66,020,974	67,087,773	73,104,232	72,375,692	72,585,965	70,416,292	73,128,726	73,546,001	67,534,511	66,411,093
W. Oregon	**123,257,234**	**126,750,625**	**129,286,535**	**131,036,934**	**132,087,238**	**132,486,834**	**133,203,184**	**133,963,393**	**135,055,527**	**136,120,475**
Residential	37,817,784	37,956,616	38,371,094	38,890,045	39,637,995	40,181,710	40,891,371	41,603,778	42,484,384	43,370,124
Commercial (Sales)	23,499,533	23,361,116	23,335,383	23,332,670	23,403,568	23,294,759	23,300,799	23,348,173	23,517,690	23,678,574
Industrial (Transport & Interruptible)	41,939,917	45,432,893	47,580,058	48,814,219	49,045,675	49,010,365	49,011,014	49,011,441	49,053,454	49,071,778
Power Generation	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
BC Interior	**49,799,561**	**49,713,313**	**49,493,423**	**49,504,415**	**49,481,952**	**49,461,001**	**49,450,907**	**49,434,715**	**49,429,938**	**49,431,156**
Residential	16,638,159	16,568,842	16,506,661	16,445,783	16,377,871	16,309,233	16,240,908	16,172,895	16,105,192	16,037,799
Commercial (Sales)	10,140,493	10,181,300	10,223,787	10,267,521	10,312,507	10,360,195	10,418,426	10,470,247	10,533,172	10,601,783
Industrial (Transport & Interruptible)	23,020,909	22,963,171	22,762,975	22,791,111	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	**92,935,737**	**92,793,975**	**93,711,847**	**95,042,932**	**97,309,146**	**99,046,651**	**100,559,296**	**102,262,646**	**106,241,310**	**107,481,282**
Residential	17,941,006	18,149,436	18,305,518	18,537,073	18,962,668	19,253,261	19,589,693	19,938,110	20,320,619	20,616,056
Commercial (Sales)	13,253,779	13,581,315	13,797,513	14,024,045	14,303,632	14,495,624	14,714,524	14,939,129	15,187,291	15,364,731
Industrial (Transport & Interruptible)	28,725,625	28,789,878	29,022,595	29,241,453	29,351,457	29,507,997	29,685,436	29,863,933	30,049,386	30,226,730
Power Generation	33,015,327	32,273,347	32,586,221	33,240,361	34,691,389	35,789,771	36,569,644	37,521,475	40,684,014	41,273,765
E. Oregon & Medford	**99,550,108**	**99,067,865**	**100,101,328**	**101,163,039**	**104,285,696**	**105,837,846**	**107,065,948**	**108,491,284**	**112,136,666**	**112,470,534**
Residential	7,630,346	7,926,540	8,097,848	8,262,317	8,464,636	8,643,913	8,832,706	9,021,821	9,225,420	9,394,426
Commercial (Sales)	5,584,104	5,820,511	5,911,371	6,003,280	6,109,120	6,198,304	6,293,893	6,389,437	6,494,296	6,574,032
Industrial (Transport & Interruptible)	9,572,001	9,542,343	9,565,813	9,582,032	9,597,893	9,613,936	9,629,373	9,642,163	9,656,997	9,679,389
Power Generation	76,763,658	75,778,472	76,526,295	77,315,409	80,114,046	81,381,693	82,309,976	83,437,864	86,759,953	86,822,687
S. Idaho	**57,264,286**	**60,960,197**	**62,177,472**	**60,983,354**	**62,900,239**	**63,557,593**	**63,482,258**	**64,022,012**	**64,397,763**	**64,778,417**
Residential	21,023,838	20,895,600	20,969,035	21,193,812	21,436,566	21,678,012	21,915,851	22,158,506	22,406,502	22,657,734
Commercial (Sales)	10,830,462	10,764,400	10,802,230	10,918,025	11,043,080	11,167,461	11,289,984	11,414,988	11,542,743	11,672,166
Industrial (Transport & Interruptible)	22,996,223	23,223,721	23,906,208	22,371,517	23,920,593	24,212,120	23,776,423	23,948,518	23,948,518	23,948,518
Power Generation	2,413,763	6,076,476	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000
