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Verlon G. Otto
Director, Regulatory Affairs

Via E-File

March 6, 2020

B.C. Utilities Commission
Suite 410, 900 Howe Street
Vancouver, BC V6Z 2N3

File No.: 4.2.7(2020)

Attention: Patrick Wruck
Commission Secretary and Manager, Regulatory Services

Dear Mr. Wruck:

Re: Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd.
Application for Acceptance of 2019 Consolidated Resource Plan and for Acceptance of Energy Conservation and Innovation (ECI) Portfolio Funding for 2020 and 2022
Response to BCSEA Information Request No. 1

Accompanying, please find the response of Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd. (collectively, PNG) to British Columbia Sustainable Energy Association (BCSEA) Information Request No. 1 in the referenced proceeding.

Printed copies of the response will be delivered by courier on Monday, March 9, 2020, including 10 copies to the BCUC's office and one copy to each of the parties who registered as interveners in this proceeding.

Please direct any questions regarding this letter to my attention.

Yours truly,

Verlon G. Otto

cc. Bill Andrews – BCSEA
Tom Hackney – BCSEA
Leigha Worth (BCPIAC) – BCOAPO

REQUESTOR NAME:	**BC Sustainable Energy Association**
INFORMATION REQUEST:	**No. 1**
TO:	**Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd.**
DATE:	**February 6, 2020**
PROJECT NO:	**1599056**
APPLICATION NAME:	**Application for Acceptance of 2019 Consolidated Resource Plan and for Acceptance of Energy Conservation and Innovation (ECI) Portfolio Funding for 2020 and 2022**

1. Introduction

1.0 Topic: CleanBC Plan
Reference: Application, Exhibit B-1, p.16

"The CleanBC Plan, released in December 2018, sets out a broad suite of policies aimed at reducing annual greenhouse gas (GHG) emissions in the province by 18.9 mega-tonnes (Mtpa) by 2030. Specific policies reflected in the demand forecasts and strategies set out in PNG's Consolidated Resource Plan are:

a) Increasing the energy efficiency of new and existing buildings;

b) Requirements for 15 percent of natural gas consumption to be from renewable gas;

c) Incentives to industry for reducing their GHG emissions; and

d) Targets for zero emission vehicles."

1.1 Please identify the elements of the 2019 Consolidated Resource Plan that correspond to each of the four CleanBC Plan policies.

Response:

PNG has reflected the CleanBC Plan's policy regarding increasing the energy efficiency of new and existing buildings in its residential and small commercial load forecasts. This is specifically described in Sections 7.3.1.2 and 7.3.2.2 of the 2019 Consolidated Resource Plan and ECI Plan (Application). Appendix C: Demand Scenarios ("Energy Efficiency Retrofits" and

"Energy Efficiency New Construction") presents the additional reductions in residential and small commercial use per account (UPA) anticipated as a result of the CleanBC Plan policy.

PNG is developing its renewable natural gas (RNG) strategy in response to the CleanBC 15 percent RNG target. This is discussed in Section 4.4 of the Application.

PNG does not currently offer incentives for industry related to reducing their GHG emissions. The CleanBC Program for Industry offers both an Industrial Incentive Program that reduces carbon-tax costs for operations based on performance against world leading emissions benchmarks, and a CleanBC Industry Fund that invests some industrial carbon tax revenue directly into emission reduction projects.

PNG does not have any targets for zero emission vehicles at this time.

2.0 Topic: Resource Planning Objectives
Reference: Application, Exhibit B-1, section 1.4; Appendix A, Resource Planning Objectives; Section 9 Portfolio Evaluation and Planning

Compared to the PNG(NE) 2015 Resource Plan, in the 2019 Consolidated Resource Plan PNG has increased the weighting on "Alignment with BC Energy Objectives from 10% to 15% and has decreased the weighting on "Least Cost Service" from 30% to 25%. [pp.10-11]

In Section 9 Portfolio Evaluation and Planning, PNG states:

> "Leaving aside the prospect of significant additional demand on the PNG-West system as a result of the RECAP, no new supply or capacity resources are required to meet identifiable customer demand at this time or within the near future. The development of resource portfolios was therefore not considered necessary and PNG concludes that there is no requirement to complete a resource portfolio evaluation for this Consolidated Resource Plan." [p.134]

2.1 What is the practical effect of PNG's amendment of the weighting of the Resource Planning Objectives?

Response:

Please see the response to BCUC IR 1.1. PNG submits that CleanBC Plan, and regulations leading to the reduction of GHG emissions warrant an increased focus by PNG. However, PNG expects that additional costs will be associated with attaining these emissions reductions. While PNG remains frugal and diligent about the impact of even small cost increases on its customers, PNG expects that the current and future regulatory environment provides ample signals that the objective of reducing GHG emissions must take an increased priority in relation to the objective of reducing costs to its customers.

In light of these considerations, PNG submits that an increase of 5 percent to Objective 6 is sufficient to increase its priority relative to the other objectives, while not diminishing, significantly, PNG's focus on the provision of least cost service (Objective 2).

3.0 Topic: FortisBC's 30BY30 Target for a lower carbon future
Reference: FortisBC website: https://www.fortisbc.com/news-events/media-centre-details/2019/09/23/fortisbc-sets-30by30-target-for-a-lower-carbon-future. [downloaded January 7, 2020

FortisBC states in a media release of September 23, 2019:

"FortisBC sets 30BY30 Target for a lower-carbon future

Sep 23, 2019

Share

Company aims to cut 30 per cent of overall customer emissions by 2030

Vancouver, B.C. – September 23, 2019: FortisBC has established its first ever emissions reduction goal, representing one of the most ambitious emissions reduction targets in the Canadian utility sector. In announcing its 30BY30 Target, FortisBC will work to reduce GHG emissions associated with their customers' energy use by 30 per cent overall by the year 2030. [underline added]

"As the foremost energy provider to British Columbians, we have the opportunity to advance a cleaner energy future for the province and do our part in the global campaign against climate change," said Roger Dall'Antonia, President and CEO of FortisBC, "Our aim with 30BY30 is to accelerate emissions reductions across our customer base and lead the way to a lower-carbon economy."

Last year, FortisBC released its plan to reduce emissions, the Clean Growth Pathway to 2050, as part of the consultation surrounding the Province's CleanBC strategy. The Clean Growth Pathway outlined four key areas to make substantial reductions in GHG emissions across the province by:

- tripling investment in energy efficiency in homes, businesses and industry and developing innovative energy projects in B.C.'s communities,
- investing in low and zero-carbon vehicles and transportation infrastructure,
- increasing Renewable Gas inventory by increasing Renewable Natural Gas (RNG) supply and advancing hydrogen deployment,
- positioning B.C. as a vital domestic and international Liquefied Natural Gas (LNG) provider to lower global GHG emissions.

Throughout 2019, FortisBC has undertaken action supporting these key areas including the opening of twelve new EV charging stations, supporting the use of

RNG in buses, supplying LNG for Canada's first international LNG export and committing to spending $368 million between 2019 and 2022 on energy-efficiency programs and rebates.

"We set our way forward through our Clean Growth Pathway. 30BY30 will focus our organization on that path and drive us to find innovative new solutions that advance a sustainable future in an affordable way," said Dall'Antonia.

For more information on FortisBC's 30BY30 Target, visit fortisbc.com/30BY30."

3.1 Is PNG aware of FortisBC's 30BY30 Target?

Response:

Yes, PNG is aware of this target.

3.2 Has PNG considered adopting a target to reduce GHG emissions associated with its customers' energy use?

Response:

Yes. PNG is currently evaluating whether to adopt a target to reduce GHG emissions associated with customers' energy use.

3.2.1 Would PNG be willing to consider establishing such a target? Please discuss.

Response:

Please see the response to Question 3.2.

4.0 Topic: Customer Rates and Use Per Customer
Reference: Application, Exhibit B-1

PNG provides rates information on its website. An example for Vanderhoof to Prince Rupert / Kitimat /Terrace residential is at: https://www.png.ca/residential/rates/vanderhoof-to-prince-rupert-kitimat-terrace.

4.1 Please provide a table or tables setting out PNG's January 1, 2020 rates by service areas and by rate class.

Response:

Please see the tables that follow.

PNG Residential Rates Effective January 1, 2020

Service Area	Basic Monthly Charge $/Month	Delivery + Commodity Charge $/GJ
Vanderhoof to Prince Rupert / Kitimat/Terrace	10.75	15.924
Fort St. John	7.00	6.968
Dawson Creek	7.00	6.770
Tumbler Ridge	8.50	13.065

PNG Small Commercial Rates Effective January 1, 2020

Service Area	Basic Monthly Charge $/Month	Delivery + Commodity Charge $/GJ
Vanderhoof to Prince Rupert / Kitimat/Terrace	25.00	13.953
Fort St. John	7.00	5.768
Dawson Creek	7.00	5.231
Tumbler Ridge	8.50	10.757

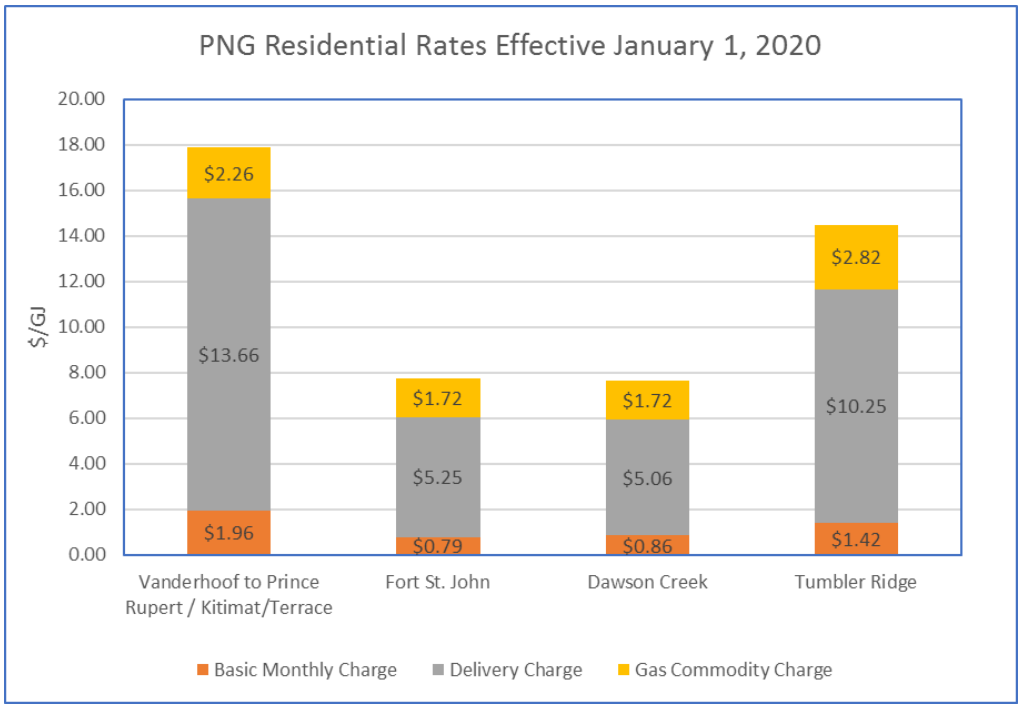
4.2 Please provide a summary graphic and table illustrating the differences in rates between the various service areas, by rate class.

Response:

Please see the tables and graphs that follow. The unitized monthly fixed charge is determined from the 12 monthly fixed charges divided by the annual use per account.

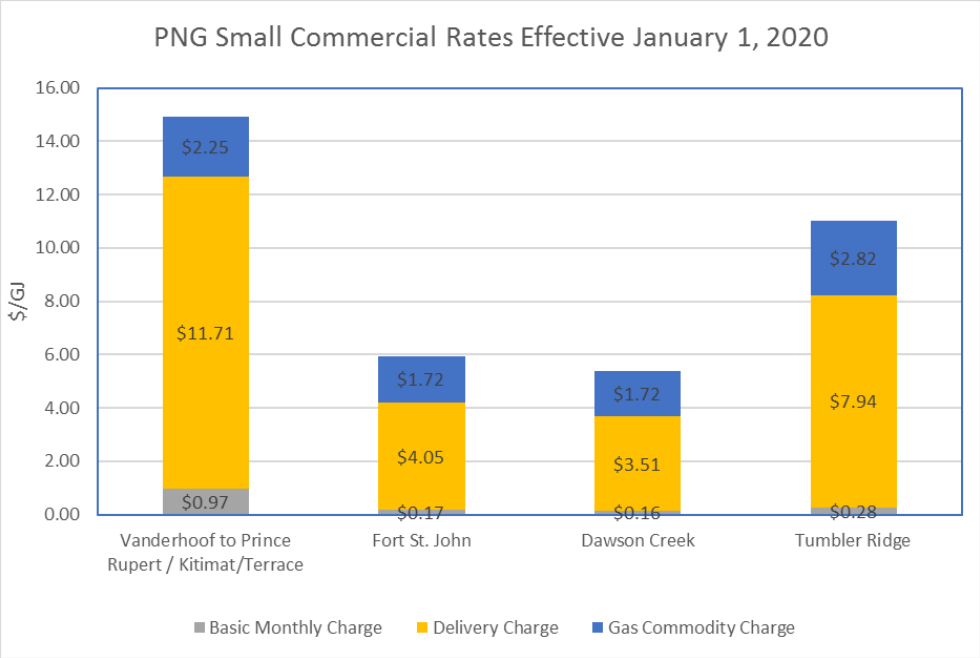
PNG Residential Rates Effective January 1, 2020

Service Area	Basic Monthly Charge ($/GJ)	Delivery Charge ($/GJ)	Gas Commodity Charge ($/GJ)
Vanderhoof to Prince Rupert / Kitimat/Terrace	1.96	13.663	2.261
Fort St. John	0.79	5.253	1.715
Dawson Creek	0.86	5.055	1.715
Tumbler Ridge	1.42	10.246	2.819



PNG Small Commercial Rates Effective January 1, 2020

Service Area	Basic Monthly Charge ($/GJ)	Delivery Charge ($/GJ)	Gas Commodity Charge ($/GJ)
Vanderhoof to Prince Rupert / Kitimat/Terrace	0.97	11.706	2.247
Fort St. John	0.17	4.048	1.720
Dawson Creek	0.16	3.511	1.720
Tumbler Ridge	0.28	7.938	2.819



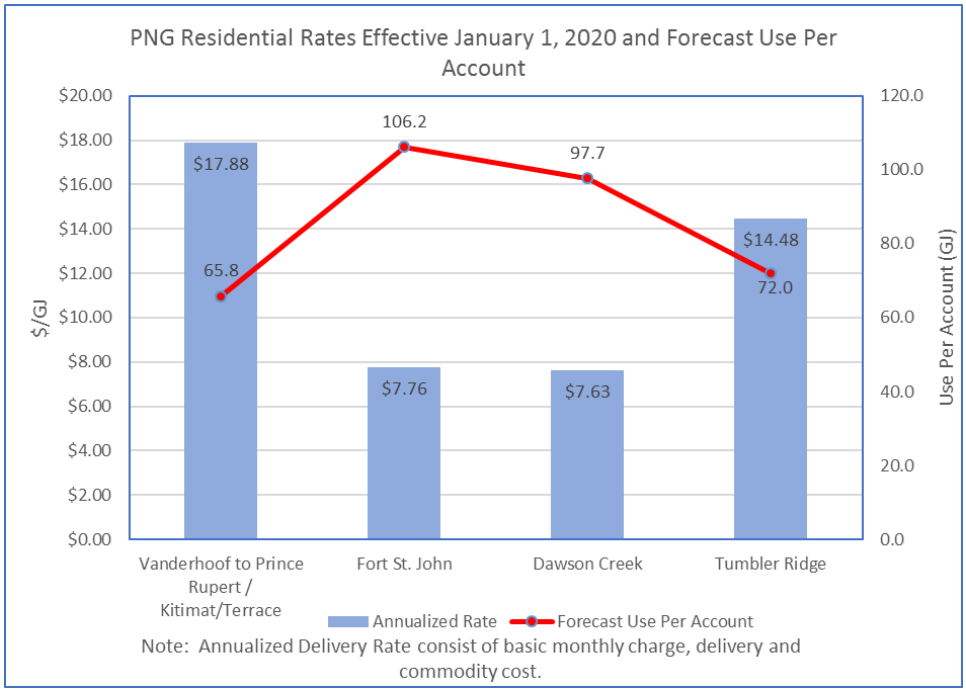
4.3 For each of the rate classes, please provide a summary graphic and table illustrating Use per Account and rates for each of the service areas.

Response:

Please see the table and graphs that follow. The annualized rate includes the delivery and commodity charges, as well as 12 monthly fixed charges divided by the forecast annual use per account.

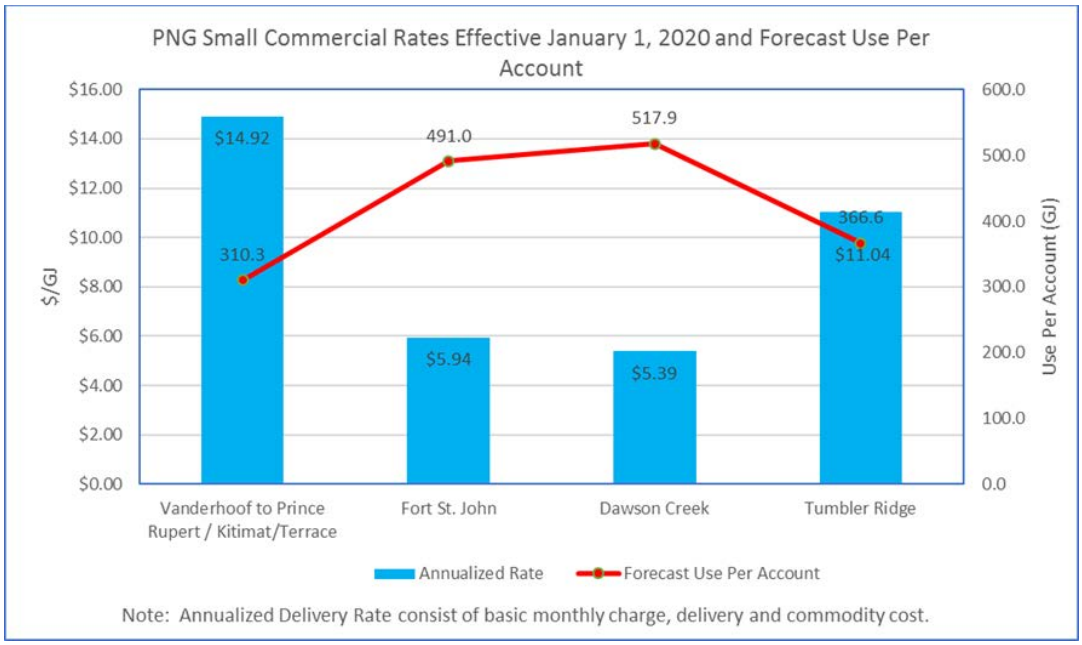
PNG Residential Rates Effective January 1, 2020 and Use Per Account

Service Area	Annualized Rate ($/GJ)	Forecast Use Per Account (GJ/Year)
Vanderhoof to Prince Rupert / Kitimat/Terrace	17.88	65.8
Fort St. John	7.76	106.2
Dawson Creek	7.63	97.7
Tumbler Ridge	14.48	72.0



PNG Small Commercial Rates Effective January 1, 2020

Service Area	Annualized Rate ($/GJ)	Forecast Use Per Account (GJ/Year)
Vanderhoof to Prince Rupert / Kitimat/Terrace	14.92	310.3
Fort St. John	5.94	491.0
Dawson Creek	5.39	517.9
Tumbler Ridge	11.04	366.6



Note: Annualized Delivery Rate consist of basic monthly charge, delivery and commodity cost.

4.4 Can it be observed that use per customer is inversely related to rates, between service areas?

Response:

No. There are a number of factors that determine a customer's use per account (UPA). Primary among them is the regional climate that they live in, with higher residential UPA's exhibited in the colder northeastern service areas of Fort St. John and Dawson Creek, as well as in the eastern portion of the PNG-West service area (from Smithers east to Vanderhoof). In addition, dwelling size and occupancy play a direct role in the space heating demand. The lower residential UPA in Tumbler Ridge reflects, in part, a higher rate of unoccupied dwellings having much lower demand. PNG has adjusted all of the UPA numbers presented in this Application to reflect normal weather patterns. A correlation of actual use per account with changes in delivery and commodity rates, the latter which may be adjusted quarterly, is therefore very difficult if not impossible to determine.

4.5 In PNG's view, what are the implications of the relationship between Use Per Account and rates in terms of PNG's resource and DSM planning?

Response:

PNG routinely monitors the cost of delivering natural gas to its customers, and compares this to the cost of electricity delivered by BC Hydro. This comparison is presented in Section 2.4 of the Application. This analysis shows that natural gas service is expected to remain competitive with electricity over the planning period spanned by the Application. In addition, information from the 2019 Customer Attitudes survey shows that PNG's customers view natural gas as the preferred energy source. Based on the results of the analyses presented in Section 2.4, PNG determined that natural gas demand remains relatively inelastic amongst PNG's customers. PNG has therefore not reflected the cost of natural gas service in the demand forecasts presented in this Application.

2. Energy Market Outlook

5.0 Topic: Policy Environment and Outlook
Reference: Application, Exhibit B-1, Section 2.1, Policy Environment and Outlook, p.23, pdf p.41

PNG outlines a substantial body of energy conservation and GHG reduction policies and initiatives forming context for the 2019 Consolidated Resource Plan, including:

- federal policies and initiatives such as the Pan-Canadian Framework on Clean Growth and Climate Change to implement Canada's commitments under the Paris Climate Agreement, the development of the federal Clean Fuel Standard, appliances and equipment standards, and the National Model Building Code,

- BC provincial energy use policies and initiatives including the CleanBC Plan addressing homes and buildings, remote communities, industry, transportation, and renewable natural gas, the CleanBC Program for Industry, and the BC Hydrogen Roadmap,

- BC provincial legislation and regulations including the Carbon Tax Act, the Greenhouse Gas Reduction (Emissions Standards) Statutes Amendments Act, the Demand Side Measures Regulation, the Clean Energy Act and Greenhouse Gas Reduction Regulation, the amended Drilling and Production Regulation, the BC Building Code, and the BC Energy Step Code, and

- Municipal energy conservation and GHG reduction policies under the BC Climate Action Charter, adopted by Prince Rupert, Terrace, Smithers, the Peace River Regional District, Fort St. John, Taylor, Dawson Creek, Pouce Coupe and Tumbler Ridge.

5.1 What is PNG's view of the implications of the energy use and climate action policy context for the 2019 Consolidated Resource Plan and ECI Plan?

Response:

PNG has fully described how federal and provincial policies are reflected in its forecast of customer additions, residential and small commercial UPA, and large customer demand in Section 6 and 7 of the Application.

6.0 Topic: Efficiency of Natural Gas
Reference: Application, Exhibit B-1, p.15, pdf. p.33

With reference to the BC energy objective "2(l) to foster the development of first nation and rural communities through the use and development of clean or renewable resources," PNG states:

> "Natural gas is the most efficient source of energy for thermal requirements..."

6.1 Please explain specifically what is meant by this statement.

Response:

PNG considers natural gas is utilized much more efficiently in direct space and water heating applications than it is by first converting it to electricity.

6.2 Provide all sources that support PNG's position.

Response:

PNG's observation is consistent with accepted engineering principles that generation and transmission losses in the electric grid are generally greater than in the natural gas production, transmission and distribution system.

6.3 Please confirm, or otherwise explain, that conventional natural gas is not a "clean or renewable resource."

Response:

Conventional natural gas is a fossil-based fuel, albeit the lowest greenhouse gas (GHG) emitting fossil-based fuel. Therefore, within time spans less than millions of years, the fuel is not considered renewable. To the extent that natural gas combustion and venting emit GHG's that are not offset by sequestration in its feedstock over the near term (as would be the case for RNG produced from biomass), natural gas would not be considered carbon neutral. To the extent that natural gas combustion generates particulates, NOx and SOx and GHG's at levels far below other fossil fuels, such as diesel or coal, natural gas is clearly a cleaner alternative.

7.0 Topic: Regional Economic Outlook
Reference: Application, Exhibit B-1, Section 2.2, Regional Economic Outlook, p.32, pdf p.50

7.1 In PNG's view, what are the main points of the Regional Economic Outlook that affect the Consolidated Resource Plan?

Response:

Please see PNG's responses to BCUC 6.1 and 7.1.

8.0 Topic: Supply Outlook
Reference: Application, Exhibit B-1, Section 2.3, Supply Outlook, p.54, pdf p.72

8.1 Please indicate the markets (market hubs) from which PNG obtains natural gas supply for each of its service areas.

Response:

PNG sources almost all of its gas supply from the Westcoast Station 2 market hub. Natural gas delivered to the communities of Wonowon, Tomslake and Tumbler Ridge is sourced directly from producers' pipelines connected to these local distribution grids. PNG also purchases gas from a connection with the Canadian Natural Resources Ltd (CNRL) transportation pipeline for additional supply to serve customers in the northern, rural portion of PNG's Fort St. John service area. Finally, PNG purchases gas at the outlet of the Westcoast Fort Nelson gas plant for delivery to the community of Pink Mountain. Collectively, these sources comprise only a small portion of PNG's overall gas supply portfolio.

8.2 In PNG's view, what are the main points of the Supply Outlook that affect PNG's acquisition of natural gas during the CRP planning period?

Response:

Please see the response to BCUC 40.3.

