CASCADE NATURAL GAS CORPORATION®

A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve®

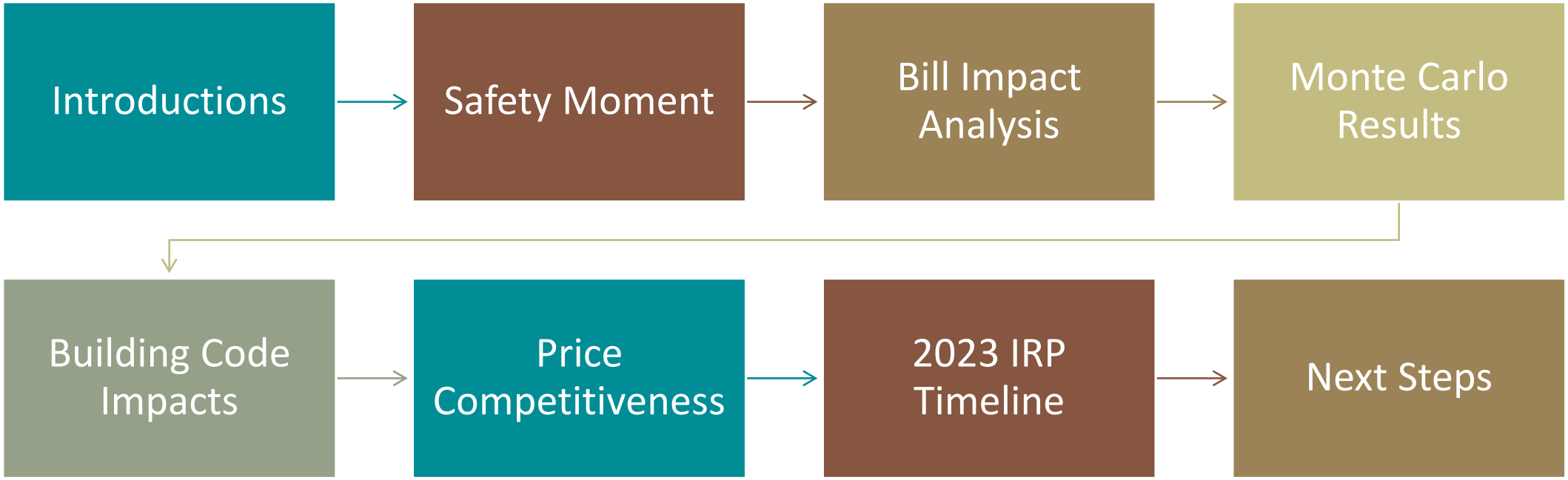
Integrated Resource Plan (WA) Technical Advisory Group Meeting #6

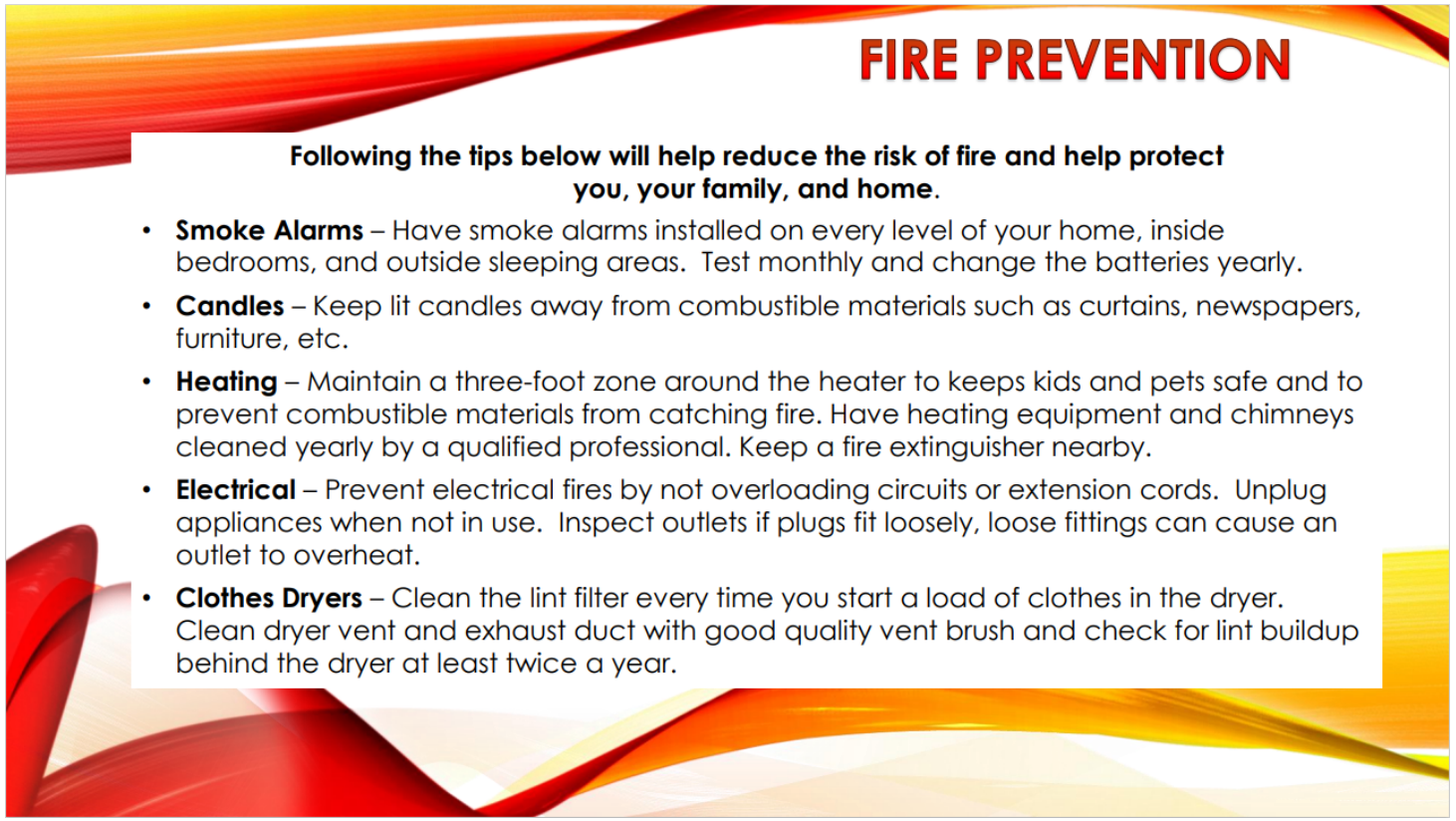
FEBRUARY 1, 2023

MICROSOFT TEAMS/TELECONFERENCE

CASCADE NATURAL GAS CORPORATION®
A Subsidiary of MDU Resources Group, Inc.
In the Community to Serve®

Agenda


Introductions
Safety Moment
Bill Impact Analysis
Monte Carlo Results
Building Code Impacts
Price Competitiveness
2023 IRP Timeline
Next Steps

