1st External TAG Meeting

05/11/2017, 9:00 - 10:35 AM

Presenters:	Mark Sellers-Vaughn & Brian Robertson
In attendance:	Mark Sellers-Vaughn, Brian Robertson, Devin McGreal
Called in:	Garret Senger, Bob Morman, Miki Bode Jones – NWP, Monica Cowlishaw, Bruce Folsom, Paul Russell OPUC Staff Representative, Ed Finklea, Mike Paruszkiewicz – Northwest Natural Gas, Deborah Glosser OPUC Staff, Carolyn P Stone
Minutes by:	Carolyn P Stone

Mark welcomed everyone to the meeting, noting that Deborah & Lisa are out ill and Paul Russell is in attendance today as OPUC Staff representative.

Mark went over today's Agenda and explained that Brian Robertson would be giving the Cascade Demand Study overview and model results, then back with Mark for the next steps.

Slide #'s 3 & 4 - Mark started out on Slide 3 & 4 with the history of Cascade Natural Gas.

Slide #5, 6 & 7 - Devin McGreal discussed the "Resource Decision Making Process" including regional   market outlook factors, noting 3 pitfalls (slide #7) that could lead to large economic losses such as:

1. An "isolationist" attitude in the US
2. The European Union (recent election in France)
3. Possible Chinese debt crises

Other than this the natural gas industry looks healthy. They are watching water & storage levels, as well as keeping an eye on the NGTL capacity per Slide #8, the "open season" opening bids up to 408 GJ/d. Slide #8 also refers to the Portland and surrounding county "pledge" to power the region with green energy only and national "net" storage injections.

Slide #9 -   Mark then went over the Draft 2018 IRP Timeline. The TAG meetings, except for TAG 3, will all be held in Salem. TAG 3 will be held at the Portland airport. He urges the group to look at this timeline and to confirm there are no conflicts.

Slide #10& 11 - Table of Contents & Appendix Table of Contents. Mark briefly discussed the 2014 IRP issues here…i.e. staffing, the narrative content, etc.

Slide #12-   Mark described the addition of new staff to the Resource Planning Department in 2016. The IRP team also has a consultant, Bruce Folsom assisting.

Bruce introduced himself as being retired from Avista Utilities and before that was part of the WUTC staff, thus he brings 30 years of IRP experience! He went on to say he is pleased with Cascade's commitment and progress on

the IRP's. The filing in Washington was strong and had an aggressive schedule. He is very impressed with the 2 new analysts, their progress & Mark's leadership.

Mark also went on to mention that, in addition, there is an IRP Steering Committee including 2 directors and 3 vice-presidents. There are also many other departments that have provided help to the IRP such as Conservation, Engineering, Accounting, Regulatory, IT, the executive team, Gas Supply and others….

Mark stated about the Table of Contents for the group to let them know if there is anything else needed here, improvements or additions??

Mark stated Cascade has a webpage solely for the OR IRP Process.

Ed Finklea made some comments about the fact that the plan is becoming challenging with pipeline capacity issues, etc. and political pressure. He went on to discuss the "electrifying" of the economy. Since electricity is carbon free, there are some movements to convert the economy to electricity from gas!

Slide #13- Shows the 2018 IRP TAG participants

Slide #14- The IRP Guidelines, order #07-002, Admin Rule #860-027-0400. This is a long-term resource planning process per regulatory requirement.

Slide #15 – 2014 IRP Issue updates.

Mark discussed the recent publishing by the Washington Utility Commission of a "Hedging Policy". Cascade is required to develop a policy regarding financial hedging. We intend to present this as part of the 2018 IRP.

Also, there will be a more comprehensive list of engineering projects to be implemented over the next several years included.

Presentation #1 – Brian Robertson
Cascade Demand Study

Slide #24- Brian Robertson went over the 20-year forecast of core natural gas demand and core peak demand. Core load is 53% is residential and 47% is commercial.

Population, employment growth, and historical weather are used in study. Creates a monthly demand forecast for 20 years at the citygate & citygate "Loop" level. Allocates citygate to each weather location, classes used are residential commercial, industrial and core interruptible.

Slide #26- **Key Points**

Demand weather/customer driven. Forecast uses 30 years of weather history to forecast 2018 – 2037.
Uses various scenarios with average year and extreme cold year, high growth and low growth. Analyzes 55 citygates & citygate "loops". 60-degree HDD threshold is used.

Slide #27- **Input Data**
Brian Robertson explained that inputs include data from EBB (Pipeline electronic bulletin boards), the gas management system called "Aligne" and CC&B (customer care & billing). Weather data is obtained from "Schneider Electric" and population/employment information from "Woods & Poole" and local market intelligence.

Slide #28 – **Weather Data**

Weather data is defined in terms of "Heating Degree Day" (HDD) using 30 years of data. Brian explained why the 60° threshold is used rather than 65° and gave an example of how the 60° figure is used to determine HDD. 65° was the figure used for many years, but in testing it, it has been determined that 60° provides more accurate results.

