

Yukon Energy Corporation (YEC) 2021 BESS Project

Information Requests of YEC
from
John Maissan

Section 3 Project Description

JM-YEC-1-1	<p>Page 3 and 5 Re. new 1.7 km 34.5 kV transmission line:</p> <ul style="list-style-type: none">(a) Has YEC now secured the easements on Crown land?(b) With respect to the portion on or following the ATCO power lines, please outline the results of discussions to date with ATCO Electric Yukon (ATCO).(c) Please provide YEC plans if discussions with ATCO have not resulted in an agreement.
JM-YEC-1-2	<p>Page 3 Re. “grid-sized BESS with 40 MWH of useful energy storage capacity”:</p> <p>Please provide the nameplate storage capacity included in the project budget.</p>
JM-YEC-1-3	<p>Page 4 Re. “...LNG plant – Three units with combined installed capacity of 13.2 MW and dependable capacity of 12.6 MW;”:</p> <ul style="list-style-type: none">(a) Does the 12.6 MW of dependable capacity signify that when the LNG units are base loaded for continuous operation the three-unit plant is operated at 12.6 MW (4.2 MW each)?(b) If not, please indicate the normal base load level for the units when in continuous operation.
JM-YEC-1-4	<p>Page 4 Re. “Mobile / rented diesel units...”:</p> <ul style="list-style-type: none">(a) Do these units have a nameplate capacity of 1.8 MW or is this the normal base load level for continuous operation?(b) If 1.8 MW is the base load for continuous operation, please provide the nameplate (peak) capacity.
JM-YEC-1-5	<p>Page 4 Re. KDFN site lease:</p> <ul style="list-style-type: none">(a) Is 1.5 ha the area of the entire KDFN Category B settlement land parcel?(b) If not, what portion of the entire parcel is this?
JM-YEC-1-6	<p>Page 4 Re. battery container system modules:</p> <ul style="list-style-type: none">(a) Please confirm that the containers will have insulated floors as well as walls and roof.(b) If not confirmed please explain.

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JM-YEC-1-7	<p>Pages 4 and 5 Re. transformer(s) "...(provision for 2 X 20 MW if this level of redundancy is selected).":</p> <ul style="list-style-type: none"> (a) How many transformers are provided for in the project budget? (b) If the answer is one, please explain on what bases and when YEC will decide to procure a second transformer.
JM-YEC-1-8	<p>Page 5 Re. "A competitive procurement process has been initiated to select battery vendors qualified to design a battery able to meet Yukon Energy's operational requirements..."</p> <p>Please provide an update on this procurement process and the present status.</p>
JM-YEC-1-9	<p>Page 5 Re. BESS life of 20 years and "...or capacity augmentation at year ten.":</p> <ul style="list-style-type: none"> (a) If the "typical year" number of cycles are experienced would YEC extend the project life to 25 or 30 years? (b) In battery systems it is typically not recommended to mix batteries of significantly different ages or use histories. Furthermore lithium-ion battery technology is evolving fairly rapidly, please explain if capacity augmentation at year ten is a realistic option / expectation compared to an overbuild at the outset. (c) Is the future battery augmentation option described provided as a possible means of holding the BESS project on budget by reducing the initial build size if price quotes come in higher than expected?
JM-YEC-1-10	<p>Page 5 Re. "At the end of life, many battery vendors will take back the battery modules...":</p> <ul style="list-style-type: none"> (a) Is this a requirement that YEC is putting in their procurement process for vendors? (b) If not, why not?
JM-YEC-1-11	<p>Page 6 Table 3-1 Re. frequency of use and number of cycles:</p> <ul style="list-style-type: none"> (a) The BESS Use frequency column on the left side of each of the two cases add up to many more cycles (i.e. 165+ for Typical Year case) than the "Total Throughput Useable Cycles" (i.e. 79 for Typical Year case). Please explain how these numbers can be different. (b) The Hatch report (Appendix B at page B-27) indicates that the state of charge for a battery should be between 10% and 90%, does this mean using 10% of the battery capacity 8 times in small cycles is equivalent to one "Total Throughput Useable Cycle"? (c) The author has not heard of the term "Total Throughput Useable Cycles" before, please define this term. Is this a term used only by lithium-ion battery manufacturers to describe / measure the useful lives of their batteries?

