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December 5, 2023

MEMORANDUM

TO: Council Members

FROM: Steven Simmons and Tomás Morrissey

SUBJECT: 2023 Natural Gas Price Forecast

BACKGROUND:

Presenters: Steven Simmons and Tomás Morrissey

Summary: This presentation will cover the recent efforts to create the natural gas price forecast for the Northwest and other WECC regions. This work is needed to support the upcoming 2024 study of wholesale electric market prices and upcoming resource adequacy studies. The forecast includes:

1. A Henry Hub price forecast based on Fuel Advisory Committee member surveys, among other inputs
2. Updated hub price differentials based on historical data
3. Updated monthly hub price shapes based on historical data

Relevance: Natural gas prices influence many factors in power planning including power plant dispatch, electricity prices, gas consumption, and emissions. These updates are an important input to the Council's annual studies on market prices and resource adequacy.

Workplan: A.2.1. Develop an updated fuels price forecast.

Background: The natural gas price forecast is constructed using a similar methodology to the 2021 Power Plan forecast. Fuel Advisory Committee members provided key inputs into the forecast and helped review it. A detailed

review of the natural gas work for the 2021 Power Plan is in the supporting materials:

https://www.nwcouncil.org/2021powerplan_sitemap/

More Info: Additional information, including the 2023 forecast, is available on the Fuels Advisory Committee webpage and the Energy Forecast webpage:

<https://www.nwcouncil.org/energy/energy-advisory-committees/fuels-advisory-committee/>

<https://www.nwcouncil.org/energy/energy-forecasts/>

2023 Natural Gas Price Forecast

Steven Simmons & Tomás Morrissey

December 12 2023

Portland, Oregon



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Today's Talk

1. Background & recent developments
2. Natural Gas – a historic perspective on use, prices and forecasts
3. Fundamentals
4. The Forecast

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Fuels Forecast

Our work is primarily concerned with producing an outlook for each fuel that might be used in the region over the next 20 plus years:

- Availability of the fuel
- Price of the delivered fuel
- Potential disruptions and volatility of the fuel supply and delivery
- Estimates of the emissions resulting from the fuel use

We produce a forecast for each plan. In past power plans – this primarily involved forecasting prices for fossil natural gas, coal and oil

These forecasts are used as inputs to many of our planning models – it's a key input that comes in early to the power planning process

The Fuels Advisory Committee (FAC) is a key player in the forecast development

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The Fuels Advisory Committee - FAC

The FAC is an expansion of the entity previous known as the *Natural Gas Advisory Committee (NGAC)*

The inaugural FAC was held October 23 in Portland – topics included

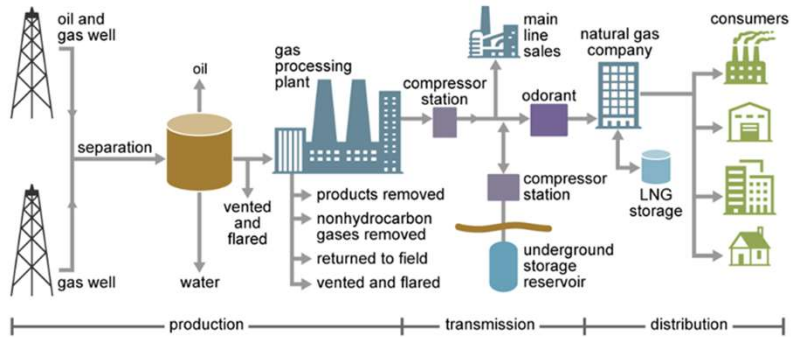
1. Natural gas fundamentals, prices, volatility, and outlooks
2. Hydrogen infrastructure and gas turbines –from Mitsubishi Power
3. Power to Gas – from Avista

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Recent Developments

- New proposed Methane rules for the US and Canada
- WA State Building Code Council and natural gas in buildings

Natural gas production and delivery



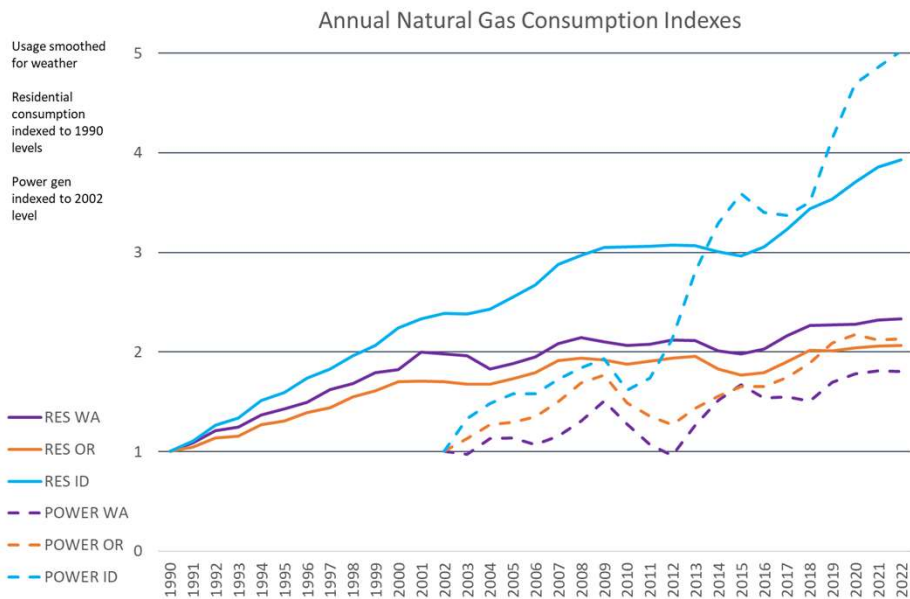
eia Source: U.S. Energy Information Administration

