# CASCADE NATURAL GAS LOAD STUDY ANALYSIS

DESIGN DOCUMENT

SEPTEMBER 2022

This document describes the data sources and analysis techniques that Cascade is using for its load study along with the results of the load study.

# TABLE OF CONTENTS

# OVERVIEW

The purpose of this document is to discuss the data gathering, estimation techniques, supporting documentation, and the current load study results for Cascade Natural Gas Corporation ("Cascade" or "Company"). The objective of the load study is to quantify and assign peak and annual responsibility by comparing individual rate schedule demands to system demands. Once Cascade has performed its load study for all customer groups, Cascade will be able to assign service costs for any class or customer based on their contribution to the system peak.

# DATA AND DATA SOURCES

The data inputs for Cascade's load study include customer usage data, customer count, and weather data.

## CUSTOMER USAGE DATA

Cascade analyzed customer usage data in its load study analysis to determine the appropriate allocation for each rate schedule's usage annually and on the peak day.

Cascade's customer usage data for the load study is being captured at the per customer per day by weather area level and will be gathered through Cascade's online database called ThoughtSpot. Since the usage data is captured at that level, the rate schedule will be easily identifiable for this analysis.

## CUSTOMER COUNT DATA

Cascade analyzed customer count data to determine the representative sample for the load analysis.

For each set of customer usage data, there is one customer behind that data. The remaining number of customers will be determined by utilizing Cascade's customer count file maintained by Cascade's accounting department. If forecasted customer

counts are needed, Cascade will utilize the forecasted customer counts from the Integrated Resource Plan (IRP).

### WEATHER DATA

Cascade utilized National Oceanic and Atmospheric Administration (NOAA) to gather daily weather data information. This data is gathered at seven weather locations: four in Washington and three in Oregon. The four in Washington are Bellingham, Bremerton, Yakima, and Walla Walla. The three in Oregon are Baker City, Redmond, and Pendleton. The data obtained from NOAA were actual and normal wind and actual and normal weather. Normal wind is defined as the average daily wind speed and normal weather is defined as the average daily temperatures of the most recent 30 years of historical data which results in the average annual temperatures as well.

The Company uses a heating degree day (HDD) as the unit of measure for temperature. HDD is calculated by taking the average temperature from a day and subtracting it from a reference temperature. If the reference temperature less HDD is negative, then the Company gives that day a 0 value for HDD. The Company uses 60°F as the reference temperature. For example, a 50°F day will result in 10 HDDs (60-50).

## SAMPLE SIZE

Cascade has completed the analysis to determine the representative sample size for each class and weather location. Determining the representative sample at the weather location level ensures the Company there is a representative sample of customers across the different geographic locations. Cascade utilized Confidence Intervals and Relative Precision to determine the appropriate sample size. PURPA suggests that electrical utilities should maintain a minimum 90 percent confidence interval with a 10 percent accuracy at time of class and system peaks.[1] Cascade

[1] Load Research Manual, 3rd edition, 2017, page 61: "…The desired accuracy should be determined for the study. The desired accuracy is usually expressed as a relative precision with a given confidence level. A design accuracy of +/- 10% at the 90% confidence level (often abbreviated "90/10") at the system and class peak time was specified in

believes these values can be utilized for natural gas as well. In early 2021, Cascade ran an initial sample size count where Cascade pulled a week's worth of data during the coldest week of 2021, February 9 through February 15. Table 1 provides the known population (actual customer count) and the sample count, which represents the number of Fixed Networks (FN) reads, during the period listed above.

