YCS-YECL-1

Issue/Sub-Issue: "reduce environmental impacts…"

Request:

(a) Please describe how "ATCO Electric Yukon is committed to working with governments, First Nation communities and customers to reduce the environmental impact of power generation in the Yukon." (12-1 lines 20-22) Thank you for sharing specific examples and broad company objectives.

(b) Please describe what ATCO Electric Yukon understands the environmental impact of power generation to be.

(c) Please explain whether ATCO Electric Yukon believes that its fossil fuel substitution of LNG for diesel will reduce the environmental impact of power generation in the Yukon.

Response:

(a) AEY, along with the ATCO Group of companies, is actively engaged with various levels of governments to collaboratively develop policies that reduce the use of fossil fuels, (eg. Specified Gas Emitters Regulation in Alberta and Yukon Independent Power Producer Policy), engaged with Indigenous Communities as evidenced by our more than 40 joint ventures partnerships (including with Denendeh Investments Incorporated's ownership in Northland Utilities and Pikanni First Nation's ownership in Oldman River Hydro Project) as well as interactions with our customers regarding on-site renewable solutions (eg. Micro-generation in Yukon and Net Metering in NWT).

(b) AEY understands that all forms of power generation have environmental impacts. Some generation technologies have impacts that cover great geographical areas whereas others are more site specific. The degree of environmental impact is subject to much interpretation by individuals. It is AEY's belief that generally, customer's expectations are to reduce the use of fossil fuels as much as possible but this expectation must be balanced against the expectations of reliable supply and cost competitiveness.

(c) As discussed in JM-AEY-23 it is not only the environmental impact of a project that is taken into consideration. It is AEY's objective to provide reliable, cost effective generation for our customers. The substitution of LNG for diesel fuel in Watson Lake provides reliable power at a lower price with comparable environmental impacts.

YCS-YECL-2

Issue/Sub-Issue: "eliminate dependence on diesel… with renewable clean energy."

"Prime Minister Justin Trudeau and the provincial and territorial Premiers announced they would take action to eliminate the dependence on diesel in Indigenous, remote and northern communities with renewable, clean energy." (12-1 lines 13-16)

Request:

(a) How does ATCO Electric Yukon believe that a significant investment ($5 million for two phases in Watson Lake) in infrastructure to burn another fossil fuel, LNG, with diesel helps meet or support the objective to eliminate the dependence on diesel in remote communities with renewable, clean energy?

(b) Does ATCO Electric Yukon consider LNG to be renewable and/or clean energy?

(c) What other strategies, programs or technologies has ATCO Electric Yukon proposed or implemented to reduce the environmental, climate and financial costs of burning diesel in off grid communities in the last ten years including efforts to reduce demand such as LED streetlights?

(d) Because fossil fuel consumption is problematic for many reasons, presumably the First Ministers were not only referring to electricity generation when they committed to eliminating the dependence on diesel in remote communities. What strategies will ATCO Electric Yukon investigate and employ to replace diesel and other fossil fuels in space heating and transportation with renewable electricity?

(e) Does ATCO Electric Yukon see any market, business and growth potential and value in displacing fossil fuels in the communities it currently serves with diesel?

Response:

(a) AEY is committed to providing reliable, economic and environmentally conscious electricity to our customers. LNG allows for the displacement of baseload diesel consumption with a more economic fuel type. AEY has proposed to conduct renewable and alternative energy studies in each of the fossil powered communities we serve. The intent of which is to displace fossil generation (either diesel or LNG) with renewable generation. However, there will still be a need for baseload generation that intermittent renewable technologies may not be able to economically provide today even with energy storage. It is AEY's belief that

based on currently available technologies there will still be a need for base load generation. Diesel and LNG can provide that baseload energy.

(b) AEY does not consider natural gas to be a renewable form of energy.

(c) AEY has reviewed and completed a number of projects to reduce diesel consumption in the off grid communities. Completed and ongoing projects include the inCharge program for DSM initiatives, improvements to emissions management, proposals to expand utilization of waste heat in power plants and installation of some LED street lights. For 2016 and 2017 AEY is proposing to conduct Renewable and Alternative Energy Studies to identify opportunities to reduce diesel generation in a financially responsible manner as well as pending the Board's Decision, work with the municipalities in our thermal communities on a possible wholesale LED streetlight replacement program.

(d) A potential outcome of AEY's renewable and alternative energy is the identification of projects that can reduce of cost of the electricity generation in our diesel powered communities by introducing renewable and alternative energy. To the extent lower cost renewable or alternative energy can be implemented at a lower cost than current diesel generation, AEY is open to removing the constraint in the rate schedule preventing customers from using electricity to fuel switch for their home heating needs. Customers are able to utilize electricity for their transportation requirements and that will be enhanced if AEY is able to implement renewable energy to reduce the costs of existing diesel generation.

(e) Yes.

