

SECTION 5

ENVIRONMENTAL CONSIDERATIONS



Overview

As an energy provider, environmental considerations and regulations have the potential to significantly impact Company efforts and methods by which it can meet its obligation to deliver natural gas to its customer base. A series of new regulations and policies are currently being proposed at the Washington, Oregon and Federal levels. The purpose of these rules are to address greenhouse gas (GHG), and specifically the management of carbon dioxide (CO₂) emissions.¹

The Clean Air Act has led the U.S. Environmental Protection Agency (EPA) to promulgate rules requiring state Clean Power Plans (also known as State Implementation Plans or SIPs) for reducing CO₂ in the electric industry.² On the state level, Washington's governor has also directed the Department of Ecology to adopt a rule to reduce GHG emissions.³ Regardless of the outcome of this effort, similar objectives will likely be included in the Washington's SIP. The 2016 Oregon Legislature adopted "Coal to Clean" (SB 1547) legislation effectively removing coal in the state by 2030 (by disallowing any coal-related costs in retail electricity rates) and also adopts a standard that requires 50% of all electricity used in Oregon to be from renewable sources starting in 2040. Other federal and state proposals are in process.

While focused on the Pacific Northwest electric industry, the Northwest Power and Conservation Council (NPCC or Council) exhaustively examined CO₂ in its Seventh Power Plan (Plan) released in May, 2016.⁴ This Plan builds on the Council's previous work and has become the recognized standard for carbon analysis.

The Council considered eight analytical approaches to establish future carbon costs.⁵ These are:

- Social Cost of Carbon (Mid-Range and High);
- Carbon Cost Risk (e.g., \$0 - \$110/ton);
- Regional Renewable Portfolio Standards at 35%; and
- Five Maximum Carbon Reduction approaches (Existing Technology, Coal Retirement, Coal Retirement with the Social Cost of Carbon, Coal Retirement with the Social Cost of Carbon, and No New Gas).

¹ GHG are atmospheric gases, such as methane, nitrous oxide, and ozone, with carbon dioxide (CO₂) being the primary component. GHGs are also referred generally as carbon dioxide equivalents or CO₂e.

² 42 U.S.C. Section 7411(d)(2014)

³ Proposed WAC 173-441-120

⁴ Seventh Northwest Power and Conservation Council Plan (aka Seventh Power Plan), Northwest Power and Conservation Council, Document 2016-02, February 25, 2016; approved and released May, 2016

⁵ Seventh Power Plan, pages 3-7 to 3.14

Four additional scenarios were included: 1) Planned Loss of a Major Non-GHG Emitting Resource (i.e., 1,000 aMW of hydro); 2) Unplanned Loss of a Major Non-GHG Emitting Resource; 3) Faster Conservation Deployment; and 4) Slower Conservation Deployment. Further, four sensitivity analyses were performed: 1) No Demand Response; 2) Low Natural Gas and Wholesale Electricity Prices; 3) Increased Market Reliance; and 4) Lower Conservation.

The Council also addresses fugitive natural gas emissions. Some studies suggest “fugitive methane” emissions can be more impactful to the natural gas industry than CO₂ emissions from using natural gas at the end-use or to generate electricity.⁶ Fugitive methane emissions occur at all points of the extraction, gathering, transportation, storage, and distribution of natural gas. The Council notes the actual amount of fugitive natural gas involves considerable uncertainty and may be less than 1% (or significantly below some estimates) and that its contribution to greenhouse gas emissions is less than that of the electric industry.

Cascade’s integrated resource plan (IRP) has been heavily informed by the Council’s Seventh Power Plan and has carefully incorporated its survey of approaches, sensitivity analyses, and scenarios. Consideration has also been given to cost-effectiveness, customer value, and the results of other local distribution companies (LDCs).

Of the eight approaches examined by the NPCC, virtually all LDCs and electric utilities—as well as the Council—have centered on the Carbon Cost Risk approach. This results in a \$10 per ton carbon cost adder to Cascade’s avoided costs in 2018 and \$30 per ton in 2035. Therefore, the question is not whether carbon adders should be included in Washington and Oregon but, rather, how and at what amount. This IRP models these assumptions and analyzes cost ranges for various sensitivities and several related scenarios.