**Table 1: Known Population and FN Sample Count**

| | | | 9-Feb-21 | 10-Feb-21 | 11-Feb-21 | 12-Feb-21 | 13-Feb-21 | 14-Feb-21 | 15-Feb-21 |
|---|---|---|---|---|---|---|---|---|---|
| **Weather Location** | **RS_CD** | **Known Population (February 2021)** | Sample Count | Sample Count | Sample Count | Sample Count | Sample Count | Sample Count | Sample Count |
| Bellingham | CNGWA503 | 85954 | 12666 | 13063 | 13292 | 13062 | 12287 | 11564 | 11495 |
| Bellingham | CNGWA504 | 10390 | 2070 | 2129 | 2149 | 2093 | 1990 | 1854 | 1864 |
| Bellingham | CNGWA505 | 196 | 31 | 33 | 34 | 33 | 31 | 25 | 24 |
| Bellingham | CNGWA511 | 26 | 6 | 6 | 6 | 6 | 6 | 6 | 6 |
| Bremerton | CNGWA503 | 40730 | 4664 | 4735 | 4885 | 5029 | 4828 | 4513 | 4429 |
| Bremerton | CNGWA504 | 5062 | 1166 | 1166 | 1174 | 1209 | 1200 | 1157 | 1131 |
| Bremerton | CNGWA505 | 58 | 17 | 16 | 17 | 17 | 17 | 17 | 17 |
| Bremerton | CNGWA511 | 19 | 4 | 4 | 4 | 4 | 3 | 3 | 3 |
| Walla Walla | CNGWA503 | 42784 | 3611 | 3942 | 3815 | 3779 | 3990 | 3634 | 3269 |
| Walla Walla | CNGWA504 | 5408 | 1522 | 1574 | 1518 | 1491 | 1525 | 1435 | 1406 |
| Walla Walla | CNGWA505 | 54 | 12 | 12 | 12 | 12 | 12 | 11 | 10 |
| Walla Walla | CNGWA511 | 17 | 5 | 5 | 4 | 3 | 2 | 1 | 1 |
| Yakima | CNGWA503 | 28578 | 5503 | 5760 | 5684 | 5865 | 5906 | 5942 | 5819 |
| Yakima | CNGWA504 | 6221 | 2155 | 2200 | 2174 | 2210 | 2210 | 2200 | 2167 |
| Yakima | CNGWA505 | 177 | 43 | 43 | 43 | 43 | 40 | 45 | 42 |
| Yakima | CNGWA511 | 31 | 8 | 8 | 8 | 8 | 7 | 8 | 8 |

Cascade has since re-analyzed the sample count and pulled data from February 12, 2022. February 12 was chosen so the Company can compare the sample counts exactly one year apart. Table 2 shows Cascade has increased the number of sample counts for every rate schedule across all four climate zones in Washington.

the Public Utility Regulatory Policy Act (PURPA) for all major rate classes (see Chapter 1 for additional background). This means that the sample will be designed to achieve a 90% confidence interval that is no more than 10% above and below the estimate of the mean.1 Although these federal standards were withdrawn in 1992, the PURPA specification remains load research common practice, particularly for samples that will be used to support rate cases or other regulatory requirements…"

**Table 2: Updated FN Sample Count**

| RS_CD | Weather Location | Sample Count |
|---|---|---|
| CNGWA503 | Bellingham | 24323 |
| CNGWA504 | Bellingham | 3613 |
| CNGWA505 | Bellingham | 70 |
| CNGWA511 | Bellingham | 14 |
| CNGWA503 | Bremerton | 7308 |
| CNGWA504 | Bremerton | 1864 |
| CNGWA505 | Bremerton | 23 |
| CNGWA511 | Bremerton | 6 |
| CNGWA503 | Walla Walla | 11240 |
| CNGWA504 | Walla Walla | 2468 |
| CNGWA505 | Walla Walla | 22 |
| CNGWA511 | Walla Walla | 8 |
| CNGWA503 | Yakima | 10638 |
| CNGWA504 | Yakima | 3543 |
| CNGWA505 | Yakima | 106 |
| CNGWA511 | Yakima | 18 |

With the information gathered, Cascade utilized the average, standard deviation, and variance of the actual data along with the z-score for the 90 percent confidence intervals and the 10 percent precision of accuracy, which enabled the Company to calculate a simple random sample-mean-per-unit estimation. The simple random sample-mean-per-unit estimation is a representative sample count estimate based on known average, variance, confidence interval, and precision of accuracy. The formula is:

$$n^0 = \frac{Z^2 * s_y^2}{D^2 * \bar{y}^2}$$

Model Notes:

- $n^0 = Simple\ Random\ Sample - mean - per - unit\ estimation$
- $Z = Z - score\ based\ on\ 90\ percent\ confidence\ interval$
- $s = variance\ of\ y$
- $D = desired\ relative\ precision$
- $\bar{y} = avereage\ use\ per\ customer\ by\ rate\ schedule\ and\ weather\ location$

Table 3 shows the average, standard deviation, variance, and the simple random sample-mean-per-unit estimation for each weather location and rate schedule for February 9, 2021.

