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January 23, 2020

Sent via email/eFile

PNG AND PNGNE CONSOLIDATED RESOURCE PLAN AND ECI PORTFOLIO	EXHIBIT A-3
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Verlon G. Otto
Director, Regulatory Affairs
Pacific Northern Gas Ltd.
750 – 888 Dunsmuir Street
Vancouver, BC V6C 3K4
votto@png.ca

Re: Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd. – 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 to 2022 – Information Request No. 1

Dear Mr. Otto:

Further to your October 31, 2019 filing of the above-noted application, enclosed please find British Columbia Utilities Commission Information Request No. 1. In accordance with the regulatory timetable established by Order G-322-19, please file your responses on or before Tuesday, February 25, 2020.

Sincerely,

Original signed by:

Patrick Wruck
Commission Secretary

/dg
Enclosure



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 to 2022

INFORMATION REQUEST NO. 1 TO PACIFIC NORTHERN GAS LTD. AND PACIFIC NORTHERN GAS (N.E.) LTD.

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A. INTRODUCTION

**1.0 Reference: INTRODUCTION
Exhibit B-1 (Application), Section 1.4, p. 10–11; Appendix A
Resource Planning Objectives**

Page 10 of Pacific Northern Gas Ltd. and Pacific Northern Gas (N.E.) Ltd.’s (collectively, PNG) 2019 Consolidated Resource Plan and expenditure schedule for the Energy Conservation and Innovation (ECI) Portfolio for 2020 to 2022 (2020-2022 ECI Expenditure Schedule) (together, the Application) states:

In accordance with the directive of BCUC Order G-155-15, PNG will consistently apply the weightings identified in its resource planning objectives when evaluating alternatives to resource portfolios, projects or other initiatives. In addition, PNG has reviewed the weightings assigned to each of the planning objectives and amended them to reflect a greater consideration of Objective 6 - the B.C. Government’s “Energy Objectives”. PNG submits that this greater weighting is appropriate in light of an increased focus on energy conservation and renewable natural gas as highlighted in the Government’s CleanBC Plan.

On Page 11 of Exhibit B-1, Table 1 shows the Resource Planning Objectives and the weightings of each objective from PNG (N.E.) Resource Plan compared to the PNG Consolidated 2019 Resource Plan. Table 1 is reproduced below.

Table 1: Changes to weightings applied to resource planning objectives

RESOURCE PLANNING OBJECTIVES		
Objective	Weights	
	PNG(N.E.) 2015 Resource Plan	PNG Consolidated 2019 Resource Plan
1 Safe, reliable service	30%	30%
2 Least cost service	30%	25%
3 Economic viability of the utility	10%	10%
4 Stable Rates	10%	10%
5 Environmental and socio-economic impacts	10%	10%
6 Alignment with the B.C. Government's Energy Objectives	10%	15%
	100%	100%

Appendix A of Exhibit B-1 shows the Summary of Resource Plan Objectives and describes the Weighting, Attributes, Measurement Criteria and Benchmarks/Targets for each Resource Plan Objective.

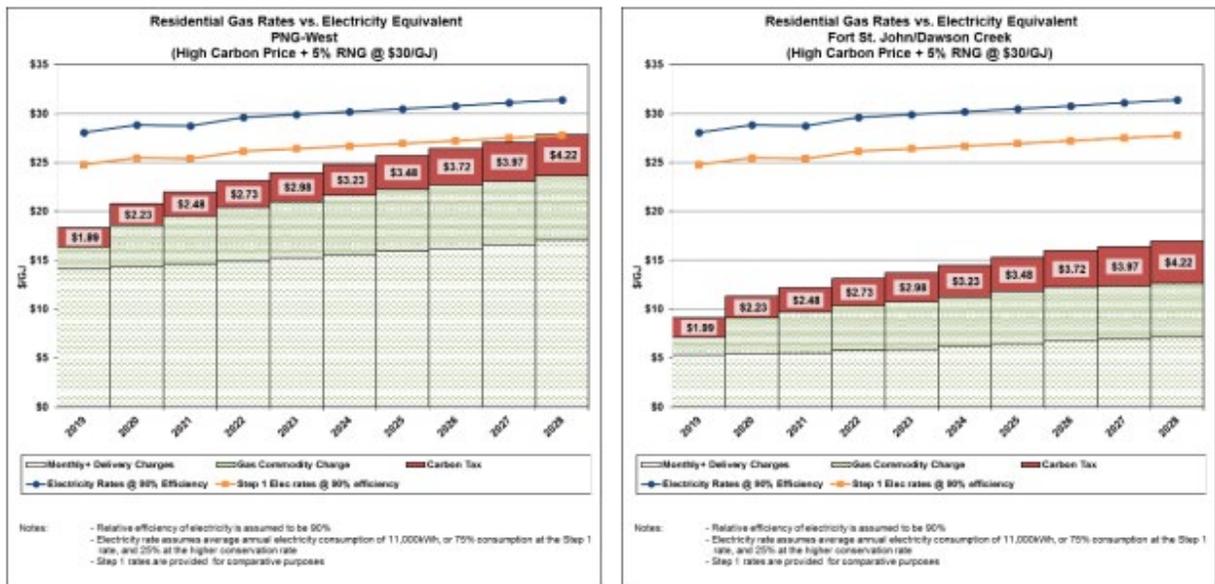
- 1.1 Please discuss PNG’s rationale for reducing the weighting of Objective 2: Provision of Least Cost Service while not reducing the weighting of any other planning objectives.
- 1.2 Please explain how PNG established the 5 percent adjustments to the weighting of Objective 2 and Objective 6. In your response please address the following:
 - i. The key actions in the CleanBC Plan that PNG anticipates will impact PNG’s resource planning objectives and why;
 - ii. Any actions, policies or initiatives expected to impact PNG’s resource planning objectives and why;
 - iii. The assumptions made with respect to the actions, policies or initiatives and their impacts on PNG’s resource planning and how the assumptions were established;
 - iv. What level of confidence PNG has applied to the assumptions; and
 - v. How PNG applied these assumptions to the weighting of the resource planning objectives.
- 1.3 Please explain why PNG considers the 5 percent adjustments to Objectives 2 and 6 to be appropriate.

B. ENERGY MARKET OUTLOOK

**2.0 Reference: ENERGY MARKET OUTLOOK
Exhibit B-1, Section 2.4, pp. 57,59; Section 4.4.1, p. 69
A Comparison of Energy Costs: Burner Tip Rates Natural Gas Rates to Electricity**

On Page 57 of Exhibit B-1, Figure 10 shows PNG burner tip vs. electricity costs (high carbon price scenario) for PNG-West and Fort St. John/Dawson Creek. The title of each graph says, “High Carbon Price + 5% RNG @ \$30/GJ.” Figure 10 is reproduced below.

Figure 10: PNG burner tip vs. electricity costs (high carbon price scenario)



On page 59 of Exhibit B-1, PNG states:

PNG has developed a high gas cost scenario by adding a blend of RNG priced at \$30 per GJ. For comparative purposes, PNG has estimated gas commodity costs that reflect a 5 percent blend of RNG by 2022, and a 10 percent blend by 2027, consistent with the CleanBC target of achieving a 15 percent blend of RNG by 2030.

On page 69 of Exhibit B-1, Table 18 shows PNG’s RNG supply forecast. Table 18 is reproduced below.

Table 18: RNG supply forecast

		2018	2019	2020	2021	2022	2023	2024
Total Deliveries (Sales and Transport)	TJ	10,586	11,146	11,546	11,861	11,870	11,831	11,709
Deliveries (Sales)	TJ	6,416	6,567	7,221	7,517	7,585	7,546	7,482
RNG Supply	TJ	-	-	-	30	130	200	300
As a portion of total deliveries	%	0.0%	0.0%	0.0%	0.3%	1.1%	1.7%	2.6%
As a portion of sales	%	0.0%	0.0%	0.0%	0.4%	1.7%	2.7%	4.0%
GHG reduction (tonnes CO₂e)	(tCO ₂ e)	-	-	-	(1,493)	(6,468)	(9,950)	(14,925)

		2025	2026	2027	2028	2029	2030
Total Deliveries (Sales and Transport)	TJ	10,926	10,800	10,745	10,668	10,587	10,471
Deliveries (Sales)	TJ	6,699	6,631	6,576	6,499	6,418	6,302
RNG Supply	TJ	400	510	620	730	840	950
As a portion of total deliveries	%	3.7%	4.7%	5.8%	6.8%	7.9%	9.1%
As a portion of sales	%	6.0%	7.7%	9.4%	11.2%	13.1%	15.1%
GHG reduction (tonnes CO₂e)	(tCO ₂ e)	(19,900)	(25,373)	(30,845)	(36,318)	(41,790)	(47,263)

2.1 Please confirm, or otherwise explain, that the RNG supply forecast included in Figure 10 is the same as shown in Table 18.

2.1.1 If not confirmed, please provide an updated graph and/or table.

**3.0 Reference: POLICY ENVIRONMENT AND OUTLOOK
Exhibit B-1, Section 2.1.1, pp. 23–26
Federal Policies**

On page 23 of Exhibit B-1, PNG states:

Actions the federal government is currently undertaking that directly influence PNG’s planning environment include the developing federal Clean Fuel Standard (CFS), changes to energy efficiency standards for appliances and equipment, and changes to the national model building code.

3.1 With respect to the Clean Fuel Standard, Appliances and Equipment Standards and the National Model Building Code, please explain how these codes and standards have informed PNG’s Demand Forecasts. In your response please address:

- i. What assumptions PNG has made with respect to the code and standards and how the assumptions were established;
- ii. What level of confidence PNG has applied to the assumptions, providing any relevant analysis; and
- iii. How these assumptions have been applied to the Demand Forecast.

**4.0 Reference: POLICY ENVIRONMENT AND OUTLOOK
Exhibit B-1, Section 2.1.1, pp. 26–30
B.C. Policies and Initiatives**

On pages 26 to 30 of Exhibit B-1, PNG provides an outline of British Columbia’s provincial policies and initiatives, including:

- Clean Growth Strategy;
- Industry Clean Growth Strategy;
- BC Hydrogen Roadmap;
- B.C. Acts and Regulations;
- Carbon Tax Act;
- Greenhouse Gas Reduction (Emissions Standards) Statutes Amendment Act;
- Demand Side Measures Regulation;
- Clean Energy Act and Greenhouse Gas Reduction Regulation;
- BC Methane Regulation;
- BC Building Code; and
- BC Energy Step Code.

4.1 Please discuss how PNG’s Demand Forecasts have been informed by the policies and initiatives outlined above. In your response please address:

- i. What assumptions PNG has made with respect to the policies and initiatives and how the assumptions were established;
- ii. What level of confidence PNG has applied to the assumptions, providing any relevant analysis; and
- iii. How these assumptions have been applied to the Demand Forecast.

**5.0 Reference: POLICY ENVIRONMENT AND OUTLOOK
Exhibit B-1, Section 2.1.1, pp. 31–32
Municipal Policies**

On pages 31 to 32 of Exhibit B-1, PNG provides an overview of the planned or implemented policies in the municipalities and local governments within PNG’s service areas, including: Prince Rupert, Terrace, Smithers, the Peace River Regional District, Fort St. John, Taylor, Dawson Creek, Pouce Coupe and Tumbler Ridge.

- 5.1 Please explain how the municipal policies outlined have informed PNG’s Demand Forecasts. In your response please address:
- i. What assumptions PNG has made with respect to the municipal policies and how the assumptions were established;
 - ii. What level of confidence PNG has applied to the assumptions, providing any relevant analysis; and
 - iii. How these assumptions have been applied to the Demand Forecast.

**6.0 Reference: POLICY ENVIRONMENT AND OUTLOOK
Exhibit B-1, Section 2.2.2, pp. 36–47
Regional Economic Outlook – PNG-West Commercial and Industrial Developments**

On page 36 of the Application, PNG states:

Economic growth in the region is highly dependent on both the likelihood and timing of major resource development investments. The plans and timing of such investments are in turn dependent on global supply, demand and price projections for commodities and resources, as well as prevailing regulatory and socio-economic conditions.

On pages 37 to 47 PNG summarizes noteworthy projects in the PNG-West service area based on the following categories (Tables 7 to 12):

- North Coast and Nechako Commercial Projects;
- North Coast Proposed Clean Energy Projects;
- Forestry;
- North Coast and Nechako Mining Projects;
- World Scale LNG Export Projects and Related Infrastructure;
- Crude Oil & Liquids Related Projects Major Projects; and
- North Coast and Nechako Clean Tech Projects.

- 6.1 For each project listed in Tables 7 to 12, please provide the probability of the project advancing to completion.
- 6.1.1 If PNG has not calculated probabilities, please explain why not.
- 6.2 Please explain how the probabilities have been used to establish the Reference scenario. In your response, please include an explanation of how the probabilities have been used to inform the capture rates and the use per account for the Residential and Small Commercial customers, and the forecast for the Large Customer Demand.
- 6.3 Please confirm, or explain otherwise, that the Reference scenario does not include forecast demand associated with any of the projects identified above.

- 6.3.1 If confirmed, did PNG include the demand forecast associated with any of the identified projects in any other scenario? Please discuss.
- 6.4 For each category identified above, please provide an updated demand forecast scenario that includes the estimated loads associated with (i) the project(s) that is closest to completion, (ii) the project(s) that PNG believes most likely to proceed and (iii) the project(s) PNG believes will have the largest demand. Please provide an explanation of any assumptions used in the demand estimates.

**7.0 Reference: POLICY ENVIRONMENT AND OUTLOOK
Exhibit B-1, Section 2.2.2, pp. 47–54
Regional Economic Outlook – PNG(N.E.) Commercial and Industrial Developments**

On pages 47 to 54 of Exhibit B-1, PNG summarizes noteworthy projects in the PNG(N.E.) service area based on the following categories (Tables 13 to 17):

- Peace River North and South Commercial Projects;
- Peace River North and South Power Projects;
- Peace River North and South Oil and Gas Sector Projects;
- Northeast B.C. Coal Projects; and
- Peace River North and South Clean Tech Projects.