PNW Annual Demand - Base	**820,893,491**	**833,433,930**	**848,469,144**	**853,288,312**	**864,628,284**	**868,395,807**	**876,633,098**	**883,687,576**	**889,650,445**	**893,496,528**
Residential	226,067,925	228,029,451	230,245,095	232,773,479	235,999,879	238,278,864	241,042,888	243,837,837	247,188,435	249,903,064
Commercial (Sales)	144,680,640	146,379,629	147,966,495	149,552,397	151,292,205	152,386,271	153,800,178	155,312,152	157,229,700	158,754,773
Industrial (Transport & Interruptible)	231,928,841	239,520,580	243,322,032	243,338,708	245,278,778	245,481,045	245,119,815	245,370,376	245,591,960	245,669,274
Power Generation	218,216,086	219,504,270	226,935,522	227,623,728	232,057,422	232,249,627	236,670,217	239,167,211	239,640,350	239,169,416

Northwest Gas Association
2012 Natural Gas Outlook
Annual Demand Summary (Dth) - High Case

Region/Sector	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Mainland & Van. Island	**145,298,798**	**144,978,939**	**146,385,457**	**147,839,255**	**149,129,471**	**150,468,587**	**151,846,468**	**153,259,816**	**154,710,133**	**156,198,903**
Residential	55,244,308	55,794,884	56,346,961	56,934,238	57,477,617	58,030,720	58,591,557	59,160,334	59,737,267	60,322,585
Commercial (Sales)	39,230,536	39,939,123	40,663,268	41,400,886	42,153,719	42,932,228	43,737,104	44,569,531	45,430,750	46,322,062
Industrial (Transport & Interruptible)	30,694,402	30,760,642	30,889,366	30,971,552	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770
Power Generation	20,129,553	18,484,291	18,485,863	18,532,579	18,525,365	18,532,869	18,545,037	18,557,180	18,569,345	18,581,486
W. Washington	**256,241,152**	**264,473,238**	**285,204,057**	**290,234,036**	**293,425,978**	**301,166,854**	**307,984,924**	**312,480,109**	**306,686,293**	**307,033,171**
Residential	70,875,917	72,814,583	74,715,410	76,594,591	78,755,014	80,356,517	82,245,211	84,162,161	86,445,228	88,198,581
Commercial (Sales)	42,987,108	44,272,221	45,473,146	46,565,528	47,664,853	48,393,743	49,285,379	50,229,117	51,416,264	52,283,188
Industrial (Transport)	76,357,152	80,298,660	81,210,999	81,294,105	81,436,163	81,314,410	81,301,851	81,294,654	81,383,403	81,345,512
Power Generation	66,020,974	67,087,773	83,804,502	85,779,813	85,569,949	91,102,185	95,152,484	96,794,177	87,441,399	85,205,889
W. Oregon	**125,787,561**	**129,908,638**	**133,135,776**	**135,416,476**	**136,879,285**	**137,643,577**	**138,652,918**	**139,662,338**	**140,985,463**	**142,019,372**
Residential	38,277,025	38,668,569	39,367,997	40,185,724	41,199,785	41,998,964	42,915,813	43,802,955	44,842,212	45,834,063
Commercial (Sales)	23,899,966	23,921,075	24,070,937	24,239,810	24,446,029	24,448,514	24,540,604	24,662,699	24,902,736	24,926,470
Industrial (Transport & Interruptible)	43,610,569	47,318,994	49,696,842	50,990,942	51,233,471	51,196,099	51,196,501	51,196,683	51,240,515	51,258,840
Power Generation	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
BC Interior	**50,071,103**	**50,257,492**	**50,315,541**	**50,600,311**	**50,848,562**	**51,108,583**	**51,376,341**	**51,652,294**	**51,936,941**	**52,230,829**
Residential	16,810,225	16,912,350	17,023,230	17,133,201	17,229,277	17,330,788	17,432,925	17,535,691	17,639,090	17,743,127
Commercial (Sales)	10,239,970	10,381,971	10,527,440	10,675,999	10,827,711	10,986,222	11,151,843	11,325,030	11,506,278	11,696,130