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- In the 90's we see strong steady growth in residential gas consumption
- Into the aughts - power generation from gas takes off

Today regionally - power is the largest consumer. National figures in (%)

- Natural Gas consumption %
- Power 36 % (38 %)
 - Industrial 24 % (32 %)
 - Residential 24 % (15 %)
 - Commercial 16 % (11 %)



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A Historic Perspective

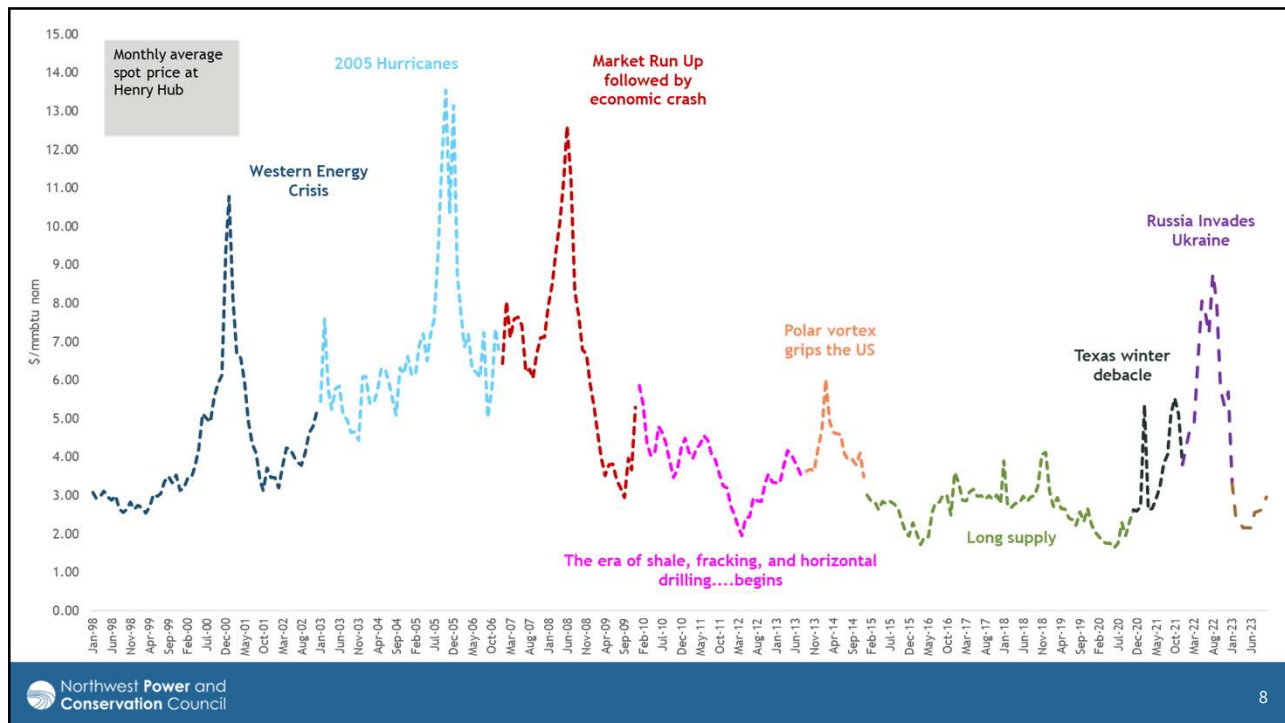


Mr. Toad's Wild Ride

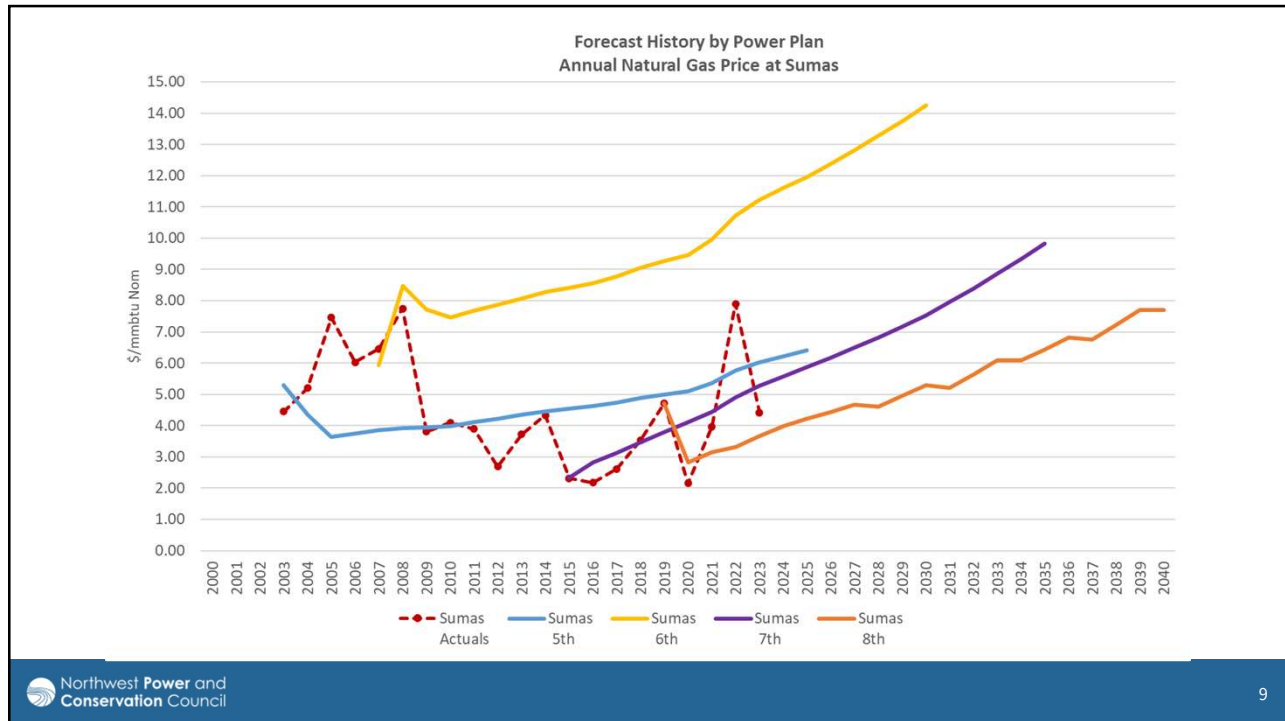
A walk back through time



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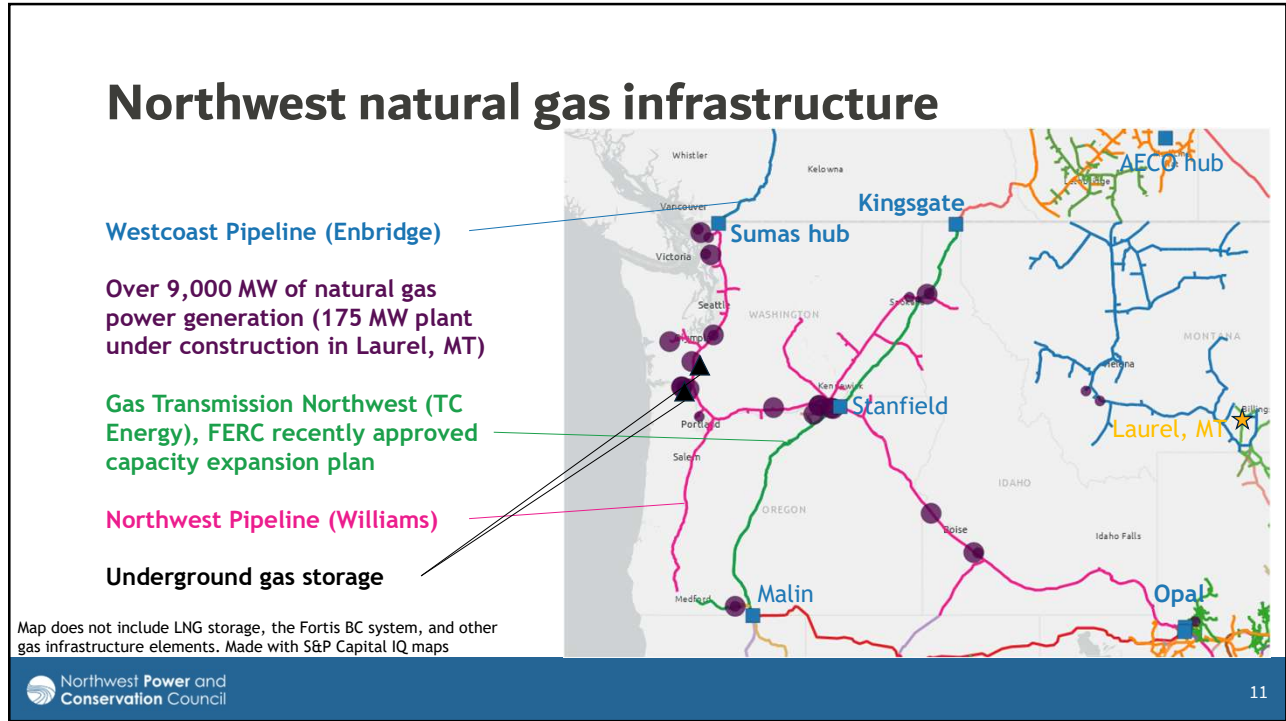
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Natural gas fundamentals