Additionally, Cascade has undertaken GHG emission reductions through its energy efficiency programs and continues to monitor other options, as described at the end of this chapter.

Purpose

This chapter considers policies that cost-effectively meet the outcomes mandated by state and federal carbon emission reduction policies and regulations. Specifically, this section examines carbon methodologies and assumptions in order to calculate inputs towards a 20 year avoided cost of natural gas, and to pair these with associated two-year action items.

⁶ Seventh Power Plan, pages 3-31 to 3-32

Significant emission policies—proposed or adopted—have occurred since Cascade’s last IRP. The Federal government as well as policy-makers in Washington and Oregon have actively pursued assertive GHG emission reductions and, specifically, required CO₂ emission reductions (because CO₂ is the primary source of GHG emissions).

The following summarizes the salient aspects of this at the national, regional, and state levels.

The National Focus

The Clean Air Act, Section 111(d) gave the US EPA authority to promulgate state Clean Power Plan regulations, primarily directed towards electric generation. The rules would require GHG emissions from specified power plants to be reduced by 32% from 2005 levels by 2030. The US Supreme Court stayed implementation of the proposed rules in February 2015 and oral arguments were heard June 2016 in the District of Columbia Circuit Court of Appeals. The timing of its findings is indeterminate.

Under the proposed regulations, states may comply in two ways:

- Rate-based – Reducing the average CO₂ emissions rate (pounds of CO₂/kilowatt-hour) from electric generating plants, or
- Mass-based – Limiting the total emissions (tons of CO₂ per year)

The Regional Focus

The Northwest Power Planning and Conservation Council recently approved its 7th Power Plan (May 2016). Significant discussion, analyses, and scenarios regarding CO₂ are contained in Chapters 3 and 15. These will be addressed in the following section (“Types of CO₂ Adder Analyses”).

Moreover, considerable prior regional collaboration has occurred regarding GHG, such as the proposed cap and trade program of the Western Climate Initiative.⁷

Washington

The Department of Ecology published its Draft Clean Air Rule (CAR) in January (2016), with a new draft released in June. The CAR was adopted on September 15, 2016 with an effective date of October 17, 2016. The reductions would come

⁷ Cap and trade is “a system for controlling carbon emissions and other forms of atmospheric pollution by which an upper limit is set on the amount a given business or other organization may produce but which allows further capacity to be bought from other organizations that have not used their full allowance.” Oxford Dictionary

from efficiency, investment in Washington, and/or purchased allowances and carbon offsets. On September 27, 2016, Avista Corporation, Cascade Natural Gas Corp., Northwest Natural Gas and Puget Sound Energy jointly filed an action in the U.S. District Court for the Eastern District of Washington challenging the CAR. The four companies also indicated plans to file litigation in Thurston County Superior Court.

The Washington natural gas utilities believe that reducing greenhouse gas emissions is a matter that needs addressing, but CAR is not the solution. Because an action has been filed challenging CAR, Cascade's 2016 IRP does not take the new rule into consideration.

Initiative 732 (I-732 or "Clean Energy Future") will appear on the November ballot. I-732 would charge a carbon tax of \$25 per ton of carbon, lower the sales tax by 1%, grant tax rebate of up to \$1,500 annually to 400,000 low income families, and eliminate the business and occupation (B&O) tax on manufacturing. On November 8th, Washington voters approved/rejected this measure with the percentage vote being ___% for/against. [Note to readers: this sentence will be update prior to submittal of the final IRP.] Potential other carbon initiatives are in-progress, such as one that may be introduced by environmental and labor advocates.⁸ Regardless, significant other state policies with CO2 impacts have been adopted including, but not limited to, the Energy Independence Act ("I-937") and the Washington State Electric Vehicle Action Plan.

