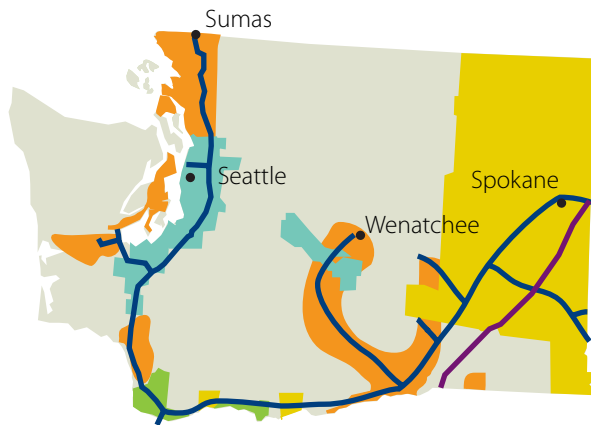


Natural Gas Fact Sheet Washington

Natural gas is a fundamental fuel for Washington's economic and environmental future. Heating homes, powering businesses, moving vehicles

and serving as a key component in many of our most vital

industrial processes. Read on for an overview of Natural Gas' role in our state, the key attributes of this clean and abundant fuel and opportunities available to increase utilization of this domestically sourced resource.



Washington's Natural Gas System

Legend

- Avista Corporation
- Cascade Natural Gas
- NW Natural
- Puget Sound Energy
- TransCanada's GTN System
- Williams Northwest Pipeline

Overview

Washington relies on four utilities to supply natural gas throughout the state. Two large transmission pipelines provide reliable gas transport to, and through, our region from major supply basins in the Rockies, Northern Alberta and Northern British Columbia.

These utilities and pipelines are major Washington employers; their joint in-state workforces total more than 4,500 individuals serving well over one million residential, commercial and industrial natural gas customers.

Utilities in Washington earn the majority of their revenue based on the service and delivery fees they charge to deliver natural gas safely to homes and businesses. The commodity cost of natural gas is largely passed on at-cost to consumers.

More Supply = Lower Costs for Washington's Consumers

As the commodity cost of natural gas has decreased, due to new supply from shale, Washington consumers have reaped the benefits through rate reductions and a stable pricing outlook.

According to a 2014 study by IHS CERA and the American Gas Foundation, low natural gas prices driven by America's abundance of domestic natural gas are expected to increase per-household income in the U.S. by \$2,000 by 2015 and more than \$3,500 by 2025. Price projections have remained low since the study was completed.

Natural gas is a key process fuel for some of Washington's largest and most vital industries, including:

- **Aerospace Product & Parts Manufacturing:** 70,865 Washington employees
- **Food Processing:** 34,295 Washington employees
- **Manufacture of Primary & Fabricated Metal Products:** 21,396 Washington employees
- **Manufacture of Wood & Paper Products:** 19,178 Washington employees

Source: 2015 BLS-NAICS

Natural Gas Keeps Washington Farms Working

As a primary ingredient in fertilizer, natural gas availability and stable pricing provide a boost for Washington's agricultural sector, responsible for 13 % of the state's economic output.

Natural Gas Helps Washington's Economy Take Flight

Natural gas plays a ubiquitous role in one of Washington's most dynamic industries, aerospace: Serving as a process fuel in the manufacture of airplane parts, an input for commercial drying operations and an efficient space heater for the state's millions of square feet of airplane assembly space.

Gas for Power Generation

Natural gas as an electric generation fuel continues to grow in importance to our state. Flexible gas-fired generation keeps the lights on when the wind isn't blowing for Washington's 3,075 MW of wind generation while providing peaking capability during times of high demand. High efficiency combined cycle units (CCCT), powered by natural gas, provide base load energy, especially during low hydro years.

Natural Gas is . . .

Abundant & Domestic

- About 93% of the natural gas consumed in the United States was produced in the U.S. The remaining 7% is imported from Canada along with a nominal amount of internationally traded liquefied natural gas (LNG).
- Washington relies on production basins in Northern Alberta, Northern British Columbia and the U.S. Rockies for our gas supply. Depending on demand and market conditions we may receive as much as two-thirds of our supply from Canada due to our proximity.
- The domestic natural gas resource base is large, estimated to be 2,515 trillion cubic feet, enough to meet America's diverse energy needs for generations to come. (Source: PGC, 2015)
- The natural gas industry operates in all 50 states and is responsible for almost 3 million jobs and \$385 billion in economic output. (Source: API, 2015)

Clean

- Natural gas is efficient: 92% of the natural gas produced is delivered to customers as usable energy. (In contrast, 32% of the total energy used to generate electricity reaches consumers.)
- Natural gas produces 50% fewer GHG emissions than coal and up to 30% fewer than oil, along with significantly fewer particulate and NOX emissions.
- Quick ramping natural gas "peaker" power plants support intermittent renewable resources, such as wind and solar, by providing power when the wind stops blowing or the sun stops shining.

