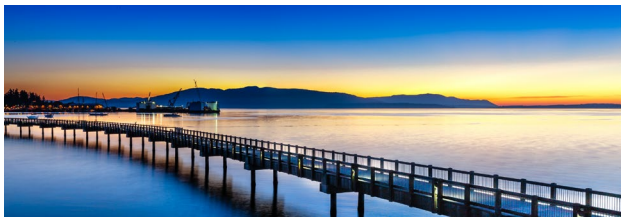
CASCADE NATURAL GAS DECOUPLING EVALUATION

Final Report



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Vision Statement

To be a world leader in developing truthful measurement and useful results; to support development of efficient, ethical, and effective practices, sustained economically; to advance human development. To improve the quality of life during the era of climate change.

Goals Statement

- To build inclusion, diversity, and social justice in support of all technical goals.
- Inclusion, diversity, and social justice is the top technical goal.
- Excellence in the integration of knowledge, method, and practice.
- Improvement and learning at all levels.
- Contextually sound measurement, analysis, and reporting.
- Anticipate and meet the needs of our clients.
- Awareness of human relevance and of the ethical core of research.
- To go further, to find better ways.

Mission Statement

With extensive experience in North America, we can provide the full range of evaluation, verification, policy, management, planning, regulatory and adaptation services – wherever and whenever there is a need.

Environmental Policy Statement

Collectively, we are at a Darwin moment. Either we move to a better model for production and income allocation; work intensely to mitigate climate change; anticipate and actualize inclusive climate adaptation - or we face being edited out of history.

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CASCADE NATURAL GAS DECOUPLING EVALUATION

Introduction & Executive Summary

This evaluation of the Cascade Natural Gas Corporation (CNGC) Decoupling Mechanisms is a compliance evaluation and a policy evaluation of CNGC's decoupling as a specific rate reform (alternative form of rate making) within a specific window of time. Decoupling, as a rate reform requires one specific change in the ratemaking process (ES 1). There may be other changes also.[1]

> In public utility regulation, decoupling refers to the disassociation of a utility's profits from its sales of the energy commodity. Instead, a rate of return is aligned with meeting revenue targets, and rates are adjusted up or down to meet the target at the end of the adjustment period. Wikipedia (https://en.wikipedia.org/wiki/Decoupling_(utility_regulation)

ES 1: Definition of Decoupling.

In the State of Washington, the other critical components of decoupling are part of state orientation, guidelines, legislation, and rules, including emphasis on energy conservation as primary energy source. The state's policies for energy conservation and for low-income become inherently part of the decoupling performance package.

Traditional ratemaking and deferral decoupling ratemaking can be contrasted as shown.[2] In traditional ratemaking, revenue is increased by emphasizing unit sales:

Traditional Ratemaking Equation			
1	Allowed Unit Price	=	$\frac{\text{Allowed Revenue Requirement}}{\text{Expected Units of Consumption}}$
2	Actual Revenue	=	Unit Price x Actual Units of Consumption

[1] Any policy/performance goal can be made part of the decoupling package if approved by the regulatory commission. Otherwise, policy/performance goals are present in the regulatory environment through commission guidance and orders, and through state legislation, and also as an expression of utility organization culture.

[2] Equations from National Renewable Energy Laboratory: "Decoupling Policies, Options to Encourage Energy Efficiency Policies for Utilities, NREL/BR-6A2-46606, December 2009. (https://www.nrel.gov/docs/fy10osti/46606.pdf).

ES 2: Traditional Ratemaking Equations.

Deferral decoupling (using a balancing account) works differently. Allowed revenue is first determined and projected using a model of expected sales. At the end of a year, the unit price for future units of energy consumption is then adjusted up or down, so there is no incentive to increase sales. Coupled with a process for setting conservation and low-income targets, the sales incentive is removed, and the utility is oriented towards achieving the conservation and low-income service targets. The adjustments at the end of each balancing window are expected to be small.

Ratemaking Equations with Deferral Decoupling

1 **Allowed Revenue = Last Rate Case Revenue Requirement**

2 **Prior Period Over or Under Collection = Allowed Revenue – Actual Revenue**

3 **Unit Price =** $\dfrac{\text{(Allowed Revenue +/- Prior Period Over or Under Collection)}}{\text{Expected Units of Consumption}}$

ES 3: Deferral Decoupling Equations.

There are eleven sections in the evaluation, including the appendices.

Section 1, Fidelity Analysis, is focused on compliance. Did CNGC comply with the specifics of the decoupling order? The short answer is, "yes". The purpose of the Decoupling Mechanism is to decouple the Company's Commission-authorized revenues from sales, such that the portion of the Company's fixed costs planned for recovery through volumetric sales and not otherwise recovered from energy sales will be recovered through the mechanism. We traced the required inputs for the computations each year. We followed each computation for cumulative deferral and interest. We examined the operation of the Earnings Test each year (2017, 2018, 2019, 2020) and examined the operation of the Three Percent Test for each of these years.

Some differences surfaced in the back-and-forth interaction with CNGC, as is the method in this type of study. Based on our analysis, we find that CNGC has calculated rates and deferrals in accordance with the Commission Order approving the decoupling mechanism with corrections required for the 2019 and 2020 calculations which CNGC has developed in response to Data Request GP-51, and which are included in this evaluation.

The Earnings Test had no effect on Schedule 594 rates in any of the years examined. The Three Percent Test had no effect on Schedule 594 rates in 2017 and 2018. As filed, it initially appeared that the Three Percent Test had no effect on Schedule 594 in 2019. However, with corrections to calculations, it turns out that three consolidated rate schedules should have been capped at three percent in 2019. This difference in 2019 chains forward into 2020 so that the corrected 2020 results are dependent on the corrected 2019 results. Amounts to be refunded through rate decreases for 2019 and for 2020 are different from those filed. A filing to account for these differences is expected.

However, these differences indicate an advantage of the deferral decoupling approach. In this approach, there is a 'true-up' each year and changes are generally small. If there is a correction required in one of the 'true-ups' it is even smaller. And, due to the use of the balancing account, correction for an error in a year is included in the adjustment for the following year. Overall, this aspect of the mechanism works well.

Section 2 is concerned with billing impacts by rate schedule. This section traces the billing impacts of decoupling as implemented. The examination of billing impacts shows that the decoupling adjustment mechanism has resulted in mostly small bill impacts that are within the range of expectation.

Section 3 examines revenue effects. CNGC's decoupling mechanism has had a stabilizing effect on revenue, reducing variability by over 20 percent for residential and commercial customer classes and between 3 percent and 13 percent in industrial, interruptible, and large volume customers. Overall CNGC revenue variability has been reduced by 15 percent due to decoupling.

Section 4 is focused on low-income billing impacts. The decoupling deferral tracker adjustment (RS 594) has had a relatively small impact on low-income customer bills. On a percentage of bill basis there is no meaningful difference in decoupling charges between low-income and all residential customers. Low-income use per customer averaged about 6.5 percent lower than average residential usage over the last six years. This means that low-income customers have a 6.5 percent lower exposure (lower rebates and lower surcharges) to the decoupling rate (RS 594) than the average residential customer.

Section 5 develops other low-income contrasts. In this section housing attributes and energy usage of low-income and other residential homes are compared using a data set developed for analysis of low-income in Yakima County. Low-income customers in Yakima County used 10 percent less natural gas annually per premise in 2018 than other residential customers. This is consistent with findings for CNGC's Washington service area as a whole which showed 6.5 percent lower usage in low-income homes. Low-income homes were also substantially smaller. With lower use in smaller homes, natural gas use per square foot in low-income homes was about 20 percent higher than for other residential customers. Analysis to determine why this is the case is beyond the scope of this evaluation, but older and less efficient building shells is at least part of the explanation.

Section 6 reports on CNGC's energy conservation program spending (residential & commercial/industrial). Conservation spending ncreases during decoupling.

Section 7 reports conservation achievement. For both commercial/industrial and residential sectors, conservation achievement has moved upwards in the decoupling years.

Section 8 is an examination of CNGC's low-income weatherization. CNGC encountered a series of barriers to low-income weatherization and has successfully resolved the problems.

Section 9 is an analysis of possible adverse factors. We found no evidence of adverse impacts on customer service, price signals, or utility program operations as a result of the decoupling mechanisms. There is no indication of any decrease in service quality. There is an issue in the design of the mechanism to the extent that calculations are performed at an individual rate level. CNGC has fixed this problem by moving to consolidated rate groups.

Section10 examines cost of service coverage for fixed costs.

Section 11 is the weather appendix, with actual weather as compared with normal. Weather has been trending warmer in recent years such that when released, NOAA's weather normals for 1991-2020 are likely to reflect significantly warmer weather than the currently available 30-year normals based on 1981-2010 data. In order to deal with the impact of trending HDD we suggest CNGC consider modifications to its definition of normal weather to reduce forecast bias from unaccounted for trends in normal weather.

Section 12 indicates outside forces that can have major effects on conservation and low-income programs. To understand decoupling and its effect on conservation and low-income programs, it is necessary to consider a wider vision that includes external factors from the environment. During times of change, these external forces can be stronger than the tractable variables that can be controlled by the utility and the programs. All of the below background factors produce forces that affect the programs; most are not controllable by the programs.

- Covid, and the health requirements to reduce spread of the virus have impacted most organizations. Supply chains are slower, communication without in-person meetings is burdened compared with communication and coordination pre-Covid, and many work processes take longer to accomplish. A year in, the added burden is noticeable. Beyond this overall societal condition of the Covid recession, during 2020 weatherization work was first subject to a substantial pause and then resumed with health and safety rules that are necessary but create added burden in time and effort. The recession effects on households has disproportionately impacted low-income workers and workers in essential services.[3]
- Poverty in the form of income insufficiency is not well indicated by the official federal poverty measure, which is why we typically use a multiple of federal poverty for program

[3] The recession particularly affects households supported by what we often think of as service industry jobs (though may be classed economically as retail) such as restaurant workers, persons in the travel industry, physical trainers, and others who are not able to work remotely and whose workplaces are closed to slow the spread of the virus.

eligibility (such as 150% or 200%), but income insufficiency runs beyond this and affects more of households above the eligibility criteria.

- The federal Consumer Price Index (CPI) used to adjust poverty and social security for inflation does not fully account for inflation. Though it is useful for comparing one year to the next, over a few or more years, adjustments fail actual inflation as experienced.
- There is a general loss of real income and a pulling apart of society as income moves to the top (and away from low-income, middle-income, and lower-upper income households). This shift in income allocation makes voluntary support from most households more difficult, lowering the ability of families and social networks to provide voluntary support and so changes the environment in which programs operate.
- Climate acceleration requires much better analytic work in order to fold conservation within practical resilience so as to improve targeting and relevance.
- Costs for conservation work are increasing relatively rapidly in the US and Canada.
- We have secured the "low-hanging fruit" and now we are left with much "higher-hanging fruit" without the same ability to spread costs within a measure package.

Yet, though subject to all of these external forces, the programs play an important role in evening out structural and social problems in the general economy and supporting energy savings and climate adaptation. Utilities, guided by the commission and directed by legislation, essentially serve as a kind of "shock absorber", advancing societal goals of conservation, inclusion, and energy efficiency during times of change. The programs are much stronger now, as a result of substantial commitment and experience; and better adapted to engage whatever the future may bring. As this report shows, CNGC has mature programs, has the interrelationships to ensure progress in the light of current knowledge, and is operating in good faith.

CNGC's decoupling mechanism is working well.

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Section 1. Fidelity Analysis

Decoupling is "…a way to make utilities indifferent to annual sales volumes by addressing the net revenue volatility associated with weather, changes in local economic conditions, and energy efficiency programs".[4] Each section of this study reports on a particular aspect of decoupling. The evaluation objective in the fidelity analysis is examination of the extent to which cumulative decoupling deferrals and resulting rate adjustments were calculated in accordance with the Commission order approving the decoupling mechanism. Specifically, have the steps in the decoupling mechanism and the resulting rates been calculated correctly?

A. Structure of Decoupling

Cascade Natural Gas Corporation's (CNGC) decoupling mechanism functions as a revenue-per-customer mechanism. Each year, CNGC files to true-up rates under each schedule. The structure of CNGC's Washington decoupling mechanism follows the Joint Settlement Agreement Figure 1-1 and Washington Utilities and Transportation Commission (WUTC or Commission) Order No. 4 of docket UG-152246. CNGC implements deferrals through Rule 21. Rule 21, Decoupling Mechanism, provides the steps through which, each year, for decoupled rate schedules, CNGC defers the difference between billed revenue and authorized revenue (in the form of authorized margin per customer). Billed revenue and authorized revenue are developed for each decoupled rate schedule for each month. The deferred balances computed are recovered through the Schedule 594 adjustment rate. Order No. 4 also specifies two decoupling rate control tools: an annual (a) earnings test and (b) decoupling rate adjustment cap.[5]

B. Schedule for Decoupling

The term of the adjustment mechanism for decoupling is five years. The first deferral amounts were calculated, by rate schedule for the month of September 2016. For each month thereafter, the cumulative total monthly deferral includes the cumulative total monthly deferral for the prior month, plus the total deferral for the current month.[6]

Each April, the Commission Basis Report (CBR) for the previous year is developed. Decoupling rate adjustments are filed each September. Rate recovery through Schedule 594 is effective each November 1st, concurrently with the Purchased Gas Adjustment (PGA).[7] At the end of the decoupling arrangement, the final deferral amount is to be recorded in September 2021. The final Schedule 594 charge or credit billing is to be on December 31, 2022. The schedule is specified in the Joint Settlement Agreement (Figure 1-1). A detailed schedule is provided in Table 1-1.

[4] Janine Migden-Ostrander & Richard Sedano, Nov. 7, 2016, accessed 8/26/2020, Regulatory Assistance Project Knowledge Center, "Decoupling Design: Customizing Revenue Regulation to your State's Priorities", https://www.raponline.org/knowledge-center/decoupling-design-customizing-revenue-regulation-state-priorities/

[5] There are also some other requirements in the Order. However, they are not included in this section.

[6] The cumulative total monthly deferral is, in this way, a chained computation.

[7] Setting the effective date for Schedule 594 the same as for the Purchased Gas Adjustment (PGA) is designed to provide one rate change to the customer, instead of two.

The deferred monthly balances under the decoupling mechanism for September 1, 2016, through December 31, 2016, will be subject to the Commission Basis Report ("CBR") filed April 30, 2017, for the 2016 fiscal year. This amount will be amortized in a filing effective November 1, 2017, that will be submitted concurrently with the 2017 PGA and gas cost deferral amortization filings.

The subsequent decoupling deferral period, January 1, 2017, through December 31, 2017, will be amortized for rebate or surcharge in a filing effective November 1, 2018, and will be subject to the CBR filed April 30, 2018, for the 2017 fiscal year. The 12-month cycle of deferring then collecting after 10 months will continue for the duration of the mechanism.

Source: Docket UG-152286 Joint Settlement Agreement, May 13, 2016, P. 5.

Figure 1-1: Overall Schedule for Decoupling (Settlement Agreement).

Table 1-1: Decoupling Timetable.

Decoupling Begins September 1, 2016					
Col. 1	**Col. 2**	**Col. 3**	**Col.4**	**Col. 5**	**Col. 6**
Develop Commission Basis Report (CBR) & Deferral				**File & Apply Rates**	
Year	**Span**	**Deferral Months Included**	**File CBR with WUTC**	**File Rate Adjustment (Schedule 594) with WUTC**	**Rate Adjustment (Schedule 594) Effective**
2016	Start-Up	Sep - Dec 2016	April 30, 2017	September 2017	November 1, 2017
2017	1	Jan – Dec 2017	April 30, 2018	September 2018	November 1, 2018
2018	2	Jan - Dec 2018	April 30, 2019	September 2019	November 1, 2019
2019	3	Jan - Dec 2019	April 30, 2020	September 2020	November 1, 2020
2020	4	Jan - Dec 2020	April 30, 2021	September 2021	November 1, 2021
2021	5	Jan - Dec 2021	April 30, 2022	September 2022	November 1, 2022
Final Deferral Amount to be recorded in September 2021. Final Schedule 594 Charge or Credit – December 2022.					

Following the schedule, CNGC's decoupling mechanism rate adjustments have been filed annually (Table 1-2).

Table 1-2: Decoupling Rate Adjustment Filings.

Decoupling Mechanism Rate Adjustment Filings				
Year	**Span**	**Rate Adjustment Effective Date**	**Advice Date**	**Docket Number**
2016	Start-Up	Nov. 1, 2017	W16-08-01	UG-152286
2017	1	Nov. 1, 2018	W17-09-03	UG-171014
2018	2	Nov. 1, 2019	W18-09-03	UG-180790
2019	3	Nov. 1, 2020	W19-09-03	UG 190767
2020	4	Nov. 1, 2021	W20-09-03	UG-200802
2021	5	Nov. 1, 2022	TBD	TBD

C. November 2017 Rate Adjustment

In this subsection, we first identify the variables used in computation of cumulative total deferral amounts. Second, we follow the calculation of cumulative total deferral amounts. Third, we examine how the cumulative total deferral amounts are developed into per therm Posted Rate Schedule 594 Tariff Rates. Fourth, we show how the per therm rates are translated into Percent Change in a typical monthly bill format. Fifth, we examine the implementation of two rate control tools, the Earnings Test, and the Cap.

Variables

For each schedule and for each month included in a deferral Span, there are six data inputs to the computation of cumulative deferral: Number of Customers in Class, Actual Margin Revenue, Authorized Revenue, Interest Rate, Number of Days in Month, and Cumulative Deferral in the Prior Month (Table 1-3).

The Number of Customers in Class is taken from a company report and is provided in the response to Data Request GP-34. Actual Margin Revenue is taken from company reports and is provided in the response to Data Request GP-35. The Authorized Revenue is provided from the set of CNGC Rule 21 Decoupling Mechanism Rate Sheets. The interest rate applied each month is developed by the Federal Energy Regulatory Agency (FERC) and is provided in the response to Data Request GP-33. Calendar Days are simply the number of days in each calendar month. In calculating the cumulative deferral amount for each month, the cumulative deferral amount from the prior month is added to the total deferral amount.

A list of Rule 21 Rate Sheets providing inputs for Actual Margin Revenue is provided in Table 1-4.

Table 1-3: Variables used in Calculation.

Variables used in Computation of Cumulative Deferral Amounts		
Variable	**Source**	**Data Request**
Number of Customers in Class	CA1499	CA1499 reports are internal customer counts used by Cascade. The response to data request GP-34 contains a compilation of historical customer accounts by class (GP-34 OR & WA THMS_REVS).
Actual Margin Revenue	CC&B report: CA1501 Revenue by District	The response to data request GP-35 provides monthly CA 1501 Reports which contain Actual Margin Revenue by Rate Schedule.
Authorized Revenue	Sequence of CNGC Rule 21 Decoupling Mechanism Rate Sheets, Tables 1 & 2	See Table 1-4 for Rate Sheets.
Interest Rate	Any deferral balance, either in the surcharge or rebate direction, will accrue interest at the FERC interest rate consistent with gas cost deferred balances. [Joint Settlement Agreement, P. 5, §15.]	The response to data request GP-33 contains the source file, "FERC Interest Rates" worksheet in the DEFSUMWA Workpaper.
Number of Days in the Month	Calendar Days	
Cumulative Deferral in the Prior Month	Prior Month Cumulative Deferral Value	

Table 1-4: Authorized Revenue Rate Sheets.

Rule 21 Rate Sheets for Rule 21 Authorized Margin		
Year	**Span**	**Rate Sheet Covers**
2016	Start Up	September 2016 – July 2018
2017	1	September 2016 – July 2018
2018	2	August 2018 – February 2020
2019	3	August 2018 – February 2020
2020	4	March 2020 forward - TBD
2021	5	TBD - TBD

Steps in Calculation

The computation of Cumulative Deferral Amounts is specified in five steps. The decoupling mechanism development of deferrals is specified in the Rule 21 Decoupling Mechanism Rate Sheets. These Rule 21 Rate Sheets state that "[on a monthly basis the Company will perform the following steps separately for each customer class that is applicable to the rate adjustment in this Rule:

1) Record Number of Customers per Customer Class

2) Determine Actual Margin Revenues

3) Determine Authorized Revenue by multiplying the number of Customers per Customer class (No. 1 above) times the Authorized Revenue for the corresponding month per Customer class as established in Tables l & 2 [of the appropriate Rule 21 Decoupling Mechanism Rate Sheet].

4) Determine then record the Deferral Amount by subtracting the Authorized Margin Revenue (No. 3 above) from Actual Margin Revenue (No. 2 above).

5) Annually determine the new rate to be applied in Schedule 594 by taking the annual sum of monthly Deferral Amounts and dividing the total by forecasted volumes per Customer class.]"[8]

For each rate included in decoupling, cumulative deferral amounts were computed for 2016 deferrals, and similarly for deferrals in 2017, 2018 and 2019. Schedule 594 rate tariffs were computed for implementation on November 1 for the years 2017, 2018, 2019 and 2020. The cycle of 12-month calendar year deferrals (for the previous year and collection beginning November 1 of each year) is to continue for the duration of the mechanism.

Cumulative Deferral (2016) for November 2017 Rate Adjustment

The start-up cumulative deferral is developed from September 1, 2016 through December 31, 2016.[9] Determination of the new rate to be applied in Schedule 594 beginning November 1, 2017 (the final component of Step 5) occurs at the end of this sequence of steps. Note that there is no interest for the first month, September 2016. Also, for September 2016, since at start-up there was no cumulative deferral from the prior month, for each Rate Schedule, the Monthly Deferral Total is equal to the Cumulative Deferral.

Calculation of 2016 cumulative deferral for each decoupled rate schedule is shown in Table 1-5. Note that in the 2016 calculation there are ten rate schedules subject to decoupling (Residential 502, Residential 503, Industrial 505, Industrial 511, Commercial 504, Commercial 511, Commercial 512, Commercial 505LV, Industrial 570, and Industrial 577. Over subsequent years, the number of schedules varies.

[8] There are additional sub-steps.

[9] See response to Data Request GP-1: CNGC Advice W18-09-03 Rule 21 Decoupling WP, 09-17-2018, Tab WA-CAP 2017.

Table 1-5: Cumulative Deferral for 2016 (All Decoupled Rate Schedules).

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
502 Residential					
Customers		527	571	610	625
Actual Margin Revenues		371.46	1,065.96	2,511.75	6,447.61
Total Actual Margin Revenues		371.46	1,065.96	2,511.75	6,447.61
Authorized Revenue		(405.79)	(765.14)	(2,482.70)	(6,043.75)
Deferral		(34.33)	300.82	29.05	403.86
Interest			(0.10)	0.77	0.88
Monthly Deferral Total		(34.33)	300.72	29.82	404.74
Cumulative Deferral Total		(34.33)	266.39	296.21	700.95
503 Residential					
Customers		180,561	181,689	182,454	183,190
Actual Margin Revenues		816,683.89	1,314,452.19	2,191,414.95	4,703,693.83
Unbilled Margin Revenues (Current Month)		569,892.40	1,490,037.04	2,778,059.14	5,424,695.71
Unbilled Margin Revenues (Prior Month)		(360,981.13)	(569,892.40)	(1,490,037.04)	(2,778,059.14)
Total Actual Margin Revenues		1,025,595.16	2,234,596.83	3,479,437.05	7,350,330.40
Authorized Revenue		(1,049,059.41)	(2,272,929.39)	(4,492,017.48)	(6,113,050.30)
Deferral		(23,464.25)	(38,332.56)	(1,012,580.43)	1,237,280.10
Interest			(69.75)	(177.97)	(3,194.43)
Monthly Deferral Total		(23,464.25)	(38,402.31)	(1,012,758.40)	1,234,085.67
Cumulative Deferral Total		(23,464.25)	(61,866.56)	(1,074,624.96)	159,460.71

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
505 Industrial					
Customers		449	449	451	453
Actual Margin Revenues (Old Rates)		(3,532.68)	-	-	-
Actual Margin Revenues (First 500)		17,165.09	19,866.79	24,711.20	31,039.98
Actual Margin Revenues (Next 3,500)		45,934.49	51,000.33	62,228.04	84,177.31
Actual Margin Revenues (Over 4,000)		37,251.84	91,343.14	55,249.14	82,572.20
Total Actual Margin Revenues		96,818.74	162,210.26	142,188.38	197,789.49
Authorized Revenue		(98,416.31)	(216,180.03)	(148,942.75)	(226,051.53)
Deferral		(1,597.57)	(53,969.77)	(6,754.37)	(28,262.04)
Interest			(4.75)	(159.86)	(185.75)
Monthly Deferral Total		(1,597.57)	(53,974.52)	(6,914.23)	(28,447.79)
Cumulative Deferral Total		(1,597.57)	(55,572.09)	(62,486.32)	(90,934.11)
511 Industrial					
Customers		12	12	13	14
Actual Margin Revenues (Old Rates)		(677.58)	-	-	-
Actual Margin Revenues (First 20,000)		14,678.80	16,937.21	15,316.29	22,556.70
Actual Margin Revenues (Next 80,000)		18,361.49	17,372.17	16,872.57	12,638.42
Actual Margin Revenues (Over 100,000)		49.12	-	389.46	-
Total Actual Margin Revenues		32,411.83	34,309.38	32,578.32	35,195.12
Authorized Revenue		(5,474.28)	(8,364.48)	(11,462.75)	(27,981.66)
Deferral		26,937.55	25,944.90	21,115.57	7,213.46
Interest			80.07	152.36	220.66
Monthly Deferral Total		26,937.55	6,024.97	21,267.93	7,434.12
Cumulative Deferral Total		26,937.55	2,962.52	74,230.45	81,664.57

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
504 Commercial					
Customers		25,279	25,473	25,612	25,822
Actual Margin Revenues		675,410.46	871,314.32	1,227,359.65	2,502,209.03
Unbilled Margin Revenues (Current Month)		449,398.43	977,929.55	1,526,529.23	2,818,768.15
Unbilled Margin Revenues (Prior Month)		(303,961.76)	(449,398.43)	(977,929.55)	(1,526,529.23)
Total Actual Margin Revenues		820,847.13	1,399,845.44	1,775,959.33	3,794,447.95
Authorized Revenue		(848,616.03)	1,461,386.01)	(2,388,575.12)	(3,191,082.76)
Deferral		(27,768.90)	(61,540.57)	(612,615.79)	603,365.19
Interest			(82.55)	(257.16)	(2,087.55)
Monthly Deferral Total		(27,768.90)	(61,623.12)	(612,872.95)	601,277.64
Cumulative Deferral Total		(27,768.90)	(89,392.02)	(702,264.97)	100,987.33
511 Commercial					
Customers		74	74	75	73
Actual Margin Revenues (Old Rates)		(682.99)	-	-	-
Actual Margin Revenues (First 20,000)		33,970.88	42,943.51	65,552.38	119,741.18
Actual Margin Revenues (Next 80,000)		4,356.18	4,385.06	10,369.50	22,667.37
Actual Margin Revenues (Over 100,000)		-	-	-	673.54
Unbilled Margin Revenues (Current Month)		19,112.61	41,644.44	75,008.29	131,875.56
Unbilled Margin Revenues (Prior Month)		(11,493.90)	(19,112.61)	(41,644.44)	(75,008.29)
Total Actual Margin Revenues		45,262.78	69,860.40	09,285.73	199,949.36
Authorized Revenue		(33,758.06)	(51,580.96)	(66,131.25)	(145,904.37)
Deferral		11,504.72	18,279.44	43,154.48	54,044.99
Interest			34.20	85.78	217.17
Monthly Deferral Total		11,504.72	18,313.64	43,240.26	54,262.16
Cumulative Deferral Total		11,504.72	29,818.36	73,058.62	127,320.78

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
512 Commercial					
Customers		1	1	1	1
Actual Margin Revenues		894.89	799.66	798.16	851.21
Total Actual Margin Revenues		894.89	799.66	798.16	851.21
Authorized Revenue		(932.83)	(893.31)	(725.35)	(810.19)
Deferral		(37.94)	(93.65)	72.81	41.02
Interest			(0.11)	(0.38)	(0.18)
Monthly Deferral Total		(37.94)	(93.76)	72.43	40.84
Cumulative Deferral Total		(37.94)	(131.70)	(59.27)	(18.43)
505LV Commercial					
Customers		1	1	1	1
Actual Margin Revenues		89.87	76.69	-	7.91
Unbilled Margin Revenues		76.69	-	7.91	56.91
Unbilled Margin Revenues		(89.87)	(76.69)	-	(7.91)
Total Actual Margin Revenues		76.69	-	7.91	56.91
Authorized Revenue		(219.19)	(481.47)	(330.25)	(499.01)
Deferral		(142.50)	(481.47)	(322.34)	(442.10)
Interest			(0.42)	(1.80)	(2.82)
Monthly Deferral Total		(142.50)	(481.89)	(324.14)	(444.92)
Cumulative Deferral Total		(142.50)	(624.39)	(948.53)	(1,393.45)

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
570 Industrial					
Customers		8	8	8	8
Actual Margin Revenues (First 30,000)		8,531.82	11,237.47	12,255.16	11,677.36
Actual Margin Revenues (Over 30,000)		1,499.21	1,947.20	3,737.83	4,953.28
Unbilled Margin Revenues (Current Month First 30,000)		11,237.47	12,255.16	11,677.36	13,760.72
Unbilled Margin Revenues (Current Month Over 30,000)		1,947.20	3,737.83	4,953.28	8,228.82
Unbilled Margin Revenues (Prior Month First 30,000)		(8,531.82)	(11,237.47)	(12,255.16)	(11,677.36)
Unbilled Margin Revenues (Prior Month Over 30,000)		(1,499.21)	(1,947.20)	(3,737.83)	(4,953.28)
Total Actual Margin Revenues		13,184.67	15,992.99	16,630.64	21,989.54
Authorized Revenue		(10,479.36)	(12,979.28)	(13,836.96)	(17,548.00)
Deferral		2,705.31	3,013.71	2,793.68	4,441.54
Interest			8.04	16.48	25.38
Monthly Deferral Total		2,705.31	3,021.75	2,810.16	4,466.92
Cumulative Deferral Total		2,705.31	5,727.06	8,537.22	13,004.14

Table 1.5 continued on next page.

Rate Schedule		September 2016	October 2016	November 2016	December 2016
	Interest Rate	3.50%	3.50%	3.50%	3.50%
	Days	30	31	30	31
577 Industrial					
Customers		2	2	2	2
Actual Margin Revenues (First 4,000)		799.92	791.83	832.08	832.08
Actual Margin Revenues (Over 4,000)		109.87	201.69	524.92	697.64
Unbilled Margin Revenues (Current Month First 4,000)		791.83	832.08	832.08	832.08
Unbilled Margin Revenues (Current Month Over 4,000)		201.69	524.92	697.64	1,364.28
Unbilled Margin Revenues (Prior Month First 4000)		(799.92)	(791.83)	(832.08)	(832.08)
Unbilled Margin Revenues (Prior Month Over 4,000)		(109.87)	(201.69)	(524.92)	(697.64)
Total Actual Margin Revenues		993.52	1,357.00	1,529.72	2,196.36
Authorized Revenue		(1,082.82)	(1,240.30)	(1,500.44)	(2,059.96)
Deferral		(89.30)	116.70	29.28	136.40
Interest			(0.27)	0.08	0.17
Monthly Deferral Total		(89.30)	116.43	29.36	136.57
Cumulative Deferral Total		(89.30)	27.13	56.4 9	193.06

Table 1-6, Column 2 provides a summary of the final (12/31/2016) year-end cumulative deferral totals for each schedule (from Table 1-5).

From Cumulative Total Deferral Amounts to Rate Schedule 594 Tariffs

In Table 1-6, for each Rate Schedule, interest assignments (Column 3) and interest accruals (Column 4) are added to the balances as of 12/31/16 (Column 2) to yield the dollar amounts for calculation of a rate per therm (Column 5). For each schedule, forecast therms (Column 6) is used to derive the rate per therm (Column 7). This is also the posted 594 Tariff Rate for each schedule (Table 1-7, Column 6).

Table 1-6: End-of-Year Consolidated Deferrals (2016), Interest, and Rate per Therm.

Line	Rate Schedule	Account Balance 12/31/2016 (Cumulative Deferral Totals)	Interest Assignments & Amortization through 10/31/2017	Interest Accruals Through Am.	Amount	Forcasted Therms	Rate per Therm
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	502	(701)	(22)	(10.24)	(733)	455,829	(0.00161)
2	503	(159,461)	(5,050)	(2,579.03)	(167,089)	118,305,576	(0.00141)
3	504	100,987	3,198	1,735.27	105,920	84,300,645	0.00126
4	512	92,328	2,924	1,839.10	97,090	12,068,315	0.00805
5	511	(208,985)	(6,618)	(3,940.71)	(219,544)	12,121,061	(0.01811)
6	505	18	1	0.42	19	49,045	0.00040
7	570	(13,004)	(412)	(240.73)	(13,657)	3,675,550	(0.00372)
8	577	(193)	(6)	(3.72)	(203)	194,923	(0.00104)

Note: Cumulative Deferral Total for each Rate Schedule in Table 1-5 is shown in Column 2.

Table 1-7: Schedule 594 Rate Tariff Posted November 1, 2017.

Line	Rate Schedule	Description	Reverse Prior Decoupling Rate Adj.	Decoupling Related Temporary Rate Adj.	Incremental R/S 594 Rate Change	Posted R/S 594 Tariff Rate
	Col. 1	Col. 1	Col. 3	Col. 4	Col. 5	Col. 6
1	**502**	Dry Out	$ -	$ (0.00161)	$ (0.00161)	$ (0.00161)
2	**503**	Residential	$ -	$ (0.00141)	$ (0.00141)	$ (0.00141)
3	**504**	Commercial	$ -	$ 0.00126	$ 0.00126	$ 0.00126
4	**512**	Compressed Nat. Gas	$ -	$ 0.00040	$ 0.00040	$ 0.00040
5	**511**	Com-Ind Dual Service	$ -	$ (0.01811)	$ (0.01811)	$ (0.01811)
6	**505**	Industrial Firm	$ -	$ 0.00805	$ 0.00805	$ 0.00805
7	**570**	Industrial Interr.	$ -	$ (0.00372)	$ (0.00372)	$ (0.00372)
8	**577**	Institutional Interr.	$ -	$ (0.00104)	$ (0.00104)	$ (0.00104)

From Rate Schedule 594 Tariffs to Percent Change in Typical Monthly Bill

In Table 1-8, Therm Sales (Column 3) are actual calendar year 2017 therms. Revenue at 11/01/2016 Rates (Column 4) is what yearly revenue would have been at the new rate placed into effect on November 1, 2017. This amount is the total revenue, not the adjusted amount. Per Therm Rate Change (Column 5) is the rate adjustment. The Amount of Change (Column 6) is the change in revenue (plus or minus) due to the Rate Schedule 594 adjustment. Percent Change, shown in Column 7, is the Amount

of Change (Column 6) divided by the Amount of Revenue for the calendar year if at the new total November 1, 2017 rates (Column 4).

Table 1-8: DMA Typical Monthly Therm Usage and Cost by Class.

Line	Rate Schedule	Description	Therm Sales	Revenue at 11/01/2016 Rates	Per Therm Rate Change	Amount of Change	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	502	Dry Out	505,257	416,921	(0.00161)	(813)	-0.19%
2	503	Residential	127,993,341	113,247,259	($0.00141)	(180,727)	-0.16%
3	504	Commercial	91,224,806	72,867,675	$0.00126	114,578	0.16%
4	505	Industrial	11,950,882	7,976,157	$ 0.00805	96,145	1.21%
5	511	Industrial Lg Vol	12,698,939	7,981,691	($0.01811)	(230,016)	-2.88%
6	570	Interruptible	3,520,163	1,831,637	($0.00372)	(13,081)	-0.71%
7	577	Interruptible Inst.	71,112	30,183	($0.00104)	(74)	-0.25%
For Twelve Months Ended 12/31/2016							

The same result is shown in a Typical Monthly Bill format in Table 1-9.

Table 1-9: DMA Proposed Typical Monthly Bill by Class.

Line	Rate Schedule	Description	Typical Monthly Therm Use	Avg Bill @ 11/01/2016 Rate	Present Filing Changes	Proposed Typical Bill	Percent Change
		Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
1	503	Residential (503)	58	$51.65	($0.08)	$51.57	-0.16%
2	504	Commercial (504)	296	$236.59	$ 0.37	$236.96	0.16%
3	505	Industrial (505)	N/A*	$0.66741	0.00805	0.67546	1.21%
4	511	Industrial Lg Vol (511)	N/A*	$0.62853	(0.01811)	0.61042	-2.88%
5	570	Interruptible (570)	N/A*	$0.52033	(0.00372)	0.51661	-0.71%
6	577	Interruptible Inst. (577)	N/A*	$0.42444	(0.00104)	0.42340	-0.25%
For Twelve Months Ended 12/31/2016 *Typical use not calculated for industrial customers due to large variation.							

The Earnings Test and the Three Percent Cap

The Earnings Test and the Three Percent Cap did not affect the Schedule 594 Tariff going into effect November 1, 2017.

A. Earnings Test -2017

The earnings test is based on CNGC's year-end Commission Basis Report (CBR) stated on an average of monthly averages (AMA) basis and prepared according to WAC 480-90-257 (Commission Basis Report).[10] For the earnings test, the decoupling accounting entries are adjusted from a therm sales basis to a revenue per customer basis. Additional adjustments for any item that materially distorts reporting period earnings and rate base are required, following WAC 480-90-257(2)(b). The CBR includes normalizing adjustments to reflect operations under normal weather conditions. Table 1-8 and Table 1-9 are constructed as AMA (or "Typical Monthly") tables conformed to CBR requirements. As shown in the Percent Change (Column 6 of both tables), each schedule shows a rate decrease or a very small increase. This means the Earnings Test does not have an effect on rates in November 2017.

B. Three Percent Cap Test - 2017

The sum of the decoupling surcharge plus interest at the Federal Energy Regulatory Commission (FERC) rate cannot exceed a three percent annual rate adjustment (unrecovered balances are carried forward to future years for recovery).[11] For the deferrals from 2016, expressed as the posted Schedule 594 tariff rate effective November 1, 2017, all change amounts are decreases or very small increases, so the Three Percent cap does not have an effect on rates in November 2017 (Table 1-10).

Table 1-10: Three Percent Surcharge Test - 2017.

Line	Calculation Step	Residential (503)	Commerical (504)	Industrial (505)	Commercial-Industrial (511)	Industustrial Interruptible (570).	Total WA
1	Revenue From 2016 Normalized Loads and Customers at Present Billing Rates	113247259	72867675	7976157	7981691	1831637	203904419
2	August 2017 - July 2018 Usage Forecast	127993341	91224806	11950882	12698939	3520163	247388131
3	Proposed Decoupling Recovery Rates	-0.001412	0.001256	0.008045	-0.018113	-0.003716	
4	Present Decoupling Surcharge Recovery Rates	0	0	0	0	0	
5	Incremental Decoupling Recovery Rates	-0.001412	0.001256	0.008045	-0.018113	-0.003716	
6	Incremental Decoupling Recovery	-180726.5975	114578.3563	96144.84569	-230015.8821	-13080.92571	-213100.2033
7	Incremental Surcharge %	-0.001595858	0.001572417	0.012054031	-0.028817939	-0.007141658	-0.001045099
8	3% Test Adjustment (2)	0	0	0	0	0	
9	3% Test Rate Adjustment	0	0	0	0	0	
10	Adjusted Proposed Decoupling Recovery Rates	-0.001412	0.001256	0.008045	-0.018113	-0.003716	
11	Adjusted Incremental Decoupling Recovery	-180726.5975	114578.3563	96144.84569	-230015.8821	-13080.92571	-213100.2033
12	Adjusted Incremental Surcharge %	-0.001595858	0.001572417	0.012054031	-0.028817939	-0.007141658	-0.001045099

[10] For Washington Administrative Code 480-90-257, see Appendix II.

[11] Any deferred balance, either in the surcharge or rebate direction, accrues interest at the FERC interest rate consistent with gas cost deferred balances. Any decoupling rebate balance at year-end is returned to customers.

D. November 2018 Rate Adjustment

The Cumulative Deferral Total for twelve months ending December 31, 2017 is used in the calculation of the Rate Schedule 594 decoupling rate adjustment effective November 1, 2018.

Cumulative Deferral Total (2017) & Rate Adjustment

Calendar year 2017 cumulative deferral was used to develop the 2018 decoupling rate adjustment.[12] Cumulative deferral is developed in five steps,[13] and is calculated per customer class per month over 2017. Calculation of 2017 total cumulative deferral for Residential Rate Schedule 502 is shown in Table 1-12. Calculation of total cumulative deferral for the other individual schedules follows the same procedure.

In contrast to 2016, for 2017, all twelve calendar months are included in the calculation. Note that there are Journal Entries for each schedule just prior to November 2017. WAC-480-90-257(2)(b) requires adjustments for any item that would otherwise materially distort reporting. Each monthly deferral is subject to interest and the sum of the Deferral plus the Interest is the Monthly Deferral Total. The Cumulative Deferral Total for each month is the sum of the Monthly Deferral Total plus the Cumulative Deferral Total from the prior month. For Residential Rate Schedule 502, the final Cumulative Deferral Total is shown in the final column and row of Table 1-12.

Tables 1-12 through 1-21 follow the same procedure and format. In each of these tables, the final row and column provides the final Cumulative Deferral Total for a decoupled Rate Schedule. There are individual tables for each of the following ten Rate Schedules: Residential 502, Residential 503, Industrial 511, Commercial 504 Large Volume, Commercial 504, Commercial 511, Commercial 512, Commercial 505 Large Volume, Industrial 570, and Industrial 577.

For the earnings test and the Three Percent Cap test, these rates are later consolidated into five rates. Combination of class rate schedules into Consolidated Rates is shown in Table 1-11. The Consolidated Rates are: 503 Residential, 504 Commercial, 505 Industrial Firm, 511 Commercial-Industrial Dual Service and Large Volume, and 570 Industrial Interruptible. Discussion of the calculation method continues following Table 1-21.

Table 1-11: Consolidated Rates (November 1, 2017).

Consolidated Rates	Individual Rates
503 Residential	502, 503 Residential
504 Commercial	504, 504 Large Volume, 512 Commercial
505 Industrial Firm	505 Industrial Firm
511 Commercial-Industrial Dual Service & Large Volume	511 Commercial, 511 Industrial
570 Industrial Interruptible	570, 577 Industrial

[12] See response to Data Request GP-1: CNGC Advice W18-09-03 Rule 21 Decoupling WP, 09-17-2018, Tab WA-CAP 2017.
[13] The five calculation steps are listed at the top of Page 1-7.