Industrial (Transport & Interruptible)	23,020,909	22,963,171	22,764,871	22,791,111	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	**111,847,036**	**112,691,654**	**114,309,609**	**116,642,237**	**123,861,837**	**122,883,729**	**126,234,505**	**130,028,110**	**130,511,760**	**130,881,722**
Residential	19,193,491	19,570,024	19,916,291	20,352,875	20,762,447	21,123,831	21,528,413	21,974,720	22,456,118	23,036,077
Commercial (Sales)	14,618,026	15,224,226	15,658,282	16,141,995	16,592,734	17,013,051	17,458,516	17,933,199	18,443,804	19,031,883
Industrial (Transport & Interruptible)	29,277,308	29,339,562	29,582,970	29,812,237	29,933,700	30,101,181	30,290,679	30,482,278	30,679,850	30,869,776
Power Generation	48,758,211	48,557,842	49,152,065	50,335,130	56,572,956	54,645,666	56,956,897	59,637,914	58,931,988	57,943,986
E. Oregon & Medford	**113,273,267**	**115,074,303**	**116,742,489**	**117,296,435**	**119,702,692**	**120,590,686**	**121,988,018**	**123,293,422**	**124,796,008**	**124,836,267**
Residential	8,078,885	8,547,390	8,862,141	9,190,111	9,525,937	9,856,306	10,182,376	10,499,678	10,847,190	11,197,977
Commercial (Sales)	5,887,871	6,215,016	6,365,178	6,514,267	6,663,540	6,807,317	6,954,216	7,099,445	7,262,528	7,417,794
Industrial (Transport & Interruptible)	9,811,397	9,779,801	9,808,099	9,828,847	9,849,657	9,870,902	9,891,484	9,909,386	9,930,047	9,958,285
Power Generation	89,495,113	90,532,096	91,707,072	91,763,211	93,663,558	94,056,161	94,959,942	95,784,913	96,756,242	96,262,211
S. Idaho	**58,639,821**	**62,618,097**	**64,202,934**	**63,299,639**	**65,557,709**	**66,566,484**	**66,852,240**	**67,764,709**	**68,524,855**	**68,951,636**
Residential	21,931,691	21,989,814	22,305,839	22,722,561	23,190,496	23,663,880	24,140,040	24,628,686	25,130,382	25,412,058
Commercial (Sales)	11,298,144	11,328,086	11,490,887	11,705,562	11,946,619	12,190,484	12,435,778	12,687,505	12,945,955	13,091,060
Industrial (Transport & Interruptible)	22,996,223	23,223,721	23,906,208	22,371,517	23,920,593	24,212,120	23,776,423	23,948,518	23,948,518	23,948,518
Power Generation	2,413,763	6,076,476	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000
PNW Annual Demand - High	**861,158,737**	**880,002,362**	**910,295,863**	**921,328,389**	**939,405,534**	**950,428,500**	**964,935,414**	**978,140,797**	**978,151,452**	**982,151,900**
Residential	230,411,543	234,297,613	238,537,868	243,113,300	248,140,574	252,361,006	257,036,334	261,764,224	267,097,489	271,744,468
Commercial (Sales)	148,161,621	151,281,720	154,249,137	157,244,046	160,295,205	162,771,557	165,563,440	168,506,526	171,908,314	174,768,587
Industrial (Transport & Interruptible)	235,767,960	243,684,551	247,859,355	248,060,311	250,137,927	250,459,055	250,221,282	250,595,862	250,946,677	251,145,274
Power Generation	246,817,613	250,738,478	269,649,502	272,910,733	280,831,829	284,836,881	292,114,359	297,274,184	288,198,973	284,493,572

Northwest Gas Association
2012 Natural Gas Outlook
Annual Demand Summary (Dth) - Low Case

Region/Sector	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Mainland & Van. Island	**142,768,402**	**139,989,923**	**138,945,876**	**137,942,961**	**136,791,311**	**135,681,221**	**134,600,466**	**133,546,081**	**132,517,218**	**131,563,522**
Residential	53,862,132	53,038,494	52,223,282	51,448,161	50,640,281	49,849,186	49,072,621	48,310,365	47,562,205	46,827,935
Commercial (Sales)	38,258,497	37,984,626	37,715,481	37,448,705	37,185,618	36,934,891	36,696,106	36,469,258	36,254,344	36,051,369