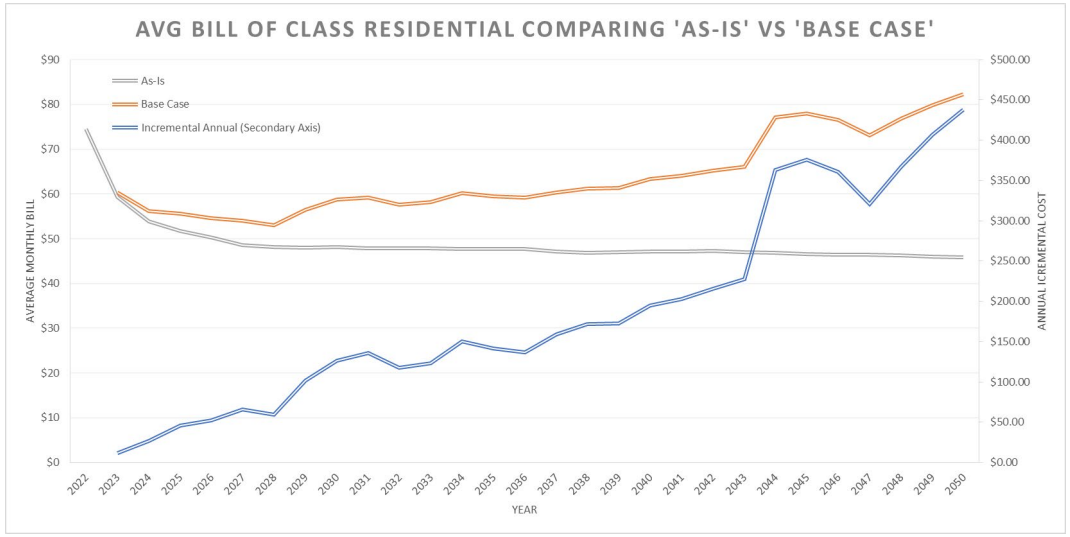


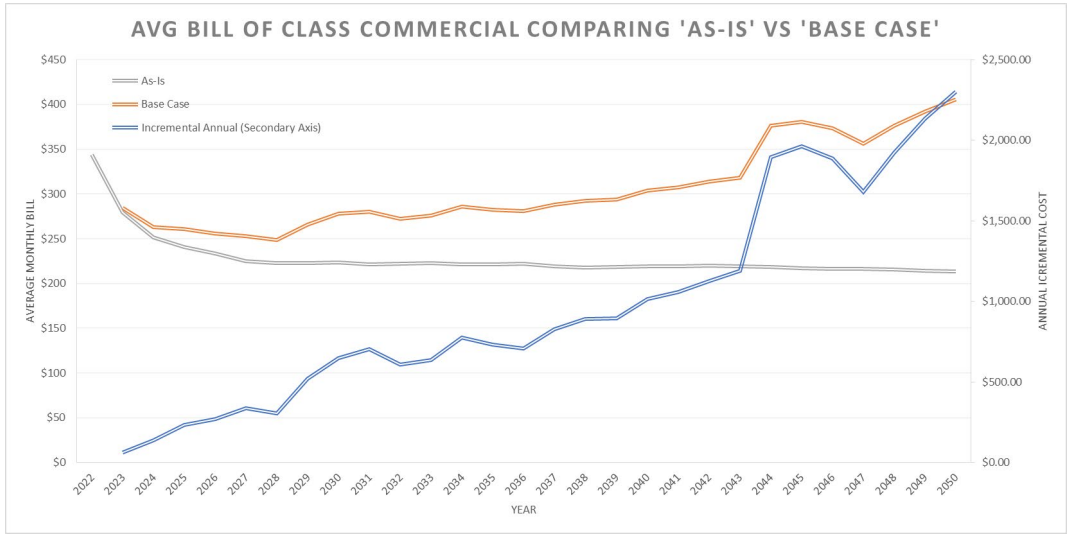
Safety Moment

Bill Impact Analysis

- For the As-Is scenario, Cascade assumed a business-as-usual approach with no carbon emission targets. This is done primarily to allow the Company to identify any upstream capacity shortfalls independent of emissions reduction requirements.
- Cascade then estimated bill impacts for each of the scenarios;
  - All-In w DSM, meet CPP and CCA compliance targets (Base Case)
  - Carbon Neutral by 2050
  - Limited RNG
  - Increased Electrification
  - High Customer Growth
  - High Price Interrupted Supply

All-In w DSM, meet CPP and CCA compliance targets (Base Case)

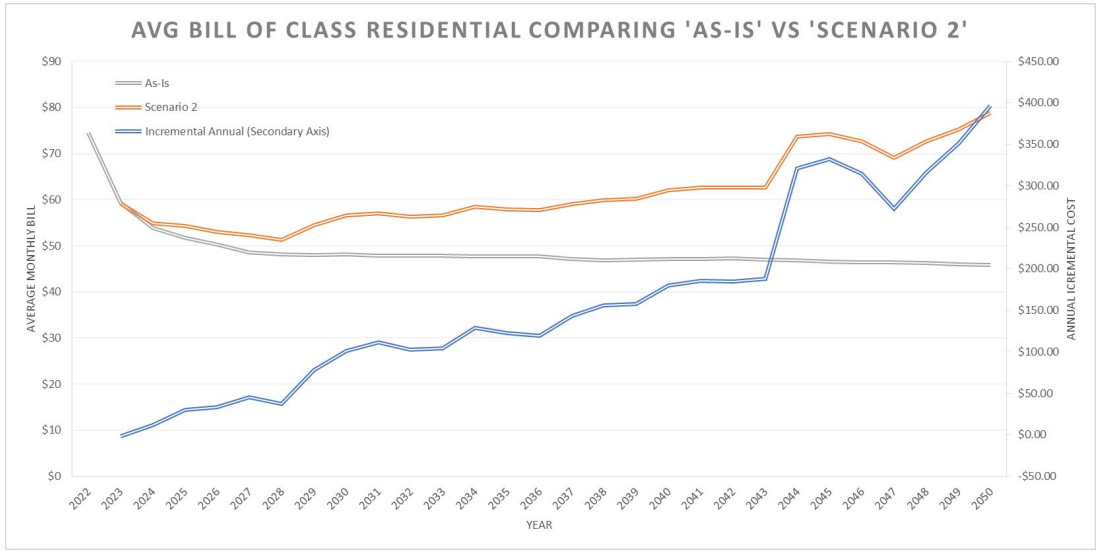


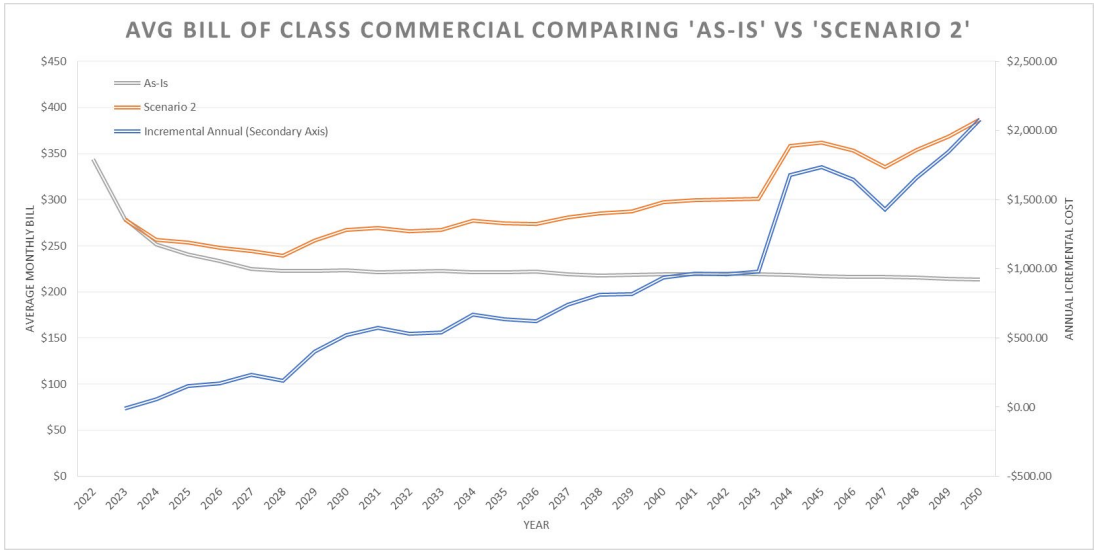


Takeaways:

- Preferred Portfolio could increase Residential Bills 20% by 2035 and 44% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 22% and 47% by 2035 and 2050, respectively.