Slide #31 – **HDD with 60° reference temperature**

In Slide #31 Brian shows the group a graph using HDD with 60° reference. Brian asked if staff was expecting anything else here.

Slide #32 – **Demand Forecast Process Followed**

Pipeline data is received daily at the citygate = both CORE/Non-Core. Brian said his group uses Aligne to "back out" the Non-Core values to get the Core values at the citygate. They then use CC&B to allocate the demand into "rate classes" as mentioned earlier. Ex scenario: What % of "Bend Loop" comes from residential demand?" CC&B data doesn't run on a "month to month" basis, so had to be "shifted forward" 1 month to match values to day of month. The IRP team then worked with the GIS group to get even more accurate allocations.

Slide #35 – **Demand Forecast Example**

This sample shows the results to the query above regarding Bend Loop.

Question: Mark asked what units this represented.
Answer: Brian answered "Dth's"

Brian stated that in the columns titled with month names, there are "seasonality indicators". Also, after shifting from city level allocations to County are made. Then after that the county customer forecast is allocated to citygate.

Slide #37 – Brian shows here how customer count, population, and employment factors are used.

Slide #39 – Brian explained here that this is the formula using SAS software for Autoregressive Integrated Moving Average (ARIMA) modeling and goes through the next few slides explaining the technical aspects of this methodology.

Slide #40 – Brian explained the way statistical analysis is used in the customer forecast.

Slide #42 – The final demand forecast includes year, month, rate class & citygate. Each model was done as using ARIMA, removing non-significant variables, using Akaike info. & MAPE. The demand forecast per customer is then applied to the customer forecast and that makes up the monthly demand forecast.

Slide #43 – Brian explained that there is demand which is not influenced by weather, for example, a customer may ramp up usage based on the season. Cascade now leaves this non-weather demand in the model, rather than removing it.

Slide #44 – This is an example of the city "Moxee" using seasonal monthly indicators, where you see the "ramp up" captured in September!

Slide #47 – Brian explained this slide shows the forecast results, with WA in blue and OR in green.

Slide #48 – This slide discusses the "growth scenarios" used in the model and Slide #49 shows the 7 weather stations associated with each citygate and loop.

Slide #50 – This slide discusses the "weather scenarios" used in the Monte Carlo weather simulations associated with the forecast.

Slide #51 – Brian shows a page of the resulting Demand Forecast including 6 areas through 9 months of 2017. Oregon citygates are shown in green. The Washington forecast is broken down by district & zone.

Slide #52 – Brian explained how the peak day forecast was created, showing the system weighted HDD on Slide #54.

Brian stated the max peak day was on 12/21/1990 - 56° weighted HDD. Our peak day was 11 degrees colder than this most recent winter.

Slide #55 – Brian discussed the value of the average peak day forecast.

Slide #57 – Citygate peak day forecast – Brian stated that this assumes every single weather location has their coldest day on the same date!

Slide #58 – Citygate peak day forecast – allows planning for coldest day at each weather location. On Slide #58, the max & citygate peak HDD's are shown.

Slide #60 – Is an example of one location's forecast from 2018 – 2037. Not all forecasts show a decrease as does this Gilchrist graph, most of the bigger cities showed growth, Brian said!

Slide #66 – This shows Bend Loop growth to 2037. The biggest growth is 1.5m Dth over 20 years. As shown on Slide #68, there is planned growth for the Bend, OR area.

Question: Mark asked Deborah if she would like the model results in the Narrative or Appendix of the IRP.
Answer: Deborah stated in the Appendix.

Slide #69 – Shows Cascade's "zonal" map = citygates by zone.

Slide #70 – Shows growth in the Baker City and Nyssa-Ontario areas – zone 24. On Slide #71 Zone GTN goes from 55m to 80m Dth!

Slide #73 – Shows Oregon's annual Therm usage – 80m to 120 m therms.

Slide #75 – This slide shows total system annual Therm usage over the forecast period. Devin McGreal stated that the group started to indicate a trend variable, numerical that goes up by 1 and comes with a coefficient. When added in, it is a negative. This trend effectively captures the heating of 1 new house into the modeling.

Mark then went over questions and the next steps in the IRP process:

Mark asked the group if they wanted to see the same information for peak day, the group answered yes, they felt it was relevant.

At the next meeting, there will be:

1. An update to any action items (such as an answer to the earlier question about assumptions in the model.
2. The next meeting is July 19th and includes "distribution planning".

Mark asked for any final comments:

Bob stated that the regarding staffing needs, in light of the hedging review/policy, will continue to be monitored and thanked the team for their hard work on this presentation!

Question: Garrett Senger asked if the next tag meeting on July 19th is a "firm" date.
Answer: Mark said yes!

Mark thanked everyone for their participation today!