Table 1-12: Residential Rate 502 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-16	Apr-17	May-17	Jun-17	Jul-17	Aug-17	Sep-17	Oct-17	Ammortize JE	Nov-17	Dec-17
Interest Rate	0.035	0.035	0.035	0.0371	0.0371	0.0371	0.0396	0.0396	0.0396	0.0421		0.0421	0.0421
Days	31	28	31	30	31	30	31	31	30	31		30	31
Customers	675	673	636	632	556	509	475	487	549	651		716	728
Actual Margin Revenues	9957.16	8104.14	7868.96	4345.26	3263.7	1706.88	430.53	244.96	276.93	1209.86		3556.83	6629.68
Total Actual Margin Revenues	9957.16	8104.14	7868.96	4345.26	3263.7	1706.88	430.53	244.96	276.93	1209.86	0	3556.83	6629.68
Authorized Revenue	-7006.5	-5727.23	-4725.5	-3046.24	-1590.16	-748.23	-427.5	-365.25	-422.73	-872.34	0	-2914.12	-7039.76
Deferral	2950.66	2376.91	3143.48	1299.02	1673.54	958.65	3.03	-120.29	-145.8	337.52	-700.95	642.71	-410.08
Interest	2.08	9.81	17.96	28.06	33.18	37.31	44.5	44.66	42.97	46.84	-22.36	44.16	48.09
Monthly Deferral Total	2952.74	2386.72	3161.44	1327.08	1706.72	995.96	47.53	-75.63	-102.83	384.36	-723.31	686.87	-361.99
Cumulative Deferral Total	3653.69	6040.41	9201.85	10528.93	12235.65	13231.61	13279.14	13203.5	13100.68	13485.04	12761.73	13448.6	13086.6

Table 1-13: Residential Rate 503 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	183,464	183,641	183,786	183,817	183,543	183,189
Actual Margin Revenues	7,984,860.96	6,131,634.68	5,636,411.33	3,349,783.45	2,414,393.74	1,408,779.55
Unbilled Mar. Revenues (Current Month)	4,856,326.74	3,984,714.25	2,598,019.22	2,187,143.76	1,530,502.65	625,618.93
Unbilled Mar. Revenues (Prior Month)	(5,424,695.71)	(4,856,326.74)	(3,984,714.25)	(2,598,019.22)	(2,187,143.76)	(1,530,502.65)
Total Actual Margin Revenues	7,416,491.99	5,260,022.19	4,249,716.30	2,938,907.99	1,757,752.63	503,895.83
Authorized Revenue	(5,667,202.96)	(4,647,953.71)	(3,892,587.48)	(2,442,927.93)	(1,585,811.52)	(1,062,496.20)
Deferral	1,749,289.03	612,068.48	357,128.82	495,980.06	171,941.11	(558,600.37)
Interest	474.01	5,126.13	7,510.04	8,815.74	10,700.19	10,911.96
Deferral Total (Month)	1,749,763.04	617,194.61	364,638.86	504,795.80	182,641.30	(547,688.41)
Deferral Total (Cum.)	1,909,223.75	2,526,418.36	2,891,057.22	3,395,853.02	3,578,494.32	3,030,805.91

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	183,032	182,924	183,583	184,813		185,688	186,285
Actual Margin Revenues	874,550.73	801,920.24	758,743.86	1,499,772.68		3,083,864.33	4,744,541.33
Unbilled Margin Revenues (Current Month)	545,900.68	385,010.03	676,571.12	1,560,951.07		3,074,464.44	4,779,530.36
Unbilled Margin Revenues (Prior Month)	(625,618.93)	(545,900.68)	(385,010.03)	(676,571.12)		(1,560,951.07)	(3,074,464.44)
Total Actual Margin Revenues	794,832.48	641,029.59	1,050,304.95	2,384,152.63	-	4,597,377.70	6,449,607.25
Authorized Revenue	(874,892.96)	(982,301.88)	(1,066,617.23)	(2,312,010.63)	-	(4,571,638.56)	(6,216,330.45)
Deferral	(80,060.48)	(341,272.29)	(16,312.28)	72,142.00	(159,460.71)	25,739.14	233,276.80
Interest	10,193.47	9,958.49	8,558.89	9,374.81	(5,084.38)	8,785.09	9,201.38
Deferral Total (Month)	(69,867.01)	(331,313.80)	(7,753.39)	81,516.81	(164,545.09)	34,524.23	242,478.18
Deferral Total (Cum.)	2,960,938.90	2,629,625.10	2,621,871.71	2,703,388.52	2,538,843.43	2,573,367.66	2,815,845.84

Table 1-14: Industrial Rate 511 Cumulative Deferral (Calendar 2017)

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	13	14	14	14	14	14
Actual Margin Revenues	27,019.11	21,828.08	26,238.98	20,589.29	16,900.81	20,052.59
Actual Margin	16,381.59	10,477.01	24,090.08	10,925.31	7,327.63	20,443.72
Actual Margin	-	-	788.32	-		574.24
Total Actual Margin Revenues	43,400.70	32,305.09	51,117.38	31,514.60	24,228.44	41,070.55
Authorized Revenue	(26,539.63)	(26,089.56)	(31,713.64)	(18,903.92)	(15,139.74)	(10,762.22)
Deferral	16,861.07	6,215.53	19,403.74	12,610.68	9,088.70	30,308.33
Interest	242.76	265.19	312.86	381.06	434.70	449.72
Deferral Total (Month)	17,103.83	6,480.72	19,716.60	12,991.74	9,523.40	30,758.05
Deferral Total (Cum.)	98,768.40	105,249.12	124,965.72	137,957.46	147,480.86	178,238.91

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	15	14	14	14		14	14
Actual Margin Revenues	13,837.90	18,944.35	14,268.37	18,149.05		24,514.68	20,640.48
Actual Margin Revenues	9,474.58	22,162.26	15,715.30	21,151.35		14,371.98	8,088.58
Actual Margin Revenues	1,076.88	1,248.70	922.23	475.32		-	
Total Actual Margin Revenues	24,389.36	42,355.31	30,905.90	39,775.72	-	38,886.66	28,729.06
Authorized Revenue	(8,409.30)	(8,187.62)	(6,386.66)	(9,758.56)	-	(12,344.50)	(27,981.66)
Deferral	15,980.06	34,167.69	24,519.24	30,017.16	(81,664.57)	26,542.16	747.40
Interest	599.47	655.23	747.44	911.45	(2,603.88)	697.48	818.13
Deferral Total (Month)	16,579.53	34,822.92	25,266.68	30,928.61	(84,268.45)	27,239.64	1,565.53
Deferral Total (Cum.)	194,818.44	229,641.36	254,908.04	285,836.65	201,568.20	228,807.84	230,373.37

Table 1-15: Commercial Rate 504LV Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	-	-	-	-	-	-
Actual Margin Revenues	-	-	-	-	-	-
Unbilled Margin	-	-	-	-	-	-
Unbilled Margin	-	-	-	-	-	-
Total Actual Margin Revenues	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-
Deferral	-	-	-	-	-	-
Interest	-	-	-	-	-	-
Deferral Total (Month)	-	-	-	-	-	-
Deferral Total (Cum.)	-	-	-	-	-	-

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	-	-	-	1		1	1
Actual Margin Revenues	-	-	-	-		110.49	337.62
Unbilled Margin Revenues	-	-	-	110.49		337.62	680.90
Unbilled Margin Revenues	-	-	-	-		(110.49)	(337.62)
Total Actual Margin Revenues	-	-	-	110.49	-	337.62	680.90
Authorized Revenue	-	-	-	(57.37)	-	(93.26)	(123.58)
Deferral	-	-	-	53.12	-	244.36	557.32
Interest	-	-	-	-	-	0.18	1.06
Deferral Total (Month)	-	-	-	53.12	-	244.54	558.38
Deferral Total (Cum.)	-	-	-	53.12	53.12	297.66	856.04

Table 1-16: Commercial Rate 504 Cumulative Deferral Calendar 2017.

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	25,898	25,906	25,878	25,826	25,772	25,650
Actual Margin Revenues	4,565,371.19	3,677,447.61	3,258,828.64	1,890,763.86	1,415,457.70	990,662.74
Unbilled Margin	2,735,108.08	2,360,218.25	1,485,478.16	1,217,916.12	887,958.52	432,089.90
Unbilled Margin	(2,818,768.15)	(2,735,108.08)	(2,360,218.25)	(1,485,478.16)	(1,217,916.12)	(887,958.52)
Total Actual Margin Revenues	4,481,711.12	3,302,557.78	2,384,088.55	1,623,201.82	1,085,500.10	534,794.12
Authorized Revenue	(3,186,230.94)	(2,642,152.94)	(2,124,325.02)	(1,357,414.56)	(932,688.68)	(730,768.50)
Deferral	1,295,480.18	660,404.84	259,763.53	265,787.26	152,811.42	(195,974.38)
Interest	(300.20)	3,206.33	5,522.51	6,473.97	7,547.65	7,793.17
Deferral Total (Month)	1,295,179.98	663,611.17	265,286.04	272,261.23	160,359.07	(188,181.21)
Deferral Total (Cum.)	1,194,192.65	1,857,803.82	2,123,089.86	2,395,351.09	2,555,710.16	2,367,528.95

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	25,603	25,573	25,638	25,813		26,032	26,173
Actual Margin Revenues	664,264.97	663,735.74	631,755.85	987,589.63		1,697,219.83	2,645,898.88
Unbilled Margin Revenues	406,653.11	313,211.61	555,794.57	1,021,091.49		1,669,858.03	2,621,765.60
Unbilled Margin Revenues	(432,089.90)	(406,653.11)	(313,211.61)	(555,794.57)		(1,021,091.49)	(1,669,858.03)
Total Actual Margin Revenues	638,828.18	570,294.24	874,338.81	1,452,886.55	-	2,345,986.37	3,597,806.45
Authorized Revenue	(690,256.88)	(760,285.29)	(860,667.66)	(1,480,891.81)	-	(2,427,744.32)	(3,234,459.34)
Deferral	(51,428.70)	(189,991.05)	13,671.15	(28,005.26)	100,987.33	(81,757.95)	363,347.11
Interest	7,962.68	7,816.49	6,971.41	7,732.38	3,219.98	7,773.39	7,767.96
Deferral Total (Month)	(43,466.02)	(182,174.56)	20,642.56	(20,272.88)	104,207.31	(73,984.56)	371,115.07
Deferral Total (Cum.)	2,324,062.93	2,141,888.37	2,162,530.93	2,142,258.05	2,246,465.36	2,172,480.80	2,543,595.87

Table 1-17: Commercial Rate 511 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	74	74	75	75	75	76
Actual Margin Revenues	166,476.44	148,929.24	138,601.49	97,083.80	84,155.79	60,656.41
Actual Margin	46,724.14	30,019.39	33,194.32	23,427.63	21,645.74	14,998.51
Actual Margin	3,578.79	2,780.82	1,822.10	1,143.98	883.51	-
Unbilled Margin	113,630.07	100,120.12	67,104.50	66,212.08	56,051.89	26,763.39
Unbilled Margin Prior	(131,875.56)	(113,630.07)	(100,120.12)	(67,104.50)	(66,212.08)	(56,051.89)
Total Actual Margin Revenues	198,533.88	168,219.50	140,602.29	120,762.99	96,524.85	46,366.42
Authorized Revenue	(151,071.74)	(137,901.96)	(169,894.50)	(101,271.00)	(81,105.75)	(58,423.48)
Deferral	47,462.14	30,317.54	(29,292.21)	19,491.99	15,419.10	(12,057.06)
Interest	378.47	470.30	612.20	540.55	621.69	650.55
Deferral Total (Month)	47,840.61	30,787.84	(28,680.01)	20,032.54	16,040.79	(11,406.51)
Deferral Total (Cum.)	175,161.39	205,949.23	177,269.22	197,301.76	213,342.55	201,936.04

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	75	76	76	75		74	74
Actual Margin	40,746.16	36,645.75	37,822.25	58,450.25		89,382.27	122,019.85
Actual Margin	9,458.65	12,814.64	10,050.96	16,818.94		28,262.12	33,548.41
Actual Margin	-			461.27		2,079.30	1,985.94
Unbilled Mar. Current Month	24,827.77	19,270.63	34,294.10	65,610.62		104,022.66	134,303.76
Unbilled Mar. Prior	(26,763.39)	(24,827.77)	(19,270.63)	(34,294.10)		(65,610.62)	(104,022.66)
Total Actual Margin Revenues	48,269.19	43,903.25	62,896.68	107,046.98	-	158,135.73	187,835.30
Authorized Revenue	(42,046.50)	(44,447.08)	(34,670.44)	(52,278.00)	-	(65,249.50)	(147,903.06)
Deferral	6,222.69	(543.83)	28,226.24	54,768.98	(127,320.78)	92,886.23	39,932.24
Interest	679.17	702.38	680.24	850.65	(4,059.60)	561.06	913.89
Deferral Total (Month)	6,901.86	158.55	28,906.48	55,619.63	(131,380.38)	93,447.29	40,846.13
Deferral Total (Cum.)	208,837.90	208,996.45	237,902.93	293,522.56	162,142.18	255,589.47	296,435.60

Table 1-18: Commercial Rate 512 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	1	1	1	1	1	1
Actual Margin Revenues	862.38	672.51	816.42	786.35	977.08	869.04
Total Actual Margin Revenues	862.38	672.51	816.42	786.35	977.08	869.04
Authorized Revenue	(744.68)	(817.71)	(890.73)	(779.90)	(862.38)	(863.67)
Deferral	117.70	(145.20)	(74.31)	6.45	114.70	5.37
Interest	(0.06)	0.27	(0.14)	(0.37)	(0.36)	-
Deferral Total (Month)	117.64	(144.93)	(74.45)	6.08	114.34	5.37
Deferral Total (Cum.)	99.21	(45.72)	(120.17)	(114.09)	0.25	5.62

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	1	1	1	1		1	1
Actual Margin	886.01	989.54	901.26	970.42		874.20	787.42
Total Actual Margin	886.01	989.54	901.26	970.42	-	874.20	787.42
Authorized Revenue	(848.85)	(829.30)	(932.83)	(893.31)	-	(725.35)	(810.19)
Deferral	37.16	160.24	(31.57)	77.11	18.43	148.85	(22.77)
Interest	0.02	0.14	0.66	0.62	0.60	0.93	1.50
Deferral Total (Month)	37.18	160.38	(30.91)	77.73	19.03	149.78	(21.27)
Deferral Total (Cum.)	42.80	203.18	172.27	250.00	269.03	418.81	397.54

Table 1-19: Commercial Rate 505LV Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	1	1	1	1	1	1
Actual Margin	56.91	57.66	-	-	-	-
Actual Margin	-	-	-	-	-	-
Unbilled Margin	57.66	-	-	-	-	-
Actual Margin	-	-	-	-	-	-
Unbilled Margin	(56.91)	(57.66)	-	-	-	-
Unbilled Margin	-	-	-	-	-	-
Total Actual Margin	57.66	-	-	-	-	-
Authorized	(463.97)	(523.33)	(416.44)	(304.64)	(260.88)	(210.75)
Deferral	(406.31)	(523.33)	(416.44)	(304.64)	(260.88)	(210.75)
Interest	(4.14)	(4.84)	(6.93)	(8.40)	(9.67)	(10.18)
Deferral Total	(410.45)	(528.17)	(423.37)	(313.04)	(270.55)	(220.93)
Deferral Total	(1,803.90)	(2,332.07)	(2,755.44)	(3,068.48)	(3,339.03)	(3,559.96)

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	1	1	1	1		1	1
Actual Margin	-	-	-	-		94.22	70.10
Actual Margin	-	-	-	-		8.35	
Unbilled Margin	-	-	-	94.22		70.10	78.58
Actual Margin	-	-	-	8.35		-	
Unbilled Mar.		-	-	-		(94.22)	(70.10)
Unbilled Mar. Prior	-	-	-	-		(8.35)	-
Total Actual Margin Revenues	-	-	-	102.57	-	70.10	78.58
Authorized Revenue	(199.50)	(161.71)	(219.19)	(481.47)	-	(330.25)	(499.01)
Deferral	(199.50)	(161.71)	(219.19)	(378.90)	1393.45	(260.15)	(420.43)
Interest	(11.97)	(12.68)	(12.84)	(14.94)	44.43	(10.84)	(12.17)
Deferral Total (Month)	(211.47)	(174.39)	(232.03)	(393.84)	1437.88	(270.99)	(432.60)
Deferral Total (Cum.)	(3,771.43)	(3,945.82)	(4,177.85)	(4,571.69)	(3,133.81)	(3,404.80)	(3,837.40)

Table 1-20: Industrial Rate 570 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	8	8	7	7	6	6
Actual Margin	13,760.72	13,056.56	1,615.36	8,683.34	7,844.56	7,136.53
Actual Margin	8,228.82	9,070.63	6,742.78	2,920.72	2,323.43	1,440.21
Unbilled Margin	13,056.56	11,615.36	8,683.34	7,844.56	7,136.53	5,916.41
Actual Margin	9,070.63	6,742.78	2,920.72	2,323.43	1,440.21	769.82
Unbilled Margin	(13,760.72)	(13,056.56)	(11,615.36)	(8,683.34)	(7,844.56)	(7,136.53)
Unbilled Margin	(8,228.82)	(9,070.63)	(6,742.78)	(2,920.72)	(2,323.43)	(1,440.21)
Total Actual Margin	22,127.19	18,358.14	11,604.06	10,167.99	8,576.74	6,686.23
Authorized	(19,141.20)	(19,244.88)	(14,322.07)	(13,668.48)	(11,255.94)	(9,453.18)
Deferral	2,985.99	(886.74)	(2,718.01)	(3,500.49)	(2,679.20)	(2,766.95)
Interest	38.66	43.04	45.14	38.15	28.52	19.51
Deferral Total	3,024.65	(843.70)	(2,672.87)	(3,462.34)	(2,650.68)	(2,747.44)
Deferral Total	16,028.79	15,185.09	12,512.22	9,049.88	6,399.20	3,651.76

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers							
Actual Margin	5,916.41	6,245.47	5,983.00	5,997.57		9,489.19	8,512.51
Actual Margin	769.82	560.86	513.05	686.53		1,786.73	2,458.84
Unbilled Margin	6,245.47	5,983.00	5,997.57	9,489.19		8,512.51	9,200.87
Actual Margin	560.86	513.05	686.53	1,786.73		2,458.84	2,865.37
Unbilled Mar.	(5,916.41)	(6,245.47)	(5,983.00)	(5,997.57)		(9,489.19)	(8,512.51)
Unbilled Mar. Prior	(769.82)	(560.86)	(513.05)	(686.53)		(1,786.73)	(2,458.84)
Total Actual Margin	6,806.33	6,496.05	6,684.10	11,275.92	-	10,971.35	12,066.24
Authorized Revenue	(9,885.68)	(10,304.42)	(9,169.44)	(11,356.87)	-	(12,107.34)	(15,354.50)
Deferral	(3,079.35)	(3,808.37)	(2,485.34)	(80.95)	(13,004.14)	(1,135.99)	3,288.26)
Interest	2.28	1.97	(10.49)	(20.44)	(414.64)	(66.57)	(73.09)
Deferral Total (Month)	(3,067.07)	(3,806.40)	(2,495.83)	(101.39)	(13,418.78)	(1,202.56)	(3,361.35)
Deferral Total (Cum.)	584.69	(3,221.71)	(5,717.54)	(5,818.93)	(19,237.71)	(20,440.27)	(23,801.62)

Table 1-21: Industrial Rate 577 Cumulative Deferral (Calendar 2017).

	Jan-17	Feb-17	Mar-17	Apr-17	May-17	Jun-17
Customers	2	2	2	2	2	2
Actual Margin	832.08	832.08	832.08	832.08	832.08	832.08
Actual Margin	1,364.28	1,548.66	1,115.47	957.35	734.38	434.89
Unbilled Margin	832.08	832.08	832.08	832.08	832.08	832.08
Unbilled Margin	1,548.66	1,115.47	957.35	734.38	434.89	236.48
Unbilled Margin	(832.08)	(832.08)	(832.08)	(832.08)	(832.08)	(832.08)
Unbilled Margin	(1,364.28)	(1,548.66)	(1,115.47)	(957.35)	(734.38)	(434.89)
Total Actual Margin	2,380.74	1,947.55	1,789.43	1,566.46	1,266.97	1,068.56
Authorized	(2,343.46)	(2,320.32)	(1,840.36)	(1,772.62)	(1,589.68)	(1,271.50)
Deferral	37.28	(372.77)	(50.93)	(206.16)	(322.71)	(202.94)
Interest	0.57	0.62	(0.42)	(0.59)	(1.26)	(2.21)
Deferral Total	37.85	(372.15)	(51.35)	(206.75)	(323.97)	(205.15)
Deferral Total	230.91	(141.24)	(192.59)	(399.34)	(723.31)	(928.46)

	Jul-17	Aug-17	Sep-17	Oct-17	Amortize JE	Nov-17	Dec-17
Customers	2	2	2	2		2	2
Actual Margin	832.08	832.08	799.00	794.22		832.08	832.08
Actual Margin	236.48	118.16	41.81	129.05		549.66	762.42
Unbilled Margin	832.08	799.00	794.22	832.08		832.08	832.08
Actual Margin	118.16	41.81	129.05	549.66		762.42	930.33
Unbilled Mar.	(832.08)	(832.08)	(799.00)	(794.22)		(832.08)	(832.08)
Unbilled Mar.	(236.48)	(118.16)	(41.81)	(129.05)		(549.66)	(762.42)
Total Actual Margin Revenues	950.24	840.81	923.27	1,381.74	-	1,594.50	1,762.41
Authorized Revenue	(1,373.40)	(1,098.78)	(1,082.82)	(1,240.30)	-	(1,500.44)	(2,059.96)
Deferral	(423.16)	(257.97)	(159.55)	141.44	(193.06)	94.06	(297.55)
Interest	(3.12)	(4.56)	(5.26)	(6.37)	(6.15)	(6.39)	(6.29)
Deferral Total (Month)	(426.28)	(262.53)	(164.81)	135.07	(199.21)	87.67	(303.84)
Deferral Total (Cum.)	(1,354.74)	(1,617.27)	(1,782.08)	(1,647.01)	(1,846.22)	(1,758.55)	(2,062.39)

Consolidated Rate Schedules (Table 1-11) are used in Table 1-22: End-of-Year Consolidated Deferrals (2017), Interest, and Rate per Therm. and Table 1-23.[14]

In Table 1-22, interest assignments (Column 3) and interest accruals (Column 4) are added to the end-of-year Account Balance (Column 2) to yield a set of dollar amounts in Amount for Rate Calculation (Column 5). The dollar amount for each consolidated schedule (Column 5) is divided by forecast therms (Col. 6) to yield the Rate per Them (Column 7) for each of the five consolidated rate schedules. The Rate per Therm (Table 1-22, Column 7) is also the Posted R/S 594 Tariff Rate (Table 1-23, Column 6).

Table 1-22: End-of-Year Consolidated Deferrals (2017), Interest, and Rate per Therm.

Line	Consolidated Rate Schedule	Account Balance 12/31/2017	Interest Assignments & Amortization through 10/31/2018	Interest Accruals Through Amortization.	Amount for Rate Calculation	Therms (Forecast)	Rate per Therm
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	503	$ (2,967,232)	$ (97,213)	$ (57,020)	$ (3,121,465)	120,761,917	-$0.02585
2	504	$ (2,456,376)	$ (105,043)	$ (50,829)	$ (2,612,248)	85,789,305	-$0.03045
3	505	$ 57,042	$ (18,054)	$ 916	$ 39,904	12,424,359	$0.00321
4	511	$ (709,555)	$ 11,950	$ (15,664)	$ (713,269)	14,072,731	-$0.05068
5	570	$ 13,871	$ 2,106	$ 370	$ 16,348	2,177,106	$0.00751

Table 1-23: Posted (November 1, 2018) Rate Schedule 594 Tariff Rate.

Line	Description	Rate Schedule	Reverse Prior Decoupling Rate Adj.	Decoupling Related Temporary Rate Adj.	Incremental R/S 594 Rate Change	Posted R/S 594 Tariff Rate
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col.6
1	Residential	503	$ 0.00141	$ (0.02585)	$ (0.02444)	$ (0.02585)
2	Commercial	504	$ (0.00126)	$ (0.03045)	$ (0.03171)	$ (0.03045)
3	Com-Ind Dual Service	511	$ 0.01811	$ (0.05068)	$ (0.03257)	$ (0.05068)
4	Industrial Firm	505	$ (0.00805)	$ 0.00321	$ (0.00484)	$ 0.00321
5	Industrial Interruptible	570	$ 0.00372	$ 0.00751	$ 0.01123	$ 0.00751

Next, the Earnings Test and the Three Percent Cap are applied to the decoupled schedules.

[14] Consolidation of Rate Schedules is shown in Table 1-11.

Earnings Test - 2018

The earnings test for the rate implemented November 1, 2018 is based on CNGC's year-end Commission Basis Report (CBR) for the previous year, presented in an average of monthly averages (AMA or "Typical Monthly" format). The CBR is prepared following the specifications of Washington Administrative Code (WAC) 480-90-257.[15] Adjustments are required for any item that materially distorts reporting period earnings and rate base, following WAC 480-90-257(2)(b). The CBR includes normalizing adjustments to reflect operations under normal weather conditions.

In Table 1-24, Therm Sales (Column 3) are actual calendar year 2017 therms. Revenue at 11/01/2017 Rates (Column 4) is what yearly revenue would have been at the new rate placed into effect on November 1, 2017. This amount is the total revenue, not the adjusted amount. Per Therm Rate Change (Column 5) is the rate adjustment. The Amount of Change (Column 6) is the change in revenue (plus or minus) due to the Rate Schedule 594 adjustment. Percent Change (Column 7) is the Amount of Change (Column 6) divided by the Amount of Revenue for the calendar year if at the new total November 1, 2017 rates.

Table 1-24: DMA Typical Monthly Therm Usage and Cost by Class.

Line	Description	Consolidated Rate Schedule	Therm Sales	Revenue at 11/01/2017 Rates	Per Therm Rate Change	Amount of Change	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	Residential	503	120,761,917	115,712,024	$ (0.02444)	(2,951,180)	-2.55%
2	Commercial	504	85,789,305	74,328,878	$ (0.03171)	(2,720,379)	-3.66%
3	Industrial Firm	505	12,424,359	8,588,587	$ (0.00484)	(60,109)	-0.70%
4	Commercial-Industrial Dual Service and Large Volume	511	14,072,731	9,092,266	$ (0.03257)	(458,405)	-5.04%
5	Industrial Interruptible	570	2,177,106	1,251,852	$ 0.01123	24,447	1.95%
For twelve months ended 12/31/2017							

Table 1-25 shows the same calculation, but in a Typical Monthly Bill format. As shown in Column 7 in Table 1-24 and Table 1-25, the Percent Change for each of Consolidated Rate Schedules 503, 504, 505 and 511 is a rate decrease, and the increase shown for Industrial Interruptible Rate 570 is less than two percent. The earnings test showed there were no excess earnings for 2018. Overall, there is a rate decrease (2.65%).

[15] For Washington Administrative Code 480-90-257, see Appendix II.

Table 1-25: DMA Proposed Typical Monthly Bill by Class.

Line	Description	Consolidated Rate Schedule	Typical Monthly Therm Use	Average Bill @11/01/2017 Rates	Present Filing changes	Proposed Typical Bill	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	Residential	503	54	$ 51.69	$ (1.32)	$ 50.37	-2.55%
2	Commercial	504	275	$ 237.94	$ (8.71)	$ 229.26	-3.66%
3	Industrial Firm	505	N/A*	$ 0.69127	$ (0.00)	$ 0.69	-0.70%
4	Commercial-Industrial Dual Service and Large Volume	511	N/A*	$ 0.64609	$ (0.03)	$ 0.61	-5.04%
5	Industrial Interruptible	570	N/A*	$ 0.57501	$ 0.01	$ 0.59	0.0195
For Twelve Months Ended 12/31/2017							

Three Percent Cap Test - 2018

The Cap requirement is that the sum of the decoupling surcharge plus interest at the FERC rate cannot exceed a 3 percent annual rate adjustment.[16] As shown in Table 1-26, Line 7, all Incremental Surcharge percentages are negative or very small, so the Three Percent Test has no effect on 2018 rates.

Table 1-26: Three Percent Cap Test - 2018.

Line	Calculation Step	Residential (503)	Commerical (504)	Industrial (505)	Commercial-Industrial (511)	Industustrial Interruptible (570).	Total WA
1	Revenue From 2017 Normalized Loads and Customers at Present Billing Rates	115,712,024	74,328,878	8,588,587	9,092,266	1,251,852	208,973,607
2	August 2018 - July 2098 Usage Forecast	120,761,917	85,789,305	12,424,359	14,072,731	2,177,106	235,225,417
3	Proposed Decoupling Recovery Rates	(0.02585)	(0.03045)	0.00321	(0.05068)	0.00751	
4	Present Decoupling Surcharge Recovery Rates	(0.00141)	0.00126	0.00805	(0.01811)	(0.00372)	
5	Incremental Decoupling Recovery Rates	(0.02444)	(0.03171)	(0.00483)	(0.03257)	0.01123	
6	Incremental Decoupling Recovery	-2,950,938	-2,720,036	-60,047	-458,363	24,438	-6,164,946
7	Incremental Surcharge %	(0.02550)	(0.03659)	(0.00699)	(0.05041)	0.01952	(0.02950)
8	3% Test Adjustment	0	0	0	0	0	
9	3% Test Rate Adjustment	0	0	0	0	0	
10	Adjusted Proposed Decoupling Recovery Rates	(0.02585)	(0.03045)	0.00321	(0.05068)	0.00751	
11	Adjusted Incremental Decoupling Recovery	(2,950,938.19)	(2,720,035.71)	(60,046.93)	(458,362.91)	24,438.01	(6,164,945.73)
12	Adjusted Incremental Surcharge %	-0.02550	-0.03659	-0.00699	-0.05041	0.01952	-0.02950

[16] Any deferred balance, either in the surcharge or rebate direction, accrues interest at the FERC interest rate consistent with gas cost deferred balances. Unrecovered balances are carried forward to future years for recovery.

E. November 2019 Rate Adjustment

Cumulative Deferral Total (2018) & Rate Adjustment

Calendar year 2018 cumulative deferral was used to develop the 2019 decoupling rate adjustment.[17] Cumulative deferral was calculated in five steps.[18] The Schedule 594 rates implemented November 1, 2019 are the final result of the calculation. Tables are shown below.

Table 1-27: Residential Rate 502 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	725	751	707	673	637	620
Actual Margin Revenues	9,287.84	7,055.65	8,453.19	5,180.72	2,620.53	937.08
Total Actual Margin Revenues	9,287.84	7,055.65	8,453.19	5,180.72	2,620.53	937.08
Authorized Revenue	(7,525.50)	(6,391.01)	(5,253.01)	(3,243.86)	(1,821.82)	(911.40)
Deferral	1,762.34	664.64	3,200.18	1,936.86	798.71	25.68
Interest	47.24	48.57	56.34	69.31	79.24	79.91
Monthly Deferral Total	1,809.58	713.21	3,256.52	2,006.17	877.95	105.59
Cumulative Deferral Total	14,896.19	15,609.40	18,865.92	20,872.09	21,750.04	21,855.63

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	598	**No customers on this rate, beginning July 2018.**					
Actual Margin Revenues	454.28	-	-	-	-	-	-
Total Actual Margin Revenues	454.28	-	-	-	-	-	-
Authorized Revenue	(538.20)	-	-	-	-	-	-
Deferral	(83.92)	-	-	-	(13,086.61)	-	-
Interest	87.06	87.07	84.60	92.81	(501.25)	34.80	36.10
Monthly Deferral Total	3.14	87.07	84.60	92.81	(13,587.86)	34.80	36.10
Cumulative Deferral Total	21,858.77	21,945.84	22,030.44	22,123.25	8,535.39	8,570.19	8,606.29

[17] See response to Data Request GP-1: CNGC Advice W18-09-03 Rule 21 Decoupling WP, 09-17-2018, Tab WA-CAP 2018.

[18] The five calculation steps are listed at the top of Page 1-7.

Table 1-28: Residential Rate 503 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	186,631	186,836	186,988	186,933	186,735	186,713
Actual Margin Revenues	6,636,822.89	4,674,307.90	5,539,638.38	3,685,135.57	2,174,874.87	1,181,931.11
Unbilled Margin Revenues	3,654,454.82	4,184,195.62	2,881,139.04	1,893,947.20	902,559.20	774,974.56
Unbilled Margin Revenues	(4,779,530.36)	(3,654,454.82)	(4,184,195.62)	(2,881,139.04)	(1,893,947.20)	(902,559.20)
Total Actual Margin Revenues	5,511,747.35	5,204,048.70	4,236,581.80	2,697,943.73	1,183,486.87	1,054,346.47
Authorized Revenue	(5,765,031.59)	(4,728,819.16)	(3,960,405.84)	(2,484,339.57)	(1,613,390.40)	(1,082,935.40)
Deferral	(253,284.24)	475,229.54	276,175.96	213,604.16	(429,903.53)	(28,588.93)
Interest	10,164.05	8,387.79	11,032.15	12,284.10	13,551.17	11,584.35
Monthly Deferral Total	(243,120.19)	483,617.33	287,208.11	225,888.26	(416,352.36)	(17,004.58)
Cumulative Deferral Total	2,572,725.65	3,056,342.98	3,343,551.09	3,569,439.35	3,153,086.99	3,136,082.41

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	186,674	187,363	187,869	189,161		190,056	190,498
Actual Margin Revenues	919,203.33	777,439.86	764,273.83	1,443,787.66		2,437,827.89	4,633,347.36
Unbilled Margin Revenues	700,776.01	291,738.80	544,023.28	1,298,232.39		3,075,899.86	3,720,439.63
Unbilled Margin Revenues	(774,974.56)	(700,776.01)	(291,738.80)	(544,023.28)		(1,298,232.39)	(3,075,899.86)
Total Actual Margin Revenues	845,004.78	368,402.65	1,016,558.31	2,197,996.77		4,215,495.36	5,277,887.13
Authorized Revenue	(892,301.72)	(655,770.50)	(971,282.73)	(2,445,851.73)		(4,568,946.24)	(6,088,316.08)
Deferral	(47,296.94)	(287,367.85)	45,275.58	(247,854.96)	(2,815,845.84)	(353,450.88)	(810,428.95)
Interest	12,491.92	12,353.27	10,894.66	12,142.54	(107,852.74)	(1,129.16)	(2,660.50)
Monthly Deferral Total	(34,805.02)	(275,014.58)	56,170.24	(235,712.42)	(2,923,698.58)	(354,580.04)	(813,089.45)
Cumulative Deferral Total	3,101,277.39	2,826,262.81	2,882,433.05	2,646,720.63	(276,977.95)	(631,557.99)	(1,444,647.44)

Table 1-29: Industrial Rate 505 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	467	469	472	471	470	470
Actual Margin Revenues	36,584.10	34,484.48	35,891.93	32,963.48	26,676.91	18,901.04
Actual Margin Revenues	110,453.41	93,245.34	101,518.86	83,345.52	60,825.95	45,164.09
Actual Margin Revenues	97,119.65	67,106.34	79,539.13	56,617.70	38,134.97	29,057.40
Total Actual Margin Revenues	244,157.16	194,836.16	216,949.92	172,926.70	125,637.83	93,122.53
Authorized Revenue	(216,673.99)	(245,441.77)	(196,559.68)	(143,485.44)	(122,613.60)	(99,052.50)
Deferral	27,483.17	(50,605.61)	20,390.24	29,441.26	3,024.23	(5,929.97)
Interest	104.87	184.67	22.46	97.85	213.26	218.27
Monthly Deferral Total	27,588.04	(50,420.94)	20,412.70	29,539.11	3,237.49	(5,711.70)
Cumulative Deferral Total	56,642.31	6,221.37	26,634.07	56,173.18	59,410.67	53,698.97

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	468	473	473	475		477	477
Actual Margin Revenues	16,666.07	15,087.96	15,917.04	21,449.55		27,966.77	33,345.21
Actual Margin Revenues	39,243.59	37,358.32	39,560.01	52,998.26		69,805.90	95,498.57
Actual Margin Revenues	26,256.94	30,654.41	39,895.96	75,972.92		48,783.12	87,559.81
Total Actual Margin Revenues	82,166.60	83,100.69	95,373.01	150,420.73		146,555.79	216,403.59
Authorized Revenue	(93,366.00)	(76,356.39)	(99,188.10)	(169,703.25)		(146,930.31)	(205,315.11)
Deferral	(11,199.40)	6,744.30	(3,815.09)	(19,282.2)	(29,054.27)	(374.52)	11,088.48
Interest	213.90	170.14	191.31	193.80	(1,112.85)	(13.26)	(15.33)
Monthly Deferral Total	(10,985.50)	6,914.44	(3,623.78)	(19,088.72)	(30,167.12)	(387.78)	11,073.15
Cumulative Deferral Total	42,713.47	49,627.91	46,004.13	26,915.41	(3,251.71)	(3,639.49)	7,433.66

Table 1-30: Industrial Rate 511 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	26,518.88	23,221.58	21,463.74	22,215.40	15,472.89	13,616.72
Actual Margin Revenues	20,174.56	11,080.85	15,521.03	18,979.78	19,055.68	18,557.69
Actual Margin Revenues	201.86	162.09	-	488.25	1,071.18	171.11
Actual Margin Revenues	46,895.30	34,464.52	36,984.77	41,683.43	35,599.75	32,345.52
Total Actual Margin Revenues	(28,581.14)	(24,226.02)	(29,448.38)	(17,553.64)	(14,058.33)	(9,224.76)
Authorized Revenue	18,314.16	10,238.50	7,536.39	24,129.79	21,541.42	23,120.76
Deferral	831.55	813.50	940.55	988.48	1,116.78	1,164.00
Interest	19,145.71	11,052.00	8,476.94	25,118.27	22,658.20	24,284.76
Monthly Deferral Total	249,519.08	260,571.08	269,048.02	294,166.29	316,824.49	341,109.25
Cumulative Deferral Total	26,518.88	23,221.58	21,463.74	22,215.40	15,472.89	13,616.72

	Jul-18	Aug-18	Sep-87	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	12	12	12	11		11	13
Actual Margin Revenues	15,494.41	15,999.69	13,770.66	22,619.91		16,667.36	20,849.15
Actual Margin Revenues	16,808.43	16,322.54	15,929.03	28,858.59		7,547.76	16,302.12
Actual Margin Revenues	34.53	-	-	719.16		-	308.34
Total Actual Margin Revenues	32,337.37	32,322.23	29,699.69	52,197.66		24,215.12	37,459.61
Authorized Revenue	(6,727.44)	(9,747.72)	(9,136.56)	(9,511.92)		(12,788.82)	(24,477.18)
Deferral	25,609.93	22,574.51	20,563.13	42,685.74	(230,373.37)	11,426.30	12,982.43
Interest	1,358.74	1,466.16	1,511.54	1,744.83	(8,823.79)	894.54	976.26
Monthly Deferral Total	26,968.67	24,040.67	22,074.67	44,430.57	(239,197.16)	12,320.84	13,958.69
Cumulative Deferral Total	368,077.92	392,118.59	414,193.26	458,623.83	219,426.67	231,747.51	245,706.20

Table 1-31: Industrial Rate 504LV Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	1	1	1	1	1	1
Actual Margin Revenues	680.90	1,071.92	1,416.68	1,113.76	694.68	127.96
Unbilled Margin Revenues	1,071.92	1,416.68	1,113.76	694.68	127.96	107.78
Unbilled Margin Revenues	(680.90)	(1,071.92)	(1,416.68)	(1,113.76)	(694.68)	(127.96)
Total Actual Margin Revenues	1,071.92	1,416.68	1,113.76	694.68	127.96	107.78
Authorized Revenue	(123.03)	(101.99)	(82.09)	(52.56)	(36.19)	(28.49)
Deferral	948.89	1,314.69	1,031.67	642.12	91.77	79.29
Interest	3.09	5.89	11.29	15.33	18.33	18.15
Monthly Deferral Total	951.98	1,320.58	1,042.96	657.45	110.10	97.44
Cumulative Deferral Total	1,808.02	3,128.60	4,171.56	4,829.01	4,939.11	5,036.55

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	1	1	1	1		1	1
Actual Margin Revenues	107.78	30.51	36.56	115.94		481.12	801.64
Unbilled Margin Revenues	30.51	36.56	115.94	481.12		801.64	1,137.43
Unbilled Margin Revenues	(107.78)	(30.51)	(36.56)	(115.94)		(481.12)	(801.64)
Total Actual Margin Revenues	30.51	36.56	115.94	481.12		801.64	1,137.43
Authorized Revenue	(26.96)	(21.60)	(32.05)	(59.39)		(89.84)	(127.00)
Deferral	3.55	14.96	83.89	421.73	(856.04)	711.80	1,010.43
Interest	20.06	20.16	19.64	21.90	(32.79)	19.38	23.11
Monthly Deferral Total	23.61	35.12	103.53	443.63	(888.83)	731.18	1,033.54
Cumulative Deferral Total	5,060.16	5,095.28	5,198.81	5,642.44	4,753.61	5,484.79	6,518.33

Table 1-32: Commercial Rate 504 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	26,212	26,234	26,243	26,195	26,136	26,057
Actual Margin Revenues	3,747,378.62	2,679,131.08	3,103,331.87	2,141,220.00	1,349,757.98	844,546.70
Unbilled Margin Revenues	2,035,651.03	2,374,763.54	1,592,737.30	1,089,892.26	551,685.03	542,449.89
Unbilled Margin Revenues	(2,621,765.60)	(2,035,651.03)	(2,374,763.54)	(1,592,737.30)	(1,089,892.26)	(551,685.03)
Total Actual Margin Revenues	3,161,264.05	3,018,243.59	2,321,305.63	1,638,374.96	811,550.75	835,311.56
Authorized Revenue	(3,224,862.36)	(2,675,605.66)	(2,154,287.87)	(1,376,809.20)	(945,861.84)	(742,363.93)
Deferral	(63,598.31)	342,637.93	167,017.76	261,565.76	(134,311.09)	92,947.63
Interest	9,181.34	8,115.40	10,251.00	11,085.11	12,489.72	11,639.26
Monthly Deferral Total	(54,416.97)	350,753.33	177,268.76	272,650.87	(121,821.37)	104,586.89
Cumulative Deferral Total	2,489,178.90	2,839,932.23	3,017,200.99	3,289,851.86	3,168,030.49	3,272,617.38

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	26,021	26,015	26,018	26,202		26,397	26,496
Actual Margin Revenues	711,414.76	676,165.17	646,022.95	987,518.65		1,426,740.68	2,657,414.36
Unbilled Margin Revenues	532,998.21	252,832.37	454,158.97	883,849.45		1,766,555.45	2,112,086.80
Unbilled Margin Revenues	(542,449.89)	(532,998.21)	(252,832.37)	(454,158.97)		(883,849.45)	(1,766,555.45)
Total Actual Margin Revenues	701,963.08	395,999.33	847,349.55	1,417,209.13		2,309,446.68	3,002,945.71
Authorized Revenue	(701,526.16)	(561,924.00)	(833,876.90)	(1,556,136.78)		(2,371,506.48)	(3,364,992.00)
Deferral	436.92	(165,924.67)	13,472.65	(138,927.65)	(2,543,595.87)	(62,059.80)	(362,046.29)
Interest	13,035.78	13,089.44	12,078.05	13,306.79	(97,425.05)	1,598.74	1,397.33
Monthly Deferral Total	13,472.70	(152,835.23)	25,550.70	(125,620.86)	(2,641,020.92)	(60,461.06)	(360,648.96)
Cumulative Deferral Total	3,286,090.08	3,133,254.85	3,158,805.55	3,033,184.69	392,163.77	331,702.71	(28,946.25)