Carbon Neutral by 2050

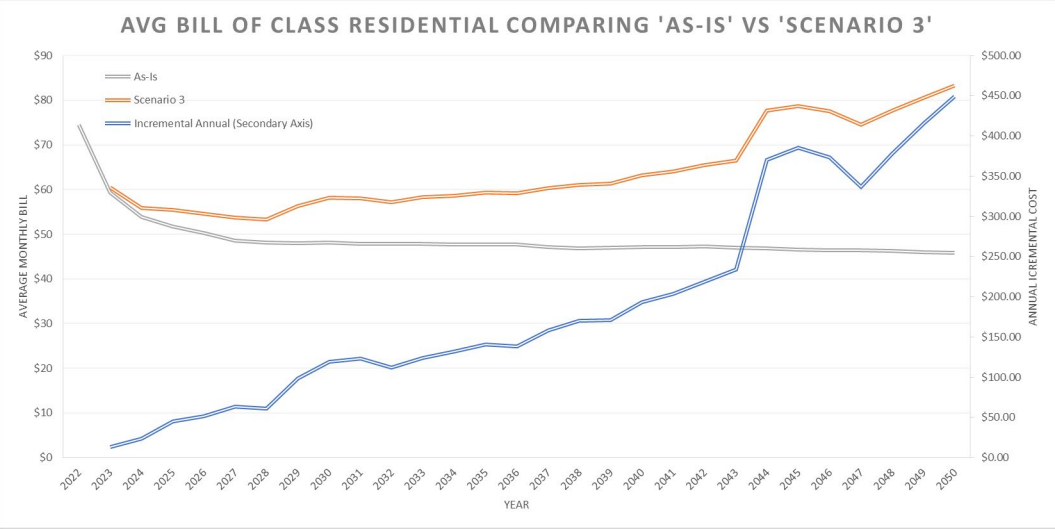


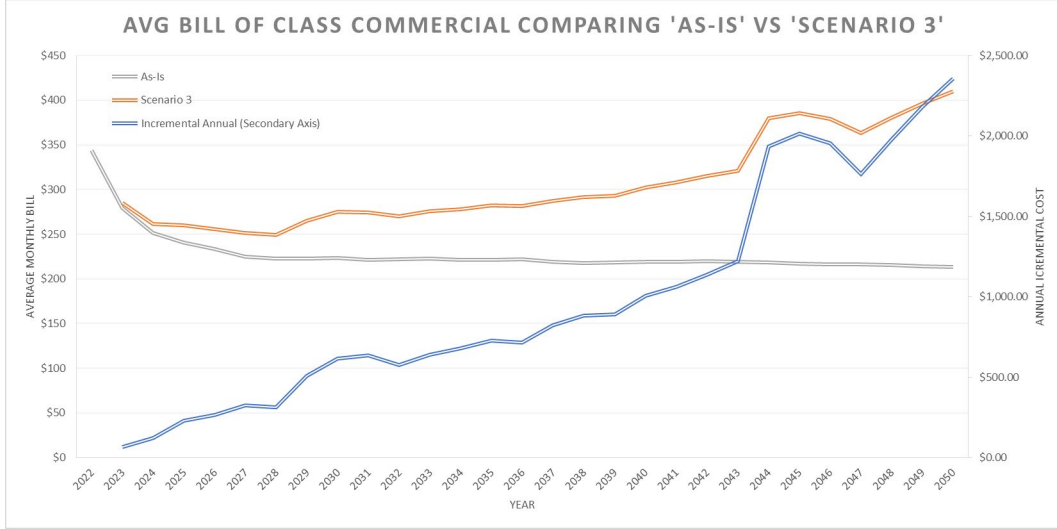


Takeaways:

- Carbon Neutral Scenario could increase Residential Bills 17% by 2035 and 41% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 19% and 44% by 2035 and 2050, respectively.
- Leading cause as to why the bills don't rise as high as the preferred portfolio is due to a lower projected traditional supply pricing.

Limited RNG

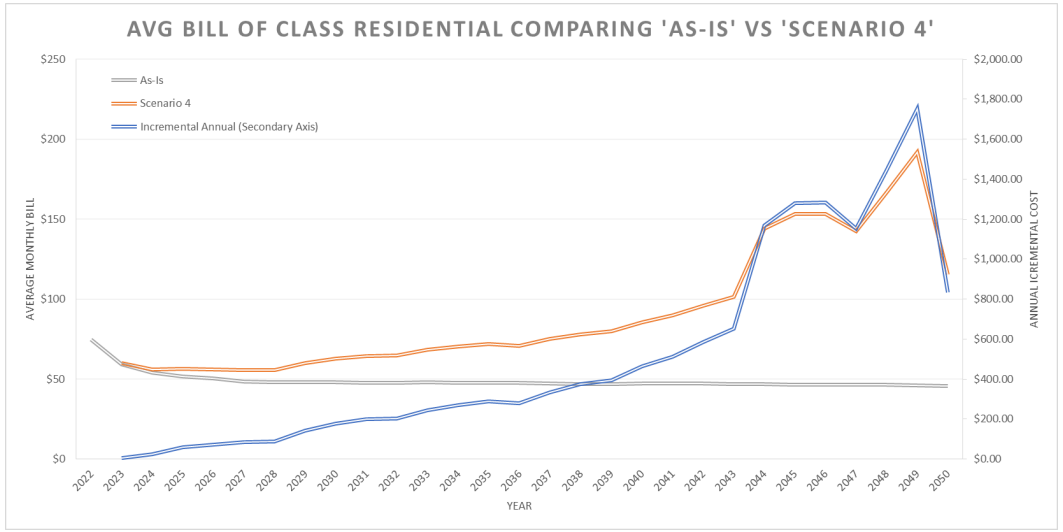


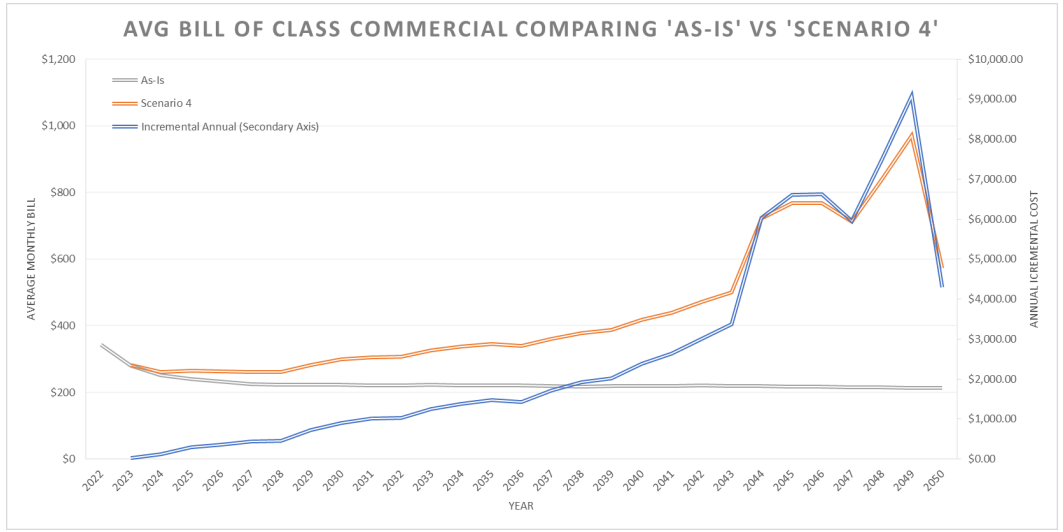


Takeaways:

- Limited RNG Scenario could increase Residential Bills 20% by 2035 and 45% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 21% and 48% by 2035 and 2050, respectively.
- Limiting the amount of RNG and Hydrogen in the later years would force the company to seek more expensive compliance options. Limited RNG/Hydrogen has a greater impact on Oregon than Washington.

Increased Electrification

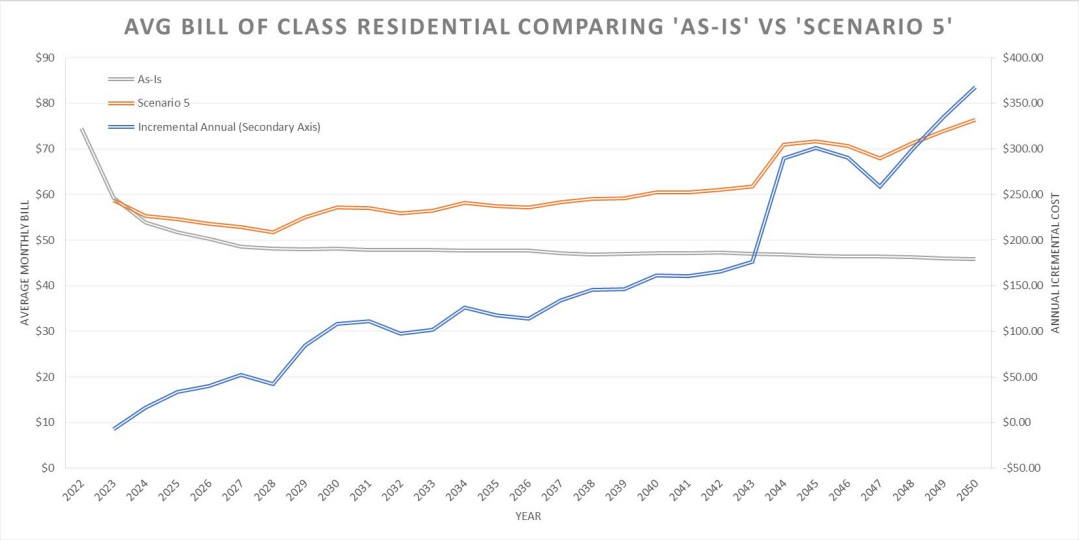


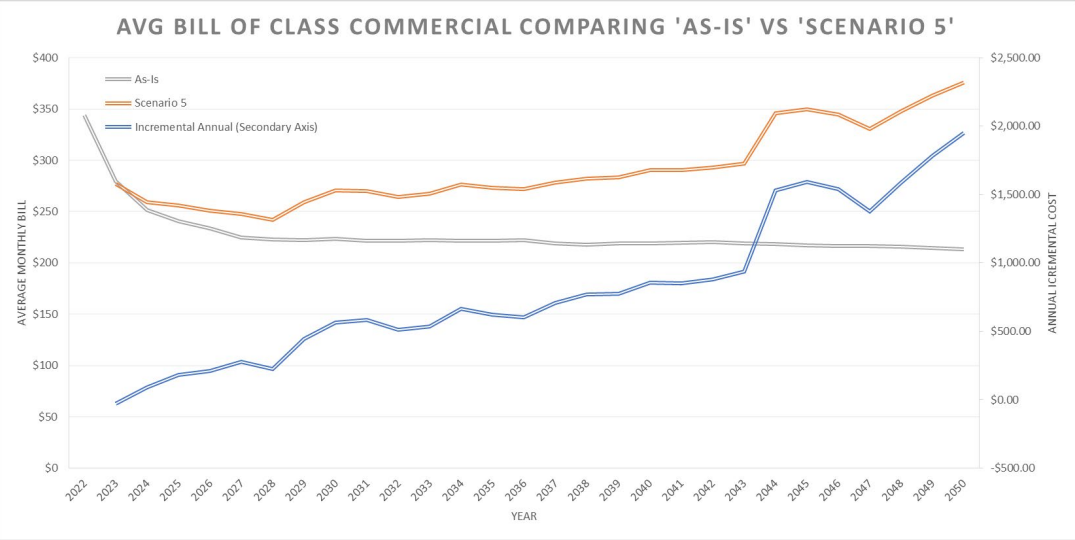


Takeaways:

- Increased Electrification Scenario could increase Residential Bills 33% by 2035 and 60% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 36% and 60% by 2035 and 2050, respectively.
- Electrification comes at the consequence of a significant cost and load increase to regional electric utilities, with all of the risks associated with the ability to serve such a dramatic influx of customers.

