CASCADE NATURAL GAS CORPORATION®

A Subsidiary of MDU Resources Group, Inc.

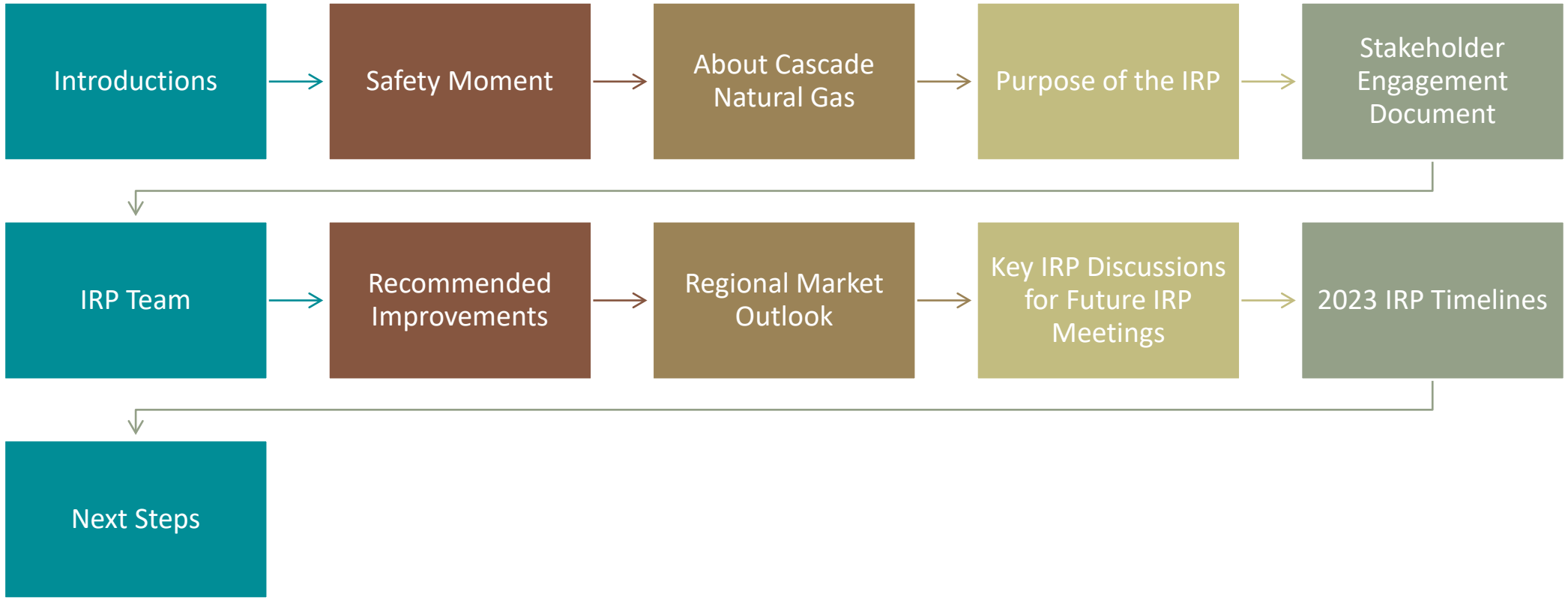
In the Community to Serve®

Integrated Resource Plan Technical Advisory Group Meeting #1

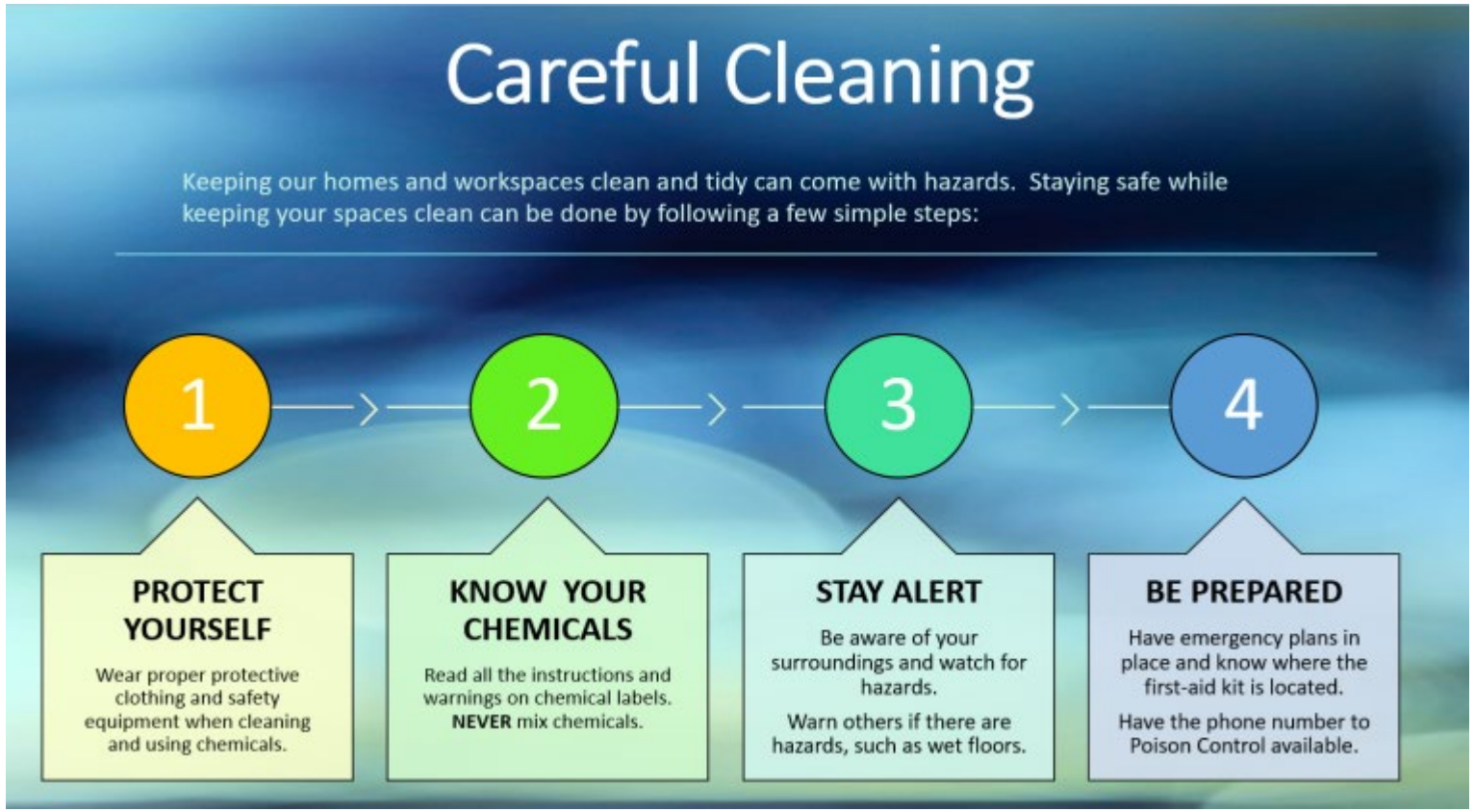
MARCH 30, 2022

MICROSOFT TEAMS/TELECONFERENCE

Agenda

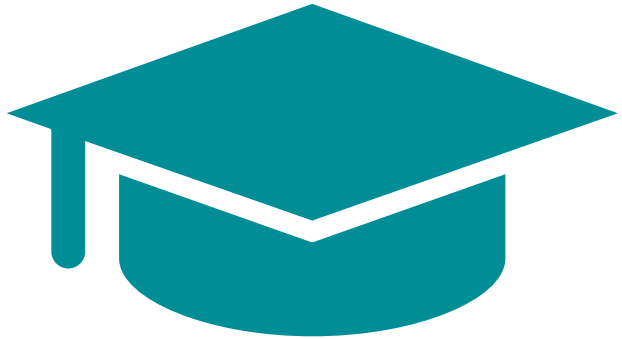

Introductions
Safety Moment
About Cascade Natural Gas
Purpose of the IRP
Stakeholder Engagement Document
IRP Team
Recommended Improvements
Regional Market Outlook
Key IRP Discussions for Future IRP Meetings
2023 IRP Timelines
Next Steps

Safety Moment



A Little History Lesson…

- Prior to 1955, natural gas was virtually unheard-of in the Pacific Northwest. Seeing an opportunity, Lester Pettit, Spencer Clark, and Stewart Matthews led a group of associates to form a company that would rise to the challenge. Cascade Natural Gas Corporation was incorporated January 2, 1953.
- In July 2007, Cascade was acquired by MDU Resources headquartered in Bismarck, ND.
  - Founded in 1924 as an electric utility.
  - Core businesses are construction, gas & electric utilities, and pipeline.
  - Approximately 13,000 employees, operating in 43 states.
  - Operates four utilities across eight states:
    - Montana-Dakota Utilities Co.
    - Great Plains Natural Gas Co.
    - Cascade Natural Gas Corporation
    - Intermountain Gas Co.



Today We Are...

Cascade serves more than 305,500 customers in 95 communities – 67 of which are in Washington and 28 in Oregon. Cascade's service areas are concentrated in western and central Washington and central and eastern Oregon.