Oregon

The Oregon Legislature has actively considered multiple new state laws as follows:

- "Coal to Clean" law adopted in 2016 (SB 1547)
 - Effectively eliminates coal power by 2030
 - 50% renewable electric generation by 2040.
- Several other legislative proposals considered without adoption in 2016:
 - Replace GHG emission goal with cap and trade program (SB 1574)
 - Repeal GHG emission goal; requires Environmental Quality Commission to adopt goals and limits (HB 4068)

Additional proposals are expected in the 2017 legislative session.

⁸ Based on discussions with environmental advocates

Types of CO2 Adder Analyses

The Council's Seventh Power Plan summarizes applicable approaches. While directed to the electric industry, these are provided as illustrations of the potential scope of methodologies and recently-performed analyses. These are excerpted, *verbatim*, so as to illustrate the Plan's characterization of each.

Social Cost of Carbon (SCC)

"Two scenarios, the Social Cost of Carbon – Mid-Range (SCC-MidRange) and Social Cost of Carbon – High (SCC-High), use the US Interagency Working Group on Social Cost of Carbon's estimates of the damage cost of forecast global climate change. According to the Working Group, the SCC is an estimate of the economic damages associated with a small increase in carbon dioxide (CO₂) emissions, conventionally one metric ton, in a given year. This dollar figure also represents the value of damages avoided for a small emission reduction (i.e. the benefit of a CO₂ reduction). Therefore, in theory, the cost and economic risk of the resource strategy that achieves carbon dioxide emissions reductions equivalent to the social cost of carbon would offset the cost of damage."

Carbon Cost Risk

"The carbon cost risk scenario is intended to explore what resources result in the lowest expected cost and economic risk given existing policy plus the economic risk that additional carbon dioxide reduction policies will be implemented. Each of the 800 futures imposes a carbon dioxide price from \$0 to \$110 per metric ton at a random year during the 20 year planning period. Over time, the probability of a carbon dioxide price being imposed and the level of that price both increase. By 2035, the average price of carbon dioxide rises to \$47 per metric ton across all futures. It should be noted, that the use of a carbon dioxide price does not presume that a "pricing policy" (e.g., carbon tax, cap and trade system) would be used to reduce carbon dioxide emissions. The prices imposed in this scenario could also be a proxy for the cost imposed on the power system through regulation to reduce carbon dioxide emissions (e.g., caps on emissions)."

Regional Renewable Portfolio Standard at 35 Percent (Regional RPS at 35%)

"This scenario assumes that a region wide Renewable Portfolio Standard (RPS) is established at 35 percent of regional retail electricity sales across all four Northwest states. Presently, three states in the region have RPS. Montana and Washington require that 15 percent of the retail sales of energy be served by renewable resources. Montana's RPS must be satisfied in 2015 and Washington's by 2020. Oregon requires that 20 percent of retail sales be served by renewable resources by 2020. These state level RPS generally only apply to investor owned utilities and larger public utilities, while this scenario assumes that all of the region's retail sales are covered. Since this scenario was designed to test the cost and

effectiveness of this policy for reducing regional power system carbon dioxide emissions, it did not include future carbon dioxide regulatory cost risk uncertainty or estimated damage cost. The cost-effectiveness of a policy that only requires use of additional renewable generation can, therefore, be compared to other scenarios that tested alternative policy options to reduce carbon dioxide emissions, including those use a combination of strategies such as limiting the type of new resources that can be developed and imposing a carbon price.”

Maximum Carbon Reduction – Existing Technology

“This scenario was designed to explore the maximum carbon dioxide emissions reductions that are feasible with current commercially available technologies. In this scenario all of the existing coal plants serving the region were assumed to be retired by 2026. In addition, the least efficient (i.e., those with heat rates exceeding 8,500 Btu/kWh) existing natural gas-fired generating facilities were assumed to be retired by 2031. No carbon dioxide cost risk or estimated damage cost was assumed, so this scenario can be compared to the cost-effectiveness of other policy options (e.g., Carbon Cost Risk, Regional RPS at 35%, Social Cost of Carbon, Retire Coal w/SCC MidRange, etc. scenarios) for reducing carbon dioxide emissions.”