- 7.1 For each project listed in Tables 13 to 17, please provide the probability of the project advancing to completion.
- 7.2 Please explain how the probabilities have been used to establish the Reference scenario. In your response, please explain how the probabilities have been used to inform the capture rates and the use per account for the Residential and Small Commercial customers, and the forecast for the Large Customer Demand.
- 7.3 Please confirm, or explain otherwise, that the Reference scenario does not include forecast demand associated with any of the projects identified above.
- 7.3.1 If confirmed, did PNG include the demand forecast associated with any of the identified projects in any other scenario? Please discuss.
- 7.4 For each category identified above, please provide an updated demand forecast scenario that includes the estimated loads associated with (i) the project(s) that is closest to completion, (ii) the project(s) that PNG believes most likely to proceed and (iii) the project(s) PNG believes will have the largest demand. Please provide an explanation of any assumptions used in the demand estimates.

C. CUSTOMER ATTITUDES

**8.0 Reference: CUSTOMER ATTITUDES
Exhibit B-1, Section 3, p. 61
Willingness to Purchase Bio-Methane**

On Page 61 of Exhibit B-1, PNG states:

Residential and commercial survey respondents gave modest support for pursuing renewable energy sources like bio-methane. Approximately one quarter (28 percent) of residential customers would opt for a bio-methane program if it was priced at \$2 per month. Potential uptake declines to 16 percent if a bio-methane program resulted in costs of \$4 per month, and to 13 percent when priced at \$8 per month. For commercial customers, 14 percent would opt for bio-methane if the cost impact was limited to a

three percent increase in their bill. Potential uptake in a bio-methane program amongst commercial customers decrease to nine percent is the cost impact was five percent; a cost impact of 10 percent lowers the potential uptake to six percent.

- 8.1 Please discuss the types of bio-methane programs, such as an “opt-in” program, that PNG is considering, and to which customers these programs may be offered.
- 8.2 Please discuss the benefits and risks of each type of program for PNG customers and BC.

D. NEW OPPORTUNITIES AND INNOVATION

- 9.0 Reference: NEW OPPORTUNITIES AND INNOVATION Exhibit B-1, Section 1.4, pp. 11, 13, 15; Section 4.1, p.63; Exhibit B-1, Appendix A, Resource Planning Objectives; PNG(N.E.) 2015 Resource Plan for the Fort St. John, Dawson Creek and Tumbler Ridge Distribution Systems Decision and Order G-155-15 dated September 30, 2015, p. 21 Remote Communities**

On page 63 of Exhibit B-1, PNG states:

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.

- 9.1 Please provide map(s) showing the name, location and population of the identified communities that are requesting natural gas service from PNG. On the same map(s), please show PNG’s existing gas transmission and distribution system and any areas of overlap between the identified communities and the existing system.

On page 15 of Exhibit B-1, PNG states:

PNG is exploring the opportunity to leverage its existing pipeline transmission and distribution systems to provide service to micro-scale producers of compressed natural gas (CNG) and LNG near demand loads and to develop new CNG and LNG distribution services to its customers. Promoting CNG and LNG as an alternative to diesel, gasoline and propane for transportation, off-grid power generation and for isolated communities and large customers unattached to the utility’s natural gas distribution or transmission system improves the economics of these end-uses while at the same time reduces greenhouse gas emissions through the displacement of higher carbon-content fuels.

On page 63 of Exhibit B-1, PNG states:

PNG first identified, in general terms, opportunities related to providing CNG and LNG distribution services to customers in remote communities in its 2015 Resource Plan for PNG(N.E.). 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.

On page 21 of the PNG (N.E.) 2015 Resource Plan for the Fort St. John, Dawson Creek and Tumbler Ridge Distribution Systems Decision, the BCUC was “of the view that the 2015 Resource Plan is not as thorough as it should be regarding the regional LNG and CNG strategy.”

- 9.2 Please provide details of any potential CNG or LNG development that could impact PNG’s demand forecast over the 20-year planning period (2019-2038). Please include in the discussion the likelihood of such developments and the potential impact on the demand forecast for the 20-year planning period.
- 9.3 Please describe in detail the extent of PNG’s efforts to develop new and existing markets for CNG & LNG in its service area.

On page 11 of Exhibit B-1, Table 1 shows the changes to weightings applied to resource planning objectives from PNG’s 2015 Resource Plan to PNG’s 2019 Consolidated Resource Plan. Table 1 is reproduced below.

Table 1: Changes to weightings applied to resource planning objectives

RESOURCE PLANNING OBJECTIVES		
Objective	Weights	
	PNG(N.E.) 2015 Resource Plan	PNG Consolidated 2019 Resource Plan
1 Safe, reliable service	30%	30%
2 Least cost service	30%	25%
3 Economic viability of the utility	10%	10%
4 Stable Rates	10%	10%
5 Environmental and socio-economic impacts	10%	10%
6 Alignment with the B.C. Government’s Energy Objectives	10%	15%
	100%	100%

On page 13 of Exhibit B-1, PNG states:

To ensure that the Company remains viable, additional supply or demand-side resources should only be considered if there is sufficient customer demand growth to support the added cost of service impacts associated with those resources, and that the addition of those resources does not materially increase rates beyond the price of energy from alternative sources. If this were to occur, it would be unlikely that the new customer demand that drove the expansion would sign up for natural gas service due to unfavourable pricing, leaving existing customers to recover the cost impacts of a resource addition. In turn, existing customers may either leave the system in favour of alternatives, or materially alter their consumption patterns, both which could adversely impact the sustainability of the utility. To ensure that resources are added only when appropriate, the Company employs financial feasibility tests, such as a mains extension test. [Emphasis added]

On page 63 of Exhibit B-1, PNG states:

In each case, the size of the community, along with the lack of significant commercial or industrial load, and the distance from supplies, either of CNG/LNG or fuel gas pipelines,

challenges the cost competitiveness of natural gas service as compared to existing propane supply. PNG continues to work with communities desiring natural gas service to ascertain current and projected loads. In making its determination on the costs and benefits of providing natural gas service, PNG is committed to assessing the opportunity within the framework of its six Resource Planning Objectives set out in Appendix A: Resource Planning Objectives. [Emphasis added]

Appendix A of Exhibit B-1 shows the Summary of Resource Plan Objectives and describes the Weighting, Attributes, Measurement Criteria and Benchmarks/Targets for each Resource Plan Objective.

- 9.4 Please identify any community in BC currently relying on LNG/CNG for their primary space and water heating requirements. For those identified, please discuss the community's current natural gas demand and its method of LNG/CNG delivery.
- 9.5 When considering opportunities related to providing CNG and LNG distribution services to customers in remote communities, please discuss how PNG uses the Resource Planning Objectives in Appendix A in its determination and the relationship to PNG's mains extension test.
 - 9.5.1 Please provide a copy of PNG's current mains extension test.
- 9.6 Please discuss whether PNG expects its proposed changes to the Resource Planning Objective Weightings to impact opportunities for providing LNG/CNG to remote communities.

**10.0 Reference: NEW OPPORTUNITIES AND INNOVATION
Exhibit B-1, Section 4.2, pp. 63–64
Natural Gas for Transportation**

On pages 63–64 of Exhibit B-1, PNG states:

Target markets include high fuel volume end-use equipment in the oil and gas, mining, marine and rail sectors. Additional opportunity exists for the on-road trucking sector, however this is expected to have the longest time to conversion due to small per-unit fuel use and time required for the build-out of a retail supply network.

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.

- 10.1 Please discuss the challenges holding back adoption of CNG/LNG as a transportation fuel in the oil and gas, mining, marine and rail sectors.
 - 10.1.1 Please explain how PNG plans to address those challenges identified.
- 10.2 Please discuss in detail PNG's efforts to develop the market for CNG/LNG in the transportation sector.
 - 10.2.1 Please provide a summary of benefits and any risks associated with the development of the CNG/LNG transportation sector.

**11.0 Reference: NEW OPPORTUNITIES AND INNOVATION
Exhibit B-1, Section 4.3, p. 64
Innovation**

On page 64 of Exhibit B-1, PNG states:

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.

Also, on page 64 of Exhibit B-1, PNG states:

Examples of technological innovation being supported by these two organizations include gas fired cold-temperature heat pumps and adsorption chillers, microscale combined heat and power units for residential and commercial installations, biomethane upgrading, carbon capture, and natural gas vehicle engines.

- 11.1 Please discuss the likelihood that these various technologies will be implemented in PNG's service area, the expected timeframe(s) and any anticipated challenges.
- 11.2 Please discuss how wide-spread adoption of these technologies in PNG's service area could impact PNG's demand forecast over the planning period (2019-2038).

**12.0 Reference: NEW OPPORTUNITIES AND INNOVATION
Exhibit B-1, Section 4.4, pp. 64–68
Renewable Natural Gas (RNG)**

On page 64 of Exhibit B-1, PNG states:

Biogas can be produced from a number of sources and biogas from all of these sources can be processed (upgraded) to RNG. The most common sources of biogas are described below. All of these sources are available in PNG's service areas, albeit perhaps not in quantities sufficient to support a project that delivers RNG into PNG's distribution systems.

- 12.1 Please identify any biogas production currently available in PNG's service area.
 - 12.1.1 For those identified, please describe the biogas facility, including biogas generation source, and the associated annual production volumes of raw biogas and equivalent RNG available.
- 12.2 What does PNG consider to be a sufficient quantity to support a project that delivers RNG into PNG's distribution system? Please elaborate.

On page 65 of Exhibit B-1, PNG states:

Accessing sufficient supplies of RNG to meet a five percent blend, let alone a 15 percent blend, has proved challenging for FEI. As the efforts of FEI over the past 10 years has shown, acquiring even a fraction of this quantity of supply is challenging at this stage of the development of the industry in B.C

On pages 65–66 of Exhibit B-1, PNG states:

PNG expects that its own efforts will be equally challenging, if not more so. Based on total deliveries to its non-bypass customers, PNG requires approximately 500 TJ of RNG to reach the five percent voluntary limit. Meeting the CleanBC target will require significantly more RNG supply, as much as 1,000 TJ, based on deliveries to sales (non-transport) customers. Sources of supply that could be connected to PNG’s system are from smaller projects that are challenging to develop at RNG prices under \$30 per GJ. In addition, regions where RNG may be generated from anaerobic digestion of manure and farm waste often lie at the ends of PNG’s gas distribution system. PNG’s systems therefore may have limited ability to accept RNG without system reinforcements, further increasing the cost of RNG supply. [*Emphasis added*]

- 12.3 Please discuss why PNG considers, as compared to FEI, it will be equally challenging, if not more so, for PNG to access sufficient supplies of RNG.
- 12.4 Please explain, with examples where relevant, what is meant by ‘system reinforcements.’
- 12.5 Please explain the types of system reinforcements that may be required for PNG to accept RNG and the estimated associated cost.

On page 66 of Exhibit B-1, PNG states:

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.

- 12.6 Please discuss PNG’s broad interpretation of Renewable Gas to that used in the 2018 CleanBC Plan.

On page 66 of Exhibit B-1, PNG states:

In order for PNG to secure sufficient quantities of RNG, PNG expects that it will need to acquire a portion of that supply from sources not directly connected to its transportation and distribution systems. PNG therefore anticipates entering into agreements for the notional transportation of RNG to its service areas, from RNG sources located elsewhere in B.C. or in other provinces and territories in Canada, or in the U.S. Such transactions would involve the creation and transfer of environmental attributes associated with RNG, from the producer to PNG.

- 12.7 Please explain how acquiring RNG in other provinces and territories in Canada, or in the U.S, is consistent with relevant BC legislation and policy, including, the *Clean Energy Act* (CEA), the *Greenhouse Gas Reduction Regulation* (GGRR) and the 2018 CleanBC Plan.
 - 12.7.1 Please explain the benefits and risks of this strategy for PNG customers.
- 12.8 Please discuss whether, as an alternative to procuring physical RNG, PNG believes that purchasing the environmental attributes of RNG produced in other jurisdictions would be consistent with relevant BC Legislation and policy.

13.0 Reference: NEW OPPORTUNITIES AND INNOVATION
Exhibit B-1, Section 4.4.1, pp. 68–69
PNG’s RNG Strategy

On page 68 of Exhibit B-1, PNG states:

In light of the GRRR 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.

On page 69 of Exhibit B-1, Table 18 shows PNG’s RNG supply forecast. Table 18 is reproduced below.

Table 18: RNG supply forecast

		2018	2019	2020	2021	2022	2023	2024
Total Deliveries (Sales and Transport)	TJ	10,586	11,146	11,546	11,861	11,870	11,831	11,709
Deliveries (Sales)	TJ	6,416	6,567	7,221	7,517	7,585	7,546	7,482
RNG Supply	TJ	-	-	-	30	130	200	300
As a portion of total deliveries	%	0.0%	0.0%	0.0%	0.3%	1.1%	1.7%	2.6%
As a portion of sales	%	0.0%	0.0%	0.0%	0.4%	1.7%	2.7%	4.0%
GHG reduction (tonnes CO₂e)	(tCO₂e)	-	-	-	(1,493)	(6,468)	(9,950)	(14,925)

		2025	2026	2027	2028	2029	2030
Total Deliveries (Sales and Transport)	TJ	10,926	10,800	10,745	10,668	10,587	10,471
Deliveries (Sales)	TJ	6,699	6,631	6,576	6,499	6,418	6,302
RNG Supply	TJ	400	510	620	730	840	950
As a portion of total deliveries	%	3.7%	4.7%	5.8%	6.8%	7.9%	9.1%
As a portion of sales	%	6.0%	7.7%	9.4%	11.2%	13.1%	15.1%
GHG reduction (tonnes CO₂e)	(tCO₂e)	(19,900)	(25,373)	(30,845)	(36,318)	(41,790)	(47,263)

- 13.1 Please describe the circumstance(s) that would lead PNG to develop its own supply project(s) versus entering into supply agreements with third parties.
 - 13.1.1 Please provide a discussion of the benefits and risks associated with each scenario.
- 13.2 Please discuss what would be included in a filing of the above noted “set of principles governing PNG’s ability to develop RNG supply infrastructure.”
 - 13.2.1 Please identify the filing PNG is referring to in which the BCUC approved a set of principles governing FEI’s ability to develop RNG supply infrastructure.
 - 13.2.2 In what timeframe does PNG anticipate filing such an application to the BCUC.
- 13.3 Please discuss any RNG supply sources PNG has identified, either committed or potential, to satisfy the RNG Supply forecast included in Table 18 for:
 - 13.3.1 2020 to 2024; and
 - 13.3.2 2025 to 2030.