9.0 Topic: PNG Burner Tip vs. Electricity Costs
Reference: Application, Exhibit B-1, Section 2.4, p.56-59, pdf p.74-77

"Environmental policies and regulations, and customer perceptions all play a role in the continued acceptance of natural gas as source of energy for PNG's customers. However, short of regulations prohibiting the continued use of natural gas as a source of thermal energy for PNG's customers, or very significant increases to the price of carbon that eliminate the cost advantage natural gas holds over electricity, PNG expects that natural gas service will continue to be the most affordable energy source in all of PNG's service areas over the foreseeable future (Figure 9)." [underline added]

In Figures 9 and 10, PNG provides a comparison of forecasts of its residential burner tip natural gas rates with adjusted BC Hydro residential electricity rates on a $/GJ basis.

9.1 Please confirm, or otherwise explain, that the comparison of PNG's residential natural gas rates and BC Hydro's residential electricity rates in Figures 9 and 10 does not take into account the capital cost of space and water heating equipment.

Response:

Confirmed.

9.2 Please explain the notes to Tables 9 and 10 saying "Relative efficiency of electricity is assumed to be 90%." I.e., efficiency of electricity relative to what?

Response:

PNG concedes that the wording chosen for these notes can be misleading. The results of the calculations of the relative costs of electricity compared to PNG's natural gas service reflects the case where a customer's natural gas furnace is 90 percent efficient whereas electric baseboards are considered 100 percent efficient. Since the price comparison is from the perspective of natural gas delivery, the cost of electricity has been decreased by a factor of 0.9. The cost comparison therefore recognizes the higher efficiency inherent in baseboard heaters. This method of comparison is consistent with what PNG has presented in previous resource plans.

9.2.1 What is the basis for the 90% figure for "relative efficiency of electricity"?

Response:

Please see the response to Question 9.2.

9.3 Please confirm, or otherwise explain, that Figures 9 and 10 assume electric resistance heating, not heat pumps.

Response:

Confirmed.

9.4 Please provide the analysis, in executable electronic format with all formulas intact, that supports each of the graphs in Figure 9 and Figure 10.

Response:

Please see the working Excel model attached as Exhibit BCSEA 9.4.

9.5 Please provide all assumptions that inform the analysis and provide the basis of each assumption.

Response:

All assumptions are clearly identified in the working Excel model attached as Exhibit BCSEA 9.4. All of these assumptions are described in Section 2.4 of the Application.

9.6 Please clarify: Is the Reference Gas Price Forecast used in Figure 9 and Figure 10 the same as what PNG refers to when it states on page 59 "For this comparative cost analysis, PNG has used an average of the 'NEB Reference', 'NEB High' and industry forecasts, with a small discount to reflect purchases of gas at Stn 2"?

Response:

Confirmed. The narrative on page 59 of the Application describes the natural gas cost assumptions that are used in Figures 9 and 10.

9.6.1 Is the dashed purple line on Figure 11, labeled "Average," the Reference Gas Price Forecast used in the CRP? If not, please provide a graph and table showing the Reference Gas Price Forecast.

Response:

Confirmed. This is the average of the 'NEB Reference', 'NEB High' and industry forecasts. PNG's gas supply portfolio is a mix of gas priced at AECO and Station 2 and the gas price forecast used in the Application reflects a blend of AECO and Station 2 prices.

9.7 Is there a figure in the Application that shows PNG's "High Carbon Price + 5% RNG @ $30/GJ" gas price scenario? If not, please provide a graph and table that show it.

Response:

Figure 10 in the Application shows the High Carbon Price + 5% RNG scenario (as described in the titles of the charts).

9.8 Please explain how the "High Carbon Price + 5% RNG @ $30/GJ" gas price scenario relates to the Competitive Electricity Scenario.

Response:

As stated on page 111 of the Application, the scenarios are based on changes to the residential and small commercial demand resulting from changes in the penetration of natural gas as the fuel for space and water heating applications in response to the perceptions of customers regarding the GHG emissions of natural gas and the relative cost advantage of natural gas over electricity. Under the Competitive Electricity scenario, new customer capture rates, and the portion of new construction heated by natural gas are lower than under the Reference and Competitive Gas scenarios. Please see also Appendix C of the Application which presents all of the assumptions used in developing the planning scenarios.

3. Customer Attitudes

10.0 Topic: Customer Attitudes
Reference: Application, Exhibit B-1, Appendix IV, PNG Customer Surveys, Final Report, April 22, 2019, pdf p.400

"Regionally, residential and commercial customers in PNGW/TR are significantly less likely than their FSJ/DC counterparts to think natural gas is reasonably priced; to agree that natural gas is a clean and efficient source of energy, or to agree that it is cheaper to heat their home with natural gas than electricity. These findings are consistent with regional differences in PNG's residential natural gas pricing." [pdf p.400]

10.1 Does PNG consider that this finding supports enhanced DSM effort in the PNG-W and Tumbler Ridge service areas?

Response:

PNG would not consider differentiated programs and incentives in PNG-West and Tumbler Ridge, as compared to Fort St. John and Dawson Creek. PNG prefers to maintain an ECI program that is available to all customers, regardless of their location.

PNG supplies approximately 6.8 petajoules (PJ) of natural gas to approximately 40,000 customers across small communities in northern B.C. To provide additional perspective on the scale of PNG's operations, PNG serves a natural gas load comparable in size to the cities of Coquitlam or Kelowna. PNG does not consider a differentiated service offering to perhaps half of its already small customer base to have a meaningful impact on participation rates. PNG considers that offering a differentiated program would create confusion amongst, and potentially discriminate between, its customers.

"Significant proportions of residential and commercial customers feel they have reduced their energy use as much as reasonably possible (55% residential, 69% commercial)." [pdf p.400]

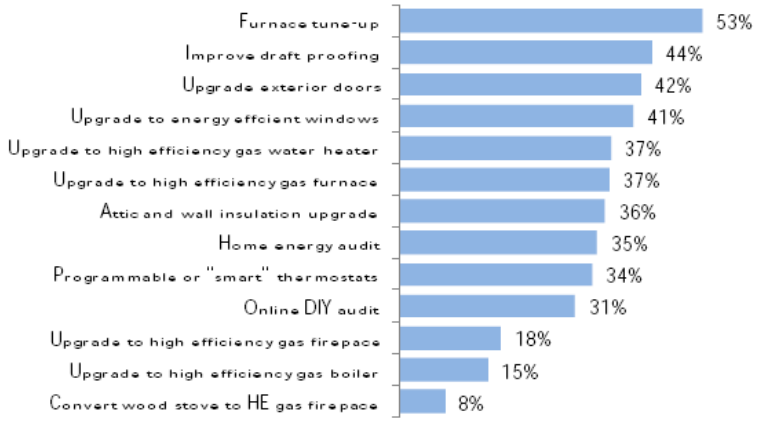
10.2 Does PNG have any validation of the accuracy of this opinion expressed by survey respondents?

Response:

Pages 10-11 of the 2019 Customer Attitudes Survey Final Report (attached as Appendix IV of Appendix F- DSM Plan) describes the statistical accuracy of the results of the 2019 Customer Attitudes survey.

"[Residential Survey Results] The results, summarized in Figure 4, show respondents are most interested (indicated they were either *extremely* or *very* interested) in a furnace tune-up program (53% very or extremely interested), a program to improve draft proofing (44%) and programs to upgrade either exterior doors (42%) or windows (41%). Respondents showed the least interest in upgrading to a gas fireplace to a high-efficiency model (18%), upgrading a gas boiler (15%), and converting a wood stove to a high-efficiency gas fireplace (8%). The low interest for gas boilers is driven, in large part, to their low penetration (used by 7% of residential respondents as either their main or secondary space heating method. Source: Table 16, Table 18)." [footnote removed]

Figure 4: Interest in Programs and Services – Residential Survey
Percent of Survey Respondents – Very or Extremely Interested



[pdf p.423, italics in the original]

10.3 Please explain why PNG chose to include only the Furnace Tune-Up and Smart Thermostat measures in the proposed residential DSM program, and not the other measures.

Response:

Please see Section 4.2 of the 2019 DSM Plan attached as Appendix F to the Application. PNG has defined the principles used to guide the development of the ECI Program, one of which is to "leverage available programs and incentives from other organizations, agencies, and utilities". The CleanBC Better Homes web portal offers window and door replacement rebates from the B.C. Government available to home owners residing in PNG's service areas.

PNG also refers to section 10.2.1. of the 2019 DSM Plan which states that "The Efficient Heating program is designed to improve the visibility and satisfaction of PNG's ECI programs by appealing to a broad segment of PNG's residential customers. A furnace tune up and smart thermostat were identified as the most relevant programs or services that PNG could offer to help customers reduce their energy use."

In the 2019-2020 ECI Program Funding Application, PNG proposed a natural gas furnace replacement rebate program that was subsequently denied by the BCUC in Order G-121-19.

Finally, PNG submits that the Schedule of Expenditures for continued funding of PNG's existing ECI programs, as well as additional programs, over the period from 2020 to 2022 goes beyond meeting the adequacy requirements in Section 3 of the Demand-Side Measures Regulation, and is an appropriate expansion of its existing ECI portfolio into the currently underserved residential sector.

"A majority (70%) of respondents indicated they were either *not very knowledgeable* or *not at all knowledgeable* about renewable energy sources like bio-methane (Table 36). Indeed, only 5% felt they were either *extremely* or *very* knowledgeable and another one-quarter (25%) indicated they were *somewhat* knowledgeable. Awareness of bio-methane did not differ significantly by region or by customer size. Facilitating awareness and understanding of bio-methane prior to launching a bio-methane initiative will necessary to improve take-up." [pdf p.430]

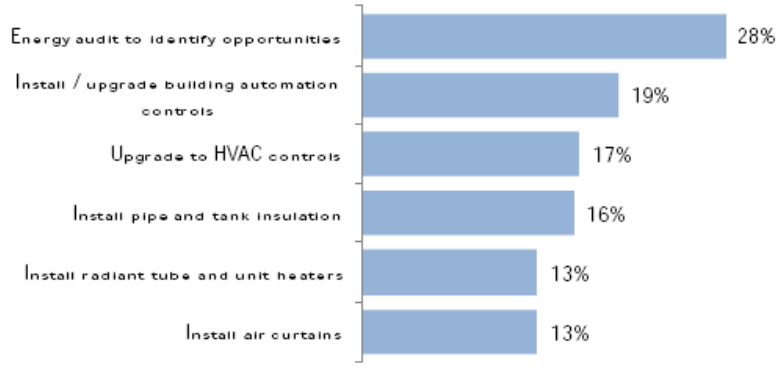
10.4 Does PNG intend to include customer education in its roll-out of biomethane?

Response:

Yes, PNG will develop a communication plan for the roll-out of biomethane.

"[Commercial Survey Results] Program ideas attracting the most interest from respondents (indicated they were either *extremely* or *very* interested) included an energy audit to identify opportunities to save energy (28% very or extremely interested), a program to install or upgrade building automation controls (19%), and a program to upgrade HVAC controls (17%) (Figure 15). In fourth position, 16% of commercial respondents expressed interest in a program to install pipe and tank insulation." [pdf p.450]

Figure 15: Interest in Programs and Services – Commercial Customers
Percent of Respondents – Very or Extremely Interested



"PNG proposes a Commercial energy efficiency program area that includes the following programs:

a) HVAC Controls;
b) Efficient Boilers;
c) Efficient Water Heaters; and
d) Efficient Kitchens." [DSM Plan, Appendix F, at pdf p.249]

10.5 Please explain how the proposed four Commercial programs in the 2019 DSM Plan relate to the measures in which Commercial Customer respondents expressed the most interest in the 2019 Customer Survey. Which of the measures addressed in the Survey are included in the proposed DSM portfolio?

Response:

As described in Section 10.3.1 of the 2019 DSM Plan (attached as Appendix F to the Application), the 2019 Customer Attitudes Survey identified relatively high levels of interest in programs that install or upgrade building automation controls, and upgrade HVAC controls. PNG estimates that most of the gas energy savings from "Building Automation Controls" comes from HVAC control upgrades. The CPR lists "HVAC Control Upgrades - Direct Digital Data Control" as having the second highest market potential.

In Section 4.2 of the 2019 DSM Plan, PNG has defined the principles used to guide the development of the ECI Program, one of which is to "leverage available programs and incentives from other organizations, agencies, and utilities". The CleanBC Better Building web portal offers energy study funding and custom projects from the B.C. Government available to commercial customers with buildings in PNG's service areas. PNG notes that the 2019 Customer Attitudes Survey identified customer's interest in additional measures which are not included in the 2019 DSM Plan but may be considered by the CleanBC Custom Program: "Install pipe and tank insulation", "Install radiant tube and unit heaters", and "Install air curtains".

PNG notes that Efficient Boilers, Efficient Water Heaters, and Efficient Kitchens are programs that have formed part of previous plans and were most recently approved by Order G-121-19. Their evaluation for inclusion predated the 2019 Customer Survey.

4. New Opportunities and Innovation

11.0 Topic: Remote Communities
Reference: Application, Exhibit B-1, Section 4.1, Remote Communities, p.63, pdf p.81

"PNG has identified a number of northern communities that are currently relying on propane for their primary space and water heating requirements, and who are requesting natural gas service from PNG. These communities are small, often consisting of a few hundred potential residential and commercial customers each having propane tanks on their property. All are remote from PNG's existing gas distribution systems and extensions of PNG's distribution mains are therefore, typically not economic."

"...In the four years since filing its 2015 Resource Plan, PNG has not proceeded beyond screening level assessments of potential opportunities for providing LNG/CNG to remote communities."

"PNG continues to work with communities desiring natural gas service to ascertain current and projected loads."

11.1 Which remote communities is PNG continuing to work with regarding potential natural gas service?

Response:

Please see the response to BCUC 9.1. PNG prefers to keep this information confidential at this time.

12.0 Topic: Natural Gas for Transportation
Reference: Application, Exhibit B-1, Section 4.2, Natural Gas for Transportation, p.63, pdf p.81

"PNG continues its efforts to develop the market for CNG/LNG for the transportation and mobile equipment sector in its service areas as part of its general business development efforts. At this time, PNG has not identified any action-able opportunities."

12.1 Does PNG anticipate seeking Commission approval if it decides to move forward with natural gas for transportation?

Response:

Yes, PNG will seek BCUC approval for services targeted at the transportation sector.

13.0 Topic: Innovation
Reference: Application, Exhibit B-1, Section 4.3, Innovation, p.64, pdf p.82

"PNG is active in the evaluation of a broad range of pre-commercial technologies that enable many different ways to reduce emissions. PNG is a participant in the Natural Gas Innovation Fund (NGIF) created by the Canadian Gas Association (CGA) to support the funding of cleantech innovation in the natural gas value chain. This includes actively working with the NGIF to identify technology that is nearing commercialization for installation at demonstration sites in PNG's service territory."

13.1 In the context of the Long-term Resource Plan Objectives and energy use and climate action policies discussed in Section 1.4, does the 2019 Consolidated Resource Plan include an enhanced emphasis on support for innovation designed to reduce emissions?

Response:

PNG's DSM Plan, attached as Appendix F to the Application, outlines continued funding to support the development and adoption of new technologies that are intended to increase the efficiency by which natural gas is used and to reduce the GHG emissions associated with that use.

13.2 Please describe the nature and timeline for the "technology that is nearing commercialization for installation at demonstration sites in PNG's service territory."

Response:

PNG has identified some opportunities to host demonstrations of pre-commercial prototypes that have application in space and water heating and cooling, power generation and carbon sequestration. PNG has no definitive timelines for these demonstrations but anticipates that one such opportunity in may be available in 2020, and a second one in 2021.

14.0 Topic: Renewable Natural Gas
Reference: Application, Exhibit B-1, Section 4.4, Renewable Natural Gas, p.63, pdf p.82

"PNG adopts a broad interpretation of "Renewable Gas" that includes landfill gas, biogas generated from digesters fed from manure, agricultural waste and household organics, or from woody biomass. In addition, synthetic methane and hydrogen, generated either through electrolysis of water, using electricity from low carbon sources, or hydrogen generated from natural gas through steam reformation in concert with carbon sequestration of the associated GHG emissions, are all considered under the definition of Renewable Gas." [p.66, pdf p.84]

14.1 Is PNG's interpretation of "Renewable Gas" aligned with "Renewable Gas" in the CleanBC Plan? If not, please explain.

Response:

PNG's interpretation of "Renewable Gas" is aligned with that defined in the CleanBC Plan. Both PNG and CleanBC identify biomethane and hydrogen as renewable gas. PNG has included synthetic methane, created from renewable resources, within the definition of renewable gas; synthetic methane has not been explicitly identified in the CleanBC plan.

15.0 Topic: Renewable Natural Gas
Reference: Application, Exhibit B-1, Section 4.4.1, PNG's RNG Strategy, p.68, pdf p.81;

"In light of the GGRR voluntary five percent RNG target and the CleanBC 15 percent RNG goal by 2030, PNG intends to develop a portfolio of RNG supply. PNG expects that such supply will initially be in the form of biomethane, but that other forms of RNG identified in the previous section, will also be pursued. PNG expects to acquire RNG, either through entering into supply agreements with third parties, or by developing its own supply projects. PNG anticipates adopting and filing for approval with the BCUC, a similar set of principles governing its ability to develop RNG supply infrastructure, as the BCUC has approved for FEI. PNG expects to begin acquiring RNG supply by late 2020 or 2021.

PNG estimates that, in order to meet the CleanBC target of 15 percent RNG supply, PNG will need to acquire between 950 to 1,500 TJ of RNG. PNG has reflected the reduction of GHG emissions associated with the deliveries of RNG to its customers in Table 18, below." [underline added, footnote deleted]

15.1 How does PNG intend to recover the cost of Renewable Natural Gas? Will the cost be included in the Commodity Charge? Or will customers be invited to voluntarily pay a premium price for RNG?

Response:

PNG intends to file an application with the BCUC for approval of an RNG cost recovery mechanism. At that time, PNG will provide full details of its proposed approach to recovering the cost of RNG supply.

5. GHG Reduction Plans

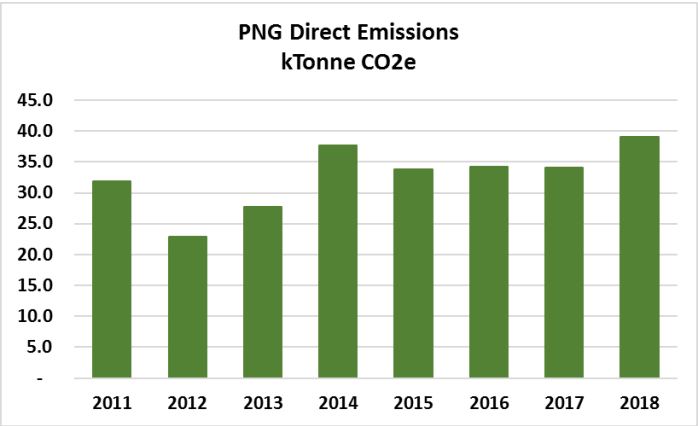
16.0 Topic: GHG Emissions
Reference: Application, Exhibit B-1, p.

Table 19 shows 2018 PNG direct GHG emissions of 39,000 tCO2e aggregated across all facilities and from all sources by Function, and by Source.

16.1 Please provide a graph and table showing PNG's aggregated direct GHG emissions (in tCO_2e and as a percentage of total) by year for the years for which data is available. Please note any assumptions, such as changes in the CO_2 equivalence of methane.

Response:

Please see the table and chart that follow.



	PNG Direct Emissions kTonne CO2e
2011	31.9
2012	22.9
2013	27.7
2014	37.6
2015	33.9
2016	34.2
2017	34.1
2018	39.0

PNG's GHG emissions have been stable over the past 8 years. There are some contributions to PNG's direct emissions that PNG can not control such as 3rd Party Damages which deviate significantly from year to year. The main difference in GHG emissions in recent years has been an increased amount of repairs to PNG's high pressure pipelines following analyses from inline Inspection tool runs. Whenever a cutout is performed, the gas from a section of mainline is evacuated to atmosphere (blown down), releasing methane. As the amount of cutouts has increased so too have the emissions from blow downs.

PNG is working on solutions to reduce GHG emissions from its operations, including those from blow downs. Please see also the response to Question 18.4.

16.2 Does PNG observe a trend in its historical annual direct aggregate GHG emissions? If so, what are the contributing factors?

Response:

Please see the response to Question 16.1.

17.0 Topic: GHG Reduction Plan
Reference: Application, Exhibit B-1, Section 5.3, PNG GHG Reduction Plan, p.71

"PNG has developed a GHG reduction plan that identifies the sources of PNG's GHG emissions, evaluates opportunities to reduce those emissions, and sets out a multi-year plan for reducing emissions from those sources."

17.1 Please file a copy of PNG's GHG Reduction Plan.

Response:

PNG's GHG Reduction Plan is an internal document constrained to direct emissions from PNG's facilities. PNG's Energy Conservation and Innovation (ECI) program presented in Section 8, and PNG's RNG strategy, presented in Section 4.4.1 of the Application, address PNG's plans for reducing downstream emissions associated with natural gas use by PNG's customers. PNG respectfully declines to submit its GHG Reduction Plan at this time.

18.0 Topic: Methane Regulation
Reference: Application, Exhibit B-1, Section 5.3, PNG GHG Reduction Plan, p.71, pdf p.89; p.16, pdf p.34

"The BC OGC Methane Regulations come into force January 1, 2020 with provisions affecting the operation of PNG facilities coming into effect January 1st, 2022. PNG has identified two near-term opportunities that meet the requirements to reduce venting and fugitive emissions, namely the replacement of the natural gas powered starter and natural gas powered actuators at compressor station R1." [p.71, pdf p.89, underline added]

BCSEA understands "BC OGC Methane Regulations" to refer to the Drilling and Production Regulation, B.C. REG. 282/2010 amended by B.C. Reg. 286/2018, under the *Oil and Gas Activities Act*.

"The BC Oil and Gas Commission (BC OGC) has introduced new regulations to reduce methane emissions from upstream oil and gas operations to meet or exceed federal and provincial methane emission reduction targets. The amendments to the Drilling and Production Regulation come into effect on January 1st, 2020. Developed with input from environmental groups and industry, the new regulations address the primary sources of methane emissions from B.C.'s upstream oil and gas industry. The changes include enhancements to requirements for leak detection and repair, designed to ensure leaks are detected and repaired quickly. Additionally, robust data management and reporting requirements to ensure transparent reporting of industry actions are under development. The new regulations and methane reduction measures align with the Province's CleanBC plan." [p.16, pdf p.34]

18.1 Please outline the provisions of the OGC Methane Regulations that come into effect on January 1, 2022 and affect the operation of PNG's facilities. What are the new requirements that affect PNG?

Response:

The OGC Methane Regulations have a variety of provisions within the document. Most of the provisions however do not affect PNG facilities at this time. Three relevant provisions are the replacement of the natural gas powered starter on the compressor at R1, with an electric starter, the replacement of natural gas actuated controllers with pneumatic or electric actuators at PNG compressor stations, and an increased frequency of leak surveys at the R1 compressor station and the Tumbler Ridge Gas Plant.

18.2 Will "the replacement of the natural gas powered starter and natural gas powered actuators at compressor station R1" entirely meet the new 2022 Methane requirements applicable to PNG? Are the additional mitigation measures discussed in Section 5.3 required to meet the Methane Regulation?

Response:

Yes. Please see the response to Question 18.1.

18.3 Please confirm, or otherwise explain, that PNG intends to implement the GHG reduction actions discussed in Section 5.3.

Response:

Confirmed.

18.4 Please provide the timeframe and cost estimates for implementation of the GHG reduction actions discussed in Section 5.3.

Response:

A project to replace the gas powered starter at compressor R1 with an electric starter is planned for 2020 at an estimated cost of $250 thousand. A project to replace the natural gas actuated controllers is planned for 2021 at an estimated cost of $1 million. PNG is currently completing a cost benefit analysis related to an acquisition of a flare and pump down compressor that can be used to conserve gas that would otherwise be evacuated to atmosphere. PNG currently does not have a defined timeline or cost estimate related to this initiative. Lineheaters are being replaced on an annual basis at costs ranging from $125 to $250 thousand, depending on the size of heater and the complexity of the installation.

18.5 By how much are PNG's GHG emissions expected to decrease as a result of the implementation of the OGC Methane Regulations.

Response:

Replacing the gas powered starter at compressor R1 with an electric starter is expected to reduce annual GHG emissions by approximately 1,400 tCO_{2e}. Replacing the natural gas actuated controllers is expected to reduce annual GHG emissions by 35 tCO_{2e}.

6. Residential and Small Commercial Demand

19.0 Topic: Residential End Use Study
Reference: Application, Exhibit B-1, p.73, pdf p.91

"PNG's residential demand forecast is based on a residential end-use model that predicts the average residential use per account based on a number of influencing factors including dwelling type, construction, the numbers and types of natural gas appliances in the home, and the behaviour of residents. In 2013, PNG completed a residential end-use survey (2013 REUS) that collected information on factors influencing residential demand including: residential dwelling types, amount of insulation, types and numbers of natural gas and electric appliances, the age of natural gas furnaces and hot water heaters, and the number of occupants as well as their energy use behaviour." [underline added]

19.1 When does PNG intend to produce a new Residential End Use Study? Will PNG have a new REUS report for its next Consolidated Resource Plan?