Table 1-33: Commercial Rate 511 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	73	73	73	73	73	73
Actual Margin Revenues	156,434.77	125,400.08	138,393.04	109,323.28	81,596.99	54,885.69
Actual Margin Revenues	43,222.92	29,445.74	38,243.29	31,287.71	21,248.27	15,449.41
Actual Margin Revenues	4,269.85	1,539.46	2,685.10	1,578.77	639.82	-
Unbilled Margin Revenues	98,766.76	117,088.49	80,057.49	61,955.90	35,317.21	36,842.93
Unbilled Margin Revenues	(134,303.76)	(98,766.76)	(117,088.49)	(80,057.49)	(61,955.90)	(35,317.21)
Total Actual Margin Revenues	168,390.54	174,707.01	142,290.43	124,088.17	76,846.39	71,860.82
Authorized Revenue	(149,030.23)	(136,038.42)	(165,363.98)	(98,570.44)	(78,942.93)	(56,117.29)
Deferral	19,360.31	38,668.59	(23,073.55)	25,517.73	(2,096.54)	15,743.53
Interest	1,070.01	1,033.07	1,287.06	1,229.98	1,372.52	1,325.59
Monthly Deferral Total	20,430.32	39,701.66	(21,786.49)	26,747.71	(724.02)	17,069.12
Cumulative Deferral Total	316,865.92	356,567.58	334,781.09	361,528.80	360,804.78	377,873.90

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-87
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	73	73	74	74		74	74
Actual Margin Revenues	42,887.62	39,296.64	38,739.70	59,100.50		83,177.59	126,761.43
Actual Margin Revenues	13,031.72	14,312.45	12,517.83	26,865.67		18,089.31	36,904.80
Actual Margin Revenues	-	-	-	477.16		1,262.75	4,417.59
Unbilled Margin Revenues	34,279.87	16,955.45	29,756.86	66,426.95		107,884.30	120,997.44
Unbilled Margin Revenues	(36,842.93)	(34,279.87)	(16,955.45)	(29,756.86)		(66,426.95)	(107,884.30)
Total Actual Margin Revenues	53,356.28	36,284.67	64,058.94	123,113.42		143,987.00	181,196.96
Authorized Revenue	(40,925.26)	(59,298.63)	(56,342.12)	(63,989.28)		(86,033.88)	(139,331.64)
Deferral	12,431.02	(23,013.96)	7,716.82	59,124.14	(296,435.60)	57,953.12	41,865.32
Interest	1,505.18	1,560.69	1,427.65	1,598.69	(11,354.10)	539.90	804.30
Monthly Deferral Total	13,936.20	(21,453.27)	9,144.47	60,722.83	(307,789.70)	58,493.02	42,669.62
Cumulative Deferral Total	391,810.10	370,356.83	379,501.30	440,224.13	132,434.43	190,927.45	233,597.07

Table 1-34: Commercial Rate 512 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	1	1	1	1	1	1
Actual Margin Revenues	953.02	766.80	894.60	822.00	990.18	961.19
Total Actual Margin Revenues	953.02	766.80	894.60	822.00	990.18	961.19
Authorized Revenue	(744.68)	(817.71)	(890.73)	(779.90)	(862.38)	(863.67)
Deferral	208.34	(50.91)	3.87	42.10	127.80	97.52
Interest	1.44	1.98	2.02	2.07	2.31	2.71
Monthly Deferral Total	209.78	(48.93)	5.89	44.17	130.11	100.23
Cumulative Deferral Total	607.32	558.39	564.28	608.45	738.56	838.79

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	1	-	-	-		-	-
Actual Margin Revenues	901.04	-	-	-		-	-
Total Actual Margin Revenues	901.04	-	-	-		-	-
Authorized Revenue	(848.85)	-	-	-		-	-
Deferral	52.19	-	-	-	(397.54)	-	-
Interest	3.34	3.56	3.46	3.80	(15.23)	2.01	2.08
Monthly Deferral Total	55.53	3.56	3.46	3.80	(412.77)	2.01	2.08
Cumulative Deferral Total	894.32	897.88	901.34	905.14	492.37	494.38	496.46

Table 1-35: Commercial Rate 505LV Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	1	1	1	1	1	1
Actual Margin Revenues	78.58	94.22	-	9.61	-	-
Actual Margin Revenues	-	116.39	-	-	-	-
Actual Margin Revenues	94.22	-	9.61	-	-	31.47
Actual Margin Revenues	116.39	-	-	-	-	-
Unbilled Margin Revenues	(78.58)	(94.22)	-	(9.61)	-	-
Unbilled Margin Revenues	-	(116.39)	-	-	-	-
Total Actual Margin Revenues	210.61	-	9.61	-	-	31.47
Authorized Revenue	(463.97)	(523.33)	(416.44)	(304.64)	(260.88)	(210.75)
Deferral	(253.36)	(523.33)	(406.83)	(304.64)	(260.88)	(179.28)
Interest	(13.85)	(13.38)	(16.75)	(18.61)	(20.46)	(20.83)
Monthly Deferral Total	(267.21)	(536.71)	(423.58)	(323.25)	(281.34)	(200.11)
Cumulative Deferral Total	(4,104.61)	(4,641.32)	(5,064.90)	(5,388.15)	(5,669.49)	(5,869.60)

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	1	1	1	1		1	1
Actual Margin Revenues	31.47	-	64.09	33.56		3.75	11.25
Actual Margin Revenues	-	-	-	-		-	-
Actual Margin Revenues	-	64.09	33.56	3.75		11.25	14.10
Actual Margin Revenues	-	-	-	-		-	-
Unbilled Margin Revenues	(31.47)	-	(64.09)	(33.56)		(3.75)	(11.25)
Unbilled Margin Revenues	-	-	-	-		-	-
Total Actual Margin Revenues	-	64.09	33.56	3.75		11.25	14.10
Authorized Revenue	(199.50)	(161.43)	(209.70)	(357.27)		(308.03)	(430.43)
Deferral	(199.50)	(97.34)	(176.14)	(353.52)	3,837.40	(296.78)	(416.33)
Interest	(23.38)	(24.27)	(23.95)	(27.02)	146.99	(11.46)	(13.14)
Monthly Deferral Total	(222.88)	(121.61)	(200.09)	(380.54)	3,984.39	(308.24)	(429.47)
Cumulative Deferral Total	(6,092.48)	(6,214.09)	(6,414.18)	(6,794.72)	(2,810.33)	(3,118.57)	(3,548.04)

Table 1-36: Industrial Rate 570 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	7	7	7	7	7	7
Actual Margin Revenues	9,200.87	8,695.19	8,330.48	8,341.75	7,943.29	6,886.74
Actual Margin Revenues	2,865.37	2,805.42	2,794.08	2,759.82	2,048.68	1,168.11
Unbilled Margin Revenues	8,695.19	8,330.48	8,341.75	7,943.29	6,886.74	6,144.86
Unbilled Margin Revenues	2,805.42	2,794.08	2,759.82	2,048.68	1,168.11	736.50
Unbilled Margin Revenues	(9,200.87)	(8,695.19)	(8,330.48)	(8,341.75)	(7,943.29)	(6,886.74)
Unbilled Margin Revenues	(2,865.37)	(2,805.42)	(2,794.08)	(2,759.82)	(2,048.68)	(1,168.11)
Total Actual Margin Revenues	11,500.61	11,124.56	11,101.57	9,991.97	8,054.85	6,881.36
Authorized Revenue	(16,748.55)	(16,839.27)	(14,322.07)	(13,668.48)	(13,131.93)	(11,028.71)
Deferral	(5,247.94)	(5,714.71)	(3,220.50)	(3,676.51)	(5,077.08)	(4,147.35)
Interest	(85.91)	(94.99)	(126.14)	(140.68)	(159.86)	(173.95)
Monthly Deferral Total	(5,333.85)	(5,809.70)	(3,346.64)	(3,817.19)	(5,236.94)	(4,321.30)
Cumulative Deferral Total	(29,135.47)	(34,945.17)	(38,291.81)	(42,109.00)	(47,345.94)	(51,667.24)

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	7	9	8	8		8	8
Actual Margin Revenues	6,144.86	8,208.58	5,560.29	6,218.27		9,365.13	8,872.87
Actual Margin Revenues	736.50	505.10	516.21	896.57		1,778.64	2,367.19
Unbilled Margin Revenues	7,365.66	5,560.29	6,218.27	9,365.13		8,872.87	9,622.91
Unbilled Margin Revenues	505.10	516.21	896.57	1,778.64		2,367.19	3,115.63
Unbilled Margin Revenues	(6,144.86)	(7,729.28)	(5,560.29)	(6,218.27)		(9,365.13)	(8,872.87)
Unbilled Margin Revenues	(736.50)	(505.10)	(516.21)	(896.57)		(1,778.64)	(2,367.19)
Total Actual Margin Revenues	7,870.76	6,555.80	7,114.84	11,143.77		11,240.06	12,738.54
Authorized Revenue	(9,885.68)	(9,942.93)	(6,932.32)	(8,996.48)		(12,708.00)	(14,600.88)
Deferral	(2,014.92)	(3,387.13)	182.52	2,147.29	23,801.62	(1,467.94)	(1,862.34)
Interest	(205.81)	(214.65)	(221.61)	(242.35)	911.66	(126.01)	(136.93)
Monthly Deferral Total	(2,220.73)	(3,601.78)	(39.09)	1,904.94	24,713.28	(1,593.95)	(1,999.27)
Cumulative Deferral Total	(53,887.97)	(57,489.75)	(57,528.84)	(55,623.90)	(30,910.62)	(32,504.57)	(34,503.84)

Table 1-37: Industrial Rate 577 Cumulative Deferral (Calendar 2018).

	Jan-18	Feb-18	Mar-18	Apr-18	May-18	Jun-18
Interest Rate	4.25%	4.25%	4.25%	4.47%	4.47%	4.47%
Days	31	28	31	30	31	30
Customers	2	2	2	2	2	2
Actual Margin Revenues	832.08	832.08	832.08	832.08	832.08	832.08
Actual Margin Revenues	930.33	896.88	747.38	705.66	396.29	83.19
Unbilled Margin Revenues	832.08	832.08	832.08	832.08	832.08	815.23
Unbilled Margin Revenues	896.88	747.38	705.66	396.29	83.19	61.06
Unbilled Margin Revenues	(832.08)	(832.08)	(832.08)	(832.08)	(832.08)	(832.08)
Unbilled Margin Revenues	(930.33)	(896.88)	(747.38)	(705.66)	(396.29)	(83.19)
Total Actual Margin Revenues	1,728.96	1,579.46	1,537.74	1,228.37	915.27	876.29
Authorized Revenue	(2,343.46)	(2,320.32)	(1,840.36)	(1,772.62)	(1,589.68)	(1,271.50)
Deferral	(614.50)	(740.86)	(302.62)	(544.25)	(674.41)	(395.21)
Interest	(7.44)	(8.75)	(12.39)	(13.77)	(16.35)	(18.36)
Monthly Deferral Total	(621.94)	(749.61)	(315.01)	(558.02)	(690.76)	(413.57)
Cumulative Deferral Total	(2,684.33)	(3,433.94)	(3,748.95)	(4,306.97)	(4,997.73)	(5,411.30)

	Jul-18	Aug-18	Sep-18	Oct-18	Amortize JE	Nov-18	Dec-18
Interest Rate	4.69%	4.69%	4.69%	4.96%		4.96%	4.96%
Days	31	31	30	31		30	31
Customers	-						-
Actual Margin Revenues	-						-
Actual Margin Revenues	-						-
Unbilled Margin Revenues							
Unbilled Margin Revenues							
Unbilled Margin Revenues	-	-	-		-	-	-
Unbilled Margin Revenues	-	-	-		-	-	-
Total Actual Margin Revenues	-	-	-		-	-	-
Authorized Revenue	-	-	-		-	-	-
Deferral	-	-	-	2,062.39	-	-	-
Interest	(25.66)	(24.93)	(27.35)	78.99	(17.85)	(18.52)	(25.66)
Monthly Deferral Total	(25.66)	(24.93)	(27.35)	2,141.38	(17.85)	(18.52)	(25.66)
Cumulative Deferral Total	(6,468.29)	(6,493.22)	(6,520.57)	(4,379.19)	(4,397.04)	(4,415.56)	(6,468.29)

The eleven 2018 Cumulative Deferral Total amounts computed by rate schedule in Table 1-27 through Table 1-37 are consolidated into five Consolidated Rate Schedules.

In Table 1-38 interest assignments (Column 4) and interest accruals (Column 5) are added to the end-of-year balance (Column 3) to yield the dollar amounts for calculation of a rate per therm for each schedule (Column 8). The dollar amount for each consolidated schedule (Column 6) is divided by forecast therms (Col. 7) to yield the Rate per Them (Column 8) for each consolidated rate schedule. The Rate per Therm is also the Posted R/S 594 Tariff Rate (Table 1-39, Column 6).

Table 1-38: End-of-Year Consolidated Deferrals (2018), Interest, and Rate per Therm.

Line	Consolidated Rate Schedule	Rate Schedule	Account Balance 12/31/2018	Interest Assignments & Amortization through 10/31/2019	Interest Accruals Through Am.	Sum	Therms	Per Therm Rate
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
1	Residential	503	$ (987,079)	$ 2,704,306	$37,392.56	$ 1,754,619	126,254,322	0.01390
2	Commercial	504	$ (2,218,697)	$ 2,291,096	$ 1,679.06	$ 74,078	91,432,236	0.00081
4	Industrial Firm	505	$ (33,779)	$ (41,374)	$ (1,975.69)	$ (77,129)	13,193,653	(0.00585)
3	Com-Ind Dual Servi	511	$ (891,926)	$ 607,916	$ (7,477.12)	$ (291,487)	14,916,789	(0.01954)
5	Industrial Interr.	570	$ 56,085	$ (11,805)	$ 1,162.32	$ 45,443	2,384,124	0.01906

Table 1-39: Posted (November 1, 2019) Rate Schedule 594 Tariff Rate.

Line	Description	Consolidated Rate Schedule	Reverse Prior Decoupling Rate Adj.	Decoupling Related Temporary Rate Adj.	Incremental R/S 594 Rate Change	Posted R/S 594 Tariff Rate
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
1	Residential	503	$ 0.02585	$ 0.01390	$ 0.03975	$ 0.01390
2	Commercial	504	$ 0.03045	$ 0.00081	$ 0.03126	$ 0.00081
3	Com-Ind Dual Servi	511	$ 0.05068	$ (0.01954)	$ 0.03114	$ (0.01954)
4	Industrial Firm	505	$ (0.00321)	$ (0.00585)	$ (0.00906)	$ (0.00585)
5	Industrial Interr.	570	$ (0.00751)	$ 0.01906	$ 0.01155	$ 0.01906

Earnings Test

The earnings test for the rate that went into effect November 1, 2019 is based on CNGC's year-end Commission Basis Report (CBR) stated on an average of monthly averages (AMA) basis and prepared subject to WAC 480-90-257 (Commission Basis Report).[19] For the earnings test, the decoupling accounting entries are adjusted from a therm sales basis to a revenue per customer basis. Additional adjustments are required for any item that materially distorts reporting period earnings and rate base, following WAC 480-90-257(2)(b). The CBR includes

[19] For Washington Administrative Code 480-90-257, see Appendix II.

normalizing adjustments to reflect operations under normal weather conditions. Table 1-40 and Table 1-41 are constructed using a "Typical Monthly" format. As shown in Column 7 of both tables, four of the (consolidated) rate changes are positive, and one is negative.

Table 1-40: DMA Typical Monthly Therm Usage and Cost by Class.

Line	Description	Consolidated Rate Schedule	Therm Sales (Forecast)	Actual Revenue	Per Therm Rate Change	Amount of Change	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	Residential	503	126,254,322	109,651,123	0.03975	5,018,231	4.58%
2	Commercial	504	91,432,236	71,195,921	0.03126	2,858,172	4.01%
3	Industrial Firm	505	13,193,653	8,775,211	-0.00906	-119,482	-1.36%
4	Large Volume	511	14,916,789	8,617,203	0.03114	464,494	5.39%
5	Industrial Inter.	570	2,384,124	1,223,950	0.01155	27,539	2.25%

Table 1-41: DMA Proposed Typical Monthly Bill by Class (Twelve Months Ended 12/31/2018).

Line	Description	Consolidated Rate Schedule	Typical Monthly Therm Use	Average Bill @ 04/01/2019 Rates	Present Filing Changes	Proposed Typical Bill	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	Residential	503	55	$ 48.06	$ 2.20	$ 50.26	4.58%
2	Commercial	504	289	$ 225.10	$ 9.04	$ 234.14	4.01%
3	Industrial	505	N/A*	$ 0.66511	$ (0.00906)	$ 0.65605	-1.36%
4	Industrial Lg Vol	511	N/A*	$ 0.57768	$ 0.03114	$ 0.60882	5.39%
5	Industrial Interr.	570	N/A*	$ 0.51338	$ 0.01155	$ 0.52493	2.25%

In Table 1-42, the Earnings Test, using information from the Commission Basis Report, shows that the difference between the Calculated ROR and the Base ROR is negative. Since there is no excess ROR, the result of the Earnings Test does cause modification of the 2019 rate.

Table 1-42: 2018 Earnings Test for Decoupling

Line	Variable	Amount
1	Rate Base	$ 339,750,739
2	Net Income	$ 21,616,060
3	Calculated ROR	6.36%
4	Base ROR	7.31%
5	Excess ROR	-0.95%
6	Excess Earnings	$ -

Cap on Maximum Rate Increase

After application of the Earnings Test, the final step in determination of Schedule 594 rate adjustments is calculation of the Three Percent Test (Table 1-43).

Table 1-43: Three Percent Test - 2019.

Three Percent Incremental Surcharge Test - 2019 (Corrected)							
Line	**Calculation Step**	**Residential (503)**	**Commercial (504)**	**Industrial (505)**	**Commercial-Industrial (511)**	**Industrial Interruptible (570)**	**Total WA**
	As Filed (CNG W19-09-03)						
1	**Revenue From 2018 Normalized Loads and Customers at Present Billing Rates**	$ 109,651,123	$ 71,195,921	$ 8,775,211	$ 8,617,203	$ 1,223,950	$ 199,463,408
2	**August 2020 - July 2021 Usage**	126,254,322	91,432,236	13,193,653	14,916,789	2,384,124	248,181,124
3	**Proposed Decoupling Recovery Rates**	0.01390	0.00081	(0.00585)	(0.01954)	0.01906	
4	**Present Decoupling Surcharge Recovery Rates**	(0.02585)	(0.03045)	0.00321	(0.05068)	0.00751	
5	**Incremental Decoupling Recovery Rates**	0.03975	0.03126	(0.00906)	0.03114	0.01155	
6	**Incremental Decoupling Recovery**	$ 5,017,978.02	$ 2,858,171.69	$ (119,508.11)	$ 464,553.56	$ 27,541.40	$ 8,248,736.57
7	**Incremental Surcharge %**	4.58%	4.01%	-1.36%	5.39%	2.25%	4.14%
	Three Percent Test (Revised in Response to GP 51) - DMA 3 Percent Test 10/28/2020)						
8	**3% Test Adjustment**	$ (1,728,444.33)	$ (722,294.06)	$ -	$ (206,037.47)	$ -	
9	**3% Test Rate Adjustment**	$ (0.01)	$ (0.01)	$ -	$ (0.01)	0.00000	
10	**Adjusted Proposed Decoupling Recovery Rates**	$ 0.00021	$ (0.00709)	$ (0.00585)	$ (0.03335)	$ 0.01906	
11	**Adjusted Incremental Decoupling Recovery**	$ 3,289,556.36	$ 2,135,857.03	$ (119,508.11)	$ 258,552.71	$ 27,541.40	$ 5,591,999.38
12	**Adjusted Incremental Surcharge %**	3.00%	3.00%	-1.36%	3.00%	2.25%	2.80%
	Notes						
	Note 1: The Three Percent Test affects rates for Residential (503), Commercial (504) and Commercial-Industrial (505). Note 2: Industrial (505) and Industrial Interruptible (570) rates are not affected by the Three Percent Test results. Note 3: There was an overcollection of $2,656,737.19 in the 2019 filing (Column Total WA, Line 6 - Line 11).						

For the Three Percent Test, the requirement is that the sum of the decoupling surcharge plus interest at the FERC rate cannot exceed a three percent annual rate adjustment.[20] As developed in the top part of Table 1-43 and shown in Line 7, an increase larger than three percent occurs for three Consolidated Rate Schedules (Residential – 503, Commercial – 504, and Commercial-Industrial – 505). Two Consolidated Rate Schedules are not affected by the results of the Three Percent Test (Industrial – 505 and Industrial Interruptible – 570)

Rate adjustments which occur when the Three Percent Test is applied are shown in the bottom part of Table 1-43. In Line 12, two of the rates are as they were in the top part of the table, and the other three are capped at 3 percent.

F. November 2020 Rate Adjustment

To develop the November 2020 Rate Adjustment, the Cumulative Deferral Total for 2019 was calculated and then expressed as the decoupling rate adjustment (Schedule 594) effective November 1, 2020.[21] The Cumulative Deferral Total and rate adjustments are calculated in five steps.[22] The Cumulative Deferral Total is developed in Table 1-44 through Table 1-55. The twelve rates shown in these tables are combined into five Consolidated Rate Schedules shown in Table 1-56. Schedule 594 rates implemented November 1, 2020 also incorporate results of the Earnings Test and the Three Percent Cap for 2020.

[20] Any deferred balance, either in the surcharge or rebate direction, accrues interest at the FERC interest rate consistent with gas cost deferred balances. Unrecovered balances are carried forward to future years for recovery.
[21] See NEW CNGC Advice W20-09-03 Rule 21 Decoupling WP 09-15-2020.xlsx.
[22] The five calculation steps are listed at the top of Page 1-7.

Cumulative Deferral Total (2019) & Rate Adjustment

Table 1-44: Residential Rate 502 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	**No Customers on the rate in 2019.**					
Actual Margin Revenues	-	-	-	-	-	-
Total Actual Margin Revenues	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-
Deferral	-	-	-	-	-	-
Interest	37.86	34.35	38.18	39.05	40.53	39.40
Monthly Deferral Total	37.86	34.35	38.18	39.05	40.53	39.40
Cumulative Deferral Total	8,644.15	8,678.50	8,716.68	8,755.73	8,796.26	8,835.66

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	**No Customers on the rate in 2019.**						
Actual Margin Revenues	-	-	-	-		-	-
Total Actual Margin Revenues	-	-	-	-		-	-
Authorized Revenue	-	-	-	-		-	-
Deferral	-	-	-	-		-	-
Interest	-	-	-	-	(8,606.29)	-	-
Monthly Deferral Total	41.27	41.47	40.32	41.24	(393.67)	-	-
Cumulative Deferral Total	41.27	41.47	40.32	41.24	(8,999.96)	-	-

Table 1-45: Residential Rate 503 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	190,816	191,181	191,240	191,097	190,896	190,735
Actual Margin Revenues	5,284,738.49	5,665,855.41	6,095,743.06	3,335,957.10	2,015,767.50	1,100,880.38
Unbilled Margin Revenues	3,720,933.68	4,659,489.85	3,001,455.01	1,556,809.66	906,299.48	595,024.50
Unbilled Margin Revenues	(3,720,439.63)	(3,720,933.68)	(4,659,489.85)	(3,001,455.01)	(1,556,809.66)	(906,299.48)
Total Actual Margin Revenues	5,285,232.54	6,604,411.58	4,437,708.22	1,891,311.75	1,365,257.32	789,605.40
Authorized Revenue	(5,791,265.60)	(4,263,336.30)	(3,903,208.40)	(2,392,534.44)	(1,361,088.48)	(894,547.15)
Deferral	(506,033.06)	2,341,075.28	534,499.82	(501,222.69)	4,168.84	(104,941.75)
Interest	(6,355.66)	(7,776.67)	1,655.35	4,087.13	1,922.24	1,887.52
Monthly Deferral Total	(512,388.72)	2,333,298.61	536,155.17	(497,135.56)	6,091.08	(103,054.23)
Cumulative Deferral Total	(1,957,036.16)	376,262.45	912,417.62	415,282.06	421,373.14	318,318.91

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	190,627	190,658	191,291	192,838		193,448	193,905
Actual Margin Revenues	875,303.46	754,930.51	732,277.02	1,732,073.44		3,163,652.94	4,801,832.72
Unbilled Margin Revenues	560,038.59	299,511.00	733,610.30	2,017,400.38		3,180,351.56	3,763,325.87
Unbilled Margin Revenues	(595,024.50)	(560,038.59)	(299,511.00)	(733,610.30)		(2,017,400.38)	(3,180,351.56)
Total Actual Margin Revenues	840,317.55	494,402.92	1,166,376.32	3,015,863.52		4,326,604.12	5,384,807.03
Authorized Revenue	(800,633.40)	(667,303.00)	(988,974.47)	(2,493,395.34)		(4,650,489.92)	(6,197,203.80)
Deferral	39,684.15	(172,900.08)	177,401.85	522,468.18	1,444,647.44	(323,885.80)	(812,396.77)
Interest	1,486.94	1,679.26	851.08	1,687.21	66,080.39	10,697.77	9,612.67
Monthly Deferral Total	41,171.09	(171,220.82)	178,252.93	524,155.39	1,510,727.83	(313,188.03)	(802,784.10)
Cumulative Deferral Total	359,490.00	188,269.18	366,522.11	890,677.50	2,401,405.33	2,088,217.30	1,285,433.20

Table 1-46: Industrial Rate 505 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	475	479	478	479	477	478
Actual Margin Revenues	34,179.92	34,768.10	36,803.62	32,246.88	24,615.73	18,807.37
Actual Margin Revenues	99,484.49	102,595.79	111,335.74	83,417.28	58,009.41	43,411.40
Actual Margin Revenues	77,265.63	99,244.05	114,125.53	79,991.96	34,962.50	24,179.84
Total Actual Margin Revenues	210,930.04	236,607.94	262,264.89	195,656.12	117,587.64	86,398.61
Authorized Revenue	(236,659.25)	(202,674.48)	(190,196.20)	(138,483.69)	(100,274.94)	(90,595.34)
Deferral	(25,729.21)	33,933.46	72,068.69	57,172.43	17,312.70	(4,196.73)
Interest	32.70	(72.57)	68.62	393.01	672.56	731.43
Monthly Deferral Total	(25,696.51)	33,860.89	72,137.31	57,565.44	17,985.26	(3,465.30)
Cumulative Deferral Total	(18,262.85)	15,598.04	87,735.35	145,300.79	163,286.05	159,820.75

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	478	478	480	481		481	479
Actual Margin Revenues	15,807.10	15,067.69	16,169.87	23,148.72		30,802.25	34,046.02
Actual Margin Revenues	39,559.06	39,455.20	42,494.60	57,638.77		77,630.99	95,888.08
Actual Margin Revenues	24,400.73	28,876.22	37,296.03	104,021.38		62,623.06	79,294.20
Total Actual Margin Revenues	79,766.89	83,399.11	95,960.50	184,808.87		171,056.30	209,228.30
Authorized Revenue	(72,895.00)	(77,163.54)	(100,656.00)	(171,846.87)		(148,162.43)	(206,175.97)
Deferral	6,871.89	6,235.57	(4,695.50)	12,962.00	(7,433.66)	22,893.87	3,052.33
Interest	746.56	782.15	788.64	785.09	(340.03)	786.38	921.60
Monthly Deferral Total	7,618.45	7,017.72	(3,906.86)	13,747.09	(7,773.69)	23,680.25	3,973.93
Cumulative Deferral Total	167,439.20	174,456.92	170,550.06	184,297.15	176,523.46	200,203.71	204,177.64

Table 1-47: Industrial Rate 511 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	13	13	13	12	11	11
Actual Margin Revenues	24,408.72	24,347.09	26,046.64	21,717.28	16,779.00	15,091.22
Actual Margin Revenues	17,642.72	17,141.97	17,869.32	18,878.98	15,487.99	14,520.07
Actual Margin Revenues	-	-	-	423.17	259.12	1,016.82
Total Actual Margin Revenues	42,051.44	41,489.06	43,915.96	41,019.43	32,526.11	30,628.11
Authorized Revenue	(27,464.58)	(22,140.30)	(27,445.86)	(15,686.52)	(8,773.82)	(9,574.73)
Deferral	14,586.86	19,348.76	16,470.10	25,332.91	23,752.29	21,053.38
Interest	1,080.97	1,038.62	1,239.60	1,341.47	1,509.65	1,574.11
Monthly Deferral Total	15,667.83	20,387.38	17,709.70	26,674.38	25,261.94	22,627.49
Cumulative Deferral Total	261,374.03	281,761.41	299,471.11	326,145.49	351,407.43	374,034.92

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	12	14	14	14		15	15
Actual Margin Revenues	17,932.71	18,108.96	18,207.56	26,756.82		26,775.89	27,850.22
Actual Margin Revenues	14,364.33	18,497.83	17,425.45	22,192.17		24,679.29	16,487.87
Actual Margin Revenues	1,606.73	1,540.80	952.08	1,230.62		2,046.46	823.81
Total Actual Margin Revenues	33,903.77	38,147.59	36,585.09	50,179.61		53,501.64	45,161.90
Authorized Revenue	(6,888.00)	(11,372.34)	(10,659.32)	(12,106.08)		(17,439.30)	(28,242.90)
Deferral	27,015.77	26,775.25	25,925.77	38,073.53	(245,706.20)	36,062.34	16,919.00
Interest	1,747.20	1,881.56	1,950.41	2,114.43	(11,238.97)	1,080.62	1,287.62
Monthly Deferral Total	28,762.97	28,656.81	27,876.18	40,187.96	(256,945.17)	37,142.96	18,206.62
Cumulative Deferral Total	402,797.89	431,454.70	459,330.88	499,518.84	242,573.67	279,716.63	297,923.25

Table 1-48: Commercial Rate 504LV Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	1	1	1	1	1	1
Actual Margin Revenues	1,137.43	1,070.55	1,269.57	816.22	522.55	149.27
Unbilled Margin Revenues	1,070.55	1,269.57	816.22	522.55	149.27	84.93
Unbilled Margin Revenues	(1,137.43)	(1,070.55)	(1,269.57)	(816.22)	(522.55)	(149.27)
Total Actual Margin Revenues	1,070.55	1,269.57	816.22	522.55	149.27	84.93
Authorized Revenue	(127.65)	(93.93)	(78.32)	(48.24)	(31.22)	(23.85)
Deferral	942.90	1,175.64	737.90	474.31	118.05	61.08
Interest	28.68	29.76	38.25	42.43	46.23	45.48
Monthly Deferral Total	971.58	1,205.40	776.15	516.74	164.28	106.56
Cumulative Deferral Total	7,489.91	8,695.31	9,471.46	9,988.20	10,152.48	10,259.04

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	1	1	1	1		1	1
Actual Margin Revenues	84.93	35.87	31.94	143.25		683.85	915.96
Unbilled Margin Revenues	35.87	31.94	143.25	683.85		915.96	1,053.42
Unbilled Margin Revenues	(84.93)	(35.87)	(31.94)	(143.25)		(683.85)	(915.96)
Total Actual Margin Revenues	35.87	31.94	143.25	683.85		915.96	1,053.42
Authorized Revenue	(24.45)	(21.60)	(32.05)	(59.39)		(89.84)	(127.00)
Deferral	11.42	10.34	111.20	624.46	(6,518.33)	826.12	926.42
Interest	47.92	48.20	46.91	48.50	(298.17)	19.56	24.11
Monthly Deferral Total	59.34	58.54	158.11	672.96	(6,816.50)	845.68	950.53
Cumulative Deferral Total	10,318.38	10,376.92	10,535.03	11,207.99	4,391.49	5,237.17	6,187.70

Table 1-49: Commercial Rate 504 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	26,545	26,585	26,564	26,465	26,386	26,319
Actual Margin Revenues	3,043,133.11	3,244,574.11	3,697,205.87	2,113,981.90	1,248,101.71	805,125.81
Unbilled Margin Revenues	2,118,899.34	2,642,795.34	1,807,633.42	979,877.64	552,611.06	426,798.19
Unbilled Margin Revenues	(2,112,086.80)	(2,118,899.34)	(2,642,795.34)	(1,807,633.42)	(979,877.64)	(552,611.06)
Total Actual Margin Revenues	3,049,945.65	3,768,470.11	2,862,043.95	1,286,226.12	820,835.13	679,312.94
Authorized Revenue	(3,388,469.25)	(2,497,129.05)	(2,080,492.48)	(1,276,671.60)	(823,770.92)	(627,708.15)
Deferral	(338,523.60)	1,271,341.06	781,551.47	9,554.52	(2,935.79)	51,604.79
Interest	(127.35)	(1,460.72)	3,969.55	7,560.44	7,891.67	7,659.30
Monthly Deferral Total	(338,650.95)	1,269,880.34	785,521.02	17,114.96	4,955.88	59,264.09
Cumulative Deferral Total	(367,597.20)	902,283.14	1,687,804.16	1,704,919.12	1,709,875.00	1,769,139.09

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	26,276	26,268	26,300	26,526		26,673	26,797
Actual Margin Revenues	709,410.37	648,656.00	620,869.33	1,126,102.92		1,834,162.29	2,778,115.34
Unbilled Margin Revenues	446,121.29	251,672.72	610,018.49	1,297,824.19		2,112,439.71	2,407,512.25
Unbilled Margin Revenues	(426,798.19)	(446,121.29)	(251,672.72)	(610,018.49)		(1,297,824.19)	(2,112,439.71)
Total Actual Margin Revenues	728,733.47	454,207.43	979,215.10	1,813,908.62		2,648,777.81	3,073,187.88
Authorized Revenue	(642,448.20)	(567,388.80)	(842,915.00)	(1,575,379.14)		(2,396,302.32)	(3,403,219.00)
Deferral	86,285.27	(113,181.37)	136,300.10	238,529.48	28,946.25	252,475.49	(330,031.12)
Interest	8,264.06	8,705.72	7,952.61	8,762.20	1,324.06	9,716.03	11,246.84
Monthly Deferral Total	94,549.33	(104,475.65)	144,252.71	247,291.68	30,270.31	262,191.52	(318,784.28)
Cumulative Deferral Total	1,863,688.42	1,759,212.77	1,903,465.48	2,150,757.16	2,181,027.47	2,443,218.99	2,124,434.71

Table 1-50: Commercial Rate 511LV Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers						
Actual Margin Revenues						
Actual Margin Revenues						
Actual Margin Revenues						
Unbilled Margin Revenues						
Unbilled Margin Revenues						
Unbilled Margin Revenues						
Unbilled Margin Revenues						
Total Actual Margin Revenues	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-
Deferral						
Interest						
Monthly Deferral Total						
Cumulative Deferral Total						

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers				7		7	7
Actual Margin Revenues						18,669.12	19,643.85
Actual Margin Revenues						35,157.15	39,654.98
Actual Margin Revenues						24,299.87	27,107.24
Unbilled Margin Revenues				18,669.12		19,643.85	19,935.75
Unbilled Margin Revenues				35,157.15		39,654.98	41,795.55
Unbilled Margin Revenues				24,299.87		27,107.24	31,678.16
Unbilled Margin Revenues				-		(78,126.14)	(86,406.07)
Total Actual Margin Revenues				78,126.14		86,406.07	93,409.46
Authorized Revenue				(6,053.04)		(8,138.34)	(13,180.02)
Deferral				72,073.10	-	78,267.73	80,229.44
Interest	-	-	-	-	-	321.07	693.54
Monthly Deferral Total	-	-	-	72,073.10	-	78,588.80	80,922.98
Cumulative Deferral Total	-	-	-	72,073.10	72,073.10	150,661.90	231,584.88

Table 1-51: Commercial Rate 511 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	74	74	73	73	73	73
Actual Margin Revenues	137,096.94	142,202.75	148,808.72	101,345.27	68,346.91	49,023.82
Actual Margin Revenues	40,242.30	40,294.37	44,890.31	28,516.88	22,122.75	15,140.33
Actual Margin Revenues	4,186.92	4,559.41	5,498.64	1,679.40	375.09	-
Unbilled Margin Revenues	113,236.80	136,900.29	88,807.29	52,596.33	33,815.01	28,042.92
Unbilled Margin Revenues	(120,997.44)	(113,236.80)	(136,900.29)	(88,807.29)	(52,596.33)	(33,815.01)
Total Actual Margin Revenues	173,765.52	210,720.02	151,104.67	95,330.59	72,063.43	58,392.06
Authorized Revenue	(156,336.84)	(126,029.40)	(154,119.06)	(95,426.33)	(58,226.26)	(63,541.39)
Deferral	17,428.68	84,690.62	(3,014.39)	(95.74)	13,837.17	(5,149.33)
Interest	1,027.70	1,001.58	1,485.90	1,506.07	1,562.80	1,581.37
Monthly Deferral Total	18,456.38	85,692.20	(1,528.49)	1,410.33	15,399.97	(3,567.96)
Cumulative Deferral Total	252,053.45	337,745.65	336,217.16	337,627.49	353,027.46	349,459.50

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	74	75	75	75		75	75
Actual Margin Revenues	39,985.11	42,022.45	36,146.30	62,882.46		97,254.58	127,232.51
Actual Margin Revenues	13,956.50	11,827.35	10,390.42	23,311.23		30,469.07	30,264.34
Actual Margin Revenues				794.06		2,193.07	2,891.86
Unbilled Margin Revenues	28,138.26	17,158.33	37,586.37	86,313.37		131,439.49	121,207.67
Unbilled Margin Revenues	(28,042.92)	(28,138.26)	(17,158.33)	(37,586.37)		(86,313.37)	(131,439.49)
Total Actual Margin Revenues	54,036.95	42,869.87	66,964.76	135,714.75		175,042.84	150,156.89
Authorized Revenue	(42,476.00)	(60,923.25)	(57,103.50)	(64,854.00)		(87,196.50)	(141,214.50)
Deferral	11,560.95	(18,053.38)	9,861.26	70,860.75	(233,597.07)	87,846.34	8,942.39
Interest	1,632.41	1,694.04	1,565.44	1,646.69	(10,685.08)	28.35	1,264.16
Monthly Deferral Total	13,193.36	(16,359.34)	11,426.70	72,507.44	(244,282.15)	88,674.69	10,206.55
Cumulative Deferral Total	362,652.86	346,293.52	357,720.22	430,227.66	185,945.51	274,620.20	284,826.75

Table 1-52: Commercial Rate 512 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	-					
Actual Margin Revenues	-	-	-	-	-	-
Total Actual Margin Revenues	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-
Deferral	-	-	-	-	-	-
Interest	2.18	1.98	2.20	2.25	2.34	2.27
Monthly Deferral Total	2.18	1.98	2.20	2.25	2.34	2.27
Cumulative Deferral Total	498.64	500.62	502.82	505.07	507.41	509.68

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	-	-	-	-		-	-
Actual Margin Revenues	-	-	-	-		-	-
Total Actual Margin Revenues	-	-	-	-		-	-
Authorized Revenue	-	-	-	-		-	-
Deferral	-	-	-	-	(496.46)	-	-
Interest	2.38	2.39	2.33	2.38	(22.70)	-	-
Monthly Deferral Total	2.38	2.39	2.33	2.38	(519.16)	-	-
Cumulative Deferral Total	512.06	514.45	516.78	519.16	-	-	-

Table 1-53: Industrial Rate 505LV Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	1	1	1	1	1	1
Actual Margin Revenues	14.10	1.25	-	-	22.85	26.96
Actual Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	1.25	-	-	22.85	26.96	-
Unbilled Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	(14.10)	(1.25)	-	-	(22.85)	(26.96)
Unbilled Margin Revenues	-	-	-	-	-	-
Total Actual Margin Revenues	1.25	-	-	22.85	26.96	-
Authorized Revenue	(498.23)	(423.12)	(397.90)	(289.11)	(210.22)	(189.53)
Deferral	(496.98)	(423.12)	(397.90)	(266.26)	(183.26)	(189.53)
Interest	(15.61)	(16.14)	(19.80)	(22.03)	(24.10)	(24.25)
Monthly Deferral Total	(512.59)	(439.26)	(417.70)	(288.29)	(207.36)	(213.78)
Cumulative Deferral Total	(4,060.63)	(4,499.89)	(4,917.59)	(5,205.88)	(5,413.24)	(5,627.02)

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	1	1	1	1		1	1
Actual Margin Revenues	-	29.10	-	-		56.59	87.65
Actual Margin Revenues	-						
Unbilled Margin Revenues	29.10	-	73.37	56.59		87.65	46.59
Unbilled Margin Revenues	-						
Unbilled Margin Revenues	-	(29.10)	-	(73.37)		(56.59)	(87.65)
Unbilled Margin Revenues	-	-	-	-		-	-
Total Actual Margin Revenues	29.10	-	73.37	(16.78)		87.65	46.59
Authorized Revenue	(152.50)	(161.43)	(209.70)	(357.27)		(308.03)	(430.43)
Deferral	(123.40)	(161.43)	(136.33)	(374.05)	3,548.04	(220.38)	(383.84)
Interest	(26.29)	(26.98)	(26.97)	(28.21)	162.30	(12.56)	(14.06)
Monthly Deferral Total	(149.69)	(188.41)	(163.30)	(402.26)	3,710.34	(232.94)	(397.90)
Cumulative Deferral Total	(5,776.71)	(5,965.12)	(6,128.42)	(6,530.68)	(2,820.34)	(3,053.28)	(3,451.18)

Table 1-54: Industrial Rate 570 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	8	8	7	7	7	7
Actual Margin Revenues	9,622.91	9,606.64	9,743.14	9,318.46	8,122.21	7,127.76
Actual Margin Revenues	3,115.63	3,082.70	3,299.50	2,924.98	1,991.48	1,168.38
Unbilled Margin Revenues	9,606.64	9,743.14	9,318.46	8,122.21	7,127.76	6,345.37
Unbilled Margin Revenues	3,082.70	3,299.50	2,924.98	1,991.48	1,168.38	688.23
Unbilled Margin Revenues	(9,622.91)	(9,606.64)	(9,743.14)	(9,318.46)	(8,122.21)	(7,127.76)
Unbilled Margin Revenues	(3,115.63)	(3,082.70)	(3,299.50)	(2,924.98)	(1,991.48)	(1,168.38)
Total Actual Margin Revenues	12,689.34	13,042.64	12,243.44	10,113.69	8,296.14	7,033.60
Authorized Revenue	(18,824.16)	(18,920.32)	(13,555.43)	(13,490.89)	(9,723.49)	(8,083.39)
Deferral	(6,134.82)	(5,877.68)	(1,311.99)	(3,377.20)	(1,427.35)	(1,049.79)
Interest	(151.80)	(162.09)	(206.03)	(216.57)	(240.43)	(240.14)
Monthly Deferral Total	(6,286.62)	(6,039.77)	(1,518.02)	(3,593.77)	(1,667.78)	(1,289.93)
Cumulative Deferral Total	(40,790.46)	(46,830.23)	(48,348.25)	(51,942.02)	(53,609.80)	(54,899.73)

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	8	8	8	8		8	8
Actual Margin Revenues	6,345.37	7,848.97	6,023.96	6,363.13		10,635.04	8,911.79
Actual Margin Revenues	688.23	463.34	389.96	693.40		2,205.61	2,638.12
Unbilled Margin Revenues	7,848.97	6,023.96	6,363.13	10,635.04		8,911.79	9,570.31
Unbilled Margin Revenues	463.34	389.47	693.40	2,205.61		2,638.12	2,985.23
Unbilled Margin Revenues	(6,345.37)	(7,848.97)	(6,023.96)	(6,363.13)		(10,635.04)	(8,911.79)
Unbilled Margin Revenues	(688.23)	(463.34)	(389.47)	(693.40)		(2,205.61)	(2,638.12)
Total Actual Margin Revenues	8,312.31	6,413.43	7,057.02	12,840.65		11,549.91	12,555.54
Authorized Revenue	(7,533.76)	(8,838.16)	(6,932.32)	(8,996.48)		(12,708.00)	(14,600.88)
Deferral	778.55	(2,424.73)	124.70	3,844.17	34,503.84	(1,158.09)	(2,045.34)
Interest	(256.45)	(254.01)	(257.93)	(263.26)	1,578.25	(78.08)	(86.37)
Monthly Deferral Total	522.10	(2,678.74)	(133.23)	3,580.91	36,082.09	(1,236.17)	(2,131.71)
Cumulative Deferral Total	(54,377.63)	(57,056.37)	(57,189.60)	(53,608.69)	(17,526.60)	(18,762.77)	(20,894.48)

Table 1-55: Industrial Rate 577 Cumulative Deferral (Calendar 2019).