**Table 3: Simple Random Sample-Mean-Per-Unit Estimation**

| | | 9-Feb-21 | | | |
|---|---|---|---|---|---|
| **Weather Location** | **RS_CD** | **Average of Sample** | **Std Dev of Sample** | **Variance of Sample** | **Simple Random Sample-Mean-Per-Unit Estimation** |
| Bellingham | CNGWA503 | 4.091887467 | 2.298500747 | 5.283105682 | 85 |
| Bellingham | CNGWA504 | 15.91251765 | 30.39203721 | 923.6759258 | 987 |
| Bellingham | CNGWA505 | 84.2498571 | 114.1713456 | 13035.09616 | 196 |
| Bellingham | CNGWA511 | 257.6603383 | 160.3683081 | 25717.99423 | 26 |
| Bremerton | CNGWA503 | 3.607587832 | 2.289821685 | 5.243283349 | 109 |
| Bremerton | CNGWA504 | 19.42605161 | 37.11893037 | 1377.814992 | 988 |
| Bremerton | CNGWA505 | 52.24799059 | 48.30301843 | 2333.18159 | 58 |
| Bremerton | CNGWA511 | 205.1663875 | 87.99347814 | 7742.852195 | 19 |
| Walla Walla | CNGWA503 | 3.831241626 | 2.335362947 | 5.453920093 | 101 |
| Walla Walla | CNGWA504 | 20.81029619 | 40.51222152 | 1641.240092 | 1026 |
| Walla Walla | CNGWA505 | 74.1282725 | 111.2028688 | 12366.07802 | 54 |
| Walla Walla | CNGWA511 | 398.0032 | 242.3198873 | 58718.92776 | 17 |
| Yakima | CNGWA503 | 3.726891392 | 3.174017324 | 10.07438597 | 196 |
| Yakima | CNGWA504 | 21.60580361 | 40.65904151 | 1653.157657 | 958 |
| Yakima | CNGWA505 | 110.8799049 | 114.4932253 | 13108.69865 | 177 |
| Yakima | CNGWA511 | 369.5092738 | 179.1723757 | 32102.74021 | 31 |

Comparing the simple random sample-mean-per-unit estimation to the actual sample count allows the Company to determine if there is a representative sample for that rate schedule and weather location. If the actual count is greater than the simple random sample-mean-per-unit estimation, then it is determined there is a representative sample. Cascade calculated the average sample count from the February 9 through February 15 data and compared it to the average simple random sample-mean-per-unit estimation for each rate schedule and weather location. Table 4 shows those results.

**Table 4: Representative Sample Size Results**

| Weather Location | RS_CD | Known Population (February 2021) | Average Sample Count | Average Simple Random Sample-Mean-Per-Unit Estimation | Do we have a representative sample? |
|---|---|---|---|---|---|
| Bellingham | CNGWA503 | 85954 | 12490 | 87 | Yes |
| Bellingham | CNGWA504 | 10390 | 2021 | 1003 | Yes |
| Bellingham | CNGWA505 | 196 | 30 | 196 | No |
| Bellingham | CNGWA511 | 26 | 6 | 26 | No |
| Bremerton | CNGWA503 | 40730 | 4726 | 117 | Yes |
| Bremerton | CNGWA504 | 5062 | 1172 | 837 | Yes |
| Bremerton | CNGWA505 | 58 | 17 | 58 | No |
| Bremerton | CNGWA511 | 19 | 4 | 19 | No |
| Walla Walla | CNGWA503 | 42784 | 3720 | 107 | Yes |
| Walla Walla | CNGWA504 | 5408 | 1496 | 832 | Yes |
| Walla Walla | CNGWA505 | 54 | 12 | 54 | No |
| Walla Walla | CNGWA511 | 17 | 3 | 12 | No |
| Yakima | CNGWA503 | 28578 | 5783 | 178 | Yes |
| Yakima | CNGWA504 | 6221 | 2188 | 879 | Yes |
| Yakima | CNGWA505 | 177 | 43 | 177 | No |
| Yakima | CNGWA511 | 31 | 8 | 30 | No |

As seen in Table 4, the results from the 2021 load analysis show that rate schedules 503 and 504 currently have a representative sample size to complete a load study. The results also show that rate schedules 505 and 511 do not have a representative sample. Referring back to Table 3, Cascade has only increased the number of fixed networking so rate schedules 503 and 504 are still high enough to have a representative sample. However, for rate schedules 505 and 511 the rate schedules are still below the necessary representative sample size which will be discussed further in the results section.

