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In the Matter of the Yukon Utilities Board review, as directed by the Minister of Justice, of an Application by Yukon Energy Corporation under Part 3 of the *Public Utilities Act* for an Energy Project Certificate and an Energy Operation Certificate regarding the Battery Energy Storage Project

OPENING STATEMENT

YUKON ENERGY CORPORATION

April 30, 2021

Overview

Mr. Chair and members of the panel, Yukon Energy welcomes the opportunity to be in front of the Yukon Utilities Board for your review of the Battery Energy Storage System (BESS) Project Application that Yukon Energy has filed with the Minister of Justice for Energy Certificates under Part 3 of the Public Utilities Act.

As outlined in our application, the proposed BESS Project will provide 40 MWh of useful energy storage and 20 MW of inverter and transformer capacity. The containerized lithium ion battery energy storage system will be located on leased Kwanlin Dun First Nation (KDFN) settlement land situated near the interconnection of Robert Service Way and the Alaska Highway, on overlapping Traditional Territory of KDFN and Ta'an Kwach'an Council (TKC). The Project will include a 34.5 kV transmission line connecting the battery to Yukon Energy's transmission system at the Whitehorse Rapids facility.

Context for Current YUB Review

The BESS Project is in its final planning stage. Yukon Energy is undertaking all required environmental and socio-economic review and permitting, engineering design, contracting and other related activities to obtain authorizations and approvals necessary for procurement to be initiated to ensure dependable capacity is available to meet N-1 contingency requirements for winter 2022/23.

The purpose of the current YUB review and hearing is to provide the Minister with the Board's report and recommendations on:

- The public need for the BESS Project under various reasonable electric load forecasts, and the effect of the Project on customer rates and service reliability.
- The capability of existing and currently committed and expected generation and transmission facilities to meet the forecast load requirements and YEC's capacity planning criteria, and the effect of the BESS Project on this capability.
- The risks for the BESS Project and their potential impacts on rates for customers and on the reliability of electricity service provided to customers.
- What, if any, reasonable alternatives exist to the BESS Project, or alternative ways of undertaking the BESS Project.
- Impacts on YEC and ratepayers of the debenture investment opportunity that YEC is providing to TKC and KDFN.
- Whether it is prudent to build the BESS Project as proposed at this time.

Summary Submission on BESS Project

1. Need for the BESS Project – To Provide Dependable Capacity

The primary need for the BESS Project is to help meet Yukon Energy's dependable capacity requirements for the Yukon Integrated System (YIS).

Requirement to Address the N-1 Capacity Shortfall

YEC's long-standing N-1 capacity reliability criterion specifies the dependable capacity required each winter for providing reliable service to non-industrial loads on the YIS. The current N-1 event that must be planned for is loss of supply from the 37 MW Aishihik Generating Station. An N-1 event is not expected to occur frequently – based on past experience, such an event might occur once per decade. Nonetheless, for the isolated YIS, the N-1 capacity reliability criterion requires that the YIS carry sufficient dependable capacity to adequately supply non-industrial loads during such an event.

YEC has a material and growing shortfall in its installed dependable capacity relative to the N-1 capacity requirement. This growing shortfall reflects ongoing growth in non-industrial winter peak demand, including continued growth in electric space heating and forecast emerging Electric Vehicle (EV) peak demand load. Until new permanent resource solutions can be implemented, rented diesels are being relied on to meet this growing N-1 dependable capacity shortfall.

YEC's 2021 GRA shows this forecast N-1 capacity shortfall at 26.4 MW for 2021/22, requiring 15 diesel rental units (plus two spares to support these units). Without new resources beyond committed and planned DSM and the Whitehorse #2 uprate, YEC's 10-Year Renewable Electricity Plan forecast shows this shortfall increasing to 39.9 MW in 2025/26 and 61.2 MW in 2030/31.

BESS Project Replaces Four Rented Diesels

The BESS Project will replace four rented diesels (7.2 MW) otherwise needed to meet the dependable capacity shortfall for winter 2022/23 and over the next 20 years.

The BESS Project will utilize proven technology, including battery operating experience in the north. The Project design will provide for 7 MW of dependable capacity to be sustained for at least 20 years.

In response to recent Federal and Territorial policies mandating reduction in greenhouse gas emissions and the dependance on fossil fuel generation in the North, YEC is placing a high priority on new projects that can address the YIS dependable capacity requirements without increasing its reliance on new fossil fuel thermal generation or rented diesel units. The proposed BESS Project is consistent with, and complements, Yukon Energy's longer-term plans to reduce the remaining rented diesel use over the next decade through Demand Side Management, uprates to existing hydro units, Atlin Hydro, and Moon Lake Pumped Storage.

2. Project Alternatives – Ratepayer Cost Savings and Reliability Benefits

The Project responds to the current need for installed dependable capacity to address the N-1 capacity shortfall. Maintaining the status quo would mean that YEC would continue to rely on rented diesel units with increases each year in both the number of rental units and in rental costs per unit. This is not a feasible alternative and permanent solutions are needed.