	Jan-19	Feb-19	Mar-19	Apr-19	May-19	Jun-19
Interest Rate	5.18%	5.18%	5.18%	5.45%	5.45%	5.45%
Days	31	28	31	30	31	30
Customers	-	-	-	-	-	-
Actual Margin Revenues	-	-	-	-	-	-
Actual Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-
Total Actual Margin Revenues	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-
Deferral	-	-	-	-	-	-
Interest	(19.43)	(17.62)	(19.59)	(20.03)	(20.79)	(20.22)
Monthly Deferral Total	(19.43)	(17.62)	(19.59)	(20.03)	(20.79)	(20.22)
Cumulative Deferral Total	(4,434.99)	(4,452.61)	(4,472.20)	(4,492.23)	(4,513.02)	(4,533.24)

	Jul-19	Aug-19	Sep-19	Oct-19	Amortize JE	Nov-19	Dec-19
Interest Rate	5.50%	5.50%	5.50%	5.42%		5.42%	5.42%
Days	31	31	30	31		30	31
Customers	-	-	-	-	-	-	-
Actual Margin Revenues	-	-	-	-	-	-	-
Actual Margin Revenues	-	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-	-
Unbilled Margin Revenues	-	-	-	-	-	-	-
Total Actual Margin Revenues	-	-	-	-	-	-	-
Authorized Revenue	-	-	-	-	-	-	-
Deferral	-	-	-	-	4,415.56	-	-
Interest	(21.18)	(21.27)	(20.68)	(21.16)	201.97	-	-
Monthly Deferral Total	(21.18)	(21.27)	(20.68)	(21.16)	4,617.53	-	-
Cumulative Deferral Total	(4,554.42)	(4,575.69)	(4,596.37)	(4,617.53)	-	-	-

The twelve 2019 Cumulative Deferral Total amounts computed by rate schedule in Table 1-44 through Table 1-55 are consolidated into five Consolidated Rate Schedules (Table 1-56 & Table 1-57).

In Table 1-56, interest assignments (Column 4) and interest accruals (Column 5) are added to the end-of-year Account Balance (Column 2) to yield a set of dollar amounts (Sum in Column 6). The dollar amount for each consolidated schedule is divided by forecast therms (Col. 7) to yield the Per Therm Rate (Column 8) for each schedule. The Rate per Therm (Column 8) is also the Posted R/S 594 Tariff Rate in Table 1-57, Column 6).

Table 1-56: End-of-Year Consolidated Deferrals (2019), Interest, and Rate per Therm.

Line	Consolidated Rate Schedule	Rate Schedule	Account Balance 12/31/2019	Interest Assignments & Amortization through 10/31/2020	Interest Accruals Through Am.	Sum	Therms	Per Therm Rate
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7	Col. 8
1	Residential	503	$ 292,818	$ (1,434,431)	$ (15,710.68)	$ (1,157,323)	127,118,966	(0.00910)
2	Commercial	504	$ (1,971,221)	$ (129,745)	$ (30,128.30)	$ (2,131,094)	88,299,944	(0.02413)
4	Industrial Firm	505	$ (268,071)	$ 66,646	$ (3,846.99)	$ (205,272)	14,482,050	(0.01417)
3	Com-Ind Dual Service	511	$ (905,324)	$ 395,679	$ (7,292.53)	$ (516,937)	27,088,723	(0.01908)
5	Industrial Interr.	570	$ 60,470	$ (33,452)	$ 458.96	$ 27,477	2,291,417	0.01199

Table 1-57: Posted (November 1, 2020) Rate Schedule 594 Tariff Rate.

Line	Description	Rate Schedule	Reverse Prior Decoupling Rate Adj.	Decoupling Related Temporary Rate Adj.	Incremental R/S 594 Rate Change	Posted R/S 594 Tariff Rate
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6
1	Residential	503	$ (0.01390)	$ (0.00910)	$ (0.02300)	$ (0.00910)
2	Commercial	504	$ (0.00081)	$ (0.02414)	$ (0.02495)	$ (0.02414)
3	Industrial Firm	505	$ 0.00585	$ (0.01417)	$ (0.00832)	$ (0.01417)
4	Com-Ind Dual Service	511	$ 0.01954	$ (0.01908)	$ 0.00046	$ (0.01908)
5	Industrial Interr.	570	$ (0.01906)	$ 0.01199	$ (0.00707)	$ 0.01199

Earnings Test

The earnings test for the rate implemented November 1, 2020, is based on information from CNGC's year-end CBR for the previous year, presented in an average of monthly averages (AMA or "Typical Monthly" format). The CBR is prepared according to Washington Administrative Code (WAC) 480-90-257.[23] Adjustments are required for any item that materially distorts reporting period earnings and rate base, following WAC 480-90-257(2)(b).

[23] For Washington Administrative Code 480-90-257, see Appendix II.

The CBR includes normalizing adjustments to reflect operations under normal weather conditions.

In Table 1-58 Therms Sold (Column 3) are actual calendar year 2019 therms. Revenue at 11/01/2019 Rates (Column 4) is what yearly revenue would have been at the new rate placed into effect on November 1, 2019. This amount is the total revenue, not the adjusted amount. Per Therm Rate Change (Column 5) is the rate adjustment. The Amount of Change (Column 6) is the change in revenue (plus or minus) due to the Rate Schedule 594 adjustment. Percent Change (Column 7) is the Amount of Change (Column 6) divided by the Amount of Revenue for the calendar year (Column 4) at the new November 1, 2019 rates.

Table 1-58: DMA Typical Monthly Therm Usage and Cost by Class for Twelve Months Ended 12/31/2019.

Line	Description	Rate Schedule	Therms Sold (Forecast)	Actual Revenue	Per Therm Decoupling Change	Amount of Change	Percent Change
	Col. 1	Col. 2	Col. 3	Col. 4	Col. 5	Col. 6	Col. 7
1	Residential	503	127,118,966	129,784,520	$ (0.02300)	(2,924,245)	-2.25%
2	Commercial	504	88,299,944	79,262,367	$ (0.02495)	(2,202,642)	-2.78%
3	Industrial Firm	505	14,482,050	9,601,453	$ (0.00832)	(120,549)	-1.26%
4	Large Volume	511	27,088,723	18,277,286	$ 0.00046	12,380	0.07%
5	Industrial Interr.	570	2,291,417	1,421,635	$ (0.00707)	(16,198)	-1.14%

As shown in Table 1-58, four of the (consolidated) rates show a decrease and one shows a slight increase. Overall, there is a decrease of about two percent. Since four of the percent changes are decreases and the other a very small increase, the Earnings Test has no effect on Schedule 594 rates in 2020.

Three Percent Test - 2020

In the top part of Table 1-59, the incremental surcharge prior to the Three Percent Test is negative for four Consolidated Rate Schedules and very small and positive for one Consolidated Rate Schedule. With these results, the Three Percent Test is then applied. The Three Percent Test does not modify results (Line 7 and Line 12 are identical). Table 1-59 is based on information from 2019 as filed.

When data are rerun using corrected 2019 information (Table 1-60), the Incremental Surcharge % amounts in Line 7, prior to the Three Percent Test, is identical to the Incremental Surcharge % amounts in Line 12. In the corrected calculation, all of the values in Line 12 are rate decreases. Since each Consolidated Rate Schedule shows a rate decrease, the Earnings Test has no effect on Schedule 594 rates in 2020.

Table 1-59: Initial Three Percent Test - 2020.

Three Percent Test - 2020 (As Filed but here Modified) - - Response to GP-51 (DMA 3 Percent Test.xlsx, Tab 2020 Filed)							
Line	**Calculation Step**	**Residential (503)**	**Commerical (504)**	**Industrial (505)**	**Commercial-Industrial (511)**	**Industrial-Interruptible (570)**	**Total WA**
1	**Revenue From 2019 Normalized Loads and Customers at Present Billing Rates (Note 1)**	$ 129,784,520	$ 79,262,367	$ 9,601,453	$ 18,277,286	$ 1,421,635	$ 238,347,261
2	**August 2020 - July 2021 Usage**	127,118,966	88,299,944	14,482,050	27,088,723	2,291,417	259,281,100
3	**Proposed Decoupling Recovery Rates**	(0.00910)	(0.02414)	(0.01417)	(0.01908)	0.01199	
4	**Present Decoupling Surcharge Recovery Rates**	0.013897	0.00081	-0.005846	-0.019541	0.019061	
5	**Incremental Decoupling Recovery Rates**	(0.02300)	(0.02495)	(0.00833)	0.00046	(0.00707)	
6	**Incremental Decoupling Recovery**	$ (2,923,863.34)	$ (2,202,642.10)	$ (120,606.51)	$ 12,406.64	$ (16,200.32)	$ (5,250,905.63)
7	**Incremental Surcharge %**	-2.25%	-2.78%	-1.26%	0.07%	-1.14%	-2.20%
	Three Percent Test Adjustment						
8	**3% Test Adjustment (Note 2)**	$ -	$ -	$ -	$ -	$ -	
9	**3% Test Rate Adjustment**	$ -	$ -	$ -	$ -	$ -	
10	**Adjusted Proposed Decoupling Recovery Rates**	$ (0.00910)	$ (0.02414)	$ (0.01417)	$ (0.01908)	$ 0.01199	
11	**Adjusted Incremental Decoupling Recovery**	$ (2,923,863.34)	$ (2,202,642.10)	$ (120,606.51)	$ 12,406.64	$ (16,200.32)	$ (5,250,905.63)
12	**Adjusted Incremental Surcharge %**	-2.25%	-2.78%	-1.26%	0.07%	-1.14%	-2.20%
	Notes						
	Note 1: Revenue from 2019 normalized loads and customers at present billing rates effective since March 1, 2020.						
	Note 2: The carryover balances will differ from the 3% adjustment amounts due to the revenue related expense gross up partially offset by additional interest on the outstanding balance during the amortization period.						
	Note 3: Each column shows a rate decrease. The Three Percent Test does not modify rates in 2020.						

Table 1-60: Fully Revised Three Percent Test - 2020.

Three Percent Test - 2020 (Fully Revised) - Response to GP-51 (DMA 3 Percent Test.xlsx, Tab 2020 Should Be)							
Line	**Calculation Step**	**Residential (503)**	**Commerical (504)**	**Industrial (505)**	**Commercial-Industrial (511)**	**Industrial-Interruptible (570)**	**Total WA**
1	**Revenue From 2019 Normalized Loads and Customers at Present Billing Rates (Note 1)**	$ 129,784,520	$ 79,262,367	$ 9,601,453	$ 18,277,286	$ 1,421,635	$ 238,347,261
2	**August 2020 - July 2021 Usage**	127,118,966	88,299,944	14,482,050	27,088,723	2,291,417	259,281,100
3	**Proposed Decoupling Recovery Rates**	(0.00910)	(0.02414)	(0.01417)	(0.01908)	0.01199	
4	**Present Decoupling Surcharge Recovery Rates**	0.00021	(0.00709)	(0.00585)	(0.03335)	0.01906	
5	**Incremental Decoupling Recovery Rates**	(0.00931)	(0.01705)	(0.00833)	0.01427	(0.00707)	
6	**Incremental Decoupling Recovery**	$ (1,183,604.69)	$ (1,505,072.55)	$ (120,606.51)	$ 386,501.90	$ (16,200.32)	$ (2,438,982.17)
7	**Incremental Surcharge %**	-0.91%	-1.90%	-1.26%	2.11%	-1.14%	-1.02%
	Three Percent Test Adjustment						
8	**3% Test Adjustment (2)**	$ -	$ -	$ -	$ -	$ -	
9	**3% Test Rate Adjustment**	$ -	$ -	$ -	$ -	$ -	
10	**Adjusted Proposed Decoupling Recovery Rates**	$ (0.00910)	$ (0.02414)	$ (0.01417)	$ (0.01908)	$ 0.01199	
11	**Adjusted Incremental Decoupling Recovery**	$ (1,183,604.69)	$ (1,505,072.55)	$ (120,606.51)	$ 386,501.90	$ (16,200.32)	$ (2,438,982.17)
12	**Adjusted Incremental Surcharge %**	-0.91%	-1.90%	-1.26%	2.11%	-1.14%	-1.02%
	Notes						
	Note 1: Revenue from 2019 normalized loads and customers at present billing rates effective since March 1, 2020.						
	Note 2: The carryover balances will differ from the 3% adjustment amounts due to the revenue related expense gross up partially offset by additional interest on the outstanding balance during the amortization period.						
	Note 3: Amount in Column Total WA, Line 6 is $(2,438,982.17), which is to be refunded. This is a correction to the amount $(5,250,905.63) to be refunded in the 2020 filing. The amount over refunded in the 2020 filing is $2,811,923.47.						

G. Summary & Conclusions – Fidelity Analysis

The purpose of the Decoupling Mechanism is to decouple the Company's Commission-authorized revenues from sales, such that the *portion of the Company's fixed costs planned for recovery through volumetric sales and not otherwise recovered from actual energy sales* will be recovered through the mechanism. In decoupling, the revenue requirement for a given year is first set. Since volumetric sales fluctuate and may not fully cover the fixed cost component

included within the volumetric portions of customer rates, the difference between actual decoupling-related revenue received from customers through volumetric rates, and the decoupling-related revenue approved for recovery through volumetric rates is accumulated in deferred revenue accounts.

CNGC decoupling to date includes development of Schedule 594 rates effective for 2017, 2018, 2019 and 2020, effective November 1 of each year. The next decoupling rate will be developed for implementation November 1, 2021. For each yearly rate adjustment, the Earnings Test and the Three Percent Test are implemented.

- The Earnings Test had no effect on Schedule 594 rates in 2017, 2018, 2019 and 2020.
- The Three Percent Test had no effect on Schedule 594 rates in 2017, 2018 and 2020.
- As filed, it initially appeared that the Three Percent Test had no effect on Schedule 594 rates in 2019. However, with corrections to calculations, it turns out that three Consolidated Rate Schedules should have been capped at three percent in 2019.
- Changed results in 2019 chain forward into 2020 results so that corrected 2020 results are dependent on the corrected 2019 results. The Three Percent Test has no effect on corrected Consolidated Rate Schedule results in 2020.
- However, amounts to be refunded through rate decreases for 2019 and for 2020 are different from those filed.
- A filing to account for these differences is expected.

For this section of the report, we traced the required inputs to the computations; followed the computations for cumulative deferral and interest in the determination of the Schedule 594 rates; examined the operation of the Earnings Test each year (2017, 2018, 2019, and 2020) and examined the operation of the Three Percent Test for each of these years.

Some differences were surfaced in back-and-forth interaction with CNGC, as is the method in this type of study. Based on our analysis of cumulative decoupling data from 2016 through 2019; and the Schedule 594 Rate effective November 1, 2017 through the Schedule 594 Rate effective November 1, 2020, we find that CNGC has calculated rates and deferrals in accordance with the Commission Order approving the decoupling mechanism, with corrections required for the 2019 and 2020 calculations which CNGC has developed in response to Data Request GP-51, and which are included here.

Section 2. Billing Impacts by Rate Schedule

The primary evaluation objective of Task 2 is:

- Determine if there were any differences in decoupling tracker adjustments among the rate schedules.

CNGC's decoupling mechanism applies to all residential, commercial, and industrial customer service schedules. Each of these schedules is listed in Table 2-1.

Table 2-1: Cascade Natural Gas Retail Service Rate Schedules

Rate Schedule	Service Description
503	Residential
504	Commercial
505	Industrial
511	Large Volume
570	Interruptible

Each of the five rate schedules listed above has been included in CNGC's decoupling mechanism since it became effective on September 1, 2016.[24] Annual filings show the proposed decoupling mechanism adjustment (DMA) to rates through rate schedule 594 (RS 594).

A. Summary of Decoupling Mechanics

Before examining the impact of decoupling by rate class it is useful to take a high-level look at the mechanics of the decoupling mechanism, actual deferrals, requested recovery amounts and decoupling rates. CNGC's decoupling mechanism allows for the recovery of the difference between actual revenue and allowed revenue.[25] This difference is referred to as the decoupling deferral balance and is tracked for each of the rate schedules shown in Table 2-1.

Beginning in September 2016, monthly deferrals are accumulated over a calendar year and used with other determinants to calculate the decoupling rate required to collect or refund the under- or over-collected revenue. Decoupling rates become effective in RS 594 on November 1 of the year following the year in which deferral balances were calculated. The timing of deferral balance accumulation and decoupling rate adjustments is shown in Figure 2-1.

[24] The following service rate schedules were originally part of the DMA but have been discontinued; 502 (dry-out service), 512 (compressed natural gas) and 577 (Institutional Interruptible). These rate schedules accounted for only 0.3% of total core customer therm usage in the 12 months ending July 31, 2017. Because volumetric sales through these rate schedules was small and they have been discontinued they are not included in our analysis of billing impacts in this section.

[25] Details of CNGC's decoupling mechanism are included in Final Order ("Order 4") and the Joint Settlement Agreement for Docket Number UG-152286 and are discussed in Section 1.

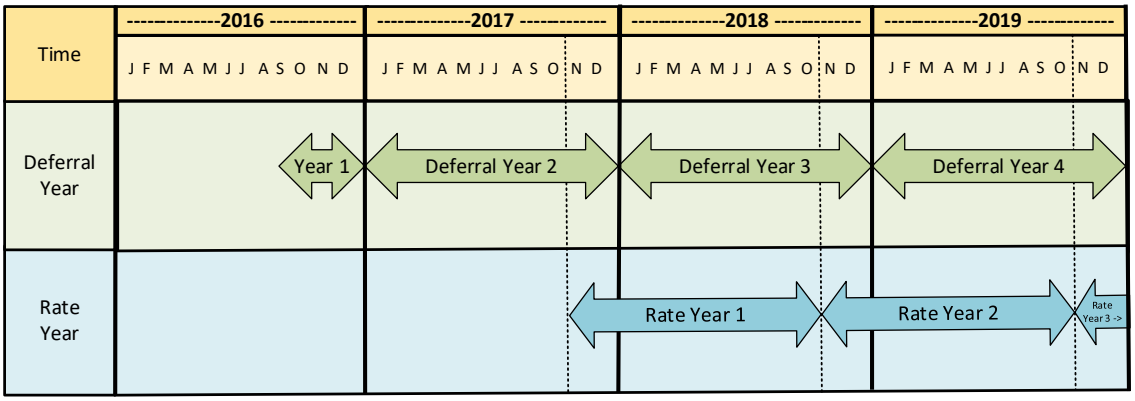

Figure 2-1: Timing of Deferral Balance Accumulation and Decoupling Rate

The first deferral year was a partial year from September 1, 2016, through December 31, 2016. Deferral balances at the end of 2016 were used, along with other determinants, to calculate the decoupling rates in effect during the first rate-year (November 1, 2017 through October 31, 2018). The same process is followed in the second deferral year and rate-year. Any deferral balance carried over from the first rate-year due to the application of the 3 percent cap is included in the calculations of decoupling rates in effect during the second rate-year (November 2018 through October 2019).

B. Factors Influencing Use per Customer

CNGC relies on volumetric charges to recover a portion of fixed costs for all rate groups and fuels. This causes use per customer to be an important factor in determining deferral balances and decoupling rates through the decoupling mechanism. More specifically, changes in use per customer from levels used in the test year to set decoupled revenue will lead to positive or negative deferral balances depending on the direction of change, all other things equal. Higher use per customer will cause negative deferrals and lower use per customer will result in higher deferrals, again all other things equal.

Two important factors causing use per customer to vary from the test year are actual weather deviations from normal weather and acquired energy efficiency savings through CNGC programs. While there are other factors that cause actual use per customer to deviate from planning assumptions, these two are either known in the case of CNGC energy efficiency impacts or readily measurable in the case of weather impacts.

In this analysis we breakdown the difference between expected use per customer and actual use per customer by the change attributable to weather, energy efficiency programs, and other unidentified factors. For this purpose, expected use per customer is defined as CNGC weather normalized usage divided by the number of customers for the 12-month period ending June

2015, the test period used in UG-152286. The change in use per customer due to CNGC energy efficiency programs was calculated as the cumulative energy efficiency savings from July 2017 through the reporting years shown in the charts below. The change in use per customer due to weather is based on the weather adjustment reported by CNGC.[26] Change due to "other" factors is calculated as the difference between the total change in use per customer and the change to weather and energy efficiency programs. In other words, the other category is what remains after accounting for weather and energy efficiency programs.

Results of these calculations are shown for two rate schedules, Residential (RS 503) and Commercial (RS 504), the two customer classes for which CNGC weather normalizes therm deliveries. Results of the analysis of changes in natural gas use per customer are visually represented in Figure 2-2 for the natural gas residential group.

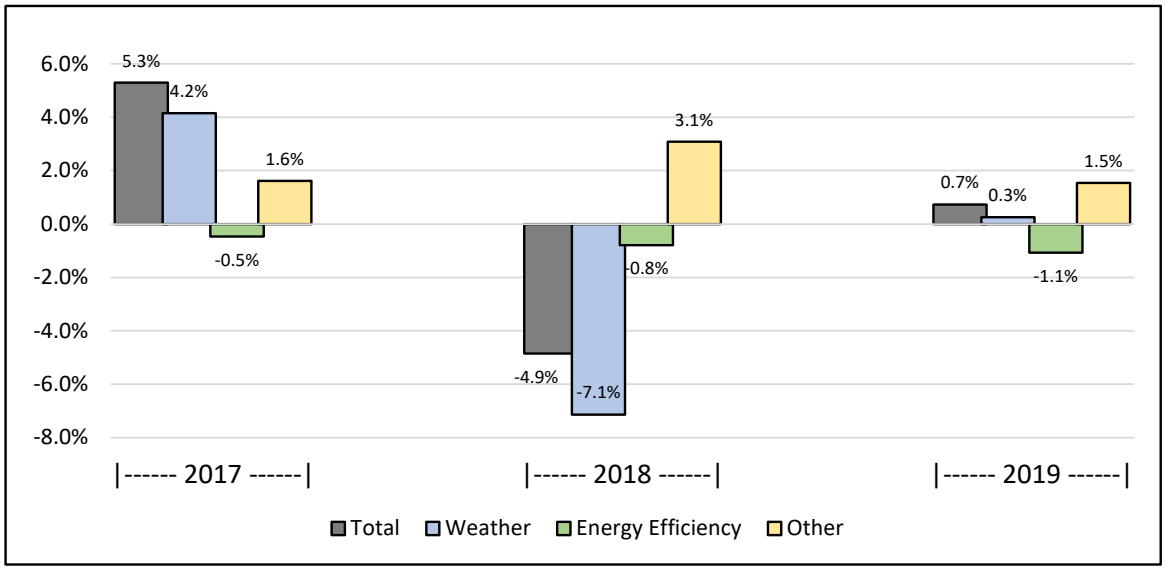

Figure 2-2: Percentage Change in Use per Customer, Residential (RS 503).

Figure 2-2 shows the percentage difference in use per residential customer relative to the test period for each of the three full calendar years covered in our analysis. Reading from left to right, the four bars in each calendar year show the total percent change followed by the three categories of change; weather, energy efficiency programs, and other unidentified factors. The sum of the categories is equal to the total change. Actual use per residential customer in 2017

[26] CNGC reported weather normalization results for a "current" and "proposed" methodology (BLR-3 Weather Normalization Results.xlsx). For the purpose of this analysis, we chose to use the "proposed" methodology for the weather adjustment component. CNGC's proposed weather adjustment methodology significantly reduced the unexplained variation in use per customer for both residential and commercial customers and on this basis appears to be an improvement over the "current" methodology.

was about 5 percent higher than test year use per customer, 5 percent lower in 2018 and slightly higher in 2019.

Not surprisingly, the impacts from above and below normal weather has been the primary source of variability in actual use per residential customer. Significantly warmer than normal weather in 2018, for example, was the primary reason for a fall in use per customer that in turn lead to a decoupling surcharge effective November 2019. CNGC's energy efficiency program has resulted in cumulative downward influence on residential use per customer. Other unidentified factors have contributed to about 2 percent higher use per customer compared to the test period. This is a small level of unexplained variation and does not appear to be trending higher or lower.

Figure 2-3 shows a plot of total percent change in use per customer from test year assumptions for commercial customers. The contribution of each factor to the percentage change in use per customer is also shown in the plot.

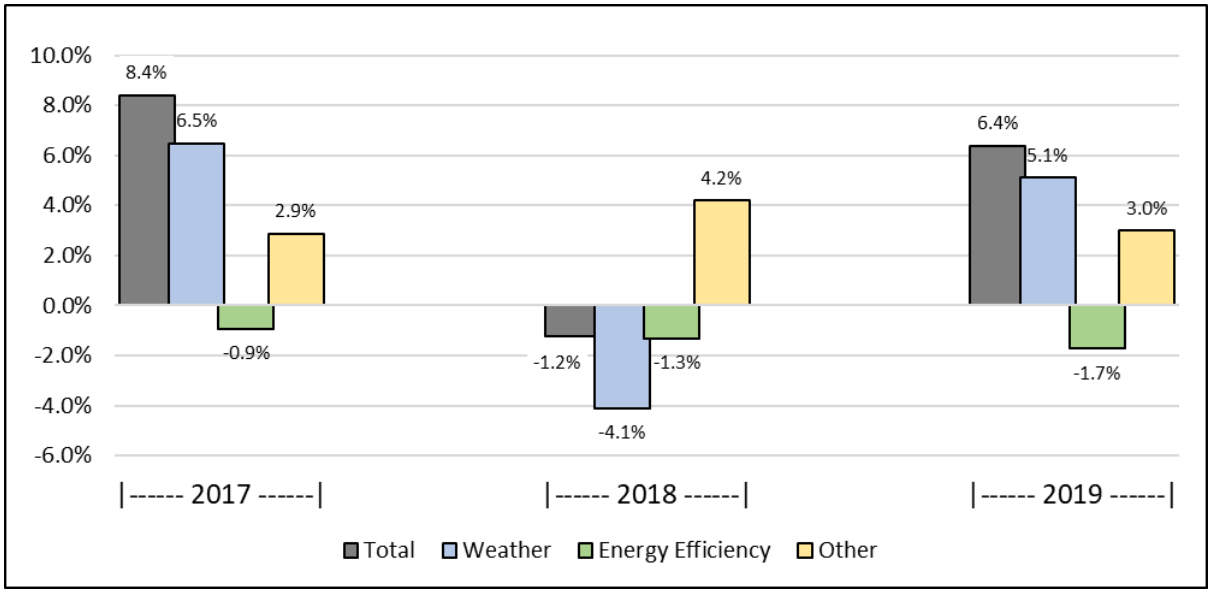

Figure 2-3: Percentage Change in Use per Customer, Natural Gas Non-Residential

Deviations from normal weather have been the largest source of variation in use per commercial customer from test year levels. As with residential customers, weather impacts on use per customer appear to be the primary driver of decoupling deferrals and customer decoupling surcharges/rebates for commercial customers. CNGC's energy efficiency program has resulted in cumulative downward influence on commercial use per customer.[27] Other unidentified factors

[27] In this analysis we have attributed all CNGC non-residential energy efficiency to commercial customers (Rate Schedule 504). Although CNGC's annual conservation report does not breakdown non-residential energy efficiency by rate schedule, commercial customers (RS 504) account for 98% of all non-residential customers and about 75% of all non-residential retail therm deliveries.

have caused 3 percent to 4 percent higher use per customer compared to the test period. This is a small level of unexplained variation and does not appear to be trending higher or lower.

C. Impact of Decoupling Tracker Adjustment by Customer Class

The DMA applies to all retail CNGC customers in Washington. These customers are served by one of five rate schedules. Customers, therm usage and revenue for each the five Washington service rate schedules in 2019 are shown in Table 2-2.

Table 2-1: CNGC 2019 Washington Customers, Usage and Revenue by Rate Schedule

	Customers	Percent	Therms	Percent	Revenue	Percent
Residential (RS 503)	191,561	87.6%	130,707,805	50.0%	117,573,639	54.7%
Commercial (RS 504)	26,476	12.1%	94,268,044	36.5%	75,897,889	35.3%
Industrial (RS 505)	480	0.2%	13,155,736	5.0%	9,316,255	4.3%
Large Volume (RS 511)	89	0.0%	17,970,325	7.5%	11,019,783	5.1%
Interruptible (RS 570)	8	0.0%	2,270,481	0.9%	1,288,390	0.6%
Total	**218,614**	**100.0%**	**258,372,391**	**100.0%**	**215,095,956**	**100.0%**

Of the over 218 thousand Washington customers receiving service from CNGC in 2019, nearly 88 percent were residential, and 12 percent were commercial service customers. A relatively small number of industrial, large volume and interruptible customers account for about 0.2 percent of customers and 13 percent of therms. Each of these customer classes will be reviewed below.

D. Residential (Rate Schedule 503)

CNGC's residential customer base accounts for just over half of total billed revenue in 2019. Six years of residential customers counts, usage, and revenue are shown in Table 2-3. This history roughly corresponding to three years before decoupling (2014-2016) and three years after decoupling (2017-2019).[28] Customer charges through the decoupling mechanism adjustment rate (RS 594) are also shown in Table 2-3 for 2017 through 2019 both in terms of the average charge per customer and as a percentage of billed revenue.

CNGC serves about 191 thousand residential customers in Washington. Since 2014 the number of residential customers served by CNGC has increased by an average of 3,100 customers annually, or 1.7 percent compound average growth rate (CAGR). During this period residential throughput has fluctuated between just under 100 million therms (2015) to over 131 million

[28] CNGC's decoupling mechanism became effective September 1, 2016 with the tracking of deferred margin revenue by rate schedule.

therms (2017). Annual use per customer has fluctuated between 558 and 713 therms, driven mostly by weather in the short term and by efficiency improvements over a longer horizon. Annual billed revenue per customer ranged between $552 and $676 over the six-year period.

The DMA established the first RS 594 rates with an effective date of November 1st, 2017. Accordingly, calendar year impacts in 2017 are small. In 2018 residential customers received an average discount of $3.55 (0.6 percent of billed revenue) in RS 594 charges. Customer charges were also negative in 2019 with an average rebate of $13.14 in 2019, 2.1 percent of billed revenue.

Table 2-2: Annual Residential Customers, Usage and Revenue

Year	Customers	Billed Therms	Use per Customer	Billed Revenue	Revenue per Customer	RS 594 Charges per Customer	Percent RS 594 of Billed Revenue
2014	176,024	111,970,307	636	$118,935,675	$676	NA	NA
2015	178,466	99,588,977	558	$107,266,203	$601	NA	NA
2016	181,087	106,466,302	588	$99,891,621	$552	NA	NA
2017	183,980	131,220,953	713	$117,224,742	$637	- $0.15	- 0.0%
2018	187,705	120,976,045	645	$113,458,990	$604	- $3.55	- 0.6%
2019	191,561	130,707,805	682	$117,573,639	$614	- $13.14	- 2.1%

Impacts of Decoupling on Residential Customer Bills

Deferred margin revenue accumulated from September 2016 through December 2016 was amortized in rates through the decoupling adjustment tariff (RS 594) effective November 1, 2017. This means that customer bills were unaffected by decoupling until November 2017. The dollar amount and percentage impact on residential customer bills due to RS 594 charges is shown in Figure 2-4.

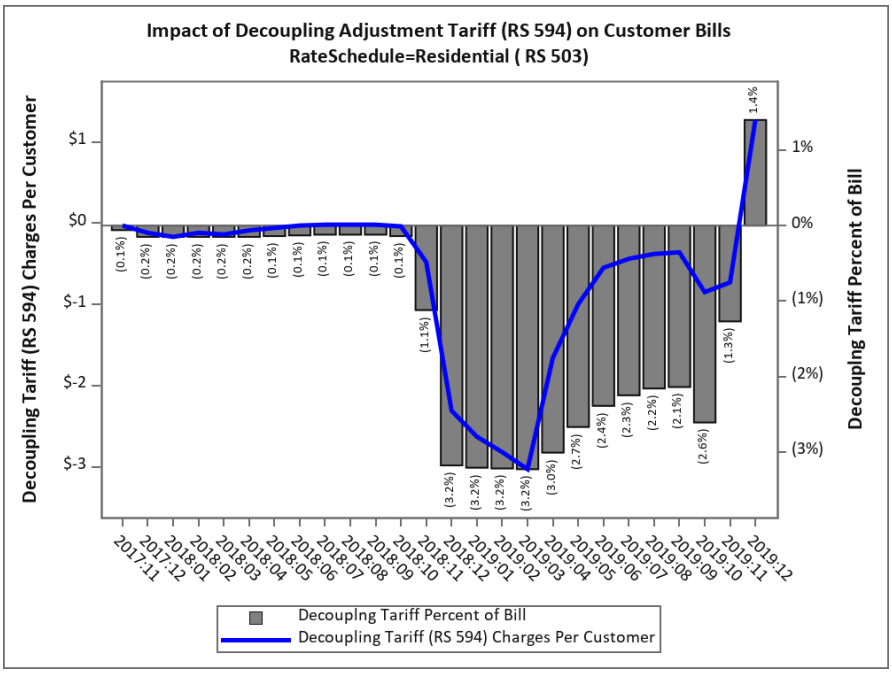

Figure 2-4: Monthly Decoupling Adjustment Charges (RS 594) per Residential Customer

During the first decoupling rate-year (November 2017 through October 2018) the impact on average monthly cost per residential customer was small and negative (rebate), ranging between -$0.02 (-0.1%) in July 2018 to -$0.17 (-0.2%) in October 2018. The impact of RS 594 on customer bills is significantly higher and also negative (rebate) in the second decoupling rate-year (November 2018 through October 2019), ranging between -$0.36 (-2.1%) in September 2019 to -$3.03 (-3.2%) in March 2019.

As can be seen in Figure 2-4, the months of November and December can show significant differences from preceding months in RS 594 amounts and as a percentage of the average bill. This is due to the November 1 effective date of new RS 594 rate adjustments. For example, the RS 594 percentage of the average residential bill went from -2.6 percent in October 2019 to a surcharge of 1.4 percent in December 2019 as the new RS 594 effective November 1, 2019 became fully reflected in customer bills.[29]

A review of the monthly patterns in Figure 2-4 shows that the percentage impact of RS 594 on total revenue also varies with seasonal usage. Because space heating in natural gas homes accounts for a large percentage of total annual usage, volumetric charges dominate billed revenue during space heating months and fall off significantly during the summer. In summer

[29] Although the effective date of revised RS 594 rates was November 1, customer bills in November reflect usage that is partially billed at the old RS 594 rate and part billed at the new RS 594 rate. The portion billed under the old and new rates is determined by a simple prorating of usage based on the number of calendar days in the billing period before November 1 and the number of days on or after November 1.

months fixed charges make up a larger percentage of billed revenue causing RS 594 revenue as a percentage of total revenue to be lower in absolute terms in swing and summer months.

E. Commercial (Rate Schedule 504)

CNGC's commercial customer base accounts for just over 35 percent of total 2019 billed revenue making it the second largest customer class in terms of revenue. Six years of commercial customer counts, usage and revenue are shown in Table 2-4. This history roughly corresponding to three years before decoupling (2014 -2016) and three years after decoupling (2017-2019). Customer charges through the decoupling mechanism adjustment rate (RS 594) are also shown in Table 2-4 for 2017 through 2019 both in terms of the average charge per customer and as a percentage of billed revenue.

CNGC serves over 26 thousand commercial customers in Washington. Since 2014 the number of commercial customers served by CNGC has increased annually by an average of just over 300 customers. This increase amounts to a 1.2 percent CAGR. During this period commercial throughput has increased to over 94 million therms in 2019. Annual unadjusted use per customer has fluctuated between 2,788 therms (2015) and 3,629 therms (2017). While not as sensitive to weather as residential customers, commercial use per customer tends to be significantly weather related. Annual billed revenue per customer ranged between a high of $3,146 in 2014 to a low of $2,557 in 2016 over the six-year period.

Table 2-3: Annual Commercial Customers, Usage and Revenue

Year	Customers	Billed Therms	Use per Customer	Billed Revenue	Revenue per Customer	RS 594 Charges per Customer	Percent RS 594 of Billed Revenue
2014	24,947	78,930,326	3,164	$78,492,966	$3,146	NA	NA
2015	25,151	70,109,665	2,788	$70,491,267	$2,803	NA	NA
2016	25,459	75,617,567	2,970	$65,097,828	$2,557	NA	NA
2017	25,814	93,671,321	3,629	$75,508,603	$2,925	$0.64	0.0%
2018	26,187	86,585,611	3,307	$73,476,148	$2,806	- $12.29	- 0.4%
2019	26,476	94,268,044	3,560	$75,897,889	$2,867	- $91.21	- 3.2%

The DMA established the first RS 594 rates with an effective date of November 1st, 2017. Accordingly, calendar year impacts in 2017 are small. In 2018 commercial customers received an average rebate of $12.29 (0.4% of billed revenue) in RS 594 charges. Customer rebates averaged $91.21 in 2019, 3.2 percent of customer bills.

Impacts of Decoupling on Commercial Customer Bills

Deferred margin revenue accumulated from September 2016 through December 2016 was amortized in rates through the decoupling adjustment tariff (RS 594) effective November 1, 2017. This means that customer bills were unaffected by decoupling until November 2017. The dollar amount and percentage impact on commercial customer bills due to RS 594 charges is shown in Figure 2-5.

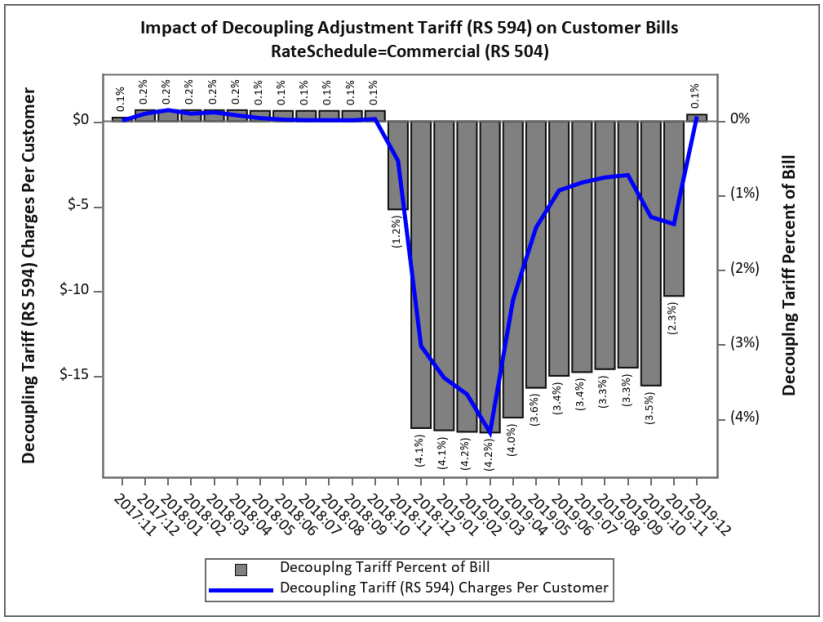

Figure 2-5: Monthly Decoupling Adjustment Charges (RS 594) per Commercial Customer

During the first decoupling rate-year (November 2017 through October 2018) the impact on average monthly cost per commercial customer was small, increasing bills by less than a dollar a month (0.1% to 0.2%). The impact of RS 594 on customer bills is significantly higher in the second decoupling rate-year (November 2018 through October 2019), ranging between a rebate of $2.26 (1.2%) in November 2018 to a rebate of $18.28 (4.2%) in March 2019.

The same monthly patterns exhibited in the residential customer class are evident with commercial customers. The months of November and December can show significant differences from preceding months in RS 594 amounts and as a percentage of the average bill as a change in the RS 594 rate is partially reflected in November billing data and then fully reflected in December. Figure 2-5 also shows that the percentage impact of RS 594 on total revenue also varies with seasonal usage. Weather dependent commercial customer end-uses, including space heating causes volumetric based charges to increase during winter months and fall off significantly during the summer. In summer months fixed charges make up a larger percentage of billed revenue causing RS 594 revenue as a percentage of total revenue to be lower in absolute terms in swing and summer months.

F. Industrial (Rate Schedule 505)

CNGC's Industrial customer class accounts for just over 4 percent of total 2019 billed revenue. Six years of industrial customer counts, usage and revenue are shown in Table 2-5. This history roughly corresponds to three years before decoupling (2014 through 2016) and three years after decoupling (2017-2019).[30] Customer charges through the decoupling mechanism adjustment rate (RS 594) are also shown in Table 2-5 for 2017 through 2019 both in terms of the average charge per customer and as a percentage of billed revenue.

Table 2-4: Annual Industrial Customers, Usage and Revenue

Year	Customers	Billed Therms	Use per Customer	Billed Revenue	Revenue per Customer	RS 594 Charges per Customer	Percent RS 594 of Billed Revenue
2014	410	12,023,183	29,355	$10,191,594	$24,883	NA	NA
2015	443	10,921,848	24,631	$9,343,647	$21,072	NA	NA
2016	452	10,823,803	23,964	$7,736,581	$17,129	NA	NA
2017	460	12,259,737	26,681	$8,247,732	$17,949	$29.76	0.2%
2018	473	11,931,476	25,234	$8,658,113	$18,311	$184.97	1.0%
2019	480	13,155,736	27,432	$9,316,255	$19,426	$54.51	0.3%

CNGC serves nearly 500 industrial customers in Washington. Since 2014 the number of customers served by CNGC under the industrial tariff (RS 505) has averaged an increase of 14 customers annually. This increase amounts to a 3.2 percent CAGR, the fastest growth rate of the five customer classes. During this period industrial throughput has fluctuated between 10.8 million therms to just over 13.1 million in 2019. Annual unadjusted use per customer has fluctuated between a low of 23,964 therms (2016) and 29,355 therms (2014). Over the six-year period annual billed revenue per customer ranged between a high of $24,883 in 2014 to a low of $17,129 in 2016.

The DMA established the first RS 594 rates, effective November 1st, 2017. Accordingly, calendar year impacts in 2017 are small. In 2018 industrial customers paid an average of $184.97 (1.0% of billed revenue) in RS 594 charges. A much smaller charge averaging $54.51 per customer was paid in 2019, 0.3 percent of industrial customer revenue.

Impacts of Decoupling on Industrial Customer Bills

Deferred margin revenue accumulated from September 2016 through December 2016 was amortized in rates through the decoupling adjustment tariff (RS 594) effective November 1, 2017. This means that customer bills were unaffected by decoupling until November 2017. The

[30] This is approximate since decoupling began November 1, 2016.

dollar amount and percentage impact on industrial customer bills due to RS 594 charges is shown in Figure 2-6.