The equipment needed to complete the Cascade fixed network installations has been significantly delayed for over 13 months due to ongoing supply shortages. The delay in equipment has moved the estimated completion of the Cascade fixed network in Washington State to the end of 2023.Cascade will continue to work through supply chain issues to install more of the fixed network devices in the service territory to increase coverage of the fixed network and to capture more data for the rate schedule 505 and 511 customers. Although rate schedules 505 and 511 do not have a representative sample, a load study can still be complete with the caveat that the results

are not within the 90 percent confidence intervals and the 10 percent precision of accuracy.

## ESTIMATION TECHNIQUES

Cascade had several techniques to choose from when analyzing a sample set of data. Each technique provides a different analysis with the same end goal result which is to determine the peak allocator within Cascade's cost of service study. However, each technique provides varying results so deciding which technique to use was important. Cascade tested regression models, mean-per-unit models, and ratio models. Cascade ultimately chose the regression model as it is a more robust model that uses statistical analysis to build a relationship between weather and usage. The regression technique is described below:

### REGRESSION

Regression models are most commonly used to describe a relationship between explanatory variables and response variables.

Model:

$$\frac{Therms}{C_{Class}} = \alpha_0 + \alpha_1 HDD^D + Fourier(k) + ARIMA\epsilon(p,d,q)$$

Model Notes:

- $\frac{Therms}{C_{Class}} = Usage\ by\ customer\ class.$
- $HDD^D = Daily\ Heating\ Degree\ Days\ from\ Weather\ Location.$
- $ARIMA\epsilon(p,d,q) = Indicates\ that\ the\ model\ has\ p\ autoregressive\ terms, d\ difference\ terms, and\ q\ moving\ average\ terms.$
- $Fourier\ Term = Indicates\ k\ number\ of\ seasonalities\ within\ dataset$

Cascade begins by running a simple linear model regressing on HDDs and wind by month. Then, the residuals are analyzed using the Durbin-Watson test to check for autocorrelation. If found, the model then adds an ARIMA term and a Fourier term. In

order to run Fourier terms alongside ARIMA terms, the ARIMA term must be forced to not difference the data. Cascade determined that each model did not have autocorrelation issues, so ARIMA and Fourier terms were not utilized. Cascade pursues this process for each rate schedule and weather zone.

## CURRENT ANALYSIS AND FINAL RESULTS

Cascade gathered daily meter reads from November 17, 2020, to June 18, 2022. Due to data size issues, Cascade had to lump certain customers together who had the same town code. The data was then analyzed at the rate schedule level and regressed against HDDs utilizing NOAA weather data. Below is a sample of the data gathered. Data was gathered at the daily level, by rate schedule, by town (then allocated to weather station), by usage (in therms), and total meters. Cascade was able to then calculate a therm per meter value. This data can be found in Table 5 as well as Exhibit 1.

**Table 5: Load Study Data**

| GAS_DAY | RS_CD | DISTRICT_TOWN_ID | Weather Location | Weather Data | Total Therms | Total # of Meters | Therms/Meter |
|---|---|---|---|---|---|---|---|
| 11/17/2020 | CNGWA503 | 47531 | Bremerton | 8.5 | 349.799 | 196 | 1.784688776 |
| 11/17/2020 | CNGWA503 | 47488 | Bremerton | 8.5 | 96.495 | 49 | 1.969285714 |
| 11/17/2020 | CNGWA503 | 47482 | Bremerton | 8.5 | 2.978 | 1 | 2.978 |
| 11/18/2020 | CNGWA503 | 47531 | Bremerton | 14 | 408.585 | 198 | 2.063560606 |
| 11/18/2020 | CNGWA503 | 47488 | Bremerton | 14 | 115.497 | 50 | 2.30994 |
| 11/18/2020 | CNGWA503 | 47482 | Bremerton | 14 | 6.453 | 1 | 6.453 |
| 11/19/2020 | CNGWA503 | 47488 | Bremerton | 15 | 88.656 | 45 | 1.970133333 |
| 11/19/2020 | CNGWA503 | 47531 | Bremerton | 15 | 391.558 | 183 | 2.139661202 |
| 11/19/2020 | CNGWA503 | 47482 | Bremerton | 15 | 10.742 | 2 | 5.371 |

After the data was gathered, Cascade utilized R, a statistical analysis software, to run linear regression models using HDDs to forecast each rate schedule by weather zone. Each weather zone and rate schedule provide an intercept coefficient estimate as well as a weather coefficient estimate. In Cascade's results, each p-value shows that it is statistically significant. Table 6, as well as Exhibit 2, shows the regression results for the weather locations and rate schedules.

