**SECTION 5**

**ENVIRONMENTAL CONSIDERATONS**

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**Overview**

New environmental regulations and policies are being proposed at the Washington, Oregon and federal levels. The purpose of these rules is to address greenhouse gas (GHG) emissions resulting from the use of fossil fuels. Considering Cascade is a natural gas distribution company, some of these regulations could have the potential to significantly increase Cascade’s operating costs.

**Key Points**

* State and federal agencies are proposing greenhouse gas (GHG) emission reduction regulations, which must be considered in the 2016 IRP.
* On September 15, 2016, the Washington Department of Ecology (Ecology) issued the final Washington Clean Air Act (CAA) Clean Air Rule (CAR) WAC-173-442. Preliminary im-pacts are still being discussed.
* The Northwest Power and Conservation Council analyzes eight analytical approaches for future carbon costs.
* Of these, the Council recom-mends the Carbon Cost Risk approach.
* Cascade models high and low ranges to examine carbon cost impacts on prices.

On October 23, 2015, the EPA published the final Clean Power Plan (CPP) rule that requires existing fossil fuel-fired electric generation facilities to reduce CO2 emissions. On February 9, 2016, however, the United States Supreme Court granted an application for a stay of the Clean Power Plan pending disposition of the applicants' petition for review in the D.C. Circuit Court and disposition of the applicants' petition for a writ of certiorari if such a writ is sought. The rule requires that states must, by September 6, 2016, either submit to the EPA a request for a two-year extension to submit a final state plan, or submit a plan demonstrating how emissions reductions will be achieved and include emission limits in the form of an annual emission cap or an emission rate that will be applied to each fossil fuel-fired electric generating facility within the state starting in 2022. Emission limits become more stringent from 2022 to 2030, with the 2030 emission limits applying thereafter. The effective date and compliance dates in the rule are expected to be addressed in a future decision made by the United States Supreme Court. However, Cascade does not own or operate any fossil-fired electric generation facilities and is not subject to the CPP.

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 adopted a standard that requires 50% of all electricity used in Oregon to be from renewable sources starting in 2040.

On September 15, 2016, the Washington Department of Ecology (Ecology) issued the final Washington Clean Air Act (CAA) Clean Air Rule (CAR) WAC-173-442 requiring greenhouse gas emission reductions from various industries in the state, including emissions from the combustion of natural gas supplied to end-use customers by natural gas distribution companies, such as Cascade. In 2017, Cascade must maintain emission of carbon dioxide equivalent (CO2e) less than or equal to its baseline emissions. Preliminary impacts from the rule are discussed in detail further below.

It is possible that other state or federal regulations and legislation may potentially be adopted in the future that could require Cascade to address GHG emissions. Cascade will continue to monitor GHG regulations and legislation for potential impacts to its operations and costs to customers.

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 (The 7th Plan) released in May, 2016.[[1]](#footnote-1) The 7th Plan builds on the Council’s previous work and has become the recognized standard for carbon analysis in the Pacific Northwest. Cascade believes the 7th Plan contains relevant CO2 costs for use in modeling cost impacts to natural gas distribution utilities.

The Council considered eight analytical approaches to establish future carbon costs.[[2]](#footnote-2) 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 Approaches: 1) Maximum Carbon Reduction-Existing Technology, 2) Maximum Carbon reduction-Emerging Technology, 3) Coal Retirement, 4) Coal Retirement with the Social Cost of Carbon, and 5) Coal Retirement with the Social Cost of Carbon and No New Gas.

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:

i. No Demand Response;

ii. Low Natural Gas and Wholesale Electricity Prices;

iii. Increased Market Reliance; and

iv. Lower Conservation.

The Council also discusses fugitive natural gas emissions in the Plan. 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.[[3]](#footnote-3) Fugitive methane emissions may 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 emitted is uncertain and that its contribution to greenhouse gas emissions is less than that of the electric industry.

Cascade’s 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 approach results in a $10/ton carbon cost adder to Cascade’s avoided costs in 2018 and $30/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.

In addition, Ecology’s constraints on emission reduction units (ERUs) for compliance with CAR makes it difficult to project their cost. Since Cascade has not conducted an analysis of ERU costs, the Company has applied NPCC’s prices to model preliminary cost impacts from CAR. Cascade expects the total cost projected in its modeling to be conservative since the model applies a price of CO2e to emissions from natural gas delivered to all customers, whereas CAR requires ERUs to be purchased for a portion of emissions from gas delivered to customers. Cascade will further evaluate ERU costs and compliance costs in the future as Ecology establishes Cascade’s baseline emissions value and emission reduction pathway, and considers the timing of a decision by the Washington Superior Court for Thurston County on the legality of CAR.