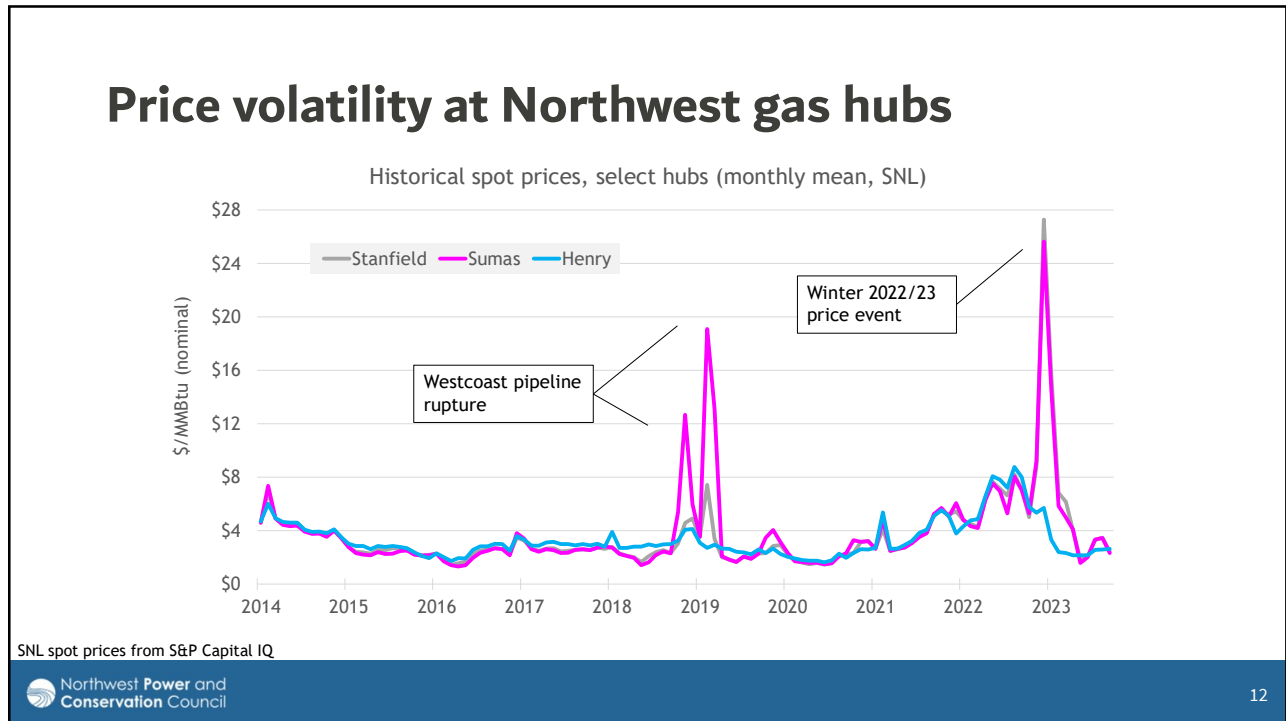
1. NW infrastructure map
2. Price volatility and winter 2022/23 high price event
3. General supply and demand
4. LNG and the Northwest

Northwest Power and Conservation Council

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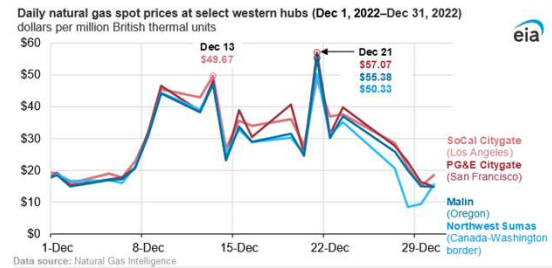


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High price factors in winter 2022/2023

- Pipeline constraints
 - Reduced ability for California to import gas from the Texas area increased prices across the West
- Low gas storage levels
- Colder than average weather
- Event demonstrates the linkage between gas hubs in the West

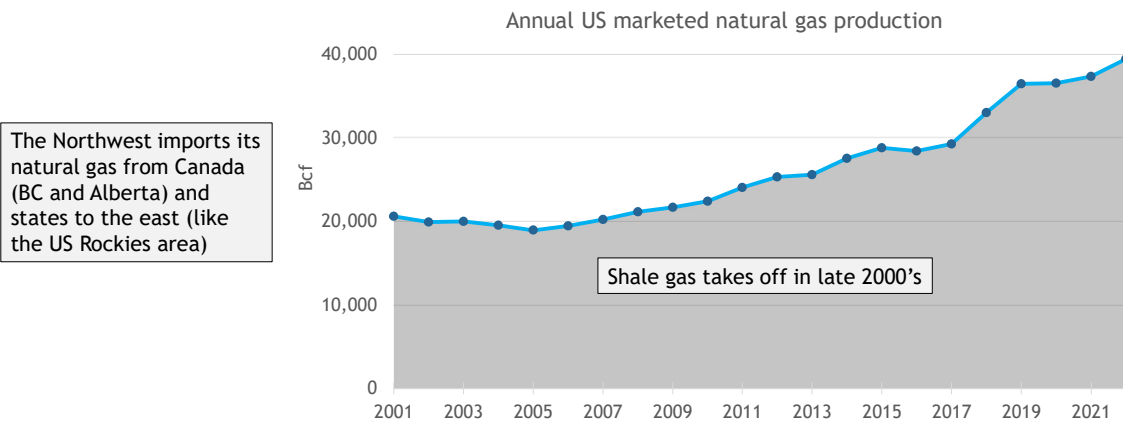
Daily natural gas spot prices in western United States exceed \$50.00/MMBtu in December