**Table 6: Load Study Regression Results**

| Zone and Rateclass | Estimate | Std. Error | t value | Pr(>\|t\|) | R.Squared | ME | RMSE | MAE | MAPE | MASE | 1 Year Total Demand Forecast |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Bremerton.CNGWA503.(Intercept) | 0.420939476 | 0.016862848 | 24.96253807 | 1.65E-129 | 0.717243422 | 3.67E-17 | 0.68302791 | 0.462998471 | Inf | 0.442403383 | 27,666,027 |
| Bremerton.CNGWA503.Weather.Data | 0.148955212 | 0.001341562 | 111.0312076 | 0 | 0.475863199 | 0 | 0 | 0 | 0 | 0 | - |
| Bremerton.CNGWA504.(Intercept) | 2.878985069 | 0.120282294 | 23.93523575 | 3.48E-119 | 0.288886893 | 5.26E-16 | 4.676270565 | 2.837425994 | 86.17794299 | 0.563887581 | 15,930,061 |
| Bremerton.CNGWA504.Weather.Data | 0.613160063 | 0.009657476 | 63.49071504 | 0 | 0.410324145 | 0 | 0 | 0 | 0 | 0 | - |
| Bremerton.CNGWA505.(Intercept) | 8.389037796 | 0.794820367 | 10.55463366 | 1.53E-25 | 0.752566748 | -1.27E-14 | 23.81006444 | 16.16176457 | Inf | 0.777782894 | 574,441 |
| Bremerton.CNGWA505.Weather.Data | 2.09847558 | 0.063824424 | 32.87887993 | 2.90E-199 | 0.138631141 | 0 | 0 | 0 | 0 | 0 | - |
| Bremerton.CNGWA511.(Intercept) | 80.73276369 | 2.737434042 | 29.49213112 | 5.35E-145 | 0.019101903 | -1.44E-15 | 54.9375551 | 49.41492251 | 57.99897294 | 0.798735185 | 976,870 |
| Bremerton.CNGWA511.Weather.Data | 6.384058345 | 0.218305181 | 29.24373269 | 3.91E-143 | 0.39802445 | 0 | 0 | 0 | 0 | 0 | - |
| Bellingham.CNGWA503.(Intercept) | 0.590233634 | 0.012411802 | 47.55422645 | 0 | 0.627950637 | -7.19E-17 | 0.651552316 | 0.406435568 | Inf | 0.390393602 | 57,173,075 |
| Bellingham.CNGWA503.Weather.Data | 0.124519602 | 0.000859423 | 144.8875131 | 0 | 0.600064659 | 0 | 0 | 0 | 0 | 0 | - |
| Bellingham.CNGWA504.(Intercept) | 1.827156534 | 0.278979155 | 6.549437473 | 6.23E-11 | 0.378335412 | 9.85E-16 | 14.08196716 | 5.087397659 | Inf | 0.769731993 | 30,169,404 |
| Bellingham.CNGWA504.Weather.Data | 0.62138526 | 0.01947732 | 31.90301629 | 3.15E-207 | 0.024188359 | 0 | 0 | 0 | 0 | 0 | - |

To verify results, Cascade applied the actual customer counts, see Exhibit 3, from June 2022 along with normal NOAA HDDs, see Exhibit 4, for an entire year's worth of data to calculate the estimated daily load by rate schedule by weather zone rolled up to an annual total. Once the results were estimated, Cascade then compared the annual load study results to the average of the three previous years' actuals. For rate schedules 503 and 504, the results were within a reasonable range from actuals. As for rate schedules 505 and 511, the results were well below the past 3-years of actuals. This is due to the high variance between the customers within those rate schedules, requiring a larger sample size of customers to have a representative sample. Cascade applied current customer counts along with normal HDDs for an entire calendar year to the regression models to calculate annual usage. Table 7 provides the load study results as well as a comparison to 2019-2021 actuals.

