#2 Miles Canyon Road
Box 5920, Whitehorse
Yukon Y1A 6S7
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June 29, 2023

Mr. Richard Buchan, Chair
Yukon Utilities Board
Box 31728
Whitehorse, Yukon Y1A 6L3

Dear Mr. Buchan:

Re: 2023 Q1 Low Water Reserve Fund ("LWRF") Report

The Low Water Reserve Fund ("LWRF") Term Sheet, as approved by Yukon Utilities Board ("YUB" or "the Board") Order 2022-07, requires Yukon Energy Corporation ("Yukon Energy" or "YEC") to file LWRF quarterly reports with the Board. Specifically, the LWRF Term Sheet states the following regarding the quarterly reports:

> Quarterly reports regarding the LWRF calculations and LWRF balance updates will be provided to the Board based on interim determinations prior to a fiscal year end. The quarterly LWRF calculations will be based on forecast loads for the year at the time of calculation as the LWRF table calculates the expected diesel amount based on annual load, not quarterly.
>
> Any interim determinations prior to a financial year end will only be placeholders; only the year end determinations will in fact have ongoing relevance for accounting and rate riders.

Accordingly, YEC is providing the 2023 Q1 quarterly report regarding the LWRF calculations and LWRF balance updates. The filing of this report was delayed due to the ongoing review of the LWRF 2022 annual report which was approved by YUB Order 2023-11 on June 20, 2023.

In summary, Tables 1 and 2 in Attachment 1 indicate as follows regarding the forecast LWRF calculations and balance for 2023:

- Based on the full-year-forecast annual load for 2023, and the LWRF Term Sheet, the LTA thermal for 2023 is 68.178 GWh[1] with 59.977 GWh LNG which is about 88% of LTA thermal generation (Table 1, L16b).[2]
- The forecast actual thermal generation requirement for 2023 at 40.218 GWh, including 8.201 GWh diesel and 32.017 GWh LNG (Table 1, L17).

[1] Calculated based on YEC's 2021 GRA approved LTA thermal calculation table. The calculation will be updated if YEC files a new GRA.
[2] LNG is assumed to displace 90% of the expected long-term average thermal requirements, subject to not exceeding total thermal less estimated diesel or actual diesel as per LWRF Term Sheet.

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- The resulting overall gap between LTA and actual thermal generation for the forecast 2023 load equals -27.960 GWh (Table 1, L18), all LNG.[3] The resulting payment required to LWRF from YEC for 2023 forecast to be $5.071 million (Table 1, L19).[4]
- LWRF balances [Table 2]:
    - 2023 opening balance of $9.895 million [as approved by the Board Order 2023-11 on June 20, 2023].
    - Estimated YEC transfers to LWRF at $5.071 million [as per Table 1].
    - Estimated closing balance on December 31, 2023 at $14.966 million.

The Board in its Order 2022-03 approved the change in the LWRF balance cap from +/- $8 million to +/- $16 million. Board Order 2019-02 set Rider E to 0.00 cents/kW.h effective April 1, 2019. The forecast LWRF balance is expected to continue to be within +/- $16 million, and no Rider E calculation is required based on 2023 forecasts.

In its April 13, 2023 filing, YEC also noted that YEC was in the process of updating its water conditions forecasts and will provide forecast water conditions in the quarterly LWRF report. The forecast water conditions memorandum prepared in April 2023 is attached for information purposes [Attachment 2]. Please note that the memo was prepared when Minto Mine was still connected to Yukon Grid, therefore, the load and expected generation forecasts in the memo do not match to tables in Attachment 1 which use more up-to-date information.

If you have any questions regarding the above please contact the undersigned.

Yours truly,

Jason Epp
Vice President, Finance and
Chief Financial Officer

[3] On long-term basis LNG is assumed to displace 90% and diesel 10% of the expected long-term average thermal requirements, subject to not exceeding total thermal less estimated diesel or actual diesel as per LWRF Term Sheet.

[4] Based on 2021 GRA average fuel costs at $0.1814 per kW.h for LNG and $0.2051 per kW.h for diesel as approved by YUB in Order 2022-03. The fuel prices will be updated if YEC files a new GRA.