- 13.4 Please confirm, or otherwise explain, that PNG considers the volume of required RNG supply as a percent of deliveries (sales) is consistent with the 2018 CleanBC Plan.
- 13.4.1 Please discuss why total deliveries (sales and transportation volumes), was not considered.
- 13.4.2 Please explain why PNG has no forecast RNG supply to 2038.
- 13.4.3 Please provide an updated version of Table 18 to include the full planning period (2019-2038).
- 13.5 Please confirm, or otherwise explain, if PNG intends to include RNG supply in its 2020/2021 its Annual Gas Contracting Plan (ACP).
- 13.6 Please confirm, or otherwise explain, if any capital costs associated with PNG’s RNG supply forecast have been included in PNG (N.E.) 2020/2021 Revenue Requirements Application or PNG (West) 2020/2021 Revenue Requirements Application.

E. GHG REDUCTION PLANS

**14.0 Reference: GHG REDUCTION PLANS
Exhibit B-1, Section 5.3, pp. 71–72
PNG GHG Reduction Plan**

On page 71 of Exhibit B-1, PNG states:

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.

- 14.1 Please provide GHG reductions in tonnes CO₂e in the following tabular format for the planning period (2019-2038) as it relates to the noted multi-year plan.

	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
PNG's GHG Reduction (tCO ₂ e)										
	2029	2030	2031	2032	2033	2034	2035	2036	2037	2038
PNG's GHG Reduction (tCO ₂ e)										

- 14.2 Please discuss the relationship between PNG’s GHG Reduction Plan and its forecasted annual demand for the planning period (2019-2038).

On page 71 of Exhibit B-1, PNG states:

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.

On page 72 of Exhibit B-1, PNG states:

- An opportunity to reduce emissions from combustion by replacing the natural gas powered turbine at R1 with an electric drive will be evaluated, taking into account capital costs, savings in carbon taxes, and the reliability of electric power at that location.
- 14.3 Does PNG anticipate filing a CPCN with the BCUC within the next 5 years for any capital upgrade work at compressor station R1? If yes, please provide the anticipated timing of such an application.
- 14.4 Please discuss the impacts of replacing the natural gas-powered turbine at R1 with an electric drive on PNG's forecasted annual demand for the planning period (2019-2038).

F. DEMAND FORECASTING

- 15.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 7.4, p. 112
Energy Conservation and Innovation Programs**

On page 112 of Exhibit B-1, PNG states:

- Finally, PNG has reflected the impact of its current and proposed ECI programs in these, gross demand forecasts. The impact on demand, of the ECI program is presented in Section 8.3.
- 15.1 Please reproduce the gross demand forecasts excluding the impact of the Energy Conservation and Innovation (ECI) Program.
- 15.1.1 Where necessary, please update all IR responses relating to the gross demand forecasts to reflect the exclusion of ECI Programs.

- 16.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.2, pp. 91-92; PNG(N.E.) 2015 Resource Plan for the Fort St. John/Dawson Creek and Tumbler Ridge Distribution Systems proceeding, Exhibit B-1, pp. 77-78, 79
Small Commercial Customers – Capture Rates**

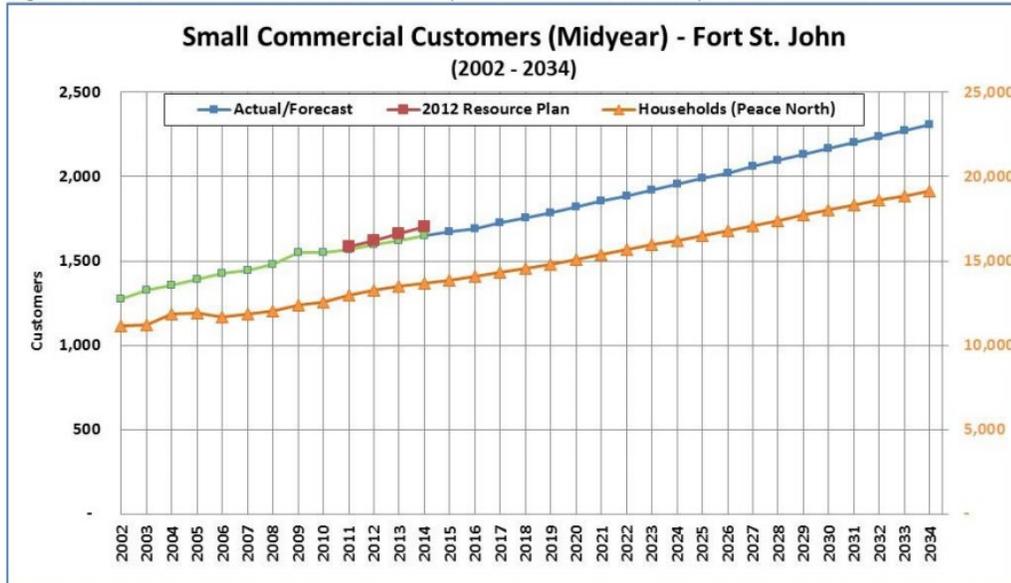
On page 91 of the Exhibit PNG states:

Consistent with the approach taken in earlier resource plans, PNG assumes that the trend in household formations in the regions served by PNG is a proxy for growth in small commercial customer additions. Capture rates adopted for the demand forecasts for 2020 in all regions are the same as those used in the 2014 and 2015 Resource Plans.

On pages 77–78 of Exhibit B-1 in PNG(N.E.)'s 2015 Resource Plan for the Fort St. John/Dawson Creek and Tumbler Ridge Distribution Systems proceeding (PNG(N.E.) 2015 Resource Plan), PNG(N.E.) stated:

The correlation between household additions and small commercial customer additions is very high: 0.95 for Fort St. John and Dawson Creek, and 0.9 for Tumbler Ridge (Figure 42, Figure 43, and Figure 44).

Figure 42: Small Commercial Customers (Historical and Forecast) – Fort St. John



- 16.1 Please provide the most recent correlation analysis between the growth in small commercial customer additions and the trend in household formations for each of PNG’s service areas.
 - 16.1.1 Please provide an explanation for any changes between the most recent correlations and those in the 2015 PNG(N.E.) Resource Plan.
- 16.2 For each of PNG’s service areas, please provide a graph in a similar format to Figure 42 above, demonstrating the historical and forecasted correlation between the growth in small commercial customer additions and the trend in household formations for the period 2002 to 2038. Please include forecasts provided in PNG’s two most recent resource plans.

On page 91 of the Exhibit B-1, PNG states:

To reflect the impact of the CleanBC Plan, namely an increased focus on the electrification of space heating, PNG is forecasting a decline in capture rates over the forecast period (Table 24). The decline is expected to be slightly more pronounced in PNG-West owing to the higher delivered cost of natural gas and perceptions of the relative costs of electricity and natural gas.

In its sensitivity analysis, PNG reflects the impact of lower capture rates on the small commercial demand forecast.

Table 24: New commercial customer capture rates over forecast period

Commercial	Capture Rates (Reference Case)		
	2020	2029	2038
PNG-West (West)	85%	79%	74%
PNG-West (East)	85%	79%	74%
FSJ/DC	100%	95%	91%
Tumbler Ridge	100%	95%	91%

On page 79 of the Application in the PNG(N.E.) 2015 Resource Plan for the Fort St. John/Dawson Creek and Tumbler Ridge Distribution Systems proceeding, PNG(N.E.) stated:

- Consistent with the assumptions for the residential customer additions, PNG(N.E.) has assumed a capture rate of 100 percent for the small commercial market. In its sensitivity analysis, PNG(N.E.) has determined the impact of a lower capture rate on the small commercial demand forecast.
- 16.3 Please explain why PNG-West is split into East and West for analysis of the capture rates.
- 16.3.1 Please explain which areas are classed as East and West and provide a map to illustrate the two areas.
- 16.4 Please explain how the decrease in capture rates were forecasted, addressing what assumptions were made regarding the impact of the CleanBC Plan and the increased focus on the electrification of space heating.
- 16.5 Please provide a graph comparing the capture rates forecasted in PNG’s most recent resource plans and the actual capture rates for the period 2015 to 2019. For any notable variances between the actual and forecasted capture rates, please provide a brief discussion of the reasons for the variation.

On page 92 of the Exhibit B-1, PNG states:

- In the PNG-West region, PNG exhibited a net loss of 15 customers, rather than a gain of 30 as forecast in the 2014 Resource Plan. Despite this discrepancy, PNG maintains its forecast of higher than historical customer additions in this region, particularly in Terrace and Kitimat, to reflect the increase of economic activity fueled by the LNG Canada construction work.
- 16.6 Please discuss the assumptions made in relation to the increase in economic activity resulting from the LNG Canada construction work.
- 16.6.1 Please explain how these assumptions have been used to inform the forecast trend in Small Commercial Customer Count for PNG-West.

**17.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.2, pp. 94, 96
Small Commercial Customers – Use per Account Forecast**

On page 94 of the Application, PNG states:

In forecasting the use per account of these customers, PNG has applied an exponential decline rate extrapolated from the past 10 years of actual UPA’s. In addition, in order to reflect the impact of CleanBC and expected incentives for commercial building energy efficiency retrofits through EfficiencyBC, PNG is forecasting an additional decrease in the UPA of existing commercial customers of five percent by 2030.

To reflect the goals of the CleanBC Plan, the UPA of new commercial construction is forecast to decline by 20 percent by 2025, by 40 percent by 2027 and by 80 percent by 2032, compared to 2018 levels. Forecasts for each region are shown in Figure 36 through Figure 39.

- 17.1 Please explain how a decrease of five percent by 2030 in the Use per Account (UPA) was established. Please detail the assumptions made and provide supporting analysis and rationale.
- 17.2 Please explain how the 20, 40 and 80 percent decreases in the UPA of new construction by 2025, 2027 and 2032, compared to 2018 levels were established. Please detail the assumptions made and provide supporting analysis and rationale.

On page 96 of the Application, PNG provides the forecast UPA for small commercial customers in the Fort St. John and Tumbler Ridge service areas:

Figure 37: Forecast small commercial use per account (Fort St. John)

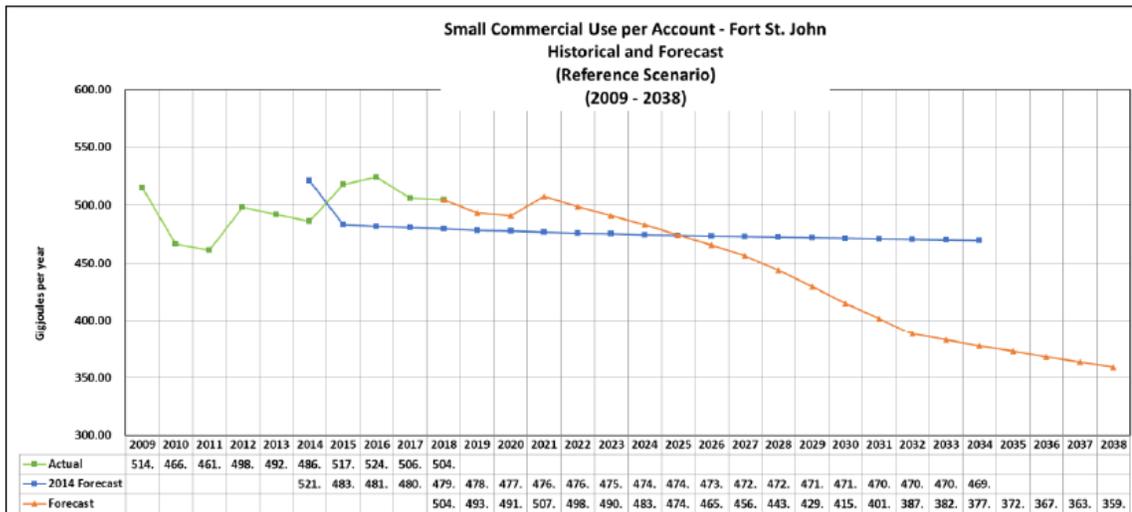
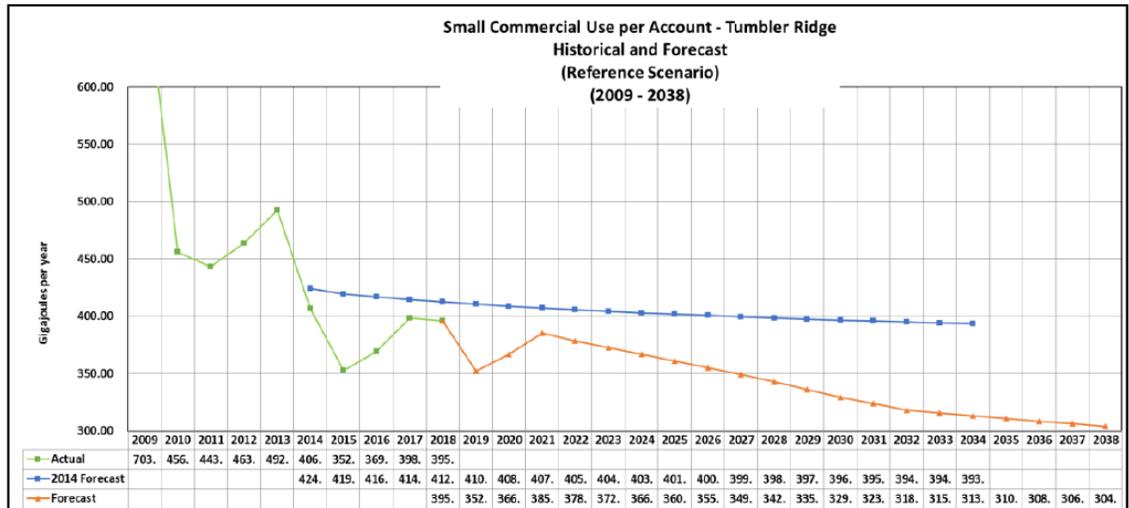


Figure 39: Forecast small commercial use per account (Tumbler Ridge)



- 17.3 Please explain the reasons for the forecasted decrease in small commercial UPA for both Fort St. John and Tumbler Ridge.