Industrial (Transport & Interruptible)	30,694,402	30,760,642	30,889,366	30,971,552	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770	30,972,770
Power Generation	19,953,371	18,206,162	18,117,747	18,074,542	17,992,641	17,924,373	17,858,969	17,793,688	17,727,898	17,711,447
W. Washington	**249,694,002**	**256,072,362**	**264,473,373**	**265,140,483**	**267,035,492**	**265,371,975**	**269,091,394**	**270,564,520**	**266,217,932**	**265,825,951**
Residential	69,936,097	70,940,486	72,041,656	73,073,787	74,337,353	75,031,012	75,976,586	76,925,362	78,183,627	78,920,848
Commercial (Sales)	42,130,649	42,732,288	43,349,931	43,847,213	44,338,902	44,473,511	44,749,480	45,063,196	45,585,390	45,807,310
Industrial (Transport)	71,606,282	75,311,815	75,977,555	75,843,791	75,773,273	75,451,159	75,236,603	75,029,962	74,914,403	74,686,700
Power Generation	66,020,974	67,087,773	73,104,232	72,375,692	72,585,965	70,416,292	73,128,726	73,546,001	67,534,511	66,411,093
W. Oregon	**120,990,642**	**123,849,743**	**125,750,547**	**127,053,109**	**127,716,712**	**127,807,917**	**128,272,567**	**128,859,843**	**129,835,076**	**130,839,001**
Residential	37,543,015	37,447,098	37,630,044	37,920,727	38,438,789	38,778,179	39,327,954	39,933,532	40,749,675	41,596,384
Commercial (Sales)	23,223,032	22,901,170	22,702,577	22,541,134	22,466,751	22,252,528	22,166,886	22,147,949	22,267,005	22,418,017
Industrial (Transport & Interruptible)	40,224,596	43,501,476	45,417,926	46,591,248	46,811,173	46,777,210	46,777,728	46,778,363	46,818,396	46,824,601
Power Generation	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000	20,000,000
BC Interior	**49,394,657**	**48,909,535**	**48,298,313**	**47,921,740**	**47,512,263**	**47,117,828**	**46,734,246**	**46,361,439**	**45,999,348**	**45,647,929**
Residential	16,389,023	16,075,434	15,775,439	15,479,491	15,176,105	14,882,977	14,595,535	14,313,668	14,037,268	13,766,228
Commercial (Sales)	9,984,726	9,870,930	9,759,899	9,651,137	9,544,586	9,443,278	9,347,137	9,256,197	9,170,507	9,090,127
Industrial (Transport & Interruptible)	23,020,909	22,963,171	22,762,975	22,791,111	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573	22,791,573
Power Generation	-	-	-	-	-	-	-	-	-	-
E. Washington & N. Idaho	**85,800,953**	**85,146,784**	**85,532,992**	**86,526,795**	**87,016,854**	**87,438,303**	**87,495,123**	**88,453,544**	**88,356,967**	**91,383,115**
Residential	17,598,573	17,204,101	16,910,474	16,815,611	16,836,724	16,753,417	16,630,711	16,557,919	16,512,111	18,878,931
Commercial (Sales)	13,162,766	13,253,193	13,252,002	13,348,338	13,502,735	13,559,074	13,654,313	13,771,633	13,934,730	14,595,886
Industrial (Transport & Interruptible)	27,130,179	27,178,174	27,400,604	27,607,650	27,706,456	27,853,568	28,021,601	28,191,129	28,367,168	28,633,336
Power Generation	27,909,436	27,511,315	27,969,911	28,755,196	28,970,939	29,272,243	29,188,497	29,932,863	29,542,959	29,274,962
E. Oregon & Medford	**87,953,820**	**87,987,063**	**89,317,450**	**90,639,128**	**91,589,622**	**92,122,008**	**92,048,293**	**93,189,035**	**92,168,509**	**92,215,052**
Residential	7,529,896	7,610,621	7,704,928	7,805,141	7,924,198	8,013,249	8,114,079	8,198,307	8,296,040	8,385,287
Commercial (Sales)	5,526,376	5,623,147	5,657,666	5,692,979	5,731,628	5,762,806	5,792,738	5,813,108	5,846,283	5,867,618