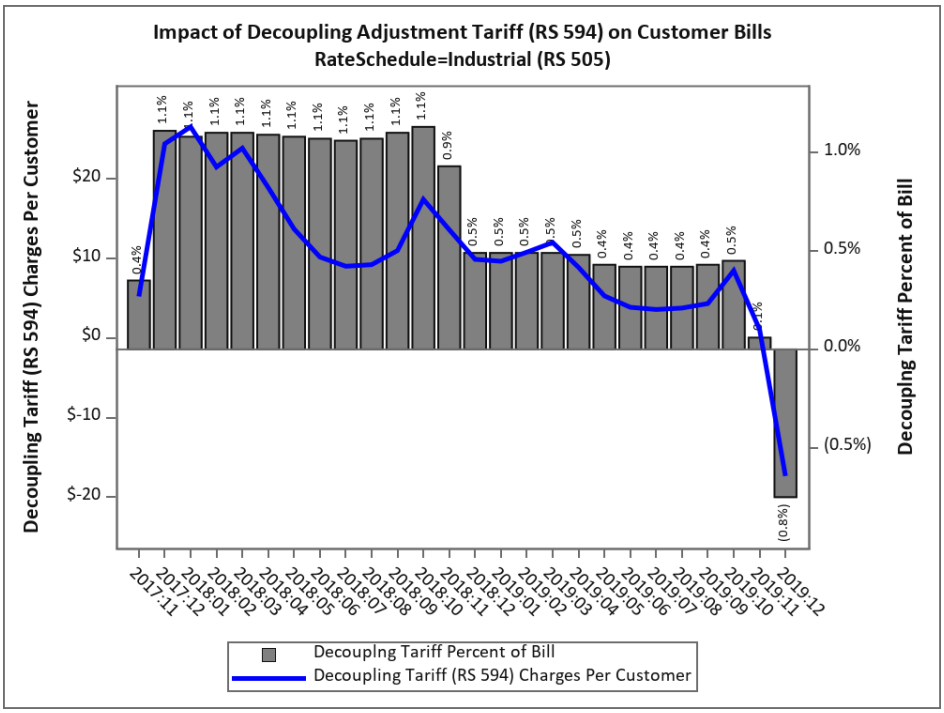

Figure 2-6: Monthly Decoupling Adjustment Charges (RS 594) per Industrial Customer

During the first decoupling rate-year (November 2017 through October 2018) the decoupling adjustment tariff (RS 594) resulted in a roughly one percent increase in monthly bills. The impact of RS 594 on customer bills in the second decoupling rate-year (November 2018 through October 2019), was also an increase in monthly bills but by a smaller percentage (0.4% to 0.5%). The drop to a 0.8 percent rebate in December 2019 reflects the RS 594 rate change effective November 1st, 2019.

G. Large Volume (Rate Schedule 511)

CNGC's large volume customer base accounts for just over 5 percent of total 2019 billed revenue. Six years of industrial customer counts, usage and revenue are shown in Table 2-6. This history roughly corresponds to three years before decoupling (2014-2016) and three years after decoupling (2017-2019). Customer charges through the decoupling mechanism adjustment rate (RS 594) are also shown in Table 2-6 for 2017 through 2019 both in terms of the average charge per customer and as a percentage of billed revenue.

Table 2-5: Annual Large Volume Customers, Usage and Revenue

Year	Customers	Billed Therms	Use per Customer	Billed Revenue	Revenue per Customer	RS 594 Charges per Customer	Percent RS 594 of Billed Revenue
2014	80	8,427,477	105,563	$6,956,122	$87,133	NA	NA
2015	82	10,177,951	124,248	$8,406,304	$102,620	NA	NA
2016	86	10,315,598	120,182	$7,072,144	$82,394	NA	NA
2017	89	13,792,018	155,112	$8,661,201	$97,408	- $387	- 0.4%
2018	86	14,041,735	163,752	$9,103,221	$106,160	- $3,763	- 3.5%
2019	89	17,970,325	202,103	$11,019,783	$123,934	- $9,304	- 7.5%

CNGC served between 80 and 90 Washington customers on the large volume rate schedule between 2014 and 2019. During this period large volume customer throughput has increased substantially, doubling to just under 18 million therms in 2019. Annual unadjusted use per customer has also nearly doubled since 2014, increasing at an average annual rate of 13.9 percent. This high rate of growth in usage per customer helped to make the large volume customer class the only customer class with an increase in revenue per customer since 2014. Because of the relatively small number of customers, customers moving in and out of this customer class can cause large fluctuations in the class as a whole.

RS 594 rates were first effective on November 1st, 2017. Accordingly, calendar year impacts in 2017 are small. In 2018 large volume customers received a rebate averaging of $3,763 (3.5% of billed revenue) in RS 594 charges. Customer rebates from RS 594 charges averaged over $9,300 in 2019, 7.5 percent of customer bills. Large volume customers have experienced the largest percentage decrease in bills due to the decoupling mechanism adjustment.

Impacts of Decoupling on Large Volume Customer Bills

Deferred margin revenue accumulated from September 2016 through December 2016 was amortized in rates through the decoupling adjustment tariff (RS 594) effective November 1, 2017. This means that customer bills were unaffected by decoupling until November 2017. The dollar amount and percentage impact on large volume customer bills due to RS 594 charges is shown in *Figure 2-7*.

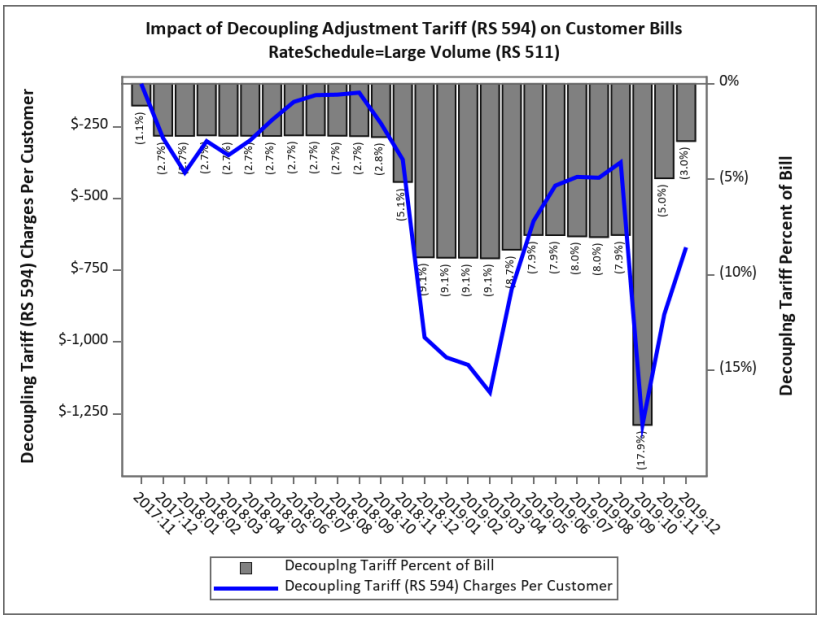

Figure 2-7: Monthly Decoupling Adjustment Charges (RS 594) per Large Volume Customer

During the first decoupling rate-year (November 2017 through October 2018) the decoupling adjustment tariff (RS 594) resulted in bill decreases of just under 3 percent in most months. The average monthly impact of RS 594 on customer bills in the second decoupling rate-year (November 2018 through October 2019) was meaningfully higher in absolute terms, reducing bills by 8 percent to 9 percent in most months. The move back down to around a 3 percent increase in December 2019 reflects the RS 594 rate change effective November 1st, 2019.[31]

[31] The large rebate to RS 511 customers in October 2019 was due to rate schedule migration of a few large accounts (CNGC Communications).

H. Interruptible (Rate Schedule 570)

CNGC's interruptible customer base accounts for less than 1 percent of total 2019 billed revenue. Six years of industrial customer counts, usage and revenue are shown in Table 2-7. This history roughly corresponds to three years before decoupling (2014-2016) and three years after decoupling (2017-2019). Customer charges through the decoupling mechanism adjustment rate (RS 594) are also shown in Table 2-7 for 2017 through 2019 both in terms of the average charge per customer and as a percentage of billed revenue.

Table 2-6: Annual Interruptible Customers, Usage and Revenue

Year	Customers	Billed Therms	Use per Customer	Billed Revenue	Revenue per Customer	RS 594 Charges per Customer	Percent RS 594 of Billed Revenue
2014	9	4,180,003	464,445	$2,983,425	$331,492	NA	NA
2015	9	3,929,182	440,656	$2,839,689	$318,470	NA	NA
2016	8	3,686,447	456,055	$2,122,560	$262,585	NA	NA
2017	7	2,934,724	419,246	$1,509,725	$215,675	- $240	- 0.1%
2018	8	2,088,288	278,438	$1,174,411	$156,588	- $333	- 0.2%
2019	8	2,270,481	296,150	$1,288,390	$168,051	$2,947	1.8%

Only a small number of Washington customers, ranging between 7 and 9 since 2014, are included in the interruptible customer class. Although the number of customers has been fairly constant, volume and revenue have fallen sharply. Still, use per customer and revenue per customer in 2019 was higher than any other customer class. The small number of interruptible customers makes this customer class more susceptible to volatility from changes in customer operations and customer drop-offs and additions.

RS 594 rates were first effective on November 1st, 2017. Accordingly, calendar year impacts in 2017 are small. In 2018 interruptible customers received an average rebate of $333 (0.2% of billed revenue) in RS 594 charges. In 2019 interruptible customers paid RS 594 charges that averaged $2,947, 1.8 percent of billed revenue.

Impacts of Decoupling on Interruptible Customer Bills

Deferred margin revenue accumulated from September 2016 through December 2016 was amortized in rates through the decoupling adjustment tariff (RS 594) effective November 1, 2017. This means that customer bills were unaffected by decoupling until November 2017. The dollar amount and percentage impact on large volume customer bills due to RS 594 charges is shown in Figure 2-8.

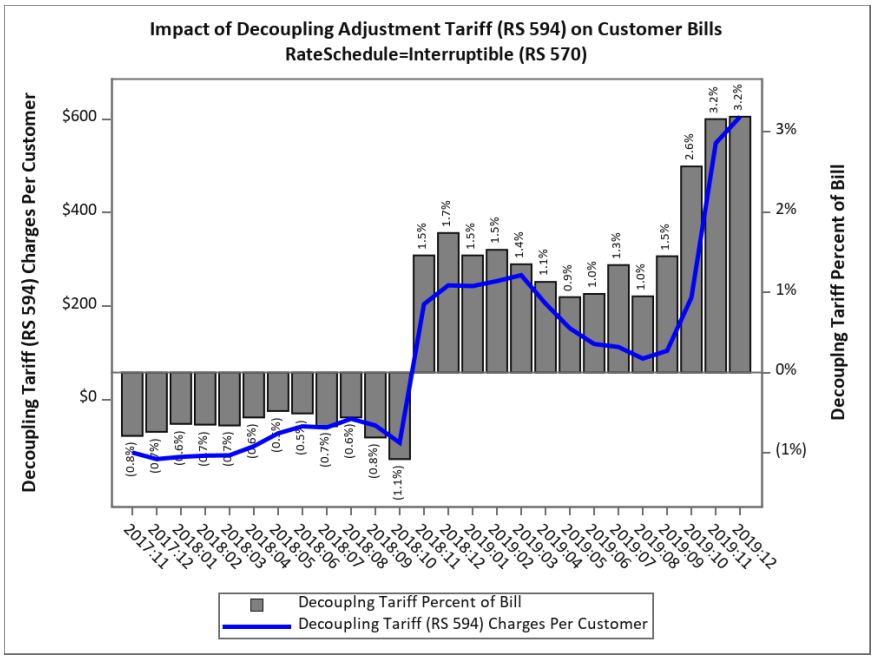

Figure 2-8: Monthly Decoupling Adjustment Charges (RS 594) per Interruptible Customer

During the first decoupling rate-year (November 2017 through October 2018) the decoupling adjustment tariff (RS 594) resulted in bill decreases of between 0.5 percent and 1.0 percent in most months. During the second decoupling rate-year (November 2018 through October 2019) the customer bills were roughly 1 percent and 3 percent higher due to the impact of RS 594. The 3 percent increase in the average interruptible customer bill in November and December 2019 reflects the RS 594 rate change effective November 1, 2019.

I. Percentage Impacts on Monthly Customer Bills by Rate Schedule

The impact of the decoupling mechanism adjustment on monthly customer bills varies by decoupling rate-year and by customer class. The magnitude of the impact on customer bills is shown in percentage terms by customer class in Figure 2-9.

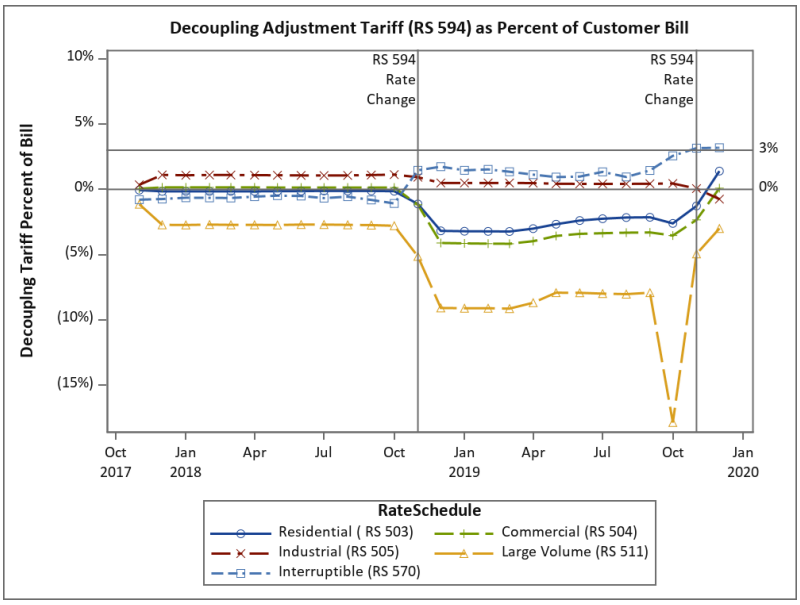

Figure 2-9: Decoupling Tariff Charges (RS 594) as Percent of Customer Bills

Information in Figure 2-9 is the same percentage bill impacts shown in Figure 2-4 through Figure 2-8 overlaid on a single chart to facilitate comparisons between customer classes over time. Changes in the percentage impact of RS 594 on customer bills over time are to be expected in the normal operation of the decoupling mechanism. Differences between customer classes are also to be expected for a number of reasons including varying degrees of weather sensitivity and differences in energy efficiency improvements.

With only a little over two years of RS 594 history, there is not a sufficient record to support conclusions regarding long term impacts. However, certain patterns can be expected to prevail in the data. These include:

- Because RS 594 rates are fixed over the decoupling rate-year (November through October), monthly impacts will be near a fixed percentage impact over any single decoupling rate-year,
- November will reflect a transition between RS 594 rate levels before the new RS 594 rate is fully reflected in December billing data, and
- Impacts should remain below +3% due to the 3 percent cap on rate increases due to RS 594 changes.

Examining the patterns in Figure 2-9 it is apparent that for the most part monthly impacts are fairly constant over a rate-year except for October 2019 for large volume customers.[32] The pattern between decoupling rate-years with November as a transition month between rate levels

[32] See footnote 31 for an explanation of the observed spike in October 2019 for large volume customers.

is apparent for all customer classes for each change in RS 594 rates. Monthly rate impacts are at or below the 3 percent cap adopted as part of the decoupling mechanism.

J. Summary – Billing Impacts by Rate Schedule

The examination of billing impacts shows that the decoupling adjustment mechanism has resulted in mostly small bill impacts that are within the range of expectation. Although only a short history of decoupling is represented in Figure 2-9 (three RS 594 adjustments effective November 1st of 2017, 2018, and 2019), four of the five customer classes have shown both increases and decreases from RS 594 impacts on customer bills. This is part of the expected pattern in decoupling rates when year-to-year variations in weather cause both over- and under-collections of allowed revenue. Only one customer class, large volume customers, has shown decreases in customer bills from decoupling in each of the three rate-years. This pattern may be explained by changes that are designed to be picked up by decoupling such as increase in use per customer that result in rebates through RS 594.

Section 3. **Analysis of Revenue Effects**

In this section we examine the effects of the decoupling mechanisms on CNGC's revenue. The objective of Task 7, is shown below:

> *Determine if the Decoupling Mechanisms has had a stabilizing impact on Company revenues.*

Relating to this objective are the following evaluation questions:

> *What impact did the Decoupling Mechanisms have on the Company's revenues (i.e., has there been a stabilizing effect)?*
>
> *What have been the results of the earnings test?*
>
> *How often has the rate cap limited the increase in RS 594 rates?*

Our discussion in this section is organized by each of the evaluation questions listed above. Much of the data used to address these questions has been presented in earlier sections of this report and repeated here for ease of discussion and the convenience of the reader.

A. Has Decoupling Stabilized Revenue

The evaluation question addressed is:

> *"What impact did the Decoupling Mechanisms have on the Company's revenues (i.e., has there been a stabilizing effect)?"*

This is a straightforward question answered by comparing actual revenue with actual revenue plus deferred revenue. Here the limiting factor is the relatively short three-year period that the mechanism has been in place. In order to answer this question, we calculated the annual variation in revenue over the 2017 to 2019 period with and without the revenue from decoupling deferrals.[33] We used the coefficient of variation (COV), calculated as the standard deviation divided by the mean, as our measure of variability. Revenue with deferrals is shown in Table 3-1 for each core customer class.

Table 3-1: Revenue with Decoupling (includes DMA Deferrals)

	Residential (RS 503)	Commercial (RS 504)	Industrial (RS 505)	Large Volume (RS 511)	Interruptible (RS 570)	Total
	(millions of dollars)					
2017	111.9	71.9	8.1	8.0	1.4	201.3
2018	111.4	71.4	8.6	8.7	1.2	201.3
2019	118.0	76.0	9.1	11.3	1.3	215.8
Mean	113.8	73.1	8.6	9.4	1.3	206.1
Std Dev	3.6	2.6	0.5	1.8	0.1	8.4
Coef. of Variation	3.2%	3.5%	6.1%	18.7%	6.5%	4.1%

[33] Deferral tracking under the Decoupling Mechanism began in September 2016. Because decoupling only applied to a portion of the 2016 calendar year, it was omitted from the analysis of revenue variability.

The calculations for the COV, a measure of variability, are also shown in Table 3-1. Residential and Commercial customers have shown the least variability in revenue under decoupling, 3.2 percent, and 3.5 percent, respectively. Large volume customers have shown the largest variability in revenue under decoupling with a coefficient of variation of nearly 20 percent.

Revenue for the five core customer groups without decoupling is estimated by removing decoupling deferred revenue from the revenue with decoupling. These results are shown in Table 3-2.

Table 3-2: Revenue without Decoupling (excludes DMA Deferrals)

	Residential (RS 503)	Commercial (RS 504)	Industrial (RS 505)	Large Volume (RS 511)	Interruptible (RS 570)	Total
	(millions of dollars)					
2017	114.7	74.4	8.1	8.5	1.3	207.1
2018	110.0	71.3	8.6	9.2	1.2	200.3
2019	119.2	78.1	9.3	12.1	1.3	220.0
Mean	114.6	74.6	8.7	10.0	1.3	209.1
Std Dev	4.6	3.4	0.6	1.9	0.1	10.0
Coef. of Variation	4.0%	4.5%	7.0%	19.3%	7.1%	4.8%

As can be seen by comparing the percentage variation with decoupling (last row of Table 3-1) to the percentage variation without decoupling (last row of Table 3-2), revenue variability is lower with decoupling. This comparison is shown graphically in Figure 3-1 by customer classes and total core revenue.

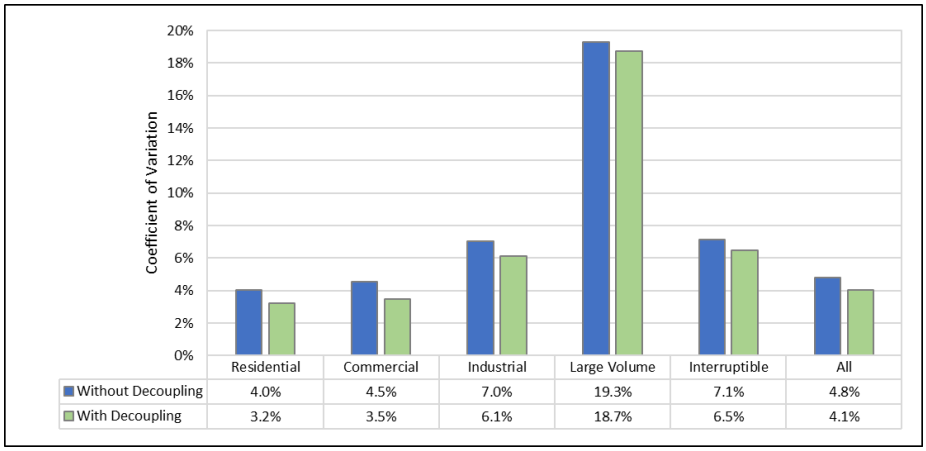

Figure 3-1: Revenue Variability with and without Decoupling (2017-2019)

It is clear from the results shown in Figure 3-1 that decoupling has had a stabilizing effect on revenue, lowering revenue variation in every customer class. The drop-in variability (change in COV between with and without decoupling) as measured as a percentage of variability without decoupling is shown in Figure 3-2.

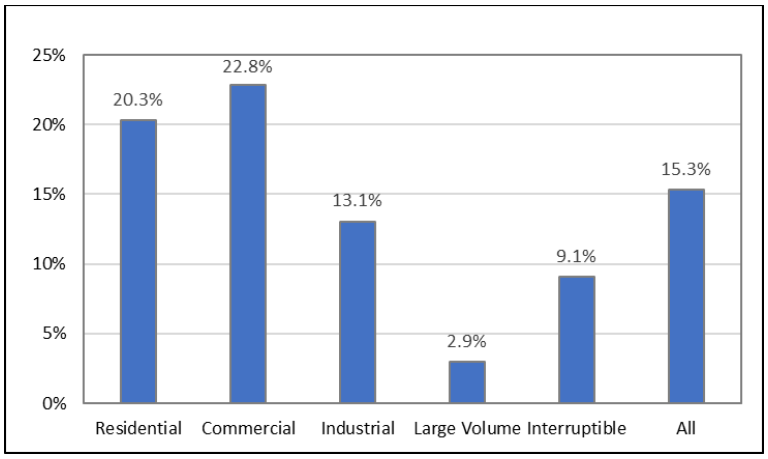

Figure 3-2: Reduction in Revenue Variability with Decoupling (2017-2019)

Revenue variability in the residential and commercial customer classes was reduced by over 20 percent as a result of decoupling. These two groups are impacted the most from large fluctuations in use per customer due to weather and from trending changes in usage due to energy efficiency improvements. Figure 3-2 shows that industrial, interruptible, and large volume customer classes also experienced a reduction in revenue variability due to decoupling, although by progressively smaller percentages.

B. Review of Earnings Test and Rate Cap

Decoupling can also have revenue effects stemming from the earnings test and Three Percent Cap on rate changes due to decoupling, both provisions of CNGC's DMA. The evaluation questions addressed are:

What have been the results of the earnings test?

How often has the rate cap limited the increase in RS 594 rates?

Excess earnings are defined as earnings over the allowed rate of return. The earnings test is calculated to determine if there are excess earnings and if so, what is the amount of excess earnings. If excess earnings exist, CNGC shares 50 percent of the excess earnings with decoupled customer classes. As explained in Section 1, the earnings test is calculated before the rate cap so that customer surcharges due to decoupling are reduced by the amount of shared excess earnings. Customer credits due to decoupling are increased by excess earnings.

The decoupling settlement stipulates that the change in the decoupling rate cannot add more than 3 percent to expected revenue before the change. If necessary, decoupling rates are capped to a level that limits the expected change in revenue to 3 percent and the amount of revenue that was not allowed to be amortized in the new decoupling rate is carried forward. Table 3-1 shows the annual history of both the earnings test and the rate cap.

Table 3-3: Summary of Excess Earnings Test and Rate Cap

RS 594 Effective Nov 1st	Excess Earnings	Did the 3% Cap Come into Effect to Limit RS 594 Rates				
		Residential (RS 503)	Commercial (RS 504)	Industrial (RS 505)	Large Volume (RS 511)	Interruptible (RS 570)
2017	$0	No	No	No	No	No
2018	$0	No	No	No	No	No
2019	$0	No	No	No	No	No
2020	$0	No	No	No	No	No

As shown in Table 3-3, the application of the excess earnings test has shown zero excess earnings for every period since the DMA has been in effect[34]. Table 3-3 shows that the 3 percent cap on annual rate increases from the decoupling rate has not resulted in limiting RS 594 rates for any customer class in any period.

C. Summary – Analysis of Revenue Effects

CNGC's decoupling mechanism has had a stabilizing effect on revenue, reducing variability by over 20 percent for residential and commercial customer classes and between 3 percent and 13 percent in industrial, interruptible, and large volume customers. Overall CNGC revenue variability has been reduced by 15 percent due to decoupling.

The excess earnings test has shown that earnings have not exceeded the authorized ROR, resulting in zero excess earnings in each period since the DMA was established. The 3 percent cap on annual rate increases from the decoupling rate has not resulted in limiting RS 594 rates for any customer class in any period.[35]

Because the earnings test and the rate cap have never come into play, it is not possible to see how certain features of the DMA were applied operationally. For example, when excess earnings are present, how is the 50 percent that is shared back to the customer actually split between the customer classes? Regarding the 3 percent cap on rate changes due to decoupling, should the cap be calculated at the customer class level or for all customer classes combined?

Recommendation: We recommend that the 3 percent cap, when applicable be applied, to each customer class. In our assessment an objective of a rate cap is to limit rate shocks due to decoupling. If a rate increase due to decoupling is limited to 3 percent for all customers on

[34] The details of the earnings test are shown in Section 1 for each period that the DMA has been in effect.

[35] The results shown in Table 3-3 are based on CNGC DMA filings. While working with CNGC on this evaluation, CNGC submitted documents to our team showing that the 3 percent rate cap should have been applied to RS 594 rates effective November 1, 2019 (GP-51 DMA 3 Percent Test.xlsx). This would have had the result of limited the RS 594 rate increase for residential (RS 503), commercial (RS 504), and Large Volume (RS 511) customer classes effective November 1, 2019. It would have also had the effect of increasing RS 594 rates effective November 1, 2020 for these same customer classes over the RS 594 rates actually filed for 2020. These two differences in what RS 594 rates would have been had the 3 percent cap been applied in 2019, lower in the 2019 filing and higher in the 2020 filing, balance each other out and have no ongoing impact on RS 594 rates. CNGC is positioned to apply the 3 percent rate cap in future DMA filings.

average yet one or more customer classes experience significantly higher increases, then the objective of limited rate shocks may not be realized.

Section 4. Low-Income Billing Impacts

In this section the billing impacts of the decoupling mechanism adjustment on low-income customers is examined. We also contrast those impacts with the residential customer class as a whole. The following objectives are addressed in this section:

- Summarize annual rate impacts of the decoupling tariff (RS 594) on the group of customers identified by CNGC as low-income.
- Compare and contrast the average impact of the decoupling tariff (RS 594) on low-income customers and CNGC's residential customer class as a whole.

A good place to start the discussion is with the question of how to define CNG'Cs low-income customers. Because this section relies on customer billing records, it is important to have a definition of low-income that can be applied to the customer information system. We refer to this group as the known low-income population and includes customers who have received bill payment assistance through one or more of the following programs: the Washington Energy Assistance Fund (WEAF), the Federal Low-Income Heating Energy Assistance Program (LIHEAP) and the CNGC's Winter Help program"[36].

For the purposes of this section, we use the known low-income population for analysis and comparison to the residential customer class as a whole. CNGC pulled account-specific billing records for low-income customers from their customer information system. Customer usage and revenue information was included for billing periods for which the customer participated in one or more low-income programs. Annual average low-income customer counts summarized from the account level data provided are shown in Table 4-1 below. Total residential customer counts as reported in Section 2 are also shown in the Table 4-1.

Table 4-1: CNGC Residential and Low-Income Customer Counts by Calendar Year

Year	Residential	Low-Income	Percent
2014	176,024	4,375	2.5%
2015	178,466	4,697	2.6%
2016	181,087	4,712	2.6%
2017	183,980	4,606	2.5%
2018	187,705	4,397	2.3%
2019	191,561	4,110	2.1%

The number of low-income customers on the CNGC system during this six-year period has varied between 4,110 in 2019 to 4,712 customers in 2016.[37] This amounts to 2.1 percent to 2.6 percent of the total residential customer class.

[36] These programs are discussed in more detail in Section 8 this report, Low-Income Weatherization. It is understood that the low-income population is much larger than the participants in the referenced programs.
[37] References to the CNGC system refer to operations in the state of Washington, the scope of this evaluation.

Our reporting and analysis of decoupling rate impacts for low-income customers includes a comparison to the residential customer class on average and begins with a review of average annual usage per customer.

A. Average Use per Customer – Annual Comparison

Due to the influence of use per customer on decoupling deferral balances, we begin our discussion with a comparison between low-income and all residential use per customer. Figure 4-1 shows natural gas use per customer for all residential and low-income customers.

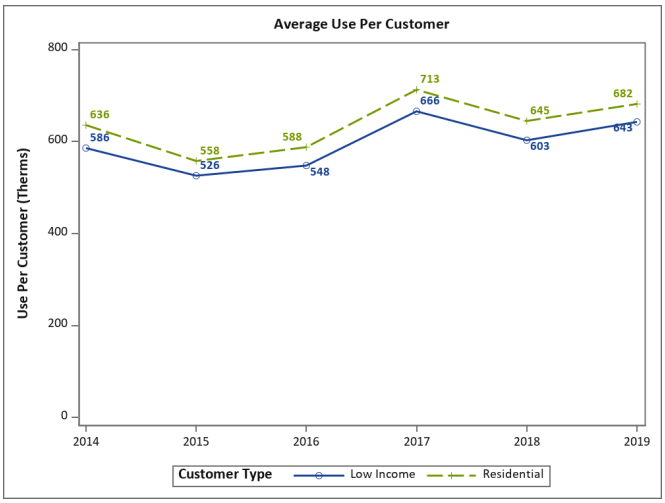

Figure 4-1: Annual Natural Gas Use per Customer, Low-Income and Average Residential

Natural gas use per low-income customer is consistently lower than the average residential customer. Low-income use per customer averaged about 40 therms (6.5%) lower than average residential usage. This means that low-income natural gas customers will have less exposure (lower rebates and surcharges) to the decoupling rate (RS 594) than the average residential customer.

Average customer revenue and decoupling tariff revenue from RS 594 is shown in Table 4-2 for the first two complete calendar years after rate RS 594 became effective (2018 and 2019). As explained in Section 1, decoupling adjustment rates first became effective November 1, 2017. Accordingly, impacts of RS 594 on billed revenue in 2017 are small.[38]

[38] In 2017 RS 594 added $0.13 and $0.15 to the average annual natural gas bill of low-income customers and all residential customers, respectively.

Table 4-2: Comparison of Average Annual Billed Revenue per Customer

Customer Group	2018 Calendar Year			2019 Calendar Year		
	Revenue	Schedule 594 Revenue	Percent of Bill	Revenue	Schedule 594 Revenue	Percent of Bill
Low-Income	$573	-$3.15	-0.6%	$579	-$12.83	-2.2%
All Residential	$604	-$3.55	-0.6%	$614	-$13.14	-2.1%
Difference	-$32	$0.39	0.0%	-$34	$0.32	-0.1%

In 2018 Schedule 594 charges credited $3.15 to the average low-income customer bill and $3.55 to the average bill for all residential customers. The slightly lower absolute Schedule 594 amount for low-income customers relative to all residential customers is explained by the slightly lower use per customer of low-income customers. As a percent of bill, there was no difference between the impact of RS 594 on low-income customers and all residential customers.

Schedule 594 credit during calendar year 2019 was significantly higher than calendar 2018, with a rebate averaging about $13 per customer for both low-income customers and the residential customer class as a whole. The increase over 2018 was due to the normal functioning of the decoupling mechanism as detailed in Section 1. On a percentage of bill basis, there is no meaningful difference in RS 594 charges between the two groups of customers. Low-income customers received just under $13 from RS 594 credit in 2019 compared to just over $13 for all residential. This is consistent with lower use per customer of low-income customers. Lower use per customer also means that low-income customers will pay lower charges than all residential when the RS 594 rate for residential customers is positive.

B. Average Use per Customer – Monthly Comparison

Monthly use per customer for six years of history is shown in Figure 4-2 for low-income and the residential customer class as a whole.

Higher usage for all residential customers compared to low-income customers that was shown in the annual data is also evident in the monthly use per customer data in Figure 4-2. Both customer groups exhibit the pattern of highly weather dependent usage with use per customer four to five time higher during peak winter months compared to summer months. Although both customer groups appear to have similar monthly usage in the summer, low-income customers have lower winter usage on average. Lower winter usage is likely due in part to low-income households occupying smaller homes.

Monthly revenue per customer for six years of history is shown in Figure 4-3 for low-income and the residential customer class as a whole.

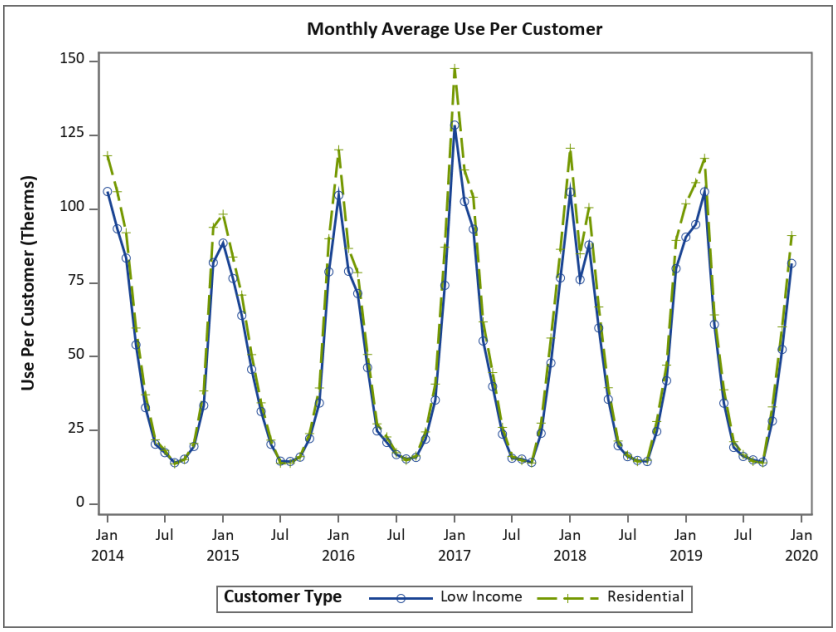

Figure 4-2: Monthly Use per Customer, Low-Income and Average Residential

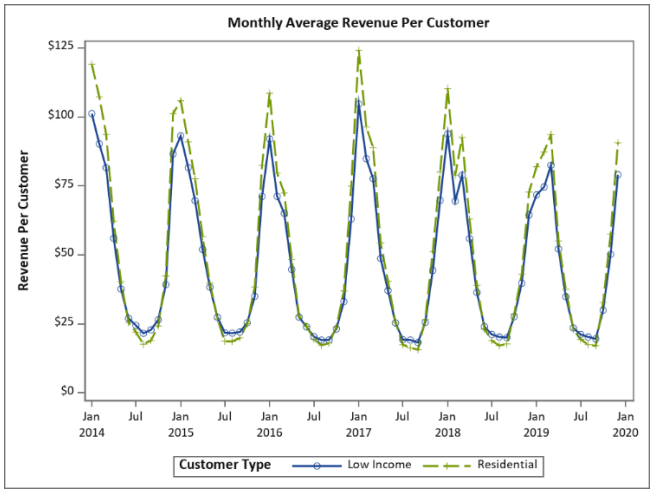

Figure 4-3: Monthly Billed Revenue per Customer, Low-Income and Average Residential

The seasonal pattern in average customer bills is similar for both customer groups and reflects the seasonal pattern in usage shown in Figure 4-2. Average monthly bills run about $20 to $25 during the summer months and $75 to $125 during winter months, depending on the weather. Low-income customers have lower usage and lower average monthly bills during winter months compared to the residential customer class as a whole.

Average monthly RS 594 charges are shown in Figure 4-4 for the first decoupling rate-year (November 2017 through October 2018) for low-income and all residential customers. These charges reflect the impact of decoupling that customers actually see on their monthly bills.

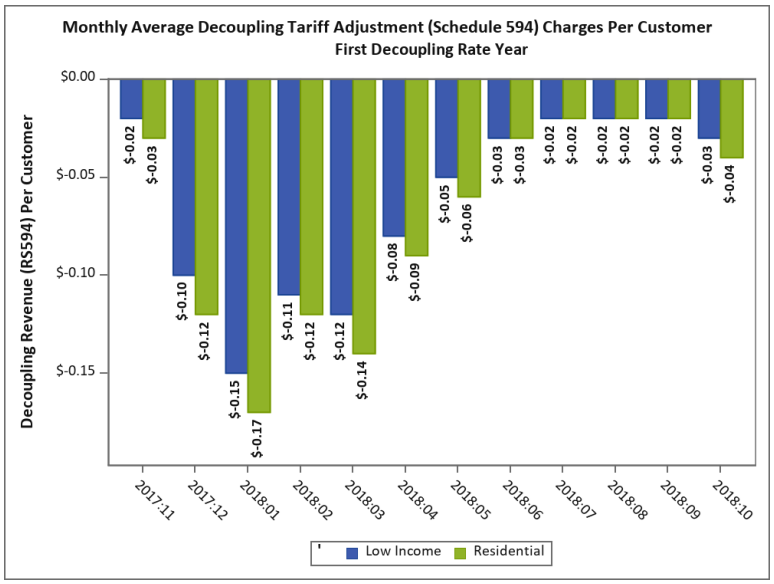

Figure 4-4: Monthly RS 594 Charges per Customer (Nov 2017 – Oct 2018)

Perhaps the biggest takeaway from Figure 4-4 is that the impacts from the decoupling tariff (RS 594) is very small during the first decoupling rate-year. This is due to the low RS 594 rate per therm for residential during the first rate-year, effective November 1, 2017.[39] RS 594 charges are based on usage and follow the same seasonal pattern as use per customer. Monthly RS 594 credit ranged from a few cents per customer in the summer months to a high in January 2018 of 15 cents for low-income customers and 17 cents for all residential customers.

RS 594 charges as a percent of customer bills is shown in Figure 4-5. RS 594 reduced bills by less than two-tenths of a percentage point during the first decoupling rate-year. The percentage dips in summer months when volumetric charges are low relative to the fixed monthly customer charge.

[39] As explained in Section 1, RS 594 rates are adjusted each year based on the cumulative difference between actual and allowed margin revenue during the previous calendar year, as well as other factors such as interest rates. A partial year (September 1, 2016 through December 31, 2016) was used to calculate the first RS 594 rate that took effect on November 1, 2017. Use of a partial year on which to base RS 594 rates contributed to keeping the magnitude of RS 594 charges small during the first rate-year. See Section 1 for more information.

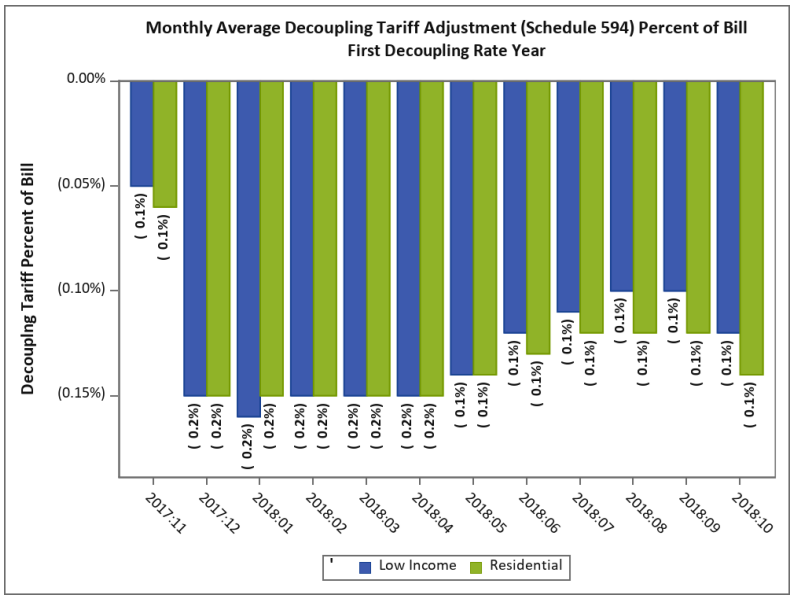

Figure 4-5: Monthly RS 594 Percent of Customer Bill (Nov 2017 – Oct 2018)

Average monthly RS 594 charges are shown in Figure 4-6 for the second decoupling rate-year (November 2018 through October 2019) and the first two months of the third decoupling rate-year (November 2019 and December 2019). Because RS 594 rates are effective November 1st of each decoupling rate-year, including the last months of calendar year 2019 shows both the second rate-year and the impact of the new rate level for the first two months of the third rate-year.

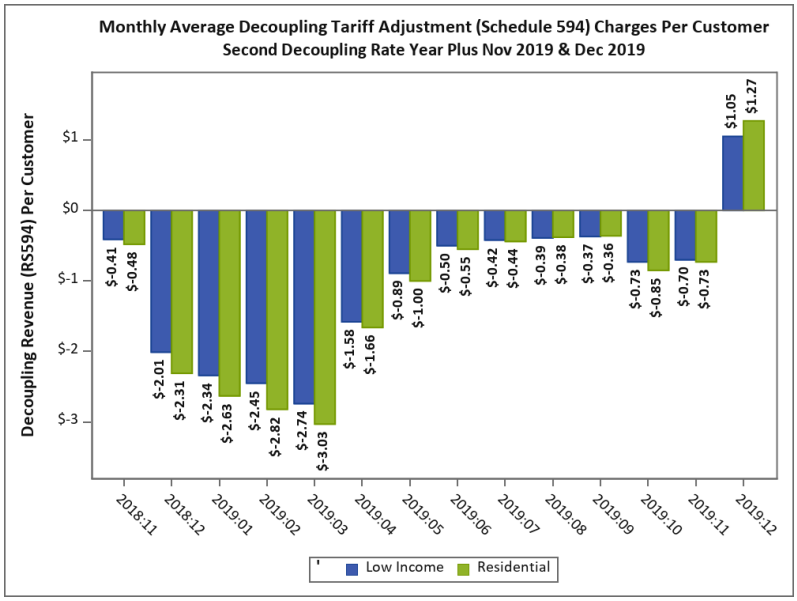

Figure 4-6: Monthly RS 594 Charges per Customer (Nov 2018 – Dec 2019)

Average monthly rebates from RS 594 were higher in the second rate-year compared to the first, reaching a peak in March 2019 of $3.03 for the average residential customer and $2.74 for the average low-income customer. RS 594 charges follow the seasonal pattern of usage with low summer charges and higher charges during the winter heating season. During the summer months RS 594 reduced bills between $0.36 and $0.55 a month. The residential rate for RS 594 is positive during the third rate-year, effective November 1, 2019. This indicates a customer surcharge from cumulative decoupling deferred revenue over the 2018 calendar year. Because of billing cycles, November billing data reflects a blend between RS 594 rates in effect in October 2019 and the new rate effective in November 2019. The December impact of RS 594 on customer bills reflects the full impact of the new RS 594 rate and shows an average rebate per customer of $1.05 for low-income customer and $1.27 for all residential customers.