2023 Q1 LWRF Report Attachment 1

Table 1: Forecast LWRF Calculations

Line No		2023 FYF [Q1]		Notes
L1a	Diesel Fuel Cost per kW.h	20.507	cents/kW.h	2021 GRA Average Fuel cost
L1b	LNG Fuel Cost per kW.h	18.136	cents/kW.h	
L1c	GRA YIS firm Load forecast	538,726	MW.h	
L1d	GRA LTA Thermal Generation forecast	85,930	MW.h	
Calculation of Thermal Cost to Charge (Refund) LWRF				
L2	YEC Grid firm load	525,455	MW.h	2023 Full-Year-Forecast
L3	Fish Lake	8,730	MW.h	LTA
L4=L2+L3	Total Grid load	534,185	MW.h	
	Assumed Actual Generation Sources			
L5	YECL Fish Lake	8,730	MW.h	2023 Full-Year-Forecast
L6	YEC Hydro	479,068	MW.h	2023 Full-Year-Forecast
L7	YEC Thermal	40,285	MW.h	2023 Full-Year-Forecast
	Diesel	8,267	MW.h	2023 Full-Year-Forecast
	LNG	32,017	MW.h	2023 Full-Year-Forecast
L7a	*YEC Diesel/LNG charged to capital, RFID and maintenar*	67	MW.h	2023 Full-Year-Forecast
L7a1	*Diesel*	67	MW.h	2023 Full-Year-Forecast
L7a2	*LNG*	-	MW.h	2023 Full-Year-Forecast
L7b=L7-L7a	*YEC Net Diesel/LNG*	40,218	MW.h	2023 Full-Year-Forecast
L7b1	*Diesel*	8,201	MW.h	2023 Full-Year-Forecast
L7b2	*LNG*	32,017	MW.h	2023 Full-Year-Forecast
L7b3=L7b1/L7b	*Diesel % of total net thermal*	*20%*		
L8	IPPs	6,102	MW.h	2023 Full-Year-Forecast
L9	Total Grid load	534,185	MW.h	
	LTA Expected Generation Sources			
L10	AEY Fish Lake (expected)	8,730	MW.h	Expected based on LTA
L11	IPPs	6,102	MW.h	Expected at 2023 Full-Year-Forecast
L12=L9-L10-L11	YEC Grid load net of expected Fish Lake and IPP	519,352	MW.h	
L13=L12-L1c+L11	Load Variance	-13,271	MW.h	
L14	LTA Thermal Generation at Actual Load	68,178	MW.h	Estimated based on 2021 GRA LTA Thermal Calculation Table
L15=L7b/L14	Actual Thermal Generation as % of LTA Thermal Generation	59%		
L16=L14	Expected YEC Thermal Generation in Rates	68,178	MW.h	
L16a	Diesel	*8,201*	MW.h	Total thermal less LNG below.
L16b	LNG	*59,977*	MW.h	90% of total thermal, subject to not exceeding total thermal less estimated diesel or actual diesel
L17=L7b	YEC Net Thermal Generation	40,218	MW.h	
L17a=L7b1	Diesel	*8,201*	MW.h	
L17b=L7b2	LNG	*32,017*	MW.h	
L18=L17-L16	YEC Thermal Generation to be included in LWRF	- 27,960	MW.h	
L18a=L17a-L16a	YEC Diesel Generation to be included in LWRF	-	MW.h	
L18b=L17b-L16b	YEC LNG Generation to be included in LWRF	- 27,960	MW.h	
L19=L1axL18a+L1bxL18b	Incremental YEC Thermal Generation Cost to Charge (Refund) LWRF ($000s)	($5,071)		

Notes:

1. As LWRF Term Sheet states the quarterly reports regarding the LWRF calculations and LWRF balance updates will be provided to the Board based on interim determinations prior to a fiscal year end. Any interim determinations prior to a financial year end will only be placeholders; only the year end determinations will in fact have ongoing relevance for accounting and rate riders.
2. The expected LTA thermal generation is calculated based on YEC's 2021 GRA approved LTA thermal calculation table. The calculation will be updated if YEC files a new GRA.
3. The calculations use the 2021 GRA approved fuel prices. The fuel prices will be updated if YEC files a new GRA.