Industrial (Transport & Interruptible)	8,899,101	8,878,449	8,881,598	8,892,253	8,903,311	8,913,770	8,924,106	8,932,485	8,943,058	8,959,811
Power Generation	65,998,446	65,874,846	67,073,258	68,248,755	69,030,485	69,432,183	69,217,370	70,245,134	69,083,127	69,002,335
S. Idaho	**56,697,700**	**60,040,929**	**61,020,207**	**59,544,612**	**61,164,156**	**61,520,495**	**61,140,952**	**61,372,268**	**61,435,314**	**61,782,868**
Residential	20,649,892	20,288,884	20,205,240	20,244,243	20,290,752	20,333,527	20,370,589	20,409,675	20,451,285	20,680,671
Commercial (Sales)	10,637,823	10,451,849	10,408,760	10,428,852	10,452,812	10,474,847	10,493,940	10,514,075	10,535,511	10,653,679
Industrial (Transport & Interruptible)	22,996,223	23,223,721	23,906,208	22,371,517	23,920,593	24,212,120	23,776,423	23,948,518	23,948,518	23,948,518
Power Generation	2,413,763	6,076,476	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000	6,500,000
PNW Annual Demand - Low	**793,300,177**	**801,996,340**	**813,338,759**	**814,768,827**	**818,826,411**	**817,059,746**	**819,383,041**	**822,346,732**	**816,530,364**	**819,257,437**
Residential	223,508,627	222,605,116	222,491,063	222,787,162	223,644,201	223,641,548	224,088,074	224,648,828	225,792,211	229,056,284
Commercial (Sales)	142,923,869	142,817,204	142,846,317	142,958,359	143,223,030	142,900,936	142,900,600	143,035,417	143,593,770	144,484,006
Industrial (Transport & Interruptible)	224,571,691	231,817,447	235,236,232	235,069,122	236,879,150	236,972,171	236,500,804	236,644,800	236,755,887	236,817,309
Power Generation	202,295,990	204,756,573	212,765,148	213,954,184	215,080,030	213,545,092	215,893,563	218,017,687	210,388,496	208,899,838

Northwest Gas Association
2012 Natural Gas Outlook
I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Base Case

DEMAND (Region/Sector)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Main & Van. Island (I-5 Corridor)	**1,390,697**	**1,394,682**	**1,398,704**	**1,403,089**	**1,407,033**	**1,411,212**	**1,415,607**	**1,420,226**	**1,425,077**	**1,430,170**
Residential	591,542	591,632	591,687	592,061	591,932	591,860	591,824	591,825	591,864	591,944
Commercial (Firm Sales & Transport)	415,393	419,288	423,255	427,266	431,339	435,590	440,021	444,639	449,450	454,464
Industrial (Firm Sales & Transport)	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164
Power Generation	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598
W. Washington (I-5 Corridor)	**1,867,894**	**1,889,431**	**1,928,246**	**1,954,088**	**1,978,489**	**2,001,204**	**2,023,206**	**2,045,533**	**2,068,517**	**2,092,775**
Residential	803,403	817,799	835,499	852,773	869,432	885,765	901,883	918,203	934,750	951,932
Commercial (Firm Sales & Transport)	329,329	336,011	344,931	353,900	362,062	368,939	375,328	381,846	388,784	396,342
Industrial (Firm Sales & Transport)	276,814	277,272	289,468	289,066	288,647	288,150	287,646	287,135	286,633	286,152
Power Generation	458,349	458,349	458,349	458,349	458,349	458,349	458,349	458,349	458,349	458,349
W. Oregon (I-5 Corridor)	**986,444**	**989,505**	**994,347**	**1,001,952**	**1,009,183**	**1,018,909**	**1,029,421**	**1,040,886**	**1,052,789**	**1,064,859**
Residential	573,984	576,808	581,517	588,251	595,514	605,235	615,250	625,657	635,969	646,432
Commercial (Firm Sales & Transport)	288,886	287,492	286,741	286,719	286,447	286,491	287,005	288,081	289,668	291,272