Response:

PNG will update its REUS when, in its estimation, the behaviour of its residential customers, in regards to natural gas use, has changed significantly. At this time, PNG believes that the residential use per account (UPA) forecasting model, which is based on the results of the 2013 REUS, remains a valid predictor of residential UPA over the forecasting period. Please see also the response to BCUC 25.0.

20.0 Topic: Natural Gas as Main Fuel for Heating
Reference: Application, Exhibit B-1, Section 6.2 Residential End-Use Characteristics, p.73, pdf p.91

PNG provides statistics on the percentage of residential dwellings that use natural gas as the main fuel for heating.

20.1 Does PNG provide service to all residential dwellings, including where natural gas is not the main fuel for heating?

Response:

PNG does not serve all residential dwellings located in its service areas.

20.2 What is the source(s) of the data presented in Figures 12 to 16? If the sources are limited to the 2013 REUS and the 2019 Customer Attitudes Survey, how does PNG take into account residential dwellings not served by PNG?

Response:

The sources of the data presented in Figures 12 to 16 of the Application are PNG's 2013 REUS and 2019 Customer Attitudes Survey. PNG does not attempt to determine the characteristics of residences that are not PNG's customers.

7. Demand Forecasting

21.0 Topic: Consolidated Demand Forecasting
Reference: Application, Exhibit B-1, Section 7 Demand Forecasting, p.77, pdf p.95

21.1 Please explain why the 2019 Consolidated Resource Plan does not provide any Consolidated results in the Demand Forecasting section.

Response:

PNG operates four distinct and isolated distribution systems. A consolidated demand forecast does not provide any additional insight into PNG's operations and challenges, if any, over the forecasting period. PNG submits that a consolidated demand forecast is relevant when designing its annual gas supply portfolio and PNG routinely files such a consolidated demand forecast when filing its Annual Gas Contracting Plan with the BCUC.

21.2 Please provide Consolidated versions of the tables and figures in Section 7.

Response:

In light of the additional work required to provide consolidated versions of the tables and figures in Section 7 of the Application, and the little if any additional utility these would provide, PNG respectfully declines to comply with BCSEA's request. A consolidated version of the demand forecast may be derived by summing the appropriate tables provided in Appendix D of the Application.

22.0 Topic: Trends Influencing Demand
Reference: Application, Exhibit B-1, Section 7.2 Trends Influencing Demand

22.1 Does PNG consider that lower forecasted Use per Account is a trend that will impact demand by putting upward pressure on delivery rates? If so, how is this reflected in the Consolidated Resource Plan? If not, why not?

Response:

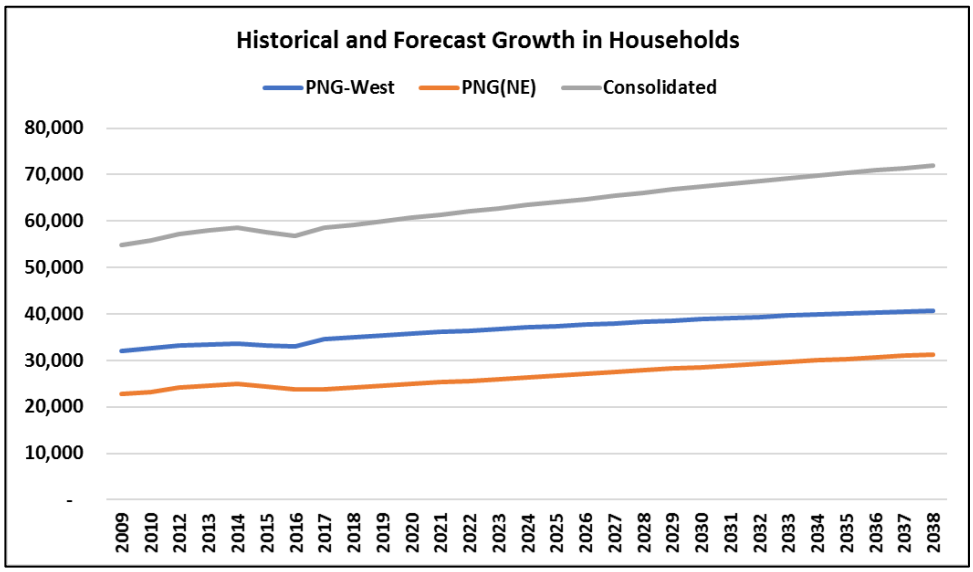
Lower system throughput, rather than UPA, puts upward pressure on delivery rates. UPA of a specific customer class, such as residential or small commercial, will result in lower system throughput only if all other contributing factors such as the number of customers in each rate class, and the contribution of negotiated contracts, remains constant.

22.2 Please provide a version of Figure 18 showing the number of households (not percentage change) for PNG-W, PNG(NE), and consolidated.

Response:

Please note that Table 18 presents the actual and forecast change in households as provided by BC Stats for each of the Local Health Authorities (LHA's) associated with PNG's service areas. The absolute number of households in these LHA's does not represent the number of households in PNG's service areas because the geographic extents of the LHA's do not coincide exactly with PNG's service areas. PNG uses the trend in the number of households in LHA52 (Prince Rupert), LHA80 (Kitimat), LHA88 (Terrace), LHA54 (Smithers), LHA55 (Burns Lake) and LHA56 (Nechako) as a proxy to determine the change in households in PNG-West. LHA59 (Peace River South) and LHA60 (Peace River North) are used as proxies to determine the change in households in the PNG(N.E.) service areas. These trends, modified by PNG's estimated capture rates, determines the growth in residential customers. This method is consistent with that used in previous resource plans that have been reviewed and approved by the BCUC.

In order to be responsive to this question, PNG has provided the requested chart showing the households in the LHA's associated with PNG's service areas.



22.3 Please provide a version of Table 20 showing the number of residential households by type for PNG-W, PNG(NE), and consolidated.

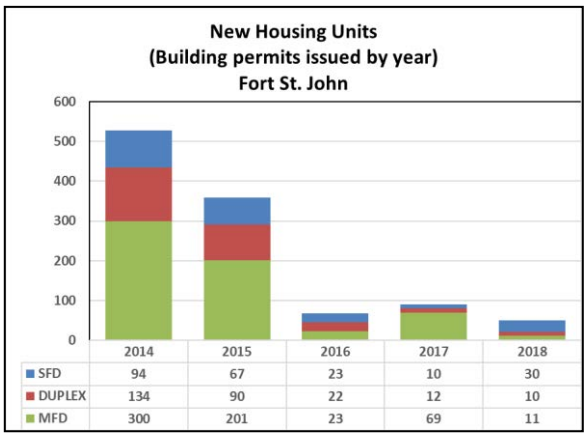
Response:

Table 20 of the Application presents the housing mix based on a random sampling of PNG's residential customers. PNG does not retain information on the dwelling type associated with each residential customer.

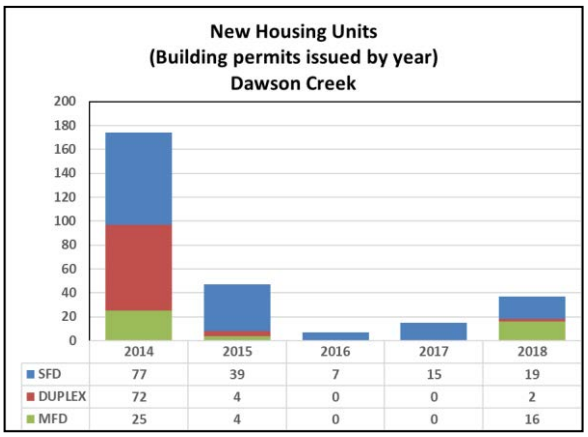
22.4 Please provide a version of Figure 19 and Figure 20 showing New Housing Mix by number for Fort St John, Dawson Creek, PNG-West, and consolidated.

Response:

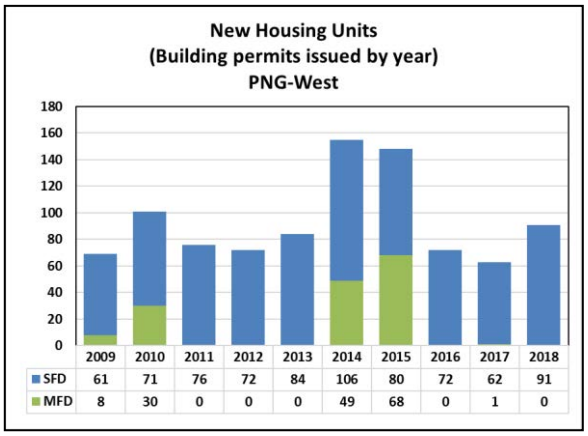
Please see the charts, below.



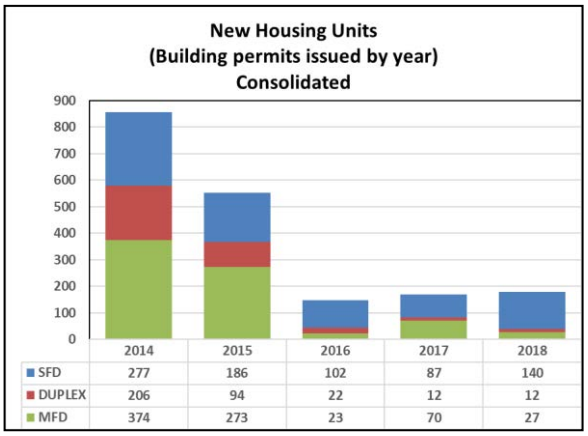
	2014	2015	2016	2017	2018
SFD	94	67	23	10	30
DUPLEX	134	90	22	12	10
MFD	300	201	23	69	11



	2014	2015	2016	2017	2018
SFD	77	39	7	15	19
DUPLEX	72	4	0	0	2
MFD	25	4	0	0	16



	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
SFD	61	71	76	72	84	106	80	72	62	91
MFD	8	30	0	0	0	49	68	0	1	0



	2014	2015	2016	2017	2018
SFD	277	186	102	87	140
DUPLEX	206	94	22	12	12
MFD	374	273	23	70	27

23.0 Topic: Natural Gas and Electric Baseboard Heaters, New Construction
Reference: Application, Exhibit B-1, Penetration of Electric Space Heat, p.80, pdf p.98

"The price competitiveness of natural gas with respect to electricity, and the public's perceptions of the environmental impact of burning fossil fuels in general, and natural gas in particular, will determine to some degree new home buyers' preference for natural gas space heating. The other determinant is the economics of installing natural gas forced air furnaces or boilers versus baseboard heaters in new construction, without regards to the higher heating costs associated with electric baseboards." [underline added]

23.1 Please provide PNG's analysis of the "economics of installing natural gas forced air furnaces or boilers versus baseboard heaters in new construction." Please specify the assumed purchase and installation costs of the systems that were compared.

Response:

PNG understands that electric baseboard heaters are considerably less expensive to purchase and install than natural gas furnaces and their associated forced-air duct work.

24.0 Topic: Air Source Heat Pumps
Reference: Application, Exhibit B-1, Penetration of Electric Space Heat, p.80, pdf p.98

PNG states:

> "CleanBC policy actions promoting the electrification of space heating, in particular the current incentives for air source heat pumps (ASHP), are expected to have only a small impact on residential and commercial space heating load in PNG's service territories. While the heat pumps can exhibit efficiencies great [sic] than one, they do so only in more temperate climates. At winter temperatures commonly experienced in most of PNG's service areas, air source heat pumps are no more efficient than electric baseboard heaters. Only in the western-most parts of PNG's service territory - Prince Rupert, Kitimat and possibly Terrace – would the efficiency gain provided by ASHP's close the cost gap between electricity and natural gas." [underline added]

24.1 What is the basis for PNG's statement that heat pumps can achieve efficiencies greater than one only in more temperate climates?

Response:

PNG does not have in depth information on the performance of air source heat pumps. However, PNG is aware of the decreased performance of air source heat pumps as ambient temperatures decrease.

At this time, PNG has no definitive operational data from air source heat pumps installed in its service territory to determine the effectiveness of the technology in PNG's specific environment.

24.2 Please describe PNG's level of awareness of cold climate heat pumps.

Response:

Please see the response to Question 24.1.

24.3 In preparing the 2019 DSM Plan did PNG take into account up-to-date information on the availability and performance of heat pumps designed for PNG's climate zones?

Response:

PNG has provided three planning scenarios that encompass an environment where the drive to increased electrification results in significantly lower than historical capture rates for new construction and an accelerated reduction in UPA for residential and small commercial customers.

24.4 Would PNG agree that in recent years heat pumps designed for cold climates have become increasingly available?

Response:

PNG does not have sufficient information on which to form an opinion. PNG is aware of at least two significant manufacturers of electric cold weather air source heat pumps: Mitsubishi and Fujitsu. However, the availability outside of metropolitan centres, and of local suppliers and contractors having the appropriate knowledge and skill to install this equipment is seen as the most significant barrier to widespread implementation at this time.

24.5 Please list the cold climate heat pumps and their cold weather specifications that PNG took into account in concluding that "At winter temperatures commonly experienced in most of PNG's service areas, air source heat pumps are no more efficient than electric baseboard heaters."

Response:

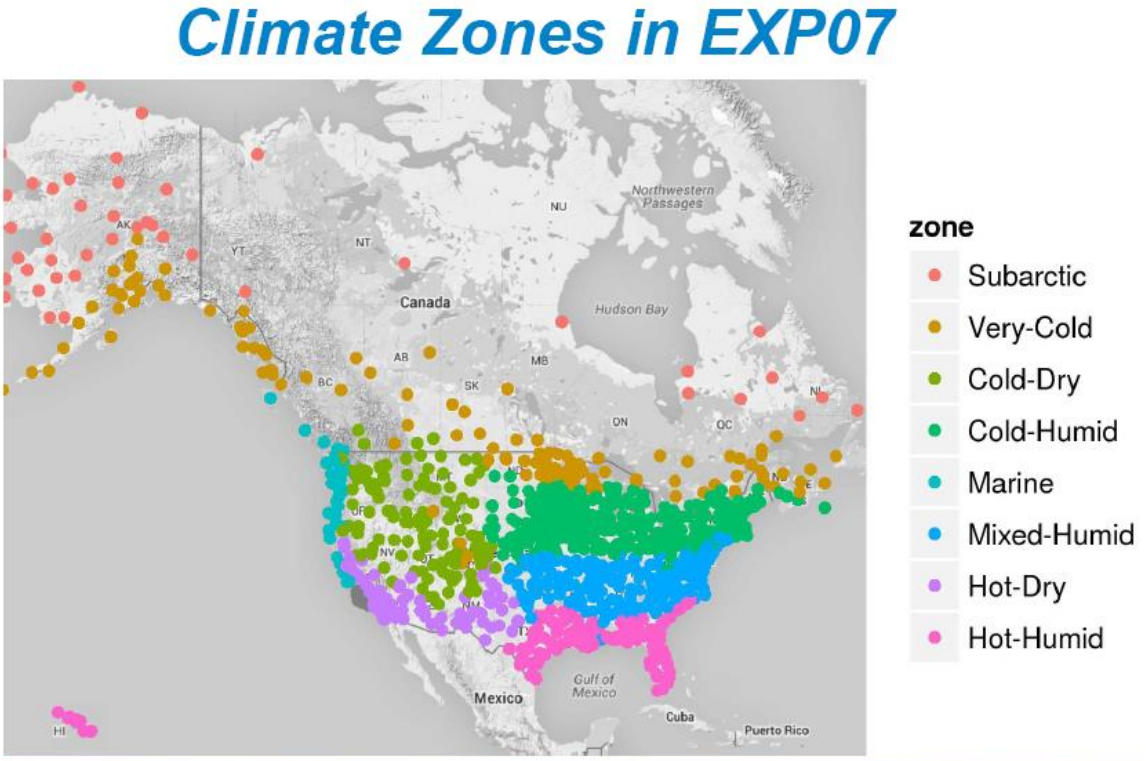
PNG has not completed this analysis.

25.0 Topic: Air Source Heat Pumps
Reference: Application, Exhibit B-1, Penetration of Electric Space Heat, p.80, pdf p.98

CSA Group is developing "Load-based and Climate-Specific Testing and Rating Procedures for Heat Pumps and Air Conditioners," EXP07: at https://publicreview.csa.ca/Home/Details/3313.

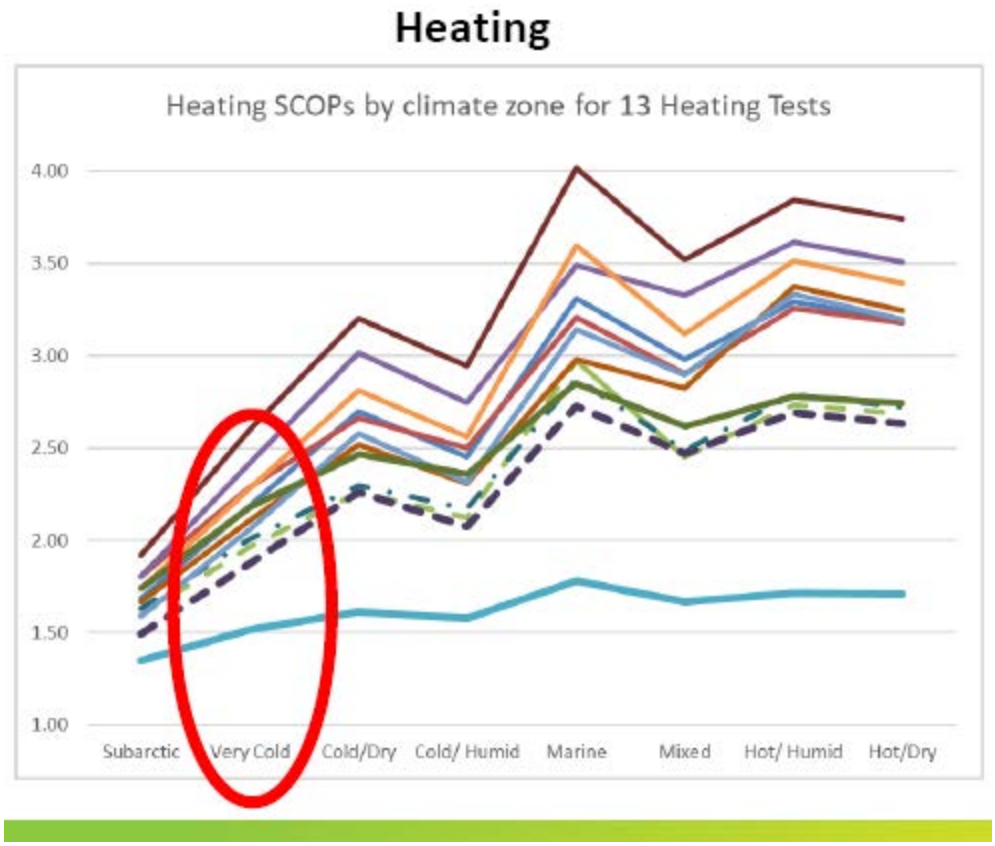
On November 26, 2019, the Northwest Energy Efficiency Alliance presented "EXP-07 Preliminary Results: A new load-based test procedure, Variable capacity heat pumps": https://conduitnw.org/Handlers/conduit/FileHandler.ashx?RID=4967.

The authors describe converting the Coefficient of Performance concept to a climate specific Seasonal Coefficient of Performance measure based on recognized Climate Zones shown in the following map on page 9. The PNG service territory appears to be in the Very-Cold climate zone.



The authors report on a 2019 Lab Evaluation of 12 ductless and 1 ducted air source heat pumps. A summary graph showing Seasonal Coefficients of Performance (SCOPs) for 13 heating tests grouped by climate zone is shown on page 27, reproduced below. The oval

shape added by BCSEA highlights SCOPs ranging from 1.5 to 2.5 for the Very-Cold climate zone.



25.1 Is PNG's service territory in the Very Cold climate zone in the classification used in the NEEA presentation?

Response:

PNG is not able to find a definition of the climate zones as they are presented in the preamble to this question. PNG is familiar with the climatic zones defined in the BC Building Code that are defined as a range of average heating degree days (HDD) below 18 C. PNG's service territory spans Prince Rupert in climate zone 5 (HDD = 3,000 to 4,000) to Fort St. John, Dawson Creek and Tumbler Ridge in climate zone 7A (HDD = 5,000 to 6,000).

25.2 Is PNG familiar with the work of the Canadian Standards Association (CSA), the Northwest Energy Efficiency Alliance (NEEA) and other organizations to implement testing procedures to assess the heating Seasonal Coefficient of Performance of air source heat pumps for climate zones across North America?

Response:

PNG is does not have extensive knowledge of the work of these organizations to implement testing procedures to assess the heating Seasonal Coefficient of Performance of air source heat pumps for climate zones across North America.

25.3 Would PNG agree that air source heat pumps can achieve seasonal coefficients of performance substantially greater than unity even in the Very Cold climate zone?

Response:

PNG acknowledges that the summary of the analysis from the Northwest Energy Efficiency Alliance, as presented in the preamble to this question, and as summarized in the presentation titled "EXP-07 Preliminary Results: A new load-based test procedure, Variable capacity heat pumps" (https://conduitnw.org/Handlers/conduit/FileHandler.ashx?RID=4967), shows that air source heat pumps can achieve efficiencies greater than one. However, PNG has not reviewed the detailed results of the study. PNG is aware that performance achieved under laboratory conditions may not be achievable under actual operating conditions.

Regardless of the actual performance, PNG has reflected an increased penetration of electric heating in its service territory in its planning forecasts. As stated on page 86 of the Application, to reflect the impact of an increased focus on the electrification of residential heating, PNG is forecasting a decrease in the portion of gas space heating in new construction SFD's and MFD's over the forecast period, with the portion of new SFD's and MFD's heated by gas in the Fort St. John, Dawson Creek and Tumbler Ridge areas declining from 95 percent in 2020 to 78 percent in 2038. Similarly, the portion of dwellings heated by natural gas in the PNG-West region declines from the historical average 85 percent, to 70 percent in 2038. As shown in Figures 26 through 28 on pages 88 – 90 of the Application, PNG is forecasting an accelerated rate of decline in residential UPA in all service areas, as compared to historical trends and as compared to the forecasts made in the 2014 and 2015 Resource Plans for PNG-West and PNG(N.E.), respectively.

26.0 Topic: Minimum Efficiency of Residential Gas Furnaces
Reference: Application, Exhibit B-1, Section 7.2.3 Residential Energy Efficiency Retrofits, p.81, pdf p.99

"As discussed in Section 2.1.1.2, changes to the federal Energy Efficiency Regulations are set to increase the minimum efficiency of most residential furnaces types to 95 percent. Over time, existing low- and mid-efficiency furnaces will be replaced with high-efficiency models, significantly lowering the amount of natural gas consumed for space heating in those dwellings."

26.1 Are the increases in the minimum efficiency standards applicable to new natural gas furnaces in PNG's service territory a significant factor affecting PNG's resource plan over the planning period?

Response:

PNG estimates that furnace replacements in existing residential dwellings are expected to contribute a reduction in residential demand of approximately 3.5% by 2025. PNG does not consider this reduction to be a significant influencing factor on PNG's resource plan.

26.2 While the subheading refers to "retrofits," please confirm, or otherwise explain, that the increasingly stringent regulatory requirements for higher-efficiency residential gas furnaces also affects residential load through new construction and the retirement/replacement of old housing stock.

Response:

Confirmed.

27.0 Topic: Industrial Fuel Gas
Reference: Application, Exhibit B-1, Section 7.2.4 CleanBC Program for Industry, p.81, pdf p.99

"New electric transmission and distribution infrastructure will be needed to enable industrial processes to switch to electricity, from natural gas, or other carbon intensive fuels. The electrification strategy is targeted particularly at the natural gas upstream sector, with the aim of making B.C.'s natural gas and LNG industries the lowest carbon emitting in the world. PNG serves a number of industrial fuel gas loads in its Fort St. John and Tumbler Ridge service areas that comprise five and 70 percent of each system's throughput, respectively."

27.1 Please identify the locations in the 2019 Consolidated Resource Plan where PNG takes into account the impact of low-carbon electrification on PNG's industrial fuel gas loads.

Response:

PNG has clearly laid out the impact of potential electrification of the upstream natural gas industry's fuel gas load in Fort St. John in Section 7.3.3.2.2, and in Tumbler Ridge in Section 7.3.3.2.4.

27.2 To what extent, if at all, does the Reference Scenario demand forecast take into account the impact of low-carbon electrification on PNG's industrial fuel gas loads?

Response:

Please see the discussion in Section 7.3.3.2.2 of the Application. Four oil and gas producers operate seven production facilities whose fuel gas requirements are provided by PNG on the Fort St. John system. PNG anticipates that a portion of this load will be lost as producers respond to federal and provincial initiatives and convert their field compressors to electric drive units. PNG has reflected a loss of 60 percent of the compressor fuel gas load by 2030 under the Reference scenario.

27.3 To what extent, if at all, does the DSM Plan include measures to assist PNG customers to reduce their industrial fuel gas loads?

Response:

PNG's Energy Conservation and Innovation (ECI) program does not currently include a program to assist industrial customers to reduce their fuel gas loads. The CleanBC Clean Industry Incentive and Clean Industry Fund provide financial incentives to upstream oil and gas producers that initiate programs to reduce their GHG emissions.

27.4 Please provide the quantities (in GJ per year) that correspond to "industrial fuel gas loads in ... Fort St. John and Tumbler Ridge service areas that comprise five and 70 percent of each system's throughput, respectively."

Response:

PNG delivered approximately 380 TJ to fuel gas loads in the Fort St. John delivery area in 2019. These deliveries comprised 13 percent of the total throughput on the Fort St. John system, not five percent as presented on page 81 of the Application. PNG delivered 520 TJ to fuel gas loads in the Tumbler Ridge area in 2019.