RS 594 charges as a percentage of the customer bill are shown in Figure 4-7 for the second decoupling rate-year (November 2018 through October 2019) and the first two months of the third decoupling rate-year (November 2019 and December 2019).

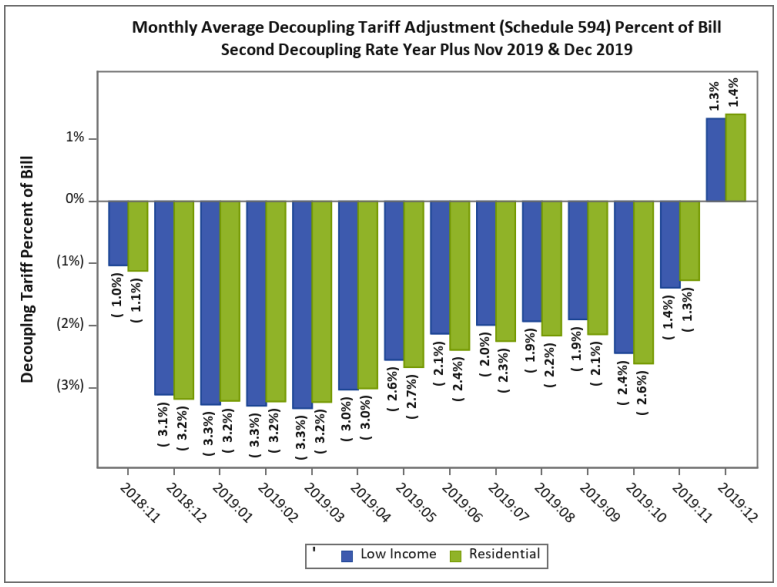

Figure 4-7: Monthly RS 594 Percent of Customer Bill (Nov 2018 – Dec 2019)

Charges from RS 594 during the winter months of between -$2 to -$3 per month per customer is between -3.0 percent and -3.3 percent of the total monthly bill. This is true for low-income customers and all residential customers. During the summer months RS 594 charges as a percent of customer bills dropped in absolute terms to between 1.9 percent and 2.4 percent. In summer months gas usage is relatively low and the fixed customer charge makes up a much higher proportion of the total bill. This causes volumetric charges to be lower in absolute amounts during the summer months and also lower as a percentage of the total bill compared to winter months. The positive RS 594 residential rate effective November 1, 2019 is evident in Figure

4-7 by the 1.3 percent and 1.4 percent percentage of billed revenue in December 2019 for low-income and all residential customers, respectively.

C. Summary – Low-Income Billing Impacts

The decoupling deferral tracker adjustment (RS 594) has had a relatively small impact on low-income customer bills. In 2018 the average low-income customer received a rebate of $3.15 in RS 594 charges.[40] These rebates amounted to 0.6 percent of the average low-income natural gas bill. In 2019 the average low-income customer received a rebate of $12.83 in RS 594 charges, 2.2 percent of the natural gas bill for the year. Calendar year 2020 will result in a surcharge to all residential customers as reflected by the positive RS 594 rate for residential effective November 1, 2019 and November 1, 2020.

On a percentage of bill basis there is no meaningful difference in decoupling charges between low-income and all residential customers. Low-income use per customer averaged about 6.5 percent lower than average residential usage over the last six years. This means that low-income customers have a 6.5 percent lower exposure (lower rebates and lower surcharges) to the decoupling rate (RS 594) than the average residential customer.

[40] 2018 is the first calendar year that decoupling rates were applied the full calendar year.

Section 5. **Low-Income Contrasts**

Low-income residential customers have been shown to have lower annual natural gas usage on average than other CNGC residential customers (see Section 3). Consequently, low-income customers are less exposed to volumetric based charges, including decoupling charges through RS 594, than are other residential customers. In this section we discuss the limitations of available data. Based on data from a relatively small geographic slice of the CNGC service area, we then contrast between low-income customers with other residential customers on several customer-specific characteristics. Finally, we discuss CNGC's plans for developing data that will allow for future analysis of low-income customers.

A. Available Data

Our team approached this task by first exploring the possibility of obtaining housing attribute data such as size and vintage of construction directly from CNGC customer information system or from secondary sources such as the US Census. CNGC does not maintain housing attribute data within their customer information system. We also explored using the American Community Survey (Census) and American Housing Survey (HUD) but found the data details did not provide the ability to drill down and compare households by income levels, energy usage and housing attributes at the same time.

We next considered the possibility of using customer-specific housing attribute data acquired for a single Washington county as part of a project our team completed for CNGC in early 2020. This project included merging customer-specific records obtained directly from the Yakima County Assessor's Office and merging the data with CNGC's customer information. This data set has the advantages of being readily available and developed for the purpose of understanding the unique characteristics of low-income customers and how those characteristics impact participation in the WEAF bill assistance program. The primary disadvantage is the limited geographic coverage of the data. Residential customers in Yakima county makeup about 14 percent of all CNGC Washington residential customers. It is understood that customer data from Yakima county cannot be considered representative of CNGC's Washington customer base as a whole. Still, the resulting database of nearly 30 thousand CNGC residential customers in Yakima County provides the ability to explore relationships in ways that would not otherwise be possible including comparisons of housing size, type, vintage, and energy intensity between low-income and other residential customers.

B. Overview of Yakima Dataset

The Yakima dataset is a site-specific match-merge of CNGC customer data with Yakima county assessor data. The merged data provides a rich set of variables for contrasts between low-income and other residential customers that would not otherwise be possible in this evaluation.

Table 5-1: CNGC Residential Customers with Assessor Data (Yakima County)

Classification	Customers	Percent
Low-Income	988	5%
Other Residential	20,592	95%
Total Customers	**21,580**	**100%**

A total of 21,580 residential customers were successfully matched to Yakima county assessor records that included living area square footage of the residence. Many other housing attributes are also available as a result of the match, but square footage is especially important in energy usage comparisons. The classification of low-income is based on participation in WEAF at any time over a five-year period immediately preceding the study (roughly 2014 through 2018).

From the assessor data we are able to examine parcel-level housing attributes, including square footage, year built, number of bedrooms, housing type, and market value. From this data, we also inferred certain variables as follows:

- Owner occupancy was assigned by comparing the physical address of the parcel with the mailing address of the owner. The overall results compare favorably with Census estimates for the County.
- When possible, heating fuel was assigned based on the heating method.

Accuracy of assessor data tends to be highest for variables such as square footage of the structure, number of bedrooms and year built. Variables related to heating and cooling equipment tend to be less accurate and are often unavailable for a parcel. In this section of the report references to "other residential" and "residential" customers are used interchangeably to mean all residential customers excluding low-income customers.

C. Energy Usage

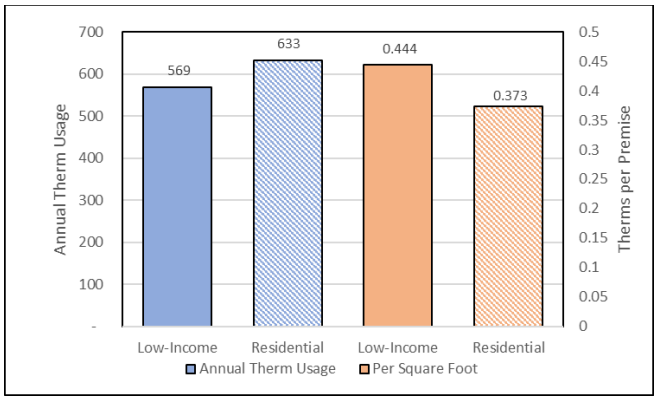

Figure 5-1: Annual 2018 Unadjusted Therm Usage per Customer (Yakima County)

Annual natural gas usage for 2018 by residential customer type is shown in Figure 5-1. Annual therm usage per customer for low-income was 10 percent lower than other residential customers in 2018. A similar relationship was found for the CNGC Washington service territory with low-income customers using 6.4 percent less therms annually than all residential customers. On a per square foot basis, natural gas usage is nearly 20 percent higher for low-income premises than for other residential customers. As will be shown below, low-income premises are significantly smaller on average than other residential customers. Possible explanations for the higher energy use per square foot are explored below.

D. Housing Characteristics

Housing characteristics obtained from Yakima County Assessor records are shown in the table below. Mean values and differences between the two residential groups are shown for each of the characteristics listed.

Table 5-2: Comparison of Housing Characteristics (Yakima County)

Characteristic	Measure	Low-income	Residential	Difference	Percent Difference
Year Built	Mean	1943	1964	-21	
Finished Sq. Feet	Median	1,246	1,686	-440	-26%
Market Value	Median	$122,000	$197,500	($75,500)	-38%
Market Value Per Sq. Ft.	Median	$98	$117	($19)	-16%
Number of Bedrooms	Mean	2.8	3	-0.2	-7%
Owner Occupancy	Mean	68%	79%	-11%	
Air Conditioning	Mean	34%	63%	-29%	
Fireplace	Mean	27%	56%	-29%	

Low-income homes are 21 years older than residential homes on average. Older homes are more likely to have less thermally efficient building shells than newer homes. The impact of this characteristic considered alone is to increase low-income energy usage per square foot relative to the residential group. Low-income homes are 440 square feet smaller on average compared to residential, a substantial 26 percent difference. Market value and market value per square foot are indicators of current quality of construction and building shell efficiency and suggest that low-income homes will use more energy than residential, all other things equal.

The number of bedrooms is not only another measure of size of home, but also a better correlate to size of household and baseload energy usage than is square feet. Fewer bedrooms in low-income housing suggest lower baseload energy usage than residential. Average size of households may also vary between the two groups. Additional housing characteristics are compared in Figure 4-1.

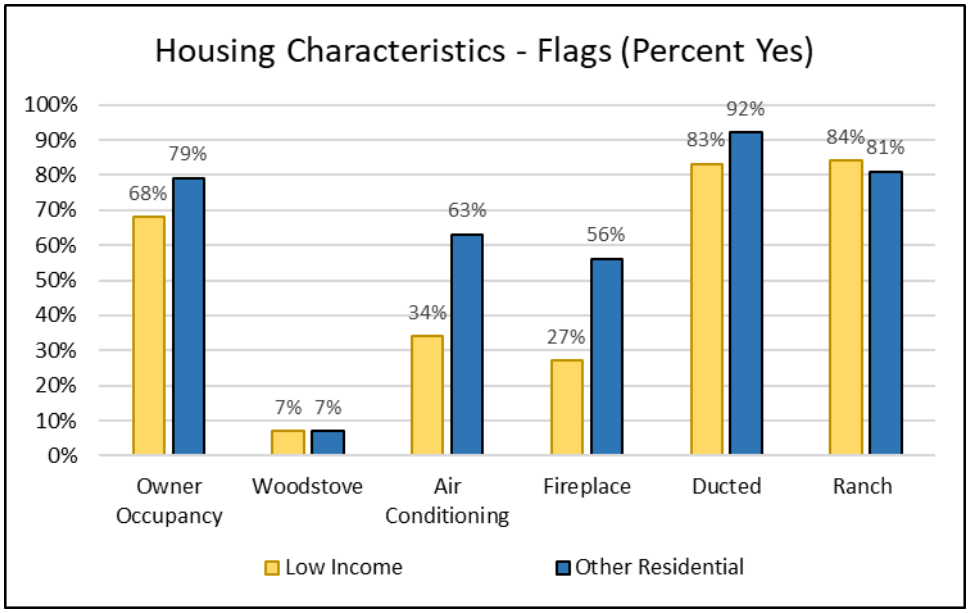

Figure 5-2: Housing Characteristics Present (Yakima County)

Owner occupancy is lower in low-income housing than it is in residential. This variable says more about the occupant's ability to make energy efficiency improvement decisions than it does about relative energy usage. Assessor data dealing with heating, ventilation, and air conditioning (HVAC) equipment is generally less reliable than square footage and year built. Still the data can be useful for comparing relative values between groups. Air conditioning is far less prevalent in low-income homes than it is in residential. This characteristic by itself does not impact natural gas usage but is indicative of the value of the housing stock.

E. Housing Type and HVAC Equipment

Housing unit type was available from the CNGC customer information system. The distribution of CNGC housing unit type is shown in Table 5-3 for the 21 thousand CNGC residential customers matched to Yakima County assessor data.

Table 5-3: Housing Unit Type – CNGC Data Yakima County

Housing Type	Low-Income	Residential
Apartment	12.9%	12.4%
Duplex	1.2%	1.4%
Single Family	85.9%	86.1%
Total	**100%**	**99.9%**
Note: Columns may not total to 100% due to rounding.		

Interestingly, low-income, and residential customers have almost identical distributions by housing unit type. Building type data from the Yakima Assessor also showed similar distributions between low-income and other residential. Typically, the housing type distribution for low-income customers is more heavily skewed toward multi-family units and fewer single-family units. Reasons for the near identical distribution between low-income and other residential customers may include fewer multifamily complexes in Yakima county than found in a more urban region.

F. Summary – Low-Income Contrasts

In this section housing attributes and energy usage of low-income and other residential homes are compared using a data set developed for analysis of low-income in Yakima County. The data set is comprised of CNGC customer data for over 21 thousand residential premises combined with Yakima County assessor data. Although the resulting data is single family centric, since multifamily units are not well represented in parcel-based tax assessor data, we do not consider this to be as large an issue in natural gas as it is in electric due to the greater frequency of all electric units in multifamily complexes. Notwithstanding these limitations, the data provide a rich set of information for insights between the differences of low-income and other residential premises.

Low-income customers in Yakima County used 10 percent less natural gas annually per premise in 2018 than other residential customers. This is consistent with findings for CNGC's Washington service area as a whole which showed 6.5 percent lower usage in low-income homes. Low-income homes were also substantially smaller. With lower use in smaller homes, natural gas use per square foot in low-income homes was about 20 percent higher than for other residential customers. Analysis to determine why this is the case is beyond the scope of this evaluation, but older and less efficient building shells is at least part of the explanation.

CNGC is currently developing more robust data as part of their energy efficiency market potential analysis. These data will be more geographically and socio-economically detailed and are expected to help provide a deeper understanding of low-income customers.

Section 6. **Conservation Programs**

This section is focused on conservation achievement during decoupling (2016 through current data). An argument sometimes put forward against decoupling is that, while decoupling may remove the major disincentive to energy conservation, it does not incent energy conservation so conservation effort might lag during decoupling. If this argument were correct, then utility work towards energy conservation and energy efficiency would remain stable or diminish during decoupling. Here we look first at conservation spending, then at conservation achievement, and then report the planning projections for savings in the remaining decoupling years.

A. Conservation Portfolio Spending

CNGC's overall conservation portfolio spending by year is graphed in Figure 6-1: Overall Conservation Portfolio Spending by Year. As shown in the graph, overall conservation portfolio spending moved up both in the prior pilot decoupling (2008-2010) and in the current decoupling (2015-2021).[41] Conservation spending is the substantive variable over which CNGC has the most control. CNGC does not have direct control of customer uptake – rebate dollars spent - so conservation spending is driven by CNGC effort to drive uptake.

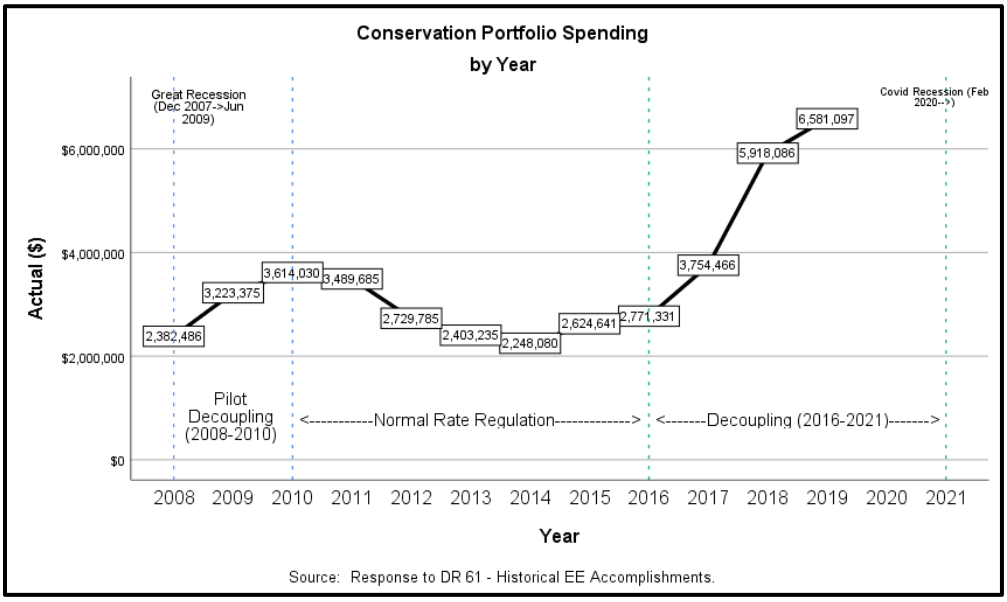

Figure 6-1: Overall Conservation Portfolio Spending by Year.

[41] If we consider planning targets, conservation achievement (therms saved), and conservation spending as indicators for level of effort, conservation spending is the most important indicator because CNGC has control of spending and spending indicates practical effort. Conservation achievement also represents practical effort, but CNGC has much less control of this variable because for both commercial and residential sectors the job mixes, measure mixes, and cost-benefit rules can vary considerably from year to year. Achievement represents practical effort, but as mediated by engagement with many real-world contingencies. Planning represents intent, but of the three variables it is likely the weakest indicator of level of effort.

Conservation spending by year is disaggregated into commercial/industrial sector (Figure 6-2) and residential sector (Figure 6-3). As shown in these figures, both graphs show the same pattern as the overall conservation portfolio spending graph.[42]

B. Commercial/Industrial Conservation Spending

As shown by the shape of the graph in Figure 6-2, commercial/industrial conservation spending by year shows an upwards trend in the prior decoupling pilot (2008-2010) and during the current decoupling.[43] Looking forward, and not shown in the graph, for 2020, data which is currently in preparation by CNGC will show lower than planned commercial/industrial uptake and lower costs due to closed businesses during the recession.

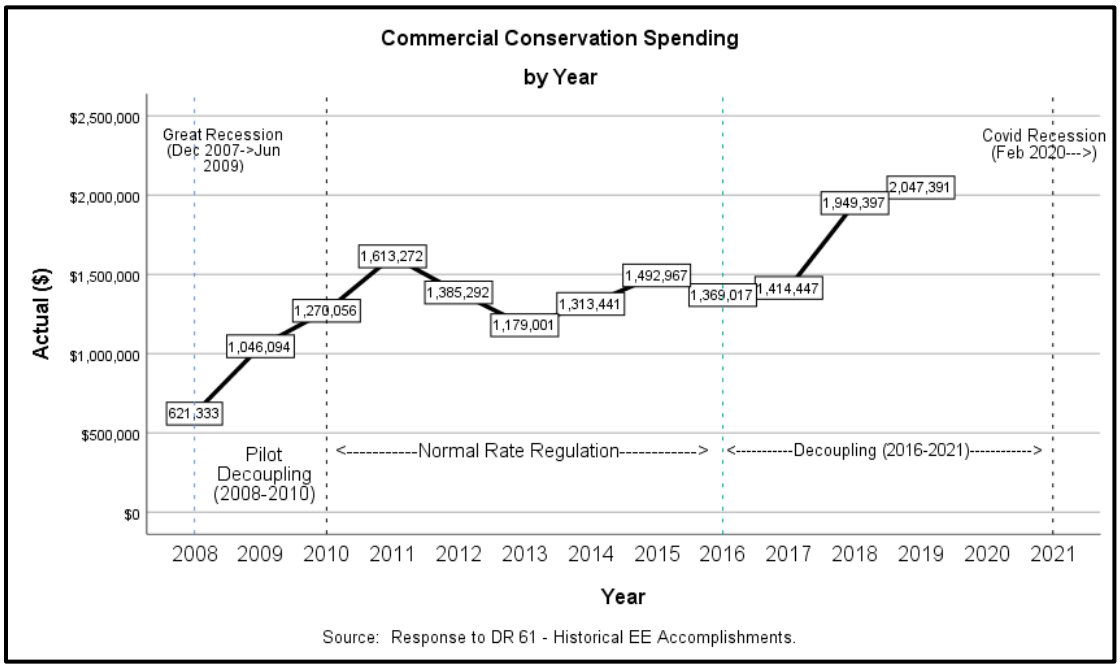

Figure 6-2: Commercial Conservation Spending by Year.

[42] Overall spending includes conservation spending outside the residential and commercial programs, for example for regional conservation relationship efforts. Residential spending shown here does not include low-income programs. Commercial spending is commercial program spending. For source data, see Response to DR 61 – Historical EE Accomplishments.

[43] The 2008-2010 decoupling pilot overlapped with the Great Recession and the current decoupling overlaps with the COVID Recession. Both recessions and how they end likely have strong exogenous effects on program results. The COVID Recession creates a number of program barriers, but when the federal level of government provides meaningful support to households, businesses, and state government public welfare functions - then the federal relief and stimulus can overcome these barriers and sometimes also overcome longstanding equity problems to establish a higher level of social welfare. The model for this is the Roosevelt administration during the Great Depression, and to a lesser extent (due to blocking of all but the first wave of relief/stimulus by the other party) the Obama administration programs of the Great Recession. It remains to be seen whether the Biden/Harris administration will be able to implement meaningful relief/stimulus similar to the Roosevelt administration and also if it will be able to proceed to structure a meaningful public health response to the ongoing COVID Recession).

C. Residential Conservation Spending

As shown by the shape of the residential conservation spending curve graphed in Figure 6-3, residential conservation spending by year trended upwards in the prior decoupling pilot (2008-2010) and, similarly, is trending upwards during the current decoupling. Not shown in the graph, residential year-end results for 2020 which are in preparation by CNGC will show that residential effort exceed goal and will continue the upward trend in the spending curve.

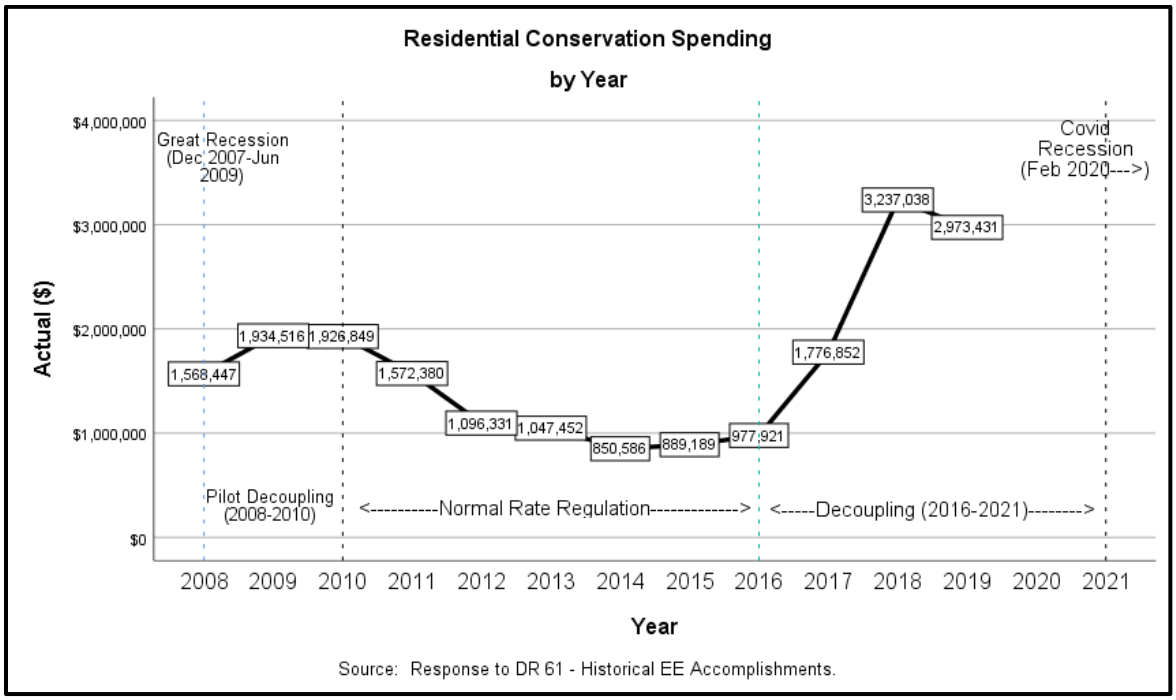

Figure 6-3: Residential Conservation Spending by Year.

D. Summary – Conservation Spending

Conservation spending for both the residential and commercial/industrial sectors increases during decoupling.

Section 7. **Conservation Achievement**

At first glance the therms achieved by year for the overall portfolio does not suggest a stable pattern (Figure 7-1). However, disaggregated by sector, the instability is in the commercial performance (the red curve in Figure 7-1) while the residential performance is regular and well-behaved (green curve in Figure 7-1). It is the "jaggedness" or "lumpiness" of the commercial curve that is reflected in the overall conservation portfolio curve.

A. Pattern & Trend

For energy conservation programs, a jagged or "lumpy" commercial curve is not a-typical, since commercial curves are often irregular.[44] This is usually because commercial work is more "lumpy" than residential work. To put it another way, though residential jobs can include different dwelling types, commercial jobs include all kinds of commercial and industrial business and different business sizes. Because commercial projects can be larger size than residential, one or two large projects can shape a curve for a given year. Also, because commercial projects often stretch over more than one year to completion (so jobs started in a year may be credited in the following year), variation from year to year tends to be high. Residential jobs tend to be more uniform, and they do not normally take more than a few months to complete, so their conservation achievement curves tend to be smooth in comparison with commercial conservation achievement curves.

For the purposes of this section, the question is whether or not conservation achievement trends upward in decoupling years. The answer is, yes. For the decoupling beginning in 2016, both the commercial and residential sectors show a strong upward trend in conservation achievement (right side of Figure 7-1).[45] The residential curve is shown using green dots; the commercial/industrial curve is indicated using red dashes, and the curve for the overall portfolio is a solid blue line. Therm savings values corresponding to the curves in Figure 7-1 are listed in Table 7-1.

For context, the programs took a more strategic approach on the C/I side to how the vendor (TRC Companies), addressed the custom vs. prescriptive program offerings. They focused on the prescriptive uptake and increasing this more dependable therm savings bucket because the custom projects do have more variability and the program did not want to rely so heavily on these fluid projects.

Both conservation spending and conservation achievement tend to increase and remain higher in decoupling years.

[44] Smoothing out commercial curves requires doing many more jobs per year or doing small bits of more buildings, but doing small bits is in tension with going after deep savings, so some "lumpiness" has to be accepted.
[45] The COVID recession will act as a strong outside force on conservation achievement, beginning in 2020. Initially, this will constrain achievement. However, if the Biden/Harris administration is not blocked in its social program relief/stimulus efforts by the other party, it is likely that there will be increased federal support and better funding to the state for conservation programs and this will facilitate CNGC conservation program efforts.

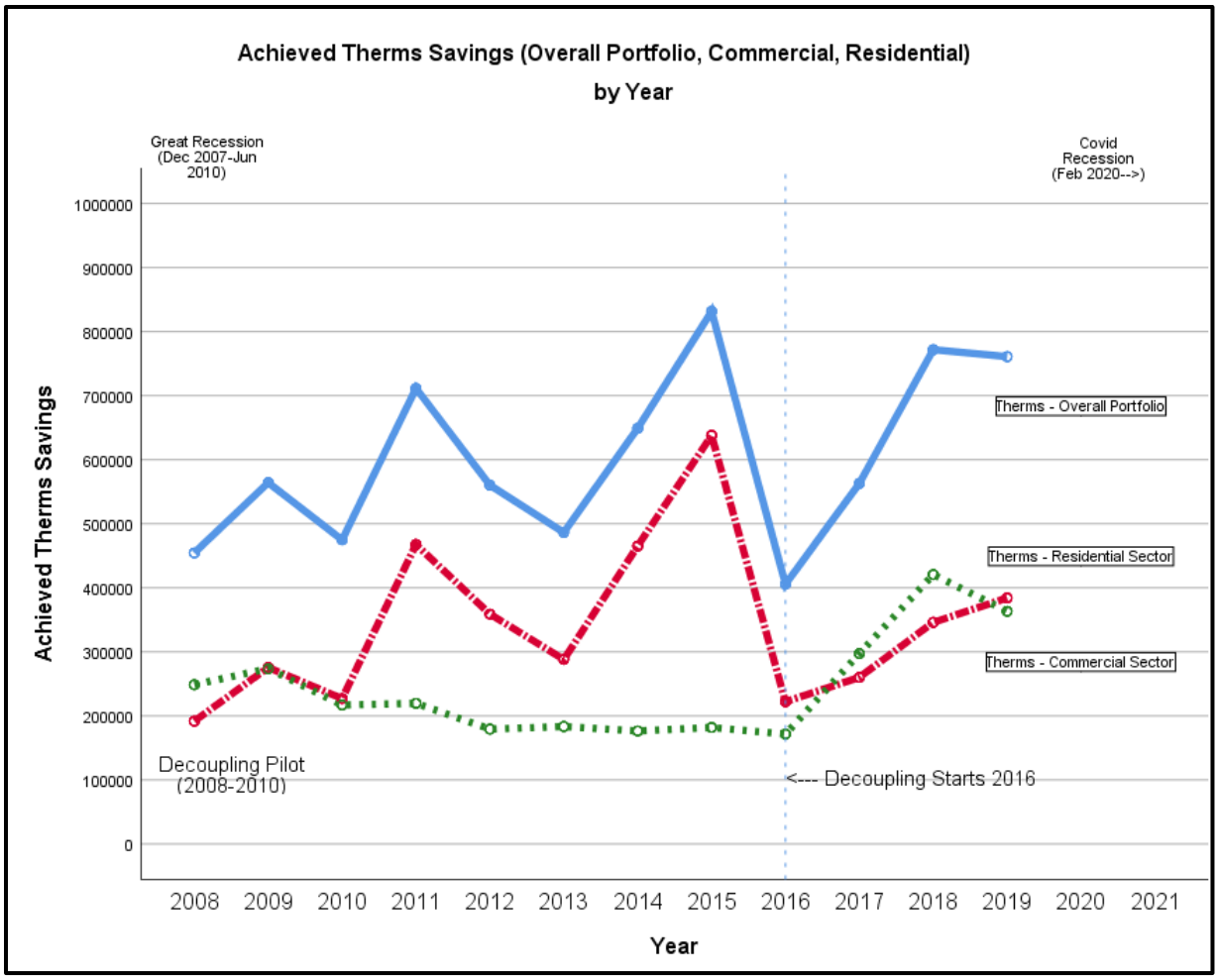

Figure 7-1: Achieved Therms by Year.

The year 2020 will be interesting since the COVID Recession officially begins in February 2020, leaving January 2020 as the only normal month in that year. It is typically the case that external forces operating on energy conservation programs are stronger than the tractable variables under program control.[46] The year 2020 presents major challenges to program delivery. Much now depends on the federal response in providing relief/stimulus to households and businesses and providing funds to the states to support public welfare during the emergency.

[46] So long as exogenous forcing is relatively stable, controllable program variables do control a program within the given structure. When major factors in the program environment change, exogenous forcing can overpower control tools available to program administrators, managers, and/or program delivery agents.

Table 7-1: Therm Savings by Year.

Conservation Achievement by Year					
Year	Therm Savings				Regulatory Process
	Overall Portfolio	Commercial	Residential	Low-Income	
2008	454,480	191,837	248,658	13,985	Prior Decoupling Pilot (Dec 2007-Jun 2010)
2009	564,170	275,604	273,833	14,733	
2010	474,825	227,017	216,999	30,809	
2011	711,383	467,657	219,596	24,130	Regular Rate Regulation
2012	560,157	359,003	179,330	21,824	
2013	486,391	288,079	183,352	14,960	
2014	648,953	465,176	176,439	7,338	
2015	831,501	637,930	181,847	11,724	
2016	405,557	222,194	171,620	11,743	Current Decoupling
2017	562,956	260,176	297,216	5,564	
2018	771,819	345,999	420,639	5,181	
2019	760,956	384,176	363,364	13,416	

Though results for 2020 and 2021 are not available, CNGC's projections indicate a strong intent to continue to build conservation therm savings, year by year (Table 7-2).

Table 7-2: Planned Therm Savings.

Targeted Therm Savings for 2020 and 2021					
Year	Therm Savings				Regulatory Process
	Overall Portfolio	Commercial	Residential	Low-Income	
2020	726,625	387,824	327,801	11,000	Current Decoupling
2021	1,062,647	578,483	471,164	13,000	

B. CNGC Conservation

The distribution of therms saved by year is shown in Figure 7-2. From 2016 through 2019, commercial and residential sectors have been running about fifty percent of energy savings, with residential ranging between 42.3 percent to 54.5 percent and commercial from 54.8 percent to 56.2 percent, depending on the year. During this time span, low-income has ranged between 2.9 percent and 0.7 percent, depending on the year.

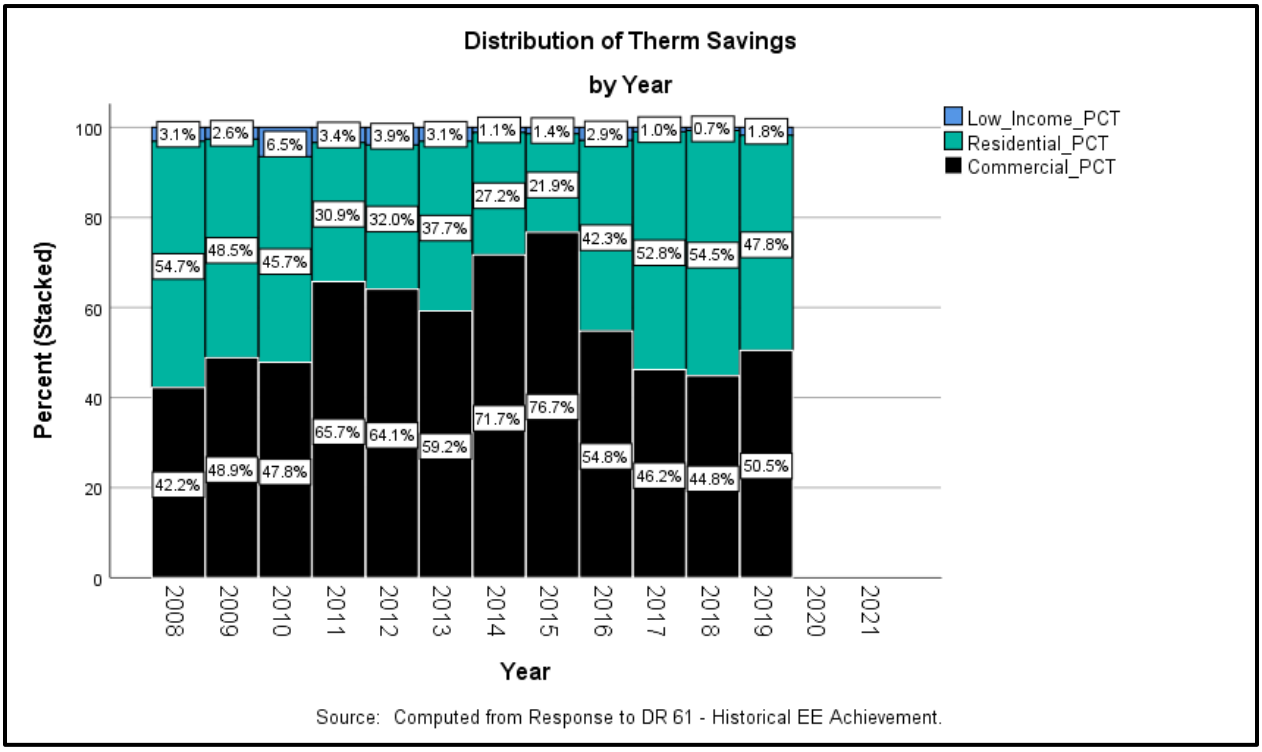

Figure 7-2: Distribution of Therms Saved Each Year.

Each year, CNGC files an Annual Conservation Achievement Report, providing information on goals and therm savings achievements. It also reports performance on the Total Resource Cost Test and the Utility Cost Test (Program Administrator's Cost Test), along with the long-term discount rate used for purposes of program reporting.

We have noted the "jagged" or "lumpy" nature of the commercial therms saved curve, and the tendency for commercial/industrial projects to complete in a subsequent year. Cascade addresses this typical phenomenon for commercial curves in the 2014 Conservation Achievement Report ("As holds true from past years, programmatic achievements in the Commercial and Industrial sectors are dependent upon a few critical deep therm-savings projects. It is also common for commercial and industrial projects to stretch beyond the program year in which they were initiated.")[47] Also, in 2015 ("…the 2015 program year yielded higher savings in the C&I sector than in 2014 with several major projects concluding.") Working with the Conservation Advisory Group, CNGC moved to a "paid date" method for recording projects in 2015, which fixes the part of the carryover problem between years.

Incentive levels were studied in 2016, with the goal of encouraging more participation, and there was a focus on particular measures. In 2017, in response to recommendations from Commission Staff under Docket UG0161253, CNGC added a new reporting category, Direct Benefit to

[47] Dependence of C/I results on a few projects with deep savings was again noted in 2016, 2017 and 2018.

Customer (DBtC) ratio, with a target of 60 percent of expenses being attributed as a direct customer benefit. Also, CNGC contracted with Applied Energy Group (AEG) to perform a Conservation Potential Assessment Study; the study was released in the second quarter of 2018. In 2018, CNGC additionally focused on increasing C/I prescriptive program participation to assist in smoothing out the "jaggedness" of the C/I therms savings curve.

Furnaces continued as the most prevalent residential measure in 2018, and there was an uptake in tankless water heaters. In 2018, CNGC notes work with NEEA to introduce alternative high-efficiency water heater measures to the portfolio as they mature, and work with trade allies to promote upstream rebates. In 2019, deemed savings per install were reduced on average by approximately 15 percent, based on the last Conservation Potential Study performed by AEG. Each year, the content and presentation of the Conservation Achievement Reports have become more complete. The 2019 Conservation Achievement Report includes:

- The year's conservation achievement by program and customer type
- Total expenditures for the year by program and customer class
- Cost effectiveness calculations
- Program evaluations completed during the calendar year.
- Program outreach

These reports also note development of Conservation Potential Studies and Load Forecasting tools, and regional work developed jointly with NEEA. A new Conservation Potential Study is planned for 2020/2021.

C. Summary – Conservation Achievement

Based on interviews, discussions, records, and responses to a series of data requests (DRs), we find that CNGC has established an excellent record of consistent good faith in fulfilling the overall portfolio, commercial/industrial and residential components of conservation program achievement throughout the span of the decoupling years to date. Conservation work has been engaged with vigor throughout decoupling. *There is zero indication of any negative effect of decoupling on energy conservation effort. For both commercial/industrial and residential sectors, conservation achievement has moved upwards in the decoupling years.*

In addition, review of CNGC management of the conservation effort indicates that CNGC's conservation effort is mature, reflecting effective interrelationships with regional conservation direction and methods, understanding of ongoing technical work to improvement measures (such as the new natural gas heat pump water heaters at the Gas Research Institute), and engaging consultants familiar with energy conservation practice at the national level and also familiar with how the Pacific Northwest and regional institutions engage energy conservation. At the executive level, the company has strength in seasoned understanding of (and orientation to) adaptive management, and at the manager and staff levels there is competence and good faith in implementing commission directives, regional guidance, and evolving practices that serve customers and meaningfully advance energy conservation.

Section 8. Low-Income Weatherization

In this section, we examine CNGC's low-income weatherization work, first outlining key results and contextual factors and then looking at engagement by CNGC to solve weatherization problems.

A. Number of Households Weatherized per Year

CNGC's low-income weatherization work has been solid over many years. The graph of CNGC's Washington households weatherized by year is shown in Figure 8-1. Notable features in Figure 1 are the recessions, the 2010 peak, the increase in number of weatherized homes during decoupling, and the small number of homes weatherized per year.

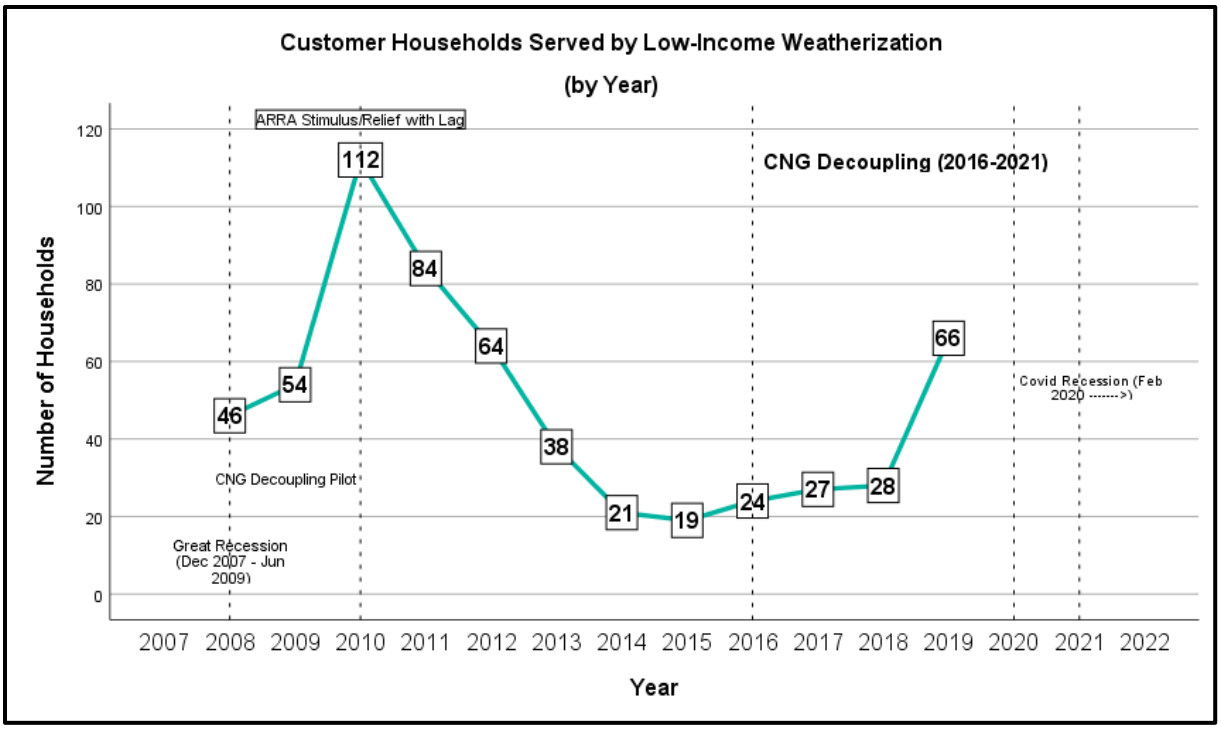

Figure 8-1: Low-income Households by Year.

- **Recessions:** Major recessions occurred during both the decoupling pilot and current decoupling.
    - **Great Recession:** In Figure 8-1, the Great Recession (December 2007 through June of 2009) is at the far left of the graph. The Great Recession, until the current COVID Recession, was the worst economic shock to the US economy since the

Great Depression (August 1929 to March 1933)[48]. CNGC's initial decoupling pilot (October 2007 through October 2010 (three years)) happened to be paired with the Great Recession.