Cascade serves a diverse territory covering more than 32,000 square miles and 700 highway miles from one end of the system to the other. Interstate pipelines transmit Cascade's natural gas from production areas in the Rocky Mountains and western Canada.

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Purpose of IRP

IRP Guidelines and Content

Washington

- IRP Guidelines from WUTC WAC 480-90-238.

Oregon

- IRP Guidelines under Order No. 07-002 as set forth in the Oregon Administrative Rule (OAR) 860-027-0400.

Casade's Basic Philosophy

- Primary purpose of Cascade's long-term resource planning process has been, and continues to be, to inform and guide the Company's resource acquisition process, consistent with state regulatory requirements.
- Input and feedback from the Company's Technical Advisory Group (TAG) is an important resource to help ensure that CNGC's IRP is developed from a broader perspective than Cascade could have on its own.
- As the scope of the IRP continues to expand, Cascade is committed to securing and supporting the appropriate internal and external resources necessary to work with all stakeholders to produce an Integrated Resource Plan that meets the requirements of Washington and Oregon.

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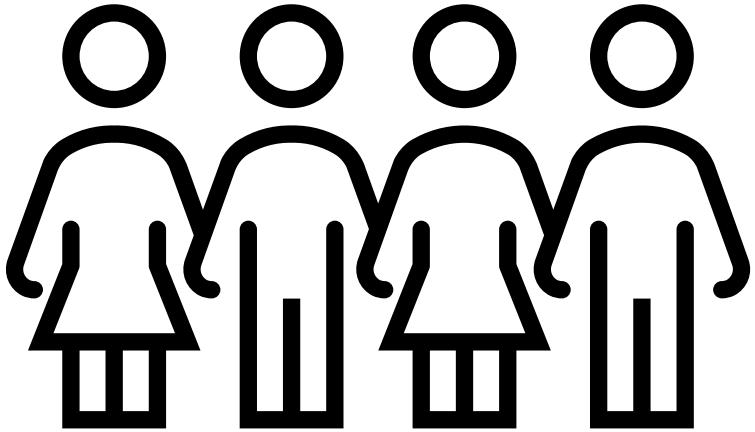

Stakeholder Engagement Document

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"Cascade seeks to employ best industry practices and recognizes external participation can add incremental improvements.