High Customer Growth

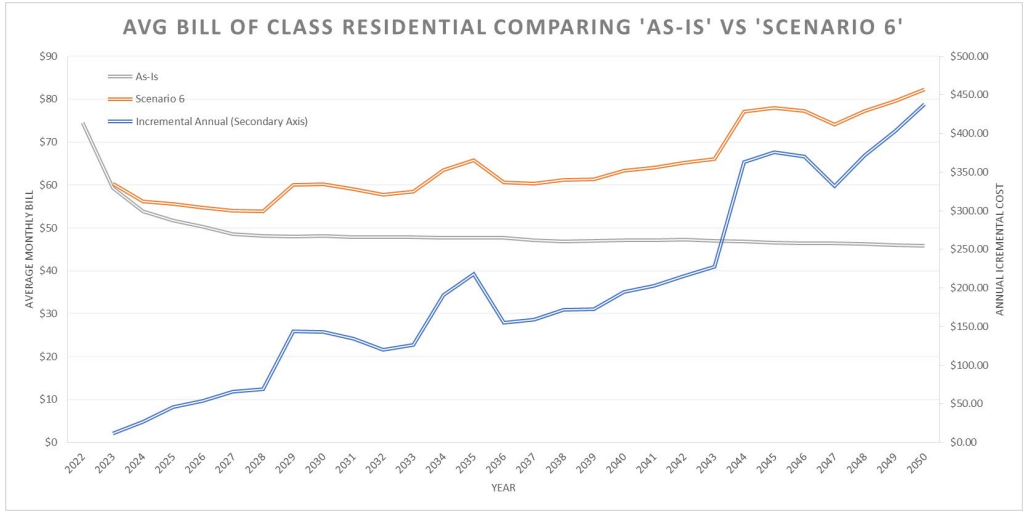


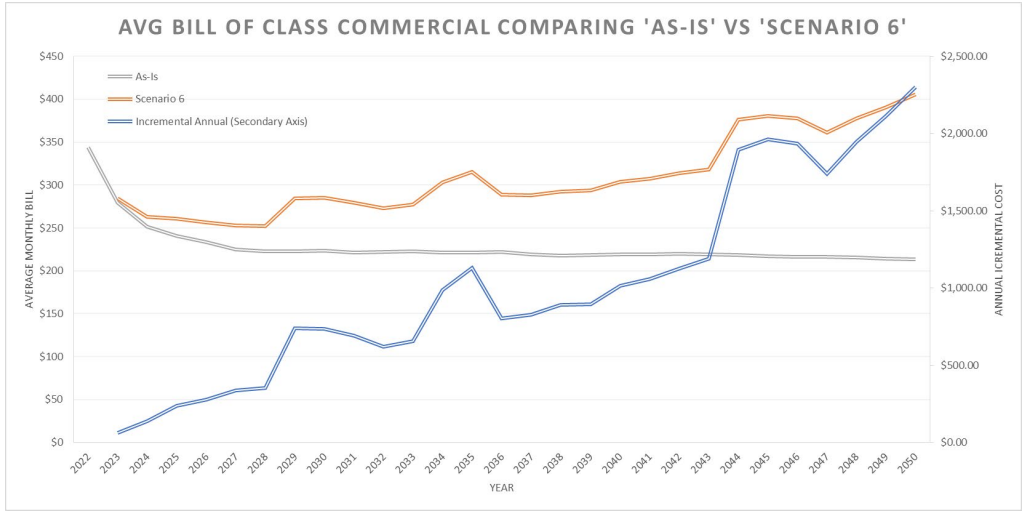


Takeaways:

- High Customer Growth Scenario could increase Residential Bills 17% by 2035 and 40% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 19% and 43% by 2035 and 2050, respectively.
- Although revenue requirement is higher than the preferred portfolio, the costs are spread out between a larger customer base, decreasing the impact to customers.

High Price Interrupted Supply

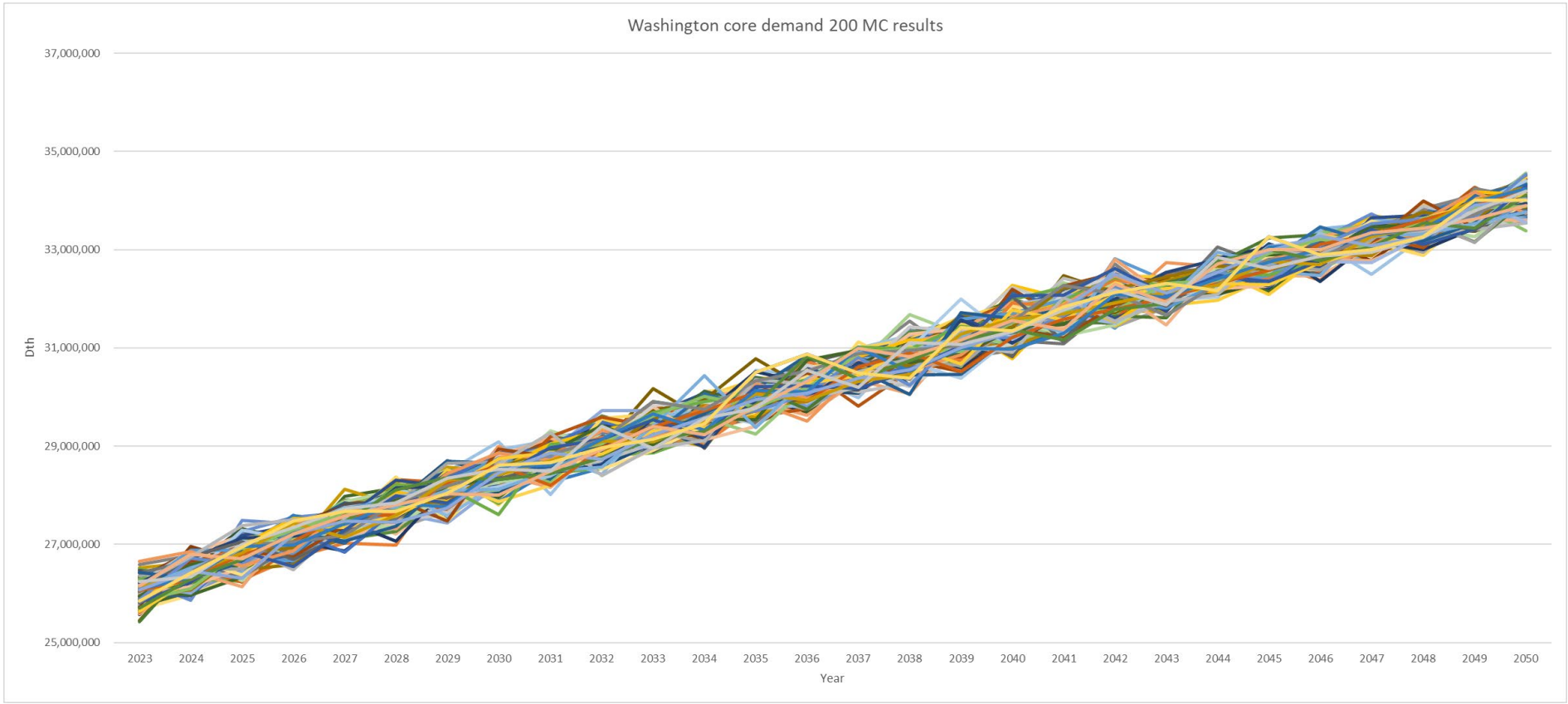




Takeaways:

- High Customer Growth Scenario could increase Residential Bills 27% by 2035 and 44% by 2050 over business-as-usual bills estimates. Commercial bills could increase by 30% and 47% by 2035 and 2050, respectively.
- Cascade has a hedge program intended to reduce the customer risk to price volatility, however, certain unforeseen circumstances could have impacts to customer bills.