28.0 Topic: Gross Demand Forecasts
Reference: Application, Exhibit B-1, Section 7.3 Annual Demand Forecast, p.81, pdf p.99; Appendix D, Annual Demand, pdf p.186; Appendix E, Design Day Demand, pdf p.199

The text describes the tables in Appendix D as showing gross annual demand, although the tables don't specify.

28.1 For greater certainty, please confirm that the tables in Appendix D are for gross annual demand, and that the tables in Appendix E are for gross design day demand forecast.

Response:

Confirmed. Please see also the response to BCUC 15.1.

28.2 Does the Application contain demand and design day demand forecasts after (net of) demand-side measures? If so, please identify the location. If not, please provide after-DSM forecasts of demand and design day demand.

Response:

Section 8.3 of the Application (specifically Figures 64, 65 and Table 39) presents the impact of PNG's proposed ECI portfolio, as well as the impact of a "high DSM" scenario based on the results of the 2017 CPR Market Potential Review.

29.0 Topic: Use per Account
Reference: Application, Exhibit B-1, Section 7.3.1.2 Use per Account (UPA) Forecast, p.85, pdf p.103

"To reflect the impact of the CleanBC Plan, namely an increased focus on the electrification of residential heating, PNG is forecasting a decrease in the portion of gas space heating in new construction SFD's and MFD's over the forecast period, with the portion of new SFD's and MFD's heated by gas in the Fort St. John, Dawson Creek and Tumbler Ridge areas declining from 95 percent in 2020 to 78 percent in 2038. Similarly, the portion of dwellings heated by natural gas in the PNG-West region declines from the historical average 85 percent, to 70 percent in 2038." [p.86, pdf p.104]

29.1 What role does PNG see for itself in contributing to the CleanBC Plan's focus on electrification of residential heating over the forecast period?

Response:

As a natural gas distribution utility, PNG expects to play a meaningful role in providing energy to its existing and future customers in a manner that supports current and future objectives of the B.C. Government. PNG does not expect to own and operate electric generation infrastructure, nor does it expect to offer incentives related to electric appliances such as electric heat pumps to its customers.

29.2 What is the basis for the size of PNG's estimate of the decrease in the portion of gas space heating in new construction SFDs and MFDs over the forecast period?

Response:

PNG has simply applied a decline in penetration of natural gas space heating in new residential construction to its forecast. This is a refinement of the forecasting method used in both the 2014 Resource Plan for PNG-West and the 2015 Resource Plan for PNG(N.E.) which did not reflect any changes over time, in residential customers' preferences regarding natural gas as a source for space and domestic water heating.

In its Decision approving the 2014 Resource Plan for PNG-West, the BCUC accepted PNG's forecasting method stating that it "is more transparent than the one previously used and produces a reasonable forecast". The BCUC went one step further, noting the "improvements PNG has made to its forecasting methodology and appreciates that PNG clearly identified the assumptions and inputs that went into its forecast. Further, the Panel also notes that the methodology was practical, frugal in its implementation and not overly elaborate. The Panel commends PNG for this approach." (Decision, G-140-14, p. 6).

In consideration of these comments from the BCUC, PNG has maintained its practical approach to forecasting residential demand, and made a meaningful adjustment to the penetration of natural gas space heating over time to reflect PNG's view that the policies identified in the CleanBC Plan, especially the focus on the electrification of space heating load, are expected change the penetration of natural gas in serving new residential loads.

29.2.1 Does PNG assume electrification would use baseboard heaters or heat pumps?

Response:

PNG does not make any assumptions on whether new residential construction that does not include natural gas space heating equipment, would implement either electric air source heat pumps or electric baseboards.

29.2.2 Is PNG's forecast sensitive to whether electrification uses baseboard heaters or heat pumps?

Response:

PNG's forecast is not sensitive to whether new residential construction that does not include natural gas space heating equipment, would implement either electric air source heat pumps or electric baseboards.

29.3 For Figures 26, 27 and 28, showing Residential Use per Account, Historical and Forecast, please confirm that the Actual data is weather normalized. Alternatively, please provide versions showing normalized Actual data.

Response:

Confirmed. All actual and forecast UPA's and demand in the Application are weather normalized quantities.

30.0 Topic: Estimated Useful Life of standard and mid-efficiency furnaces
Reference: Application, Exhibit B-1, p.87, pdf p.105

"PNG has forecast the replacements of standard and mid-efficiency furnaces based on a service life of 30 years."

30.1 Please provide the basis for the assumed service life of existing standard and mid-efficiency furnaces.

Response:

The 2013 Residential End-Use Survey (2013) yielded information on the ages of natural gas furnaces in PNG's service areas. In 2013, the median age of natural gas furnaces in PNG-West and in PNG(N.E.) was 14 years, and 9 years, respectively. However, approximately nine percent of respondents reported having furnaces older than 30 years.

In its analyses of the cost effectiveness of a residential furnace program, presented in PNG's 2019-2020 Funding Application, PNG adopted a measure life related to furnace replacements of 18 years, consistent with the measure life presented by FEI in its 2019 – 2022 DSM Application.

In order to reflect the results of the 2013 REUS in a forecast of residential UPA, PNG has assumed that customers having the oldest furnaces would be the first to replace their equipment with high efficiency models, with furnaces 30 years old or older replaced in the early years of the planning period.

PNG notes that the BCUC, by way of Order G-121-19, denied PNG's request for funding related to a furnace replacement program proposed in PNG's 2019 – 2020 Funding Application. In its current Application, PNG is not proposing a furnace replacement initiative and therefore the furnace service life plays no role in the determination of energy savings resulting from PNG's ECI program.

30.2 Is PNG aware of the estimated useful life of standard and mid-efficiency furnaces used by FEI, or other natural gas energy efficiency program implementers? If yes, please provide the values used.

Response:

Yes. Please see the response to Question 30.1.

31.0 Topic: RECAP
Reference: Application, Exhibit B-1, Section 7.3.4 RECAP and Forecast Demand, p.105, pdf p.123

"On June 28, 2019, PNG filed an application with the BCUC regarding the Process for Allocation of Reactivated Capacity (RECAP) and approval of a Large Volume Industrial Transportation Rate (RS 80)." [p.123]

"In Section 7.3.4, PNG discusses the RECAP process. PNG has not reflected any outcomes of the RECAP in any of its forecasting scenarios. At this time, PNG has no clear indication of the outcome of the RECAP and will not speculate on any likely uptake of spare capacity. At this time, the PNG-West system, as it is currently operated, has ample capacity to meet expected demand outside of the RECAP process." [p.19]

31.1 Would Commission approval of the RECAP application cause PNG to prepare a new or amended Consolidated Resource Plan sooner than is currently planned?

Response:

PNG wishes to clarify that its application for the approval of the Reactivated Capacity Allocation Process (RECAP application) requests approval of the underlying elements that will support the RECAP, including a new tariff for large volume industrial transportation service. On February 28, 2020 the BCUC issued Order G-35-20 approving all requests made in PNG's RECAP application. Approval of the RECAP lays the foundation for an Open Season for available capacity expected later in 2020.

PNG has determined the available unutilized capacity available to an Open Season on its PNG-West system, giving due consideration of the current and future demand from its existing customers. Depending on the amount of available capacity subscribed through the anticipated Open Season, PNG would initiate a project or projects to reactive one or more compressor stations. PNG expects that such projects would be fully described in either an application for a Certificate of Public Convenience and Necessity (CPCN) or through a revenue requirements application. PNG submits that these established processes are sufficient for the BCUC and interveners to review the implications of these projects, specifically on the ability of the PNG-West system to serve current and future loads.

Regardless of the amount of capacity subscribed for through the Open Season, PNG does not anticipate amending its Resource Plan to reflect the increased throughput. Please see also the response to BCUC 24.4.

31.2 If the Commission has issued a decision in the RECAP proceeding by the time PNG responds to these information requests, please provide a short summary and indicate how the decision affects the 2019 Consolidated Resource Plan.

Response:

On February 28, 2020 the BCUC issued Order G-35-20 approving all requests made in PNG's RECAP application, which includes a new Large Volume Industrial Transportation Rate, the concept of a toll premium, draft General Terms and Conditions of service, draft Transportation Service Agreements, draft Transportation Reservation Agreements, a new deferral account to record a portion of revenues from RECAP as well as reservation fees to the benefit of ratepayers, and a new deferral account to record some development costs for the RECAP project. The BCUC further directed PNG to file annually, information on the credit-worthiness of each shipper subscribing capacity through a subsequent open season.

The BCUC decision has no impact on PNG's 2019 Consolidated Resource Plan. Please also see the response to Question 31.1.

32.0 Topic: Annual Demand Forecast
Reference: Application, Exhibit B-1, Section 7.3.6 Annual Demand Summary, p.106, pdf p.124

32.1 The graphs in section 7.3.6 (Figures 43 to 46, for Reference Scenario Annual Demand for the four service areas) show more categories than are shown in the tables in Appendix D (pdf pp.187, 190, 193, 196). Please provide tables corresponding to Figures 43 to 46.

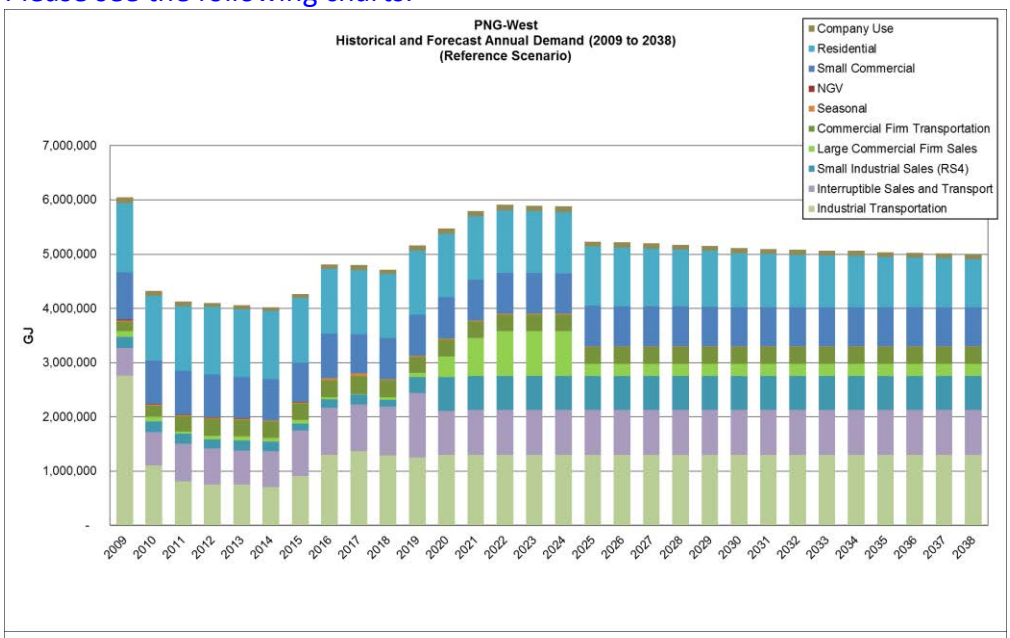
Response:

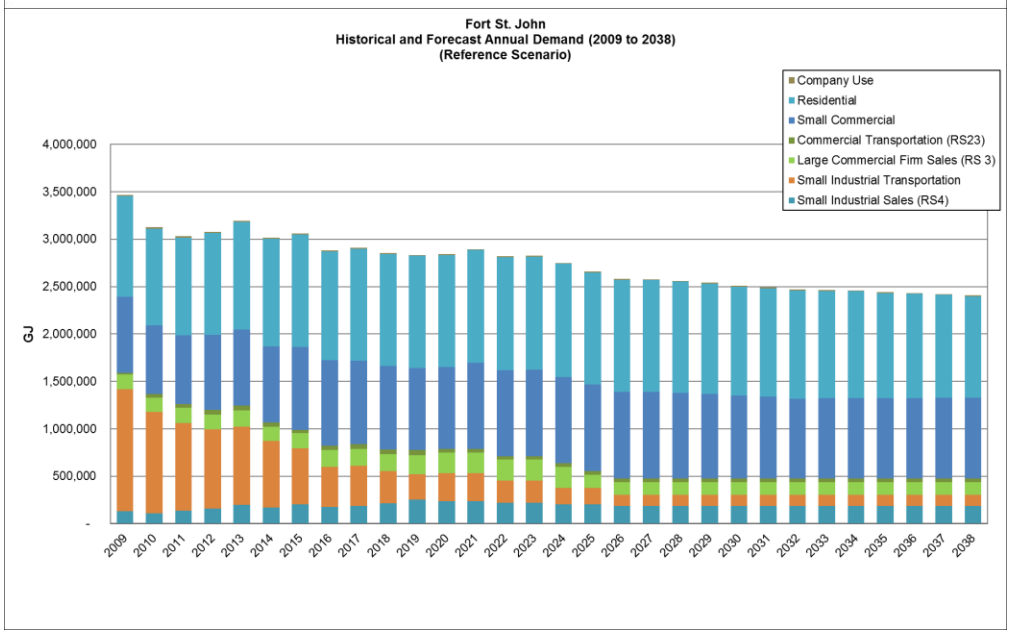
PNG respectfully submits that recasting the tables in Appendix D in the format requested requires additional work that PNG submits is not justified for the information that it provides. PNG submits that the combination of Figures 43 to 46 and the Tables of Appendix D provide a sufficiently detailed view of the composition of the demand forecasts.

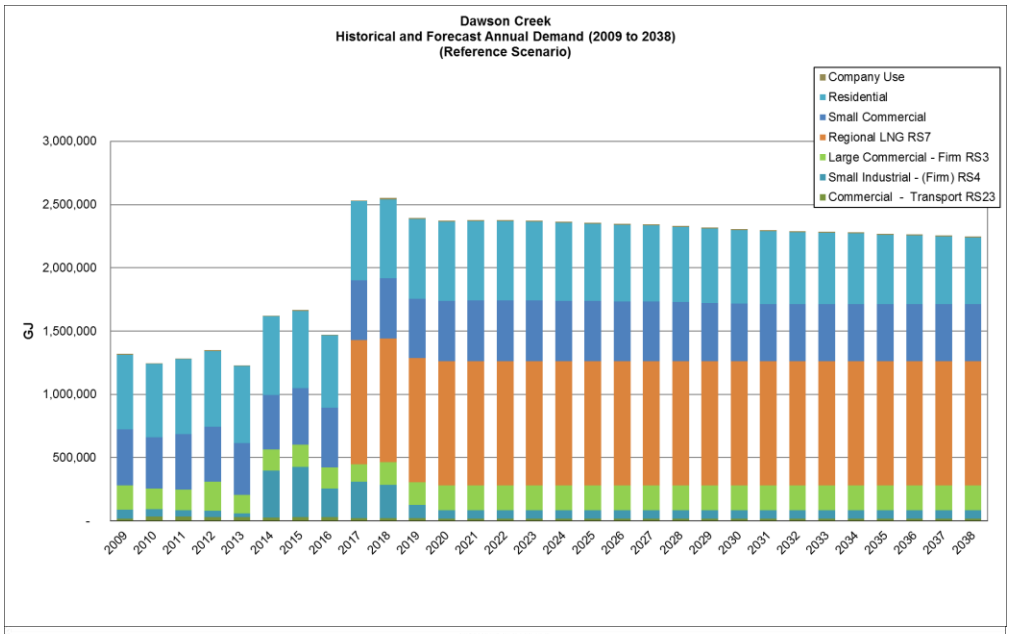
32.2 It is difficult to distinguish some of the colours in Figures 43 to 46. Please clarify, such as by listing the items in the legend vertically in the order they appear in the bars.

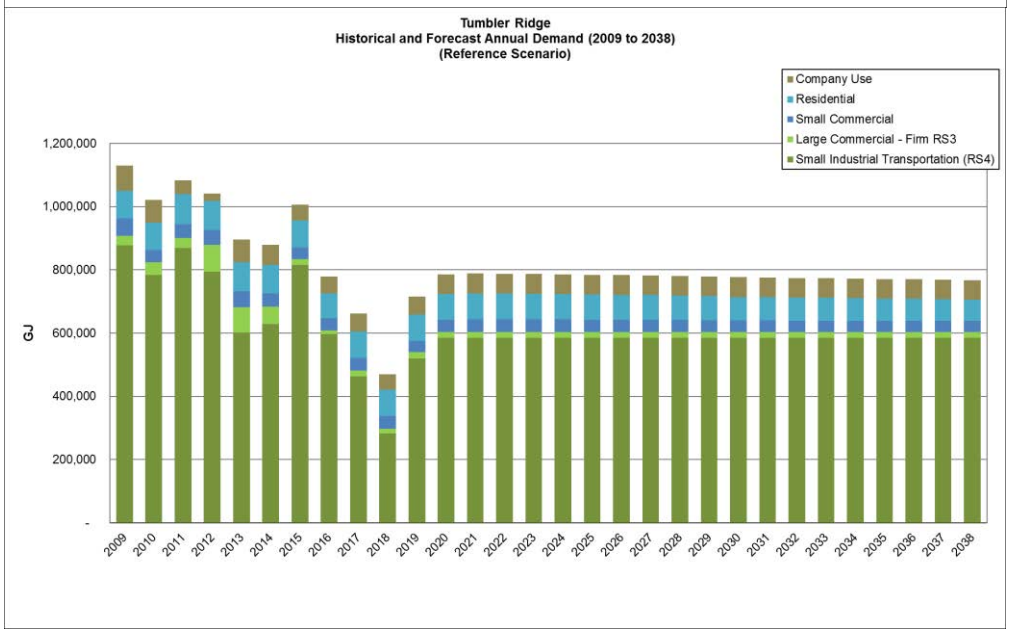
Response:

Please see the following charts.






Dawson Creek
Historical and Forecast Annual Demand (2009 to 2038)
(Reference Scenario)
Company Use
Residential
Small Commercial
Regional LNG RS7
Large Commercial - Firm RS3
Small Industrial - (Firm) RS4
Commercial - Transport RS23
GJ
3,000,000
2,500,000
2,000,000
1,500,000
1,000,000
500,000
-
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038


Tumbler Ridge
Historical and Forecast Annual Demand (2009 to 2038)
(Reference Scenario)
Company Use
Residential
Small Commercial
Large Commercial - Firm RS3
Small Industrial Transportation (RS4)
GJ
1,200,000
1,000,000
800,000
600,000
400,000
200,000
-
2009 2010 2011 2012 2013 2014 2015 2016 2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027 2028 2029 2030 2031 2032 2033 2034 2035 2036 2037 2038

33.0 Topic: Sensitivity Analysis
Reference: Application, Exhibit B-1, Section 7.4 Sensitivity Analysis, p.110, pdf p.128

"The scenarios are based on changes to the residential and small commercial demand resulting from changes in the penetration of natural gas as the fuel for space and water heating applications in response to the perceptions of customers regarding the GHG emissions of natural gas and the relative cost advantage of natural gas over electricity, driven in part through changes to the B.C. carbon tax as well as eventual federal and provincial regulations mandating a blend of RNG in natural gas deliveries to end-use customers.[58] As well, the scenarios reflect varying degrees to which the CleanBC targets for improvements to the energy efficiency of existing and new construction are met.

[58] Such as, for example the Federal Clean Fuel Standard applicable to natural gas, and the CleanBC 15% RNG target." [p.111, pdf p.129]

33.1 How does PNG differentiate between the Reference Scenario and the Competitive Electricity Scenario? Does the Reference Scenario include no changes to demand due to government policy and customer concerns regarding GHG emissions?

Response:

All assumptions driving the forecast demand under all three planning scenarios are fully described in Section 7.4, and Appendix C provides an overview of the main determinants used in the residential and small commercial forecasts. In its Reference scenario, PNG has reflected the anticipated impact of the CleanBC Plan's focus on electrification in a declining capture rate of new residential and commercial customers, in increasing energy efficiency of new and existing buildings, in the declining penetration of natural gas space heating in new construction, and in the electrification of a portion of PNG's industrial fuel gas loads in the Fort St. John and Tumbler Ridge areas. All of these impacts are fully described on pages 83, 85-86, 88, 94, and 101 of the Application

33.2 Please confirm, or otherwise explain, that the Sensitivity Analysis is limited to Residential and Small Commercial customers. If confirmed, please explain why PNG excluded Medium, Large and Industrial customers from the sensitivity analysis.

Response:

Not confirmed. Please see the discussions in Section 7.3.3.1 on changes to the Large Commercial demand, and Section 7.3.3.2 on changes to the Industrial demand under the three planning scenarios. Section 7.4 summarizes the assumptions used in all three planning scenarios.

33.3 Would PNG agree that all of the factors supporting the Competitive Electricity Scenario discussed in the above-quoted paragraph, apply to a greater or lesser extent to Medium, Large and Industrial customers?

Response:

PNG agrees that the factors supporting the Competitive Electricity Scenario discussed in the Application apply to a greater or lesser extent to Medium, Large and Industrial customers.

33.4 Please provide a demand forecast sensitivity analysis that includes all of PNG's sales customer classes, not just Residential and Small Commercial. In addition to providing the results for each service area, please provide the results on a Consolidated basis.

Response:

PNG has provided a sensitivity analysis that reflects different outcomes for all of PNG's customer classes, including large sales and transportation customers. Please see Tables 30 – 33, Figures 59 – 62, and Appendix D of the Application.

In light of the additional work required to provide consolidated versions of the tables and figures in Section 7 of the Application, and the little if any additional utility these would provide, PNG respectfully declines to comply with BCSEA's request. A consolidated version of the demand forecast may be derived by summing the appropriate tables provided in Appendix D of the Application. Please see also the response to Question 21.1.

33.5 Please confirm, or otherwise explain, that the Sensitivity Analysis is based on gross demand.

Response:

Confirmed.

"The underlying growth in households and small commercial enterprises remains the same in all scenarios, while the capture rates are adjusted to reflect varying degrees of probability that these new households and commercial enterprises become customers of PNG."

33.6 Tables 28 and 29 and Figures 53 to 58 focus on changes to Use per Account. Please confirm, or otherwise explain, that these tables and figures do not take into account differences between the Scenarios in changes regarding capture rates.

Response:

Not confirmed. The forecast UPA reflects a blended average of changes in natural gas consumption from both existing and new construction. The capture rate of new customers is therefore a factor in the forecast of UPA.

33.6.1 Please confirm, or otherwise explain, that Tables 30 to 33 and Figures 59 to 62 do include differences between the Scenarios in changes regarding capture rates.

Response:

Confirmed.

8. Demand Side Management

34.0 Topic: DSM Expenditure Schedule
Reference: Application, Exhibit B-1, Section 8. Demand Side Management, p.126, pdf p.144

"Expenditures associated with the 2020 – 2022 ECI Plan are presented in Table 38. PNG is requesting BCUC approval of expenditures related to the ECI portfolio for 2020 that are in addition to those previously approved. PNG is also requesting approval of expenditures for two additional years (2021 and 2022) to fund an expanded ECI portfolio. Based on total expenditures over three years of $2.57 million accruing to a ratebase deferral account, and an amortization of those expenditures over five years, consistent with PNG's current treatment of expenditures that has been approved by the BCUC, PNG estimates the impact to its residential customers to be in the neighbourhood of $8 per year." [pp.129-130, underline added]

Table 38: Summary of expenditures

Summary: New and Existing Programs and Initiatives					
Item		2020	2021	2022	Total
		(F/C)	(F/C)	(F/C)	(F/C)
Existing Programs and Initiatives	(a)	$ 378,800	$ 487,900	$ 514,900	$ 1,381,600
New Programs and Initiatives	(b)	$ 402,200	$ 392,200	$ 392,200	$ 1,186,600
Total Forecast Expenditures	(c)	$ 781,000	$ 880,100	$ 907,100	$ 2,568,200
Approved Expenditures (G-121-19)	(d)	$ 290,000	$ -	$ -	$ 290,000
Variance (Actual - Approved)	(c) - (d)	$ 491,000	$ 880,100	$ 907,100	$ 2,278,200

34.1 For greater certainty, please confirm that PNG is seeking Commission acceptance of a DSM Expenditure Schedule for 2020, 2021 and 2022 in the amounts shown on the last row of Table 38, noting that for 2020 the amount for which acceptance is requested ($491,000) is in addition to the amount ($290,000) accepted in the compliance filing pursuant to Order G-121-19 (as indicated in Table 36).

Response:

Confirmed. PNG is requesting BCUC acceptance of expenditures of $491 thousand related to the ECI portfolio for 2020 that are in addition to those previously accepted by way of Order G-121-19. PNG is also requesting acceptance of expenditures for two additional years ($880 thousand in 2021 and $907 thousand in 2022) to fund an expanded ECI portfolio.

34.2 For greater certainty, please specify the assumptions behind the estimated impact to residential customers "in the neighbourhood of $8 per year" of implementation of the 2020-2022 DSM Expenditure Schedule.

Response:

PNG estimates the impact to the delivery margin, of $2.57 million in total ECI expenditures over three years accruing to a ratebase deferral account attracting PNG's approved rate of return, and an amortization of those expenditures over five years, consistent with PNG's current treatment of ECI expenditures that has been approved by the BCUC.

34.2.1 Please provide a corresponding estimate of the impact on commercial customers.

Response:

The annual impact to the delivery margin is in the range of $0.08 to $0.10 per gigajoule; the average impact to residential and small commercial customers' bills is $8 and $38 per year, respectively. Please see the table that follows for further details.