- **COVID Recession:** At the far right of the graph in Figure 8-1, current decoupling runs from September 2016 through August 2021 (five years). The current decoupling got off to a good start prior to recession, but then happened to pair with the COVID Recession from February 2020 and forward.

- **Spike in 2010:** In Figure 8-1, a noticeable feature of the graph is the spike to 112 homes 2010. A likely cause is the American Recovery and Reinvestment Act (ARRA), coordinated changes in federal weatherization guidelines, and increased federal weatherization support to community action agencies. These provided additional incentive, flexibility, and capability in the community action agencies.[49] CNGC effort to help meet customer needs during difficult times in the Great Recession is another. ARRA was enacted in February 2009 (two years after the beginning of the Great Recession and four months prior to the official end of the recession). Although ARRA projects were to be "shovel ready," the new funding took months to get through federal and state processing to show up in on-the-ground projects, and some parts were delayed for a program year. These additional funds and program authorizations meaningfully boosted delivery capability of community action agencies. The pattern of a sharp increase in the number of households served, followed by gradual decrease tracks the pattern of relief funding. ARRA and related special funding gradually disappeared in the following years. ARRA money and changes in the United States Department of Energy's Weatherization Program (WAP) meant that, temporarily, Customer Assistance Program (CAP) agencies had more flexibility, better equipment, and more staff capability. They could handle more work, until the relief funds and the relief authorizations began to dwindle and end some years later.

[48] Official dates of the depression and the recessions do not correspond well to actual experience of businesses and households. Beginning dates can follow negative economic effects with a lag. End dates can be early, as the economy initially begins to improve. Many sectors of the economy may continue to experience negative economic effects beyond official end dates. We include the official dates rather than social experience dates for reference since they are official. The pattern is for relief efforts to follow the initial shock with a lag (relief starts late). However, relief efforts tend to continue beyond official end dates. The recessions that the Great Recession was "worse than" are: February to October 1945 (war demobilization); November 1948 to October 1949 (fed raised interest rates after the war too quickly); July 1953-May 1954 (fed tightened monetary policy too much following Korean War); July 1953-May 1954 (fed monetary policy); April 1960 to February 1961 (mild economic contraction); 1973-1975 (Arab oil embargo, run on gold when gold standard was ended, Nixon administration mistakes in wage-price controls); Jan-Jun 1980 and July 1981-Novmber 1982 (fed raised interest rates too and Iranian oil embargo); July 1990-March 1991 (deregulation of savings and loan banks); March to November 2001 (failure in regulation of dot-com industry, Y2K scare, and 9/11 attack). We tend to think of the economy as normal with occasional shocks and recovery. It may be more realistic and strategic, looking forward, to return to an earlier view that capitalist economies with poor protections for workers and general social welfare are inherently and likely increasingly unstable.

[49] Because CNGC partners with community action agencies, CNGC production for low-income weatherization is dependent on agency authorizations, priorities, and perspectives.

- **Likely Next Spike:** We do not yet see the (lagged) effect of COVID Recession funding and programmatic enhancements yet because they are too new, and there will likely be more. Federal program adaptations stemming from federal response to COVID in 2020[50] and the relief legislation passed at the end of December 2020 can be expected to show up in 2021. Results for 2020 will show a drop since program field work was, for a while, suspended, followed by serious efforts to catch up. The December 2020 COVID legislation effects will show up by the second half of 2021. If the new national administration is successful (not blocked by the other party or social instability) it is reasonable to expect a spike in weatherization numbers later in 2021 and in 2022.[51]

- **Increase during Decoupling:** The number of treated homes increased during the pilot (2009, 2010 compared with 2008) and, to date for the current decoupling (2016, 2017, 2018, 2019 compared with 2014, 2015).

- **Small Number of Homes Weatherized per Year:** The number of homes weatherized each year is relatively small. In recent years, the numbers are running in the middle to high 20's which is low compared with the years from 2008 through 2014 and small for the size of the company. Small numbers are likely largely driven by the interaction of three factors. The first is the dramatic reduction in the supply price of natural gas. The second is CNGC's reliance on independent community action agencies situated within the federal/state weatherization programs. The third is that natural gas weatherization work is more complex than electric.

    - **Reduction in Price of Natural Gas changes Cost-Benefit Test Results:** For natural gas companies, a primary benefit of introduction of large quantities of fracked gas has been a 30 - 40 percent drop in the commodity cost of natural gas due to advances in extraction technologies. This price drop is a straight pass-through to customers.[52] While a sizable and meaningful benefit to all customers, the benefit to low-income households is greatly increased relative to other customers due to their high energy burdens (share of household income that must

[50] The initial 2020 COVID relief/stimulus legislation reduced poverty. The bipartisan legislation included a $600/week unemployment booster and extended unemployment support to gig workers. The $600/week was equivalent to a 40-hour work week with a $15/hour wage, long a goal of the labor movement (though, currently the goal should be updated to $24/hour). For the duration of the initial 2020 COVID relief the most poorly paid workers who qualified experienced a decent wage for the first time. However, most support to businesses and workers from the initial legislation ran out by the end of July 2020. From August 2020 through the end of December, the political party in control of the Senate power blocked COVID relief. Weak COVID stimulus/relief was legislated at the end of December 2020, and since the Democrats control the executive, the House and the Senate, strong stimulus/relief is expected for 2021 and 2022.

[51] The ARRA stimulus was to be followed by two larger stimulus bills, but these were blocked by the other party (Source: Midwest Energy Efficiency Association annual conference presentation by federal weatherization officials.)

[52] There are important environmental, health and climate costs to fracking but these are not priced into gas supply costs.

be devoted to household energy use). The provision of much lower gas cost to customers has the effect of lowering avoided cost in cost-benefit calculations. When price has a sharp decrease, previously cost-justified weatherization measures (from before the price drop) can fail the tests.[53] Or incentives for some measures drop so much that community action agencies have to make up a substantial difference from other, less restricted, funding sources (though the measures are continued in the program).

- **Organization of Service Delivery:** To organize and implement weatherization work, CNGC can work through non-profit community action agencies, rather than through for-profit construction firms or an in-house weatherization work group.[54] This form for organizing service delivery provides multiple benefits to the company and to customers (for example, community action agencies are multiservice agencies that can link customer households to many other types of programs); also, melding of federal and utility funds (and other funding sources) provides options for structuring benefit-cost calculations that are otherwise not available.[55] However, community action agencies come with federal/state regulations and guidelines and organizational interests which generally, but not always, align with utility interests. In contrast, a for-profit service delivery agent has sharply clarified accountability, that comes from a single reporting relationship to the utility. The for-profit agent takes direction, priorities, and rules from the utility in a much more direct, hierarchical relationship.[56] Direct accountability also occurs when using in-house weatherization staff. When a utility works in coordination with a community action agency, it is like working together in a community setting. The possibilities for the utility to give direction are present but are limited.[57]

- **Community Action Agencies report primarily to the state.** The state is also responsible to pass through federal guideline and directives for programs that are partially federally funded. Though the Community Action Agency can have an additional reporting relationship to the utility, this is subordinate and is likely to be more like mutual participation and joint coordination than a clear reporting

[53] Sometimes there are bureaucratic lags and procedural factors that dampen and delay this effect.
[54] This is the pattern for utilities in Washington where utility weatherization work is coordinated with federal and state programs.
[55] Hill, Lawrence J. & Marilyn A. Brown, "Issues in Assessing the Cost-Effectiveness of Coordinated DSM Programs," *Utilities Policy*, Vol. 2, No. 1, Pp. 47-53, 1995; Hill, Lawrence J. & Marilyn A. Brown, "Estimating the Cost-Effectiveness of Coordinated DSM Programs," *Evaluation Review*, Vol. 19, No. 2, April 1995.
[56] When service delivery is organized for profit, there have been problems elsewhere with quality and completeness. There can be a tension between keeping up with completion rate targets to make profit goals and time allocation per site, including pressure to go light on health and safety checks. Non-profit community action agencies do not have profit as a primary goal. Their goals include completeness and full implementation of health and safety guidelines and protocols.
[57] Community Action Agencies report primarily to the state and the state reports to the federal level for programs that are partially federally funded.

relationship. Community Action Agencies come with federal, state, and agency priorities already built-in and unilaterally changeable by federal guidelines, transmitted through the state to the Community Action Agency. An example is described in CNGC's Annual Achievement Report for 2014 (Figure 8-2).

> The Company's Low Income Conservation Program experienced a further decline in therm achievements and number of customers…. This unanticipated decline is the direct result of the CAP agencies required adherence to increasingly stringent United States Department of Energy Weatherization Program (USDOE WAP) household prioritization rules which results in natural gas heated homes being left off of agency waiting lists in the absence of other prioritization elements such as elderly, and households with young children or disabled individuals.
>
> **2014 CNGC Annual Conservation Achievement Report, P. 3.**

Figure 8-2: Primary Reporting Relationship is to the State.

The problem continued in 2015 (Figure 8-3).

> It is … in the Company's interest to ensure as many low-income natural gas homes receive weatherization services as possible within Cascade's service area.
>
> **2015 CNGC Annual Conservation Achievement Report, P. 7.**

Figure 8-3: Company's Goal to serve as many Low-Income Cascade households as possible.

The problem continued, over 2015 and into 2016 (Figure 8-4), though there was a marginal increase to 24 homes in 2016.

> Since the discontinuation of ARRA funds, Cascade has experienced an ongoing decrease in the number of homes served by the WAP in its Washington service area. In 2015, the number dropped to 19 homes served and a total of 11,724 therms saved, reaching near-historical lows.
>
> **2016 Annual CNGC Conservation Achievement Report, P.6**

Figure 8-4: Decrease in Number of Homes Served Continues.

- It might seem that prioritizing households with an adult aged 60 or over, a household with one or more children under the age of 6 or a household with at least one disabled individual is neutral as to type of energy used for household heating.[58] However, CAP agencies push down and sometimes drop homes from the waiting list when homes with a higher priority come in later, allowing the prioritized homes to cut in line. If there are many electric or oil heated homes in a service area that fit the priorities while there are fewer gas heated homes that fit the priorities, and given limited-service delivery capability, especially in years in which federal funding declines, it is quite possible for gas-heated homes to be pushed down on the list and effectively to be pushed off the list of jobs that can be started in a given year. The next year, the same thing can happen. There is more to the prioritization situation, however, creating informal organizational incentives to deprioritize gas-heated homes. We can characterize the problem as one of complexity.

- **Gas is more complex:** Weatherization work for natural gas heated homes is generally more complex than for electrically heated homes. Because cost-tested measures are often not fully covered by gas utilities (due to the current significant cost advantage for natural gas), to do gas jobs, community action agencies often have to piece together funding from federal, gas utility, and other sources.[59] For electric homes, the electric utility (due to electricity's current higher heating cost disadvantage as a form of energy) can typically cover the whole cost of weatherization. Gas furnaces and gas appliances also require more health and safety work than electric. Gas jobs are often harder to arrange, and they take more time. If a community action agency can complete more electric jobs within the same time it takes to do fewer gas jobs, that is an incentive that can work toward doing lower numbers of gas jobs. Similarly, if electric jobs are fully funded, the whole administrative process is simpler – so this can be another incentive toward doing more electric work. Within a given capability for a calendar year, it may be sensible, given federally mandated objectives, for some community action agencies to schedule more electric work and less gas work.

[58] These are the core priorities for service, however, there are sometimes other priorities such as service to American Indian households and service to very high energy use households.

[59] Different funding sources have different budget years, different regulations and requirements, and funding is typically not stable from year to year. There is a fair amount of work effort for the community action agency in piecing together funding for specific job sites (households) across funding sources. Over the past two years, CNGC has addressed this problem – the Low-Income program as adapted to fully cover the costs associated with incentivizing a natural gas home through the WIP and EWIP portions of the program offerings in addition to the increased funds available to the agency through a 15% project coordination fee and a 10% indirect-rate reimbursement to the agency per project.

This is likely an informal factor in producing yearly job numbers as low as 19, and recently in the middle to high 20's.

B. Correlation of Number of Low-Income Households Weatherized with Therms Saved

The correlation of number of households served and therms saved is r = 0.906 (Figure 8-5). This is equivalent to a regression result of $R^2 = 0.82$. This means that while all other factors can explain about 18 percent of the variation in number of therms saved by year, the number of homes weatherized is the major factor with a very large effect size. A picture representing this amount of explanatory strength is shown in Figure 8-6.

Correlations

		Low-Income Therms Saved
Number of Low-Income Households Weatherized	Pearson Correlation	.906**
	Sig. (2-tailed)	.000
	N	12

**. Correlation is significant at the 0.01 level (2-tailed).

Figure 8-5: Correlation of Number of Households with Therms Saved (by Year).

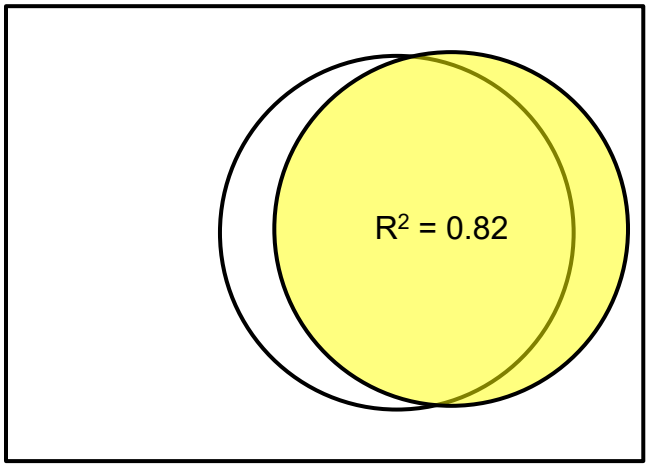

Figure 8-6: Strong Explanation of Therms Saved by Number of Households.

In Figure 8-6, the white circle represents number of households weatherized per year. The yellow circle represents number of therms saved per year. Their overlap is about 82 percent. This leaves about 18 percent (call it roughly 20%) of yearly variation in therms saved to be explained by factors other than number of households weatherized per year. So, roughly four-

fifths explained by number of households and one-fifth (20%) by everything else. This amount of "everything else" variation is represented by the yellow crescent to the right of the figure.

C. Therms Saved by Year

The graph of therms saved by year is shown in Figure 8-7. This graph has approximately the same shape as the "number of households" graph in Figure 8-1, due to the high correlation of number of homes weatherized with therms saved. Though other factors contribute some variation to therms saved, if we know the number of homes weatherized in a given year, we know the approximate number of therms saved.

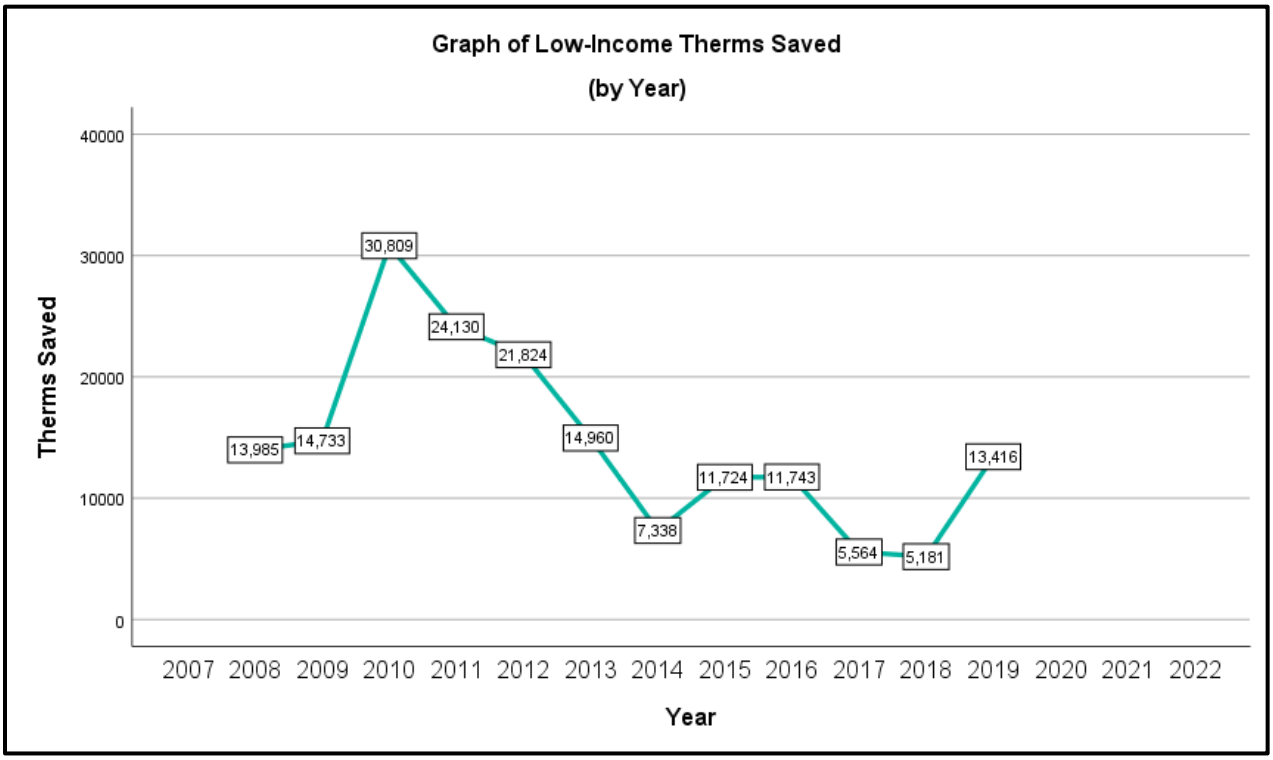

Figure 8-7: Low-Income Therms Saved by Year.

The average therms saved per low-income household is about 327 therms (Table 8-1). Although total savings in 2008, 2009 and 2013 (considered as a set), results for 2010, 2011 and 2012 are meaningfully higher (following the ARRA funding pattern). We could consider the set 2008, 2009 and 2013 as normal production. The value for 2014 is low. Values for 2015 and 2016 move up towards the normal set, but values for 2017 and 2018 are quite low. In 2019 there is recovery to the normal set of values (Figure 8-8). This variation may reflect changes in the measure package installed in different years, which is usually driven by the proportions of different dwelling types served in different years or by a factor such as the changing allocation of

households by climate zone in different years. Also, when there are a small number of cases in each year, some variation is expected as an artifact of small numbers. When there are less than 30 cases in a year, variation tends to have larger effects. When there are sixty or 120 cases per year, there are enough cases to generally create a smooth variation.

Table 8-1: Average Therm Savings per Household.

Average Therms Saved per Household		
Mean	N	Std. Deviation
326.98	12	125.592

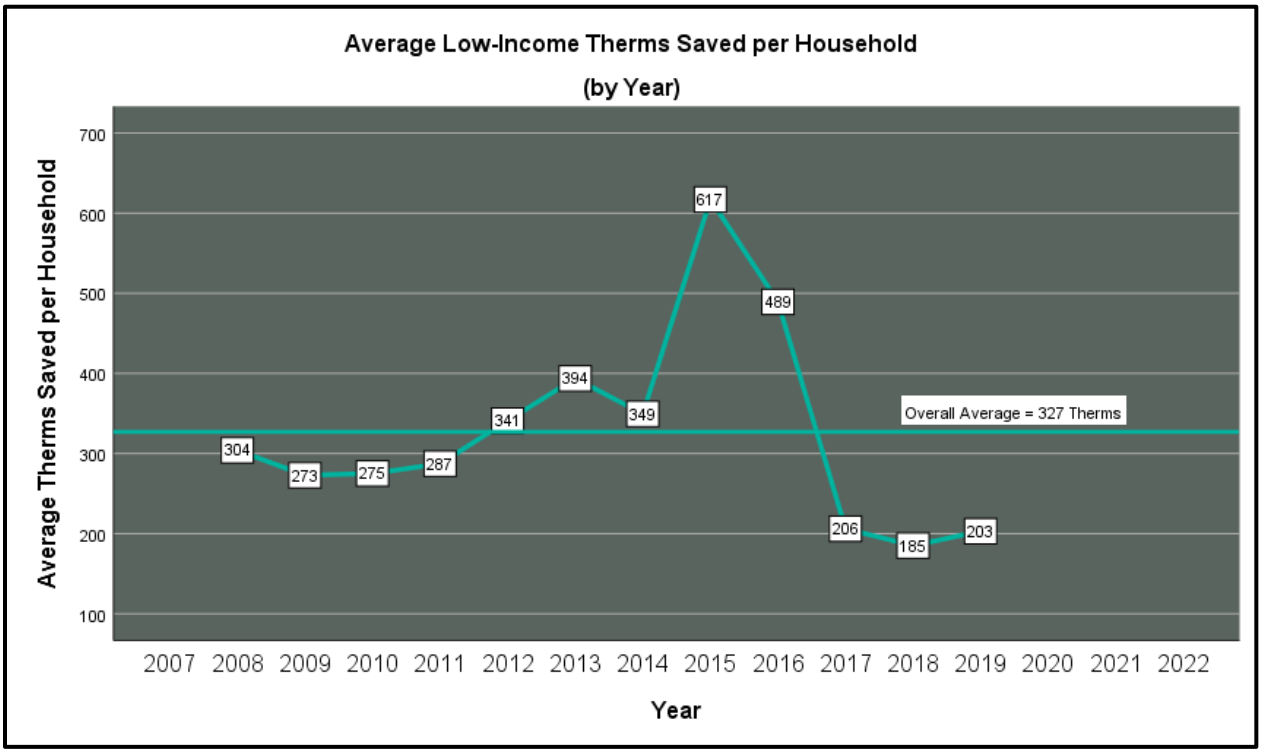

Figure 8-8: Average Savings by Year.

D. Engagement by CNGC

Given the CNGC goal to ensure as many low-income natural gas homes receive weatherization services as possible (Figure 8-1), and CNGC's early identification of a "therms saved" per year problem affecting low-income weatherization which is driven primarily (Figure 8-5 & Figure 8-6) by number of households weatherized per year, how did CNGC engage the problem?

First, as shown in Figure 8-7, since number of households weatherized in 2010 was at a peak, the earliest appearance of the problem was in 2011. It would then have required more than two years to identify a trend downward. Based on year-end reporting, the data points for 2010, 2011 and 2012 establish a trend. But, of course, CNGC program staff had real-time interaction with the program on an ongoing basis, which is a much better resource than year-end numbers. CNGC work on the problem of decreasing numbers of low-income homes weatherized was engaged in 2012.

CNGC also identified this same pattern in CNGC's Oregon service area, and in 2012 CNGC initiated a study to find and analyze reasons for the downturn, which included interviews with key CAP agencies in the Oregon service area. At the same time, CNGC consulted with its Conservation Advisory Group (CAG) and Washington CAP agencies. And, in a remarkable innovation, working with the CAG, CAP agencies and advocates in both Washington and Oregon, independently came up with the pilot Conservation Achievement Tariff (CAT), proposed by CNGC and adopted by the Oregon Commission Figure 8-9.

> The CAT was designed in consultation with the low-income agencies and advocates to bridge the gap between what can be funded under traditional energy efficiency cost-effectiveness parameters and the total installed and administrative costs of weatherization work performed.
>
> **2014 CNGC Annual Conservation Achievement Report, P. 3.**

Figure 8-9: A Remarkable Innovation: The Conservation Achievement Tariff.

At the time, low-income weatherization funds were in a standard low-income tariff and were being collected. But, on an ongoing basis Company staff noticed that the CAP agencies were not drawing on the accumulating funds and the number of CNGC low-income weatherization jobs was continuing to drop. The innovation consisted in the proposal to allocate unspent funds designated for low-income weatherization under the existing tariff using a new companion tariff that allowed the funds to be spent for the designated purpose, but outside the cost-benefit calculation constraints in the existing tariff. This meant that the existing tariff could continue to cover parts of a job, subject to its cost-benefit calculation constraints and the new tariff could cover the difference.[60]

[60] ARRA funds provided enhance capability to CAP agencies but were disappearing and now the agencies were experiencing service constraints. Also, the innovation of new fracked gas dramatically lowered the cost of natural gas supply which had the consequence of constraining amounts that could be paid for gas weatherization measures. Electric weatherization work, due to the higher cost of electric heating, could generally be covered by electric utilities under existing cost-benefit calculations; the CAT enabled CNGC to similarly cover most job costs on a pilot basis.

With ongoing consultation with CAP agencies, advocates, and the CAG, the CAT became a model for a similar innovative tariff in its Washington Incentive Program (WIP). "The Company was directed by Commission Order No. 04, issued in Docket No. UG-15226 to develop a proposal for overcoming barriers to empowering the (CAP) agencies to serve more natural gas homes (Figure 8-10). In October 2016, the Company presented potential revisions to WIP to the CAG. These revisions were proposed to the Commission and became effective in February 2017.

The revisions include:

- Expanding the measures list to align more closely with the Washington Department of Commerce' Weatherization Priorities List
- Increasing rebate payments to cover total installed cost, with a cap of $10,000 per dwelling. This is funded by the combination of WIP and the Enhanced Weatherization Incentive Program (E-WIP).
- Adding a $550 audit reimbursement and a $300 inspection payment (with annual update to ensure CAP costs for these areas are fully recovered by the agencies).
- Adding a requirement for agencies to execute a memorandum of understanding that defines their role as program administrators and establishes annual performance target.

> The Company was directed by Commission Order No. 04, issued in Docket No. UG-15226 to develop a proposal for overcoming barriers to empowering the [CAP] agencies to serve more natural gas homes. The Order instructed the Company and stakeholders to "consider approaches that Cascade has employed in other states, such as the low-income weatherization pilot tariff currently operating in the state of Oregon."
>
> **2016 CNGC Annual Conservation Achievement Report, P. 3.**

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Figure 8-10: Washington Order.

In the 2017 Weatherization Achievement Report, CNGC notes that "there is still a great deal of untapped potential." Further, that "the avoided cost of natural gas is not a constant" which results in changes to incentives to the agencies that had not been taken into account until EWIP. At the same time, CNGC notes that according to TREAT (Targeted Retrofit Energy Analysis Tool) audit reports, there were "minimum changes in measure payout," so the actual effect of declining gas costs was likely quite small. Further, the report cites continuing declines in federal funding as an effect on agency capabilities. The 2017 report also says that there are likely "many homes" that have been served by the agencies independently of WIP and EWIP with other agency funds.

On August 1, 2018, revisions to EWIP took effect. This set of revisions was carefully designed to remove remaining barriers to serving CNGC low-income customers. Revisions include:

- Remove the $10,000 per project cap.
- Add a 15% project coordination fee.
- And a 10% indirect charge.
- Update per therm payment.
- Remove the $500 cap for health and safety.

These changes were developed by CNGC in close coordination with the weatherization agencies. In addition, CNGC provided outreach support and a number of outreach strategies were implemented with the agencies.

The US Department of Energy (USDOE) permitted the Department of Commerce to retire the previous USDOE priorities list as of February 3, 2020. The Department of Commerce implemented a revised "Deemed Measures Priority List." This list serves as an alternative to the TREAT audit. All measures in the new priority list have been calculated to have a Savings to Investment ratio (SIR ratio) of one or greater, based on analysis of averaged savings data. The "Deemed Measures Priority List" is allowable with all weatherization funding, except USDOE funding. These changes permit more flexibility in developing an optimal set of measures for each household.

Changes to optimize for the objective of serving more CNGC households are substantial. As 2019 results demonstrate, major barriers to conservation achievement for low-income weatherization have been removed (Figure 8-11).

> The Company believes most major barriers to agency participation have now been removed.
>
> **2019 CNGC Annual Conservation Achievement Report, P. 16.**

Figure 8-11: Barriers are Removed.

Results for calendar 2020, however are affected by the COVID pandemic. To protect public health by slowing viral spread, the Washington Stay at Home order has the side effect of restricting production for the 2020 year. The 2020 CNGC Annual Conservation Achievement Report is expected to reflect this. Progress continued to be made in 2020, but when numbers for the year are available, they will reflect the effect of guidance for slowing the spread of the virus. From an economic, rather than a health perspective, all of this is part of the COVID recession, which began in February 2020 and does not yet have an end date.

Since the Democrats won the presidential election and now will also control both the House and the Senate, experience of relief/stimulus support for the COVID recession can be expected to parallel the experience of the Great Recession, with a resumption of meaningful federal support to people, business, states, and local governments. If this works out (is not blocked in some way

by the other party, as the renewal of stimulus for the Great Recession was blocked by the other party), we can expect continued improvement of federal funding for low-income weatherization for the next set of years. However, the CNGC 2019 low-income weatherization results demonstrate the effectiveness of CNGC's identification of problems, analysis to find solutions, work in coordination with the agencies, the Department of Commerce, advocates, and commission staff, with commission oversight. This successful result can be expected to be demonstrated again, after the COVID emergency when the virus is defeated.

Finding: CNGC has established an excellent and consistent record of good faith in engaging the "therms saved" and "numbers of households weatherized" problems. *There is zero indication of any negative effect of decoupling on low-income weatherization work.* Rather, there is a substantial record of coordination with CAP agencies, parties, the Department of Commerce, and the commission to work through these problems. CNGC accurately identified the barriers to low-income weatherization. This was part of an engagement that has many facets, but three stand out: (1) The development of the CATs and EWIP tariffs. This tariff structure for low-income weatherization is a major regulatory reform, successfully accomplished; it is not minor. (2) Meeting the actual needs of the CAP agencies through the revisions of August 1, 2018. This is a major reform, not a minor matter, and it works, (3) Working with the Department of Commerce new "Deemed Measures Priority" to provide flexibility to the agencies.

E. Summary & Recommendations – Low-Income Weatherization

CNGC encountered a series of barriers to low-income weatherization and has successfully resolved the problems. The recommendations here are put forward for clarification and for thought about other related dimensions.

(1) **Continue.** Continue optimizing production with Customer Assistance Program approach. We have explored here to some degree the tension between working through for-profit firms and non-profit community agencies to deliver low-income weatherization services. Both approaches to service deliver have pluses and minuses. Our recommendation is to continue on the current path of coordination and joint effort with the CAPs. We have seen elsewhere problems that can happen when low-income work is turned over to profit-maximizing entities. CAP staff tends to have high social consciousness and community orientation which usually shows in quality of work. Working with the CAPs is part of being an integral part of the community and sharing in decision-making. Continuing to work with the CAPs, the Department of Commerce, the advocates, and the Commission is the optimal path for proceeding in this work. Though it takes time to work things through when engaging participation, CNGC is working in a promising direction with substantial accomplishment with mutual cooperation and coordination.

(2) **Assess Walkaways**. We have observed, in projects in other states and provinces that there can be many or few homes in which work is not possible ("walkaways"). All states have walkaways, but Washington seems to have relatively more, perhaps due to age of housing stock in different parts of the state combined with changes in historical employment patterns which leave low-income families in older housing. CNGC could consider a study to quantify this problem by type of causation and by location within its Washington service area. In federal/state Weatherization Assistance, walkaways are usually due to the need for a substantial amount of home repairs that must be completed before weatherization measures can be usefully installed. Sometimes, it is because substantial health and safety improvements are required. Or it can be both. A walkaway is a devastating thing for a low-income household, and it can mean that a low-income household is unhoused, for example, when the furnace is red tagged or there are holes in the building shell.

When CNGC encounters such homes in the context of its low-income tariffs, the encounter is with customer households in their actual homes. It is an existential situation. Another factor is that deep weatherization work is becoming more costly. In some ways, more than forty years of conservation using a regional methodological approach, to the extent it has influenced low-income housing weatherization has progressively weatherized homes at the easier end of the low-income housing stock. If low-income housing is to be meaningfully addressed, there will need to be a continuing and programmatic commitment to meet need as cost per weatherization job increases, as is the current situation. This is particularly necessary if equity and inclusion goals are implemented on a practical basis to achieve actual results. Homes which cost more tend to be homes in which the weatherization (sometimes including furnace replacement) is the primary factor that enables a household to remain housed. This benefit is not captured in standard cost-benefit analysis but is at the root of a just society.[61] It is likely that decisions to proceed need to be policy-based on building sciences and health criteria as well, rather than simply by a standard cost-benefit criterion.

(3) **Housing as a Utility:** Experience with weatherization leads to the question of whether it would be useful to do some construction as well as retrofit. CNGC could consider operating weatherization alongside housing as a utility (utility managed new construction) as twin parts of the same utility/housing effort. In the 1930's, Catherine Bauer, one of the leaders of the housing movement from the 1920's through the Great Depression, promoted the concept of housing as a public utility.[62] Bauer was a drafter of the US Housing Act of 1937. Bauer's work contributed to the shaping of social housing worldwide, and especially in the US. She could not get housing as a utility into the Housing Act, but as a visionary, understood the Housing Act of 1937 as a step along the way, to be followed by additional major legislation that would crystallize the "housing as

[61] Problems affecting programs are discussed further in Section 11, Exogenous Forces.
[62] Bauer, Catherine, *Modern Housing*. Minneapolis & London, University of Minnesota Press, 1934; 2020 edition with forward by Barbara Penner.

a public utility" concept. Tom Bender, the engineering economist leading "factor ten" economics has developed an approach to new housing designed to radically shrink financing costs and energy costs.[63] In Sweden, many households are in public housing, which is some of the best housing and best located housing and provides one example of a successful implementation of the housing as a public utility concept.[64] These are three parts that could be explored to put together a housing initiative.

CNGC could consider adding a housing component that could be operated by CNGC as an enterprise housing utility. Looking ahead, with the accelerating climate change, this is a way to continue to ensure development and ongoing operation and maintenance of high quality, healthy, decent, safe, and sanitary housing that is also resilient under expected changed climate conditions and meet carbon goals while adding an area of activity. If desired, there could be gas microgrid back-up.

[63] Bender, Tom, Learning to Count what Really Counts, The Economics of Wholeness. Manzanita, Oregon, Fire River Press, 2002.
[64] Rents are based on type of apartment, but not on location. Rather than rationing access on price, prime locations have longer waiting lists.

Section 9. **Analysis of Possible Adverse Factors**

Throughout the study, we found no evidence of adverse impacts on customer service, price signals, or utility program operations as a result of the decoupling mechanisms. As shown in Table 9-1 and Table 9-2, there is no indication of any decrease in service quality between the two years prior to decoupling and the four decoupling years (beginning in 2016). Service quality appears overall to be high, and constant.

Table 9-1: Service Quality – Complaints, Response, Missed Appointments.

Annual Service Quality Reports						
Year	Number of Customer Complaints		Call Received to Order Placed	Field Response Time	Total Time	Missed Customer Appointments
	Received	Filed				
2014	93	18	3 min 7 sec	33 min 8 sec	36 min 15 sec	0
2015	138	11	4 min 11sec	36 min 0 sec	50 min 11 sec	0
2016	155	5	3 min 11 sec	38 min 0 sec	41 min 11 sec	0
2017	269	7	3 min 49 sec	40 min 53 sec	44 min 42 sec	0
2018	267	8	3 min 33 sec	37 min 45 sec	41 min 18 sec	0
2019	323	3	6 min 43 sec	36 min 25 sec	43 min 8 sec	2

Table 9-2: Service Quality – Percent Disconnects, Calls, Time to Answer.

Annual Service Quality Reports						
Year	Percent Disconnects due to Nonpayment		Number of Calls	Percent Calls Answered Live w/in		
	Residential	Commercial		Sixty Seconds	Fifty Seconds	Forty Seconds
2014	2.65%	1.44%	294,562	81.41%	79.33%	76.86%
2015	1.70%	1.10%	263,518	80.22%	77.96%	77.28%
2016	1.96%	1.27%	276,725	86.63%	85.29%	83.71%
2017	1.98%	1.29%	274,452	89.90%	88.78%	87.40%
2018	1.85%	1.20%	295,602	75.34%	74.02%	72.61%
2019	1.55%	1.37%	236,334	78.98%	77.54%	75.97%

While there is no adverse utility performance result, there is an adverse factor in the initial design of the mechanism. This is that, initially, calculations tended to be performed at the individual rate level. There is nothing wrong, in the abstract, in calculations by rate schedule or by consolidated rate schedules. However, because customers (particularly commercial customers) may move among the rate schedules over the decoupling years it is possible for a rate schedule with only a few customers, one of them large, decoupling rate calculation based on an individual rate might lead to a larger than anticipated rate change due to movement of customers among schedules. There was some experience with this.

As a thought experiment, imagine a rate with 100 customers all of which are quite similar to each other. In this rate class, though annual energy use varies by customer, the size of variation compared with mean or median use is small, say about 5 percent. Then, any one or ten customers moving to another rate schedule has no meaningful effect on the energy use for the remaining customers. Now, imagine a different rate with five customers. For this rate, one customer has annual energy use forty times the amount of energy use of any one of the other four customers. If the large customer changes rate class, there is a major effect on energy use within the original class and a resultant large change in rates for the next year. However, a ratemaking principle is to avoid large changes in rates whenever possible.

CNGC has been aware of this problem and has largely fixed the problem, by moving to consolidated rate groups. Generally, the more customers in a decoupling rate classification, and the more similar the customers are to each other in energy use, the less the potential problem. Conversely, the fewer customers in a decoupling rate group and the more dissimilar they are in patterns of energy use, the more there is a potential for large than anticipated rate effects. This is a potential problem that occurs with decoupling but not in the absence of decoupling.

A. Summary – Possible Adverse Factors

We found no evidence of adverse impacts on customer service, price signals, or utility program operations as a result of the decoupling mechanisms. There is no indication of any decrease in service quality.

There is a problem in the design of the mechanism to the extent that calculations are performed at an individual rate level. CNGC has fixed this problem by moving to consolidated rate groups. We recommend that CNGC continue this approach.

Section 10. **Cost-of-Service Analysis**

The purpose of this addendum to the CNG Decoupling Evaluation Report is to address cost-of-service issues identified as areas of interest in the Joint Settlement Agreement (JSA). These cost-of-service issues are:

> "The degree to which allowed revenues are recovering its allocated cost-of-service, by customer class," (JSA, page 3) and
>
> "The fixed cost recovery in classes that are not covered by the decoupling mechanism." (JSA, page 4)

Although the JSA applies the first issue to customer class and the second issues to only non-decoupled customers, CNG provided a detailed and comprehensive response to cost-of-service data requests allowing our team to analyze both questions for both decoupled and non-decoupled customer classes. CNG customer classes by decoupled status are shown in Table 10-1.

Table 10-1: CNG Customer Classes by Decoupled Status

Decoupled Customer Classes		**Non-Decoupled Customer Classes**	
Customer Class	**Rate Schedules**	**Customer Class**	**Rate Schedules**
Residential (General Service)	502, 503	Transportation	663
Commercial (General Service	504	Special Contracts	9xx
Industrial (General Service)	505, 512		
Large Volume (General Service)	511		
Interruptible	570, 577		

A. Allowed Revenue and Cost-of-Service Recovery

For this analysis it is necessary to show annual calendar revenues and cost-of-service for each customer class, including decoupled and non-decoupled customer classes. CNG provided detailed cost-of-service workbooks showing revenue and cost calculations for this analysis.[65] Actual cost and rate base allocations are based on allocation factors in CNG's 2015 cost-of-service study, their most recent cost-of-service study.

Results of this analysis are shown in Table 10-2 through Table 10-4 for the years 2017, 2018 and 2019. The tables for each year are structured the same and begin with lines showing total revenue with deferred decoupling revenue broken out from the total. Subtracting the cost of gas and taxes on revenue results in the operating margin shown on line 7. Operating income (Line 9) is derived by subtracting

[65] See Response to Data Request numbers 57 and 58.

operating expenses from operating margin. Total revenue requirements are shown on line 10 and represent the operating margin required to cover all costs including the required rate of return (line 14) on allocated rate base (line 12). The revenue requirement surplus or deficit is shown on line 11 and represents the dollar amount that operating margin (line 7) exceeded or fell short of required revenue (line 10).

The actual rate of return (line 13) expresses the operating income as a percentage of the rate base allocated to each customer class. This result is compared to the required (allowed) rate of return (line 14) with the difference shown on line 15.

Revenue to cost ratios are shown in the last two lines of each annual table. The actual revenue to cost ratio (line 16) is the result of dividing operating margin (line 7) by the total revenue requirement (line 10). An actual revenue to cost ratio of less than one for a customer class means that revenue requirements were not met and the actual rate of return is less than the required rate of return. Likewise, actual revenue to cost ratio of over one means actual operating margins exceeded all costs including the required return on rate base. Another way to think of the revenue requirement surplus or deficit is the amount of revenue to subtract in the case of a surplus or add in the case of a deficit to achieve a revenue cost ratio of 1.0.

The current parity ratio (line 17) simply rebases the actual revenue to cost ratio to a level equivalent to a companywide revenue to cost ratio of 1.0 and is calculated by dividing the actual revenue to cost ratio of each customer class by the actual revenue to cost ratio for the total of all CNG customer classes. The parity ratio shows how far relative to 1.0 over or under each customer class was in meeting all revenue requirements assuming CNG exactly met all revenue requirements in total. Parity ratios provide an easy way to see which customer classes over or under contributed relative to full cost recovery companywide.

Figure 10-1 presents parity ratios across all three years for ease in comparison across time. Examining the results shown in Table 10-2, Table 10-3, Table 10-4 and Figure 10-1 reveals a consistent pattern. Revenues from residential customers were less than costs in all three years of our analysis, resulting in actual revenue to cost ratios of less than one. In 2019, for example, revenue from residential customers was over $15 million under the total required revenue from that customer class. While revenues were also less than costs for CNG as a whole, parity ratios show the residential customer class covered less than its share of costs even after adjusting for companywide results. Alternatively, revenues from non-residential customer classes typically exceeded all attributable costs of service resulting in rates of return that exceeded the required (allowed) rate of return. Two notable exceptions are interruptible and special contracts customers. It's important to note that these customer classes are made up of a small number of large customers which adds to volatility and tends to confound cost allocation models.

In only one year for one customer class was revenue from decoupling deferrals sufficient to appreciably change the actual revenue to cost ratio. Without the decoupling mechanism the large volume general service customer class in 2019 would have had an actual revenue to cost ratio of significantly lower than one rather than the 1.23 reported in Table 10-4. In every other customer class and year deferred revenue from decoupling was too small relative to operating margins and revenue requirements to have a meaningful impact.