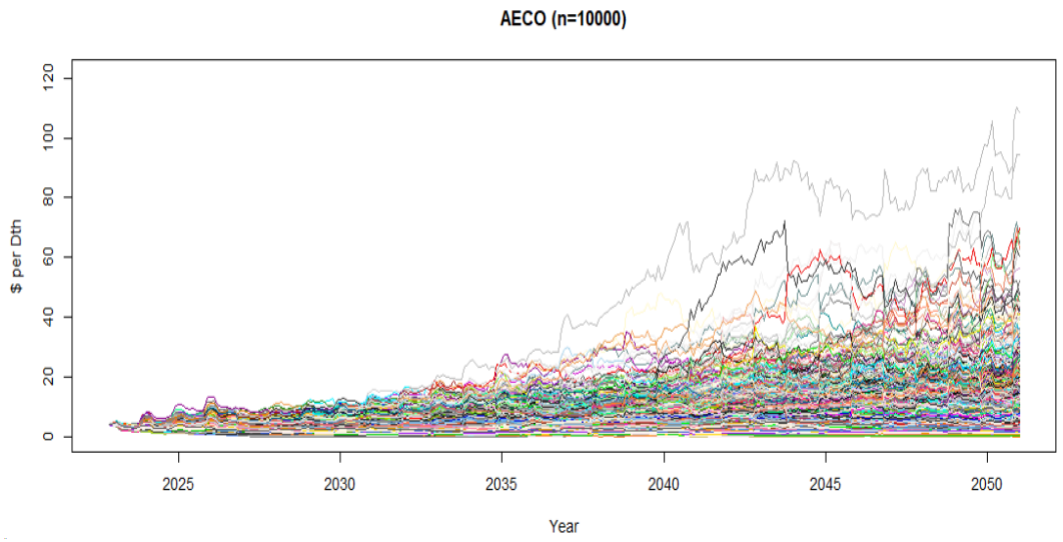
Monte Carlo Demand Results



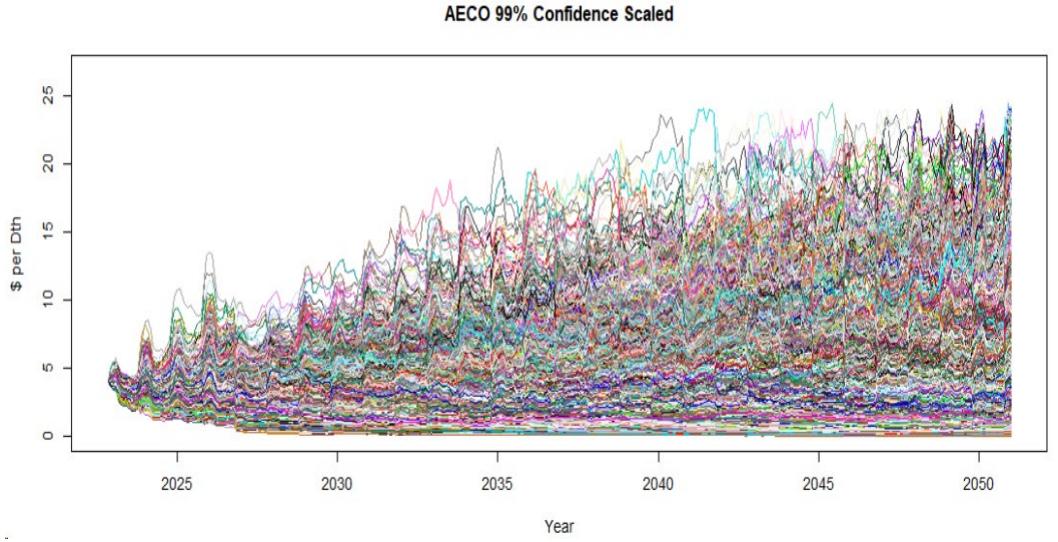
CASCADE NATURAL GAS CORPORATION®
A Subsidiary of MDU Resources Group, Inc.
In the Community to Serve®