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

# **Purpose**

This section considers mandated state and federal GHG emission reduction policies and regulations directly impacting natural gas distribution companies. In addition, this section examines methodologies for applying a cost of carbon to natural gas distribution companies and identifies the assumptions made in determining a 20-year avoided cost of natural gas, and pairs these costs with associated two-year action items.

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 GHG emission reductions, and primarily CO2 emission reductions.

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

## **The National Focus**

The EPA has applied Clean Air Act, Section 111(d) 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 U.S. Supreme Court stayed implementation of the proposed rules in February 2015 and oral arguments were heard on September 27, 2016 in the District of Columbia Circuit Court of Appeals. The timing of its findings is indeterminate.

## **Washington**

On September 15, 2016, the Washington Department of Ecology (Ecology) issued the final Washington Clean Air Act (CAA) Clean Air Rule (CAR) WAC-173-442 requiring greenhouse gas emission reductions from various industries in the state, including emissions from the combustion of natural gas supplied to end-use customers by natural gas distribution companies, such as Cascade. On the same date, Ecology finalized requirements for reporting GHG emissions from natural gas distributors under WAC 173-441. In 2017, Cascade must maintain emissions of CO2e less than or equal to its baseline emissions. Cascade’s baseline emissions will be set by Ecology using the average emissions from natural gas consumption by Cascade’s customers between 2012 and 2016. Beginning in 2018, Cascade must meet an emissions reduction pathway that decreases 1.7% each year from its emissions baseline or must acquire emissions offsets equal to the amount of emissions in excess of Cascade’s emission reduction pathway.

Cascade plans to obtain emissions offsets to comply with CAR because natural gas delivery pipelines are not emission sources and Cascade has an obligation to meet the natural gas demand of its customers. Emission offsets consist of either in-state emission reduction units (“ERUs”) or, to a limited and declining extent, out-of-state allowances from states or provinces that have established multi-sector greenhouse gas programs. Under CAR, each metric ton (MT) of CO2e that a covered party emits that exceeds the covered party’s compliance obligation and is not covered by an emission offset is a separate violation of CAR. Thus, failure to obtain sufficient emissions offsets could subject Cascade to state CAA enforcement.

Cascade has significant concerns about the legal underpinnings of the CAR. It is Cascade’s position that Ecology does not have authority to implement a program to limit statewide greenhouse gas emissions, particularly a trading program based on ERUs. Cascade also maintains that Ecology does not have authority to regulate non-emitting sources for their customers’ emissions. Cascade expressed these concerns in comments on the proposed rule that preceded CAR, which were submitted to Ecology on July 22, 2016. Ecology failed to address Cascade’s comments in the final CAR.

On September 27, 2016 and September 30, 2016, Cascade and three other natural gas distribution utilities jointly filed complaints in the United States District Court for the Eastern District of Washington and the State of Washington Thurston County Superior Court, respectively, challenging the legal underpinnings of CAR. While a decision from the state court may possibly be issued some time in 2017, CAR is final and remains in effect, Cascade must plan accordingly for compliance while the legal issues are resolved.

# **Compliance Obligations Under CAR**

CAR includes natural gas distributors in the scope of required emissions reductions under WAC 173-442-010. Cascade is a Covered Party under CAR as the Company is a natural gas distributor per WAC 173-442-020(k). WAC 173-442-020(j)(iii) then identifies CO2 emissions that are reported to EPA under 40 CFR 98 Subpart NN as the covered emissions for natural gas distributors.

## **Baseline Emissions**

First, Cascade reviewed previous GHG reporting reports it submitted to EPA according to 40 CFR 98 Subpart NN. Using the data provided for those reports, Cascade estimated the approximate gas delivered to customers (assumed to be core customers and customers that are not considered covered parties themselves) for 2012 to 2016 and provides that data in Table 5-1 below. Cascade believes this would be the quantity of natural gas delivered to customers to be used in estimating Cascade’s baseline GHG emissions value according to the rule.