2023 Q1 LWRF Report Attachment 1

Table 2: Forecast LWRF Continuity Schedule

Line	Activity	2023 Q1 ($000s)
A	**Opening Balance [1]**	**$9,895**
B	Incremental Thermal Generation Cost to Charge/(Refund)[2] to LWRF	($5,071)
C=B	Total LWRF operation for YEC	
	YEC pays to LWRF	$5,071
	YEC withdraws from LWRF	$0
D=A+C	**LWRF Balance after Annual Operation**	**$14,966**
E	**Interest on LWRF Balance [3]**	
F=D+E	**LWRF Balance after Interest charge**	**$14,966**
G	**Rider E (Rebate)/Collections [January - December]**	**$0**
H=F+G	**LWRF Ending Balance [4]**	**$14,966**
I	**LWRF Cap [5]**	**`+/-16000**
J	**LWRF Rebate/(Collections) Required**	**$0**

Notes:

1. Opening Balance is based on Table 1-2 of April 13, 2023 Annual Filings for 2022 and reflects 2022 Ending Balance.
2. Based on calculations provided in Table 1.
3. As per YUB Order 2022-03 the LWRF is included in the rate base. Therefore, going forward no interest calculations on the LWRF balances.
4. The negative balance indicates a cost to ratepayers, and the positive balance indicates a benefit to ratepayers.
5. LWRF cap was increased to +/- $16 million as per YUB Order 2022-03.

MEMO

From: Kevin Maxwell
To: Chris Milner
Date: 19 April, 2023
Pages: 6
Subject: 2023 Water Availability Forecast

2 Miles Canyon Rd
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Whitehorse, YT Y1A 3A1

Phone: (867) 393-5313
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Dear Mr. Milner,

1.0 Reservoir Water Levels

The historic and forecast reservoir water levels for the three Yukon Energy reservoirs Aishihik, Marsh and Mayo are shown in Figures 1-3. In addition to the figures a description of the current elevations relative to historical elevations are discussed below. These figures show actual water elevation to April 18, 2023 and the expected forecasted elevation based on average historic inflows[1] for the balance of the year shown with the orange dotted line. Historic water levels for each reservoir are shown in grey:

- The solid grey line shows the median historic water level
- The light grey shaded area shows the Min-Max rage of water levels
- The medium grey shaded area shows the 25th-75th percentile water level

The following trends can be observed with the current water levels:

Aishihik Lake: The elevation of Aishihik Lake, as of April 18, 2023, was 913.762m or 1.40m below Full Supply Level. This water level is below the historic median level (grey line in figure 5), largely due to maximizing Aishihik generation to minimize thermal. With average inflows and average temperatures in the 2022/23 winter Aishihik is forecasted to draft down to 913.732m by May 2023 and will recover to about 20cm below Full Supply Line in summer 2023.

Marsh Lake: The elevation of Marsh Lake, as of April 18, 2023, was 654.260m, or 0.46m above the Low Supply Line (grey line in figure 6). Marsh lake has experienced above average temperatures in August through Oct 2022 in addition to two large rainstorms on Sept 27 and Oct 15, 2022, which resulted in historical high inflows in the Fall of 2022 with inflows reaching up to

[1] Marsh Lake and Aishihik Lake also includes a Hydrotel high inflow based on current snow conditions shown as a red dotted line.

850 cms vs normal inflows of about 280cms. As a result, Yukon Energy has lowered Schwatka Lake a second time on October 15, 2022, which increases flows through Whitehorse by about 5%. Yukon Energy continues to flow about 180 CMS through Whitehorse (the maximum winter flows that will not cause Marwell flooding) to get Marsh lake down to the Low Supply Line by freshet. As of April 20, 2023 all gates at Marsh were opened and Schwatka lowered to maintain the 180 cms flow. Marsh Lake is forecasted to get down to 653.93m in early May 2023.

Mayo Lake: The elevation of Mayo Lake, as of Aprill 18, 2023, was 664.32m which is 1.07m above the Low Supply Line (grey line in figure 7). Starting mid November 2022, Yukon Energy implement the winter Ice protocol and ramp flows down to 15-18 cms while setting the ice. On January 06, 2023 Yukon Energy has started the ramp back up to target flow of about 24 cms by Mid-February 2023. Because of the late summer inflow Mayo will not reaches the Low Supply Line before the May 2023 freshet.