Impact of ECI expenditures of $2.568 million over three years (2020 - 2022)			
Division	to Delivery Margin ($/GJ)	to average residential customer ($/year)	to average small commercial customer ($/year)
PNG-West	$0.10	$7	$32
Fort St. John/Dawson Creek	$0.09	$9	$43
Tumbler Ridge	$0.08	$6	$30
Average	na	$8	$38

35.0 Topic: DSM Scenarios
Reference: Application, Exhibit B-1, p.21; Section 8.3 Alternative DSM Scenario, p.130, pdf p.148

On page 21 of the Application, PNG states:

"PNG presents its analysis of a "reference" and "high DSM" funding scenarios in Section 8. PNG has not included an analysis of a "low DSM" funding scenario. PNG submits that a low DSM funding scenario corresponds to a DSM portfolio that meets the adequacy requirements of the DSM Regulation only." [p.21, underline added]

In Section 8.3 Alternative DSM Scenario, PNG discusses a "Proposed ECI Portfolio" and a "2017 CPR Market Potential." PNG states:

> "PNG has based the reference funding scenario on the forecast energy savings of the 2020 – 2022 ECI portfolio assuming a continuation of a similar level of funding in 2023 and beyond, with market saturation occurring after five years, in 2027.
>
> PNG has developed a "high DSM" scenario based on the results of the 2017 CPR Market Potential Review that estimated three percent in cumulative gas savings market potential as a percentage of consumption by 2022, increasing by 0.5 percent annually and reaching 7.9 percent by 2035. [p.130, pdf p.148, footnote omitted]

35.1 For greater certainty, please confirm that the Proposed ECI Portfolio is the same as the first three years of the Reference Scenario.

Response:

Not confirmed. The demand forecast scenarios ("Reference", "Competitive Gas", "Competitive Electric") presented in Section 7, and in Appendix D of the Application are gross demand forecasts, before the effect of any and all demand-side measures, including those in PNG's ECI portfolio.

In its Decision attached to Order G-155-15 approving the 2015 Resource Plan for PNG(N.E.), the BCUC directed PNG to include in its next and subsequent resource plans "different DSM funding scenarios which should at a minimum include a "reference" DSM funding scenario with 'high DSM' and 'low DSM' scenarios relative to the reference funding scenario."

As stated on page 130 of the Application, PNG has based the reference DSM funding scenario requested by the BCUC, on the forecast energy savings of the 2020 – 2022 ECI portfolio presented in the Application.

"Forecast energy savings in terajoules (TJ) and as a portion of demand forecast under the Reference scenario are presented graphically and in tabular form in Figure 64, Figure 65 and Table 39, respectively. The impacts are presented in the context of the demand across all four divisions of PNG, excluding demand from Industrial Sales and Transport. Demand from LNG Canada, a commercial customer in PNG-West, has also been excluded. While the ECI Commercial program can be accessed by PNG's industrial customers, the existing and proposed initiatives within the Commercial program are most applicable to small and larger commercial customers. Industrial customers include Campus Energy's Regional LNG facility in Dawson Creek, CNRL's fuel gas operations in Fort St. John and Tumbler Ridge, as well as pellet plants in PNG-West. Even under an ECI portfolio expanded to achieve the level of energy savings suggested by the 2017 CPR, there is limited opportunity to offer initiatives that would influence the demand of these types of customers. Including only those loads that can be influenced by the ECI programs is therefore appropriate." [pp.130-131, underline added]

35.2 Please explain the paragraph quoted above. Is PNG saying that the 2017 CPR Market Potential scenario, i.e., "high DSM," does not include any DSM savings from industrial customers? Or, is PNG saying that the 2017 CPR Market Potential scenario is not achievable because it does assume DSM savings from industrial customers?

Response:

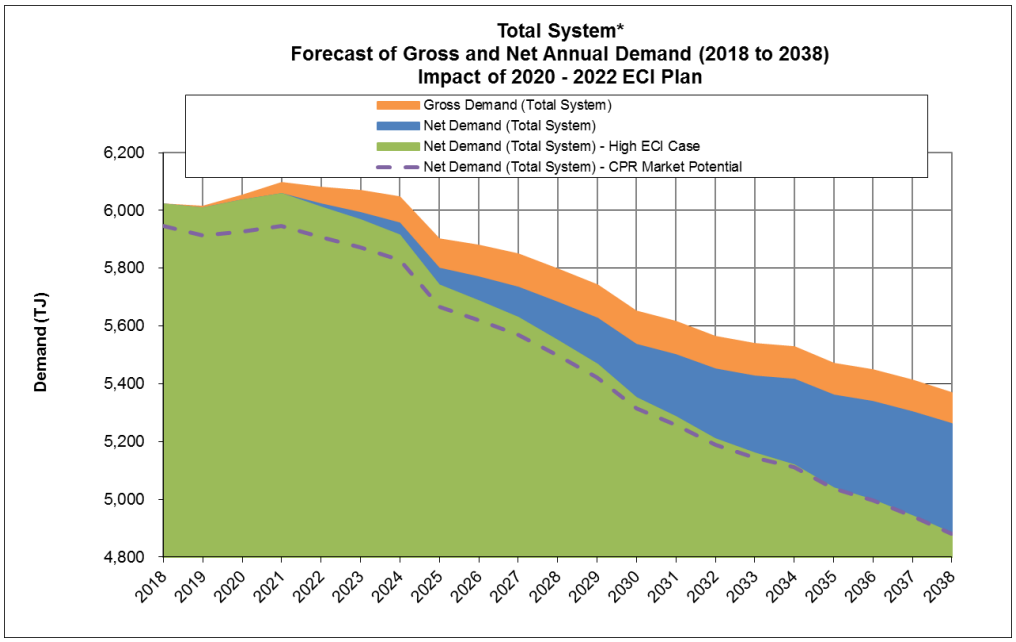
PNG's "high DSM" scenario does include DSM savings from Industrial customers. However, this scenario is not readily achievable through actions taken by PNG for the following reason.

PNG's industrial customers are sophisticated entities who have the capacity and knowledge to make the best decisions on upgrading or replacing equipment based on their own feasibility studies. The CleanBC Clean Industry Fund and Industrial Incentive Program, and the Innovation Clean Energy Fund (ICE) are examples of provincial programs available to assist PNG's industrial customers. PNG's ECI portfolio, having a proposed total annual budget of less than $1 million, is too small to make a meaningful contribution to this sector.

35.3 In Figure 64: Forecast Gross and Net Annual Demand (TJ), what is the dashed purple line?

Response:

Please see the revised version of Figure 64, below. PNG has corrected the formatting error in Figure 64. The dashed purple line indicates the total net system demand if the market potential savings identified in the 2017 Conservation Potential Review were realized.



35.4 Please provide a version of Table 39 that shows annual energy savings (in TJ) for Proposed ECI Portfolio and 2017 CPR Market Potential, and annual Gross System Load (in TJ) for the years indicated.

Response:

Please see the table that follows. The gross consolidated load excludes industrial sales and transportation demand on all four distribution systems. This presentation is consistent with Table 39 of the Application.

Reduction in Annual Demand *		2018	2019	2020	2021	2022
Gross Consolidated Load *	TJ	6,023	6,014	6,052	6,096	6,080
Reduction from proposed ECI Portfolio	TJ	-1.96	-5.14	-18.06	-38.39	-58.72
	% **	-0.03%	-0.09%	-0.30%	-0.63%	-0.97%
Reduction from 2017 CPR Market Potential	TJ	-1.96	-5.13	-18.10	-38.52	-69.90
	% **	-0.03%	-0.09%	-0.30%	-0.63%	-1.15%
		>>>		2025	2030	2035
Gross Consolidated Load *	TJ			5,901	5,650	5,471
Reduction from proposed ECI Portfolio	TJ			-101.25	-113.90	-110.27
	% **			-1.72%	-2.02%	-2.02%
Reduction from 2017 CPR Market Potential	TJ			-159.90	-300.02	-432.70
	% **			-2.71%	-5.31%	-7.91%

* Excluding Industrial Sales and Transport
** Relative to Reference Scenario

35.5 Does PNG have a cost estimate for annual spending in the test period under the 2017 CPR Market Potential scenario? If so, please provide it. If not, please explain why not.

Response:

PNG has not prepared a cost estimate for annual spending in the test period under the 2017 CPR Market Potential scenario. Developing a cost estimate requires program planning that was not performed as part of the CPR or as part of the 2019 DSM Plan.

35.6 Please state the criteria and reasons for PNG's choice of the Proposed ECI Portfolio over the 2017 CPR Market Potential scenario for the test period DSM expenditures.

Response:

The proposed amendments to existing ECI programs and proposed new programs set out in the 2019 DSM Plan respond to the comments of the BCUC to expand the scope and breadth of PNG's DSM programs while also improving the effectiveness of the portfolio. Please see also Section 4.2 of the 2019 DSM Plan attached as Appendix F to the Application for a description of the ECI Guiding Principles.

35.7 How did PNG reach the conclusion that there is limited opportunity to offer initiatives that would influence the demand of its industrial customers including Campus Energy's Regional LNG facility in Dawson Creek, CNRL's fuel gas operations in Fort St. John and Tumbler Ridge, as well as pellet plants in PNG-West? Was this based on customer input? Was it based on the PNG CPR report?

Response:

Please see the response to BCUC 50.2.1.

35.8 Has PNG examined FortisBC Energy Inc.'s DSM Industrial Program Area to determine if there are energy saving measures or opportunities that would be applicable to PNG's industrial customers? If so, what were the results? If not, why not?

Response:

PNG has not examined FortisBC Energy Inc.'s DSM Industrial Program Area to determine if there are energy saving measures or opportunities that would be applicable to PNG's industrial customers.

35.9 Has PNG considered contracting with FEI to have some or all of FEI's DSM Industrial Programs made available to PNG's industrial customers?

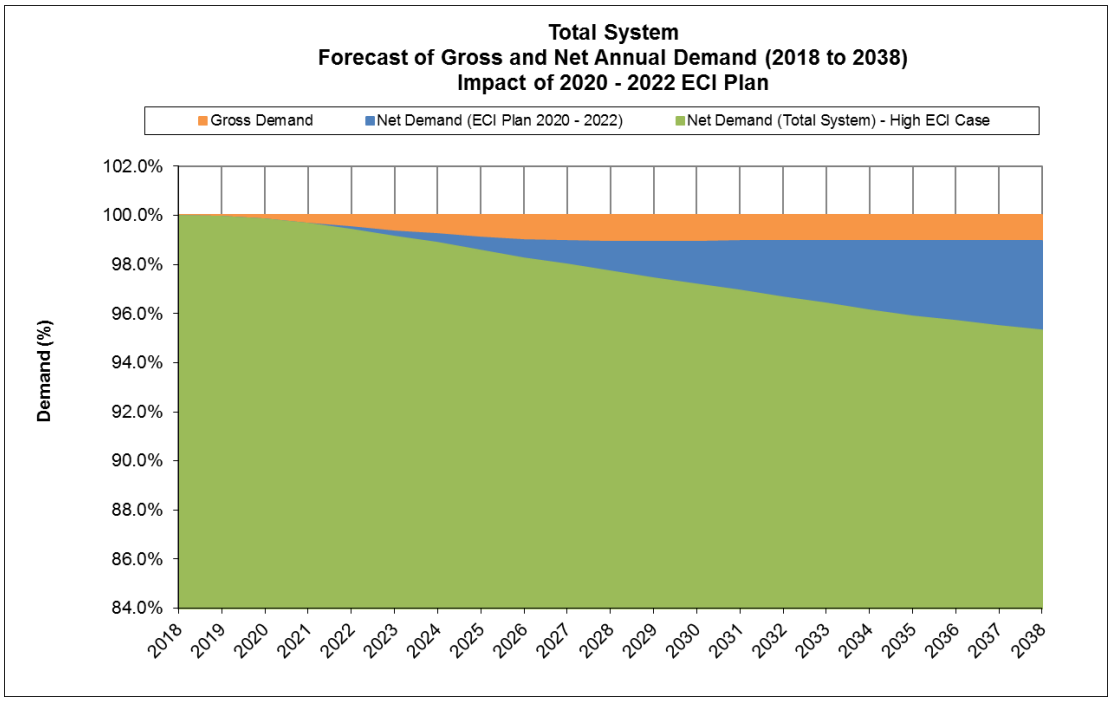
Response:

PNG has not considered contracting with FEI to have some or all of FEI's DSM Industrial Programs made available to PNG's industrial customers. As noted in the response to Question 35.2, PNG submits that its ECI portfolio, with a proposed total annual budget of less than $1 million, is too small to make a meaningful contribution to this sector at this time.

35.10 Please provide versions of Figure 65 and Table 39 that do not exclude Industrial Sales.

Response:

Please see the chart and table that follow. The impact of the demand reductions as a result of the ECI Plan and the High ECI Case are presented with respect to the total gross demand including Industrial Sales and Transport.



Reduction in Annual Demand *		2018	2019	2020	2021	2022
Proposed ECI Portfolio	TJ	1.96	5.14	18.06	38.39	58.72
	% **	0.02%	0.05%	0.16%	0.32%	0.49%
2017 CPR Market Potential	TJ	1.96	5.13	18.10	38.52	69.90
	% **	0.02%	0.05%	0.16%	0.32%	0.59%
		>>>		2025	2030	2035
Proposed ECI Portfolio	TJ			101.25	113.90	110.27
	% **			0.92%	1.06%	1.05%
2017 CPR Market Potential	TJ			159.90	300.02	432.70
	% **			1.45%	2.80%	4.11%

* Including Industrial Sales and Transport
** Relative to Reference Scenario

"PNG is proposing an expanded ECI portfolio that will form the foundation for further expansions that may ultimately achieve the theoretical market potential demand reductions. In this iteration of the ECI portfolio, PNG has increased the budget for marketing all programs to its customers, increased the level of activity of its Conservation Education and Outreach (CEO) activities, enhanced the incentives offered by the commercial program, and proposed an effective program fulfilling the needs of its residential customers. Once participation in the ECI programs increase, PNG will be in a better position to assess the actual cost effectiveness of the ECI programs to date, and make an extrapolation of the costs to achieve further reductions approaching the theoretical market potential." [pp.132-133]

35.11 Please explain this paragraph. Are the "proposed expanded ECI portfolio," "this iteration of the ECI portfolio," and the 2020-2022 DSM Expenditure Schedule one and the same? Does "further expansions" refer to DSM in years 2023 and following?

Response:

The "proposed expanded ECI portfolio" and "this iteration of the ECI portfolio" are both references to PNG's proposed ECI portfolio for 2020 – 2022 and PNG's request for acceptance of the 2020-2022 DSM Expenditure Schedule as set out in the Application. "Further expansions" refers to additional expansions of PNG's ECI portfolio beyond 2022.

36.0 Topic: DSM Costs Allocation
Reference: Decision and Order G-121-19, page 29

In Decision and Order G-121-19, the Panel approved "PNG's proposed method of allocating the ECI costs between PNG-West and PNG (N.E.) using the market size approach as set out more fully in its Application and approves PNG's proposed allocation of ECI costs amongst customer classes on the basis of their relative contribution to the gross margin in each division as set out more fully in its Application."

The Panel cites PNG's proposed allocation of DSM costs between Divisions as follows, citing Exhibit B-2, BCUC IR 15.1 in that proceeding:

Table 12[137]

Division:	PNG-West	Fort St John /Dawson Creek	Tumbler Ridge
Allocation of DSM costs	51.9%	46.3%	1.8%

36.1 Does PNG propose any change in the currently approved methodology for allocation of DSM costs between Divisions and customer classes?

Response:

PNG does not propose any change in the currently approved methodology for allocation of ECI costs between PNG's divisions and customer classes.

36.2 Please provide a table showing the proposed allocation of DSM costs by Division for the test period.

Response:

Please see the table that follows.

	Allocation of ECI Schedule of Expenditures (2020 - 2022)		
	Allocation	Requested	Total Requested and Approved
PNG-West	51.9%	$ 1,181,722	$ 1,332,265
Fort St. John/Dawson Creek	46.4%	$ 1,056,103	$ 1,190,643
Tumbler Ridge	1.8%	$ 40,175	$ 45,293
Total	100.0%	$ 2,278,000	$ 2,568,200

36.3 Please provide a table showing the proposed allocation of DSM costs by customer class for the test period. Topic: ECI Annual Report

Response:

The table that follows allocates the currently approved and requested ECI Schedule of Expenditures for the period from 2020 to 2022 to each division, based on the market size approach, and to each customer class based on each class's contribution to the gross margin in each division. Please note that PNG allocates the impact to the revenue requirement, of the ECI Schedule of Expenditures, to each customer class based on their contribution to the gross margin. The impact on the revenue requirement is determined by the annual expense related to the amortization of the expenditures over five years, and by the impact of the approved rate of return of the unamortized portion.

	Allocation of ECI Schedule of Expenditures Requested + Approved (2020 - 2022)		
Customer Class	**PNG-West**	**Fort St. John/Dawson Creek**	**Tumbler Ridge**
Residential	$582,778	$673,656	$26,721
Small Commercial	$282,041	$342,893	$11,975
Large Commercial, Small Industrial Sales and Other	$121,896	$108,617	$4,756
Firm Transport	$261,441	$65,476	$1,840
Interruptible Sales and Transport	$84,109	$0	$0
Total	$1,332,265	$1,190,643	$45,293

37.0 Topic: DSM Underspending
Reference: Application, Exhibit B-1, Appendix F, 2019 Demand Side Management Plan, Table 10: Summary of New and Existing Programs, pdf p.243

Table 10: Summary of New and Existing Programs

Summary: New and Existing Programs and Initiatives								
Item	2016	2017	2018	2019	2020	2021	2022	Total
Actual/Forecast Expenditures	(Act)	(Act)	(Act)	(F/C)	(F/C)	(F/C)	(F/C)	(F/C)
Existing Programs and Initiatives	$ 215,244	$ 70,696	$ 126,543	$ 330,733	$ 378,800	$ 487,900	$ 514,900	$ 2,124,816
New Programs and Initiatives	$ -	$ -	$ -	$ -	$ 402,200	$ 392,200	$ 392,200	$ 1,186,600
Total Actual/Forecast Expenditures	$ 215,244	$ 70,696	$ 126,543	$ 330,733	$ 781,000	$ 880,100	$ 907,100	$ 3,311,416
Approved Expenditures	$ 432,403	$ 317,039	$ 349,024	$ 342,000	$ 290,000	$ -	$ -	$ 1,730,466
Variance (Actual - Approved)	$ (217,159)	$ (246,343)	$ (222,481)	$ (11,267)	$ 491,000	$ 880,100	$ 907,100	$ 1,580,950

37.1 Given the substantial underspending during 2016, 2017 and 2018, what specific steps will PNG take to ensure it will be able to spend the requested amounts for 2020, 2021 and 2022?

Response:

Please refer to the response to BCUC 45.2. PNG intends to increase awareness of its ECI programs amongst its customers in order to increase participation in all of the ECI incentive programs.

37.1.1 Please explain why these steps will lead to PNG fully expending its requested budgets.

Response:

PNG believes that increased awareness of programs will lead to increased participation.

38.0 Topic: ECI Annual Report
Reference: Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd. Energy Conservation and Innovation Program Funding Application ~ Project No. 1598979, Exhibit B-1, Appendix C, 2017 ECI Annual Report, pdf p.89 (https://www.bcuc.com/Documents/Proceedings/2019/DOC_53180_B-1-PNG-ECI-Program-Funding-Application.pdf)

In the December 2018 ECI 2019-2020 Funding Application, PNG provided the 2017 ECI Annual Report. The current Application does not provide a 2018 ECI annual report.

38.1 Please file the 2018 ECI Annual Report, or indicate when it will be available.

Response:

PNG has attached the 2018 ECI Annual Report as Exhibit BCSEA 38.1 to these responses.

39.0 Topic: Conservation Potential Review
Reference: Application, Exhibit B-1, Appendix V: PNG 2017 Conservation Potential Review, pdf p.548

"The study uses incentive levels and administrative costs derived from FortisBC Gas's historic experience as a reasonable proxy for PNG. The team recognizes that FortisBC Gas's incentive levels and administrative costs may reflect efficiencies from economies of scale and market experience that may not yet be attained by PNG's conservation efforts. Additionally, PNG may pursue different implementation plans that lead to different incentive levels and administrative costs than seen in FortisBC Gas's service territory. As such, the budgets and cost-effectiveness tests are indicative of mature program experience in the region, but may differ from PNG's realized costs in the near term as its DSM programs gain experience and scale." [underline added]

39.1 The cited paragraph suggests that the lack of maturity of PNG's programs could result in higher implementation costs than FortisBC has historically achieved. Please discuss the effect that the relative newness to the markets of PNG's efficiency programs could have in reducing program costs in the near term relative to FortisBC's costs, due to lower market saturation, unsatisfied demand, and other factors.

Response:

PNG has not analysed the effect that the relative newness to the markets of PNG's efficiency programs could have in reducing program costs in the near term.

39.2 When does PNG expect to have a new or updated Conservation Potential Review report?

Response:

PNG does not have a plan to develop a new or updated CPR at this time.

40.0 Topic: DSM Programs to address New Construction
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf p.219

"The low rate of development across PNG's service areas challenges the feasibility of programs aimed at the new construction sector. New home starts average less than 500 per year and new commercial construction starts average less than 50 per year."

In Directive 7 of Order G-203-15A, the Commission states:

> "The Panel directs PNG to include the results of its research and analysis of the applicability of the programs currently offered by FEI in the next DSM expenditure schedule filing, and to specifically include a review of the costs and benefits of offering 'new construction' program(s) to mitigate lost DSM opportunities." [underline added]

40.1 Does PNG agree that foregoing opportunities for efficiency measures in new construction can result in lost DSM opportunities?

Response:

PNG does not agree that foregoing opportunities for efficiency measures in new construction results in lost DSM opportunities for PNG. As stated in Section 3.1 of the 2019 DSM Plan, owing to PNG's low customer density, its ECI programs do not benefit from the economies of scale found in larger jurisdictions, most notably that there are fewer contractors skilled in energy efficient construction and appliance installation, and these serve a large geographic area, entailing higher travel costs.

Additionally, the target audience for a program needs to be large enough such that the energy saving benefits from the participants, usually a small portion of the target audience, are greater than the costs of the program's overhead; thereby resulting in a cost benefit test result of greater than one. The rate of new construction in PNG's service areas is extremely low, averaging less than 500 new homes and less than 50 new commercial construction starts per year.

40.2 Please fully explain why, in PNG's view, the low rate of development across PNG's service areas "challenges the feasibility of programs aimed at the new construction sector."

Response:

Please see the response to Question 40.1.

40.3 Is PNG saying that DSM programs aimed at the new construction sector in its service areas in the test period would not have acceptable benefit/cost results?

Response:

Yes. Owing to the limited amount of new construction in PNG's service areas, the energy savings opportunities are not sufficient to justify establishing a program and incurring the fixed administrative and marketing costs. Please see also the response to Question 40.1.

40.4 Does PNG consider that there is a minimum size below which a DSM program during the test period would not be acceptable (or feasible)? If so, please provide the rationale and the method by which PNG determines the minimum acceptable program size.

Response:

Yes. A total market opportunity consisting of 500 residential and 50 commercial construction starts is considered too small an opportunity, especially as compared to the opportunity afforded by PNG's proposed programs.

40.5 Would PNG agree that one of the advantages of having a relatively small amount of residential and commercial new construction in its service areas, compared to, say, FEI, is that there are fewer builders to engage in a DSM program aimed at new construction?

Response:

PNG submits that engaging with fewer builders may or may not be an advantage and that it would depend on relationships, values, and business drivers.

40.6 If program size is a barrier, has PNG explored arrangements with FEI, or BC Hydro, for delivery of a new construction DSM program?

Response:

For the reasons presented in its responses to Questions 40.1, 40.3, and 40.4, PNG hasn't explored the development or delivery of a new construction DSM program independently or with FEI or BC Hydro.

PNG refers to section 4.2 of the 2019 DSM Plan attached as Appendix F to the Application. PNG has defined the principles used to guide the development of the ECI Program, one of which is to "leverage available programs and incentives from other organizations, agencies, and utilities". The CleanBC Better Buildings web portal offers a CleanBC Commercial New Construction Program from the B.C. Government available to commercial customers with buildings in PNG's service areas.

40.7 Please provide any data that PNG has regarding the number of home builders who completed homes that connected to PNG gas service in each of 2016, 2017, and 2018, and the number of homes that each completed

Response:

PNG does not collect data on the activities of home builders active in PNG's service areas.

40.7.1 How many builders in total for each year completed homes that connected to PNG gas service in 2016, 2017, and 2018?

Response:

PNG does not collect data on the activities of home builders active in PNG's service areas.

40.7.2 How many homes did each builder complete in each year? Please provide the data in table format such as is illustrated below:

Anonymized Home Builder ID	# of electrically-heated completed home units with PNG Service		
	2016	2017	2018
Builder A	12	7	14
Builder B….			
Anonymized Home Builder ID	# of gas-heated completed home units with PNG Service		
	2016	2017	2018
Builder A	8	4	11
Builder B….			

Response:

PNG does not collect data on the activities of home builders active in PNG's service areas.

40.8 Please provide any data that PNG has regarding the number of commercial builders who completed commercial buildings that connected to PNG gas service in each of 2016, 2017, and 2018, and the number of commercial buildings that each completed.

Response:

PNG does not collect data on the activities of commercial builders active in PNG's service areas.

40.8.1 How many commercial builders in total for each year completed commercial buildings that connected to PNG gas service in 2016, 2017, and 2018?