JM-YEC-1-12	<p>Pages 6 – 10 Re. BESS N-1 Capacity Reserve use and Other BESS Uses:</p> <ul style="list-style-type: none"> (a) In an N-1 event when the BESS is being used to provide the 7.2 MW of Dependable Capacity all useable energy in the battery appears to be used, in this circumstance are all “Other BESS Uses” excluded? (b) If, as it appears, the N-1 use of BESS excludes all other uses, would the “other uses” be excluded as the YIS system approaches a peak load day to be available for a potential N-1 requirement? (c) If some of the “other uses” can be provided while the N-1 need is being served, which are they? (d) If the BESS is being used for one or more “other uses” when an N-1 event occurs how would the BESS be transitioned to N-1 use and how would 7.2 MW of dependable capacity be provided during that transition time?
JM-YEC-1-13	<p>Page 10 Re. “Operating reserve”:</p> <ul style="list-style-type: none"> (a) Is “operating reserve” the same as what is often referred to as “spinning reserve”? (b) If not please explain the differences.
JM-YEC-1-14	<p>Page 10 Re. Diesel peak shifting:</p> <ul style="list-style-type: none"> (a) Please confirm that LNG peak shifting can and would occur when LNG is being used on the margin in the same manner as described for diesel peak shifting. (b) If not confirmed please explain.
JM-YEC-1-15	<p>Page 10 Re. Diesel peak shifting. To provide a clearer understanding of the use of diesel and LNG for thermal generation and the potential for diesel and / or LNG peak shifting please provide the following:</p> <ul style="list-style-type: none"> (a) For the period January 2019 through February 2021 please provide a table of actual monthly total generation broken down by: hydro, IPP plus micro-generation, LNG thermal, and diesel thermal. (b) For the period January 2020 through 2021 (using GRA forecast generation for March through December 2021) please provide a similar table but using hydro generation figures based on long-term average water availability.
JM-YEC-1-16	<p>Page 10 (and page 23 bottom) Re. Grid reliability and ancillary services:</p> <ul style="list-style-type: none"> (a) Please explain what level of intermittent energy supply can be stabilized by the BESS. Would this be the 40 GWh per year of IPP SOP energy supply, or would it be more related to the capacity of individual projects (e.g. risk of tripping off)? (b) In the absence of a hydro energy surplus, could a surplus of intermittent energy be used to charge the BESS for “other uses”

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	including diesel (or LNG) peak shifting?
JM-YEC-1-17	<p>Page 10 Re. “other uses”:</p> <p>(a) Can all “other BESS uses” be provided at the same time?</p> <p>(b) If they cannot all be provided at the same time please list, for each of the “other uses” which “other uses” can and cannot be provided.</p>
JM-YEC-1-18	<p>Page 11 Re. operating reserve:</p> <p>If the answer to JM-YEC-1-13 is that “operating reserve” is the same as “spinning reserve”, and if spinning reserve is equated to load following [YEC 2017-2018 GRA response to IR JM-YEC-1-19(c)], would not a high (full) state of charge essentially preclude load following which may require charging as well as discharging?</p>
JM-YEC-1-19	<p>Page 11 Re. operating reserve “there are several weeks in winter when no operating reserve benefits can be achieved due to water flow limitations.”</p> <p>Please explain this statement by describing in detail the grid load and generation situation(s) during these weeks.</p>
JM-YEC-1-20	<p>Page 13 Re. Operating reserve “... Based on YEC’s 2021 GRA fuel prices the annual thermal fuel cost savings ... is about \$1.156 million.”</p> <p>(a) What are the current March 2021 (most recent) YEC LNG and diesel prices?</p> <p>(b) What would be the annual savings at the current LNG and diesel prices?</p> <p>(c) If the project is provided with the necessary Part 3 certificates and built, how does YEC propose to measure, record, and track the actual savings?</p>
JM-YEC-1-21	<p>Page 15 Re. Grid Reliability and Ancillary Services “ Yukon Energy is also exploring other options such as BESS use for stabilizing hydro operation during periods of downstream winter ice formation, reducing downstream winter flooding ...”:</p> <p>Would this potential use extend to mitigating Aishihik River downstream impacts as well as for Whitehorse Rapids and Mayo B?</p>
JM-YEC-1-22	<p>Page 16 Re. Project Costs:</p> <p>(a) The text indicates that a 15% contingency is included in the estimate, however the figures in Table 3-4 seem to imply that the 15% contingency was only applied to the Hatch portion of the estimate and no contingency is applied to the YEC portion (Planning Costs and Owner’s costs). Is this what was intended?</p> <p>(b) If no contingency is added to the YEC portion of the cost estimate why not?</p> <p>(c) If, as indicated, the estimate is indeed +/- 30%, is it fair to say that the</p>

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	cost estimate is \$31.7 million +/- \$9.5 million?
JM-YEC-1-23	<p>Page 17 Re. Project Costs Table 3-5 Site Lease:</p> <p>(a) The site lease term is indicated to be 25 years. Does the lease contain an option to extend the lease should the life of the BESS be extended or a BESS replacement at the end of life be contemplated?</p> <p>(b) If not please explain why not.</p>
JM-YEC-1-24	<p>Page 18 Re. Project Costs “in summary...the specified need ...would best be met through development of the project. Compared to the feasible and best alternative available today (i.e., diesel rental) ...”:</p> <p>Please explain why replacement diesels (e.g. standard CAT 3616 4.4 MW diesels) for the three retired Mirrlees generators at the existing Whitehorse Rapids diesel plant, at least two of which have been retired since the LNG plant was completed, is or was not feasible in the same time frame.</p>
JM-YEC-1-25	<p>Pages 20-21 Re. Other Project Planning:</p> <p>Please provide updates on each of these three planning items.</p>
JM-YEC-1-26	<p>Page 22 Re. Summary of Environmental and Socio-economic impacts, “The YESSA assessment has not been initiated at this time.”</p> <p>Please provide an update of the YESSA assessment that is to be filed by March 31.</p>