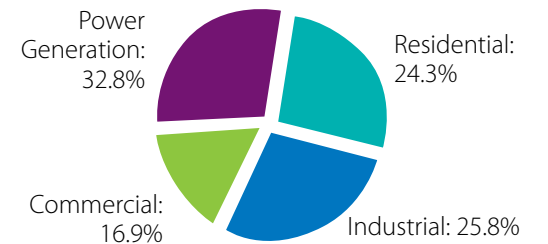
Safe & Reliable

- Natural gas pipelines and utilities have strict protocols for testing and replacing, designed to ensure system integrity.
- Stakeholders have begun the process of extending and improving the "Dig Law" (2013). The law will continue to enhance the safety of natural gas pipelines through increased excavator and operator transparency along with more effective damage reporting and enforcement guidelines
- Two natural gas transmission pipelines, Williams NW Pipeline and TransCanada GTN, deliver the majority of the natural gas consumed in Washington; both pipelines have continuously operated safely and reliably for more than 50 years.
- According to the National Transportation Safety Board, pipelines are the safest form of energy transportation.

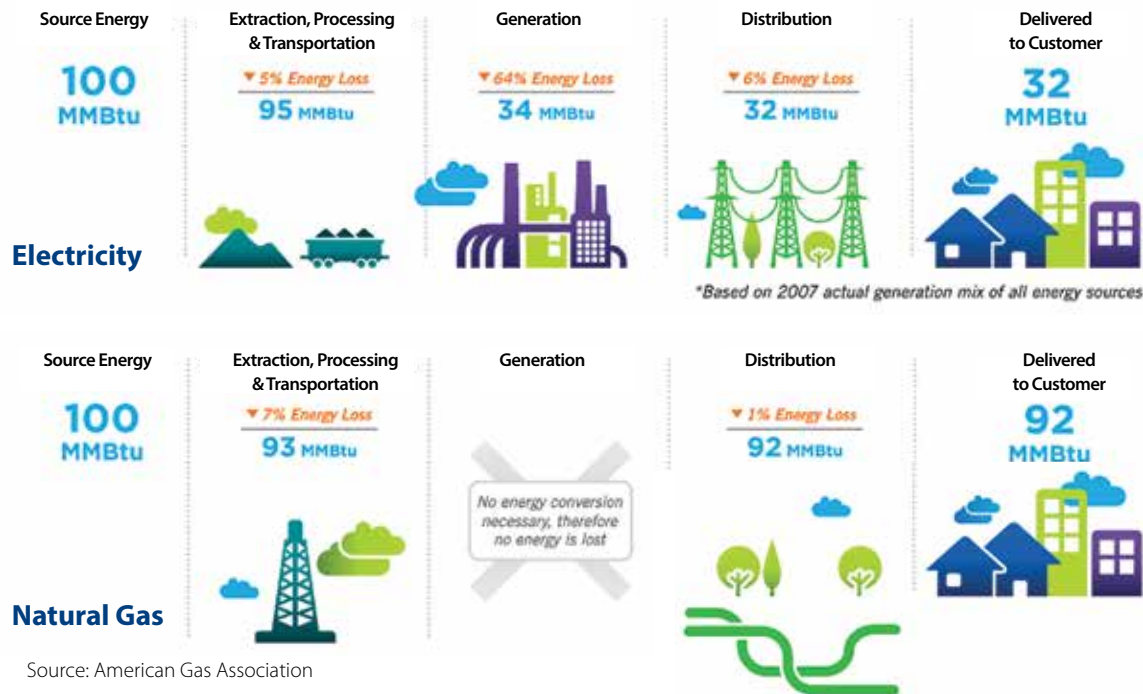
Versatile

- Natural gas touches nearly every segment of American life, as the dominant source of energy nationwide for heat, hot water and cooking in homes and businesses.
- Natural gas also has uses as a feedstock for industrial processes, is used to generate electricity and has a growing role as a transportation fuel.

Washington's 2016 Gas Consumption by End Use



Source: EIA, 2016



Opportunities

Our nation's abundant natural gas supply outlook offers an incredible opportunity to deliver energy value to American homes and businesses, fuel a renaissance in manufacturing and provide a cleaner, less expensive option for vehicles, thus reducing our dependence on imported oil.

Natural Gas for Transportation

- Compared to diesel-powered vehicles, natural gas vehicles can reduce greenhouse gas emissions by 17%.
- This could be as high as 83% if renewable natural gas is introduced to the supply.
- Natural gas vehicles offer significant fuel savings over time and began 2017 around \$2 per Diesel Gallon Equivalent.
- Natural gas engines in medium and heavy duty trucks are the most economically efficient way to reduce harmful NOx emissions.

Extending Natural Gas Service

- Washington state natural gas utilities are working with policymakers and regulators to extend service to unserved or underserved regions in our state. If successful, these efforts could allow for increased economic development opportunities and emissions reductions in Washington's rural communities.

Combined Heat & Power (CHP)

A proven American technology that can be more efficient and cleaner than the majority of current power generation technologies. CHP puts the excess heat created during power generation to use, boosting efficiency while producing clean, affordable energy for businesses and factories.

Direct Use

- When natural gas is utilized directly in the home more than 90% of its energy is applied to its intended use.
- Natural gas furnaces are up to 98% efficient, last longer than electric heat pumps and deliver heat up to 25 degrees warmer, for comfort more quickly.

Greater recognition of the benefits of natural gas in federal and state regulation, legislation, building energy codes, appliance standards and energy policy initiatives will open new doors to increased energy efficiency and energy security for our state and its citizens.



Puget Sound marine operators including the Washington State Ferries System and Tote Inc. continue to explore the use of Liquefied Natural Gas as a cleaner alternative to diesel or bunker fuel.



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