Table 10-2: 2017 Cost-of-Service Results

Row	Customer Rate Class	Total	Residential	General Service Commercial	General Service Industrial	General Service Large Volume	Interrup-tible	Transpor-tation	Special Contracts
	Rate Schedules Included		**502, 503**	**504**	**505, 512**	**511**	**570, 577**	**663**	**9xx**
Row	**Item**	**(dollars in thousands)**							
1	Revenue at Current Rates	$ 225,100	$ 112,357	$ 71,901	$ 8,122	$ 7,974	$ 1,472	$ 17,317	$ 5,957
2	Decoupling Revenue	$ 34	$ 28	$ (16)	$ (14)	$ 34	$ 2	$ -	$ -
3	Other Revenue	$ 1,040	$ 519	$ 332	$ 37	$ 37	$ 7	$ 80	$ 28
4	Total Revenue	$ 226,174	$ 112,904	$ 72,216	$ 8,146	$ 8,046	$ 1,481	$ 17,397	$ 5,984
5	Less Cost of Gas	$ 113,381	$ 58,660	$ 41,708	$ 5,480	$ 6,141	$ 1,391	$ -	$ -
6	Less Taxes on Revenue	$ 19,643	$ 9,806	$ 6,272	$ 707	$ 699	$ 129	$ 1,511	$ 520
7	Operating Margin	$ 93,150	$ 44,439	$ 24,236	$ 1,958	$ 1,206	$ (39)	$ 15,886	$ 5,465
8	Less operating expenses	$ 74,852	$ 43,739	$ 16,628	$ 1,269	$ 789	$ 147	$ 9,464	$ 2,816
9	Operating Income	$ 18,298	$ 699	$ 7,607	$ 689	$ 417	$ (186)	$ 6,422	$ 2,649
10	Total Revenue Requirement (a)	$ 97,305	$ 57,353	$ 19,767	$ 1,685	$ 1,093	$ 340	$ 13,364	$ 3,703
11	Rev. Req. Surplus (Deficit)	$ (4,155)	$ (12,914)	$ 4,469	$ 273	$ 113	$ (379)	$ 2,522	$ 1,762
12	Rate Base	$ 286,561	$ 123,229	$ 64,679	$ 7,000	$ 4,693	$ 760	$ 65,465	$ 20,735
	Rate of Return:								
13	Actual Rate of Return	6.39%	0.57%	11.76%	9.84%	8.88%	-24.53%	9.81%	12.77%
14	Required Rate of Return	7.35%	7.35%	7.35%	7.35%	7.35%	7.35%	7.35%	7.35%
15	Return Surplus (Deficit)	-0.96%	-6.78%	4.41%	2.49%	1.53%	-31.88%	2.46%	5.42%
	Revenue to Cost Ratios								
16	Actual (Current)	0.96	0.77	1.23	1.16	1.10	(0.12)	1.19	1.48
17	Current Parity Ratio	1.00	0.81	1.28	1.21	1.15	(0.12)	1.24	1.54

(a) Total revenue requirement includes required return to rate base

Table 10-3: 2018 Cost-of-Service Results

Row	Customer Rate Class	Total	Residential	General Service Commercial	General Service Industrial	General Service Large Volume	Interrup-tible	Transpor-tation	Special Contracts
	Rate Schedules Included		**502, 503**	**504**	**505, 512**	**511**	**570, 577**	**663**	**9xx**
Row	**Item**	**(dollars in thousands)**							
1	Revenue at Current Rates	$ 224,784	$ 111,749	$ 71,477	$ 8,694	$ 8,587	$ 1,271	$ 18,085	$ 4,921
2	Decoupling Revenue	$ 1,188	$ 639	$ 309	$ (90)	$ 327	$ 3	$ -	$ -
3	Other Revenue	$ (1,487)	$ (740)	$ (473)	$ (57)	$ (59)	$ (8)	$ (119)	$ (32)
4	Total Revenue	$ 224,485	$ 111,648	$ 71,314	$ 8,547	$ 8,856	$ 1,265	$ 17,966	$ 4,889
5	Less Cost of Gas	$ 109,783	$ 56,425	$ 40,249	$ 5,562	$ 6,529	$ 1,018	$ -	$ -
6	Less Taxes on Revenue	$ 19,056	$ 9,478	$ 6,054	$ 726	$ 752	$ 107	$ 1,525	$ 415
7	Operating Margin	$ 95,646	$ 45,746	$ 25,011	$ 2,260	$ 1,575	$ 139	$ 16,441	$ 4,474
8	Less operating expenses	$ 73,305	$ 43,913	$ 16,202	$ 1,199	$ 740	$ 142	$ 8,589	$ 2,521
9	Operating Income	$ 22,341	$ 1,833	$ 8,809	$ 1,061	$ 835	$ (2)	$ 7,852	$ 1,953
10	Total Revenue Requirement (a)	$ 98,743	$ 57,210	$ 20,900	$ 1,664	$ 1,015	$ 225	$ 13,502	$ 4,227
11	Rev. Req. Surplus (Deficit)	$ (3,097)	$ (11,464)	$ 4,111	$ 596	$ 560	$ (86)	$ 2,939	$ 247
12	Rate Base	$ 339,751	$ 148,472	$ 76,653	$ 8,156	$ 5,450	$ 881	$ 76,060	$ 24,078
	Rate of Return:								
13	Actual Rate of Return	6.58%	1.23%	11.49%	13.01%	15.32%	-0.27%	10.32%	8.11%
14	Required Rate of Return	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%
15	Return Surplus (Deficit)	-0.73%	-6.08%	4.18%	5.70%	8.01%	-7.58%	3.01%	0.80%
	Revenue to Cost Ratios:								
16	Actual (Current)	0.97	0.80	1.20	1.36	1.55	0.62	1.22	1.06
17	Current Parity Ratio	1.00	0.83	1.24	1.40	1.60	0.64	1.26	1.09

(a) Total revenue requirement includes required return to rate base

Table 10-4: 2019 Cost-of-Service Results

Row	Customer Rate Class	Total	Residential	General Service Commercial	General Service Industrial	General Service Large Volume	Interrup-tible	Transpor-tation	Special Contracts
	Rate Schedules Included		**502, 503**	**504**	**505, 512**	**511**	**570, 577**	**663**	**9xx**
Row	**Item**	**(dollars in thousands)**							
1	Revenue at Current Rates	$ 239,865	$ 117,959	$ 77,056	$ 9,098	$ 10,314	$ 1,343	$ 19,741	$ 4,354
2	Decoupling Revenue	$ 5,711	$ 2,518	$ 2,415	$ (26)	$ 827	$ (23)	$ -	$ -
3	Other Revenue	$ 2,155	$ 1,057	$ 697	$ 80	$ 98	$ 12	$ 173	$ 38
4	Total Revenue	$ 247,731	$ 121,534	$ 80,168	$ 9,152	$ 11,239	$ 1,332	$ 19,914	$ 4,392
5	Less Cost of Gas	$ 125,166	$ 63,241	$ 45,600	$ 6,365	$ 8,862	$ 1,099	$ -	$ -
6	Less Taxes on Revenue	$ 20,649	$ 10,130	$ 6,682	$ 763	$ 937	$ 111	$ 1,660	$ 366
7	Operating Margin	$ 101,917	$ 48,163	$ 27,887	$ 2,024	$ 1,440	$ 123	$ 18,254	$ 4,026
8	Less operating expenses	$ 79,865	$ 48,132	$ 17,638	$ 1,295	$ 798	$ 154	$ 9,169	$ 2,678
9	Operating Income	$ 22,052	$ 31	$ 10,248	$ 729	$ 642	$ (32)	$ 9,085	$ 1,348
10	Total Revenue Requirement (a)	$ 108,582	$ 63,426	$ 22,658	$ 1,925	$ 1,174	$ 253	$ 14,385	$ 4,761
11	Rev. Req. Surplus (Deficit)	$ (6,665)	$ (15,263)	$ 5,228	$ 99	$ 266	$ (131)	$ 3,869	$ (735)
12	Rate Base	$ 374,226	$ 164,724	$ 84,411	$ 8,911	$ 5,945	$ 961	$ 83,000	$ 26,275
	Rate of Return:								
13	Actual Rate of Return	5.89%	0.02%	12.14%	8.18%	10.81%	-3.30%	10.95%	5.13%
14	Required Rate of Return	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%	7.31%
15	Return Surplus (Deficit)	-1.42%	-7.29%	4.83%	0.87%	3.50%	-10.61%	3.64%	-2.18%
	Revenue to Cost Ratios:								
16	Actual (Current)	0.94	0.76	1.23	1.05	1.23	0.48	1.27	0.85
17	Current Parity Ratio	1.00	0.81	1.31	1.12	1.31	0.52	1.35	0.90

(a) Total revenue requirement includes required return to rate base

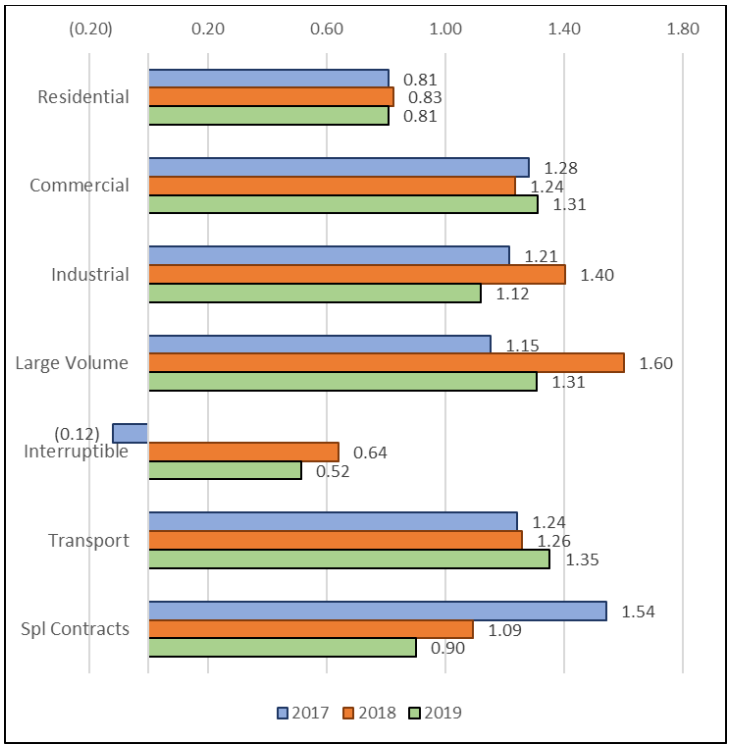

Figure 10-1: CNG Revenue to Cost Parity Ratios

B. Fixed Cost Recovery Through Fixed Charges

In this section we examine fixed costs and fixed charges for all CNG customer classes to assess the extent to which fixed costs are recovered through fixed charges. The scope of this section was expanded to include decoupled customer classes to facilitate comparison to customer classes excluded from the decoupling mechanisms. Fixed cost and revenue collected from fixed charges was provided by CNG in response to data request (DR) 58. We examine the recovery of fixed cost through fixed charges and the relationships presented in the data. Throughout the discussion it is useful to keep in mind that the basis for cost allocation is CNG's 2015 cost-of-service study.

Annual revenue from fixed charges and fixed costs are shown for natural gas customer classes in Table 10-5.

Table 10-5: Fixed Cost and Fixed Charges, CNG Customer Classes

Customer Rate Class	Total	Residential	General Service Commercial	General Service Industrial	General Service Large Volume	Interrup-tible	Transpor-tation	Special Contracts
Rate Schedules Included		**502, 503**	**504**	**505, 512**	**511**	**570, 577**	**663**	**9xx**
2017								
Revenue from Fixed Charges	17,836,752	8,933,032	3,097,650	264,840	106,700	14,040	4,881,546	538,944
Fixed Cost	75,200,128	48,161,753	16,777,196	1,205,882	669,425	101,855	6,163,349	2,120,668
Percent Recovered from Fixed Charges	23.7%	18.5%	18.5%	22.0%	15.9%	13.8%	79.2%	25.4%
2018								
Revenue from Fixed Charges	20,360,716	10,007,318	3,501,572	297,548	113,198	14,576	5,452,443	974,062
Fixed Cost	76,311,714	48,873,667	17,025,192	1,223,707	679,320	103,360	6,254,453	2,152,015
Percent Recovered from Fixed Charges	26.7%	20.5%	20.6%	24.3%	16.7%	14.1%	87.2%	45.3%
2019								
Revenue from Fixed Charges	23,433,838	11,608,656	4,151,362	346,980	133,250	15,159	6,289,967	888,465
Fixed Cost	83,915,593	53,743,553	18,721,622	1,345,640	747,009	113,660	6,877,662	2,366,447
Percent Recovered from Fixed Charges	27.9%	21.6%	22.2%	25.8%	17.8%	13.3%	91.5%	37.5%

Over the 2017-2019 period fixed charges for all customer classes have averaged around 26 percent of fixed cost. The trend over the short three-year period has been clearly upward, rising about two percentage points a year. Of the decoupled customer classes, Industrial customers cover the highest percentage of fixed costs, averaging 24% with a clear upward trend. Again, considering just decoupled customer classes, interruptible customers recover the smallest percentage of fixed costs through fixed charges, averaging just under 14% with no apparent trend. Residential and commercial general service customer classes each average about 20% recovery of fixed cost through fixed charges. The trend in these customer classes is also upward.

Between the two non-decoupled customer classes, transportation customers recovered the majority of fixed costs through fixed charges rising from 79.2% in 2017 to 91.5% in 2019. The range of percent recovery of fixed costs through fixed charges over 2017-2019 was greatest in the special contracts class, ranging from a low of 25.4% in 2017 to 45.3% in 2018.

C. Summary

An assessment to determine if allowed revenues by customer class are recovering their respective costs of service shows CNG has not fully recovered all revenue requirements. The primary reason for this shortfall is the Residential customer class which on average has recovered about 78% of total revenue requirements over the 2017 through 2019 period, an average annual shortfall of $13.2 million. Revenue from the three decoupled non-residential

general service customer classes (Commercial, Industrial, and Large Volume) and the non-decoupled Transportation customer class have exceeded revenue requirements helping to nearly close the overall shortfall in CNG revenue. Decoupling has not had a meaningful impact on revenue to cost results.

CNG recovers about 26 percent of fixed cost through fixed customer charges, trending higher over the 2017-2019 period.

Section 11. Appendix - Weather Compared to Normal

Weather can have a significant impact on decoupling rebates and surcharges. The impact of weather depends on the level of weather sensitive energy usage and the difference between actual and normal weather.[66] Weather that causes greater than expected usage results in over collection of allowed revenue (negative deferral balances) and vice versa. Residential is the most weather sensitive customer group and is therefore expected to have the largest weather-related impacts on decoupling deferral balances and rates.

Heating degree days (HDD) are useful for describing atmospheric temperatures in units related to the need for space heating. Actual and normal heating degree days are shown for each of the three full calendar years covered in this study in Table 1-1.[67]

Table A-11-1: Comparison of Actual and Normal Annual Heating Degree Days

	Heating Degree Days		
	2017	**2018**	**2019**
Actual	3,938	3,369	3,884
Normal	3,939	3,939	3,939
Percent Difference	0.0%	-14.5%	-1.4%

Holding everything else constant and considering just the variances from normal degree days shown in Table A-11-1 it would be reasonable to expect deferral balances for weather sensitive customer classes to be small in 2017 and 2019 but strongly positive in 2018. As expected from the weather pattern, positive deferral balances were observed for residential and commercial customers in 2018. Residential and commercial customers are the two most weather sensitive customer classes. While many factors influence customer usage including energy efficiency investments, the nearly 15 percent warmer than normal weather in 2018 contributed to the decoupling surcharge that became effective in customer rates November 1, 2019.

Figure A-11-1 shows the difference between actual and normal HDD from the beginning of decoupling deferral-balance tracking (August 2016) through August 2020. A negative value means warmer-than-normal weather (i.e., less than normal need for space heating).

[66] In order to be consistent with CNGC, normal weather for this analysis is defined as the 30-year average calculated by NOAA for the 1981 through 2010 period (1981-2010 U.S. Climate Normals). NOAA updates their estimates of Climate Normals every decade.

[67] Actual and normal HDD are calculated from NOAA records for the four weather stations CNGC uses for the state of Washington: Bellingham (0.41), Bremerton (0.21), Walla Walla (0.19), and Yakima (0.19). Weights provided by CNGC to weight each station to the total for Washington are shown in parentheses. Beginning in 2019 CNGC replaced the Hoquiam weather station with the Bremerton weather station for daily temperature records.

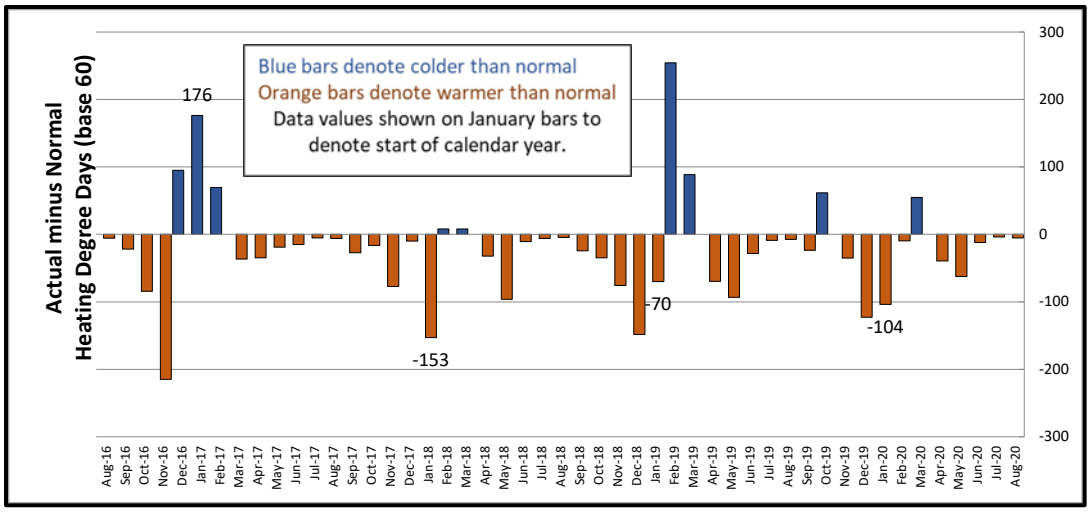

Figure A-11-1: Monthly Heating Degree Days (difference from normal)

The pattern in Figure A-11-1 shows that since the inception of decoupling deferral-balance tracking there have been more warmer-than-normal months than there have been colder-than-normal months. The monthly pattern also shows colder-than-normal months mostly occurred in early 2017 and early 2019. Calendar 2018 was either near normal or warmer than normal in every month, resulting in 15 percent lower HDD than normal (see Table A-11-1).

A. Annual Long-Term HDD Patterns

Because expectations regarding weather are important in utility planning and ratemaking, it is useful to consider how weather patterns have been changing over time. Normal weather refers to the weather expected over a typical meteorological period. NOAA calculates and publishes normal weather for thousands of weather stations using a 30-year period of history. The 30-year period used is shifted forward once every decade with the most recent NOAA 30-Year weather normal period being 1981 through 2010. CNGC uses NOAA's most recent 30-Year normal weather for planning purposes.

A comparison of the difference between actual and normal HDD over the last 60 years is shown in Figure A-11-2 for the weather stations in Washington used by CNGC.[68]

Blue bars in the graph denote colder-than-normal years (actual HDD exceeds normal HDD) and orange bars denote years with warmer-than-normal weather. A visual inspection of Figure A-10-2 appears to indicate that somewhere around 1990 the frequency of warmer-than-normal years (orange bars) started to exceed the frequency of colder-than-normal years (blue bars).

[68] Because of gaps in reporting from one or more weather stations the following years were removed from analysis: 1987, 1995, 1996, 1997, and 1998.

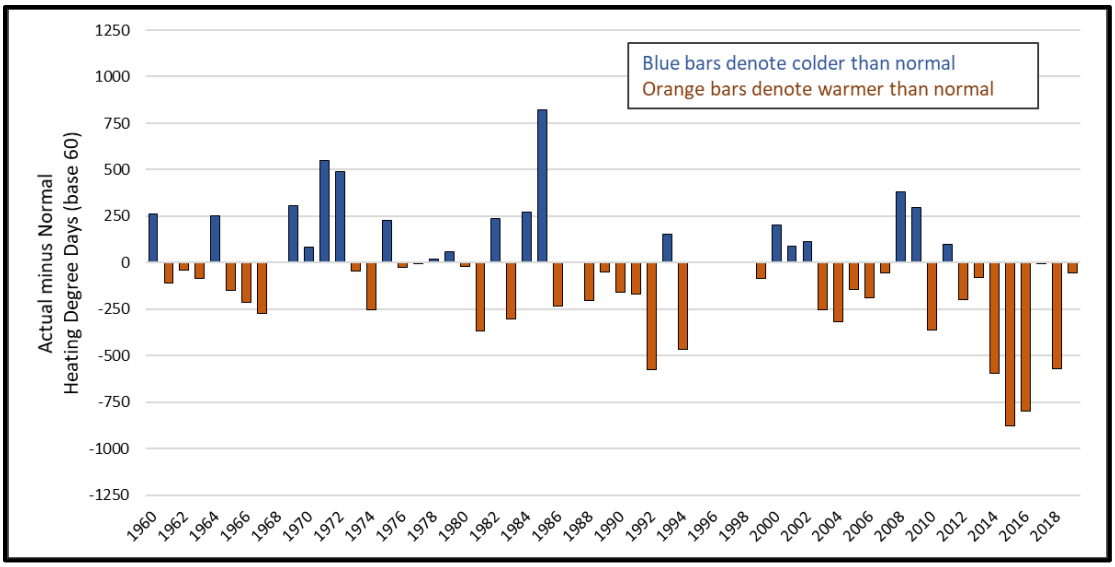

Figure A-11-2: HDD Variation from Normal, WA CNGC Weather Stations (1960-2019)

Another pattern in Figure A-10-2 is that, with a few exceptions, the magnitude of the blue bars appears to become smaller over time and the magnitude of the orange bars appears to be getting larger over time. In other words, there appears to be a trend toward warmer weather evident in Figure A-11-2. A closer examination of the question of trending HDD is shown in Figure A-11-3.

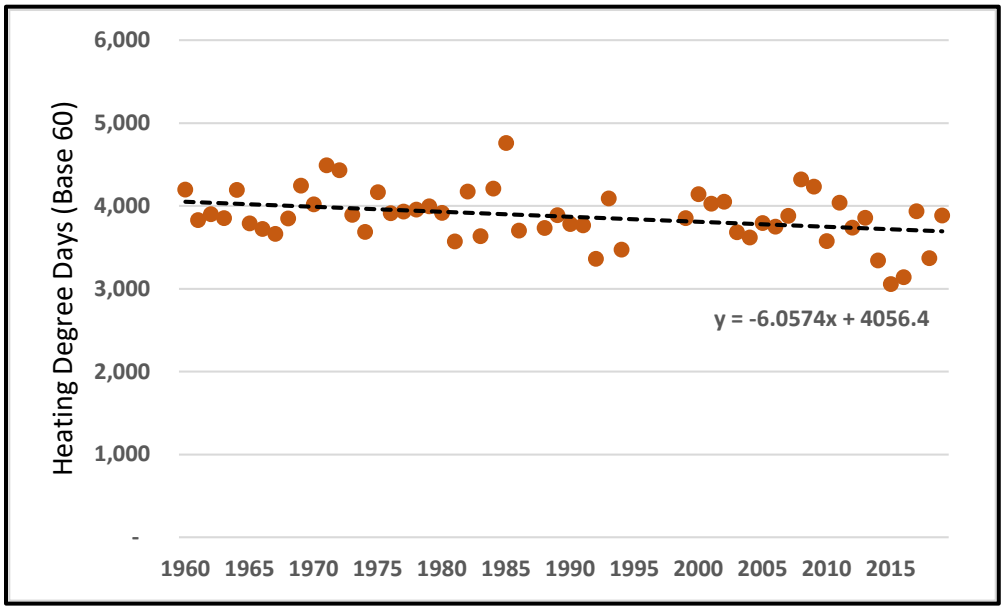

Figure A-11-3: HDD History and Trendline, WA CNGC Weather Stations (1960-2019)

Annual actual HDD since 1960 are plotted in Figure A-10-3 along with a trendline (dashed line) to quantify the magnitude and statistical significance of the trend term ("x" in the equation shown on the chart). As with Figure A-11-2, five years with missing data for one or more weather stations have been removed from the analysis and estimation of the trendline shown in Figure A-11-3. Visually, there appears to be a slight downward trend in HDD over time. By fitting a simple trendline to the data we are able to quantify the magnitude of the trend in HDD and determine if it is statistically significant.

The coefficient of the "x" term in Figure A-11-3 of negative 6.06 (-6.06) means that over the period 1960 through 2019, actual HDD has trended lower by 6.06 HDD with each passing year. The estimated trend toward lower HDD over time is also statistically significant.[69] These findings have implications for the use of NOAA 30-year weather normals. For one, since NOAA 30-year normals are updated every decade, our estimate of trend suggests that by the end of 10 years annual HDD have trended lower by 61 HDD. Another implication is that the presence of trend in historical HDD suggests that a shorter period of time is preferable to a longer period of history so that the average over the entire period is most representative of what can be expected going forward. Another way to see this point is that an annual trend of negative 6.06 HDD suggests that annual HDD are about 91 HDD lower at the end of the 30-year period than they were at the middle of the 30-year period (15 years x -6.06 HDD/year = -91 HDD). Since it has currently been nearly 10 years since the last NOAA update, we can expect that current estimates of HDD to include both sources of differences from trend and are therefore about 152 HDD too high (61+91).[70]

B. Summary and Recommendations – Weather Compared to Normal

Weather has been trending warmer in recent years such that when released, NOAA's weather normals for 1991-2020 are likely to reflect significantly warmer weather than the currently available 30-year normals based on 1981-2010 data. In order to deal with the impact of trending HDD we suggest CNGC consider the following modifications to its definition of normal weather.

- Use a shorter period than 30 years to define climate normals. The use of 30 years by NOAA was decided nearly 100 years ago and is recognized as having shortcomings in today's environment.[71] While it is important to include several years for smoothing irregularities and estimating central tendency in the data, a shorter period will reduce the bias associated with errors due to trending temperatures over the estimation period. We suggest using 20 or 15 years to strike a balance between the need for several years over

[69] The trend coefficient is statistically significant at the 0.01 level of probability. This means there is only a one percent chance of estimating this level of trend (-6.06) or higher if there were no trend.
[70] Another way to see this is an annual trend of -6.06 HDD applied to the distance between the middle and end of the 30-year period (15 years) plus the 10-year lag in NOAA updates since the 1981-2010 normals for a total of 25 years and an overestimate of 152 HDD due to trending weather (-6.06 x 25 years).
[71] See "https://www.ncdc.noaa.gov/news/defining-climate-normals-new-ways" for history and discussion on this topic.

which to average data and the desire to minimize forecast bias due to trend. While NOAA now publishes 5-, 10-, 15-, and 20-year normals all periods end with 2010.

- Use a rolling annual update of normal weather to minimize bias due to the lag between the estimation period and the forecast period. For example, 20-year rolling normal weather would be updated annually using weather from 2000-2019, 2001-2020, 2002-2021, etc. Such updates would take place soon after the end of the 20-year period and are not available from NOAA.

We recognize that these changes would require greater expense on CNGC's part in developing or acquiring weather normals. Such updates would need to allow for data irregularities such as missing data imputation. Also, a change in how normal weather is calculated requires internal and external review and discussion. Improvements in the definition of normal weather along the lines of these recommendations will however reduce forecast bias from unaccounted-for trends in normal weather.

Section 12. Appendix - Exogenous Forces

In earlier eras in the United States, "conservation" meant water, soil, wildlife, and forest conservation. The ethic was to respect nature, use but no misuse the natural world, and ensure the health and contribute to the resilience of the natural environment. When, partly as a result of successive energy crises, and influenced by the "limits to growth" understanding, the growing conservation movement found expression in energy conservation, it was initially guided by the earlier the concept of conservation.[72] Within less than twenty years, however, and as cost-benefit methodology and standard cost tests were adopted to assess energy conservation programs, "conservation" in the earlier sense of using less energy and living within limits became largely replaced with the concept of "energy efficiency" (Figure 11-1).

Energy efficiency and energy conservation are related but different.

Sometimes people confuse energy efficiency with energy conservation. When someone follows the advice on a sign that says, "Be energy efficient—use the stairs instead of the elevator," are they increasing energy efficiency? No. The elevator will operate less often, but it will still use the same amount of electricity when it does operate. Using the stairs instead of an elevator is energy conservation. Two or more people using the elevator at the same time is more efficient than just one person using it.

- **Energy efficiency** is using technology that requires less energy to perform the same function. Using a light-emitting diode (LED) light bulb or a compact fluorescent light (CFL) bulb that requires less energy than an incandescent light bulb to produce the same amount of light is an example of energy efficiency.
- **Energy conservation** is any behavior that results in the use of less energy. Turning the lights off when leaving the room and recycling aluminum cans are both ways of conserving energy.

US Energy Information Administration, "Use of energy explained: Energy efficiency and conservation." (https://www.eia.gov/energyexplained/use-of-energy/efficiency-and-conservation.php)

Figure A-12-1: Energy Efficiency and Energy Conservation.

A. Energy Sufficiency

Since the late 1990's and influenced partly as a result of the acceleration of climate change, the concept of "energy sufficiency" has been gradually restoring the older conservation understanding (Figure A-11-2). Information in this figure is from the Energy Sufficiency Project of the European Committee for an Energy Efficient Economy (ECEEE). Moving beyond the earlier concept of energy conservation, energy sufficiency is focused also on social inclusion. That means ensuring that everyone has the affordable energy that they need and avoiding energy

[72] One of the iconic images of the conservation era was President Jimmy Carter, a plantation farmer and nuclear engineer, who put a small solar installation on the White House (later removed by the other party) and who always wore a sweater while addressing the nation. Conservation meant not only using less energy, but wearing a sweater – keeping people warm, rather than rooms. It included efficiency as a component.

waste. It combines the goals of conservation (using less energy), social inclusion in the use and the production of energy (no one should be left out), and energy efficiency (optimizing to do more with less). The energy sufficiency approach includes both conservation (residential and commercial/industrial) and low-income programs. It combines conservation, and understanding of limits, and technical efficiency.

Energy Sufficiency

And now picture this: a modern apartment block, designed so that it stays warm in winter and cool in summer with very little energy use; designed so that the numbers and sizes of rooms in each apartment can be changed as families grow and contract; designed with shared laundry rooms and guest rooms so that space and equipment is fully utilised. That's energy sufficiency….

When we talk about energy sufficiency we are talking about a situation in which everyone has affordable access to the energy services they *need*, in which the energy services we *want* are equitably shared, and in which the environmental limits of the planet are respected.

Energy sufficiency goes beyond energy efficiency. It recognises the planetary boundaries within which we have to live, but at the same time supports progress towards greater wellbeing. To move towards the energy sufficiency space – the safe space for humanity in terms of energy use – we need to think about both the quantity and the quality of energy services we demand.

Energy Sufficiency, "Progress within Boundaries." https://www.energysufficiency.org/about/living-well-within-the-limits-the-credo-of-this-project/)

Figure A-12-2: Energy Sufficiency.

B. The Times

Conservation and low-income programs are reviewed in their respective sections of this report. In this appendix we note some of the background factors that affect both kinds of programs.

Due to the tension that almost everyone has experienced over the last four years, and particularly during 2020, stable times have seemed a thing of the past. Something similar happened in the 1930's with the intense economic and social shocks of the Great Depression. The Great Depression was resolved, in large part, by centralized federal programs, such as the Civilian Conservation Corps, Social Security, strong labor laws to promote unionization, and the first strong social housing legislation. Such programs helped in the mobilization of the nation to reduce economic oppression, increase security, and to put into place basic standards for quality

of life. The other major factor in recovery from the Great Depression was World War II, which, by necessity, put all combatant nations into command economies for the duration of the war. Though it required serious rationing and control of production through the Office of Price Control and other government agencies for the duration, the war helped pull the economy out of the Great Depression.

There was a long post-war expansion (though there were, even in this period, a series of short economic crises) that seemed essentially stable to those who lived within it – the economy improved over several years. Similarly, in the 1960s, the US was economically strong and socially confident and secure enough to address poverty in the Great Society programs. From the early 1960s through at least 1968, with the Civil Rights movement confronting overt racism, and the Peace movement confronting the wars, the economy exhibited an age of abundance, which seemed to offer the prospect not only of stability but of continuous improvement into the future. With a high economy, stimulated by both the substantial federal social spending of the War on Poverty and then the escalating Viet Nam war spending, the economy was hot, jobs were plentiful and the middle classes experienced confidence in its economic security. This era of stability and improvement ended in the early 1970s.

During a stable time-window, it is possible for programs to focus primarily on tractable variables (those variables that are under program control or that can be strongly influenced by program engagement). However, in times of change, the effects of outside forces on program processes and outcomes are easily seen as important. In such times, like the present and our foreseeable future, external forces typically have more effect on programs than the internal program efforts.

Our times now, with the COVID Recession coming not many years after the Great Recession (from which many have not yet recovered), are in many ways similar to the early years of the Great Depression. There is both a widening of vision to go beyond previous conceptual and program restraints in order to effectively solve problem and accomplish objectives, and a confluence of forces (from the outside) that affect the conservation and low-income programs.

B. Forces

Here are some of the problems associated with factors exogenous to the programs that have major effects.

(1) **Poverty.** The US has never developed a good poverty indicator. A simple approach to cure this, as in some European countries, is to define poverty in relation to the income of the upper income group; if the upper 10 percent take off with radically increased income, adjustments are made within all lower income groups. The US does not do this, so after the Post WWII era and the middle 1960's, since about 1970, the economy has tended to pull apart. Beginning with the Nixon administration, income has separated in the US so that those who have more acquire more, and those who have less have even less. This continuing separation of society is creating an economic and social split between the top group and the other 99 percent and 95 percent of the population. This is why the stock

market can do well when most people are suffering, and why markets for luxury goods can be very healthy while the quality of food deteriorates overall and amounts of basic consumer goods can be less than optimal. To compensate for the failure of the official federal measure of poverty, we usually adjust needs-based programs to run at 150 percent or 200 percent of poverty. It is a useful to do this, but it does not approach running programs at a practical level of income sufficiency.

(2) **General Loss of Income by the lower, middle, and lower-upper income groups.** Programs that might have worked well in the middle 1960s can have problems today because people do not have the relative discretionary income, losing security, resource, and freedom. This creates a drag on any efforts the involve people helping people and makes full program funding more essential. Thinking back over 2019 and 2020, the year 2019 was a good year for reduced unemployment, about as good as it gets. Then we experienced a severe economic shock related to COVID in 2020 in a context of increasing scarcity.

With the exception of the long post-WWII expansion and the War on Poverty plus War in Southeast Asia government stimulus to the economy which followed, the United States economy is rather full of economic shocks. We tend to think of the economy as reliable and stable with some interruptions, but right now it may be more useful to understand the current United States economy as fundamentally unstable with some intervals of relative security and reliability. Seeing the reality of a weaker and weaker middle class, the predation on low- and middle-income students of the US higher education loan system,[73] the long-term decline of labor union membership and its effect on democratic processes, the separation of pay from productivity, it is clear that conservation and low-income programs – to be deeply effective, so as to really work well and be inclusive – need more funding.[74]

(3) **Climate Acceleration.** With the acceleration of climate change, it is important to develop analytic methods[75] and abilities to think more flexibly and productively in time, so that programs are less limited by short time horizons and so that cost-effectiveness

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[73] Johannsen, Cryn, Solving the Student Loan Crisis, Dreams, Diplomas & A Lifetime of Debt. Los Angeles: New Insights Press, 2016.

[74] We are pretty good at energy efficiency, but not very good at energy sufficiency. For sufficiency goals, as opposed to efficiency, see: Raworth, Kate, *Doughnut Economics*. White River Junction, Vermont: Chelsea Green Publishing, 2017. For energy sufficiency, search papers by the European Association for an Energy Efficient Economy (ECEEE). Also see PowerPoint by John Mitchell and Gil Peach, American Energy Services Professionals Conference, Anaheim, California, February 2020; (https://cdn.ymaws.com/www.aesp.org/resource/resmgr/chapters/cachap/energy_sufficiency_-_next_fi.pdf)

[75] See, for example, Marchau, A.W.J., Warren E. Walker, Pieter J.T.M. Bloemen & Steven W. Popper, eds., *Decision Making Under Deep Uncertainty, From Theory to Practice*. Cham, Switzerland: Springer, 2019.

might be approached from a more long-term, strategic perspective[76]. Right now, we are dealing with the COVID emergency and experiencing the COVID Recession, which officially began in February 2020. But disciplined thinking about time, for example, developing analytic practice to routinely look ahead not just twenty years, but forty, fifty, one-hundred, and two-hundred years will likely give us much better answers for program design, a more realistic approach to cost-effectiveness calculations, and will indicate the need for more fully developed program funding. Overall, the Pacific Northwest has done fairly well with the energy efficiency era; now we need to fold conservation in with resilience and inclusion, which will require better tools, better designs, a less reductive understanding of cost-effectiveness, and more full up-front funding.

(4) **Cost Increases.** After February 2020, increasingly, buildings-oriented residential and commercial/industrial programs and home weatherization programs in the US and Canada are experiencing sizable increases in costs of materials as a side effect of the COVID problem. As households experience directives to stay at home as much as possible, sometimes with lockdowns, and since many are working from home, there has been a major increase in demand for materials and equipment used to build, renovate, repair, and weatherize buildings. At the same time, also due to the COVID problem, there are major supply difficulties resulting in higher prices. And labor costs for some of the building trades is being bid upwards. This last tendency, of course, is good for workers, but from a program perspective it means that cost-effectiveness has to be re-thought and production of conservation needs to be put more on the basis of attaining physical targets by certain dates and less on application of cost-tests at the measure and sub-portfolio levels.

(5) **"Higher Hanging Fruit" and Deep Savings.** On December 5, 1980, Congress passed the Pacific Northwest Electric Power Planning and Conservation Act, which authorized the four states of Idaho, Montana, Oregon, and Washington to form the Northwest Power and Conservation Council (Council). One of the chief policies of the new Council was to go after cost-effective conservation. Initially, application of the California tests provided a firm cost justification for strong conservation programs. And, at that time, it was primarily the utilities that conducted the conservation work. The legitimation of conservation was then known as least-cost planning. That is, going after the "low-hanging fruit" first. Initial major programs in the region were building-oriented and spanned across residential, commercial/industrial, and low-income sectors (though certain industrial processes were also addressed).

[76] On perspectives on time, see Ialenti, Vincent, Deep Time Reckoning. Cambridge, Massachusetts: MIT Press, 2020; Bjornerud, Marcia, Timefulness. Princeton, New Jersey & Oxford, United Kingdom: Princeton University Press, 2018.

In the early through middle 1980's the language of conservation was closely tied to regional planning concepts of *improving the building stock of the region*. Also, real conservation was accomplished through utility programs, in part because it took a while for the "big box" home and lumber stores to come on the scene and to offer effective energy saving products. Several other eras of conservation followed the early era in which conservation goals were articulated in terms of improving the regional building stock in all sectors, but cost-effectiveness approaches did not change much until very recently. What we can note, however, is that over four decades of successful integration of the practice of energy conservation with the theory of least-cost planning, including the application of the California cost tests have now come to result in the need to pay more to go deeper. Figure that, to take the perspective of improving the building stock of the Pacific Northwest, and specifically Washington now requires more funding flexibility and more up-front funding than during earlier conservation eras. This factor combines with the climate acceleration factor, in that any new construction project or substantial retrofit should analyze likely effects of climate acceleration for the site and build in long-duration resilience. This will cost more than we are used to. But, done well, it will enable low-income households to remain housed, and permit middle through lower-upper income households to live forward in resilient dwellings while protecting business and industrial infrastructure.

Summary – Exogenous Forces

To understand decoupling and its effect on conservation and low-income programs, it is necessary to take into account a wider vision that includes external factors from the environment. During times of change, these external forces can be stronger than the tractable variables that can be controlled or, in large part driven by the utility and the programs. All of the below background factors produce forces that affect the programs; most are not controllable by the programs.

- Covid and Covid recession driven factors.
- Poverty in the form of income insufficiency, which is not fully covered by the current approximation of using a multiple of the federal poverty level.
- Loss of coverage of parts of inflation in the annual adjustment of poverty level and social security payments using the Consumer Price Index (CPI).
- There is a general loss of real income and a pulling apart of society as income moves to the top (and away from low-income, middle-income, and lower-upper income households). As more and more of income is allocated to the upper ten percent of households by income, this reduces the ability of families and social networks to offer voluntary support and makes more robust programs more necessary.
- Climate acceleration requires much better analytic work to fold conservation within practical resilience.
- Costs for conservation work are increasing relatively rapidly.

- We have secured the “low-hanging fruit” and now we are left with much “higher-hanging fruit” without the same ability to spread costs within a measure package.

Yet, though subject to all of these external forces, the programs play an important role in evening out structural and social problems in the general economy and supporting energy savings and climate adaptation. Utilities, guided by the commission and directed by legislation, essentially serve as a kind of “shock absorber”, advancing societal goals of conservation, inclusion, and energy efficiency during times of change. The programs are much stronger now, as a result of substantial commitment and experience; and better adapted to engage whatever the future may bring. As this report shows, CNGC has mature programs, has the interrelationships to ensure progress in the light of current knowledge, and is operating in good faith.

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Section 14. **Recommendations**

(1) We recommend that the 3 percent cap, when applicable be applied, to each customer class. In our assessment an objective of a rate cap is to limit rate shocks due to decoupling. If a rate increase due to decoupling is limited to 3 percent for all customers on average yet one or more customer classes experience significantly higher increases, then the objective of limited rate shocks may not be realized. (Page 3-21)

(2) Continue optimizing low-income weatherization with Customer Assistance Program approach. Working with the CAPs is part of being an integral part of the community and sharing in decision-making. Continuing to work with the CAPs, the Department of Commerce, the advocates, and the Commission is the optimal path for proceeding in this work. Though it takes time to work things through when engaging participation, CNGC is working in a promising direction with substantial accomplishment with mutual cooperation and coordination. (Page 8-13)

(4) Consider conducting a systematic assessment of low-income weatherization walkaways. In federal/state Weatherization Assistance, walkaways are usually due to the need for a substantial amount of home repairs that must be completed before weatherization measures can be usefully installed. Sometimes, it is substantial health and safety improvements are required. Or it can be both. A walkaway is a devastating thing for a low-income household, and it can mean that a low-income household is unhoused, for example, when the furnace is red tagged or there are holes in the building shell. (Page 8-13)

(5) If low-income housing is to be meaningfully addressed, there will need to be a continuing and programmatic commitment to meet needs as cost per weatherization job increases, as is the current situation. This is particularly necessary if equity and inclusion goals are implemented on a practical basis to achieve actual results. Homes which cost more tend to be homes in which the weatherization (sometimes including furnace replacement) is the primary factor that enables a household to remain housed. This benefit is not captured in standard cost-benefit analysis but is at the root of a just society. It is likely that decisions to proceed need to be policy-based on building sciences and health criteria as well, rather than simply by a standard cost-benefit criterion. (Page 8-14)

(6) CNGC could consider adding a housing component that could be operated by CNGC as an enterprise housing utility. Looking ahead, with the accelerating climate change, this is a way to continue to ensure development and ongoing operation and maintenance of high quality, healthy, decent, safe, and sanitary housing that is also resilient under expected changed climate conditions, and meet carbon goals, while adding an area of activity. (Page 8-14)

(7) There is a problem in the design of the mechanism to the extent that calculations are performed at an individual rate level. CNGC has fixed this problem by moving to consolidated rate groups. We recommend that CNGC continue this approach. (Page 9-2)

(8) Use a shorter period than 30 years to define climate normals. The use of 30 years by NOAA was decided nearly 100 years ago and is recognized as having shortcomings in today's environment.[77] While it is important to include several years for smoothing irregularities and estimating central tendency in the data, a shorter period will reduce the bias associated with errors due to trending temperatures over the estimation period. We suggest using 20 or 15 years to strike a balance between the need for several years over which to average data and the desire to minimize forecast bias due to trend. While NOAA now publishes 5-, 10-, 15-, and 20-year normals all periods end with 2010. (Page 10-5)

(9) Use a rolling annual update of normal weather to minimize bias due to the lag between the estimation period and the forecast period. For example, 20-year rolling normal weather would be updated annually using weather from 2000-2019, 2001-2020, 2002-2021, etc. Such updates would take place soon after the end of the 20-year period and are not available from NOAA. (Page 10-5)

[77] See "https://www.ncdc.noaa.gov/news/defining-climate-normals-new-ways" for history and discussion on this topic.

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