YCS-YECL-3

Issue/Sub-Issue: Renewable and Alternative Energy Study

Request:

(a) Please describe how ATCO Electric Yukon defines "renewable energy" and "alternative energy" including the generation sources that it would include in those definitions.

(b) Please provide details of the scope, methodology, timeline and researchers proposed to complete a Renewable and Alternative Energy Study for each of ATCO's off grid communities.

(c) When will the Renewable and Alternative Energy Studies for each of ATCO Electric Yukon's off-grid communities be made available to the public?

(d) What kind of demand side management, load management and fossil fuel displacement technologies will be included in the studies?

(e) What options around energy storage technology will be investigated?

(f) What is ATCO Electric Yukon's perspective on electric thermal storage in its off-grid communities to both maximize integration of intermittent renewables and displace fossil fuels in space heating?

Response:

(a) AEY defines "renewable energy" as generation sources that obtain their fuel from naturally replenishing resources. The term "alternative energy" was intended to capture technologies that increase the efficiency of fossil fuel combustion, such as waste heat recovery and district heating.

(b) AEY has provided the scope for the Renewable and Alternative Energy Study on pages 12-4 to 12-6 in the referenced Section 12. The study is proposed to occur over 2016 and 2017. External expertise will likely be required and a competitive process to select an appropriate consultant(s) may be conducted. Proposed methodology will be evaluated during the competitive process.

(c) The results of the study will be made available during the next Yukon Utilities Board application.

(d) There will no demand side management or load management initiatives included in the renewables and alternative energy studies. The purpose of the study is fossil fuel displacement. Please refer to Page 11.7 of the Application for demand side management initiatives.

(e) Proven storage technologies will be considered, such as batteries and flywheels.

(f) Electric thermal storage is a potential solution in communities with a high penetration level of non-dispatchable generation. All solutions will be reviewed to ensure they are economically viable. An important economic consideration is that each energy conversion (eg. electric to thermal energy) introduces additional losses into the system; losses which have a cost.

YCS-YECL-4

Issue/Sub-Issue: LNG Boil Off Gas

Preamble: Appendix 3 page 2 reads:

"Without refrigeration, LNG naturally begins to vaporize over time as it slowly gains energy from the ambient atmosphere, making long term storage expensive. Continuous operation mitigates the challenge of long term storage, as the LNG is consistently drawn down and replenished, keeping the system cool. The addition of another LNG storage tank will ensure there is sufficient onsite storage of fuel during operations in Phase 2 and an offload pump will be necessary to increase the speed of transfer of the LNG from the shipper to the storage tanks."

Request:

(a) Please explain what will happen with LNG storage issues when ATCO or an IPP develops renewable energy for Watson Lake, and the existing diesel and proposed LNG/diesel generating facility becomes backup, not baseload.

Even if the supply of LNG will be consistently drawn down and replenished for continuous baseload generation, boil off gas in the LNG tanks will result.

(b) What volume of boil off gas does ATCO Electric Yukon predict will result from LNG storage?

(c) What is ATCO Electric Yukon's plan for utilization of boil off gas?

(d) Can boil off gas be burned in the modified generators, or will a different end use need to be established as is the case at Yukon Energy's LNG plant?

Response:

(a) AEY is of the opinion that base load fossil fuel generation will continue to be necessary in the near term even with the development of renewable energy and energy storage. The decision to burn LNG or diesel will be determined based on the relative costs associated with the two fuels.

The boil off gas resultant from LNG storage is natural gas. All natural gas will be consumed in the Bi-Fuel generating units. If circumstances arise where LNG is

no longer cost effective, the LNG system will be depleted of natural gas and shutdown and diesel would be consumed to supplement renewables and/or storage.

(b) The system is designed to direct all boil off gas to the BiFuel generation units for consumption. The boil off gas will comingle with the vaporized LNG (now in gaseous form) in the Vaporization Skid. As boil off LNG (natural gas) is identical to vaporized LNG (natural gas), the volume of natural gas consumed will be directly proportional to the volume of LNG that enters the LNG storage tank.

(c) Please refer to responses (a) and (b) above.

(d) Please refer to responses (a) and (b) above.

YCS-YECL-5

Issue/Sub-Issue: Renewable energy v. fossil fuel generation

Request:

(a) What would be ATCO Electric Yukon's motivation or reason for developing renewable energy once significant investments in LNG modifications and infrastructure at diesel generating stations are made in Watson Lake and/or other off-grid communities?

(b) How does ATCO Electric Yukon currently participate in the development of renewable energy in off grid communities?

(c) How does or will ATCO Electric Yukon fit renewable energy development into its business plan when it is part of the ATCO Group of Companies that is largely in the business of natural gas transmission, distribution and infrastructure development, not renewable energy development?

(d) What assurances do Yukon people have that ATCO will support the goals and desires of governments and communities to displace fossil fuel electricity generation, and build renewable energy generation (or support IPPs to do so)?

