Northwest **Power** and **Conservation** Council

July 9, 2019

MEMORANDUM

TO: **Council Members**

FROM: **Steven Simmons**

SUBJECT: **Natural Gas End-Use Load Forecast**

BACKGROUND:

Presenter: Steven Simmons

Summary: This presentation provides a high-level summary of the Natural Gas End-Use Load Forecast process. This forecast is new to the Power Planning process and is a component within the all fuels Price Effect Load Forecast. This is a demand forecast for natural gas for the end-use sectors: residential, commercial, industrial, and transportation.

Relevance: By developing an end-use load forecast for natural gas and pulling in the outlook of gas demand from our power generation models, we can gain a more holistic look at the overall natural gas demand for the region. The end use and power generation sectors rely on much of the same natural gas infrastructure. In addition, by having a more complete picture of overall energy demand in the region, we may better analyze carbon reduction strategies.

Workplan: A.3.1 Forecasting and Economic Analysis Develop Base Load Forecast

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Natural Gas End-Use Load Forecast

Process for the 2021 Northwest Power Plan

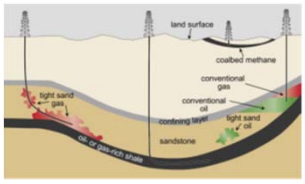
Butte Montana – July 16, 2019

Steven Simmons

THE 2021 NORTHWEST POWER PLAN
FOR A SECURE & AFFORDABLE ENERGY FUTURE

Agenda

1. The Natural Gas End-Use Forecast: where it fits in and why it's important
2. General Approach and Methodology



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Forecast the Consumption of Natural Gas → Forecast Load with Price Effects

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What is it ?

1. Forecast of demand for natural gas in the region from the direct-use sectors (basically everything except the power sector)
   - Residential
   - Commercial
   - Industrial
   - Transportation
2. The forecast is a component of the Price-effect Load Forecast
3. Like the all-fuels Price-effect Load Forecast, the gas forecast will include a range of demand outlooks based on the defined sets of economic growth drivers
4. This forecast is new for the 2021 Power Plan

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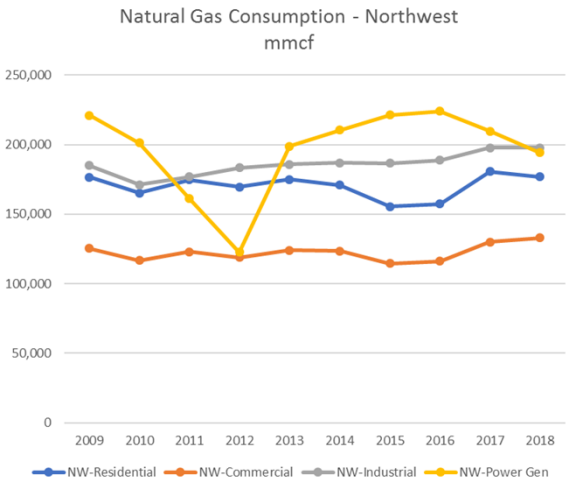
Consumption

1. US consumption of natural gas hit an all time high in 2018 – 82.1 billion cubic feet/day
2. Much of the growth in the US is coming from the power generation sector
   a. Natural-gas fired generation is now the largest source of utility-scale electricity – around 35%
   b. 14.5 net GW of new gas capacity was added while 13 GW of coal retired
3. In the Northwest, consumption for end use sectors Res-Com-Ind accounts for roughly 70% of the gas consumed in region



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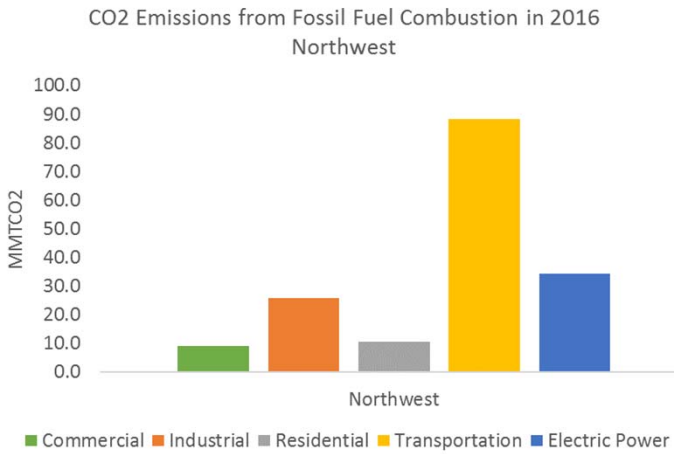
In the Northwest the Residential, Commercial, and Industrial sectors accounted for 27% of the CO2 emissions from fossil fuel in 2016



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Why is it important ?

1. We can now get a more holistic look at overall natural gas demand – the electric generation and end-use sectors share much of the same natural gas infrastructure in the region
2. A forecast of the overall gas consumption allows us to view a more complete picture of greenhouse gas emissions in the region
3. By having a gas forecast integrated with the electric load forecast, we can better develop regional carbon reduction scenarios. Important to remember - in the region right now, gas meets winter heating peaking demands for a large section of the population.

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Methodology

1. Historic natural gas usage by state and sector provides the starting point for the forecast
2. Historic gas usage is associated to each end use (such a space heating) and historic temperatures
3. Estimates of historic efficiency, fuel prices, and temperatures are factored in – resulting in price effect variables (based on economic choices) and non-price effect variables (such as preference or convenience)
4. In the forecast period, the economic drivers and future temperatures determine the new energy requirements to be met by the consumer choice of fuel type

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Key Inputs

1. Historic natural gas consumption
2. Device efficiency, units, square feet, and market shares for gas
3. Heating degree days
4. Natural gas retail price
5. Economic growth drivers
6. Potential blend and cost of renewable natural gas

Key Outputs

1. Monthly, annual and peak natural gas load by state, sector and end use
2. Natural gas market shares
3. Greenhouse gas emissions related to combustion