AECO Price Simulations

10,000 Simulations

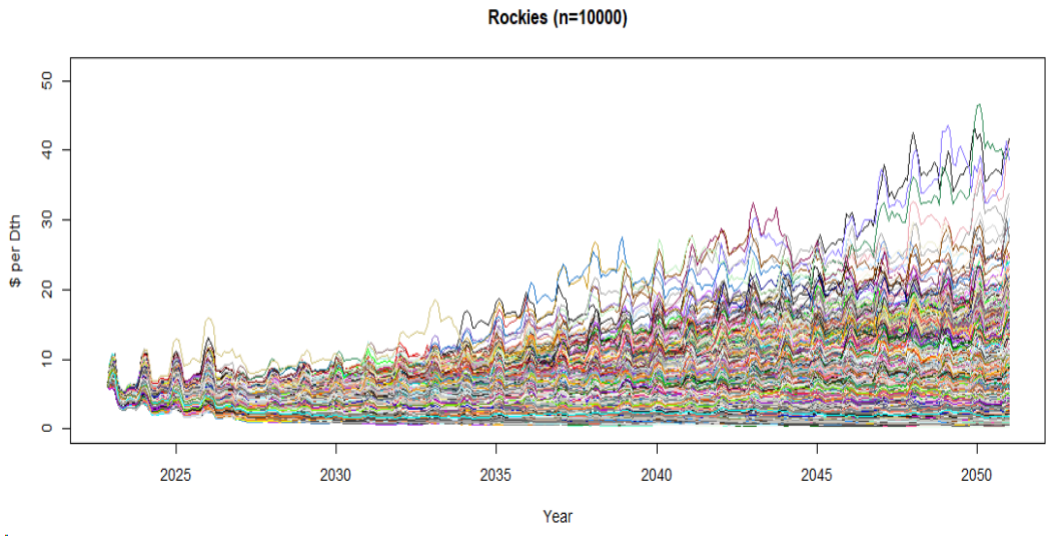


99th Percentile

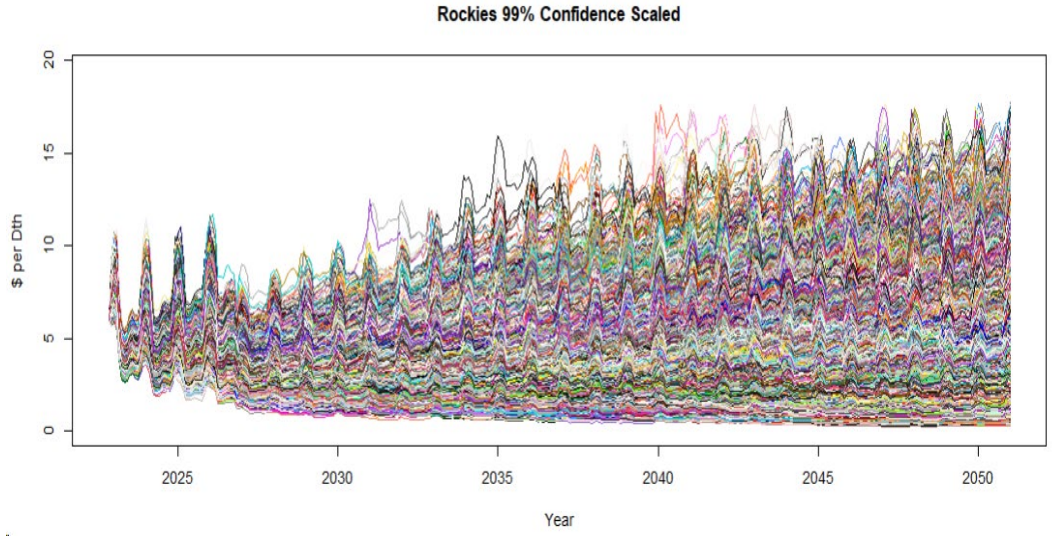


Rockies Price Simulations

10,000 Simulations

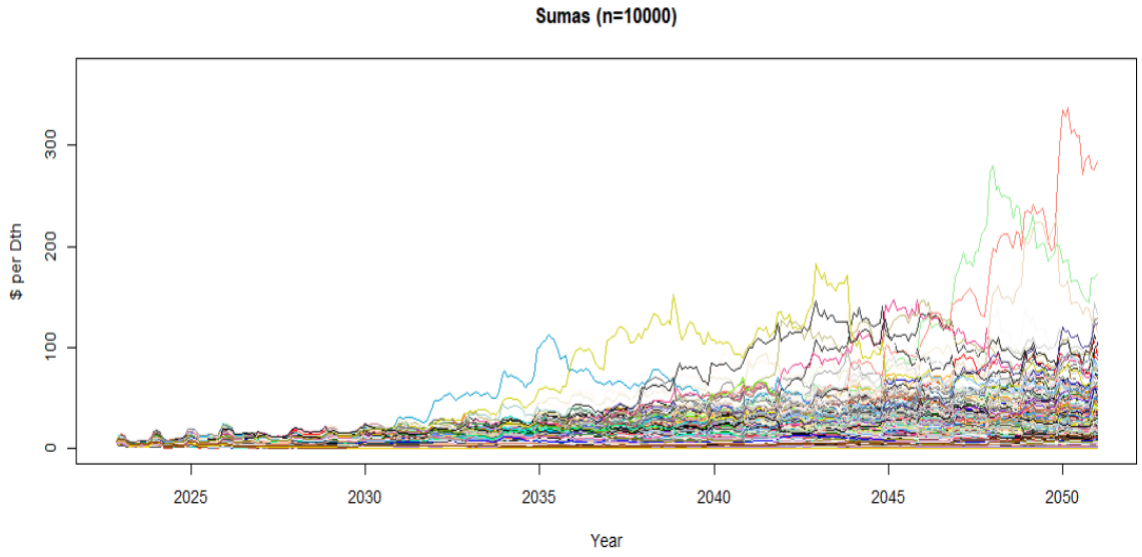


99th Percentile

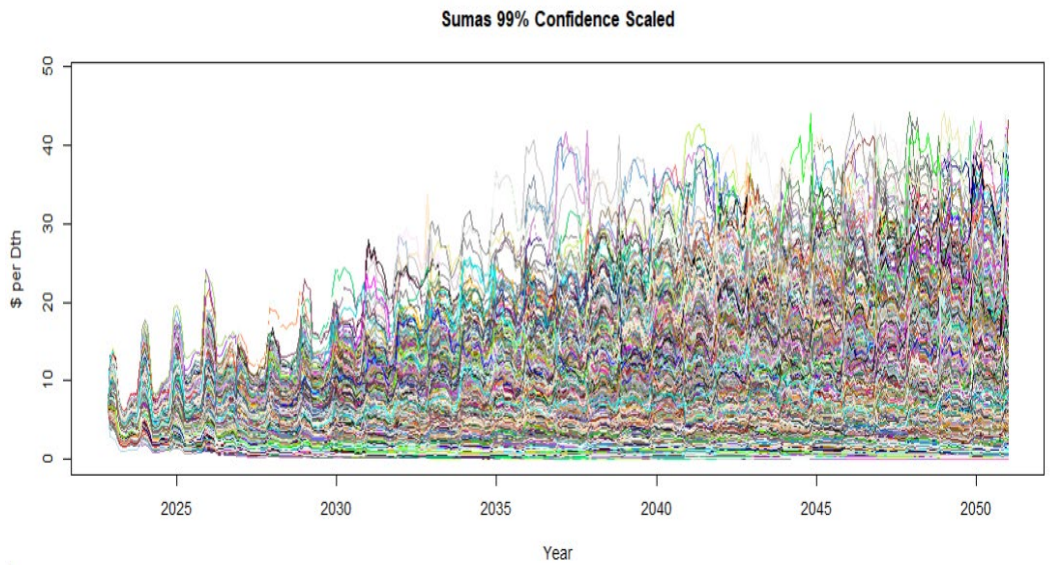


Sumas Price Simulations

10,000 Simulations

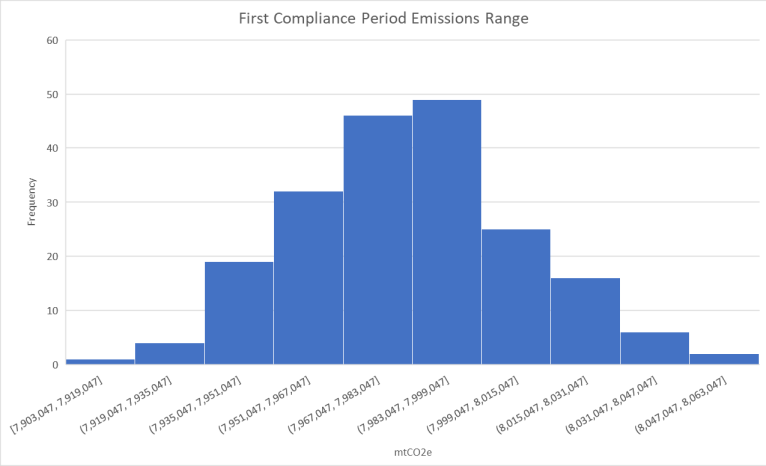


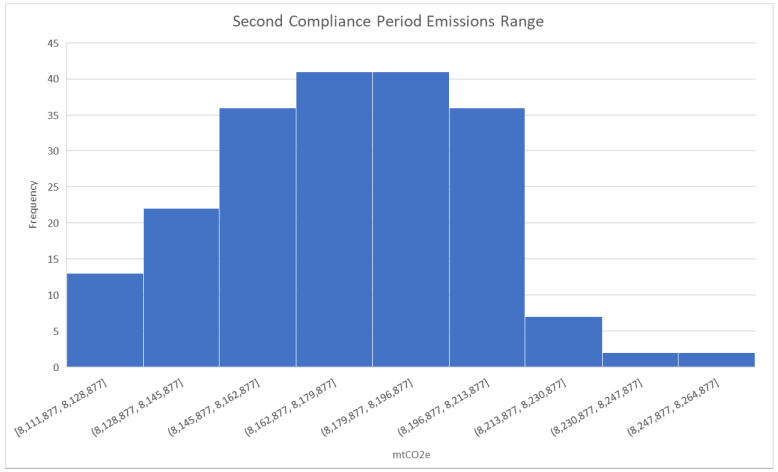
99th Percentile

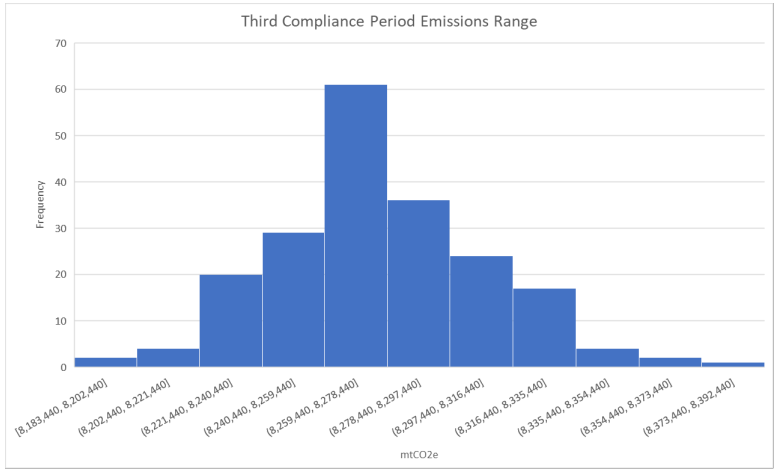


CASCADE NATURAL GAS CORPORATION®
A Subsidiary of MDU Resources Group, Inc.
In the Community to Serve®

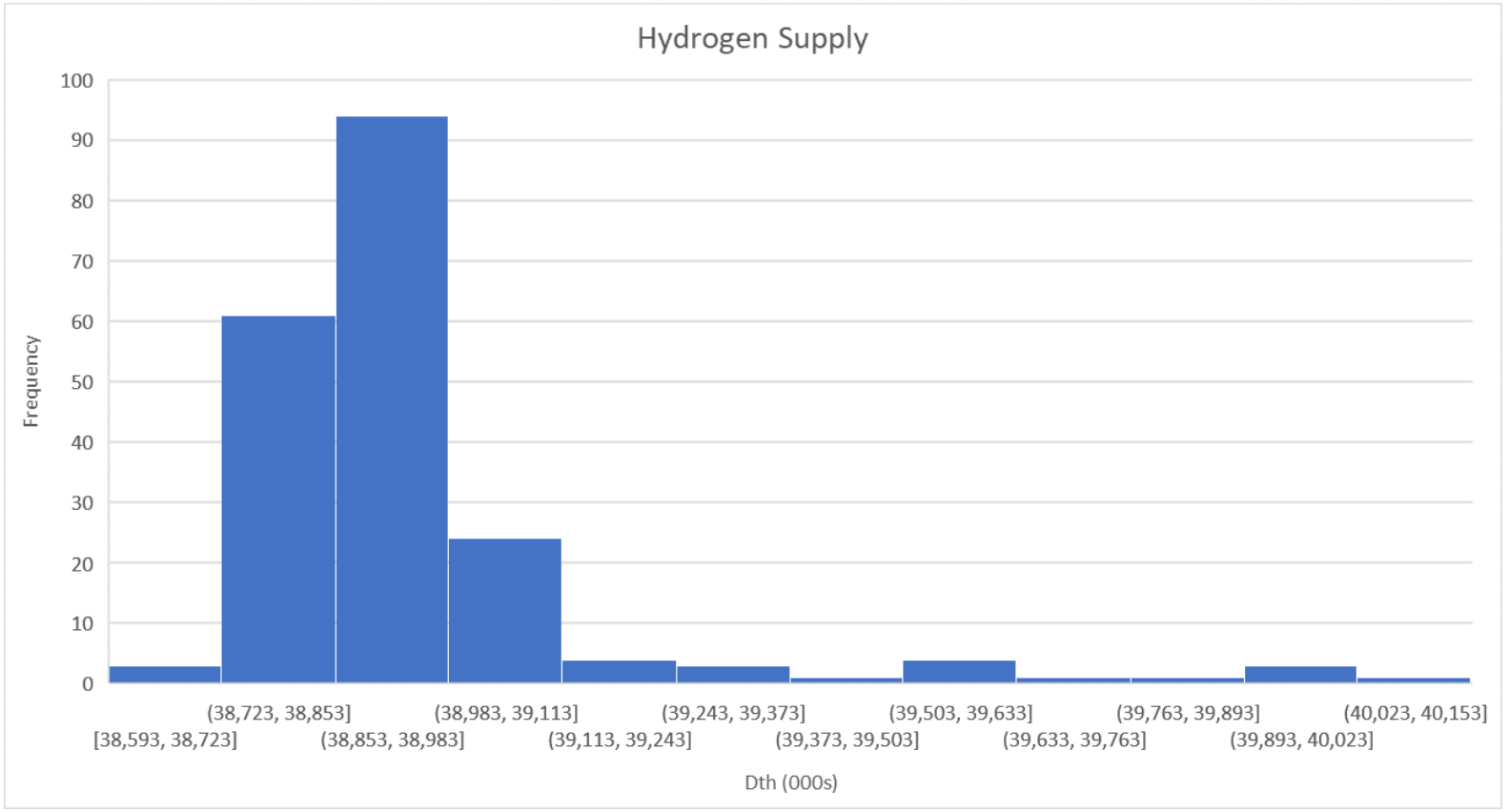
Emission ranges for first three compliance periods