EIA: <https://www.eia.gov/todayinenergy/detail.php?id=55279>

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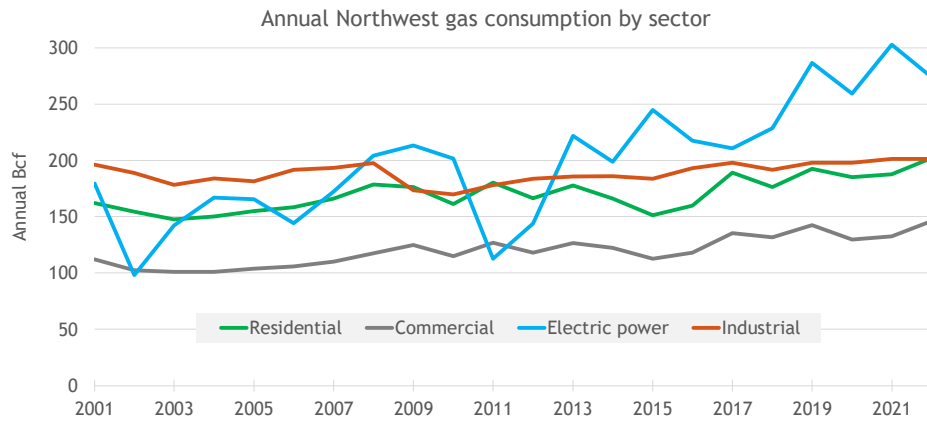
US gas production continues to grow



EIA: https://www.eia.gov/dnav/ng/ng_prod_sum_a_EPG0_VGM_mmcf_a.htm

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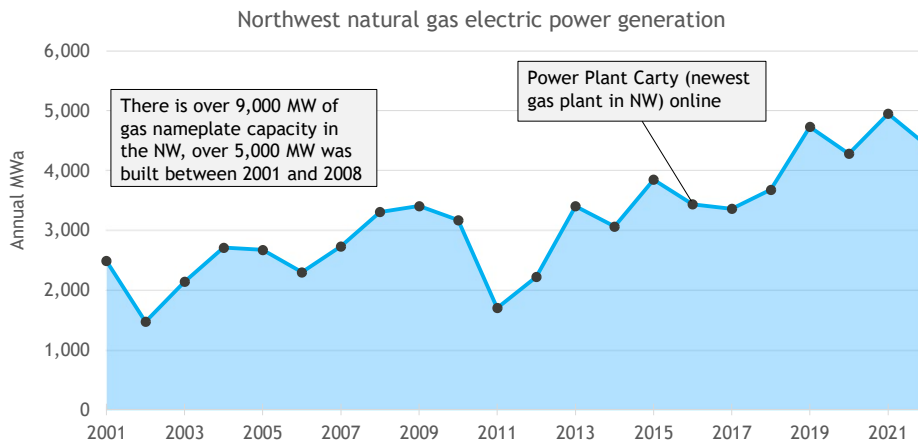
Northwest gas consumption



Total consumption in ID, MT, OR, WA
 EIA: https://www.eia.gov/dnav/ng/ng_cons_sum_dcu_swa_m.htm

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NW gas power generation trending up



There is over 9,000 MW of gas nameplate capacity in the NW, over 5,000 MW was built between 2001 and 2008

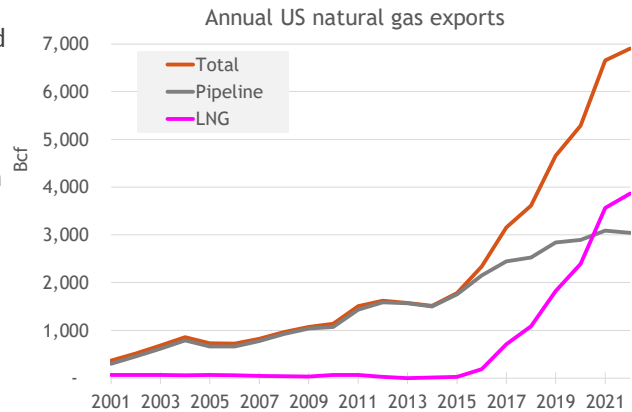
Power Plant Carty (newest gas plant in NW) online

Natural gas total electric power generation in ID, MT, OR, WA
 EIA: <https://www.eia.gov/electricity/data/state/>

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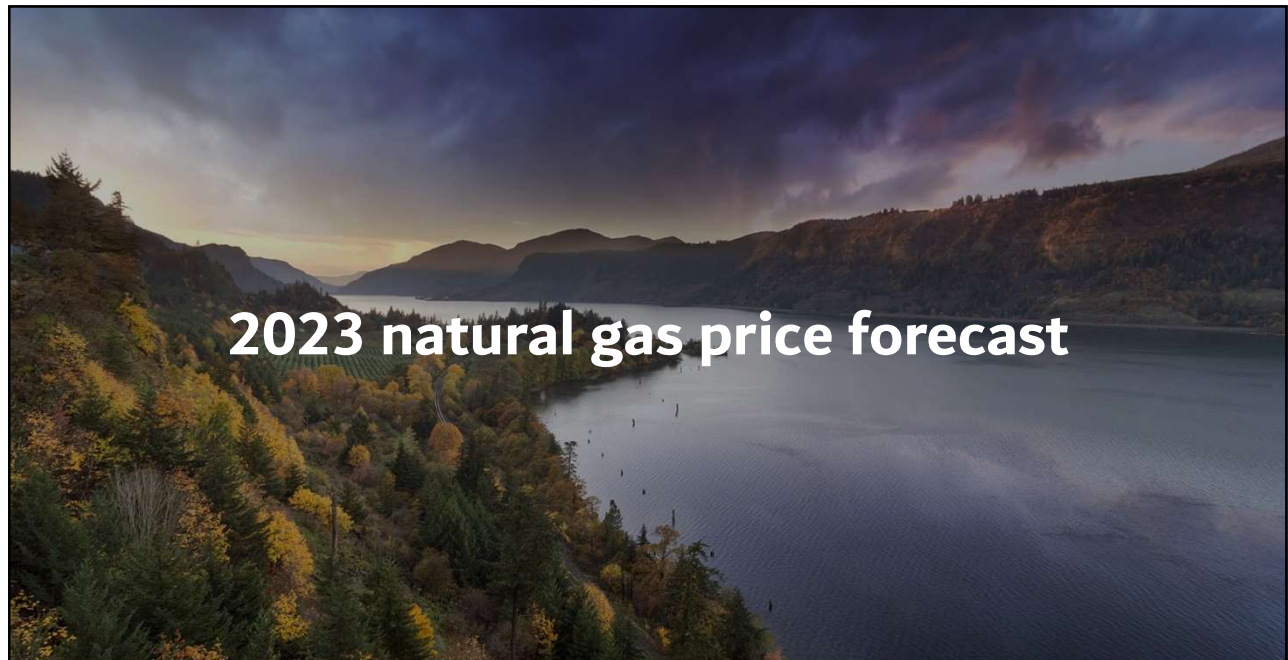
Liquified natural gas (LNG) exports