Cascade recognizes stakeholders have a multitude of projects before them. This Design Document is intended to assist in optimizing participation by interested parties to yield a solid IRP to the benefit of customers and the Company."

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CASCADE NATURAL GAS STAKEHOLDER ENGAGEMENT DESIGN DOCUMENT

Abstract

This document contains the rational, assumptions, and explanation behind the Stakeholder Engagement process of Cascade's IRP Process

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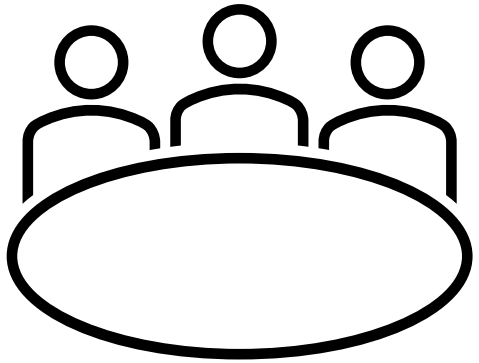


IRP Team

LAST NAME	FIRST NAME	TITLE	COMPANY
Archer	Pam	Regulatory Analyst IV	Cascade
Blattner	Lori	Director, Regulatory Affairs	Cascade/Intermountain
Burin	Kary	Supervisor, Energy Efficiency	Cascade
Campbell	Kathleen	Senior Engineer	MDU
Chiles	Mark	Vice President, Customer Service and Regulatory Affairs	Intermountain
Connell	Kevin	Director, Gas Supply	MDU
Cowlishaw	Monica	Manager, Energy Efficiency & Community Outreach	Cascade
Cunnington	Brian	Manager, Industrial Services	Cascade
Darras	Patrick	Vice President, Engineer & Operations Services	MDU
Davis	Ashton	Resource Planning Economist II, Gas Supply	Cascade
Folsom	Bruce	Consultant	Bruce W Folsom Consulting LLC
Goodman	Chad	Enterprise Endpoint Administrator, Associate	MDU
Hodges	Becky	Financial Analyst IV	Cascade
Hoyle	Brian	Financial Analyst II	Cascade
Krebsbach	Abbie	Director, Environmental	MDU

INTERNAL TEAM MEMBERS OF CNGC'S INTEGRATED RESOURCE PLAN

LAST NAME	FIRST NAME	TITLE	COMPANY
Madison	Scott	Executive Vice President, Business Development and Gas Supply	MDU
McGreal	Devin	Senior Resource Planning Economist, Gas Supply	Cascade
Myhrum	Isaac	Regulatory Analyst II, Regulatory Affairs	Cascade
Nygard	Tammy	Controller	MDU
Parvinen	Mike	Manager, Regulatory Affairs II	Cascade
Robbins	Chris	Manager, Gas Supply and Control- CNGC/IGC	Cascade/ Intermountain
Robertson	Brian	Supervisor, Resource Planning, Gas Supply	Cascade
Sellers-Vaughn	Mark	Manager, Supply Resource Planning	Cascade
Senger	Garret	Executive Vice President, Regulatory, Customer Service and Administration	MDU
Sorensen	Renie	Manager, Engineering	Cascade
Spector	Alyn	Manager, Conservation Policy	Cascade
Stone	Carolyn	Gas Supply Analyst III	Cascade
Storvick	Jon	Conservation Analyst II	Cascade
Goodman	Chad	Enterprise Endpoint Administrator, Associate	MDU
Wood	Eric	Supervisor, Gas Supply	Cascade/ Intermountain

INTERNAL TEAM MEMBERS OF CNGC'S INTEGRATED RESOURCE PLAN

Recommended IRP Improvements from WUTC

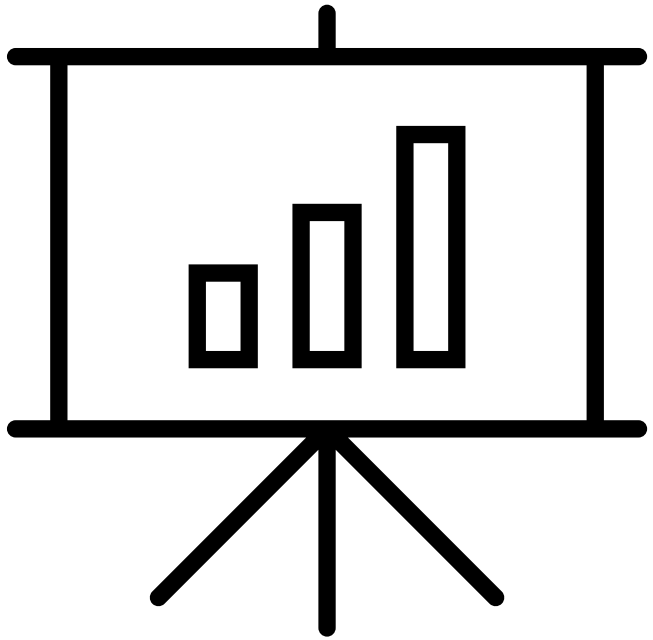
- Impact of Legislation Enacted in 2021
- Impacts of COVID-19 Pandemic
- Peak Day Standard
- Impacts of Climate Change
- Upstream Greenhouse Gas Emission Accounting
- Avoided Cost Formula
- Impacts of Electrification and Natural Gas "Bans"
- Renewable Natural Gas Modeling and Evaluation Tool
- Validation of Methods
- Encouraging Participation in the IRP Process by Additional Stakeholders