18.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, p. 97; PNG(N.E.) 2015 Resource Plan for the Fort St. John/Dawson Creek and Tumbler Ridge Distribution Systems proceeding, Exhibit B-1, p. 84
Large Customer Forecasts

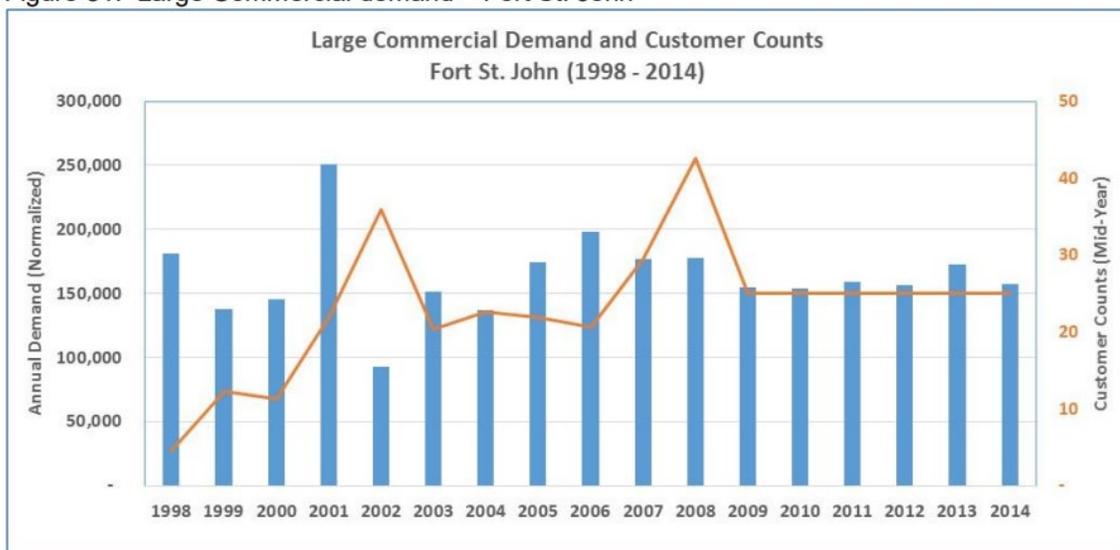
On page 97 of the Application, PNG states:

All of these customers provided a forecast of their 2020 natural gas consumption to PNG during the summer of 2019. In some cases, PNG has adjusted the customer’s forecast to align more closely with their historical operations. The adjusted forecasts are included in the annual revenue requirements applications and are the basis for the long-term forecast. Unless identified specifically in the following sections, PNG has maintained the existing number and type of large customers over the planning period. The Company has no information at this time that would suggest changes to this number. The forecasts of the large customers for selected years of the 20-year planning period are presented in Table 25.

- 18.1 Please confirm, or otherwise explain, whether PNG’s large customers provided forecasts for 2020 only.
 - 18.1.1 If confirmed, please discuss how PNG extrapolated the 2020 forecasts to inform PNG’s long-term demand forecasts. Please provide details of all assumptions with supporting rationale.
 - 18.1.2 If not confirmed, please provide the time period for the forecasts.
- 18.2 Please explain why PNG has adjusted some customer forecasts to align with historical operations. Please include in the discussion how previous customer forecasts have compared to their actual demand.
- 18.3 Please provide details of the adjustments that PNG has made to the customer forecasts.

On page 84 of the Application in the PNG(N.E.) 2015 Resource Plan for the Fort St. John/Dawson Creek and Tumbler Ridge Distribution Systems proceeding, PNG(N.E.) provided the Large Commercial demand for Fort St. John:

Figure 51: Large Commercial demand – Fort St. John



- 18.4 For each of PNG’s service areas, please provide a graph in a similar format to Figure 51 above, comparing the historic actual large commercial demand and customer counts with the forecasts as provided in previous resource plans for the period 2009 to 2019.

**19.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, pp. 98, 100-101
Large Customer Forecasts – PNG-West**

On page 98 of the Application PNG provides Table 25, summarizing the Large Customer and Transportation Forecast:

Table 25: Large Customer Sales and Transportation Forecast

	2018 Actual	2019 Projected	2020 Forecast	2024 Forecast	2029+ Forecast
PNG-West					
Large Commercial Firm Sales	47,539	77,812	381,250	822,620	224,020
Commercial Firm Transportation	309,498	290,080	305,167	305,167	305,167
Small Industrial Sales (RS4)	126,647	293,300	627,880	627,880	627,880
Seasonal	21,421	22,573	18,400	18,400	18,400
NGV	-	-	-	-	-
Industrial Transportation ⁽¹⁾	1,287,765	1,251,299	1,301,914	1,301,914	1,301,914
Interruptible Sales and Transport	900,209	1,192,044	807,490	826,600	826,600
	2,693,080	3,127,107	3,442,101	3,902,581	3,303,981
Fort St. John					
Large Commercial Firm Sales (RS 3)	177,651	200,284	220,500	220,500	137,500
Commercial Transportation (RS23)	48,641	51,748	37,600	37,600	37,600
Small Industrial Sales (RS4)	216,094	251,514	238,000	202,800	185,200
Small Industrial Transportation	340,143	271,641	291,420	174,852	116,568
Total	782,529	775,188	787,520	635,752	476,868
Dawson Creek					
Large Commercial Firm Sales (RS 3)	177,383	179,792	196,000	196,000	196,000
Commercial Transportation (RS23)	20,659	21,869	15,500	15,500	15,500
Small Industrial Sales (RS4)	264,514	103,507	70,000	70,000	70,000
Small Industrial Transport (RS7) ⁽²⁾	980,025	980,025	980,025	980,025	980,025
Total	1,442,581	1,285,193	1,261,525	1,261,525	1,261,525
Tumbler Ridge					
Large Commercial Firm (RS 3)	14,292	19,269	18,000	18,000	18,000
Small Industrial Transportation (RS4)	283,238	520,098	585,600	585,600	585,600
Total	297,530	539,367	603,600	603,600	603,600

(1) Average actual demand. Rio Tinto Alcan Firm Contract Demand 120.1 e³m³ per day at heating

(2) Regional LNG Firm Contract Demand

- 19.1 Please confirm that the data represented in Table 25 is expressed in units of GJ per year.
- 19.2 Please provide a discussion on the factors PNG considered when preparing the 2019 Projection and 2020 to 2029+ Forecasts for Interruptible Sales and Transport in the PNG-West service area.

On pages 100 to 101 of the Application, PNG states:

Over the longer term, [Ridley Island Propane Export Terminal] RIPET may offset some of its demand for natural gas with ethane produced from its fractionation plant. Under this situation, the demand from RIPET may be reduced to the minimum demand of 410 GJ per day specified in the 15-year firm gas sales agreement entered into with PNG. Accordingly, PNG has used a forecast based on the minimum contract demand, equivalent to approximately 150 TJ per year, in its Competitive Electricity scenario.

- 19.3 Please discuss why, with supporting rationale, the Reference and Competitive Gas scenarios do not assume that RIPET will offset some of its demand for natural gas with ethane.

- 19.4 Please confirm, or otherwise explain, that the 410 GJ per day (150 TJ annually) is provided under a take or pay contract.
- 19.4.1 Please confirm, or otherwise explain, that the minimum RIPET demand is included in PNG's Annual Contacting Plan.
- 19.5 How does PNG manage the volume imbalance between RIPET's forecast demand of 33,000 GJ/month (approximately 1.1 TJ/day) and the minimum contract demand of 410 GJ/day? Please also discuss how PNG manages its price risk exposure in this event.

**20.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, pp. 98, 101–102
Large Customer Forecasts – Fort St. John**

On pages 101 to 102 of the Application, PNG states:

Four oil and gas producers operate seven production facilities whose fuel gas requirements are provided by PNG on the Fort St. John system. Fuel gas loads in oil and gas field operations is typically consumed by compressors, line heaters and space heating. 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, and a loss of all of the compressor fuel gas load by 2030 under the Competitive Electricity scenario (Figure 41). PNG has reflected no reduction in compressor fuel gas load under the Competitive Gas scenario.

- 20.1 Please discuss, and provide details of, the federal and provincial initiatives that PNG expects to result in oil and gas producers converting to electric drive units, including the anticipated timing for conversion.
- 20.2 Please explain how PNG established a loss of 60 percent by 2030 for the Reference and Competitive Electricity Scenarios. Please detail the assumptions made and provide supporting rationale.
- 20.3 Please explain why PNG assumed no reductions in compressor fuel gas load under the Competitive Gas scenario. Please provide any relevant calculations in your response.
- 20.4 Please discuss the factors PNG considered when preparing the 2019 Projection and 2020 to 2029+ Forecasts for Commercial Transportation (RS23) in the Fort St. John service area.

**21.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, pp. 98, 101
Large Customer Forecasts – Dawson Creek**

- 21.1 Please provide a discussion on the factors PNG considered when preparing the 2019 Projection and 2020 to 2029+ forecasts for Commercial Transportation (RS23) in the Dawson Creek service area.

**22.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, pp. 98, 103-104
Large Customer Forecasts – Tumbler Ridge**

On pages 103 to 104 of the Application, PNG states:

Opportunities for [Canadian Natural Resources Ltd.] CNRL to electrify its Murray River fuel gas loads are limited by the proximity to the BC Hydro grid in all but the northern

extent of the production area. The impact of the Province's electrification policies on the demand from CNRL Murray River are expected to be in the range of 10 to 15 percent of existing demand, with this reduction expected to be offset by increased demand from additional production in the area.

- 22.1 Please discuss the provincial electrification policies that PNG expects to impact CNRL.
- 22.2 Please explain how PNG established a reduction of 10 to 15 percent of existing demand. Please detail the assumptions made and provide supporting rationale.
- 22.3 Please confirm, or otherwise explain, whether the increased demand referenced in the preamble above refers to CNRL restarting production from its low-pressure wells in Murray River.

**23.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.3, p. 105
Season and NGV Demand**

On page 105 of the Application, PNG states: "PNG no longer has any customers under the [Natural Gas Vehicle Fleet] NGV rate."

- 23.1 Please confirm, or explain otherwise, that PNG still offers the NGV rate.
 - 23.1.1 Please confirm when PNG ceased to have any customers under the NGV rate.
- 23.2 Please provide a breakdown of actual historic demand attributed to large commercial, industrial, seasonal or NGV customers for 10 years prior to the last year a customer took service under the NGV.
- 23.3 Please discuss the reasons why PNG no longer has any customers under the NGV rate.
- 23.4 Please discuss whether PNG has considered options to attract new customers under this rate.
 - 23.4.1 If no options have been considered, please explain why not.
- 23.5 Please provide a forecast of the number of potential NGV customers and their associated demand, detailing any assumptions made.

**24.0 Reference: Annual Demand Forecast
Exhibit B-1, Section 7.3.4, pp. 105–106
RECAP and Forecast Demand**

On page 105 of the Application, PNG states:

Recent changes in market conditions, especially in the LNG sector, have revived interest in PNG's transmission pipeline capacity. In response, PNG conducted an open season in the fourth quarter of 2018 to measure the demand for reactivated capacity as well as for expansion capacity on its pipeline system. PNG terminated that process because demand was not sufficient at that time to warrant the contemplated large-scale expansion of PNG's transmission system. The open season did, however, identify potential significant demand for capacity presently available on PNG's transmission system.

- 24.1 Please provide a summary of the potential for capacity demand identified during the fourth quarter 2018 open season.
- 24.2 Please discuss whether the identification of potential significant demand as discussed in the preamble above has been considered in PNG's forecasting scenarios.

Further on page 106, PNG states:

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.

Depending on the RECAP demands, and the requested delivery points, PNG has modeled the full extent of the capital costs for the reactivation recommissioning, and system reinforcement to be up to approximately \$120 million. The activities include compressor rehabilitation, pipeline reactivation and system reinforcement.

While PNG could reasonably include sufficient additional demand under the Competitive Gas scenario that would result in a fully utilized transmission system, such a forecast provides little if any meaningful information.

- 24.3 Please discuss the probable outcomes of the Process for Allocation of Reactivated Capacity (RECAP) and for each of the probable outcomes, please provide an updated demand forecast, clearly explaining how these outcomes would affect PNG’s demand and supply portfolio.
- 24.4 Please discuss why PNG believes that including the forecast demand from the RECAP process in its forecasting scenarios does not provide any meaningful information.
- 24.5 Please explain how PNG arrived at a capital cost estimate of \$120 million.