The BESS Project is the best available near-term option to displace four rental diesel units. The Project also provides a net benefit to ratepayers compared to the rented diesel option and includes additional features or beneficial uses not provided by diesel rentals or new diesel replacements.

Ratepayer Cost Savings

The Project will reduce ratepayer costs compared to rented diesels or any other option to provide the same dependable capacity, with the following unique features of this option contributing to ratepayer savings:

- A $16.5 million federal grant, which reduces the estimated capital cost (2020$) to $15.2 million;
- Displacement of diesel rental costs (or similar fixed capital and non-fuel O&M costs for any other thermal option considered);
- Operating reserve savings from the battery displacing diesel and LNG generation fuel use – a benefit linked specifically to the BESS Project capabilities; and
- Fuel cost savings from peak-shifting use – another benefit linked specifically to the BESS Project capabilities.

The net present value (2022$) of ratepayer savings from the BESS Project over its 20 year life is forecast at $12.7 million. This estimated saving is based on YEC's 2021 GRA forecast weighted average cost of capital, forecast Project capital and operating costs (including provision for net recharging costs), forecast savings in diesel rental unit costs, and forecast

savings in thermal generation fuel costs resulting from BESS use for operating reserve and for peak shifting (assuming 2021 GRA forecast fuel prices). This ratepayer savings estimate excludes any additional thermal fuel cost saving benefits from improved hydro unit efficiency resulting from this BESS use.

There are no feasible renewable resource alternatives to the Project that have been identified within the near term to provide the needed dependable capacity. Aside from the Atlin Hydro and Moon Lake pumped storage projects, temporary rental diesels or permanent new thermal development remain the only feasible alternatives that would provide dependable capacity required to address the N-1 shortfall. The BESS Project's operating reserve use benefits enable it to provide ratepayer cost savings relative to both the diesel rental and permanent thermal alternatives.

Reliability Benefits

The BESS Project will provide added reliability benefits for customers beyond the ratepayer cost savings from dependable capacity, operating use and peak shifting.

Other reliability benefits provided by BESS include rapid blackstart and outage restoration capability, grid reliability and ancillary services (including frequency regulation, coverage of large generation unit outages, prevention of "load shedding" events, and renewable integration), load loss stabilization, and reactive power support. Rented or permanent thermal generation options to provide N-1 capacity reserve cannot provide these same additional benefits. Although YEC cannot easily quantify the additional ratepayer cost savings related to these added reliability benefits, they will reduce the impact of outages on customers, improve overall reliability of service, and enhance the capability of the YIS to integrate new Independent Power Producer (IPP) renewable generation that is currently planned to be connected in the next few years.

The proposed BESS Project size has taken into consideration the added reliability benefits from these secondary uses. For example, the 20 MW BESS Project inverter size significantly increases the size of the load segments that can be picked up during the blackstart process, which reduces the time required for grid restoration. The 20 MW sizing can also cover the loss of Whitehorse Hydro Unit #4, preventing critical grid outages. The proposed sizing also provides greater operational flexibility to accommodate future changes in the configuration and operational needs of the grid as more intermittent renewable resource options come online.

3. Project Risks and Mitigation

Yukon Energy plans to develop the BESS Project using technology with operational installations in Northern Quebec, the Northwest Territories, and Alaska. Lithium ion is a proven, safe technology for use in our Northern climate.

The Project will be built using conventional construction technologies suited for northern climate conditions and following all applicable construction and design practices for works of this nature, including building and electrical codes and adhering to industry best practices.

No special added costs are anticipated at this time to be required to comply with anticipated material conditions in the approvals and permits.

4. Debenture

First Nations' support for the Project is important given its location and YEC's desire to provide economic benefits to First Nations on new investments.

The proposed debenture investment approach is a measure that enables First Nation investment in clean energy development with no change in the costs paid by ratepayers. Similar debentures have been provided to enable First Nation investments in YEC transmission, hydro (Mayo B), and LNG projects in the past. The BESS Project is the first instance when Yukon Energy is to provide such a debenture rather than Yukon Development Corporation.

The proposed debenture investment opportunity for KDFN and TKC is a loan that will receive a return based on YEC's actual return on equity. The proposed debenture investment will be included as part of YEC's equity return when setting rates without any change in the 40% equity share assumed in the capital structure when setting rates. The end result will provide the same overall return (as part of YEC revenue requirement) as it would provide currently for YDC, without any impact to ratepayers.

Conclusion

In summary, to meet the growing electricity demand of Yukon and comply with emerging clean policy development, a diverse portfolio of resources is needed. The battery project will directly reduce Yukon Energy's reliance on thermal generation, provide savings for ratepayers, and increase the reliability of the Yukon grid.

Based on all of the above, it is prudent to build the BESS Project today as proposed by YEC.