Docket UG-190714 WUTC Comments: https://www.utc.wa.gov/casedocket/2019/190714/docsets

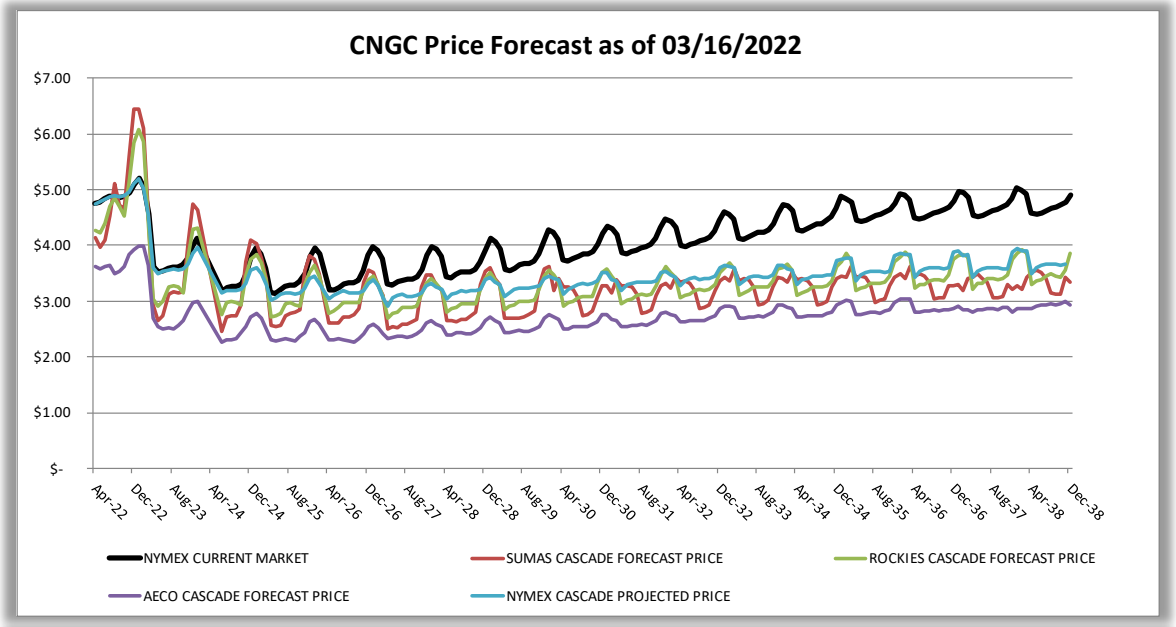
Recommended IRP Improvements from OPUC

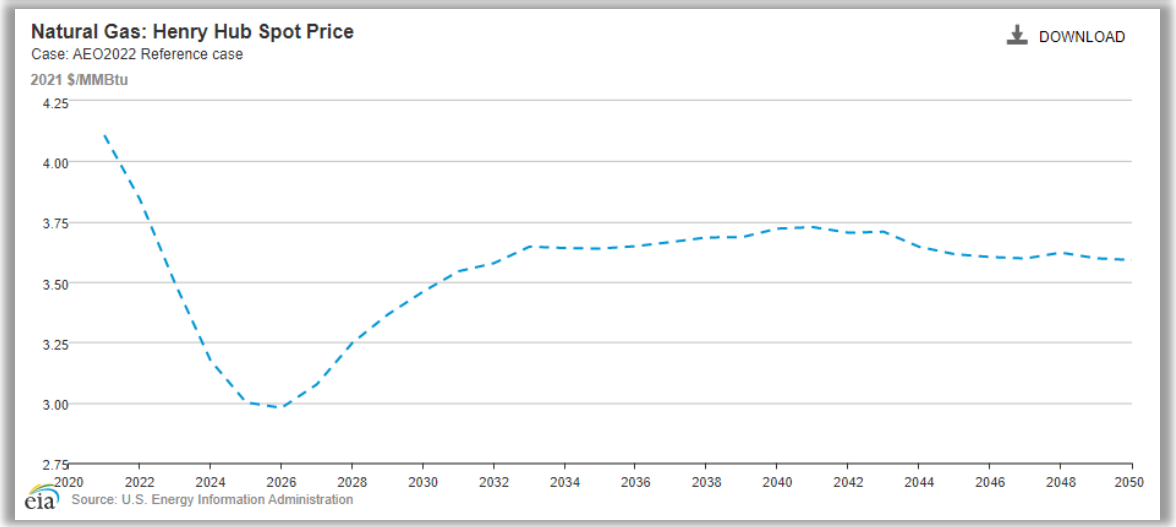
- Include price as an explanatory variable in its demand forecast
- Publish variables included in the model as part of an appendix
- Provide an update to the Company's current and proposed future efforts to use DSM in avoiding infrastructure upgrades and hold a workshop to describe these efforts in the next IRP cycle
- Include an explanation of how the Washington RNG program may interact with programs being developed for customers in Oregon and whether RNG programs developed in Oregon might be used to comply with laws in other states
- Revisit the stochastic modeling and reduce the frequency of Enbridge rupture type events in its Sumas gas price forecasts
- In a 2022 IRP Technical Advisory Group (TAG) meeting, incorporate gas price forecasts and price shocks into the discussion and work with Staff and stakeholders to potentially update its methodology
- Continue to work with Staff and stakeholders through UM 1893 on refining distribution costs avoided through energy efficiency for use in its 2022 IRP
- Host a workshop with Staff prior to or at the beginning of the 2022 cycle to consider options for improved communication among the Company and stakeholders

