Cascade's Responses to Washington UTC Staff Questions on Cascade's Tariff Changes.

1. *Please specify which IRP is the bases for the 45-year summary of costs.*
    a. Cascade Natural Gas's 2016 Integrated Resources Plan

2. *Were internet enabled thermostats reviewed as an option to be included as a program measure?*
    a. In an effort to include a broader range of program participation, such as customers who do not have access to the internet, smart or internet enabled thermostats are included under our working definition of programmable thermostat, so long as they allow for multiple daily schedules and do not use single point temperature settings.

3. *When Calculating "Admin Cost per Therm (Goal)" (Cell C76), where does the figure 323,878 originate?*
    a. Thank you for the opportunity to clarify – we have cited the source of these figures in our final version. The 323,878 figure is the Residential Therm Target for Calendar Year 2017 per the 2017 Conservation Plan.

4. *In 2016, the program achieved $3.03/therm in Program Delivery & Admin ($519,634.13 in Total Expenditures of Program & Delivery divided by 171,620 in Total Annual Therm Savings), please describe the process of setting $1.70/therm as a Program Delivery & Admin goal*.
    a. Thank you for the inquiry – we will cite the source of these figures in our final version. Cascade reviewed the proposed tariff changes under multiple scenarios to ensure cost-effectiveness, including based on past years' rates of achievement, adjusted for the 2016 IRP Appendix H Avoided Costs. However, in the scenario provided, we are utilizing the Calendar Year 2017 administrative budget from the 2017 Conservation Plan, $550,000, and its correlating therm savings target of 323,878 therms, which yields a levelized administrative cost per therm of $1.698, rounded to $1.70.

5. *Please describe the calculation of Societal and Participant NEBs.*
    a. We are using two basic types of Non Energy Benefits, namely Societal and Participant benefits in our TRC B/C calculation. We are not including Utility side benefits that are sometimes considered in these analyses. While there are many NEBs cited in the literature related to energy saving endeavors, we have narrowed the field down to the following list which we felt were most relevant. Please note the difference between the residential and commercial calculations are due to the retail cost per therm – at the time these were developed it was $.90 vs. $.95 per therm.
        i. SOCIETAL NEBS
            1. Positive Economic Impacts to the Community- This is related to quantification of NEBs of the beneficial economic effect for the community, (i.e. job creation, sales tax receipts, etc.) We are proposing to quantify this effect using 50% of the retail value (at current average tariff cost/therm for each customer class) of the first year's therm

savings as a conservative estimate of this benefit. This is a one- time benefit realized in the year of the installation.

a. *PEI NEB=.5*(therm saved) * $.90/therm or $.95/therm*

2. Carbon Offsets- We ascribe a value for each ton of CO2 offset (based on therm savings) @$20/ton. These offsets accrue each year that the energy measure is in effect. To convert to a year 1 cost offset, we take the present value of this stream of carbon offset $ over the life of the measure.

a. *CO NEB = PV (interest rate, measure life, ($20/ton x 1ton/2000lb x 11.6 lb CO2/therm saved x therm saved))*

ii. PARTICIPANT NEBS

1. Property Value Benefit= Increasing the value of the participant's property value via installation of energy saving measures has also been mentioned in much of the literature related to quantification of NEBs that have a beneficial effect. We are using here a 10% of the retail value (at current average tariff cost/therm for each customer class) of the first year's therm savings as a conservative estimate of this benefit. This is a one-time benefit realized in the year of the installation.

a. *PVB NEB=.1*(therm saved) * $.90/therm or $.95/therm*

2. Reduced Maintenance Cost – Due to installation of energy savings measures, there are benefits derived via reduction in maintenance cost due to improved operations systems and equipment. We ascribe a 5% of retail savings value (at current average tariff cost/therm for each customer class of the therm savings. The benefits accrue each year that the energy measure is in effect. To convert to a year 1 cost offset, we take the present value of this stream of maintenance benefit $ over the life of the measure.

a. *MAINT NEB = PV (interest rate, measure life, (.05* (therm saved)*$.90/therm or $.95/therm)*

3. Water/Sewer Reductions-For those measures that also save water, we have included a credit based on $2/1000 gallon water reduction. The benefits accrue each year that the energy measure is in effect. To convert to a year 1 cost offset, we take the present value of this stream of water reduction benefit $ over the life of the measure.

a. *WTR NEB = PV (interest rate, measure life, ($2 x 1000 gall))*

6. Please provide Tab APP 2885 that retains Excel formulas.

a. See enclosed document titled Appendix H – Avoided Costs, on tab 'Appendix H P1 WA'.

7. *For tab APP 2885, please support that Melded Cost per Therm contain avoided gas commodity costs, avoided gas distribution costs, avoided gas storage costs, avoided gas distribution costs, avoided environmental compliance costs, the value of risk mitigation and/or increase reliability, and avoided credit and collection costs.*
    a. Please reference *Appendix H – Avoided Costs.xlsx* - of Cascade's 2016 IRP. The tab labeled "Sys Avoided Cost Allocation" breaks down the various components that Cascade has elected to include in its avoided cost calculation. While Cascade is always reviewing its avoided cost methodology, these are the costs that are currently included in the calculation.
        i. The SENDOUT® resource planning model is used to generate the avoided costs for the 2014 and 2016 IRPs.
        ii. SENDOUT® contains a marginal cost report which lists the daily incremental cost to serve the next unit of demand for each demand region.
        iii. The model determines the lowest cost method for serving the next unit of demand and computes a marginal cost.
        iv. With regards to alternative resources considered in the optimization of the portfolio, there is a level of uncertainty as to when certain alternative supply side resources will materialize and yet a base case needs to be created to calculate the avoided cost.
        v. Using the base case demand parameters as inputs, including the design weather pattern, and base case customer and gas price forecasts, in addition to existing supply side resources, the Company's resource portfolio for purposes of the avoided cost calculation include:
            1. Incremental NGTL, Foothills, GTN and NWP transport (all of which are allocated between Oregon and Washington).
            2. Also, a small level of satellite LNG and biogas is also included in the base case—however; these two alternative resources are assigned directly to Washington
        vi. The long term gas price forecast compiled from a consultant's gas price forecast (which is the majority of the cost)
        vii. A price for carbon included in the gas price forecast, which has been embedded by price forecast consultant
        viii. Gas storage variable and fixed costs
        ix. Upstream variable and fixed transmission costs
        x. Peak related on-system transmission costs and
        xi. A 10 percent adder for unidentified environmental benefits, as recommended by the Northwest Power and Conservation Council (NPCC).

8. *Please support that the Loaded Utility Benefit to Cost Ratio (column X) includes the Non-Energy Benefits percentage adder, and the Loaded Societal Benefit to Cost Ratio (column AB) excludes the Non-Energy Benefits percentage adder, as found in the worksheet provided.*
    a. Yes – this is correct for both questions. See answer 5 above for further elaboration.