**Table 5-1: Estimated Quantity of Gas Delivered to Customers for Determining Cascade’s Baseline GHG Emissions**

(pending consultation with Ecology in 2017)

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Total Gas Received by Cascade from Suppliers (Mscf) | Approximate Gas Delivered to Customers Considered Covered Parties Themselves (Mscf) | Approximate Gas Delivered to Customers to Establish Cascade’s Baseline (Mscf) |
| 2012 | 80,068,497 | 38,009,461 | 42,059,036 |
| 2013 | 94,336,926 | 52,968,305 | 41,368,621 |
| 2014 | 91,569,922 | 45,956,078 | 45,613,844 |
| 2015 | 90,932,690 | 52,301,573 | 38,631,117 |
| 2016 (projected) | 92,069,349 (1.25% projected growth from 2015) | 50,408,652 (average from 2013-2015) | 41,660,697 |
| 2012-2016 Average | 89,786,383 | 47,928,814 | 41,866,663 |

Next, Cascade estimated the CO2 emissions resulting from Cascade’s delivery of gas to customers that would not be considered covered parties themselves and includes that data in Table 5-2. Ecology states in the rule that a baseline GHG emissions value will be calculated in metric tons (MT) of CO2 equivalent (CO2e). Further discussion will be planned with Ecology at a future date on whether the CO2 emissions under 40 CFR 98 Subpart NN are different than what Ecology considers for CO2e emissions in this section of the rule for natural gas distribution companies. At this time Cascade is using CO2 as calculated under Subpart NN for estimating CO2/CO2e per WAC 173-442-020(j)(iii).

According to Table 5-2, CO2 emissions from natural gas delivery to customers are greater than 70,000 MT per year and, thus, Cascade is considered a Category 1 covered party per WAC 173-442-50(1)(a). For Category 1 covered parties, a baseline GHG emissions value is determined according to WAC 173-442-050(2)(a) and (3). From these requirements Cascade projects its approximate baseline emission value would be equivalent to the 2012 to 2016 average annual emissions from delivery of natural gas to customers that are not themselves covered parties under CAR. This value is estimated at approximately 2,277,546 MT per year of CO2. Cascade must submit emission calculations for 2012 to 2016 to Ecology as required by March 31, 2017 and will contact Ecology to discuss emission calculations before submitting. Ecology must then establish a final baseline emissions value for Cascade through a regulatory order by January 30, 2018.

**Table 5-2: Estimated Baseline GHG Emissions Value for Cascade**(pending consultation with Ecology in 2017)

|  |  |  |
| --- | --- | --- |
| Year | Approximate Gas Delivered to Customers to Establish Cascade’s Baseline (Mscf) | Annual Emissions, (MT of CO2)  [Mscf x 0.0544 MT CO2/Mscf] |
| 2012 | 42,059,036 | 2,288,012 |
| 2013 | 41,368,621 | 2,250,453 |
| 2014 | 45,613,844 | 2,481,393 |
| 2015 | 38,631,117 | 2,101,533 |
| 2016 (projection) | 41,660,697 | 2,266,342 |
| 2012-2016 Average Delivery to Customers and Estimated Baseline GHG Emissions Value | 41,866,663 | **2,277,546** |

## **Compliance Pathway**

In 2017, the GHG reduction pathway for Cascade is equivalent to the baseline emissions of approximately 2,277,546 metric tons (MT) of CO2. As mentioned above, the emission reduction pathway decreases annually by an additional 1.7% of Cascade’s baseline emissions value. In calendar year 2036, the emission reduction pathway remains constant at the value calculated for 2035.

Table 5-3 represents Cascade’s preliminary estimated baseline emissions value and emission reduction pathway from 2017 to 2035, showing emissions allowed each year.

**Table 5-3: Preliminary Baseline GHG Emission Value and Projected Emission Reduction Pathway for Cascade**

|  |  |  |
| --- | --- | --- |
| Year | Cascade’s Baseline Emissions Value (MT of CO2) | Potential Emission Reduction Pathway or Emissions Allowed Each Year (MT of CO2) |
| 2017 | 2,277,546 | 2,277,546 |
| 2018 | 2,277,546 | 2,238,828 |
| 2019 | 2,277,546 | 2,200,110 |
| 2020 | 2,277,546 | 2,161,392 |
| 2021 | 2,277,546 | 2,122,673 |
| 2022 | 2,277,546 | 2,083,955 |
| 2023 | 2,277,546 | 2,045,237 |
| 2024 | 2,277,546 | 2,006,518 |
| 2025 | 2,277,546 | 1,967,800 |
| 2026 | 2,277,546 | 1,929,082 |
| 2027 | 2,277,546 | 1,890,364 |
| 2028 | 2,277,546 | 1,851,645 |
| 2029 | 2,277,546 | 1,812,927 |
| 2030 | 2,277,546 | 1,774,209 |
| 2031 | 2,277,546 | 1,735,490 |
| 2032 | 2,277,546 | 1,696,772 |
| 2033 | 2,277,546 | 1,658,054 |
| 2034 | 2,277,546 | 1,619,336 |
| 2035 | 2,277,546 | 1,580,617 |