25.0 Reference: Residential and Small Commercial Demand Exhibit B-1, Section 1, p. 20, Section 6, pp. 73–76; PNG (N.E.) 2015 Resource Plan for the Fort St. John, Dawson Creek and Tumbler Ridge Distribution Systems Decision and Order G-155-15 dated September 30, 2015, p. 8 Residential End Use Survey

On page 20 of the Application, PNG provides the following table of BCUC requests and directives and the current status:

G-155-15	The Panel directs PNG(N.E.) to include a summary of the assessments performed and the results of such assessments PNG relied on to inform the timing of the REUS and small commercial customer survey in the next resource plan filing. (p. 8)	PNG decided not to refresh the results of the entire 2013 REUS. PNG has no indications from the year over year trend of its residential and small commercial use per accounts, that customer characteristics or end use behaviour has changed substantially. However in 2019, PNG completed a Customer Attitudes Survey targeted at both residential and commercial customers, that addressed a range of topics including attitudes and beliefs about the environment, natural gas and renewable energy; satisfaction with customer service interactions; interest in online services from PNG; participation and interest in energy-efficiency initiatives, and willingness-to-purchase natural gas augmented with bio-methane. A set of questions on customers natural gas appliances and dwelling characteristics, similar to those included in the 2013 REUS, were included as well. Section 3 presents a summary of the results.
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Further on page 73, of the Application, PNG states:

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.

The Customer Attitudes Survey, completed in 2019, collected information on the main and secondary sources of space heating, and the fuel used for heating domestic hot water. No statistically significant differences in the results from the 2013 REUS and the 2019 Customer Attitudes Survey were found.

- 25.1 Please explain how PNG can be informed of the year over year trend of its residential and small commercial use per accounts, customer characteristics and that end-use behaviour has not changed substantially, if it did not compete a REUS.
- 25.2 Please explain how, if at all, PNG has satisfied the directive on page 8 of the PNG (N.E.) 2015 Resource Plan for Application for Acceptance of the 2015 Resource Plan for the Fort St. John, Dawson Creek and Tumbler Ridge Distribution Systems Decision.
 - 25.2.1 How does Customer Attitudes Survey serve as an adequate substitute or proxy to a REUS? Please discuss.
- 25.3 Please provide a summary of the differences between the 2013 REUS and the 2019 Customer Attitudes Survey.
- 25.4 Please provide a summary and comparison of the results of the 2013 REUS and the 2019 Customer Attitudes Survey for PNG-West and PNG(N.E) for each factor influencing residential demand.
- 25.5 Please provide a detailed explanation of how PNG concluded that there are no indications of substantial change in residential and small commercial use per accounts, customer characteristics or end use behaviour without carrying out a REUS.

On pages 73–76 of the Application, PNG has provided information on residential end-use characteristics and annual use per account including figures 12, 13 ,14, 15, 16 and 17.

- 25.6 Please explain the source of the information provided on the pages referenced in the preamble above.
- 25.7 Please provide details of the time, resources required and estimated cost to update the 2013 REUS in its entirety.

**26.0 Reference: Demand Forecasting
Exhibit B-1, Section 7.3.1.1, pp. 81–85
Residential Customer Additions Forecasts**

On page 82 of the Application, PNG states:

The number of households in the Local Health Areas (LHA) served by PNG-West is expected to increase by an average of 0.7 percent per year over the forecast period. The number of households in the North and South Peace LHA's are expected to increase on average 1.8 percent per year, and 0.6 per cent per year, respectively over the forecast period.

- 26.1 Please explain which of PNG's service areas correspond to the North and South LHAs described in the preamble above.

On page 82 of the Application, PNG states:

The capture rates are determined in a manner consistent with that described 2015 Resource Plan for PNG(N.E.) and is based on a comparison of housing starts and actual

customer additions in each region over the past five years. Housing starts in PNG-West have not kept pace with the loss of customers over the past 10 years. Consequently, capture rates cannot be determined using this approach. The very low level of building activity in Tumbler Ridge does not provide a statistically meaningful value for customer capture rates in that region.

PNG has adjusted its customer captures rates used in its residential demand forecasts, based on the analysis presented here. Capture rates adopted for the demand forecasts for 2020 in all regions are approximately 10 percent lower than those used in the 2014 and 2015 Resource Plans

Table 21: New customer capture rates – Historical and Forecast (2020)

	Historical Average			Forecast (2020)		
	10-Year	5-Year	3-Year	Reference	Competitive Gas	Competitive Electricity
PNG-West (West)	-128%	-82%	2%	65%	75%	50%
PNG-West (East)				90%	90%	70%
FSJ/DC	88%	74%	93%	90%	90%	70%
Tumbler Ridge	68%	130%	na	90%	90%	70%

- 26.2 Please reconcile the statement ‘capture rates are determined in a manner consistent with that described 2015 Resource Plan for PNG(N.E.)’ and ‘Consequently, capture rates cannot be determined using this approach’.
- 26.3 Please confirm, or explain otherwise, that PNG has utilized an alternative method for calculating capture rates in the Application.
 - 26.3.1 Please explain how the capture rates for PNG-West (West) and PNG-West (East) have been determined.
 - 26.3.2 Please explain how the capture rates for Tumbler Ridge have been determined.
- 26.4 Please confirm, or explain otherwise, that PNG calculated capture rates using a method other than using housing starts and this method is consistent with the 2015 Resource Plan for PNG(N.E.).
- 26.5 Please explain, providing calculations where relevant, how PNG derived capture rates adopted in the demand forecast for 2020 which were 10 percent below those found in the 2014 and 2015 resource plans.

Further on page 83 of the Application, PNG has provided declining capture rates for each of PNG’s services areas in the following table:

Table 22: New residential customer capture rates over forecast period

Residential	Capture Rates (Reference Case)		
	2020	2029	2038
PNG-West (West)	65%	57%	50%
PNG-West (East)	90%	79%	69%
FSJ/DC	90%	82%	75%
Tumbler Ridge	90%	82%	75%

- 26.6 Please explain how PNG has forecasted the decreases in the capture rates for 2029 and 2038 described for each of its service areas in the preamble above.
- 26.7 Please confirm if the capture rates have been adjusted for the competitive gas and competitive electricity scenario.
- 26.7.1 If yes, please provide the details of the same.
- 26.7.2 If no, please explain why they have not been adjusted.

On pages 83 and 84 of the Application, PNG states:

In the Fort St. John/Dawson Creek area, actual customer additions over the period from 2014 to 2018 have exceeded forecast additions by seven percent. In the PNG-West region, PNG exhibited a net loss of customers, rather than a gain of over 500 as forecast in the 2014 Resource Plan. Despite this discrepancy, PNG maintains its forecast of higher than historical customer additions in this region, particularly in Terrace and Kitimat, to reflect the increase of economic activity fueled by the LNG Canada construction work. Tumbler Ridge also exhibited little or no growth in customers over the 2014 – 2018 period. In this case, PNG has revised downwards, the forecast based on the LHA projections.

- 26.8 Please explain why the effects of the increased economic activities described in Section 2.2.2.2 on pages 47 to 54 for PNG(N.E.) service areas have not been considered in PNG’s forecast of customer additions and capture rates.

On pages 84 and 85, PNG has provided Figures 22, 23, 24 and 25 with the 2014 forecast and actual (2014-2018) customer additions for each of its services territories. Except for Fort St. John, PNG’s forecasts for each of its services territories were overestimated for the 2014-2018 period.

- 26.9 Please explain the reasons for the differences between the forecast and actual customer additions for 2014-2018 period for each of PNG’s service territories.

**27.0 Reference: Demand Forecasting
Exhibit B-1, Section 7.3.1.2, pp. 85–90, Appendix B-1, Appendix B-2
Residential Use per Account (UPA) Forecast**

On page 88 of the Application, PNG states:

Actual UPA in all systems over the period from 2014 to 2018 has been lower than forecast in the previous resource plans.

- 27.1 Please explain the reasons for the differences between the forecast and actual UPA for 2014-2018 period for each of PNG's service territories.
- 27.2 Please explain how the UPA forecasts have been adjusted to account for results of the 2019 Customer Attitudes Survey.

On page 1 of Appendix B-2 of the Application, PNG states:

The attributes have been quantified in terms of their degree of penetration in each housing segment. In the case of the existing stock archetype, the degree of penetration has been taken from the results of the Residential End-Use Survey.

Further on pages 2-6 of Appendix B-2, PNG provides its annual use per account and degree of penetration for attributes in each of its service areas for Building Archetypes.

- 27.3 Please explain if the penetration of existing stock archetype has been updated with the results from the 2019 Customer Attitudes Survey.
 - 27.3.1 If yes, please provide details of how these have been updated.
 - 27.3.2 If no, please explain why these have not been updated.

28.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 2.1.1, pp. 23–32; Section 2.2.2, pp. 47–54; Section 7.4, pp. 110–111
Policy Environment and Outlook and Scenario Assumptions

On pages 110 to 111 of the Application, PNG states:

PNG has developed a Reference scenario that reflects the current mix of natural gas appliances and insulation in existing construction, and the current mix of SFD and MFD buildings being constructed in PNG's service areas. Forecasts of UPA for residential and commercial construction reflect changes to the mix of new construction as well as improvements to the energy efficiency of new construction, and building retrofits, that are aligned with the policy actions and targets identified in the CleanBC Plan. Forecast changes to large customers' loads are based on known additions and removals of these loads as well as on an estimated response to the CleanBC policy to promote the electrification of the upstream oil and gas sector.

- 28.1 For each federal, provincial and municipal policy or incentive summarized in section 2.1.1 of the Application, please compare the assumptions made in the Reference scenario against the assumptions made in the Competitive Gas and Competitive Electric scenarios. Please provide the rationale for any differences.
- 28.2 For each noteworthy project summarized in section 2.2.2 (Tables 7 to 17) please provide the probability of the project advancing to completion under the Competitive Gas and Competitive Electric Scenarios.
 - 28.2.1 If probabilities have not been calculated, please explain why not.
- 28.3 Please explain how the probabilities have been used to establish the Competitive Gas and Competitive Electricity scenarios. In your response, please explain how the probabilities have been used to inform the capture rates and the use per account for the Residential and Small Commercial customers, and the forecast for the Large Customer Demand.

**29.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 7.4, p. 111; Appendix C, pp. 1–2
Capture Rates Scenario Assumptions**

On page 111 of the Application, PNG states:

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.

On pages 1 to 2 in Appendix C of the Application, PNG summarizes the demand determinants used in each of the planning scenarios for the following categories:

- New Customer Capture Rates Residential
- Portion of New Construction that is Single Family Dwellings
- New Construction (SFD) heated by natural gas
- New Customer Capture Rates Small Commercial
- Energy Efficiency Retrofits
- Energy Efficiency New Construction

29.1 For each category, please provide an overview of how PNG established the demand determinants, detailing any assumptions.

**30.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 7.4.1, p. 112
Competitive Gas Scenario**

On page 112 of the Application, PNG states:

Improvements to the energy efficiency of new construction are half those targeted under the CleanBC Plan, while no significant improvements to the energy efficiency of building retrofits are reflected.

30.1 Please explain why, with supporting rationale, PNG has assumed that improvements to the energy efficiency of new construction will be half those targeted under the CleanBC Plan for the Competitive Gas scenario.

**31.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 7.4.2, pp. 112–113
Competitive Electric Scenario**

On page 113 of the Application, PNG states: “Improvements to the energy efficiency of new construction meet the CleanBC targets, and improvements to the energy efficiency of building retrofits reach 10 percent by 2030.”

31.1 Please explain why, with supporting rationale, PNG has assumed that improvements to the energy efficiency of building retrofits reach 10 percent by 2030 for the Competitive Electric scenario.

**32.0 Reference: Sensitivity Analysis
Exhibit B-1, Section 2.4, p. 57; Section 7.4.3, p. 113
Summary of Scenarios**

On page 113 of the Application, PNG states: “In all systems, the residential and small commercial use per accounts forecast exhibits declines under all three scenarios (Figure 51 through Figure 58).”

- 32.1 In consideration of the forecasted decrease in demand across all service areas for all scenarios, please discuss whether there is a point at which the PNG system would reach its operational limit.
 - 32.1.1 If so, please elaborate further on the operational limits for the system in each service area, and provide any supporting analyses, plans or studies conducted by PNG.
 - 32.1.2 Could the operational limit be reached or exceeded under any of the scenarios presented in the Resource Plan? Please discuss.
 - 32.1.3 How would PNG mitigate the effects, and the impact to customers, in this event? Please discuss.