Response:

PNG does not collect data on the activities of commercial builders active in PNG's service areas.

40.8.2 How many commercial buildings did each builder complete in each year? Please provide the data in table format such as is illustrated below:

Anonymized Commercial Builder ID	# of electrically-heated completed commercial buildings with PNG Service		
	2016	2017	2018
Builder AA	2	4	1
Builder BB….			
Anonymized Commercial Builder ID	# of gas-heated completed commercial buildings with PNG Service		
	2016	2017	2018
Builder AA	2	0	3
Builder BB….			

Response:

PNG does not collect data on the activities of commercial builders active in PNG's service areas.

41.0 Topic: Conservation Potential Review
Reference: Application, Exhibit B-1, Appendix V: PNG 2017 Conservation Potential Review, pdf p.541.

"The whole facility end-use dominates the residential sector, accounting for 70% of the total savings potential. This is largely driven by ENERGY STAR Homes, which have by far the most market potential of all residential measures…."

41.1 Please confirm that the CPR prepared for PNG determined that a residential new construction market opportunity centered on ENERGY STAR Homes had "the most market potential of all residential measures."

Response:

PNG confirms that the CPR prepared determined that a residential new construction market opportunity centered on ENERGY STAR Homes had the most market potential of all residential measures.

PNG submits that, per Section 4.6 of the 2019 DSM Plan, the most appropriate use of the 2017 CPR Market Potential Review is to provide portfolio level directional guidance to PNG DSM planning. The CPR market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate.

41.2 Which DSM new construction programs for comparatively-sized utilities has PNG reviewed, if any?

Response:

PNG has not reviewed DSM new construction programs of comparatively-sized utilities.

PNG refers to section 4.2 of the 2019 DSM Plan. PNG has defined the principles used to guide the development of the ECI Program, one of which is to "leverage available programs and incentives from other organizations, agencies, and utilities". The CleanBC Better Homes web portal links to offers for three residential new construction programs being offered in PNG's service areas.

PNG also refers to the discussion in section 4.6 and section 3.1 of the 2019 DSM Plan. PNG submits that it is most effective for the ECI Program to support training for home builders on construction practices that support municipalities' adoption of the BC Energy Step Code.

41.2.1 Please discuss the applicability to PNG and its customers of any of the DSM new construction programs for comparatively-sized utilities that PNG has reviewed.

Response:

Please see the response to Question 41.2.

42.0 Topic: Conservation Potential Review
Reference: Application, Exhibit B-1, Appendix V: PNG 2017 Conservation Potential Review, pdf p.548 and pdf p.552

Table 5-2 and Table 5-3 both have a column heading label "Sector" but neither table indicates in the column which sector the figures apply to.

42.1 Please provide a version of each table that includes appropriate sector labels.

Response:

Please see the tables that follow.

Table 5-2 (Amended)

Sector	Spending Type	2016	2020	2025	2030	2035	2016 - 2035 Total
Commercial	Incentives	$ 258	$ 398	$ 492	$ 487	$ 407	$ 8,481
	Non-Incentives	$ 59	$ 67	$ 76	$ 69	$ 54	$ 1,323
	Total	$ 317	$ 464	$ 568	$ 556	$ 460	$ 9,804
Industrial	Incentives	$ 26	$ 41	$ 71	$ 98	$ 107	$ 1,422
	Non-Incentives	$ 17	$ 22	$ 31	$ 38	$ 41	$ 616
	Total	$ 43	$ 63	$ 103	$ 135	$ 148	$ 2,038
Residential	Incentives	$ 114	$ 275	$ 341	$ 463	$ 477	$ 6,360
	Non-Incentives	$ 165	$ 196	$ 205	$ 264	$ 264	$ 4,164
	Total	$ 279	$ 471	$ 546	$ 727	$ 742	$ 10,524
Total	Incentives	$ 399	$ 713	$ 904	$ 1,047	$ 991	$ 16,263
	Non-Incentives	$ 241	$ 285	$ 313	$ 371	$ 358	$ 6,103
	Total	$ 639	$ 998	$ 1,216	$ 1,418	$ 1,350	$ 22,366

Table 5-3 (Amended)

		Total Resource Cost Test	Societal Cost Test	Utility Cost Test	Participant Cost Test	Rate Impact Measure Test
Commercial	2016	1.59	1.59	2.33	4.68	0.38
	2020	1.58	1.58	2.32	4.22	0.40
	2025	1.60	1.60	2.33	4.07	0.42
	2030	1.51	1.51	2.21	3.81	0.42
	2035	1.48	1.48	2.17	3.70	0.42
	2016-2035	1.58	1.58	2.31	4.17	0.41
Industrial	2016	1.45	1.45	1.55	4.39	0.46
	2020	1.79	1.79	1.91	4.69	0.52
	2025	2.05	2.05	2.20	4.74	0.56
	2030	2.03	2.03	2.19	4.47	0.57
	2035	2.02	2.02	2.18	4.34	0.58
	2016-2035	1.91	1.91	2.05	4.58	0.54
Residential	2016	0.98	0.98	1.32	5.17	0.29
	2020	1.14	1.14	1.67	4.52	0.32
	2025	1.26	1.26	1.83	4.51	0.35
	2030	1.19	1.19	1.71	4.18	0.35
	2035	1.18	1.18	1.63	4.05	0.35
	2016-2035	1.22	1.22	1.71	4.70	0.33
Portfolio	2016	1.32	1.32	1.84	4.83	0.35
	2020	1.38	1.38	1.99	4.37	0.37
	2025	1.47	1.47	2.09	4.29	0.39
	2030	1.38	1.38	1.95	4.03	0.39
	2035	1.36	1.36	1.87	3.93	0.40
	2016-2035	1.44	1.44	2.02	4.41	0.38

43.0 Topic: Conservation Potential Review
Reference: Application, Exhibit B-1, Appendix V: PNG 2017 Conservation Potential Review, pdf p.544

Figure 5-17. Top 40 Measures for Gas Energy Market Savings Potential in 2025 (TJ/year)

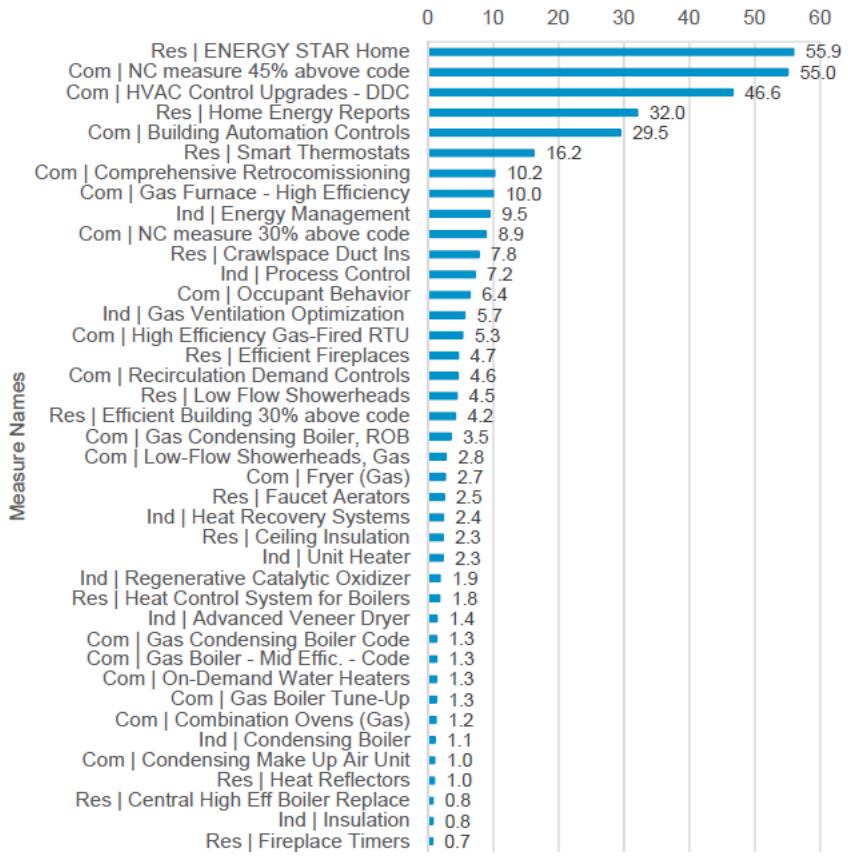


Figure 5-17 shows the top 40 measures for the market potential.

43.1 Please reproduce Figure 5-17 showing the top 40 measures for the economic potential.

Response:

PNG submits that, per section 4.6 of the 2019 DSM Plan, the most appropriate use of the 2017 CPR Market Potential Review is to provide portfolio level directional guidance to PNG's DSM planning process. The CPR market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate. Assumptions for fuel shares, building characteristics, equipment shares, measures, end use intensities, technology and administration costs, and payback acceptance are not specific to PNG's service territory. The 2017 CPR lead consultant relied on FEI data to calibrate key model assumptions such as variable administrative costs that do not reflect the history, challenges, and opportunities particular to PNG's ECI portfolio. The technical and economic potential estimates would be even less reasonable than the market potential estimates.
PNG submits that completing the analysis requested would not provide information meaningful to the 2019 DSM Plan. For this reason, PNG respectfully declines to complete the analysis.

43.2 Please provide a full listing of the measures that were included in the technical potential, economic potential, and market potential, along with the estimated costs and savings for each at the measure and aggregated measure level, and the benefit-cost test ratios (TRC, UC, PCT and RIM).

Response:

Please see the response to Question 43.1.

44.0 Topic: Conservation Potential Review
Reference: Application, Exhibit B-1, Appendix V: PNG 2017 Conservation Potential Review, pdf p.554

Appendix A of the Conservation Potential Review, under the heading "Detailed Model Results," says:

"For granular Base Case results from the model, see attachments 'PNG_Appendix_A1_2017-04-26.xlsx'"

44.1 Please provide the attachment in electronic format with all formulas intact.

Response:

The attachment to the CPR: "PNG_Appendix_A1_2017-04-26.xlsx" contains confidential data that is the property of FortisBC and BC Hydro that PNG is not at liberty to share.

45.0 Topic: PNG Current ECI Delivery Partners
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf p.220

"As a small utility with approximately 120 staff, PNG does not have a manager who is fully dedicated to the management of the ECI program. The Manager, Energy Management and DSM is responsible for the development and execution of the ECI programs."

45.1 Please summarize the overall responsibilities of the Manager, Energy Management and DSM, and provide an estimate of the full time equivalent that they are expected to spend on each responsibility.

Response:

The Manager, Energy Management and DSM is responsible for the planning and execution of PNG's ECI program. In addition, he is responsible for completing the Consolidated Resource Plan and associated DSM plan currently under review in this proceeding. The manager is also responsible for PNG's RNG acquisition strategy. For the remainder of 2020, he is also the project manager responsible for the implementation of PNG's Geographic Information system.

The manager divides his time amongst his various responsibilities as required, consistent with other managers in the organization.

45.2 Please explain how PNG concluded that it could effectively implement its ECI programs without a full-time DSM Manager.

Response:

PNG remains very aware of the burden of high natural gas delivery rates on PNG's customers in PNG-West and Tumbler Ridge. Therefore, PNG is sensitive to the impact that additional costs related to increases in staffing have on customer rates. PNG has roughly 1/30th of the number of customers and delivery volumes of FEI. PNG is simply not able to support higher expenses related to the management of a DSM program without a disproportionate impact on customer's costs. Therefore, PNG determined that the Manager, Energy Management and DSM would have additional responsibilities, and that they would be supported by external subject matter experts.

In addition, as described in Section 3.2 of the 2019 DSM Plan (attached as Appendix F to the Application), PNG relies on an extensive network of partners to plan, promote and deliver its programs. PNG submits that its organization model that leverages third party expertise is effective and entirely appropriate for the scale of PNG's operations, its customer base, and its ECI programs.

45.3 Please provide the names of all PNG staff and subcontractors who contributed to the development of this plan, along with the approximate number of hours each contributed.

Response:

PNG does not consider this information relevant to the review of PNG's Application, nor to the review of the effectiveness of its proposed Schedule of Expenditures. PNG respectfully declines to provide this information.

46.0 Topic: PNG Current ECI Delivery Partners
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf p.220

"BC Hydro, BC's primary electric utility, has been engaged in energy conservation and efficiency for over 15 years."

"PNG has an agreement with FEI whereby FEI shares DSM program information and materials for PNG's use."

46.1 Please explain the strategic support that PNG receives from BC Hydro.

Response:

PNG has conferred on aspects of the ECI portfolio with BC Hydro's experienced program staff.

46.1.1 Does PNG have any sharing agreements with BC Hydro, similar to its agreement with FEI?

Response:

PNG does not have any sharing agreements with BC Hydro that are similar to its agreement with FEI.

46.2 Please describe the sharing arrangement that PNG has with FEI.

Response:

PNG has a consulting service agreement with FEI and pays fees as required.

46.2.1 Specifically, what is the information that FEI shares?

Response:

PNG has been the recipient of program assumptions, ENews copy, marketing collateral, and "how to" videos files.

46.2.2 Specifically, how does PNG use the information to advance participation and savings for its ECI programs?

Response:

PNG uses information from FEI, alongside other market insights, for program planning and delivery.

46.2.3 Have FEI and PNG discussed joint implementation of any DSM programs? Please explain.

Response:

Yes. PNG has discussed joint implementation of the Residential Furnace and Boiler Replacement Program with FEI, BC Hydro, and the Ministry of Energy Mines and Petroleum Resources (MEMPR).

47.0 Topic: PNG Current ECI Delivery Partners
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf p.221

"PNG has an agreement with BC Hydro to deliver the Energy Saving Kit (ESK) and Energy Conservation Assistance Program (ECAP) programs."

47.1 Please explain the key features of the agreement referenced above.

Response:

On September 30, 2016, PNG and BC Hydro concluded their negotiations on a cost sharing agreement (Contribution Agreement) whereby PNG reimburses BC Hydro a portion of the cost of ESK's delivered to customers in PNG's service areas. Under this agreement, BC Hydro continues to receive and process applications through its existing call centre and online channels. When an application is identified as belonging to a BC Hydro customer residing in a community in which PNG provides natural gas delivery service, PNG is responsible for paying a portion of the cost associated with delivering an ESK to that customer. PNG's contribution is based on PNG's share of the space heating and domestic water heating end use market in PNG's service area.

All ESK's shipped to customers in PNG's service area are packaged in a box rebranded with PNG's logo, and includes an installation manual having content reflective of PNG.

PNG and BC Hydro have also finalized a funding agreement, similar to the Contribution Agreement entered into for the ESK program. Under this agreement, BC Hydro continues to receive and process applications through its existing call centre and online channels. When an application is identified as belonging to a BC Hydro customer residing in a community in which PNG provides natural gas delivery service, PNG is responsible for paying a portion of the cost associated with delivering the ECAP to that customer. PNG's contribution is based on the installed measures related to natural gas space heating and domestic water heating.

Both PNG's ESK and ECAP programs have been previously approved by the BCUC, most recently by way of Order G-121-19.

47.2 Please explain how the agreement benefits PNG customers.

Response:

PNG ESK and ECAP participants benefit from a dual natural gas and electric program with a familiar message and approach developed by BC Hydro for its customers. PNG customers benefit from an affordable fee for service approach to program delivery.

47.3 Please describe any differences between the ESK and ECAP programs that BC Hydro provides its customers when they are also PNG customers, compared with BC Hydro customers who are not PNG customers.

Response:

The ESK and ECAP programs delivered BC Hydro on PNG's behalf are identical to the ESK and ECAP programs that BC Hydro and FEI jointly deliver in FEI's service territory.

47.4 Have BC Hydro and PNG discussed joint implementation of any DSM programs? Please explain.

Response:

Please see the response to Question 46.2.3.

48.0 Topic: ECI Guiding Principles
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p. 223

"PNG has defined its principles to guide the development of the ECI program:

1. Alignment with BC's Energy Objectives;
2. Meet the Adequacy requirement of Section 3 of the Demand-Side Measures Regulation;
3. Develop a portfolio of programs that is cost effective at the portfolio level over the funding period as determined by the appropriate application of the Total Resource Cost/Benefit (TRC) and Modified Total Resource Cost/Benefit (mTRC) as prescribed by Section 4 of the DSM Regulation.
4. Be responsive to the needs and wants of PNG customers as determined by PNG sources, including but not limited to the REUS and 2019 Customer Attitudes Survey;
5. Provide a balanced and consistent approach to assisting residential, commercial, and industrial customers in their energy management and reduction of consumption.
6. Goal of limiting the non-incentive costs of each program at 50 percent of the program expenditure in a given year.
7. Leverage available programs and incentives from other organizations, agencies, and utilities."

48.1 Please define the term "balanced" as used in Guiding Principle 5 above, "Provide a balanced and consistent approach to assisting residential, commercial, and industrial customers in their energy management and reduction of consumption."

Response:

When defining and designing energy savings programs, PNG may consider existing programs and supports, the number of customers in a sector, available opportunities, costs, savings, as well as the other guiding principles.

48.2 Please explain the rationale for PNG adopting Guiding Principle 6 above, "Goal of limiting the non-incentive costs of each program at 50 percent of the program expenditure in a given year."

Response:

PNG submits that limiting non-incentive costs of each program at 50 percent of the expenditures would limit the administrative cost of the program and provide incentives where needed. PNG notes that the guiding principle is consistent with that in previous plans and was most recently approved in Order G-121-19.

48.2.1 Please provide any empirical evidence demonstrating that 50 percent is the most appropriate limit for non-incentive costs.

Response:

PNG does not have empirical evidence to demonstrate that 50 percent is the most appropriate limit. Please see also the response to Question 48.2.

49.0 Topic: PNG ECI Program Market Intelligence, 2013 REUS
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.224

"Approximately 16 percent of PNG's residential customers can be considered low-income households."

"Lower income households were more likely than other groups to choose "not at all interested" in any of the energy efficiency programs suggested on the survey. Similarly, the highest income households were most likely to be "very interested" in any of the programs. Programs where this pattern did not hold included installing programmable thermostats and furnace or heat pump tune-ups, which exhibited broad interest across all income groups."

49.1 Please provide the criteria that were used to define a "low-income household." How does this compare with the definition of "low-income household" in the DSM Regulation?

Response:

In its 2013 REUS, in the 2019 Customer Attitudes Survey and in its eligibility criteria for its ESK and ECAP programs, PNG has defined "low income household" in a manner that is consistent with the definition of "low-income household" presented in the Demand-Side Measures Regulation.

49.1.1 Do the same criteria also define "lower income households"?

Response:

Yes.

49.1.2 Are the criteria used to define low-income or lower income households consistent with the criteria used to determine eligibility for any of PNG proposed programs?

Response:

Yes. Please see the response to Question 49.1.

49.2 Please provide the list of programs that were presented when asking whether a respondent was interested in any of the energy efficiency programs.

Response:

Both the 2013 REUS and the 2019 Customer Attitudes Survey presented a list of energy efficiency programs and services. The list of programs and services presented in the 2013 REUS is found in Section 3.11.1, p. 50 of Appendix II to the 2019 DSM Plan (Appendix F to the Application). The list of programs and services for residential and commercial customer presented in the 2019 Customer Attitudes Survey is found in Section 3.4.3, p. 25 and Section 4.3.3, p. 52, respectively, of Appendix IV to the 2019 DSM Plan (Appendix F to the Application).

49.2.1 Did the survey provide any indication of what the programs were intended to provide to participants, or did respondents base their responses on their prior understanding of energy efficiency programs?

Response:

Please see the 2013 REUS attached as Appendix II to the 2019 DSM Plan. The cover letter sent to survey participants stated, "This survey is an important tool for understanding how energy is used in homes, the types of space and water heating appliances installed, how those appliances are used, the energy efficiency of homes and attitudes about energy issues. This information is very important for:

- forecasting future demand for natural gas
- designing energy efficiency programs to help you save money on your energy bills
- protecting the environment by lowering greenhouse gas emissions"

The 2019 Customer Attitudes Surveys didn't provide any indication of what the programs were intended to provide to participants in order to capture current opinions.

49.3 Please describe any conclusions that PNG has reached, or any decisions regarding its proposed energy efficiency programs that have been made, in part or in whole based on the finding that lower income households were more likely to choose "not at all interested" in any of the energy efficiency programs.

Response:

PNG has not reached any conclusions or made any decisions regarding its proposed energy efficiency programs in part or in whole based on the finding that lower income households were more likely to choose "not at all interested" in any of the energy efficiency programs.

50.0 Topic: PNG ECI Program Market Intelligence, 2013 REUS
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.224

"While 32 percent of households claimed to have an ENERGY STAR® qualified model, nearly the same proportion (30 percent) were not sure if their model was ENERGY STAR® qualified or not."

50.1 To what type(s) of appliances or other equipment does this statement refer?

Response:

PNG's statement refers to gas furnaces or boilers.

51.0 Topic: 2019 Customer Attitudes Survey
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf pp. 225-227

"Awareness of PNG energy efficiency programs is low. Only 17 percent of residential customers were aware of PNG's low-income program prior to taking the survey. The lack of awareness was common to respondents in all regions, customer sizes, and household incomes. For commercial survey respondents, only six percent were aware of PNG's Commercial Efficient Water Heater Program, three percent were aware of the Commercial Efficient Boiler Program, and one percent were aware of the Commercial Efficient Kitchens Program. There were no statistically significant differences in awareness by region or customer size."

"Residential customer satisfaction with PNG's efforts to help them use energy efficiently is very low, with only 11 percent of respondents satisfied, 49 percent neutral, and 30 percent dissatisfied. The remaining 11 percent were unsure how satisfied they were with PNG's efforts – a response consistent with the low awareness of PNG residential energy efficiency programs. Customers in Fort St. John and Dawson Creek were somewhat more satisfied than their counterparts in PNG-West and Tumbler Ridge (mean satisfaction scores of 5.7 and 5.2, respectively)."

"Survey respondents were asked to express interest in a variety of programs and services to help them reduce their energy use. Residential customers expressed the most interest in a furnace tune-up program (53 percent very or extremely interested), a draft proofing program (44 percent) and programs to upgrade exterior doors and windows (42 percent for each)."

"Program ideas attracting the most interest from commercial survey respondents include an energy audit to identify opportunities to save energy (28 percent very or extremely interested), a program to install or upgrade building automation controls (19 percent), and a program to upgrade HVAC controls (17 percent)."

51.1 Given the low customer awareness and low customer satisfaction that was reported in this survey, particularly among residential customers, please describe the specific steps that PNG has included in its ECI Plan to ensure that its programs will lead to success regarding Guiding Principle 4, "Be responsive to the needs and wants of PNG customers as determined by PNG sources, including but not limited to the REUS and 2019 Customer Attitudes Survey."

Response:

Please see the response to BCUC 45.2.

51.2 Did PNG assess the merits of a draft proofing program in its ECI Plan? Please explain.

Response:

PNG did not assess the merits of a draft proofing program in its ECI Plan. PNG supports weatherization through the existing energy saving tips videos on the PNG website as well as through the existing ESK and ECAP programs.

51.2.1 Is draft proofing supported by PNG in any of its proposed programs?

Response:

Please see the response to Question 51.2.

52.0 Topic: DSM Programs Offered in BC and Across Canada, CleanBC
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. pp. 227-229

"A review of the CleanBC Better Homes and Better Buildings websites found that energy efficiency programs noted below are available to PNG's customers. This information helps PNG identify where its efforts have most value."

52.1 How, specifically, has PNG used information regarding CleanBC programs to identify where its efforts have most value?

Response:

Please see Section 4.2 of the 2019 DSM Plan. PNG has defined the principles used to guide the development of the ECI portfolio. Within the context of the guiding principles, PNG reviewed the CleanBC programs to identify incentives and supports available. PNG aims to not duplicate existing programs already available to PNG's customers. In a particular instance where PNG identified an unmet need, PNG sought to collaborate with CleanBC on launching a Furnace and Boiler Replacement Program. PNG notes that proposed program was denied by the BCUC in Decision and Order G-121-19.

52.2 What conclusions has PNG reached regarding where its programs have most value based on its awareness of CleanBC programs?

Response:

PNG concludes that CleanBC offers no incentive for gas space heating efficiency measures in PNG's service territory.

52.3 Please describe all activities undertaken by PNG to encourage or facilitate its customers' participation in CleanBC programs.

Response:

PNG does not actively promote the CleanBC programs.

52.4 Is it PNG's position that if there is a CleanBC program that addresses certain energy efficiency opportunities—draft proofing, for example—then PNG has no obligation or responsibility to offer similar programs or to coordinate delivery of its programs with CleanBC?

Response:

Please refer to the response to Question 52.1.

53.0 Topic: Under-served Markets
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.234

"The Commission [in Order G-121-10] directed PNG to conduct "a review and discussion of new [energy efficiency] programs for …under-served markets... "PNG submits that the residential sector is an underserved market in PNG service territory…."

"PNG acknowledges that the industrial sector is also an underserved market in the PNG service territory…."

53.1 Please provide the definition of "under-served market" used by PNG in reaching the conclusions reproduced above.

Response:

PNG defines "under-served market" to be one that where there are few providers who are delivering energy efficiency and conservation solutions to a market with known energy efficiency and conservation potential.

53.2 Please describe the process and criteria used by PNG to determine that the residential and industrial sectors in PNG service territory are underserved markets.

Response:

PNG reviewed its current ECI portfolio as well as programs available through BC Hydro and CleanBC to determine what groups of PNG customers may be under-served. As discussed in the response to Question 35.2, PNG's industrial customers are sophisticated entities who have the capacity and knowledge to make the best decisions on upgrading equipment based on their own feasibility studies. The CleanBC Clean Industry Fund and Industrial Incentive Program, and the Innovation Clean Energy Fund (ICE) are examples of provincial programs available to assist PNG's industrial customers.