- US LNG exports expected to increase, LNG exports today are from the Gulf of Mexico and the East Coast
- Woodfibre LNG (British Columbia) expected online in 2027, could put increase Northwest gas prices (a pipeline expansion may occur in 2029, alleviating some pressure)
- LNG Canada likely online in 2025 (BC), has a dedicated pipeline from production areas
- Costa Azul, in BC Mexico, projected online in 2025, may pressure Western prices as well



EIA: https://www.eia.gov/dnav/ng/ng_move_expc_s1_a.htm

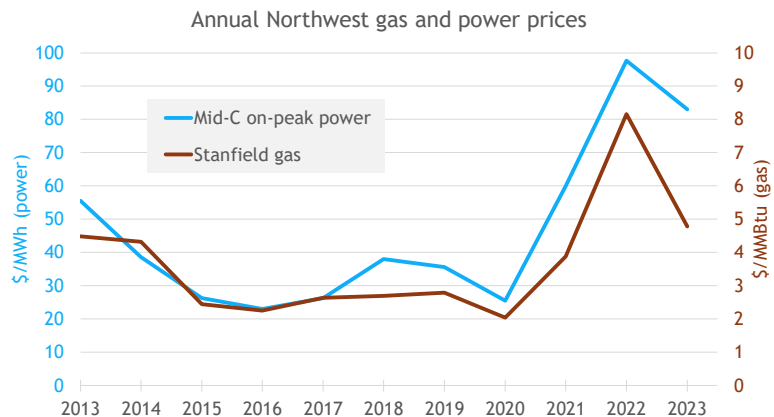
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Why natural gas prices matter

- Power and gas prices are positively correlated
- Other factors impact power prices too, but in general, higher gas prices lead to higher power prices
- In modeling, gas forecasts impact the projected cost/value of new gas power plants, and the dispatch of existing plants



2023 actuals are year-to-date, data from SNL (spot prices), nominal \$

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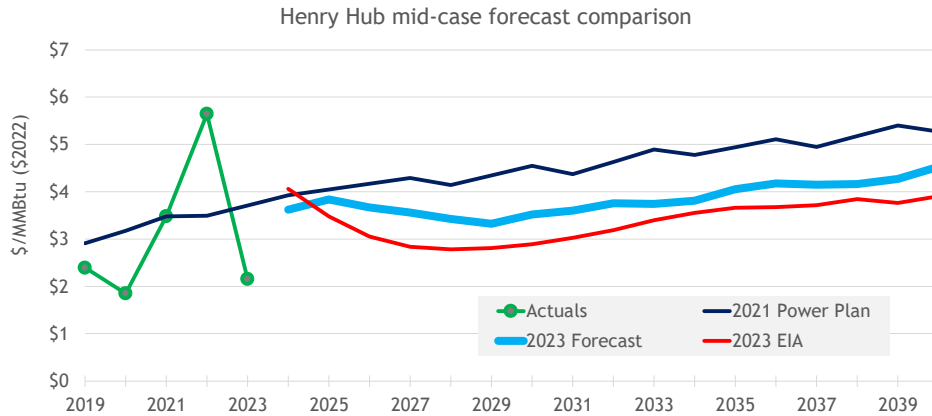
Fuels Advisory Committee forecast process

1. Henry Hub forecast is created using an aggregation of Committee member forecasts, IRP forecasts, EIA & CEC forecasts, and price futures (NYMEX)
2. The Henry Hub forecast is translated into hub level forecasts (Sumas, AECO, etc.) using historical price differences
3. The hub level forecasts are made monthly using historical pricing patterns
4. For some processes additional volatility is added into the forecast

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2023 mid-case forecast comparison