Section 4 Project Justification

JM-YEC-1-27	<p>Page 24 Yukon Grid Context, “Seasonal generation constraints also present additional challenges to the YIS. Electricity demand on the YIS is highly variable with seasonal mismatch between the timing of maximum available electricity production from renewable generation ...The result is surplus renewable generation during the summer (which cannot be sold to other jurisdictions) and reliance on thermal generation to supply peak load requirements during winter.”</p> <p>(a) Please confirm that there are SCADA connected secondary sales customers (e.g. the Canada Games Centre) that are able and willing to buy surplus energy when available.</p> <p>(b) Please confirm that there were secondary sales in the last half of 2020 when YEC had surplus hydro generation available due to high water flows.</p>
JM-YEC-1-28	<p>Page 25 Re. Evolving Grid Load Conditions, “...Yukon Energy continues to pursue ...and also to implement a Demand Side Management (DSM) program aimed to reduce load growth, especially peak demand reductions.”:</p> <p>(a) The author signed up for a “Peak Smart” program in the first few days of it being advertised a year or more ago and has yet to have any</p>

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	<p>equipment installed to enable the remote controls to limit peak load demands, despite following up at least 3 times over the past 8 months. Is this program still being pursued and if so, why does it not appear to be being implemented?</p> <p>(b) Please describe any other peak load growth limiting DSM initiatives that are currently being contemplated or implemented and indicate whether being contemplated or implemented.</p>
JM-YEC-1-29	<p>Page 25 Re. “The 10-year Renewable Electricity Plan ... Ongoing generation projects include ...”:</p> <p>Please provide the status of / updates on each of the following: WH2 uprate, WH4 uprate, renewable energy purchases from IPP SOP projects, solar energy from the micro-generation program, southern lakes enhanced storage program, Mayo Lake enhanced storage program, replacement of diesel generators (if not already updated in JM-YEC-1-24) and each of the three major projects proposed in the 10-year Renewable Electricity Plan.</p>
JM-YEC-1-30	<p>Page 30 Re. Demand Side management:</p> <p>Does YEC propose any DSM programs involving rate structures, or building and appliance codes or standards?</p>
JM-YEC-1-31	<p>Page 31 Re. new 20 MW Wind Project:</p> <p>(a) Would the proposed 20 MW / 40 MWh BESS be capable of keeping the grid frequency stable with such a wind farm connected to the YIS?</p> <p>(b) Even if it does not supply dependable capacity, would a 20 MW wind farm not reduce winter diesel and LNG generation, as well as reduce water storage pressure/requirements at Southern Lakes, Mayo Lake, and Aishihik Lake?</p> <p>(c) Could such a wind farm not provide significant benefits to the grid in reduced thermal generation in the event of a drought such as experienced from 2017 to the summer of 2020?</p> <p>(d) In the absence of a pumped hydro energy storage system could not a portion of any summer surplus energy be sold as secondary sales to SCADA connected secondary sales customers?</p>
JM-YEC-1-32	<p>Page 39 Re. Table 4-3 Annual Ratepayer Impacts from BESS:</p> <p>(a) Do the savings from Operating Reserve and from Peak Shifting include any variable costs such as consumables and variable labour from reduced operating hours of diesel and LNG generators?</p> <p>(b) If not, why are these not included as a cost savings?</p>
JM-YEC-1-33	<p>Page 39 Re. Table 4-3:</p> <p>(a) Please provide an updated Table 4-3 based on the present (March 2021) actual LNG and diesel fuel prices.</p>

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	<p>(b) Based on the present actual costs of diesel and LNG, at approximately what BESS project cost over-run would the project be break-even?</p> <p>(c) Please provide a Table 4-3 based on the project coming in at 30% below the estimate.</p> <p>(d) Please provide a Table 4-3 based on the project coming in at 30% above the estimate.</p> <p>(e) Please reference the Hatch Report page B-113 and provide a Table 4-3 based on a long-term avoided cost of diesel at \$0.277 per kWh and a long-term avoided cost of LNG at \$0.248 per kWh.</p>
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Appendix B Hatch Report

JM-YEC-1-34	<p>Page B-14 Re. TKC Land – Whitehorse Access road:</p> <p>(a) Is the reference to an ‘existing access across from the Yukon Energy access’ referring to the Robert Service Way access road toward Yukon Energy (and Miles Canyon Road)?</p> <p>(b) If so, can YEC confirm that Hatch is mistaken with respect to the existence of traffic lights at this intersection?</p>
JM-YEC-1-35	<p>Page B-19 Re. “A 2 MW wind farm is currently being planned for operation in 2021”:</p> <p>Please describe the wind farm that is being referenced here and what is its present status?</p>
JM-YEC-1-36	<p>Page B-78 Re. “Several of the major underfrequency events lasted for extended periods, one lasting for several days.”:</p> <p>Please provide the dates involved in the underfrequency event that lasted for several days and describe the circumstances that caused this event.</p>