On page 57 of the Application, PNG provides comparisons of the residential gas rates against the electricity equivalent for PNG’s service areas based on reference gas price forecast and the high carbon plus 5 percent renewable natural gas at \$30 per GJ:

Figure 9: PNG burner tip vs. electricity costs

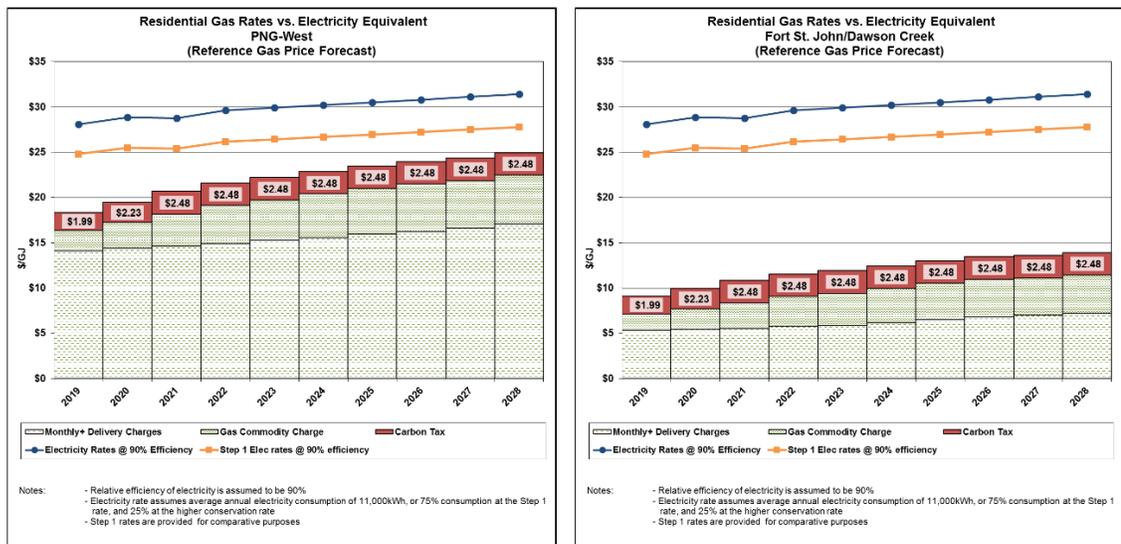
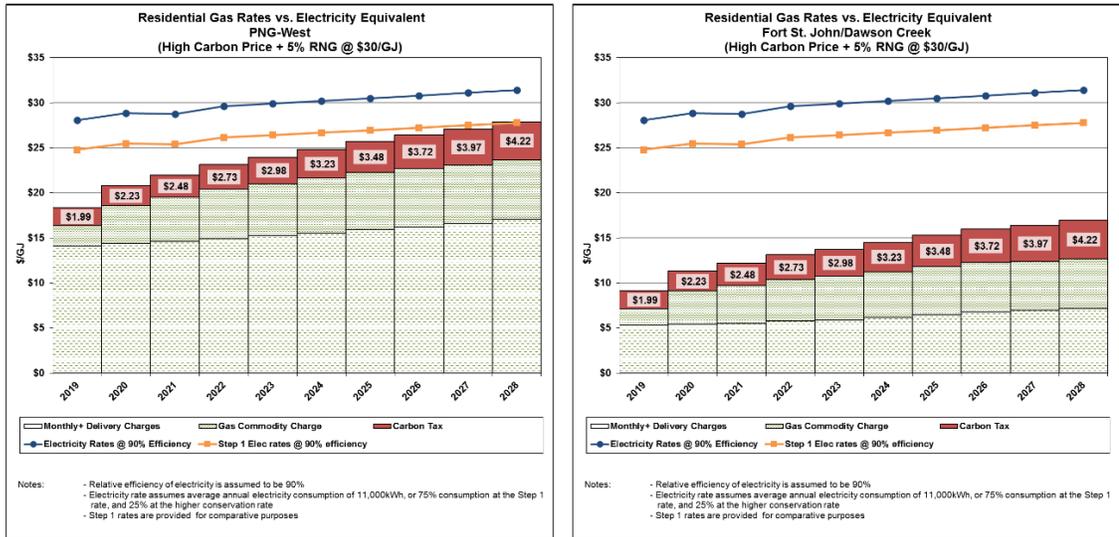


Figure 10: PNG burner tip vs. electricity costs (high carbon price scenario)



32.2 For each service area, please provide a comparison of the natural gas rates versus the electricity equivalents, adjusting the Monthly Delivery Charges to represent the demand forecasts under the Reference, Competitive Gas and Competitive Electricity scenarios. Please provide a comparison for (i) Residential; (ii) Small Commercial Customers; and (iii) Large Customers.

32.2.1 Based on the analysis, please discuss whether there is a point at which the rates would be considered uneconomical for PNG’s customers, resulting in a higher rate of customer losses.

32.3 Please discuss PNG’s proposals for increasing its customer base over the short, medium and long-term.

32.4 Please discuss whether PNG has identified any new areas to which it could provide service.

32.4.1 Please provide any estimates of the likelihood, anticipated timelines and costs of any opportunity PNG has identified.

**33.0 Reference: Sensitivity Analysis
 Exhibit B-1, Section 7.4.3, pp. 117–120
 Summary of Scenarios**

On page 117 of the Application, PNG states:

Demand from residential and small commercial customers comprises 40 percent of the throughput on the PNG-West system. Differences in throughput between all three scenarios from 2019 to 2024 are due primarily to differences in the forecast UPA and customer additions. Increased demand during the period from 2019 to 2024 is due to deliveries to the LNGC temporary construction facilities; this demand is extended an additional five years under the Competitive Gas scenario.

On page 118 of the Application, PNG provides the following table:

Table 30: Cumulative and Average Change in Demand (PNG-West)

Cumulative and Average Annual Change in Demand of:	(2018 - 2038)		
	Reference	Competitive Gas	Competitive Electric
Residential	-25.04% / -1.43%	-14.23% / -0.76%	-32.90% / -1.97%
Small Commercial	-6.17% / -0.32%	7.99% / 0.38%	-11.49% / -0.61%
Total Demand	5.97% / 0.29%	11.49% / 0.55%	-2.22% / -0.11%

On pages 118 to 120 of the Application, PNG summarizes the Cumulative and Average Change in Demand for all service areas under the Reference, Competitive Gas and Competitive Electricity scenarios in Tables 30 to 33.

- 33.1 Please explain how PNG calculated the cumulative and average change in demand for each of the scenarios in Table 30.
- 33.2 For all service areas, please provide a breakdown of the average differences in throughput between all scenarios according to the contributing factor (e.g. forecast UPAs, customer additions etc.). Please provide the analysis both in terms of GJ and percentage weighting.

**34.0 Reference: Design Day Demand Forecast
Exhibit B-1, Section 1.1.1, pp. 2–3; Section 7.5.1, pp. 122–123
Results – PNG-West**

On pages 2–3 of the Application, PNG states:

With the closure of Methanex’s methanol/ammonia facility in Kitimat in November 2005, PNG deactivated its compressor stations at Vanderhoof, Burns Lake, and Telkwa, as well 85 kilometres of 10 inch pipeline...These deactivated facilities have been partially maintained for potential future use.

On page 122 of the Application, PNG provides the Forecast Design Day Demand in Table 35:

Table 35: Forecast Design Day Demand

	Design Day Demand in 2038 vs. Current System Capacity (GJ/D)			
	Reference	Competitive Gas	Competitive Electricity	System Capacity
PNG-West at Summit Lake	39,889	42,813	37,558	134,309
Fort St. John	25,306	31,846	22,740	na*
Dawson Creek MS52	16,103	17,514	15,330	27,597
Tumbler Ridge Plant	3,243	3,941	3,049	5,731

* The Fort St. John system is a distribution network supplied from nine receipt points

On page 123 of the Application, PNG states:

While the system capacity presented in Table 35 represents the original design capacity of the PNG-West system reflecting the reactivation of compressor stations R2, R3 and R4, the design day demand forecast over the planning period does not reflect any future

demand resulting from the RECAP process. As stated in Section 7.3.4, PNG has no clear indication of the outcome of the RECAP and will not speculate on any likely uptake of spare capacity.

- 34.1 Given that compressor stations R2, R3 and R4 have been deactivated since 2005, please discuss the likelihood and anticipated date when these compressor stations may become reactivated.
 - 34.1.1 Do these compressors require a minimum level of throughput for maintenance purposes? Please discuss.
 - 34.1.2 At the current partial level of maintenance, please provide an estimate of the remaining useful life for each compressor stations. Please elaborate.
- 34.2 Please update Table 35 to include the design capacity of the PNG-West system without the reactivation of compressor stations R2, R3 and R4.

**35.0 Reference: Design Day Demand Forecast
Exhibit B-1, Section 7.5.1, p. 124
Results – Dawson Creek**

On page 124 of the Application, PNG states:

The Dawson Creek distribution system consists of a high pressure pipeline running from a connection with the Enbridge Dawson Creek Lateral located roughly 12 kilometres north of the Dawson Creek City centre. This pipeline is comprised of a two kilometre line purchased from PennWest in 2014 (the PennWest segment), followed by the 10 kilometre Sunrise Lateral running south to the Dawson Creek Gate Station.

Since its purchase of the PennWest pipeline in 2014, PNG has imposed a limit of 3,800 kPa (550 psi) that is below the maximum acceptable operating pressure (MAOP). The capacity of the PennWest segment is therefore reduced to approximately 60 percent of its design capacity of 41,300 GJ per day.

PNG intends to remove this self-imposed limit when and if it establishes the structural integrity of the pipeline through a corrosion survey and investigative digs. However, at this time, PNG has determined that it has sufficient capacity to reliably serve the customers of Dawson Creek.

- 35.1 Please explain, with rationale, whether PNG is currently required to test the structural integrity of the PennWest pipeline when operating:
 - 35.1.1 Below the self-imposed limit;
 - 35.1.2 Below the MAOP.
- 35.2 Please provide the timelines for completing the assessment of the structural integrity of the PennWest pipeline through corrosion surveys and investigative digs.
 - 35.2.1 Please explain how PNG would serve its customers in the event of a PennWest pipeline failure.

G. DEMAND SIDE MANAGEMENT

36.0 Reference: DEMAND SIDE MANAGEMENT
Exhibit B-1, Section 8, pp. 130, 131–133; Appendix V, pp. 12, 24–25;
PNG(N.E.) 2015 Resource Plan for the Fort St. John, Dawson Creek and Tumbler Ridge
Distribution Systems Decision and Order G-155-15 dated September 30, 2015, p. 10;
Utilities Commission Act, section 44.1(2)(f)
DSM Funding Scenarios

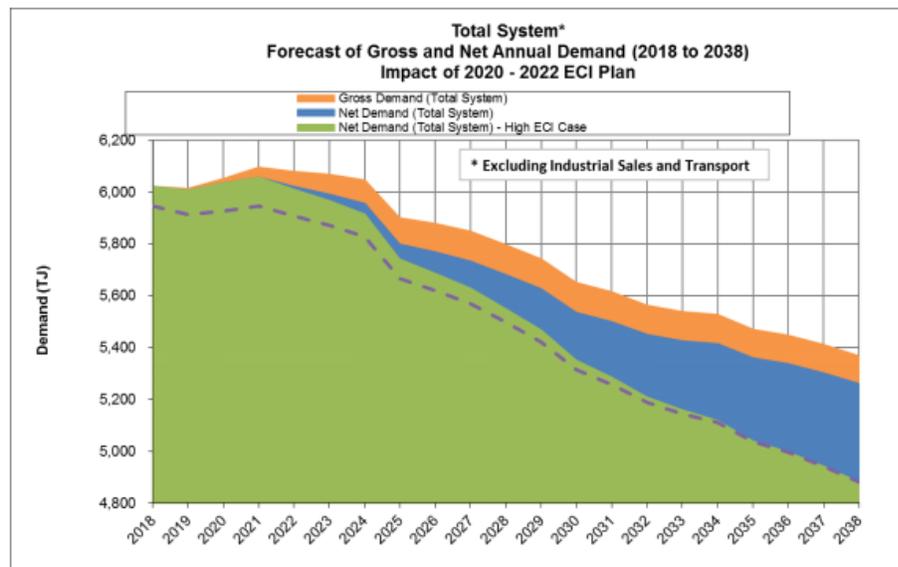
In its Decision attached to Order G-155-15 approving the 2015 Resource Plan for PNG(N.E.), the BCUC directed PNG to include in its next and subsequent resource plans “different DSM funding scenarios which should at a minimum include a “reference” DSM funding scenario with ‘high DSM’ and ‘low DSM’ scenarios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

On page 130 of the Application, with respect to these DSM funding scenarios, 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 [Conservation Potential Review] 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.

On page 131, Figure 64 shows the forecast gross and net annual demand (TJ) after DSM:

Figure 64: Forecast Gross and Net Annual Demand (TJ)



On pages 132 to 133 of the Application, PNG states:

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.

On pages 24 – 25 of the Conservation Potential Review attached as Appendix V, Navigant Consulting

states that “Natural change accounts for changes in consumption that are naturally occurring and are not the result of utility-sponsored programs or incentives.”

- 36.1 Please clarify the purpose of the dashed line on Figure 64.
- 36.2 Please explain on what basis PNG has assumed market saturation will occur after 2027 in the reference scenario.
 - 36.2.1 Please confirm, or explain otherwise, that market saturation refers only to the measures contemplated in the 2020-2022 DSM Plan, and that further DSM savings would be possible post-2027 if different DSM measures were contemplated at that time.
 - 36.2.2 Given the assumption of market saturation after 2027, please explain whether PNG has made any assumptions for a decline in DSM savings towards the end of the period covered by the CRP, as measures reach the end of their useful life, or accounting for “natural change”.
- 36.3 Please explain if PNG has made any high-level calculations of the cost-effectiveness values for implementing the reference scenario and the high scenario over the period covered by the CRP. If so, please provide these values, as a TRC ratio and \$/GJ saved, with any relevant supporting explanation or caveats.
- 36.4 Please discuss how the competitive gas scenario and the competitive electricity scenario would affect the long-term forecasts of DSM funding scenarios, considering factors including the likely adoption rates of DSM measures, overall energy and demand reductions, and cost-effectiveness.

On page 12 of the Conservation Potential Review attached as Appendix V, Navigant Consulting states:

Given that PNG has limited historic experience administering conservation programs, the team relied on FortisBC Gas data to calibrate key model assumptions... To customize this evaluation for PNG’s service territory, Navigant applied PNG-specific building stock and end use intensity forecasts, avoided costs, retail rates and discount rates. By using PNG-specific building stock and end use intensities, this study’s results are appropriately scaled to reflect the unique characteristics of PNG’s service territory.

- 36.5 Please discuss if there are any key limitations of the applicability of the CPR Market Potential analysis to the specific situation of PNG’s service territory.

Section 44.1(2)(f) of the *Utilities Commission Act* (UCA) states that a long-term resource plan must include:

(f) an explanation of why the demand for energy to be served by the facilities referred to in paragraph (d) and the purchases referred to in paragraph (e) are not planned to be replaced by demand-side measures;

- 36.6 Based on the information filed in the Application, please provide an explanation that satisfies the requirement of section 44.1(2)(f) of the UCA.

