**CASCADE NATURAL GAS CORPORATION**
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## TAG #5 OR – TAG Meeting

**Date & time:**  11/9/2022, 9:00 AM to 1:20 PM

**Location:**  Microsoft Teams Meeting

**Presenters:**  Kathleen Campbell, Brian Robertson, Devin McGreal, & Ashton Davis

**In attendance:**  Abbie Krebsbach, Abe Abdallah, Ashton Davis, Brian Robertson, Bruce Folsom, Caleb Reimer, Carolyn Stone, Daniel Serres, Devin McGreal, Haixiao Huang, JP Batmale, Kathleen Campbell, Kevin Connell, Kim Herb, Mark Sellers-Vaughn, Matt Steele, Michael Parvinen, Monica Cowlishaw, Moyd Kathy, Pamela Archer, Sebastian Weber, and Zachary Sowards

Brian Robertson, Supervisor of Resource Planning, opened the meeting by welcoming and thanking stakeholders for participating in Cascade's IRP Process. Brian then proceeded with introductions, the agenda, a safety moment, and a reminder of the stakeholder engagement goals.

**Presentation #1 – Distribution System Planning** (Kathleen Campbell)

- Kathleen began by covering system dynamics, discussing types, size, and length of pipes in the ground. Also talked about regulators and gate stations.
- Kathleen then talked about Synergi modeling and the model building process.
- Kathleen shared

  **Question:**  JP asked about models being rebuilt in 2021.
  **Answer:**  Kathleen said that the models being rebuilt are mainly a calibration to ensure the accuracy of the model.

  **Question:**  Abe asked the choice of 3 years is the most effective, and what happens if you have a system change within those 3 years, and if one calibration is enough to calibrate it?
  **Answer:**  Kathleen responded that Cascade believes 3 years is an adequate calibration period, and that Cascade keeps the models updated throughout system changes.

- Kathleen presented HDD graphs and customer usage based on weather.
  **Question:**  Kathy asked if customers really don't use heat until 60 degrees.
  **Answer:**  Brian R. answered that furnaces are still being used but with efficiency enhancements over the years, homes don't lose as much heat until below 60 degrees.

- Kathleen then began presenting Synergi modeling capabilities.
- Kathleen discussed distribution system enhancement options, and introduced a new program called "Demand Side Management Program".

  **Question:**  Abe asked if this would be residential, commercial, or industrial.
  **Answer:**  Kathleen responded that it would be all of them.

- Kathleen discussed the enhancement selection process

**Question**:  JP asked at what point in the process does engineering take into account emissions constraints.
**Answer**:  Kathleen responded that planning for CPP is somewhat separate from this process.
**Answer:**  Brian added that Cascade has had a large industrial customer ask if they could come onto our system, and Cascade determined that it would be in noncompliance with CPP if that customer was added.

**Question**:  Daniel Serres asked about GTN Xpress upgrade and how those costs would affect downstream planning.
**Answer**:  Brian responded that those upstream costs are considered in the IRP planning part and the engineering side is siloed among the downstream functions.

**Question**:  Abe asked about comparing emission impacts of each solution and how that translates to costs at a later date.
**Answer**:  Kathleen responded that the CPP strategy is baked into the demand that engineering receives.  Also said that CPP is new and engineering will need to think more about that.

Kathleen ended by summarizing the changing dynamics and impacts to distribution system modeling.
**Question**:  Kim asked if Cascade is more reactive in the modeling process rather than proactive, and if there is a more proactive approach that could be taken earlier?
**Answer**:  Kathleen responded that DSM is definitely included as an alternative presented Baker as an example where engineering is choosing DSM over pipe.

## Presentation #2 – Backcast Overview (Ashton Michael Davis)

- Ashton opened by sharing what cross-validation, or backcast, is and how it's used to test the accuracy of a model.
- Ashton then provided a breakdown of how the cross-validation modeling works.
- Ashton shared the results of the model, as well as an explanation of what the results of the cross-validation tells Cascade.  In summary, the "fit" of Cascade's models have been relatively good and provide useful feedback on where improvements can be made.

**Question**:  Abe asked if peak day is part of this cross-validation process and if error terms could be shown as values rather than just a visual aid.
**Answer**:  Ashton responded that peak day cross validation is important and will be part of the next cross-validation effort, and that the IRP narrative would certainly benefit from some error terms rather than just graphs.