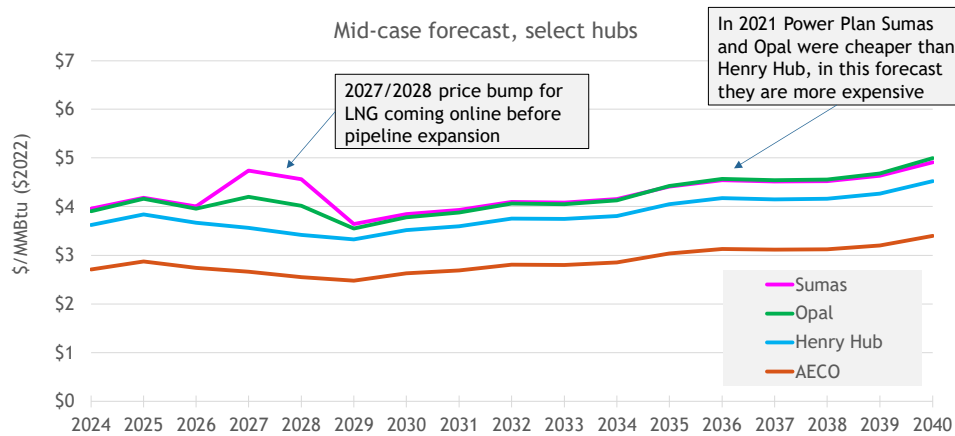
The next few slides are in \$2022 dollars (not nominal)



2023 actuals are year-to-date, actual data from SNL (spot prices)

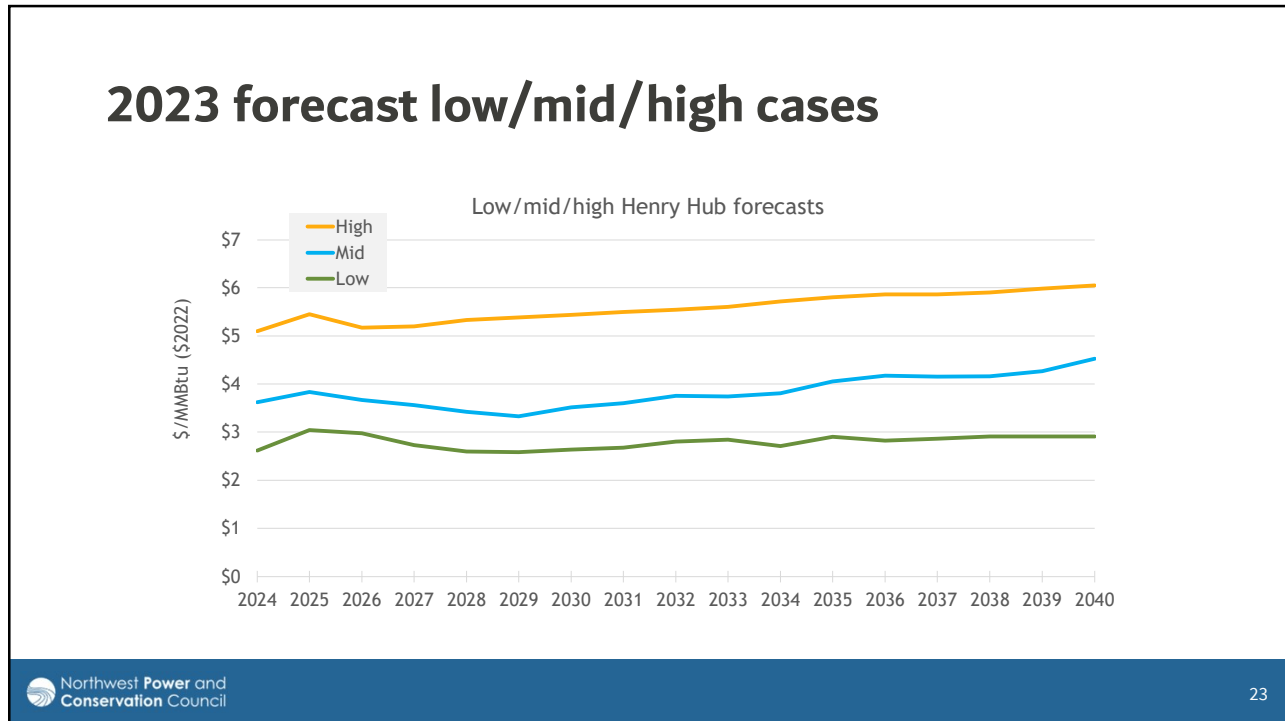
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2023 mid-case forecast for select Northwest hubs



Other Northwest hubs, like Stanfield, not shown for graphical clarity. The forecast for all hubs is available online.

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Next steps

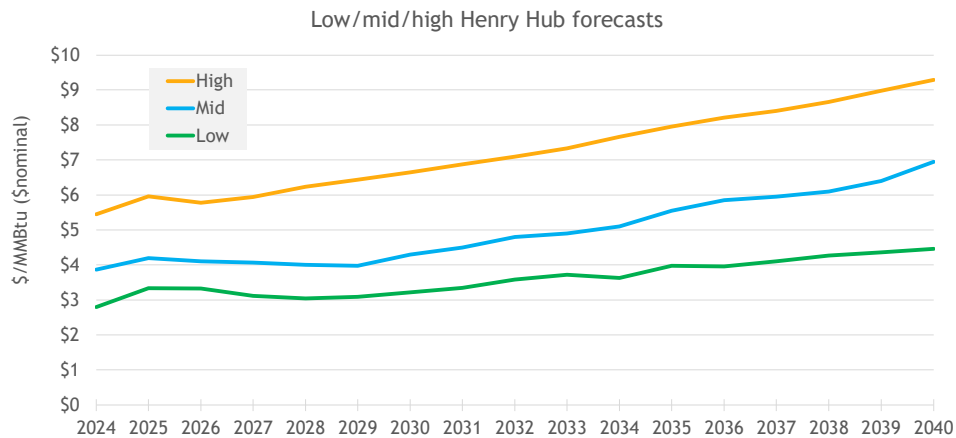
- 2023 Price forecast
 - Planning to use this forecast in year 2024 power price and adequacy studies
 - Full forecast available online at: <https://www.nwcouncil.org/energy/energy-forecasts/>
- Fuels Advisory Committee in 2024
 - Continue to develop create price forecasts for natural gas and other fuels
 - Continue to discuss nascent fuel development, like hydrogen, ammonia, and RNG