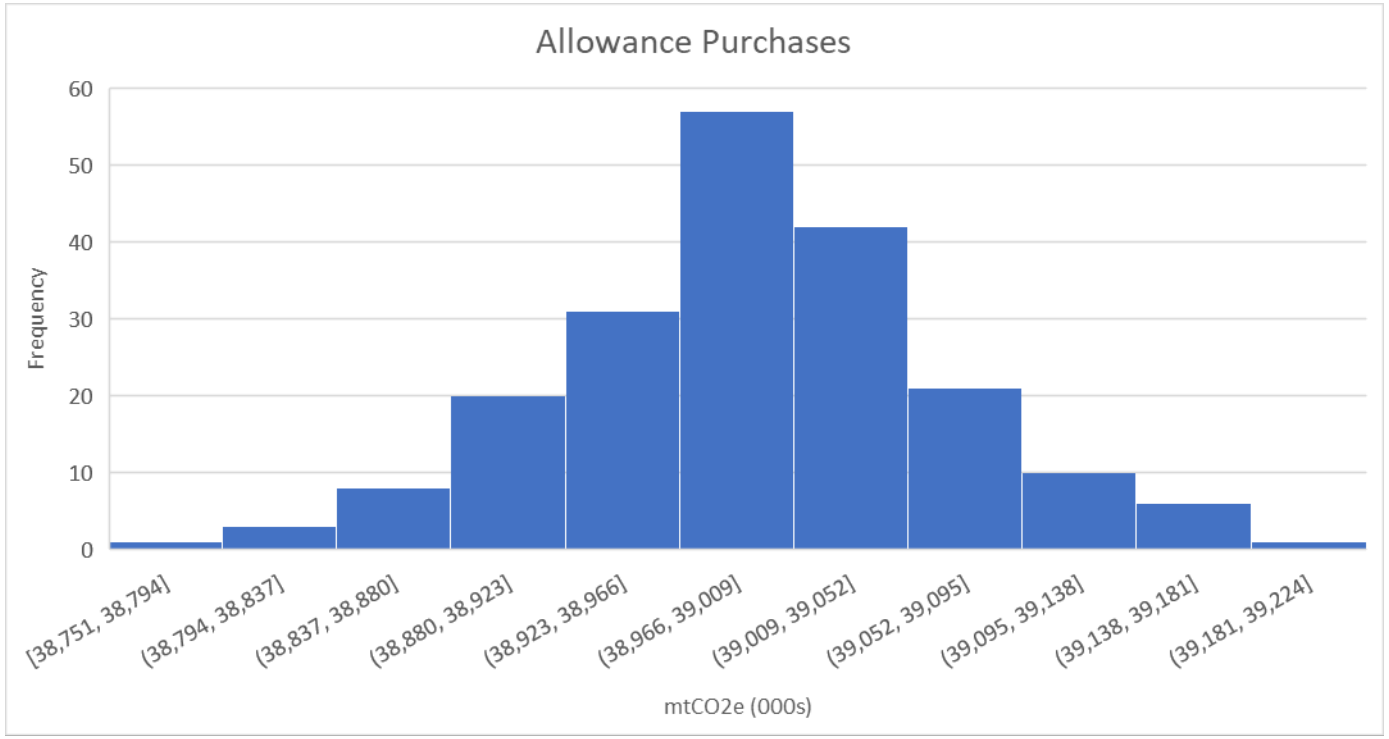




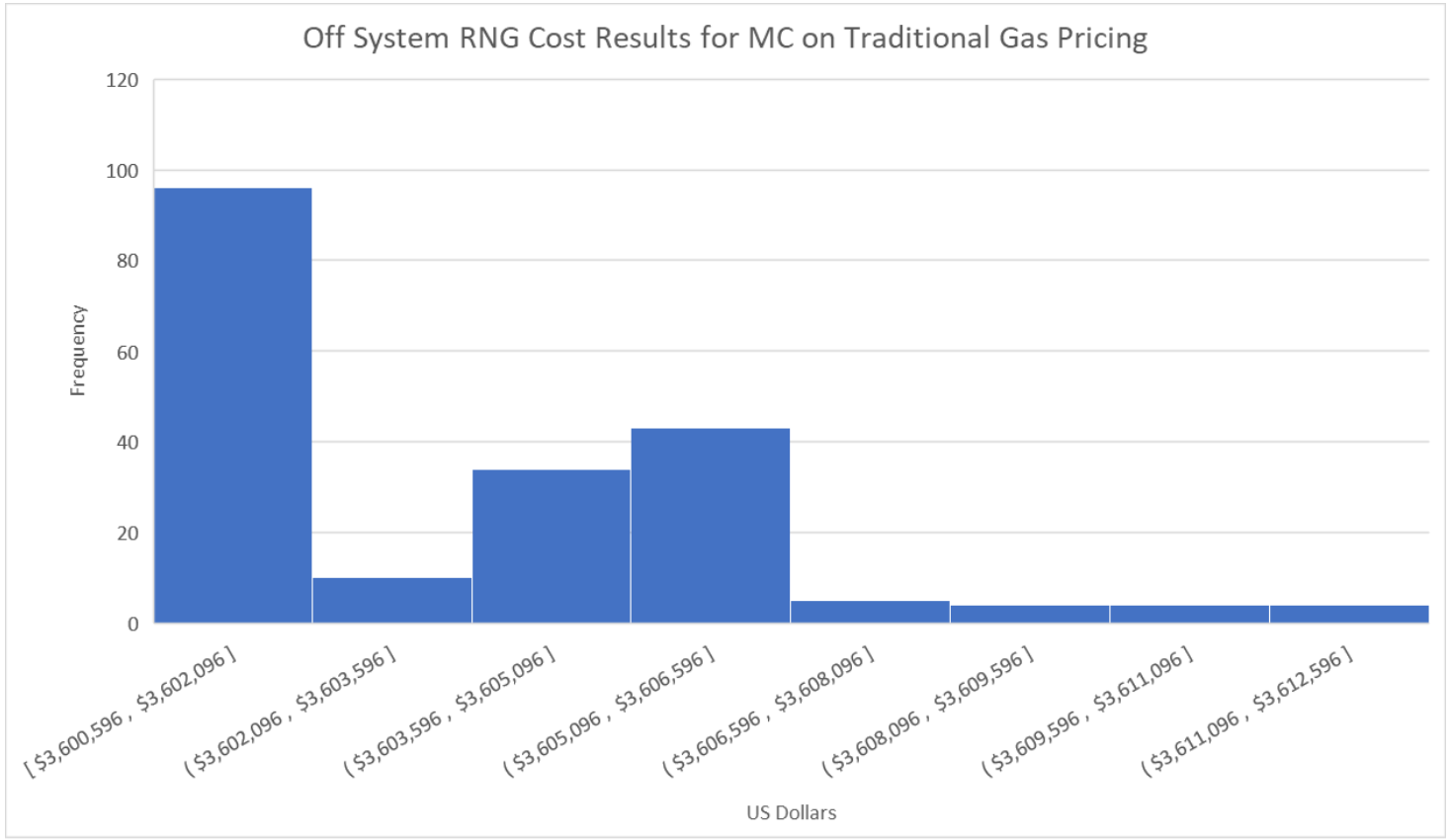
Green Hydrogen Take (Entire Planning Period)