LC 76 Staff Final Order: https://apps.puc.state.or.us/orders/2021ords/21-127.pdf



Regional Market Outlook





Regional Market Outlook – Long Term

The EIA's Annual Energy Outlook for 2022 was released earlier this month. The reference case shows "projected natural gas prices stay below $4.00 per million British thermal units (MMBtu) for most of the projection period." This lines up with Cascade's price forecast. [1]

According to the EIA's 2022 Annual Energy Outlook, natural gas exports will continue to grow through 2025, and natural gas production will ramp up after 2025 in order to meet the growing export demand. [1]

The EIA expects natural gas consumption to grow but only because natural gas prices are expected to remain low. The industrial sector is projected to be the largest share. [1]

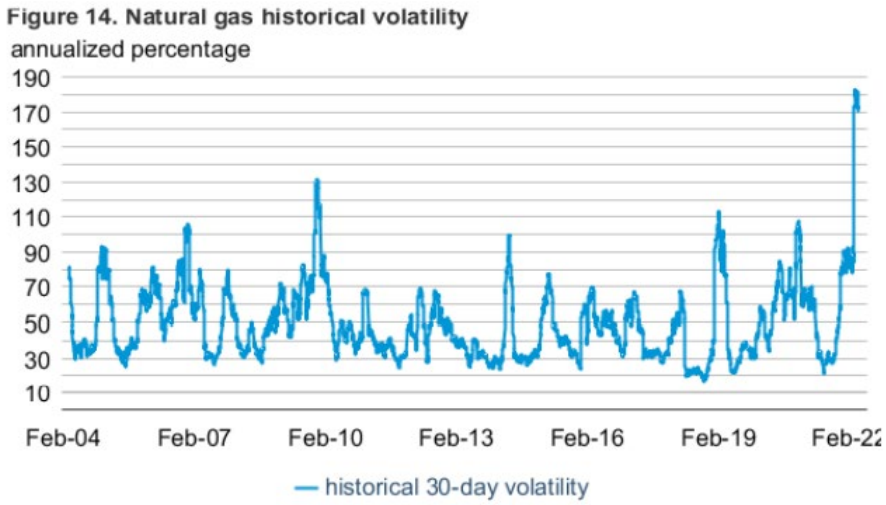
[1] Annual Energy Outlook 2022 - U.S. Energy Information Administration (EIA)

Regional Market Outlook Short-Term

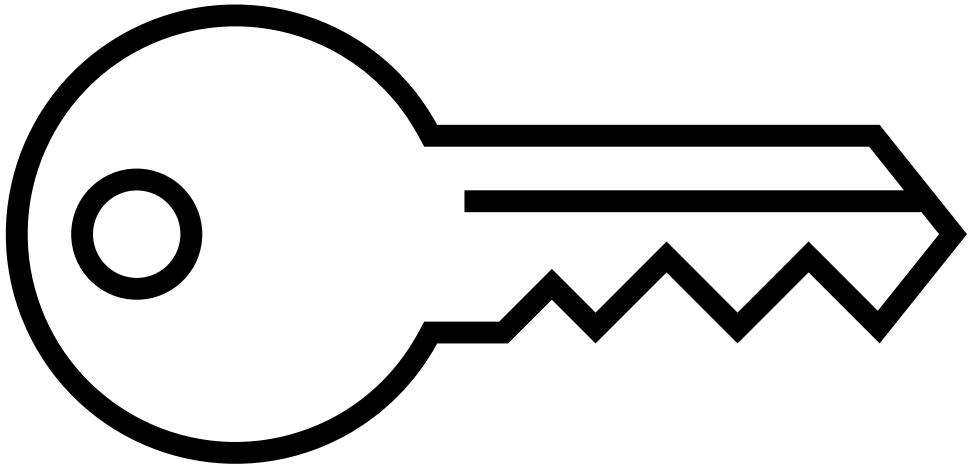
Both OR and WA legislative sessions ended early March. Cascade is continuing to monitor any bills that relate to natural gas, such as ones that address greenhouse gas emissions in new buildings.

According to Cascade's hedging consultant, "Recurring winter weather and dramatic geopolitical uncertainty have placed a spotlight on global gas supply and resulted in an elevated risk premium in NYMEX prices throughout 2022."

February 2022 saw record high natural gas price volatility at 179.1%, based on rolling front-month contracts. With the market volatility in the near term, Cascade's hedging program is more important than ever. [1]



[1] Short-Term Energy Outlook - U.S. Energy Information Administration (EIA)



Key IRP Discussions for Future IRP Meetings

Load Forecast

The Company currently utilizes an Autoregressive Integrated Moving Average (ARIMA) methodology with Fourier terms to predict customer count and usage.

Cascade uses a 60-degree reference temperature to calculate HDDs.

Multiple scenarios are analyzed such as high/low growth, warm/cold weather, peak day events, etc.

Cascade has continued to evaluate other potential predictors. This IRP will see price introduced as a potential regressor for use-per-customer. Cascade also performs cross-validation on its models to ensure accurate forecasts and assumptions are being made.