H. PORTFOLIO EVALUATION AND PLANNING

- 37.0 Reference: Portfolio Evaluation and Planning
Exhibit B-1, Section 9.4, p. 135; BC Oil and Gas Commission Compliance Assurance**

Protocol – Integrity Management Program (IMP) for Pipelines, p. 4
Integrity Management Program

On page 135 of Application, PNG states:

PNG's System Betterment/General Plant capital plans are driven primarily by PNG's asset risk management process and regulatory compliance requirements. PNG has embarked on a sequence of activities to assess the integrity of the PNG-West and Tumbler Ridge transmission systems over the next five years and will be addressed in either future rate applications or CPCN applications. These include:

- Electromagnetic Acoustic Technology (EMAT) tool runs to help PNG determine whether instances of Stress Corrosion Cracking (SCC), known for catastrophic pipeline failures in industry incidents, exist on PNG's transmission systems.
- Pipeline Cut Outs: With increased EMAT tool runs, PNG expects to identify additional segments of pipe to be cut out and replaced.
- Salvus to Galloway Remediation: Repair of sections of the Prince Rupert eight inch pipeline traversing treacherous mountainous terrain in environmentally sensitive areas between Salvus and Galloway.
- New Pig Barrels: Three new pig receiving barrels are required on the PNG-West and Tumbler Ridge transmission systems in order to properly inspect segments of high-pressure pipeline.

- 37.1 Please elaborate on the rationale for conducting the activities listed in the above preamble, including a description PNG's risk management process, risk assessments conducted and relevant regulatory compliance requirements, including any existing compliance concerns.
- 37.2 Please explain the urgency and prioritization of each activity, when the activity is planned to be undertaken, and the scope and anticipated cost of each activity.

On page 4 of the BC Oil and Gas Commission Compliance Assurance Protocol – Integrity Management Program (IMP) for Pipelines states: ¹

As required by the BC Oil and Gas Commission (Commission) under Section 7 of the Pipeline Regulation (PR), every permit holder planning, designing, constructing, operating, maintaining or abandoning pipeline infrastructure within the province of British Columbia must have a fully developed and implemented IMP. To facilitate compliance assurance, all permit holders must act in accordance with the most current version of the CSA Z662 standard.

- 37.3 Please confirm, or otherwise explain, that PNG has a fully developed and implemented IMP, which is compliant with the most current version of the CSA Z662 standard.
- 37.4 Please confirm, or otherwise explain, that PNG has identified and assessed all potential hazards that can lead to failure or external interference incidents during operation of its transmission pipelines.
- 37.5 Please discuss whether there are any potential hazards on PNG's transmission pipelines that could be an integrity or compliance concern but are not addressed in PNG's System Betterment/General Plant capital plan.

¹ [BC Oil and Gas Commission Compliance Assurance Protocol](#)

**38.0 Reference: Portfolio Evaluation and Planning
Exhibit B-1, Section 9.4, p. 134; BCUC Resource Planning Guidelines, p. 4
Resource Portfolios – Identification of supply and demand resources**

On page 134 of the Application, 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.

Section 3 of the BCUC's Resource Planning Guidelines requires the identification of supply and demand resources.

- 38.1 Please identify the supply and demand resources for both PNG-West and PNG(N.E.). Please include a list of the feasible individual supply and demand resources, both committed and potential.²
- 38.2 Please discuss the requirements PNG considers necessary to complete a resource portfolio evaluation with respect to RNG supply.

**39.0 Reference: Portfolio Evaluation and Planning
Exhibit B-1, Section 9.4, p. 134; BCUC Resource Planning Guidelines, p. 4
Resource Portfolios – Measurement of supply and demand resources**

Section 4 of the BCUC's Resource Planning Guidelines requires a measurement of the supply and demand resources.

- 39.1 For both PNG-West and PNG(N.E.), please provide a measurement of the supply and demand resources. In your response, please address the following:
- (i) Measurement of each supply-side and demand-side resource against the objectives established in section 1.4 of the Application, to include utility and customer costs (life cycle costs, impact on rates, etc.), associated risks, and lost opportunities;
 - (ii) Characterization of the feasible supply and demand resources, discussing how the resources perform relative to specific social and environmental objectives; and
 - (iii) Cost estimate for the supply and demand resources, representing the full costs of achieving a given magnitude of the resource. The cost estimates may be represented as supply curves.

**40.0 Reference: Portfolio Evaluation and Planning
Exhibit B-1, pp. 54–55, 58; Section 9.4, p. 134; BCUC Resource Planning Guidelines, p. 4
Resource Portfolios – Evaluation and selection of resource portfolios**

On pages 54 and 55 of the Application, PNG states:

As production shifts westward in western Canada to access the sources richer in condensate and NGLs, pipeline capacity has not kept pace with production. Additional

² Individual resources are defined as indivisible investments or actions by the utility to modify energy and/or capacity supply, or modify (decrease, shift, increase) energy and/or capacity demand.

pipeline capacity is being constructed in those areas. The construction can cause interruptions to existing pipeline capacity resulting in periods when some gas in western Canada is sold at very low or even negative prices to find a market.

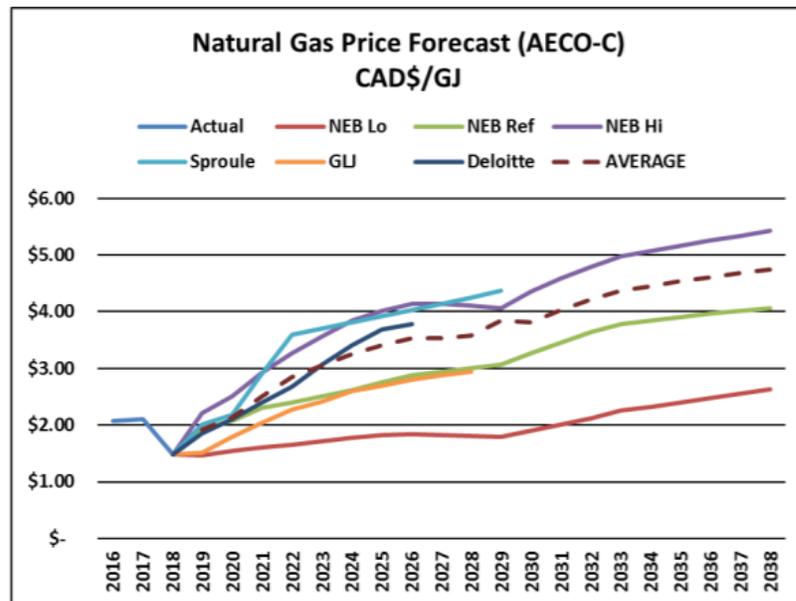
[T]he startup of LNG Canada's export project on B.C.'s West Coast, expected in 2025, should help clear the western Canadian natural gas market and help balance out supply and demand. This is expected to positively affect the price of AECO-C. The AECO-C price is projected to gradually increase to \$2.10/GJ by 2020, and reach \$3.80/GJ by 2028.

Due to the continued depressed pricing in western Canada and specifically at Station #2, the liquidity for term gas supply has decreased. Many producers have scaled back their drilling programs for the upcoming gas year and some production has already been shut in. In addition, the pending completion of the North Montney Mainline, will further reduce the gas supply on the Westcoast system. The forward pricing at Station #2 has strengthened relative to AECO as a result. PNG anticipates this trend to continue until pricing increases and new supplies start to come on the system.

On page 58 of the Application, PNG states:

PNG purchases almost all of its gas supply at Westcoast Stn 2, with approximately half of the gas supply priced off of the AECO near month index, and the remainder at the daily price at Stn 2. Despite periodic capacity constraints on Westcoast T-South that depress prices at Station 2, over the long term, the prices at Station 2 are expected to follow those at AECO. 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.

Figure 11: AECO-C Natural Gas Price Forecasts



On page 134 of the Application, PNG states:

The purpose of preparing this Consolidated Resource Plan was to determine whether any actions are required at this time and over the foreseeable future with respect to supply side system capacity additions or the implementation of ECI programs. 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.

Section 6 of the BCUC's Resource Planning Guidelines requires an evaluation and selection of resource portfolios.

- 40.1 Please explain why PNG did not provide an evaluation and selection of resource portfolios in the Application, as set out in the Resource Planning Guidelines.
- 40.2 Please explain how the BCUC could determine that the Long-Term Resource Plan is in the public interest without development, analysis and selection of a resource portfolio.
- 40.3 In the absence of a resource portfolio, please discuss how PNG is prepared and mitigates against exogenous supply-side risks. In your answer, please discuss the effects of the decline in station 2 prices and resultant liquidity, the economics of new gas production and supply, pipeline capacity, and market events, such as a pipeline failure.
- 40.4 Please update Figure 11 to include Station 2 prices, based on the same NEB and industry forecasts.
- 40.5 For each of the gross demand forecasts developed for PNG-West and PNG(N.E.), please assess the set of alternative resource portfolios that match the forecast against the objectives outlines in Section 1.4 of the Application. In your response please provide:
 - i. an analysis of the trade-offs between the portfolios;
 - ii. a description of how the portfolios perform under uncertainty;
 - iii. an identification of the portfolio that performs best relative to the stated objectives; and
 - iv. the selection of a set of preferred resource portfolios, with each portfolio matching one of the gross demand forecasts.

**41.0 Reference: Portfolio Evaluation and Planning
Exhibit B-1, Section 9.4, p. 134; BCUC Resource Planning Guidelines, p. 5
Resource Portfolios – Development of an action plan**

Section 7 of the BCUC's Resource Planning Guidelines requires the development of an action plan.

- 41.1 Please provide PNG's an action plan for both PNG-West and PNG(N.E.), based on the evaluation and selection of resource portfolios. Please include:
 - (i) the detailed acquisition steps for those resources (from the selected resource portfolio) which need to be initiated over the next four years in order to meet the most likely gross demand forecast;
 - (ii) contingency plans, specifying how PNG would respond to changes in circumstances, such as changes in loads, market conditions or technology and resource options; and

- (iii) For resources with considerable uncertainty, the action plan should incorporate an experimental design and monitoring plan to allow for hindsight evaluation of associated market impacts and full resource costs.

I. ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING

42.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING Exhibit B-1, Appendix F, p. 43 Demand-Side Measures Regulation B.C. Reg. 117/2017 (DSM Regulation), section 3(1) Adequacy Measures

On page 43 of the DSM Plan, PNG outlines the budget for “General Conservation Education and Outreach”, which includes a program titled “Codes and Standards.”

Section 3(1)(E) of the DSM Regulation specifies that a public utility's plan portfolio is adequate for the purposes of section 44.1 (8) (c) of the Act only if the plan portfolio includes:

one or more demand-side measures to provide resources as set out in paragraph (e) of the definition of "specified demand-side measure", representing no less than

- (i) an average of 1% of the public utility's plan portfolio's expenditures per year over the portfolio's period of expenditures, or
- (ii) an average of \$2 million per year over the portfolio's period of expenditures;
[*Emphasis added*]

Paragraph (e) of the definition of specified demand-side measure reads:

financial or other resources provided

(i) to a standards-making body to support the development of standards respecting energy conservation or the efficient use of energy, or

(ii) to a government or regulatory body to support the development of or compliance with a specified standard or a measure respecting energy conservation or the efficient use of energy in the Province. [*Emphasis added*]

42.1 Please discuss if PNG’s “Codes and Standards” program, or elsewhere in the DSM Plan, includes a measure(s) that provides financial or other resources to the relevant bodies and for the purposes set out in paragraph (e) of the definition of specified demand-side measure.

42.1.1 Please confirm, or explain otherwise, that this measure(s) represents an average of at least 1% of PNG’s portfolio expenditures per year over the 2020 to 2022 period.

43.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING Exhibit B-1, Cover Letter, p. 3; PNG 2015 Conservation and Energy Management (CEM) proceeding, Exhibit B-1, p. 11 Approvals sought for flexibility in transferring DSM funds

PNG states on page 3 of the Cover Letter:

In addition, PNG requests that the BCUC grant approval allowing PNG flexibility in the reallocation of expenditures amongst ECI programs and between program years, subject to the

total amount spent by PNG on ECI activities between the date of approval and 2022 not exceeding the total amount of \$2,278,000 sought in this Application, unless otherwise approved by the BCUC. PNG proposes to continue the program funding transfer rules that were approved under Order G-121-19.

PNG's funding transfer rules, which were set out in the 2015 CEM application and originally approved by Order G-115-15A are repeated below:

- Funding transfers under 25 percent from one approved Program Area to another approved Program Area would be permitted without prior approval of the Commission.
- In cases where a proposed transfer out of an approved Program Area is greater than 25 percent of that approved Program Area, prior Commission approval would be required.
- In cases where a proposed transfer into an approved Program Area is greater than 25 percent of that approved Program Area, prior Commission approval would be required.
- Further, in the event that PNG spends more or less than the full approved amount for a particular year, PNG also seeks approval to have the difference allocated to the DSM program spending in the following year, subject to the total expenditures by PNG on DSM activities between the date of approval and 2018 not exceeding the total amount sought in this Application, unless otherwise approved by the Commission. (2015 CEM application, p. 11)

43.1 Please confirm, or explain otherwise, that PNG is requesting a change to the funding transfer rules approved by G-115-15A, to provide additional flexibility regarding DSM expenditures

43.1.1 If confirmed, please discuss the reasons for PNG requesting a change to the approved transfer rules.

**44.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, Tables 6, 7, 8, pp. 27–29
DSM Expenditure to date**

Tables 6, 7 and 8 of Appendix F present actual and forecast expenditures on PNG's Residential, Commercial, and Conservation Education and Outreach Program Areas from 2016-2022, including actual and forecast applicants for the commercial and residential programs.

44.1 Please provide updated versions of Tables 6, 7 and 8 showing 2019 actual expenditures for the existing programs.

44.2 Please provide updated versions of Tables 6 and 7, showing actual applicants in 2019 for the existing residential and commercial programs respectively.