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Extra slides

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2023 forecast low/mid/high cases (nominal)



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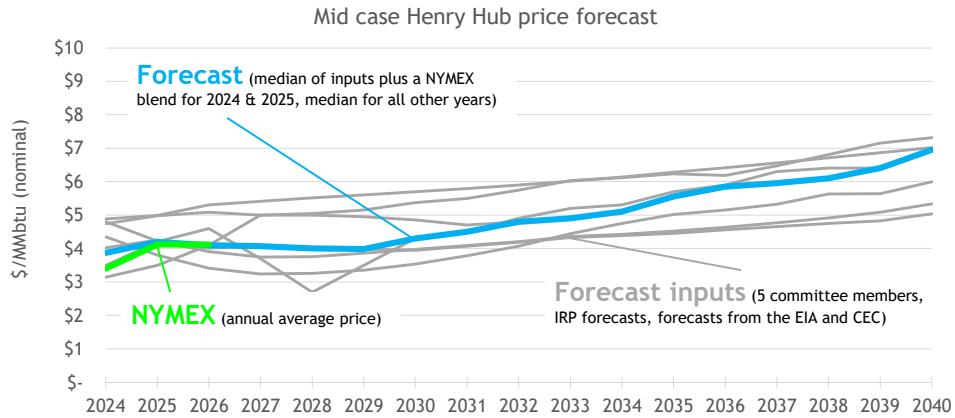
Hub price comparison to the 2021 Plan

2024-2040 avg price (\$ / MMBtu, \$2022)

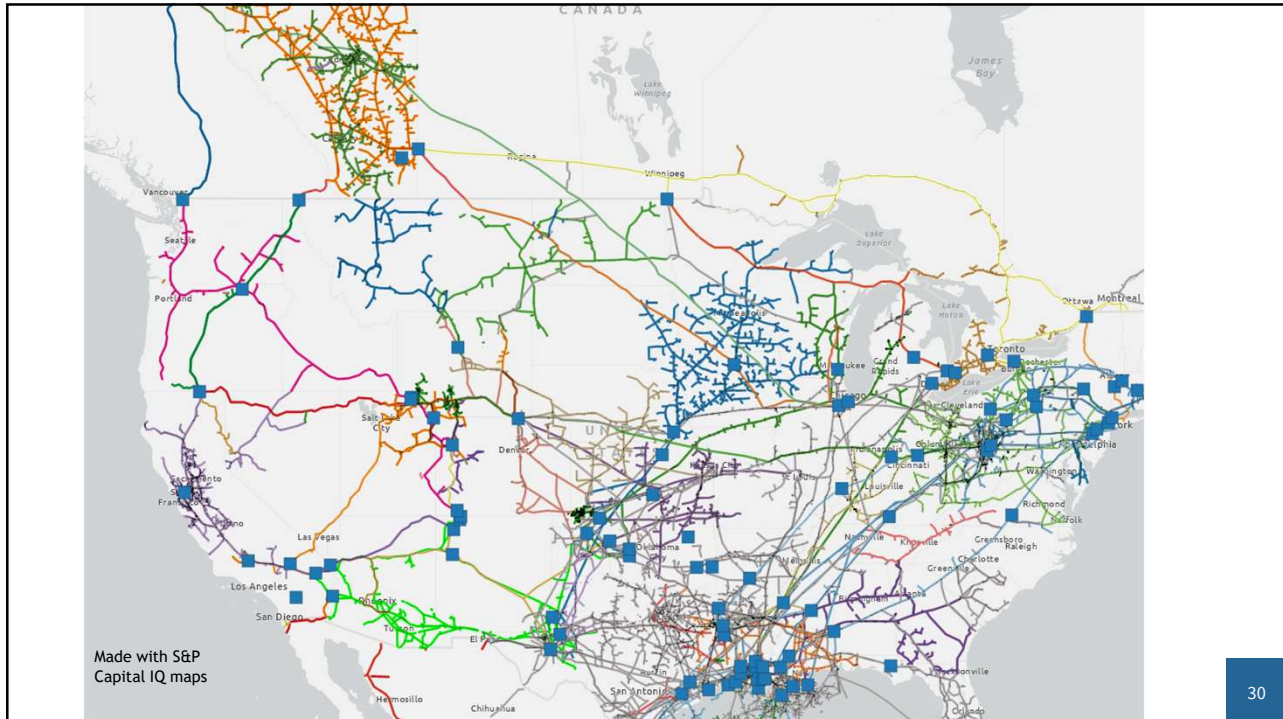
	2023 forecast		2021 Power Plan
Henry Hub	\$3.83	↓	\$4.40
AECO	\$2.89	↓	\$2.97
Sumas	\$4.25	↑	\$4.19
Opal	\$4.30	↑	\$4.10

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Forecast construction for 2023



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EIA US natural gas projections