Allowance Purchases (Entire Planning Period)



Off System RNG Cost results for MC on Traditional Supply Pricing



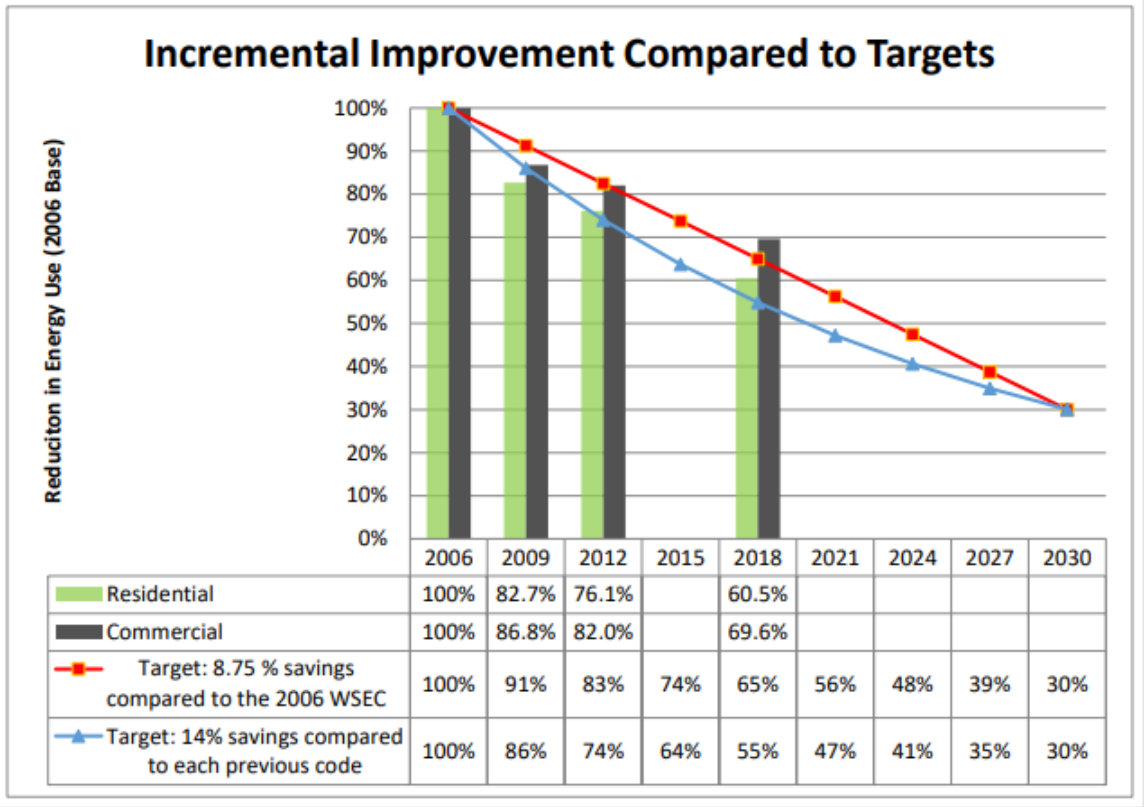
Compliance Success Rate

Portfolio	CCA Compliance Success Rate
As-Is Model	0%
All In W DSM	100%
All In No DSM	100%
Offsets Only	99%
Hydrogen Only	0%
Renewables Only	0%
RNG Only	0%
Transport Only	0%

Building Code Impacts

- Staff asked about RCW 19.27A.020(2)(a) and questioned if Cascade has adequately anticipated further reductions from building codes.
- Cascade Response:
  - RCW 19.27A.020(2)(a) is a broad goal that provides direction to the SBCC to adopt amendments to the WSEC that progressively moves the needle for new construction homes and buildings to be non-emitting by 2031. To achieve this goal, it is important to consider that a non-emitting (zero fossil-fuel greenhouse gas emission) home/building is typically considered based upon the net emissions; however, the legislative direction does not specify "net" in this circumstance. Consideration of net emissions is important, as it allows for a broader and more reliable energy portfolio. To achieve net-zero, emitting energy uses can be offset by renewable energy production (i.e. wind or solar) or energy that has a negative carbon intensity (i.e. RNG); thus, allowing for emitting (i.e. NG) energy use during severe weather events, while still having a home/building that has net-zero emissions.
  - Under RCW 19.27A.020(2)(a), the SBCC is directed to "…help achieve the broader goal…" of zero emission homes/buildings. Note that this is a goal, not a mandate. Conversely, RCW 19.27A.160 is an explicit direction to the SBCC to move towards a 70% reduction in annual net energy consumption by 2031. This is a mandate, and is clear that the goal is a "net" energy.

Building Code Impacts (Cont'd)



	2006	2009	2012	2015	2018	2021	2024	2027	2030
Residential	100%	82.7%	76.1%		60.5%				
Commercial	100%	86.8%	82.0%		69.6%				
Target: 8.75 % savings compared to the 2006 WSEC	100%	91%	83%	74%	65%	56%	48%	39%	30%
Target: 14% savings compared to each previous code	100%	86%	74%	64%	55%	47%	41%	35%	30%

Chart Source: Final Cost Benefit Analysis for the 2021 WSEC-R

- Since RCW 19.27A.020(2)(a), the enacting legislation resulted from 2009 SB 5854. Therefore, the 2012, 2015, 2018, and 2021 code cycles were all likely impacted by the legislation. This chart provides an explanation of how the SBCC has addressed the more explicit legislative direction of RCW 19.27A.160.

Building Code Impacts (Cont'd)

- Some of the most impactful measure were found in the 2018 and 2021 WSEC. For example, NEEA, in their WA Residential Post Code Adoption Market Research Final Report, found that "…builder practices have significantly changed under the 2018 WSEC compared to the 2015 WSEC. This includes a shift towards electric space heating and water heating…" "…the incidence of electric primary space heating is 88% in this study of the 2018 WSEC; the 2015 WSEC study (CLEAResult 2020) recorded a 20% incidence of electric primary space heating for comparison. Water heating fuel is also showing significant changes. This study of the 2018 WSEC shows 87% electric water heating, while the 2015 WSEC study (CLEAResult 2020) recorded 44% electric water heating." (Note that this NEEA report was focused solely on residential; NEEA's 2018 WSEC Energy Savings Analysis for Nonresidential Buildings may provide some additional insight for commercial projects).
- With the forthcoming 2021 WSEC (effective July 1, 2023), the use of natural gas for space and water heating is generally prohibited for commercial buildings, and may only be used for supplementary (backup) heating or within gas heat pumps in residential buildings. Given the shift towards electric appliances already found from the 2018 WSEC, the 2021 WSEC will only further this trend.

Building Code Impacts (Cont'd)

- Pre-2018 building code impacts were mainly to energy efficiency programs.
- 2018 and 2021 building code impacts have had a larger role on end use appliances which impact use per customer.
- When customers replace end use appliances, they are not required to report that to the Company, which results in end use data that may or may not be accurate.
- Cascade utilizes an ARIMA model that captures trends in use per customer (upc), and then uses that trend when forecasting future upc.

Price Competitiveness

- Staff questions if Cascade's customer count estimates incorporate Cascade's price-competitiveness? For example, vis-à-vis other utility options in the future.
- Cascade included price as a variable in Cascade's load forecast model in an attempt to capture price elasticity. Cascade believes this could be improved to capture customer count elasticity when it comes to fuel switching, and has been working with Guidehouse to develop a methodology for future IRPs.
- Cascade does include an electrification scenario. This scenario encompasses customers fuel switching from natural gas to electric, which gives the Company reasonable expectations for a decreasing customer count.
- Cascade is interested to hear from other parties on other ideas the Company can implement.

2023 IRP Remaining Schedule

- File Final IRP on February 24, 2023

Contact Information

Mark Sellers-Vaughn – Manager, Supply Resource Planning: (509) 734-4589 mark.sellers-vaughn@cngc.com

Brian Robertson – Supervisor, Resource Planning: (509) 221-9808 brian.robertson@cngc.com

Devin McGreal – Senior Resource Planning Economist: (509) 734-4681 devin.mcgreal@cngc.com

Ashton Davis – Resource Planning Economist II: (509) 734-4520 ashton.davis@cngc.com

Jenny De Boer – Resource Planning Economist I: (208) 871-8331 Jennifer.DeBoer@cngc.com

Cascade IRP email – irp@cngc.com

CASCADE NATURAL GAS CORPORATION®

A Subsidiary of MDU Resources Group, Inc.

In the Community to Serve®

Integrated Resource Plan (WA) Technical Advisory Group Meeting #6

FEBRUARY 1, 2023

MICROSOFT TEAMS/TELECONFERENCE

CASCADE NATURAL GAS CORPORATION®
A Subsidiary of MDU Resources Group, Inc.
In the Community to Serve®