Customer Forecast

Model: $C^{CG,Class} = \alpha_0 + \alpha_1 Pop^{CG} + \alpha_2 Emp^{CG} + Fourier(k) + ARIMA\varepsilon(p,d,q)$

Model Notes:

C = Customers; CG = Citygate; Class = Residential, Commercial, Industrial, or Interruptible; ARIMAε(p,d,q) = Indicates that the model has p autoregressive terms, d difference terms, and q moving average terms; Pop = Population; Emp = Employment; Fourier(k) = Captures seasonality of k number of seasons.

Use-Per-Customer Forecast

Model:

$$Therms/C^{CG,Class} = \alpha_0 + \alpha_1 HDD^{CG,D} + \alpha_2 Wind^{CG,D} + \alpha_3 I_w + ARIMA\varepsilon(p,d,q)$$

Model Notes:

Therms/C = Therms per customer; CG = Citygate; Class = Residential, Commercial, Industrial, or Interruptible; HDD = Heating Degree Days; Wind=Average Windspeed; D= Day; I_w = Indicator Variable set to 1 if it is a weekend; ARIMAε(p,d,q) = Indicates that the model has p autoregressive terms, d difference terms, and q moving average terms.

New variable to introduce as possible regressor: Price

Hedging

Cascade has continued to strengthen the qualitative and quantitative analytics that have informed its hedging practices, to the benefit of its customers.

- The Company entered into a call option in August of 2021, the first of Cascade's modern hedging program, which proved to be very beneficial during elevated winter pricing in 2021.
- The Retrospective reports of the 2021 and 2020 Annual Hedge Plans reported gains of $4.6 million in the 2020-2021 hedge season, and $1.5 million in the 2019-2020 hedge season.
- The 2022 Annual Hedge Plan, which will include the 2021-2022 retrospective report, will be filed on or before September 15th, 2022.

Avoided Cost

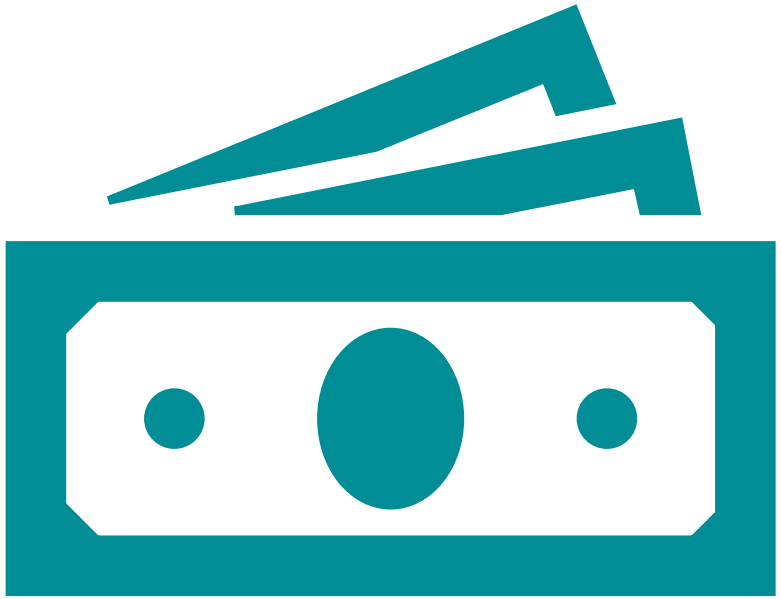
Cascade is continuing to work towards refining its avoided cost calculation by incorporating feedback from stakeholders.

- The Company will now apply the 10% environmental adder as recommended by the Northwest Power and Conservation Council to all elements of the avoided cost.
- The Company is reevaluating its distribution system cost calculation methodology, which will be discussed further in TAG 3.
- The Company is also considering modifications to its risk premium calculation, to align the process its other risk-based calculations.

Discussion question: Avoided Cost in a post CCA/CPP world?

Avoided Cost Formula

$$AC_{nominal} = (TC_f + TC_v + SC_f + SC_v + (CC + C_{Compliance}) + (DSC * HM) + RP) * E_{adder}$$



Where:

$AC_{nominal}$ = The nominal avoided cost for a given year. To put this into real dollars you must apply the following: Avoided Cost/(1+discount rate)^Years from the reference year.

TC_f = Incremental Fixed Transportation Costs

TC_v = Variable Transportation Costs

SC_f = Incremental Fixed Storage Costs

SC_v = Variable Storage Costs

CC = Commodity Costs

$C_{Compliance}$ = Carbon Compliance Costs, SCC for both states

E_{adder} = Environmental Adder, as recommended by the Northwest Power and Conservation Council

DSC = Distribution System Costs

HM = Hourly Modifier

RP = Risk Premium

Energy Efficiency

We are restructuring our Energy Efficiency (EE) department into a regional Western Team. Goal is to assess and leverage resources to meet increasing sustainability requirements

Electrification would impact Cascade's savings potential across both states

Oregon Demand Side Management

- Energy Trust to submit savings potential end of August for the IRP forecast
- In light of Department of Environmental Quality's Climate Protection Program and 2050 carbon reduction goals Energy Trust can accelerate uptake of discretionary efficiency resources based on budget and testing for impact
- Cascade is reviewing how to provide and fund EE to Transport customers. We are exploring how to determine potential, and Energy Trust is open to serving them through a variety of options depending on regulatory direction
- We are seeking to expand our engagement and are working on targeted opportunities in select communities
- Energy Trust is planning scenarios to adjust EE projections based on assumptions to changing gas loads through electrification