Figure 1: Aishihik Lake Elevations

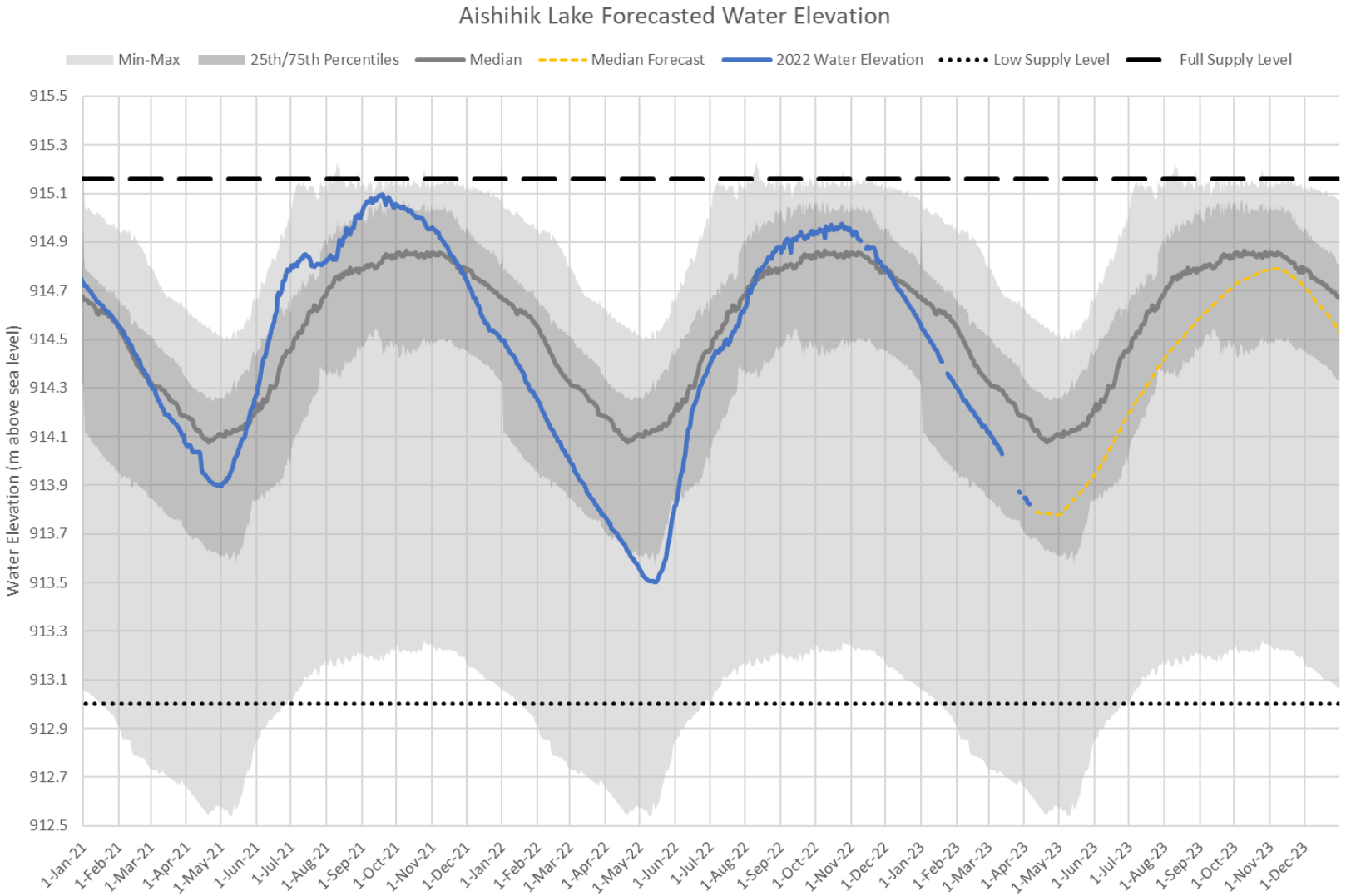


Figure 2: Marsh Lake Forecasted Elevations

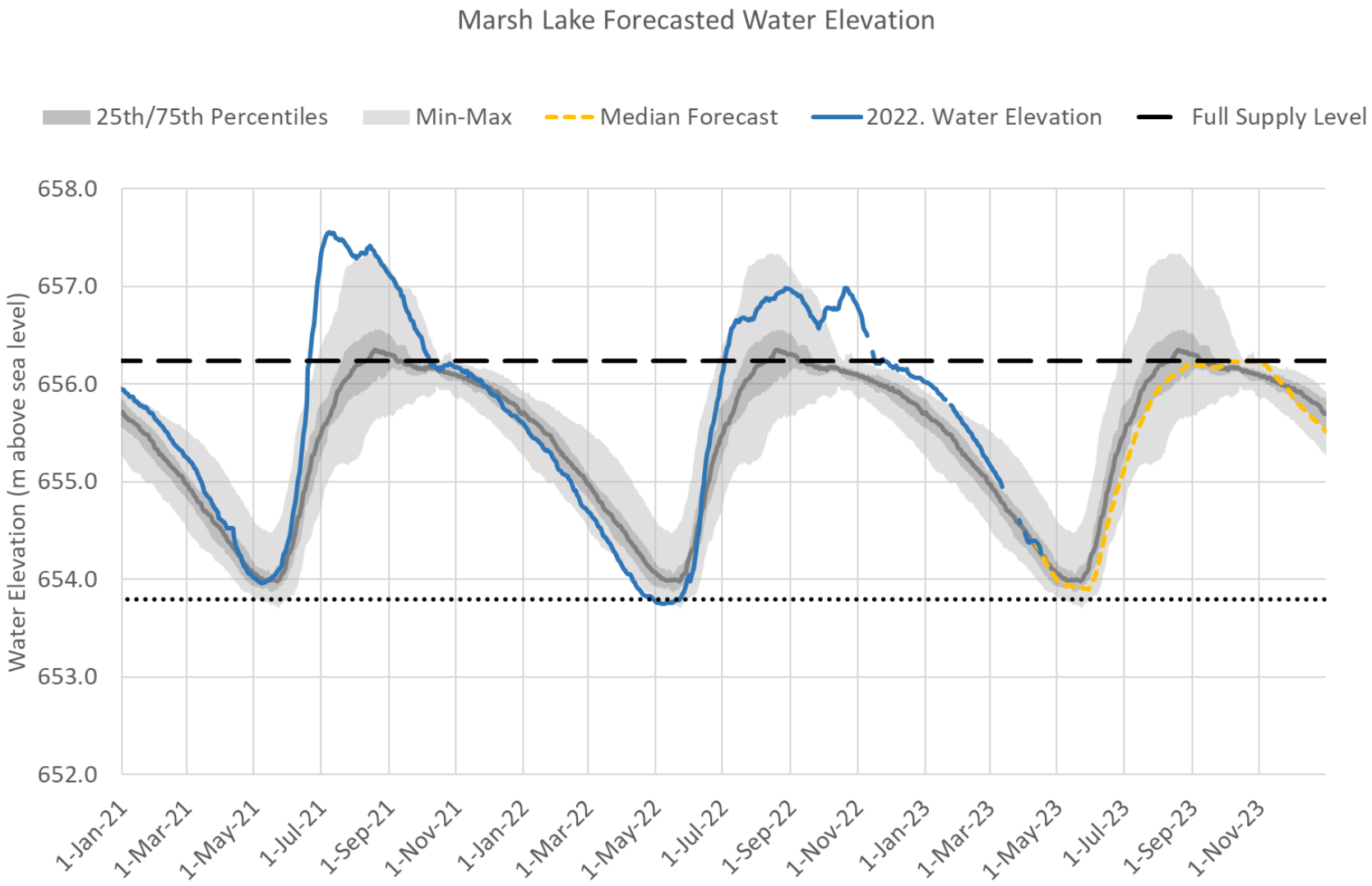
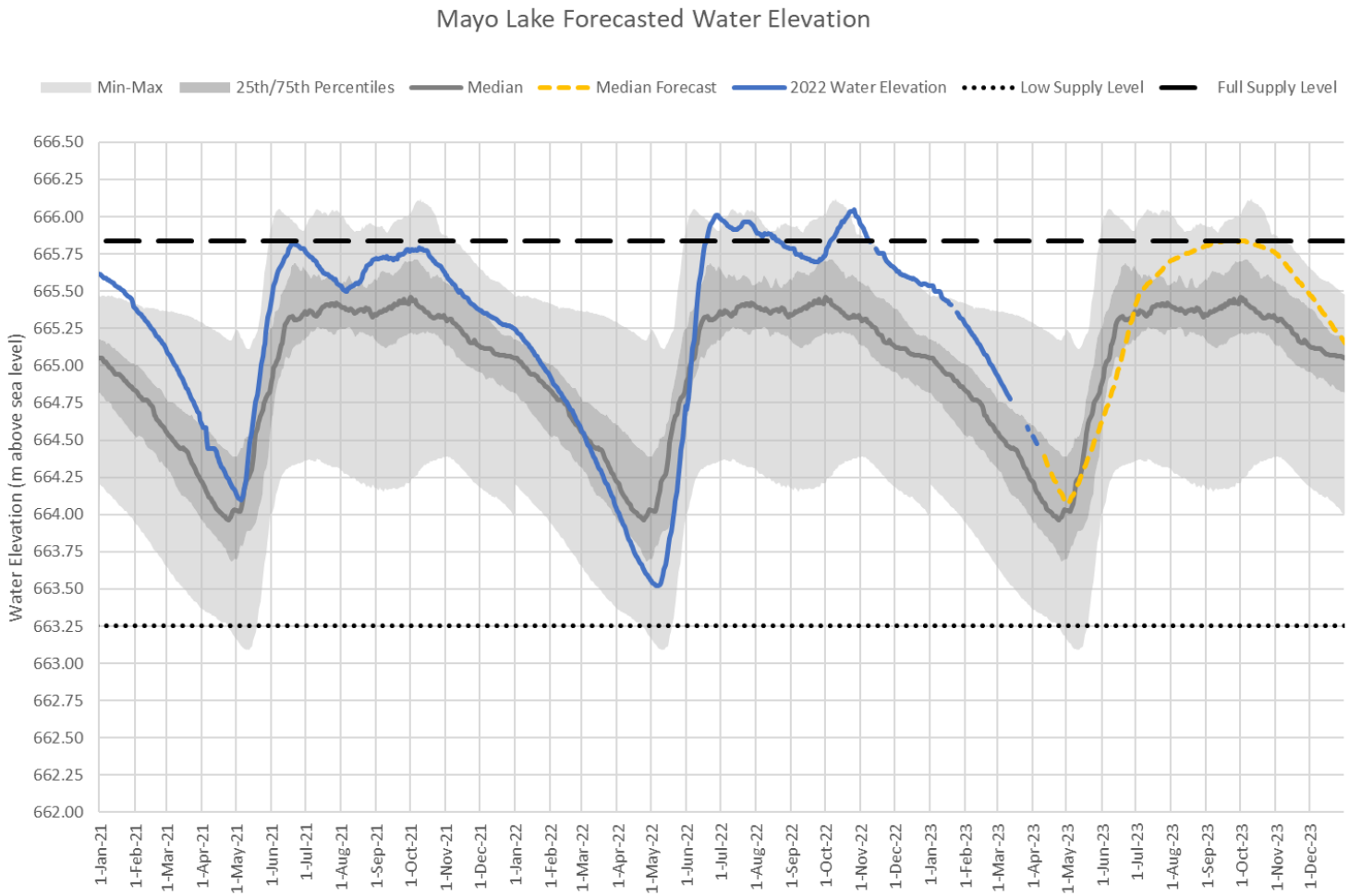


Figure 3: Mayo Lake Forecasted Elevations Mayo Lake Forecasted Elevations



2.0 2023 Generation Forecast

The present 2023 total Yukon Energy grid generation forecast is 556 GWh. Of the 550 GWh 286.3 GWh will come from Whitehorse generation, 135 GWh will come from Aishihik generation, 77 GWh will come from Mayo Generation, 8.1 GWh will come from Diesel generation and 40.2 GWh will come from LNG generation, and 8.4 GWh will come from SOP. Yukon Energy forecast 93.3% of the energy in 2023 will be from renewable sources and 8.7% from Thermal. Yukon Energy always optimizes the system to maximize Hydro generation with the goal to minimize thermal generation.

Regards,

X

Kevin Maxwell

Kevin Maxwell
Resource Planner
Yukon Energy Corporation