Through its review, PNG determined that a program targeting space heating for PNG's residential customers complements, rather than duplicates, programs already offered through CleanBC.

53.3 Does PNG make any distinctions between various components of the residential sector in terms of how, or by how much, they are underserved?

Response:

PNG has identified low-income households as a distinct group within the residential sector. PNG offers the ESK and ECAP programs to residential low-income customers.

54.0 Topic: Home Energy Report
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.235

"The 2017 CPR lists the "Home Energy Report" as the measure with the second highest market potential, based on achieving savings in natural gas demand of two percent in all single-family detached homes in PNG's service territory at no incremental cost, based on achieving behavioural change.

PNG has determined the underlying assumptions, particularly the assumption regarding cost, to be unreasonable. PNG expects that the delivery of Home Energy Reports to even a portion of single-family detached homes in PNG service territory would come with associated marketing and outreach costs, as well as considerable costs to setup and administer such a program. Therefore PNG has determined that a program to provide Home Energy Reports is not cost effective."

54.1 Please provide PNG's analysis, including all assumptions and the basis for them, that determined that a Home Energy Report program would not be cost-effective.

Response:

PNG submits that, per section 4.6 of the 2019 DSM Plan, the most appropriate use of the 2017 CPR Market Potential Review is to provide portfolio level directional guidance to PNG DSM planning. The CPR market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate.

PNG did not perform a formal analysis on the cost effectiveness of the Home Energy Reports (HER) given how the CPR is used by PNG and the view that the assumptions for this measure are unreasonable. As a rough calculation: based on a single-family dwelling in PNG territory using 100 GJ/yr, then a 2 percent behavioural savings is 2 GJ/yr for a 1-year measure life. Informal conversations with industry experts led PNG to believe it would not be possible to design and deliver a HER program for this low-level benefit. PNG submits that a more formal analysis would not be meaningful to the 2019 DSM Plan. PNG will continue to monitor federal, provincial, and utility activity for HERs and will pursue collaboration where possible.

54.2 At what level of cost would PNG consider the Home Energy Report program to be cost effective?

Response:

PNG would consider a Home Energy Report program to be cost effective if the results of the Total Resource Cost Test (TRC) exceed 1.0.

55.0 Topic: Commercial New Construction
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.236

"In the commercial sector, the 2017 CPR lists "New Construction measure 45 percent above code" as having the highest potential. The offices subsector assumes an incremental cost of $58 per square metre of floor space and 45 percent gas savings over the baseline. PNG estimates new commercial building starts to be less than 50 per year across the entire service territory. PNG therefore concludes that it is not cost effective to deliver a program to this small market segment. In addition, PNG notes that there are incentives available to PNG customers through other organizations."

55.1 Please clarify: is it PNG's position that it cannot offer a cost-effective program to capture the energy savings potential of commercial new construction because it "estimates new commercial building starts to be less than 50 per year?"

Response:

Yes. Please see the responses to Questions 40.1 and 40.3.

55.1.1 If yes, please provide the empirical basis of this determination.

Response:

PNG made the determination that a program for this market subsector would not be cost-effective based on professional experience. Please see also the responses to Questions 40.1 and 40.3.

55.1.2 If no, please explain how the statements above support PNG's determination that it cannot offer a cost-effective program for this market subsector.

Response:

Not applicable.

55.2 Please provide references to all energy efficiency programs targeted to the commercial new construction market sector that are implemented by other Program Administrators that PNG reviewed in development of its proposed Plan.

Response:

Please see Section 4.4 of the 2019 DSM Plan attached as Appendix F to the Application. PNG reviewed the following programs: CleanBC Commercial New Construction Program, CMHC Green Home Program - Condo Units, Genworth Energy-Efficient Housing Program - Condo Units, and Federal & Provincial GST/HST New Residential Rental Property Rebate.

55.3 Has PNG investigated contracting with FEI or BC Hydro for the delivery of a DSM program(s) for commercial new construction? If so, why has PNG apparently chosen not to pursue this route? If not, why not?

Response:

PNG has not investigated contracting with FEI or BC Hydro for the delivery of a DSM program for commercial new construction. Please see the response to Question 40.6.

56.0 Topic: Residential Program Area: Efficient Heating
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. pp.244-245

"The Efficient Heating program is designed to improve the visibility and satisfaction of PNG's ECI programs by appealing to a broad segment of PNG's residential customers. A furnace tune up and smart thermostat were identified as the top programs or services that PNG could offer to help customers reduce their energy use."

56.1 How much energy savings does PNG project for an average customer who participates in the Efficient Heating program?

Response:

Please see Table 11 on p. 33 of the 2019 DSM Plan attached as Appendix F to the Application. PNG expects annual energy savings to be approximately 6 GJ per participant.

56.1.1 How does this level of energy savings per customer compare with the top ten residential energy saving measures in the economic potential from the 2017 CPR?

Response:

As stated in Section 4.6 of the 2019 DSM Plan, the most appropriate use of the 2017 CPR Market Potential Review is to provide portfolio level directional guidance to PNG's DSM planning. The CPR market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate. The 2017 CPR does not present the savings per participant.

56.2 What are the estimated bill savings associated with the energy savings?

Response:

Bill savings are comprised of the avoided delivery charge, commodity cost and carbon tax, and depend on the region in which the customer lives. Based on an energy savings of 6.12 GJ per year and at current delivery and commodity costs and carbon tax rates, a residential customer in the PNG-West or Tumbler Ridge service areas could expect bill savings of approximately $100 per year. Residential customers in the Fort St. John and Dawson Creek service areas could expect annual bill savings of about $50.

56.2.1 How does this level of bill savings per customer compare with the top ten residential energy saving measures in the economic potential from the 2017 CPR?

Response:

The 2017 CPR does not present the savings per participant. The bill savings result from measures identified in the 2017 CPR cannot be determined.

57.0 Topic: Residential Program Area: Efficient Heating
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. pp.244-245

"Maintaining a furnace and optimizing its use through a smart thermostat can provide more savings than upgrading to an ultra-high efficiency furnace. This can be achieved at a fraction of the cost to the customer, resulting in a payback period measured in months, rather than years. PNG estimates that a furnace tune up and smart thermostat installation would cost an average of $550 per participant. By way of comparison, PNG estimates that an ultra-high efficiency furnace and matching thermostat would cost on average $7,500 to install."

57.1 Please provide the analysis and assumptions that support the statement that "Maintaining a furnace and optimizing its use through a smart thermostat can provide more savings than upgrading to an ultra-high efficiency furnace." Please provide the analysis in electronic format with all formulas intact. Please cite all empirical evidence that PNG relied on in making this determination.

Response:

PNG notes that DSM programs are intended to incentivize behaviours and purchases that achieve energy savings that go beyond those mandated by codes, standards and regulations. It is on this basis that PNG determines the cost effectiveness of its proposed programs.

In the case of a furnace replacement, PNG assumes an ultra-high efficient furnace is rated 98 percent annualized fuel utilization efficiency (AFUE) or greater. The code requirement for a replacement of an old gas furnace with a new one is 95 AFUE or greater. Therefore, the energy savings attributable to a DSM incentive program is 3 percent (98 AFUE – 95 AFUE).

Using the information in the 2017 CPR, PNG assumes a furnace tune-up can reduce space heating demand by up to 3 percent and a smart thermostat can achieve a further 9 percent reduction.

PNG notes it proposed a residential furnace replacement program in its 2019-2020 ECI Program Funding Application that was denied by the BCUC in Decision and Order G-121-19.

57.2 What is the expected useful life of the energy savings that will result from a furnace tune-up? Please cite all empirical evidence that PNG relied on in making this determination.

Response:

PNG assumes the measure life of a smart thermostat to be 11 years based on the 2017 CPR.

57.3 What is the expected useful life of the energy savings that will result from the installation of an ultra-high efficiency furnace? Please cite all empirical evidence that PNG relied on in making this determination.

Response:

PNG assumes the measure life of an ultra-high efficiency furnace is 18 years as per the 2017 CPR.

57.4 Please provide the evidence upon which PNG determined that the average installation cost for an ultra-high efficiency furnace would be $7,500.

Response:

PNG reviewed Energy Efficiency Alberta rebates and found an average cost of $7,362 for a 98 AFUE furnace. This cost was rounded up to $7,500.

57.4.1 What is the AFUE rating of the "ultra-high efficiency" furnace?

Response:

PNG assumes an ultra-high efficient furnace is rated 98 percent annualized fuel utilization efficiency (AFUE) or greater.

57.4.2 What are the estimated monetary savings to PNG customers over the lifetime of the furnace if they have an ultra-high efficiency furnace as compare to a high, medium and low efficiency furnace, respectively?

Response:

PNG submits that the analysis requested would not be meaningful to the 2019 DSM Plan. PNG refers to the Section 5.1.1 of the 2019 - 2020 ECI Program Funding Application that proposed a Residential Furnace and Boiler Replacement Program. PNG notes that proposed program was denied by the BCUC in Decision and Order G-121-19.

PNG notes that the TRC of the Residential Furnace and Boiler Replacement Program was 0.13 and the TRC of the Residential Efficient Heating program proposed in the 2019 DSM Plan is 0.42.

57.4.3 Did PNG examine the costs of furnaces that it does not consider to be "ultra-high efficiency?"

Response:

PNG did examine the costs of furnaces that it does not consider to be "ultra-high" efficiency.

57.4.3.1 If not, why not?

Response:

Not applicable.

57.4.3.2 If yes, please provide the estimated costs and associated AFUE ratings for all the categories of furnaces examined by PNG.

Response:

PNG reviewed Energy Efficiency Alberta rebates and found an average cost of a 96 AFUE furnace to be $5,126 and a 97 AFUE furnace to be $6,878.

58.0 Topic: Energy Conservation Assistance Program (ECAP)
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. pp.246-247

"BC Hydro and PNG have partnered to offer this program to low income households, including renters. The program is delivered by BC Hydro and Ecofitt, and is promoted through several channels, including: bill inserts, print ads, on-line, and partnerships with government ministries and non-profits that serve the low-income population."

Table 12: ECAP Program Summary

PROGRAM SUMMARY		
New/ Retrofit	Partner	Participants/yr
Retrofit	BC Hydro	100
Annual Budget 2020	Annual Gas Savings (GJ)	
$ 48,500	733	
Participant Cost before Incentive	Incentive Amount per Participant	Annual Gas Savings per Participant (GJ)
$ 360	$ 360	7.33
Marketing Costs		
2020	2021	2022
-	-	-
Administration Costs		
2020	2021	2022
12,500	12,500	12,500
Measure Life (years)	Free Ridership	Spill Over Rates
12	0%	0%
COST BENEFIT TESTS		
TRC	mTRC	UCT
0.72	5.22	0.47
PCT	RIM	
5.50	0.18	

BC Hydro and Ecofitt will deliver this program on behalf of PNG, and Table 12: ECAP Program Summary indicates that PNG estimates there will be 100 ECAP participants annually.

58.1 In addition to the PNG customers who participate in the PNG implementation of ECAP (delivered by BC Hydro and Ecofitt), will any PNG customers participate in the BC Hydro implementation of the program? If yes, how many?

Response:

Ecofitt is the service provider delivering the ECAP program for BC Hydro. Under the funding agreement between PNG and BC Hydro, BC Hydro continues to receive and process applications through its existing call centre and online channels. When an application is identified as belonging to a BC Hydro customer residing in a community in which PNG provides natural gas delivery service, PNG becomes responsible for paying a portion of the cost associated with delivering the ECAP to that customer. In other words, PNG funds a share of the BC Hydro ECAP program which is delivered to BC Hydro and PNG customers in PNG's service areas. Please see also the response to Question 47.1.

58.2 Table 12: ECAP Program Summary indicates that the average per participant annual savings will be 7.33 GJ. Please provide the basis of this savings estimate, by measure.

Response:

Please see Section 10.2.2 of the 2019 DSM Plan attached as Appendix F to the Application for a list of measures included in the ECAP program. PNG has not determined the savings by measure. PNG notes that the ECAP program formed part of previous plans and was most recently approved by Order G-121-19.

In this 2019 DSM Plan, PNG proposes adding a smart thermostat to the ECAP bundle of installed measures. The 2017 CPR found that smart thermostats can save customers nine percent on their natural gas heating demand; the third highest potential savings in the residential sector.

58.3 What other measures, if any, did PNG consider for inclusion in the ECAP program?

Response:

As stated in Section 10.2.2 of the 2019 DSM Plan, PNG proposes adding a smart thermostat to the ECAP bundle of installed measures.

58.3.1 For each measure that PNG considered for inclusion in the ECAP program but did not include, please explain the basis of the decision not to include the measure.

Response:

Not applicable. Please see the response to Question 58.3.

58.3.2 Are there any measures that BC Hydro and Ecofitt provide to BC Hydro customers that are not provided to PNG customers? Please list any such measures.

Response:

No. Please see the response to Question 58.1.

58.4 Please compare the ECAP program measures as proposed by PNG to the low income energy efficiency program measures offered to the customers of FEI.

Response:

PNG offers the same package of basic ECAP measures that FEI does. In addition, PNG proposes adding a smart thermostat to the ECAP bundle of installed measures.

58.4.1 Does FEI offer any gas-saving measures to its low-income customers that PNG does not?

Response:

Income-qualified customers of FEI may also qualify for attic, wall and/or crawlspace insulation, or a high-efficiency natural gas furnace or a furnace rebate.

58.4.2 If yes, would these measures provide savings for PNG's low-income customers?

Response:

PNG agrees that these additional measures will provide additional savings.

58.4.3 If yes, why does PNG decline to offer these measures?

Response:

PNG has not declined to offer these measures. PNG has not yet fully considered these measures for inclusion at this time.

59.0 Topic: Commercial Program Area: HVAC Controls
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. pp.249-250

"PNG proposes a new HVAC Controls program to provide incentives up to 50 percent of the cost to commercial business owners who upgrade their HVAC Controls. Commercial customers would work with the HVAC controls contractor of their choice to propose a HVAC controls system and submit an application for preapproval. Once approved, the work would be completed, and the contractor would show the PNG incentive as a discount on the customer invoice and receive payment from PNG directly.

The HVAC Controls program is designed to appeal to all of PNG's commercial customers and serve as a flagship program to focus communications, increase awareness and draw in participants to other program programs. According to the 2019 Customer Attitudes Survey, a program to install or upgrade building automation controls, and a program to upgrade HVAC controls both resulted in relatively high levels of interest from commercial survey respondents, at 19 and 17 percent, respectively.6 PNG estimates that most of the gas energy savings from "Building Automation Controls" comes from HVAC control upgrades. The CPR lists "HVAC Control Upgrades - Direct Digital Data Control" as having the second highest market potential.

HVAC control systems measure key variables and collect data to help manage temperature, humidity, pressure and ventilation to ensure optimum HVAC system efficiency. There are a variety of systems available from a host of suppliers. Solutions will be customized for each participant. The energy used by HVAC systems varies with the building type and ranges between 40 and 82 percent. PNG estimates that HVAC controls will save an average of 12 percent of the HVAC energy use."

59.1 Please describe any qualification criteria and/or parameters for "HVAC controls" to be eligible for incentives.

Response:

PNG plans to complete a detailed program design upon BCUC approval of the 2020 – 2022 ECI Schedule of Expenditures presented in the Application.

PNG expects the eligibility criteria to be similar to that of PNG's other commercial programs including:

- Participants must receive natural gas or piped propane service from PNG under any rate schedule except the residential service (RS1).
- Participants must be a property owner or long-term lease holder.
- Participants must be adding HVAC controls systems where there is currently no control system.
- PNG customers are not eligible unless all amounts owing by such customer to PNG are paid in full and there are no past due balances outstanding.
- The commercial building must be located in PNG's service territory.

59.2 Please provide any analysis that supports PNG's assumption that "HVAC controls will save an average of 12 percent of the HVAC energy use."

Response:

PNG has used the savings assumption presented in the confidential 2017 CPR Appendix A.2. PNG is unable to provide this analysis. Please refer also to the response to Question 44.1.

60.0 Topic: Commercial Program Area: Efficient Boilers
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.235

Table 16: Efficient Boilers Program Summary

PROGRAM SUMMARY		
New/ Retrofit	Partner	Participants/yr
Retrofit	TBD	4
Annual Budget 2020	Annual Gas Savings (GJ)	
$ 51,000	3,284	
Participant Cost before Incentive	Incentive Amount per Participant	Annual Gas Savings per Participant (GJ)
$ 27,600	$ 8,900	820.90
Marketing Costs		
2020	2021	2022
6,500	6,500	6,500
Administration Costs		
2020	2021	2022
8,900	8,900	8,900
Measure Life (years)	Free Ridership	Spill Over Rates
20	18%	0%
COST BENEFIT TESTS		
TRC	mTRC	UCT
1.61	9.22	2.40
PCT	RIM	
8.10	0.32	

Table 16: Efficient Boilers Program Summary, indicates that PNG anticipates 4 participants per year.

60.1 Please explain why, in PNG's view, it is not reasonable to offer a commercial new construction program based on an estimate of only 50 new commercial buildings in PNG territory per year when it is reasonable to offer the Efficient Boilers program to 4 expected participants per year.

Response:

The target market for the Efficient Boilers program is approximately 2,500 customers, while the target market for the commercial new construction sector is 50. PNG does not expect to achieve 100 percent penetration for any program. Please see also the response to Question 40.1.

61.0 Topic: Commercial Program Area: Efficient Kitchens
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.253

"Launched in June 2018, the Efficient Kitchen program offers customers operating commercial kitchen facilities a free efficient pre-rinse spray valve to effectively remove excess food residue from dishes. The models offered by PNG use less hot water than standard spray valves, thereby saving water and energy."

61.1 What other measures, if any, did PNG consider for inclusion in the Efficient Kitchens program?

Response:

PNG's Efficient Kitchens program also includes two faucet aerators. PNG did not consider any additional measures for inclusion in the Efficient Kitchens program.

61.1.1 For each measure that PNG considered for inclusion in the Efficient Kitchens program but did not include, please explain the basis of the decision not to include the measure.

Response:

PNG did not consider any other measures for inclusion in the Efficient Kitchens program. Please see also the response to Question 61.1.

61.2 Does FEI offer any gas-saving measures to its commercial kitchen customers that PNG does not?

Response:

PNG understands that FEI offers additional gas-saving measures to its commercial kitchen customers that PNG does not including combination ovens, convection ovens, conveyor ovens, fryers, fryers – large vat, griddles, rack ovens, and steam cookers.

61.2.1 If yes, would these measures provide savings for PNG's commercial kitchen customers?

Response:

PNG generally agrees that additional measures will provide additional savings but PNG has not analysed any specific measures at this time.

61.2.2 If yes, why does PNG decline to offer these measures?

Response:

PNG has not declined to offer these measures. PNG has not yet fully considered these measures for inclusion at this time.

62.0 Topic: Natural Gas Innovation Fund
Reference: Application, Exhibit B-1, Appendix F, PNG 2019 DSM Plan, pdf. p.255

"PNG proposes to allocate a small amount of its ECI Program budget to support the development and adoption of new energy technologies through the Natural Gas Innovation Fund (NGIF). Programs funded by PNG may include funding laboratory and field testing of commercial and pre-commercial high efficiency natural gas equipment to demonstrate its viability to builders, HVAC professionals and policy makers; or funding research into the impact of injecting quantities of hydrogen into natural gas distribution systems."

PNG proposes a budget for its contribution to the Natural Gas Innovation Fund (NGIF) of $35,000 in 2020 and $50,000 per year in 2021-22.

62.1 Please provide information about the NGIF, including its organizational structure, mission and vision.

Response:

The Natural Gas Innovation Fund™ (NGIF) was created by the Canadian Gas Association (CGA) to support the funding of cleantech innovation in the natural gas value chain. It seeks to fill a technology development gap in the sector and invest in innovation enabling natural gas solutions for current and emerging challenges facing Canada's energy system.

The NGIF is funded by natural gas producers (Birchcliff Energy, Canadian Natural Resources, Chevron, Perpetual Energy, Petrona, Shell, Tourmaline Oil) and natural gas distribution utilities (ATCO, Enbridge, FortisBC. SaskEnergy, PNG).

NGIF's mandate is to take action and advance the most promising enterprises in cleantech innovation and support them through their projects to commercialization and market success. Its investment focus falls within the following categories:

A. Natural Gas Production: Technologies related to sustainable production, GHG and air emission management, water management and treatment, natural gas processing, LNG, digital transformation, RNG and hydrogen production.

B. Natural Gas Transmission: Technologies related to advanced materials and technologies, energy efficiency, intelligent systems, and methane capture.

C. Natural Gas Distribution: Technologies related to carbon capture, energy efficiency, heat and power generation, intelligent systems, methane capture, RNG and hydrogen production.

Examples of innovative pre-commercial solutions that the NGIF has funded are:

A. CharTech Solutions filters hydrogen sulfide out of renewable natural gas, allowing users to drastically reduce their maintenance costs. This project involves scaling-up CHAR's pilot production system. The project will allow CHAR Technologies to produce 1-tonne per day of CharTech Solutions. This will also demonstrate that CharTech Solutions can efficiently and safely scrub hydrogen sulfide from a biogas stream to an amount less than 4ppm.

B. Enersion has developed an adsorption based cooling technology that uses heat instead of electricity. This project aims to develop an adsorption based chiller that will range from 1 ton to more than 10 tons of cooling power. The units can be connected in-line to add cooling power. With the given range, the units can be used at manufacturing sites, data centers, commercial and residential buildings.

C. G4 Insights Inc. is a Vancouver based company developing and commercializing a proprietary PyroCatalytic Hydrogenation (PCH) process to produce renewable natural gas. PCH is a low temperature thermochemical process that enables large-scale, economic production of renewable natural gas (RNG) from biomass. Through this project, G4 Insights will build a demonstration plant and test the technology under actual operational conditions. Using a range of biomass types, G4 Insights will generate relevant technical operating and economic data.

D. Hydrogenics' technology converts surplus renewable electricity into hydrogen gas. This project will build a power-to-gas demonstration plant that will convert electricity into hydrogen. At 5MW, the plant will be the largest power-to-gas demonstration project in North America and will form the building block for future utility-scale deployments.

E. The i2 Hybrid Smart Furnace (HSF) has a unique patented system that uses natural gas to generate both heat and electricity for use in the home; a first of its kind. Built in Canada for the North American market, the self-powered i2 HSF will be ideal for retrofit and new construction standard ductwork, ready-to-install as a replacement for traditional residential natural gas furnaces with no extra connections. The production of both heat and electricity will give the i2 a distinct advantage over conventional high-efficiency furnaces as it will provide critical power supply during a power outage while boasting an overall efficiency that is greater than any traditional high-efficiency furnace. This project aims to help develop the i2 technology for certification of three prototype devices. Upon certification, the certified i2

HSF will be deployed to pilot sites for the 2018/2019 heating season. This project will serve to validate the technical performance of the furnace and secure certification required for commercialization in 2019.

F. NextGrid's development of a multi-residential/small commercial combined heat and power (CHP) system, which uses turbine and combustion technologies, aims to achieve up to 50 per cent higher fuel efficiency than existing water heaters. NextGrid's project will test and confirm the performance of a CHP system while subjected to a variety of thermal/ power loads and conditions. It will utilize a CHP system developed by NextGrid. The system is able to generate 5-30kW of electricity and 30-150kW of thermal energy, and is intended for installation in multi residential/small commercial buildings.

62.2 Please provide a listing of the other funding sources for the NGIF.

Response:

Please see the response to Question 62.1.

62.3 Please describe the projects that the NGIF is currently engaged in.

Response:

Please see the response to Question 62.1.

62.4 Please explain how the work of the NGIF supports provincial climate objectives.

Response:

PNG understands the reference to the "provincial climate objectives" as references to both the policy actions identified in the CleanBC Plan, and the B.C. Government's Energy Objectives set out in the Clean Energy Act. More specifically, Part 1(2) of the British Columbia Clean Energy Act sets out the following energy objectives that are not specifically applicable only to electricity resources:

> 2(b) to take demand-side measures and to conserve energy;
>
> 2(d) to use and foster the development in British Columbia of innovative technologies that support energy conservation and efficiency and the use of clean or renewable resources;
>
> 2(g) to reduce BC greenhouse gas emissions;
>
> 2(h) to encourage the switching from one kind of energy source or use to another that decreases greenhouse gas emissions in British Columbia; and
>
> 2(i) to encourage communities to reduce greenhouse gas emissions and use energy efficiently;

The NGIF helps fund the development of precommercial technology addressing a broad set of challenges faced by the natural gas industry as it responds to both federal and provincial policies to reduce the GHG emissions associated with the production, transport, distribution and use of natural gas. Please also see the response to Question 62.1 for a list of technology that has been previously supported by the NGIF.

62.5 Does the NGIF engage in any projects that cannot be directly linked to attainment of the province's climate objectives?

Response:

No. In addition, each participating member utility of the NGIF makes an individual decision on whether or not to participate in funding of a particular project. PNG always considers the provincial context, as defined by the province's hydro generated electricity, the Clean Energy Act, and the CleanBC Plan, when evaluating the applicability of any proposal put before it.

62.5.1 If yes, please describe these projects.

Response:

Not applicable. Please see the response to Question 62.5.

62.6 How did PNG determine that $50,000 per year would be a sufficient level of funding for the NGIF to development of new GHG-reducing technologies?