Energy Efficiency

Washington Demand Side Management

- This is the first IRP where Cascade is working from a Biennial Conservation Plan pursuant to RCW 80.28.380. Per Conditions in Docket UG-210838 this includes requirements to:
  - Inform its Conservation Advisory Group (CAG) members of IRP meetings addressing the Company's gas price forecasts and resource cost assumptions
  - To focus on public engagement, in coordination with the Resource Planning Team
  - Evaluation, Measurement and Verification including ongoing third-party review
  - Current Conservation Potential Assessment (CPA) is from 2021, next CPA will be in 2023
- Proposed WA State code change and local electrification through natural gas bans will affect potential identified through LoadMAP and will need to be addressed in the IRP

Decarbonization Planning

Compliance with Washington's CCA and Oregon CPP are a key tenet of Cascade's 2023 IRP

The Company is exploring a number of ways to reduce its emissions from both a demand-side and supply-side perspective

Accounting for upstream emissions varies by state

The Company is optimistic that it will be able to use its new resource optimization software to set emissions reduction targets as a hard constraint in its resource integration modeling

Environmental Policy

- Provide environmental regulatory interpretation and compliance support and policy review for all Company facilities and operations across all eight states.
- Collaborate across the company and with many external stakeholders on decarbonization planning and sustainability strategies.
- There are six full time employees - scientists, engineers, a certified hazardous material manager, and are expanding the department to support decarbonization and sustainability programs for Cascade and across company.
- Review and draft the Environmental Policy section of IRP in collaboration with the resource planning team.

Renewables

Cascade is in the planning stages of program development of RNG supply for customers per HB1257 and SB98 and associated rules and policy statements.

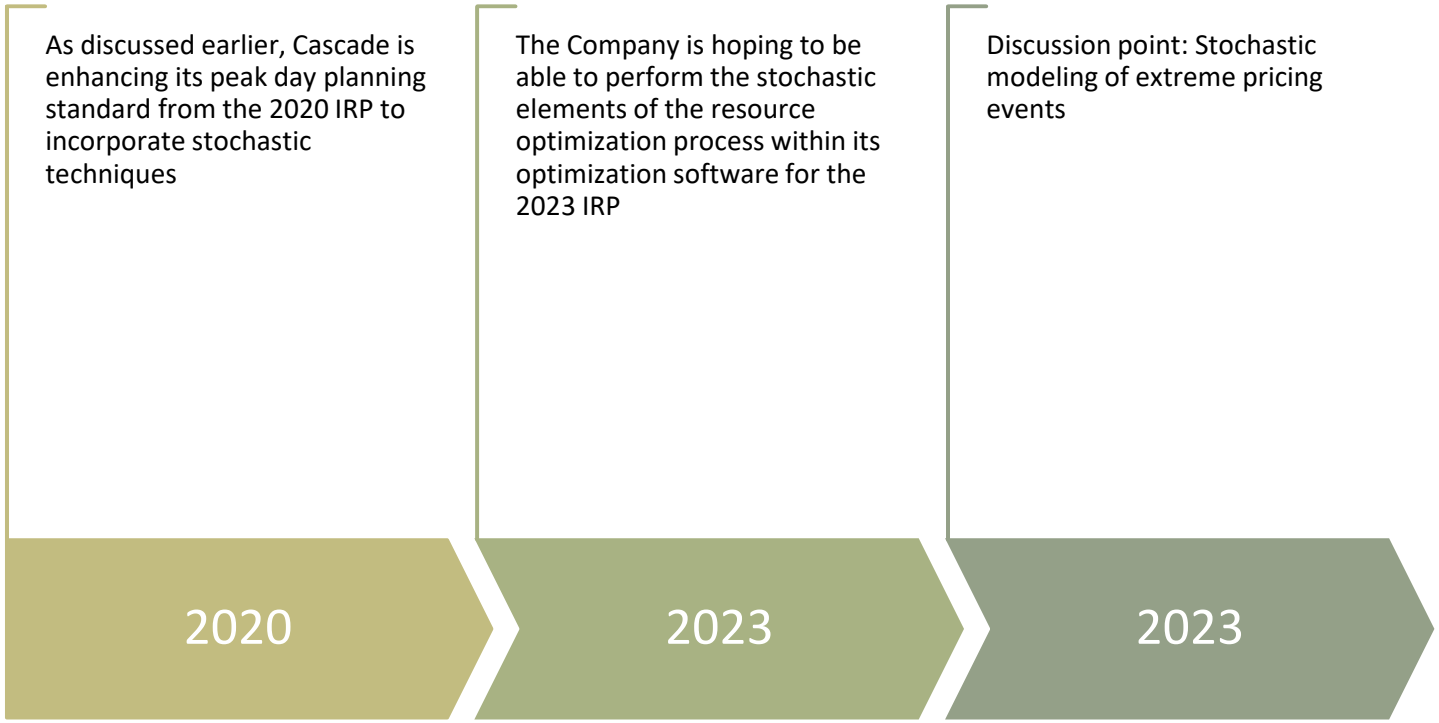
Cascade is getting several inquiries from the developers of prospective RNG projects in both Washington and Oregon. Cascade is having ongoing discussions and weighing each opportunity.

Cascade is also actively pursuing RNG projects.

Distribution System Planning

- 2023 IRP includes a discussion of the elements utilized in distribution system planning to determine needed system enhancements.
- Cascade will provide all planned WA and OR projects for the next five years.
- Cascade encourages stakeholder feedback related to distribution system planning.
- Distribution system modeling utilizes Synergi, which is a separate model from the upstream modeling.