**45.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, p. 132; Appendix F, p. 13; Table 20; Appendix F, Table 20, p. 43
Level of awareness of DSM programs**

Page 13 of Appendix F states:

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.

Table 20 of Appendix F presents the overall budget for General Conservation and Outreach:

Table 20: Budget – General Conservation Education and Outreach

Conservation Education and Outreach	2016	2017	2018	2019	2020	2021	2022	Total
	(Act)	(Act)	(Act)	(F/C)	(F/C)	(F/C)	(F/C)	(F/C)
K-12 Conservation Education and Outreach	\$ 6,570	\$ 24,774	\$ 26,445	\$ 39,983	\$ 60,000	\$ 60,000	\$ 60,000	\$ 277,772
Post-Secondary Conservation Education and Outreach				\$ 24,000	\$ 24,000	\$ 31,700	\$ 31,700	\$ 111,400
General Conservation Education & Outreach		\$ 4,838	\$ 15,040	\$ 85,800	\$ 33,500	\$ 115,900	\$ 92,900	\$ 347,978
Codes and Standards Support				\$ 14,052	\$ 10,000	\$ 10,000	\$ 10,000	\$ 44,052
Innovation				\$ 35,000	\$ 35,000	\$ 50,000	\$ 50,000	\$ 170,000
Enabling Activities	\$ 202,770	\$ 28,668	\$ 62,985	\$ 6,000	\$ 6,000	\$ 10,000	\$ 60,000	\$ 376,423

On page 132 of the Application PNG states it has increased the budget for marketing all programs to its customers and increased the level of activity of its Conservation Education and Outreach (CEO) activities.

- 45.1 Please elaborate on the reason(s) for the changes in proposed expenditure between years during the test period in the General Conservation Education & Outreach line item, as shown in Table 20.
- 45.2 Given the low levels of awareness identified in the 2019 Customer Survey despite expenditure on general outreach between 2017 and 2019, what steps is PNG taking to ensure that the funds are targeted more effectively in the test period, and that the number of participants is maximized? Please elaborate.
- 45.3 Other than increased expenditure, please explain in more detail what PNG is doing to ensure that its outreach activities result in an increase in DSM awareness.

On page 41 of Appendix F, PNG states: “Owing to the success of Energy is Awesome, PNG proposes to increase investment in the program by refreshing materials and applying PNG’s brand, working with NEAT to keep staff and students engaged, and increasing outreach to students’ parents.”

- 45.4 Please explain what methodology PNG is using to determine the success of the Energy is Awesome K-12 outreach, and of all outreach in general.

46.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING Exhibit B-1, Appendix F, p. 40; PNG and PNG(N.E.) Energy Conservation and Innovation Program Funding Application proceeding, Exhibit B-2, BCUC Information Request (IR) 4.2 Free-ridership and spillover assumptions

In response to BCUC IR 4.2 in the PNG and PNG(N.E.) Energy Conservation and Innovation Program Funding Application 2019 PNG ECI proceeding, PNG stated that:

With the exception of the Low Income programs (ESK and ECAP) that are operated by BC Hydro on PNG’s behalf, PNG has adopted all of the free ridership and spillover rates used by FEI in determining the cost effectiveness of their DSM programs in their 2019-2022 DSM Expenditures Plan that has been accepted by the BCUC by way of Order G-10-19.

PNG has adopted BC Hydro’s free ridership and spillover rates applicable to its ESK and

ECAP programs as presented in its Fiscal 2017 – 2019 Revenue Requirements Application (Section 5.3, Appendix V – Demand Side Management Initiatives Descriptions).

On page 40 of Appendix F, PNG states that as a change from analyses presented in PNG’s 2019 –2020 ECI Program Funding Application, the free ridership rate for the Commercial Efficient Kitchen Program has been reduced from 20 to zero percent to reflect the low participation to date.

- 46.1 Please confirm, or explain otherwise, that the remaining free-rider and spillover assumptions for each of the existing ECI programs remain unchanged to assumptions those in FEI’s 2019-2022 DSM Expenditures Plan.
- 46.2 Please provide all relevant sources for the free-rider and spillover assumptions used for the proposed new Residential Efficient Heating program, and the Commercial HVAC Controls program.

**47.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, p. 33; Table 14, p. 35; Demand-Side Measures Regulation B.C. Reg. 117/2017 (DSM Regulation, section 3(1.8))
Proposed Residential Efficient Heating Program**

Under Section 3(1.8) of the DSM Regulation, the BCUC may determine that a demand-side measures, excluding certain types as specified in the regulation, is not cost-effective if the measure would not be considered cost-effective under the utility cost test.

On page 33 of Appendix F, table 11 shows that the proposed Residential Efficient Heating Program has a TRC of 0.42, an mTRC of 2.53, and a UCT of 0.35.

Table 14 summarizes the Residential programs including non-program specific expenditures, the total number of participants, and the expected annual energy savings.

Table 14: Budget – Residential Program Area

Residential Program Summary							
Program	Forecast Participant	Forecast Expenditures			Cumulative Annual Savings (GJ)		
		2020	2021	2022	2020	2021	2022
Efficient Heating	400	\$ 193,700	\$ 188,700	\$ 188,700	1,224	3,672	6,120
Energy Conservation Assistance Program	100	\$ 48,500	\$ 48,500	\$ 48,500	1,100	1,833	2,566
Energy Saving Kits	381	\$ 12,900	\$ 12,900	\$ 12,900	4,054	5,083	6,111
Total	881	\$ 255,100	\$ 250,100	\$ 250,100	6,378	10,587	14,797

Using the information in Table 14 BCUC staff calculate the proposed Residential Efficient Heating Program to account for 75.7% of the proposed residential budget over the test period.

- 47.1 Please discuss how PNG determined the annual budget for each of the residential programs.
 - 47.1.1 Please discuss how PNG views the UCT results, and how they are used to inform the development of PNG’s ECI program.

**48.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, Section 10, p. 36
Commercial HVAC Controls program**

On page 36 of Appendix F PNG states:

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.

PNG estimates HVAC system upgrade costs an average of \$2/m² of floor space. PNG proposes to fund \$1/m². PNG proposes to initially target five percent of commercial floor space (180,000m²) per year and plans to focus on public sector buildings.

- 48.1 Please confirm if there is a maximum dollar value on the total HVAC cost allowed or a maximum dollar value on the total incentive amount available per applicant.
- 48.2 Please discuss what steps PNG intends to take to verify the incentive claims made by individual contractors.

**49.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, pp. 37–38
Change in incentives for Commercial Efficient Boilers program**

PNG states on pages 37–38 of Appendix F:

Since April 2017, PNG has offered qualifying commercial customers incentives of up to \$2,700 towards the purchase and installation of ENERGY STAR® certified natural gas fired boilers sized up to 299 MBH, in order to replace their existing, low efficiency boilers. PNG proposes to increase the eligible boiler size to 1,500 MBH and provide incentives up to a maximum of \$11,000.

This proposed program change comes after a jurisdictional scan and customer analysis that determined that most replacement boilers purchased in PNG’s service territory have capacities in the range of 500-1500 MBH. The incentive level was found to be consistent with other jurisdictions and therefore remains unchanged at \$9/MBH.

- 49.1 Please discuss, in PNG’s view, to what extent the eligible boiler size was a key factor in the low uptake to date. Please include a discussion of what customer analysis was undertaken to support this change.
 - 49.1.1 Is PNG aware of any other barriers to participation that could be affecting participation, other than low awareness.
- 49.2 Please confirm, or otherwise explain, that the amount of incentive available to each applicant is capped at \$9/MBH.

PNG also proposes allowing housing providers that are local government, societies (as defined in section 1 of the *Societies Act* other than a member-funded society as defined in section 190 of that Act, or an association as defined in section 1 (1) of the *Cooperative Association Act*), and the governing body of a First Nation access to a higher incentive of \$15/MBH. This proposed program change comes in response to feedback received from BC Housing and the BC Not for Profit Housing Association.

- 49.3 Please discuss how this level of incentive compares to other jurisdictions.

**50.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, p. 131, Appendix F, p. 21
Portfolio balance and Industrial DSM**

PNG states on page 21 of Appendix F:

PNG acknowledges that the industrial sector is also an underserved market in the PNG service territory but notes that commercial rebates are also available to industrial customers. Industrial customers account for < 0.05 percent of PNG customers and represent 18 percent of the natural gas demand.

PNG states on page 131 of the Application:

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.

- 50.1 Please discuss what work PNG has undertaken regarding any possible DSM measures targeted at the industrial sector, including any discussions with industrial customers to date.
- 50.2 Please confirm, or explain otherwise, that the CPR indicates that there are cost-effective measures that could be applicable to industrial customers.
 - 50.2.1 Please explain why there is "limited opportunity" to offer incentives to industrial customers.
- 50.3 Please clarify whether the offerings in the ECI Commercial program are suitable for most of PNG's industrial customers. Why or why not?

**51.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, pp. 8, 30; Table 21, p. 44
Evaluation, Monitoring and Verification (EM&V)**

PNG states on page 30 of Appendix F: "PNG anticipates having sufficient uptake in the Residential program area to justify an EM&V review in 2022. An EM&V review of the Commercial program area is expected after 2022, once participation increases."

Table 21 on page 44 of Appendix F includes the following note next to the Enabling line-item: *2020 includes Portfolio EM&V.

- 51.1 Please confirm if the Portfolio EM&V activities will be occurring in 2020 or 2022.

On page 8 of Appendix F, PNG lists the various implementation partners involved in delivering its ECI program.

- 51.2 What preparatory work is PNG undertaking to ensure that an EM&V review can be successfully completed in 2022, particularly in light of the use of multiple 3rd party implementers?

**52.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, pp. 11, 33
PNG ECI Program Market Intelligence**

PNG’s states on page 11 of Appendix F:

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.

On page 33, PNG states: “As a cost-effective way to get significant energy savings through the [Energy Conservation Assistance Program] ECAP, PNG proposes to add a smart thermostat offer to the bundle of measures currently being installed.”

52.1 Please confirm if ECAP applicants will also be offered the furnace tune-up. If not, please explain why not.

52.2 Please confirm if Energy Saving Kit (ESK) applicants will be offered either the programmable thermostat or furnace tune up. If not, please explain why not.

**53.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING
Exhibit B-1, Appendix F, pp. 28–29, 44
Enabling Costs**

Table 21 on page 44 of Appendix F provides the allocation to individual programs in accordance with the methodology approved under G-121-19.

Table 21: Enabling Activities Allocation Factors.

	2019		2020		2021		2022	
	%	\$	%	\$	%	\$	%	\$
Efficient Heating	0.0%	\$ -	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
ECAP	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
ESK	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
HVAC Controls	0.0%	\$ -	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
Efficient Boiler	22.5%	\$ 13,500	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
Efficient Water Heating	22.5%	\$ 13,500	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
Efficient Kitchens	22.5%	\$ 13,500	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
CEO - K-12	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -	0.0%	\$ -
CEO - Post Secondary	0.0%	\$ -	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
CEO - General	22.5%	\$ 13,500	12.9%	\$ 7,714	12.9%	\$ 12,857	12.9%	\$ 12,857
Enabling*	10.0%	\$ 6,000	10.0%	\$ 6,000	10.0%	\$ 10,000	10.0%	\$ 60,000
Total	100.0%	\$ 60,000	100.0%	\$ 60,000	100.0%	\$100,000	100.0%	\$150,000

*2020 includes Portfolio EM&V.

53.1 Please provide an itemized breakdown of the enabling activities which the make up the total expenditure shown in Table 21, including, but not limited to: resources required, number of FTE’s and associated costs.

In a note below Table 7 on page 28, and Table 8 on page 29 of Appendix F, PNG notes that the 2019 and 2020 Approved Expenditures have been adjusted for enabling costs that were previously allocated to the rejected Residential Furnace program.

- 53.2 Please explain how PNG has adjusted the 2019 and 2020 approved expenditures for each Program identified in tables 7 and 8 to account for the costs previously allocated to the Residential Furnace Program.
- 53.3 Please discuss the pros and cons of continuing with PNG's current percentage-based method for allocating enabling costs.
 - 53.3.1 Has PNG considered any alternative methods of allocating enabling costs? If so, please discuss the pros and cons of the alternative method and why this method has been considered.
 - 53.3.2 Please provide a comparison of each method for allocating enabling costs, including their application and impacts on program expenditures.

54.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING Exhibit B-1, Appendix F, Table 5, p. 26, 39; PNG and PNG(N.E.) Energy Conservation and Innovation Program Funding Application proceeding, Exhibit B-1, Table 3, pp. 12, 19 Updates to the Cost-Benefit Model

Table 5 on page 26 of Appendix F provides updated assumptions of the PNG Cost Effectiveness Model (PCEM) for 2019, including updated assumptions for the cost of gas and carbon tax relative to the information provided in Table 3 on page 12 of the of the PNG and PNG(N.E.) Energy Conservation and Innovation Program Funding Application.

PNG states on page 39 of Appendix F that no changes are proposed for the Commercial Efficient Water Heater program, and reports a mTRC of 1.69.

On page 19 of the PNG and PNG(N.E.) Energy Conservation and Innovation Program Funding Application, PNG reported a mTRC of 1.32 for the Commercial Efficient Water Heater program.

- 54.1 Please discuss the reasons for any changes to the reported cost-benefit ratios, and to what extent the updated PCEM assumptions account for the change in reported cost-benefit values.

55.0 Reference: ENERGY CONSERVATION AND INNOVATION PORTFOLIO FUNDING Exhibit B-1, Appendix F 2019 DSM Plan, p. 45, footnote 7 Incomplete footnote

Footnote 7 at the end of the paragraph dealing with the alignment of the ECI Portfolio with BC's Energy Objectives on page 45 appears to be incomplete.

- 55.1 Please provide the complete footnote.