Industrial (Firm Sales & Transport)	36,574	38,206	39,090	39,981	40,222	40,183	40,166	40,148	40,151	40,155
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	4,245,035	4,273,619	4,321,297	4,359,128	4,394,705	4,431,325	4,468,234	4,506,645	4,546,383	4,587,804
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
Underground Storage	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**
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
Mist Storage (NWN)	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000
Peak LNG	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**
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 (FortisBC)	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466
Mt. Hayes LNG (FortisBC)	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042
Total Supply	**4,521,568**	**4,521,569**	**4,521,570**	**4,521,571**	**4,521,572**	**4,521,573**	**4,521,574**	**4,521,575**	**4,521,576**	**4,521,577**
Supply Surplus/**(Shortfall)**	276,533	247,950	200,272	162,442	126,866	90,247	53,340	14,930	(24,808)	(66,227)

Northwest Gas Association
2012 Natural Gas Outlook
I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - High Case

DEMAND (Region/Sector)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Main & Van. Island (I-5 Corridor)	**1,400,830**	**1,415,127**	**1,429,647**	**1,444,727**	**1,459,542**	**1,474,793**	**1,490,471**	**1,506,593**	**1,523,180**	**1,540,249**
Residential	597,520	603,648	609,804	616,351	622,442	628,651	634,959	641,370	647,887	654,513
Commercial (Firm Sales & Transport)	419,548	427,717	436,080	444,614	453,338	462,380	471,750	481,461	491,531	501,975
Industrial (Firm Sales & Transport)	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164
Power Generation	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598
W. Washington (I-5 Corridor)	**1,892,022**	**1,918,178**	**2,079,044**	**2,110,564**	**2,140,853**	**2,228,056**	**2,256,312**	**2,285,098**	**2,314,802**	**2,345,061**
Residential	809,534	826,786	847,876	868,884	889,474	909,924	930,277	950,954	972,036	993,235
Commercial (Firm Sales & Transport)	333,630	341,935	352,606	363,382	373,387	382,136	390,434	398,944	407,961	417,394
Industrial (Firm Sales & Transport)	290,509	291,107	303,438	303,174	302,869	302,484	302,089	301,689	301,292	300,920
Power Generation	458,349	458,349	575,124	575,124	575,124	633,512	633,512	633,512	633,512	633,512
W. Oregon (I-5 Corridor)	**996,356**	**1,004,616**	**1,015,544**	**1,029,398**	**1,042,537**	**1,057,254**	**1,071,807**	**1,086,785**	**1,101,632**	**1,116,704**
Residential	576,995	582,898	591,385	602,025	613,228	626,465	639,308	652,161	664,496	677,025
Commercial (Firm Sales & Transport)	291,441	291,930	293,354	295,427	297,109	298,629	300,357	302,500	305,009	307,548
Industrial (Firm Sales & Transport)	40,920	42,789	43,806	44,947	45,200	45,159	45,142	45,123	45,127	45,131
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	**4,289,208**	**4,337,921**	**4,524,235**	**4,584,690**	**4,642,932**	**4,760,103**	**4,818,590**	**4,878,476**	**4,939,613**	**5,002,014**
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
Underground Storage	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**
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
Mist Storage (NWN)	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000
Peak LNG	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**