Stochastic Analysis



Resource Integration

As discussed earlier, Cascade will be overhauling its resource integration process to ensure compliance with emissions reduction requirements

The Company is changing its approach to both portfolio analysis and scenario/sensitivity modeling to allow for a more wholistic approach to resource integration

Cascade will evaluate the Value at Risk (VaR) of the candidate portfolio in each scenario to ensure that the extrinsic risk of the portfolio is within tolerable levels.

Cascade will detail its determination of future long-term resource needs, its analysis of the expected costs and associated risks of the alternatives to meet those needs, and its action plan to select the best portfolio of resources to meet those needs.

Resource Integration

2023 IRP Proposed Scenarios	Scenario						
	Base Case - OR-CPP and WA-CCA	**Carbon Neutral by 2050**	**Limited RNG availability**	**Electrification**	**High Customer Case**	**High Price - Interrupted Supply**	**Other?**
Customer Growth	Current Expectations			No new customers after 2030	High Customer Counts	Current Expectations	
Energy Efficiency	CPA Projections	High CPA Projections				CPA Projections	
Renewable Natural Gas	Expected Availability	Expected - High Avail.	Low Availability	Expected - High Avail.		Expected Availability	
Hydrogen	Expected Availability	Expected - High Avail.	Low Availability	Expected - High Avail.		Expected Availability	
Natural Gas Bans	Current Bans			Additional Bans	Current Bans		
Natural Gas Price	Expected Price	Adjusted Price?	Expected Price	Adjusted Price?		High Price	

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2023 WA IRP Schedule

Process Items	Process Elements	Date
TAG 1 (Combined)	Process, Key Points, IRP Team, Timeline, Regional Market Outlook, Planned Scenarios and Sensitivities, Plan for dealing with issues raised in the 2020 IRP	3/30/2022
TAG 2 (Combined)	Demand and Customer Forecast and Non-Core Outlook, Drilling down into segments of demand forecast. Upstream Pipeline presentation.	5/18/2022
TAG 3 (WA)	Distribution System Planning, Alternative Resources, Price Forecast, Avoided Costs, Current Supply Resources, Transport Issues.	6/29/2022
TAG 4 (WA)	Carbon Impacts, Energy Efficiency, Bio-Natural Gas, Preliminary Resource Integration Results.	8/10/2022
TAG 5 (WA)	Final Integration Results, finalization of plan components, Proposed new 2- to 4-year Action Plan.	9/28/2022
Draft of 2022 IRP distributed (WA)	Filing of Draft IRP	11/24/2022
Comments due on draft from all stakeholders (WA)	Comments due from Stakeholders	1/13/2023
TAG 6, if needed (WA)	An additional TAG if needed based on comments from Stakeholders	2/1/2023
IRP filing (WA)	IRP Final Filing	2/24/2023

Original 2023 OR IRP Schedule

Process Items	Process Elements	Date
TAG 1 (Combined)	Process, Key Points, IRP Team, Timeline, Regional Market Outlook, Planned Scenarios and Sensitivities, Plan for dealing with issues raised in the 2020 IRP	3/30/2022
TAG 2 (Combined)	Demand and Customer Forecast and Non-Core Outlook, Drilling down into segments of demand forecast. Upstream Pipeline presentation.	5/18/2022
TAG 3 (OR)	Distribution System Planning, Alternative Resources, Price Forecast, Avoided Costs, Current Supply Resources, Transport Issues.	7/13/2022
TAG 4 (OR)	Carbon Impacts, Energy Efficiency (ETO), Bio-Natural Gas, Preliminary Resource Integration Results.	8/24/2022
TAG 5 (OR)	Final Integration Results, finalization of plan components, Proposed new 4-year Action Plan.	10/12/2022
Draft of 2022 IRP distributed (OR)	Filing of Draft IRP	12/8/2022
Comments due on draft from all stakeholders (OR)	Comments due from Stakeholders	1/27/2023
TAG 6, if needed (OR)	An additional TAG if needed based on comments from Stakholders	2/15/2023
IRP filing (OR)	IRP Final Filing	3/17/2023

Process Items	Process Elements	Date
TAG 1 (Combined)	Process, Key Points, IRP Team, Timeline, Regional Market Outlook, Planned Scenarios and Sensitivities, Plan for dealing with issues raised in the 2020 IRP	3/30/2022
TAG 2 (Combined)	Demand and Customer Forecast and Non-Core Outlook, Drilling down into segments of demand forecast. Upstream Pipeline presentation.	5/18/2022
TAG 3 (OR)	Distribution System Planning, Alternative Resources, Price Forecast, Avoided Costs, Current Supply Resources, Transport Issues.	7/14/2022
TAG 4 (OR)	Carbon Impacts, Energy Efficiency (ETO), Bio-Natural Gas, Preliminary Resource Integration Results.	9/21/2022
TAG 5 (OR)	Final Integration Results, finalization of plan components, Proposed new 4-year Action Plan.	11/9/2022
Draft of 2022 IRP distributed (OR)	Filing of Draft IRP	1/5/2023
Comments due on draft from all stakeholders (OR)	Comments due from Stakeholders	2/24/2023
TAG 6, if needed (OR)	An additional TAG if needed based on comments from Stakeholders	3/15/2023
IRP filing (OR)	IRP Final Filing	4/14/2023

Updated 2023 OR IRP Schedule

Questions/Next Steps

Review Plans for TAG 2 Discussion

Demand and Customer Forecast.

Non-Core Forecast.

Pipeline Capacity Overview.

Next TAG is Wednesday, May 18th.

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MARCH 30, 2022

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