**Table 7: Load Study Annual Results**

| Weather Zone | Rate Schedule | 2019 | 2020 | 2021 | Average | Load Study Results (therms) |
|---|---|---|---|---|---|---|
| Bellingham | CNGWA503 | 58,951,560 | 58,965,281 | 58,315,686 | 58,744,176 | 57,173,075 |
| Bellingham | CNGWA504 | 29,611,710 | 27,978,823 | 28,677,722 | 28,756,085 | 30,169,404 |
| Bellingham | CNGWA505 | 4,163,636 | 4,004,601 | 3,542,179 | 3,903,472 | 2,458,477 |
| Bellingham | CNGWA511 | 3,886,734 | 3,722,799 | 3,682,732 | 3,764,088 | 1,258,040 |
| Bremerton | CNGWA503 | 26,838,665 | 26,243,199 | 26,617,183 | 26,566,349 | 27,666,027 |
| Bremerton | CNGWA504 | 18,242,941 | 16,725,935 | 17,459,700 | 17,476,192 | 15,930,061 |
| Bremerton | CNGWA505 | 1,550,749 | 1,485,041 | 1,450,144 | 1,495,311 | 574,441 |
| Bremerton | CNGWA511 | 2,782,889 | 2,779,275 | 2,421,589 | 2,661,251 | 976,870 |
| Walla Walla | CNGWA503 | 26,244,218 | 23,516,988 | 22,852,138 | 24,204,448 | 25,691,511 |
| Walla Walla | CNGWA504 | 21,816,226 | 17,912,896 | 18,405,043 | 19,378,055 | 17,992,344 |
| Walla Walla | CNGWA505 | 1,232,062 | 946,887 | 930,259 | 1,036,403 | 786,680 |
| Walla Walla | CNGWA511 | 3,464,647 | 3,183,626 | 3,015,806 | 3,221,360 | 1,041,646 |

| | | | | | | |
|---|---|---|---|---|---|---|
| Yakima | CNGWA503 | 18,673,362 | 16,471,441 | 15,893,273 | 17,012,692 | 14,251,465 |
| Yakima | CNGWA504 | 24,567,571 | 20,606,072 | 20,986,534 | 22,053,392 | 22,342,573 |
| Yakima | CNGWA505 | 6,207,542 | 5,151,807 | 5,330,374 | 5,563,241 | 2,939,760 |
| Yakima | CNGWA511 | 4,989,951 | 4,795,853 | 5,063,320 | 4,949,708 | 2,340,785 |

For peak day results, Cascade utilized December 21, 1990, HDDs as it is the coldest day in Cascade's recorded history. Below are the NOAA HDD values for that day by weather station. Table 8 provides the peak HDD for each weather location.

**Table 8: Peak Day HDD**

| Location | HDD60 |
|---|---|
| Yakima | 58 |
| Walla Walla | 66 |
| Bremerton | 41.5 |
| Bellingham | 45.5 |

Similar to the annual results, Cascade applied current customer counts along with the peak HDDs to the regression models to calculate what a peak day event would look like if peak temperatures happened under current customer counts. Table 9 provides the Load Study Peak Day Results. The peak day results reflect what the Company would expect usage to be on a single day if a peak day event occurred under current estimated use-per-customer coefficients and actual customer counts. Peak day usage is utilized in Cascade's Integrated Resource Plan, mainly for upstream pipeline modeling with Gas Supply and downstream pipeline modeling with Engineering, to determine the resource needs to serve customers during the highest usage day. Estimating the class core responsibilities on peak day is important as the Company's pipeline system is built to meet peak day loads.

**Table 9: Load Study Peak Day Results**

| Weather Zone | Rate Schedule | Peak Day (therms) |
|---|---|---|
| Bellingham | CNGWA503 | 542,197 |
| Bellingham | CNGWA504 | 315,029 |
| Bellingham | CNGWA505 | 13,932 |
| Bellingham | CNGWA511 | 11,806 |
| Bremerton | CNGWA503 | 274,997 |
| Bremerton | CNGWA504 | 143,070 |
| Bremerton | CNGWA505 | 5,347 |
| Bremerton | CNGWA511 | 6,568 |
| Walla Walla | CNGWA503 | 391,754 |
| Walla Walla | CNGWA504 | 242,125 |
| Walla Walla | CNGWA505 | 9,796 |
| Walla Walla | CNGWA511 | 5,418 |
| Yakima | CNGWA503 | 156,583 |
| Yakima | CNGWA504 | 228,481 |
| Yakima | CNGWA505 | 21,268 |
| Yakima | CNGWA511 | 18,795 |

Cascade believes the annual rate schedules 503 and 504 results fall within the 90 percent confidence and the 10 percent precision of accuracy. Although the rate schedules 505 and 511 fall outside the 90 percent confidence and the 10 percent precision of accuracy, Cascade believes the Company can achieve these levels once more fixed networking is applied to the remaining customers who do not have fixed network meters under the schedule 505 and 511 rates. Cascade is also confident that as the Company gathers more data over time, the confidence and precision of accuracy of these regression results will only continue to improve.