By January 30, 2018, Ecology is required to issue a regulatory order per WAC 173-442-200(6) to Cascade which will contain the official emission reduction pathway in units of metric tons of CO2e for each calendar year in the compliance period and the total reduction pathway for each compliance period.

Table 5-4 shows a preliminary comparison of Cascade’s greenhouse gas emission reduction pathway, projected gas delivery to customers that are not covered parties themselves under CAR, and the resulting projected annual compliance emissions obligation for Cascade. The projected gas delivery to customers assumes a 1.25% annual forecasted growth in demand. Considering this growth rate and that 2016 is yet a projection of emissions, Cascade projects emissions from natural gas deliveries in 2017 to exceed its baseline emission value, as shown in Table 5-4. As such, Cascade will be required to reduce its emissions consistent with CAR beginning in 2017. Future increases in natural gas delivery coupled with Cascade’s declining emission reduction pathway increase Cascade’s compliance burdens under CAR.

**Table 5-4: Preliminary Annual Compliance Obligation for Cascade**

|  |  |  |  |
| --- | --- | --- | --- |
| Year | Projected Emission Reduction Pathway or Emissions Allowed Each Year (MT of CO2) | Projected Emissions, assuming 1.25% Annual Growth for Cascade Gas Delivered (MT of CO2­) | Compliance Obligation (MT of CO2) |
| 2017 | 2,277,546 | 2,294,671 | 17,125 |
| 2018 | 2,238,828 | 2,323,355 | 84,526 |
| 2019 | 2,200,110 | 2,352,396 | 152,287 |
| 2020 | 2,161,392 | 2,381,801 | 220,410 |
| 2021 | 2,122,673 | 2,411,574 | 288,901 |
| 2022 | 2,083,955 | 2,441,719 | 357,764 |
| 2023 | 2,045,237 | 2,472,240 | 427,003 |
| 2024 | 2,006,518 | 2,503,143 | 496,625 |
| 2025 | 1,967,800 | 2,534,432 | 566,632 |
| 2026 | 1,929,082 | 2,566,113 | 637,031 |
| 2027 | 1,890,364 | 2,598,189 | 707,826 |
| 2028 | 1,851,645 | 2,630,667 | 779,021 |
| 2029 | 1,812,927 | 2,663,550 | 850,623 |
| 2030 | 1,774,209 | 2,696,844 | 922,636 |
| 2031 | 1,735,490 | 2,730,555 | 995,064 |
| 2032 | 1,696,772 | 2,764,687 | 1,067,915 |
| 2033 | 1,658,054 | 2,799,245 | 1,141,192 |
| 2034 | 1,619,336 | 2,834,236 | 1,214,900 |
| 2035 | 1,580,617 | 2,869,664 | 1,289,047 |

WAC requires compliance to be demonstrated at the end of each compliance period as explained in WAC 173-442-200. Each compliance period is a three-year period with the first period from 2017 to 2019. As required by WAC 173-442-250, Cascade must submit its first compliance demonstration report by December 31, 2020, to Ecology, providing the required verification that sufficient qualifying ERUs have been purchased to cover emissions above Cascade’s emission reduction pathway.

## **Emission Offsets**

Cascade continues to evaluate options for purchasing ERUs and allowances to cover emissions above the projected emission reduction pathway. Per WAC 173-442-100, ERUs must originate from greenhouse gas emission reductions occurring within Washington; per WAC 173-442-170, a limited amount of allowances also may be used for compliance.

The price of ERUs is unknown at this time. Ecology’s constraints on ERUs make it difficult to project their cost. Considering Cascade’s modeling applies a price of CO2 to all emissions from natural gas delivered to all customers and CAR only requires compliance with a portion of these emissions, the total carbon cost from Cascade’s modeling is expected to be conservative. Cascade will further evaluate ERU costs and compliance costs in the future as Ecology establishes Cascade’s baseline emissions value and emission reduction pathway, and considers the timing of a decision by the Washington Superior Court for Thurston County on the legality of CAR.