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 (FortisBC)	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466
Mt. Hayes LNG (FortisBC)	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042
Total Supply	**4,521,568**	**4,521,569**	**4,521,570**	**4,521,571**	**4,521,572**	**4,521,573**	**4,521,574**	**4,521,575**	**4,521,576**	**4,521,577**
Supply Surplus/**(Shortfall)**	**232,360**	**183,648**	**(2,665)**	**(63,119)**	**(121,360)**	**(238,530)**	**(297,016)**	**(356,902)**	**(418,037)**	**(480,438)**

Northwest Gas Association
2012 Natural Gas Outlook
I-5 Corridor Peak Day Demand/Supply Balance (Dth/day) - Low Case

DEMAND (Region/Sector)	2011-12	2012-13	2013-14	2014-15	2015-16	2016-17	2017-18	2018-19	2019-20	2020-21
BC Lower Main & Van. Island (I-5 Corridor)	**1,375,497**	**1,364,399**	**1,353,444**	**1,342,944**	**1,332,134**	**1,321,649**	**1,311,463**	**1,301,572**	**1,291,976**	**1,282,672**
Residential	582,574	573,835	565,190	556,979	548,422	540,049	531,838	523,786	515,890	508,150
Commercial (Firm Sales & Transport)	409,160	406,802	404,491	402,202	399,950	397,838	395,863	394,025	392,324	390,760
Industrial (Firm Sales & Transport)	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164	122,164
Power Generation	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598	261,598
W. Washington (I-5 Corridor)	**1,811,657**	**1,828,294**	**1,861,507**	**1,881,459**	**1,900,011**	**1,916,624**	**1,932,685**	**1,949,036**	**1,966,129**	**1,984,200**
Residential	800,138	811,427	825,433	838,725	851,436	863,517	875,643	887,974	900,648	913,745
Commercial (Firm Sales & Transport)	327,542	332,624	339,753	346,892	353,265	358,355	362,898	367,528	372,549	378,099
Industrial (Firm Sales & Transport)	267,634	267,901	279,978	279,499	278,967	278,410	277,801	277,191	276,590	276,013
Power Generation	416,343	416,343	416,343	416,343	416,343	416,343	416,343	416,343	416,343	416,343
W. Oregon (I-5 Corridor)	**935,060**	**929,929**	**927,627**	**928,668**	**930,396**	**934,914**	**941,218**	**949,653**	**959,589**	**969,658**
Residential	568,919	566,833	567,093	569,725	573,296	579,336	586,415	594,710	603,683	612,784
Commercial (Firm Sales & Transport)	285,015	280,575	277,263	275,029	272,958	271,473	270,714	270,872	271,831	272,796
Industrial (Firm Sales & Transport)	31,126	32,520	33,270	33,913	34,142	34,105	34,089	34,072	34,075	34,078
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	**4,122,214**	**4,122,622**	**4,142,578**	**4,153,070**	**4,162,540**	**4,173,188**	**4,185,366**	**4,200,261**	**4,217,694**	**4,236,530**
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
Underground Storage	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**	**1,716,000**
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
Mist Storage (NWN)	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000	520,000
Peak LNG	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**	**501,508**
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 (FortisBC)	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466	155,466
Mt. Hayes LNG (FortisBC)	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042	153,042
Total Supply	**4,521,568**	**4,521,569**	**4,521,570**	**4,521,571**	**4,521,572**	**4,521,573**	**4,521,574**	**4,521,575**	**4,521,576**	**4,521,577**
Supply Surplus/**(Shortfall)**	399,354	398,947	378,992	368,500	359,032	348,384	336,208	321,313	303,881	285,047