## Presentation #3 – Summary of Alternative Resources (Ashton Davis)

- Ashton provided a high-level summary of Cascade's alternative upstream resources. Alternative upstream resources include transportation, storage, traditional natural gas, renewable natural gas, and hydrogen.

**Presentation #4 – Components of Candidate Portfolios** (Brian Robertson)

- Brian covered Cascade's six steps to running the Company's Supply Resource Optimization Process. This process explains how Cascade analyzes portfolios through a deterministic and stochastic analysis and then runs sensitivity and scenario analysis on the top ranked portfolio.

  **Question**: Abe asked about hydrogen blending and the assumptions made by Cascade.
  **Answer**: Brian responded that we have a 20% blend base assumption and a 30% blend scenario.

- Brian recapped the As-Is Analysis, which shows how Cascade's current supply resources would meet future needs. Transportation shortfalls would begin mid- to late-2030's and emission shortfalls would begin right away.
- Brian then listed the portfolios and provided information about each portfolio. This included what the portfolio entails, how it does or does not meet emission reduction targets, as well as costs.

  **Question**: Kim asked about RNG availability.
  **Answer**: Devin responded that Cascade did an analysis on its "share" of RNG in the pacific northwest.

- The final rankings of the portfolios were provided, with the All-in including DSM portfolio being the least cost, least risk option that met supply and emission targets. The All-in Portfolio includes a small amount of on-system RNG, offsets, allowance purchasing, and hydrogen to meet customer demand while meeting carbon compliance targets.

**Presentation #5 – Stochastic Methodology** (Brian Robertson)

- Brian provided background information on Cascade's stochastic methodology throughout the previous IRPs. Cascade was limited with the amount of Monte Carlo simulations in previous IRPs, but Cascade has continued to improve this process by utilizing R, a free statistical analysis software.
- Brian then gave details on how the process of weather and price Monte Carlo's work as well as some results from the stochastic analysis.

  **Question**: JP asked if Cascade does Monte Carlo on customer counts?
  **Answer**: Brian responded that we have different scenarios to represent varying customers but will look into doing Monte Carlo on customer counts in the future.

**Presentation #6** – **Scenario and Sensitivity** (Devin McGreal)

- Devin described the new philosophy behind scenario and sensitivity modeling, which is reducing the number of scenarios to allow for more in-depth and robust analysis. In the past, Cascade modeled a wide breadth of scenarios and sensitivities, but time constraints did not allow for a deep analysis of the results.
- Devin went into detail regarding each scenario and sensitivity, describing what is included.
- Total system costs, carbon emission resource stacks, and key takeaways were provided for every scenario

  **Question**: Kathy Moyd asked about RNG projects being local vs buying credits from out-of-state.
  **Answer**: Devin said that Cascade's top priority is compliance, but there are a number of local RNG projects that Cascade is involved in.

  **Question**: Kim asked about the timing of the CPA's and whether they adequately reflect the avoided costs or if it might be needed to update the CPA based on recent higher prices.

**Answer**:　　　Devin responded that he doesn't think the long-term gas markets are that much different from the assumptions in the CPA.

**Question**:　　　Abe asked if world events effect Cascade's supply and pricing.
**Answer**:　　　Devin responded that Cascade's operations are indirectly related to world events or LNG events such as the Freeport LNG issue or the Enbridge explosion.  Devin said that these price spikes on slide 130 could represent many different events.

**Question**:　　　Abe asked if Cascade is expecting the price spike event to last 1 year, or 2 years?
**Answer**:　　　Devin responded that Cascade modelled a 24 month return to normal time horizon.

**Presentation #7** – **Proposed Two-Year Action Plan** (Brian Robertson)

- Brian described Cascade's current Two-Year Action Plan that Cascade will undertake over the next two years.

**Presentation #8** – **2023 IRP Schedule** (Brian Robertson)

- Brian went through the remaining TAG schedules for both WA and OR.
- Brian noted that the next TAG meeting will be Oregon-focused and take place on November 9th while the next WA step is that the draft will be filed November 23rd.

**The Meeting was Adjourned**

Per Cascade Commitment #8 (Stakeholder Engagement Design Document, 2/22/2022: "Provide TAG minutes that include the action items from bullet #7 as well as any upcoming deadlines for feedback on the IRP"), here are additional action items to track, coming out of the TAG 4 meeting:

1. Cascade will provide IRP bill impacts in the draft IRP filing.
2. Cascade will investigate customer count Monte Carlo analysis in future IRPs.