Initiative 732 (I-732 or “Clean Energy Future”) appeared on the November 2016 ballot and would have charged a carbon tax of $25/ton of carbon, lowered the sales tax by 1%, granted a tax rebate of up to $1,500 annually to 400,000 low income families, and eliminated the business and occupation (B&O) tax on manufacturing. On November 8th, Washington voters rejected this measure with the percentage vote being 59% against.

Potential other carbon initiatives are in-progress, such as one that may be introduced by environmental and labor advocates.[[4]](#footnote-4) 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. However, Cascade’s operations are not directly impacted by these two policies.

## **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).

It is possible that other state or federal regulation and legislation may potentially be adopted in the future that could require Cascade to address GHG emissions. Cascade will continue to monitor GHG regulation and legislation for potential impacts to natural gas distribution companies.

**The Regional Focus**

The Northwest Power Planning and Conservation Council’s mission is to ensure, with public participation, an affordable and reliable energy system while enhancing fish and wildlife in the Columbia River Basin. The Northwest Power Planning and Conservation Council develops electric generation system plans for the Pacific Northwest and recently approved its 7th Power Plan (May 2016). Significant discussion, analyses, and scenarios regarding CO2 are contained in Chapters 3 and 15 of the 7th Plan. These will be addressed in the following subsection (“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.[[5]](#footnote-5)

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# **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. According to a report commissioned by the Natural Gas Council, fugitive methane emissions comprise 10.6% of U.S. anthropogenic GHG emissions. However, methane emissions from the natural gas industry comprise 2.6% of total emissions. Furthermore, emissions from natural gas system themselves represented only about 1.4% of the volume of methane in U.S. natural gas produced in 2014.[[6]](#footnote-6)

The Council’s Seventh 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:

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, Northwest Natural Gas includes a cost for carbon beginning in 2021 at $7/ton with $28/ton in 2035 for Oregon; for Washington; the carbon adder 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 Section 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, transmit 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 to 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.[[7]](#footnote-7)

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.

In addition, the natural gas industry is focused on methane recapturing and leak prevention efforts. Cascade is monitoring these efforts, both nationally and regionally and has made commitments in one of these areas in particular.

Most recently, Cascade became a Founding Partner of the EPA’s Natural Gas Star Methane Challenge Program. As a Founding Partner, Cascade has voluntarily chosen to participate in the program under the Best Management Practice (BMP) Commitment – Excavation Damages within the natural gas distribution sector. The BMP Commitment entails a Partner commitment to company-wide implementation of BMPs to reduce methane emissions. During the initial commitment timeframe, Cascade will conduct incident analyses on all excavation damages and report the relevant data to EPA. Cascade is also exploring other voluntary actions which could reduce methane emissions resulting from excavation damage. Cascade’s operational and infrastructure changes have resulted in lower methane emissions, and therefore lower GHG emissions, in the State of Washington.

# **Proposed Direction**

As mentioned above, the Council’s 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/ton carbon adder in 2018, rising to $30/ton in 2035.

High and low ranges modeled to determine cost sensitivities and scenario planning provide alternative forecasting methodologies. As mentioned above in discussion on CAR impact, Cascade believes significant uncertainty remains regarding the cost of compliance. As ERU costs are more clearly defined, and actual offset markets develop in the state, the Company will be able to more effectively model in impacts of this rule. In the meantime, sensitivities and impacts on prices have analyzed, with expanded analysis occurring as more information becomes available.

1. 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. [↑](#footnote-ref-1)
2. Seventh Power Plan, pages 3-7 to 3-14 [↑](#footnote-ref-2)
3. Seventh Power Plan, pages 3-31 to 3-32 [↑](#footnote-ref-3)
4. Based on discussions with environmental advocates. [↑](#footnote-ref-4)
5. 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 [↑](#footnote-ref-5)
6. Finding the Facts on Methane Emissions: A Guide to the Literature, ICF International on Behalf of The Natural Gas Council, http://www.ngsa.org/download/analysis\_studies/NGC-Final-Report-4-25.pdf [↑](#footnote-ref-6)
7. *See* <https://www.energystar.gov/buildings/facility-owners-and-managers/existing-buildings/use-portfolio-manager/understand-metrics/difference>). [↑](#footnote-ref-7)