> "Business Drivers and Benefits
> Meeting Federal and Yukon Goals
>
> The Federal and Yukon governments have indicated a strong desire to reduce or eliminate dependence on diesel fuel in northern and remote communities. The implementation of the Watson Lake Bi-Fuel meets this goal while allowing for future renewable power generation." (Appendix 3 page 7)

(e) Please explain how ATCO believes that investment in LNG/diesel generation will allow for future renewable power generation, not be a barrier to it.

> "LNG is currently transported through the Yukon for power generation by Yukon Energy Corporation in Whitehorse and the Northwest Territories Power Corporation in Inuvik. Increasing the volume of consumption could offer further advantages to customers through economies of scale." (Appendix 3 page 8)

(f) Please explain what is meant by further advantages of increasing the volume of consumption of LNG through economies of scale.

(g) In ATCO Electric Yukon's Business Case Appendix 3, Evaluation of Viable Alternatives, only status quo or fossil fuel options are described. Please explain why no renewable energy options to reduce diesel reliance are discussed.

Response:

(a) Please refer to AEY's response to YCS-YECL-2(a).

(b) Through legislation, AEY has the obligation to serve the generation and electricity distribution needs in all of the off-grid communities we serve. In October 2015, the Yukon government introduced an IPP Policy with a goal to having it finalized by October 2016. This Policy is intended to allow for IPP's to provide some of the electrical generation in these off-grid communities. AEY would provide the balance of the generation and all system stability requirements.

(c) Although the ATCO Group of Companies is involved in the business of natural gas transmission, distribution and infrastructure development, it is also involved in power generation. It is well known that Canada and many other parts of the world desire to transition from fossil fuel based electricity generation to renewable sources of electricity. The ATCO Group of Companies, including AEY, are committed to meeting the renewable energy needs of its customers.

(d) It is not just a goal of the ATCO Group of Companies to transition to renewable sources of electricity generation but one shared by the Federal and Territorial governments. Much discussion and effort is being put into policies that either strongly encourage, or mandate the transition away from fossil fuel based electricity generation. ATCO has not only been a part of the development of these policies but is also committed to meeting or exceeding them. In the Yukon, AEY is working with the Yukon Government, Yukon Energy and Yukon Development Corporation to further the IPP Policy which allows for the displacement of fossil fuel with renewable energy in those communities served by thermal generation in AEY's service area. As well, AEY has been engaged with customers and the Yukon Government to implement the Micro Generation policy which allows for customer based solar generation.

(e) Please refer to AEY's response to YCS-YECL-2(a).

(f) Please refer to AEY's response to UCG-AEY-53(a).

(g) Renewable and alternative energy options will be considered as part of AEY's Renewable and Alternative Energy study. It is AEY's view that in the near term,

intermittent renewable energy could provide supplemental energy to existing fossil powered grids, not baseload, even with energy storage. In AEY's renewable and alternative energy study, external experts will provide insight into the most cost effective renewable energy integration into the existing fossil fuel based grids. Further, the cost of displacing 50% diesel fuel with renewable energy and storage is not yet well understood and therefore was not included as an alternative at this time. Only near term options for replacing baseload power were considered. AEY is committed to looking at solutions to displace the fuel requirements for baseload energy. However, at this time, the only viable baseload options for Watson Lake appear to be diesel or LNG.

YCS-YECL-6

Issue/Sub-Issue: LNG/methane/natural gas infrastructure creep

Requests:

(a) What is ATCO's plan for LNG in other communities it currently serves by burning diesel?

(b) What assurance does the public have that ATCO Electric Yukon and or ATCO Gas will not use the proposed LNG storage tanks in Watson Lake as a starting point to distribute natural gas?

(c) Does ATCO Electric Yukon or ATCO Gas have plans or intentions to distribute or sell LNG or natural gas in the community of Watson Lake or other Yukon communities for purposes other than electricity generation?

Response:

(a) Please refer to AEY's response CW-YECL-3(g).

(b) The LNG Storage tanks for the Watson Lake Bi-Fuel Project do not have the capacity to supply or distribute natural gas to any other recipient besides the generating units at the Watson Lake power plant.

(c) Please refer to the response to (b).

YCS-YECL-7

Issue/Sub-Issue: Air emissions monitoring

Air emissions from burning diesel with LNG will be different from those resulting from burning exclusively diesel.

Request:

(a) Please describe the air emissions monitoring system and program (including technology, reporting and costs) that ATCO will have in place for Phase 1 Watson Lake Bi-Fuel Project.

Response:

(a) In 2013, the Yukon Environmental and Socio-economic Assessment Board ("YESAB") provided AEY with conditional approval for Phase 1. Prior to providing a permit for Phase 2, YESAB has requested emissions testing of Phase 1. The precise emissions requirements have not been specified; this will require a discussion with regulators following the test results of Phase 1. Estimated costs for emissions monitoring have been included under Installation and Commissioning in Table 1 of the Watson Lake Bi-Fuel Project business case. These costs are based on reasonably expected emissions monitoring requirements.