Maximum Carbon Reduction – Emerging Technology

“This scenario considers the role that new technologies might play in achieving carbon dioxide reduction. Due to the speculative nature of the performance and ultimate cost of technologies considered in this scenario the Council’s Regional Portfolio Model (RPM) was not used to identify this scenario’s least cost resource strategy. Rather, the RPM was used to define the role (e.g., capacity and energy requirements) that new and emerging technologies would need to play in order to achieve carbon dioxide reductions beyond those achievable with existing technology.”

Retire Coal – This scenario is identical to the Maximum Carbon Reduction

“Existing Technology scenario, except that it does not retire any existing natural gas generation. This scenario was designed to establish the lowest carbon dioxide emission level achievable by retiring all of the existing coal plants serving the region while assuming the continued operation of existing gas-fired generation. Since this resource strategy relies on existing gas generation rather than investing new resource development it could potentially have lower costs than the Maximum Carbon Reduction – Existing Technology scenario, but might produce similar carbon dioxide emissions. This scenario constructed based on public comment on the draft plan, and therefore was not considered during its development.”

Retire Coal with Social Cost of Carbon Mid-Range (Retire Coal w/SCC MidRange)

“This scenario is identical to Retire Coal scenario, except that it assumes that the US Interagency Working Group on Social Cost of Carbon’s Mid-

Range estimate of the damage cost of forecast global climate change are reflected in fossil fuel costs. This scenario was designed to test the cost, economic risk and carbon emissions impacts that internalizing the damage cost of climate change would have on the resource dispatch and development. It was assumed that this scenario's resource strategy would rely more on renewable resources. Therefore, this scenario assumes greater availability and lower solar PV system cost for both utility scale projects and distributed systems. This scenario was constructed based on public comment on the draft plan, and therefore was not considered during its development."

Retire Coal with Social Cost of Carbon Mid-Range and No New Gas Generation
(Retire Coal w/SCC MidRange & No New Gas)

"This scenario is identical to Retire Coal w/SCC MidRange scenario, except that it assumes that no new natural gas-fired generation resources can be constructed to replace retiring coal plants or existing gas generation if such plants are uneconomic to operate. This scenario was designed to test the cost, economic risk and carbon emissions impacts of restricting new resource development to renewable resources when compared to the Retire Coal w/SCC MidRange scenario. This scenario was constructed based on public comment on the draft plan, and therefore was not considered during its development."

To account for resource uncertainty, in addition to the above approaches, four additional scenarios were analyzed. "Four scenarios explored resource uncertainties and carbon dioxide regulatory compliance cost and economic risk. Two examined the effect that the loss of a major non-greenhouse gas-emitting resource might have on the region's ability to reduce power system carbon dioxide emissions. The Unplanned Major Resource Loss scenario assumed that a significant (approximately 1000 average megawatt) non-greenhouse gas emitting generator was unexpectedly taken out of service. The Planned Major Resource Loss scenario assumed that similar magnitudes of the region's existing non-greenhouse gas emitting resources were phased out over the next 20 years. Since both of these scenarios were designed to identify resource strategies that would maintain regional compliance with federal carbon dioxide emissions limits they assumed the cost of future carbon dioxide regulatory risk used in the Carbon Cost Risk scenario.

"The Planned Major Resource Loss scenario also provides insight into the resource implications that would occur in the event of the planned removal of any specific non-carbon resource in the region, including the removal of major hydroelectric projects such as the four federal dams on the lower Snake River. The lower Snake River dams have a combined nameplate capacity of 3,033 megawatts. However, because of limited reservoir storage, their useful peaking capability (e.g. 10-hour sustained-period capacity) ranges from about 1,700 to 2,000 megawatts, which represents about 11 percent of the aggregate hydroelectric system's sustained peaking capability. Annually, on average, these

four projects produce about 1,000 average megawatts of energy or about 5 percent of the region's annual average load.”