Response:

The NGIF provides up to approximately 25 percent of a project's funding requirements, with the remainder coming from the proponents, from grants and from other investors. Costs are shared by utilities proportionally based on their number of customers. PNG is by far the smallest participating utility and its contribution is sized accordingly. By participating in the NGIF, PNG's small investment allows it to participate in the evaluation and demonstration of cleantech innovation to an extent that would otherwise not be possible. The annual budget identified by PNG is therefore sufficient to participate in a meaningful way in the NGIF.

62.7 Are there any aspects of the work of the NGIF that do not support provincial climate objectives?

Response:

No. Please see the response to Question 62.1. The activities of the NGIF are limited to supporting the funding of cleantech innovation in the natural gas value chain.

63.0 Topic: Comparison of PNG's proposed portfolio with FEI
Reference: Application, Exhibit B-1, p.129, pdf. p.147

In developing this DSM Plan, PNG reviewed DSM programs offered by other Canadian gas utilities as well as the two major BC electricity utilities, BC Hydro and FEI.

63.1 Please provide PNG's comparison of the natural gas programs currently offered by FEI in the province with PNG's proposed 2020-22 portfolio of programs, including the following:

63.1.1 Annual budget, participation, and savings targets by program;

Response:

PNG did not complete a comparison of the natural gas programs currently offered by FEI with those proposed by PNG in the 2019 DSM Plan covering the period from 2020-22. PNG refers the BCSEA to BCUC File: 57964: *Application for Acceptance of Demand Side Management (DSM) Expenditures Plan for the period covering from 2019 to 2022* for details on the natural gas programs currently offered by FEI.

The design of PNG's Commercial Efficient Boiler and Commercial Efficient Water Heater programs closely follow similar programs offered by FEI, differing only in the maximum incentive amounts.

63.1.2 Eligible measures and incentive amounts; and

Response:

Please see the response to Question 63.1.1.

63.1.3 Program TRC results.

Response:

Please see the response to Question 63.1.1.

63.2 Are there programs that FEI offers that PNG does not propose to include in its plan? If yes, please explain why, for each program, PNG does not propose to include it.

Response:

Yes, FEI offers numerous programs that PNG currently does not propose to include in its ECI portfolio. FEI has received BCUC acceptance of total DSM expenditures of $325 million over the period from 2019 through 2022; this is over 100 times as large as PNG's request. PNG respectfully reminds the BCSEA that PNG is not a large utility. PNG serves a natural gas load comparable in size to the cities of Coquitlam or Kelowna. PNG supplies approximately 6.8 petajoules (PJ) of natural gas to approximately 40,000 customers across small communities in northern B.C. In terms of deliveries and customers, PNG is approximately 1/30th the size of FEI. In addition, PNG customers in the PNG-West and Tumbler Ridge service areas pay significantly higher delivery rates than FEI customers.

PNG has a staff of approximately 125, including approximately 20 head office staff. PNG does not have a large energy efficiency department and the responsibility for developing all aspects of an energy efficiency program rests with the Manager, Energy Management and DSM.

64.0 Topic: Cost-Effectiveness Results
Reference: Application, Exhibit B-1, , Appendix V: PNG 2017 Conservation Potential Review, pdf. pp. 551 and 552

64.1 Please provide the complete program level cost-effectiveness analysis conducted by PNG for its 2020-22 proposed programs that was used as the basis for the reported values in the individual program tables. (For example, Table 16: Efficient Boilers Program Summary on pdf p. 251 shows a program TRC of 1.61).

Response:

PNG has included relevant assumptions and outputs in the 2019 DSM Plan. PNG's model for calculating cost effectiveness is consistent with the *California Standard Practice Manual: Economic Analysis of Demand-side Programs and Projects*, has been reconciled with another utilities model and has been previously accepted by the BCUC.

64.2 Please provide the complete program level cost-effectiveness analysis conducted by Navigant to develop Table 5.3 on pdf p. 552 in the CPR.

Response:

PNG is unable to provide this analysis. Please also see the response to Question 44.1.

64.3 Please compare the results of PNG's cost-effectiveness analysis and Navigant's analysis and explain any differences.

Response:

PNG submits that completing the analysis requested would not be meaningful to the 2019 DSM Plan.

PNG submits that, per section 4.6 of the 2019 DSM Plan, the most appropriate use of the 2017 CPR Market Potential Review is to provide portfolio level directional guidance to PNG DSM planning. The CPR market potential estimates are not intended to be program-specific and are most reasonable when results are considered in aggregate. Assumptions for fuel shares, building characteristics, equipment shares, measures, end use intensities, technology and administration costs, and payback acceptance are not specific to PNG's service territory and program design requires additional effort. The 2017 CPR lead consultant relied on FEI data to calibrate key model assumptions such as variable administrative costs that do not reflect the history, challenges, and opportunities particular to PNG's ECI portfolio.

9. Portfolio Evaluation and Planning

65.0 Topic: Next Consolidated Resource Plan
Reference: Application, Exhibit B-1, pp.134-135, pdf pp.152-153

"9.3 RECAP - Reactivated System Capital and Major Industrials Customer
The RECAP, discussed in Section 7.3.4, could result in the addition of one or more large customers on the PNG-West system within the planning horizon spanned by this Consolidated Resource Plan. Such an outcome will trigger significant capital expenditures to reactivate facilities and pipe to provide the required capacity. PNG will make the appropriate applications to the BCUC for approval of CPCN's should such a growth opportunity arise." [pp.134-135]

65.1 When does PNG intend to prepare and file its next Consolidated Resource Plan?

Response:

PNG proposes to file its next Consolidated Resource Plan in five years, in 2025. The five year interval is consistent with the period between the current Consolidated Resource Plan and the previous 2015 Resource Plan for PNG(N.E.).

65.2 In the event that the RECAP results in the addition of one or more large customers on the PNG-West system within the planning horizon of the 2019 CRP, would PNG consider advancing its next CRP?

Response:

No. Please see the response to Question 31.1.

66.0 Topic: Supply Resource Portfolio
Reference: Application, Exhibit B-1, p.136, pdf p.154

"PNG has developed a supply resource portfolio of gas commodity, storage and pipeline contracts in order to satisfy its gas contracting objectives."

66.1 Is there a method by which the results of PNG's supply resource portfolio and Annual Gas Contracting Plan can be compared with the results achieved by other natural gas distribution utilities, such as FEI? Can PNG comment on how the results of its supply resource portfolio and Annual Gas Contracting Plan compare with those of other natural gas distribution utilities?

Response:

PNG does not understand what BCSEA means by "results" of PNG's supply portfolio. PNG's Annual Gas Contracting Plan (ACP) describes the physical gas supply resources PNG intends to secure to meet the projected peak day and average daily gas demand of PNG's gas sales customers over the coming 12 months period. In addition, the annual gas contracting process is intended to reduce price volatility to customers while attempting to maintain price competitiveness and ensure that the commodity is available to customers when needed.

Furthermore, the characteristics of every utility is distinct; having different load profiles, different access to gas markets and different storage and transportation requirements. Comparison of one utility's gas supply portfolio with another therefore would not provide any meaningful information. PNG completes an analysis of its annual gas and transportation requirements every year and files an ACP with the BCUC. The BCUC reviews and, if appropriate, approves PNG's ACP.

67.0 Topic: RNG Supply
Reference: Application, Exhibit B-1, p.139, pdf p.157

"In light of the GGRR voluntary five percent RNG target and the CleanBC 15 percent RNG goal, PNG intends to develop a portfolio of RNG supply. PNG expects that such supply will initially be in the form of biomethane, but that other forms of RNG will also be pursued. PNG expects to acquire RNG, either through entering into supply agreements with third parties, or by developing its own supply projects. PNG anticipates adopting and filing for approval with the BCUC, a similar set of principles governing its ability to develop RNG supply infrastructure, as the BCUC has approved for FEI. PNG expects to begin acquiring RNG supply by late 2020 or 2021. PNG's RNG strategy is described in Section 4.4" [underline added]

67.1 Would it be feasible for PNG to begin acquiring RNG supply sooner than late 2020 or 2021? If not, why not?

Response:

PNG expects to file applications with the BCUC seeking approval to acquire RNG through supply agreements as well as approval of a plan to recover the cost of RNG supply from its customers. PNG expects that the time to submit an application and receive BCUC approval will result in PNG acquiring RNG in late 2020.

EXHIBIT BCSEA 38.1
PNG ECI PROGRAM
2018 ANNUAL REPORT

PACIFIC NORTHERN GAS LTD.

ENERGY CONSERVATION AND INNOVATION (ECI)

2018 ANNUAL REPORT

April 30, 2019

TABLE OF CONTENTS

1 INTRODUCTION

In its application requesting approval of expenditures related to the development, execution and management of a Demand-Side Measures (DSM) program filed with the British Columbia Utilities Commission (BCUC) on June 26, 2015 (the Application), Pacific Northern Gas Ltd. (PNG) proposed a portfolio of DSM programs that met the adequacy requirements of the Demand-side Measures Regulation (DSM Regulation) and were determined to be cost effective under the modified Total Resource Cost Test (mTRC). These programs are:

1. Programs to assist low income households to reduce their natural gas consumption and thereby their natural gas utility bill;
2. a program offered to owners/managers of rental apartment buildings;
3. a domestic hot water heater program for the rental apartment market;
4. a pilot efficient boiler program to commercial customers;
5. a low cost program targeting commercial kitchens (the pre-rinse sprayer program);
6. Conservation Education and Outreach (CEO) programs to students enrolled in public schools in PNG's service areas;
7. CEO programs to students enrolled post-secondary institutions in PNG's service areas; and
8. a general CEO program.

In Order G-203-15, the BCUC accepted PNG's DSM expenditure schedule for the calendar years 2015 through 2018 and instructed PNG to file annual DSM reports covering each year of the 2015-2018 expenditure schedule period (with the exception of 2015) by no later than April 30 of the immediately following year. The BCUC set out its expectations for the content of each annual report as follows:

i. A comparison of the DSM accepted budget to amounts spent;
ii. a description of key milestones achieved in the delivery of programs;
iii. an update on PNG's progress towards its commitment to apply for funding of new programs or expansions of existing programs during the 2015-2018 period based on the results of the province-wide Conservation Potential Review (CPR);
iv. a summary of the role, responsibility and key achievements of the DSM manager position; and
v. Evaluation, Measurement and Verification (EM&V) results of PNG's DSM programs as they become available (including TRC/mTRC and UCT results).

This annual report comprises the third compliance filing and provides an update of the progress made in 2018 towards implementing the programs described in the Application.

2 2018 ECI ANNUAL REPORT

During 2018, PNG continued to develop the capacity of its ECI initiative, gaining operational experience with its low income and education programs, and launching its commercial efficient kitchen rebate program. Significant outcomes attained during 2018 are described below.

2.1 Residential Low Income Programs:

2.1.1 Energy Saving Kits (ESK's)

On September 30, 2016, PNG and BC Hydro concluded their negotiations on a cost sharing agreement (Contribution Agreement) whereby PNG reimburses BC Hydro a portion of the cost of ESK's delivered to customers in PNG's service areas. Under this agreement, BC Hydro continues to receive and process applications through its existing call centre and online channels. When an application is identified as belonging to a BC Hydro customer residing in a community in which PNG provides natural gas delivery service, PNG is responsible for paying a portion of the cost associated with delivering an ESK to that customer. PNG's contribution is based on PNG's share of the space heating and domestic water heating end use market in PNG's service area.

All ESK's shipped to customers in PNG's service area are packaged in a box rebranded with PNG's logo, and includes an installation manual having content reflective of PNG.

Deliveries of ESK's to PNG's customers have exceeded expectations. In 2018, 409 EKS's were delivered to applicants in PNG's service areas, an increase of 9% compared to 2017, and significantly higher than the 109 forecast in PNG's Application. Since the inception of the cost sharing agreement between PNG and BC Hydro, 930 EKS's have been delivered to applicants in PNG's service areas, compared to a forecast of 301 (**Table 1**).

Table 1

Kits Shipped	Low Income Program Energy Savings Kits (ESK)			
	2016*	2017	2018	Total
Actual	145	376	409	930
Forecast	83	109	109	301
Variance (Act - F/C)	62	267	300	629

* Program Inception: Oct 1, 2016

Higher than forecast deliveries have contributed to the higher than forecast expenditures on this program (**Table 2**). In addition, the cost per kit ($28.47) is higher than originally estimated ($22.51) (**Table 3**). PNG relied primarily on BC Hydro's outreach activities and has therefore not incurred any marketing costs related this program. PNG does not anticipate that additional marketing on its part would significantly improve the enrollment in this already well-established program.

Table 2

Residential Low Income Programs: Energy Saving Kits				
Item	2016*	2017	2018	Total
Actual	$ 5,904	$ 12,416	$ 12,645	$ 30,965
Approved	$ 7,968	$ 5,554	$ 5,554	$ 19,076
Variance (Actual - Approved)	$ (2,064)	$ 6,862	$ 7,091	$ 11,889

* Program Inception: Oct 1, 2016

Table 3

Residential Low Income Programs: Energy Saving Kits Variance Analysis (2016 - 2018)			
Item	Approved	Actual	Variance
Setup/Admin Costs/Inventory	$ 3,000	$ 3,556	$ 556
Marketing Costs	$ 9,300	$ -	$ (9,300)
Number of Participants	301	930	629
Cost per Kit	$ 22.51	$ 28.47	$ 5.96
Incentive (Kit Costs)	$ 6,776	$ 26,479	$ 19,703
Total	$ 19,076	$ 30,965	$ 10,959

2.1.2 Energy Conservation Assistance Program (ECAP)

ECAP has been developed and administered by BC Hydro to help low income households achieve greater energy savings. The program offers a personalized home energy evaluation, personalized energy efficiency advice, and the installation of energy saving products by a qualified contractor. The bundle of measures may include low-flow plumbing fixtures, water heater pipe wrap, professional draft proofing, outlet gaskets, window film, insulation, improved ventilation, and carbon monoxide detectors.

On April 30, 2018, PNG and BC Hydro finalized a funding agreement, similar to the Contribution Agreement entered into for the ESK program. Under this agreement, BC Hydro continues to receive and process applications through its existing call centre and online channels. When an application is identified as belonging to a BC Hydro customer residing in a community in which PNG provides natural gas delivery service, PNG is responsible for paying a portion of the cost associated with delivering the ECAP to that customer. PNG's contribution of $260 per household is based on PNG's share of the space heating and domestic water heating end use market in PNG's service area.

Implementation of the funding agreement has been delayed pending approval of changes to the ECAP application's general terms and conditions by BC Hydro, FortisBC Energy Inc. (FEI) and PNG. These changes were necessary in order to reflect the inclusion of PNG in an existing partnership between BC Hydro and FEI. Changes have recently been approved by all three utilities and PNG anticipates launching the funding partnership on May 1, 2019.

No direct costs related to establishing this program have been incurred in 2018. The amount approved to the end of 2018 is $39.5 thousand.

2.1.3 Summary: Low Income Programs

The summary of expenditures on PNG's residential low income programs is shown in **Table 4**, below. Total expenditures for 2016 through 2018 are lower than budgeted due to the delayed launch of the ECAP program.

Table 4

SUMMARY: Residential Low Income Programs (ESK + ECAP)				
Item	**2016**	**2017**	**2018**	**Total**
Actual	$ 5,904	$ 12,416	$ 12,645	$ 30,965
Approved	$ 24,468	$ 17,054	$ 17,054	$ 58,576
Variance (Actual - Approved)	$ (18,564)	$ (4,638)	$ (4,409)	$ (27,611)

2.2 Commercial Programs

2.2.1 Commercial Efficient Boiler Program

PNG received BCUC acceptance for the implementation of an efficient boiler program for all commercial customers, including rental accommodation. The program, as originally envisioned, would offer rebates to qualifying commercial customers wishing to replace their existing, low efficiency boiler with ENERGY STAR® certified boilers sized up to 299,000 BTU per hour (British Thermal Units per hour) or 299 MBH (thousand BTUs per hour), and eligible mid-efficiency and condensing boilers sized 300 MBH and higher.

As part of the work to implement this program, PNG refined its analysis of the expected market demand and concluded that, because of the limited budget allocated to this program, providing an incentive structure similar to that offered by Fortis, as originally contemplated, and would unduly limit participation in the program to only a handful of participants.[1] Therefore, PNG limited the applicability of its program to small ENERGY STAR® certified boilers sized up to 299 MBH in order to provide the broadest impact from the limited budget available to this program. Beginning April 15, 2017, PNG has offered rebates covering up to 35 percent of the cost of an ENERGY STAR® certified boiler to a maximum of $2,700.

In 2018, PNG received one application for pre-approval under this commercial program.

PNG is currently undertaking the development and execution of a marketing plan to increase awareness of its ECI programs amongst its customers. PNG is also re-evaluating the incentive structure and applicability criteria for the program and may broaden the applicability of the program to include boilers over 300 mbh.

2.2.2 Commercial Efficient Water Heater Program

This program provides rebates of up to $2,000 for the installation of high-efficiency commercial water heaters with thermal efficiencies greater than or equal to 84 percent. Condensing storage and volume type water heaters, near condensing storage and volume type water heaters, and condensing on-demand water heaters are all eligible for incentives under this program. PNG launched this program in December, 2017.

PNG has not received any applications for rebates under this commercial program and has not incurred any direct costs related to this program.

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[1] FEI's Natural Gas Boiler program offers rebates of up to $45 thousand to commercial customers replacing their standard efficiency boiler with a mid or high efficiency boiler. PNG's annual budget for the Commercial Efficient Boiler program is approximately $40 thousand.

PNG is currently undertaking the development and execution of a marketing plan to increase awareness of its ECI programs amongst its customers. PNG is also re-evaluating the incentive structure and applicability criteria for this program.

2.2.3 Commercial Efficient Kitchen Program

This program offers the direct installation of low-flow pre-rinse spray valves at no charge to program participants in the commercial food services sector in order to reduce the demand for hot water from gas-fired water heaters. PNG has determined that a customer installation of these devices is feasible and appropriate in light of the cost associated with facilitating a direct-install version of the program. PNG has entered into an agreement with EcoFitt Corporation, the entity responsible for filling orders for BC Hydro and PNG's ESK program, for filling orders for pre-rinse spray valves from PNG's commercial customers. Under the terms of the agreement, PNG will pay EcoFitt $145 plus shipping costs and applicable taxes, for every pre-rinse spray valve ordered by, and shipped to PNG's commercial customers.

PNG has developed marketing and instructional materials, including an instructional video that clearly sets out the benefits to customers of installing low flow pre-rinse spray valves in order to help achieve the highest possible uptake of this program. PNG launched this program in June, 2018. To date, PNG has shipped one pre-rinse spray valve.

The summary of expenditures on PNG's Commercial Efficient Kitchen program is shown in **Table 5**, below.

Table 5

Commercial Efficient Kitchen Program Variance Analysis (2016 - 2018)	
Item	
Setup/Admin Costs	$ 9,265
Pre-Rinse Spray Valve inc. Admin & Shipping	$ 162
Total (Actual)	$ 9,428
Total (Approved)	$ 19,050
Variance (Actual - Approved)	$ (9,622)

2.3 Conservation Education and Outreach

2.3.1 Elementary School Program

PNG entered into contractual arrangements with the Northern Environmental Action Team (NEAT), a not-for-profit society active in PNG's Fort St. John and Dawson Creek service areas to deliver the "Energy is Awesome" program to elementary school children in grades 4 and 5 beginning in June 2017. NEAT, formed in 1989, delivers an environmental education program in schools in the Peace Region, and also assists organizations and institutions to develop strategic plans to reduce waste and conserve resources. NEAT is based in Fort St. John with satellite offices in Dawson Creek, Chetwynd, and Fort Nelson.

PNG has set as a goal, to provide the "Energy is Awesome" program to every child in grades four and five on a two year revolving basis. Once the program delivery is fully ramped up, approximately 2,300 students in 75 classrooms will receive the program every year.

During 2018, PNG and NEAT delivered PNG's "Energy is Awesome" program to 799 students in 33 classrooms located in Fort St. John and Dawson Creek. Since the inception of the program, 1,564 students in 58 classrooms in schools located across all of PNG's delivery areas have received the program.

NEAT encountered some staffing challenges in the second half of 2018 that affected its ability to deliver the Energy is Awesome program. However, these challenges have been adequately addressed and both NEAT and PNG are confident that the program is back on track to a full delivery of the program during the remainder of the 2018/19 school year and beyond.

A comparison of the actual and approved expenditures in 2016 through 2018 on PNG's elementary school program is provided in Table 6. Expenditures in 2016 are for work done by FEI in rebranding their "Energy is Awesome" material for PNG's purposes. No other expenditures related to setting up the program were incurred.

Table 6

"Energy is Awesome" Elementary School Education Program				
Item	**2016**	**2017**	**2018**	**Total**
Actual	$ 6,570	$ 24,774	$ 26,445	$ 57,789
Approved	$ 30,600	$ 13,600	$ 13,600	$ 57,800
Variance (Actual - Approved)	$ (24,030)	$ 11,174	$ 12,845	$ (11)

2.3.2 Summary Conservation and Education Programs

PNG has not initiated any further conservation and education programs aimed at students in post-secondary intuitions at this time.

The goal of PNG's general Conservation Education and Outreach (CEO) program is to increase awareness amongst PNG's customers of the ECI programs and associated incentives in order to increase participation. PNG has created, and has begun to distribute materials that provide information on, and raise awareness of, PNG's ECI programs. During the August and September billing cycles, PNG distributed a bill insert highlighting commercial offers to all its commercial customers. PNG has made improvements to its ECI webpages; adding an interactive home page that supports the ECI brand, along with additional content presenting new program offers.

PNG continues to establish relationships in the communities in order to raise awareness of its ECI programs. In the spring of 2018, PNG reached out to community services organizations, chambers of commerce and municipalities' staff. Some of these organizations are now distributing PNG's marketing materials and helping raise awareness of PNG's ECI programs.

PNG is leveraging their local staff to help garner interest in the ECI programs and distribute ECI collateral through their regular business interactions with customers and at community events such as the annual Taylor Safety BBQ.

Finally, PNG has begun working with Ecolighten Energy Solutions to engage HVAC contractors in the PNG service territory to raise awareness of programs and start to build the relationships necessary for a successful trade ally network.

PNG intends to launch an e-newsletter in 2019 and is currently collaborating with FEI to develop content, and is actively collecting subscribers.

A summary of actual and approved expenditures for all conservation, education and outreach activities is shown in Table 7.

Table 7

Conservation Education and Outreach Variance (2016-2018)			
Item	**Approved**	**Actual**	**Variance**
General	$ 98,000	$ 8,971	$ (89,029)
Elementary School	$ 57,800	$ 57,789	$ (11)
Post Secondary	$ 48,000	$ -	$ (48,000)
Total	$ 203,800	$ 66,760	$ (137,040)

2.4 Enabling Activities

Enabling activities are initiatives that support delivery and development of PNG's ECI programs without directly creating any energy savings. The approved budget for Enabling Activities reflects the costs for a DSM program manager (labour and benefits) to complete the detailed program design, to develop, negotiate, and manage program partnerships, and for ongoing program administration. An amount for the evaluation, measurement and verification (EM&V) of the programs had also been included as part of the budget for Enabling Activities rather than at the program level.

After beginning the implementation of its approved programs, PNG has restructured the role of the DSM program manager. While the Manager, Energy Management and DSM retains overall responsibility for the implementation and administration of the ECI programs, the role has additional responsibilities in the regulatory affairs and gas supply group. Accordingly, costs associated with this manager's salary and overhead are not being assigned to the ECI program.

Costs assigned to Enabling Activities are primarily external consulting fees. PNG retains a consultant to assist with the implementation of its ECI programs.

At this stage of the implementation of these programs there is little, if any, operational experience on which to conduct EM&V activities, and these costs have not yet been incurred.

Table 8

Enabling Activities				
Item	**2016***	**2017**	**2018**	**Total**
Actual	$ 202,770	$ 28,668	$ 62,985	$ 294,423
Approved	$ 217,000	$ 193,500	$ 193,500	$ 604,000
Variance (Actual - Approved)	$ (14,230)	$ (164,832)	$ (130,515)	$ (309,577)

* Includes amounts in 2015 related to the Application

2.5 Summary

A comparison of actual spending on all ECI programs and activities to the end of 2018, compared to the approved amounts is presented in Table 9. By the end of 2018, PNG had implemented and was managing the Residential Low Income ESK, Commercial Efficient Boiler, Commercial Efficient Water Heater, Commercial Efficient Kitchen, and the elementary school conservation education programs, as well as the ECI website. PNG's spending on ECI programs has been significantly below that projected in the Application, due to the lack of uptake of its new commercial programs, and the delay in launching its remaining low income and commercial programs.

Table 9

SUMMARY: All Programs				
Item	**2016**	**2017**	**2018**	**Total**
Actual	$ 215,244	$ 70,696	$ 115,636	$ 401,576
Approved	$ 467,203	$ 362,639	$ 410,424	$ 1,240,266
Variance (Actual - Approved)	$ (251,959)	$ (291,943)	$ (294,788)	$ (838,690)

PNG currently has an application before the BCUC that proposes expenditures on additional programs over the 2019 to 2020 period that make use of the unutilized funds. These additional programs provide incentives to residential customers, and bring PNG's ECI program into compliance with the changes to the Demand-Side Measures Regulation made on March 24, 2017. PNG anticipates launching these programs beginning in the third quarter of 2019, pending a favourable decision on the application by the BCUC.