Four sensitivity analyses were performed:

- No Demand Response
- Low Natural Gas and Wholesale Electricity Prices
- Increased Market Reliance
- Lower Conservation

Fugitive Methane Emissions

Electric generation fueled by natural gas has significantly less CO₂ emissions than electric generation from coal. However, fugitive methane (a major component of natural gas) occurs during production, transportation and distribution with estimates as high as 10%.⁹ New production facilities now are coming in around 1%.

The Council's 7th Power Plan notes:

“...there is considerable uncertainty around such issues as whether its impacts compared to carbon dioxide are over or under-stated...and whether accounting for the methane emissions from coal production would also raise that fuel's full life-cycle climate impacts...”

“...will likely draw on gas production new wells which have lower fugitive emissions...”

“...unless new pipeline capacity is needed, fugitive emissions from pipeline leaks remain relatively constant...”

Thus, fugitive methane emissions need to be addressed but do not offset the benefit of lower overall CO₂ emissions when compared to electric generation from natural gas.

Washington and Oregon Commission-Jurisdictional Planning Treatment

All Washington and Oregon LDCs follow the protocols of the Council's Carbon Cost Risk approach:

⁹ Seventh Power Plan, Page 3-32

Puget Sound Energy

In its 2015 IRP, Puget Sound Energy modeled three CO2 prices: No Federal CO2 price (\$0/ton); Mid CO2 price (\$13/ton in 2016 to \$54/ton in 2035); High CO2 price (\$35/ton in 2020 to \$120/ton in 2035)

NW Natural Gas

In its “2016 IRP Draft for Public Comment,” for Oregon, a cost for carbon begins in 2021 at \$7/ton with \$28/ton in 2035 and for Washington; it starts at \$7/ton in 2017 with \$32/ton in 2035)

Avista

In its 2016 Natural Gas IRP: a carbon adder is included beginning in 2018 (\$10/ton), escalating to approximately \$20/ton (2035) based on cap and trade carbon policy

Cascade’s Current Efforts for Greenhouse Gas Reduction

Cascade’s conservation programs help reduce CO2 emissions by providing incentives to customers for a comprehensive set of prescriptive and custom energy efficiency upgrades designed to streamline their use of natural gas, thus reducing their overall carbon footprint. Space, water heating, and weatherization incentives drive positive energy behavior in customers’ homes and businesses. This leads to lowered demand, bill reductions, and overall carbon emission reductions in the communities Cascade serves (see Chapter 7 *Demand Side Management* for additional details).

In addition to the conservation of natural gas, the direct use of this resource can also be a significant source of carbon reduction. When natural gas is transported to electric generation facilities which, in turn, transmits electricity for customers’ end-uses (e.g., space heating, water heating, cooking, etc.), 50% to 75% of the Btu content of the power is lost when compared for the same end-uses which have been supplied by natural gas. According to the American Gas Association’s whitepaper, *Dispatching Direct Use: Achieving Greenhouse Gas Reductions with Natural Gas in Homes and Businesses*, a typical gas water heater uses half the energy of an electric resistance hot water heater, emits half the CO2, and costs less than half as much to operate on an annual basis. This opportunity for carbon savings applies to space heating equipment as well.

In fact, the Environmental Protection Agency recognizes source efficiency as the method utilized when assessing the energy efficiency value of conservation equipment and measures

<https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/difference>).

It is for these reasons that Cascade has encouraged the direct use of natural gas when paired with strong energy conservation measures. Accelerating this effort would be of benefit from both a demand response and a carbon reduction standpoint—a win for the community, company, and customers.

The natural gas industry is additionally focused on methane recapturing and leak prevention efforts. Cascade is monitoring these efforts, both nationally and regionally.

Proposed Direction

The Seventh Power Plan provides a considered rendition of carbon cost treatment for planning purposes. Cascade’s specific assumptions would benefit by following the Council’s Carbon Cost Risk approach yielding a \$10 per ton carbon adder in 2018, rising to \$30 per ton in 2035.

High and low ranges modeled to determine cost sensitivities and scenario planning provide alternative forecasting methodologies. Thus, sensitivities and impacts on prices are analyzed.