EB-2023-0195

Toronto Hydro-Electric System Limited 2025-2029 Rates Application

Interrogatories of the Power Workers' Union (PWU)

2B-PWU-1

Ref 1: Exhibit 2B, Section A ORIGINAL, Page 13 of 46:

> "The underground system is vulnerable to flooding from extreme rainfall, while the overhead system is susceptible to extreme winds, freezing rain, and wet snow, resulting in damage and outages."

Ref 2: E Exhibit 2B Section E6.2 ORIGINAL Page 1 of 36:

> "Outages caused by asset failure on the underground system take approximately 34 percent longer to restore than outages on the overhead system, resulting in lengthy interruptions that may last up to 24 hours or longer."

Ref 3: Exhibit 2B Section A ORIGINAL, Page 13 of 46:

> "Toronto Hydro now incorporates climate data projections into its equipment specifications and station load forecasting."

a) What is THESL's overall strategy regarding asset investment/replacement as between overhead vs. underground?
b) What technologies are considered to deal with underground equipment failure such as cables, PVC ducts etc.

2B-PWU-2

Ref 1: Exhibit 2B Section A ORIGINAL Page 20 of 46

"To ensure that price was kept top-of-mind, the utility also adopted top-down financial constraints for the development of the plan:

i. Price Limit: Toronto Hydro set an upper limit of approximately 7 percent as a cap on the average annual increase to distribution rates and charges.
ii. Budget Limits: Toronto Hydro set upper limits of $4,000 million for the capital plan and $1,900 million for the operational plan over the 2025-2029 period."

a) How did THESL arrive at these price and budget upper limits – what is the basis or assumption or rationale for picking these limits? Please describe the approach or steps followed to arrive at these limits?

2B-PWU-3

Ref 1: Exhibit 2B Section E4 ORIGINAL, Page 8 of 23

"Expenditures [2020-2024] in the Underground System Renewal – Horseshoe, and Underground System Renewal – Downtown are forecasted to be approximately 24 percent lower than planned."

a) Please identify and list Underground System Renewal program investments that were planned to be completed in the 2020-2024 rate period but deferred to the 2025-2029 rate period.

b) In THESL's view, is the deferral of Underground System Renewal investments from the 2020-2024 rate period a major/material reason for the proposed increase in expenditure in the current application?

2B-PWU-4

Ref 1: Exhibit 2B Section E4 ORIGINAL, Page 9 of 23

"Expenditures [2020-2024] in the Overhead System Renewal program are forecasted to be approximately 18 percent lower than planned."

a) Please identify and list Overhead System Renewal program investments that were planned to be completed in the 2020-2024 rate period but deferred to the 2025-2029 rate period.

b) In THESL's view, is the deferral of Overhead System Renewal program investments from the 2020-2024 rate period a major/material major reason for the increase in expenditure in this category in the current application?

2B-PWU-5

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 3 of 23

> "Connected approximately 10,000 customers through the Customer Connections program, with an increase of $147.5 million (71 percent) in capital expenditures over the forecast to maintain and exceed performance."

a) Was the $147.5 million increase in capital expenditure due to under-forecasting of customer connection or due to other factors?

2B-PWU-6

Ref 1: Exhibit 2B Section E4 ORIGINAL Pages 7-8 of 23

The reference indicates that from 2020 to 2024, System Access expenditures are forecasted to be approximately 33 percent higher than planned due to higher than forecast expenditures in the Customer Connections program (55%), in the Load Demand program (38%), and Externally Initiated Plant Relocations and Expansions (18%).

a) Why were such significant variances in demand for resources for these programs not anticipated/foreseen in the plan?

b) It appears that the higher than planned expenditures in System Access are partially made possible by shifting resources away from investments in System Renewal, especially the overhead and underground system renewal programs. Did THESL consider other funding options such as ICM funding? If not, why?

2B-PWU-7

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 9 of 23

> "In Downtown program, Toronto Hydro was able to find some savings over the 2020-2024 rate period by engineering an alternative approach to cable renewal work which leverages existing available civil infrastructure to the extent possible."

a) Please describe and give example/s of such alternative approaches to cable renewal work.

2B-PWU-8

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 9 of 23

- Expenditures in the Network System Renewal program are forecasted to be approximately 26 percent higher than planned.[23] The increase is driven in large part by design and execution complexities that emerged as the projects matured from conceptual to detailed design. This includes additional scope of work (e.g. civil construction and legacy cable removal), material cost increases driven by supply chain disruptions, and work execution challenges related to field conditions (e.g. urban congestion) and operational complexities (e.g. coordination challenges).
- Expenditures in the Stations Renewal program are forecasted to be approximately 23 percent higher than planned due to project complexity, necessary scope increases, and inflationary cost escalations.[24]

a) The reference suggests that the forecasted increases in expenditure (for the 2020-2024 rate period) are due to changes in the scope, design, and complexity of projects as well as due to inflationary cost escalations. What lessons did THESL learn from this variance? Has THESL incorporated those lessons, if any, into the planning and design of projects proposed in the 2025-2029 system plan?

2B-PWU-9

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 8 of 23, lines 14-15

"From 2020 to 2024, System Renewal expenditures are forecasted to be approximately 5 percent lower than planned."

b) Please confirm that the 5% lower than planned expenditure amounts to $76.6 million

2B-PWU-10

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 20 of 23

"Starting in 2025 Toronto Hydro is adjusting inspection cycles for wood poles from ten years to eight years to manage failure risk driven by wood pole age and condition demographics. Toronto Hydro will also begin inspecting concrete and

steel poles as part of its Pole inspection program on a ten-year cycle."

a) What study or other information did THESL use to apply an 8-year cycle and 10-year cycle for wood pole inspection, and concrete and steel poles, respectively? Did THESL consider the practices of other similar utilities including in other jurisdictions?

2B-PWU-11

Ref 1: Exhibit 2B Section E4 ORIGINAL Page 20 of 23

"Toronto Hydro plans to reduce its Network Vault civil inspection program starting in 2027 as a result of the implementation of Network Condition Monitoring and Control resulting in reduced costs in that program."

a) Please describe how the implementation of Network Condition Monitoring and Control has resulted in cost reductions in the Network Vault civil inspection program.

b) What impact (positive or negative) on reliability and safety performance does THESL anticipate as a result of the plan to reduce the Network Vault civil inspection program?

2B-PWU-12

Ref 1: Exhibit 2B Section E5.1 ORIGINAL Page 10 of 30

"Under Section 6.2 of the DSC, for all types of DERs, Toronto Hydro has an obligation to enable and connect the DER. Toronto Hydro must balance its obligations to prospective and existing DER connections with its responsibilities to maintain a safe and reliable distribution system for its load customers."

a) Please describe, with examples, the kind of safety and reliability risks that DER connections pose to existing load customers.

b) Has THESL encountered safety issues such as islanding in connection with DER connections? Please describe safety risks, if any, suffered by THESL's employees or members of the public.

c) How does THESL ensure that DER connections do not detract from the reliability of the distribution system?

2B-PWU-13

Ref 1: Exhibit 2B Section E6.1 ORIGINAL Page 27 -28 of 31

The reference describes the three options proposed for Rear-Lot Conversion

a) Please complete the table, making any corrections to the numbers that have already been provided.

OPTION	**Estimated Cost**
Option 1 - at Current (2020-2024) Pace	
Option 2 - Moderately Increased Pace **(selected)**	$ 236.7M
Option 3 - at Accelerated Pace	

2B-PWU-14

Ref 1: Exhibit 2B Section E6.2 ORIGINAL Page 13 of 36

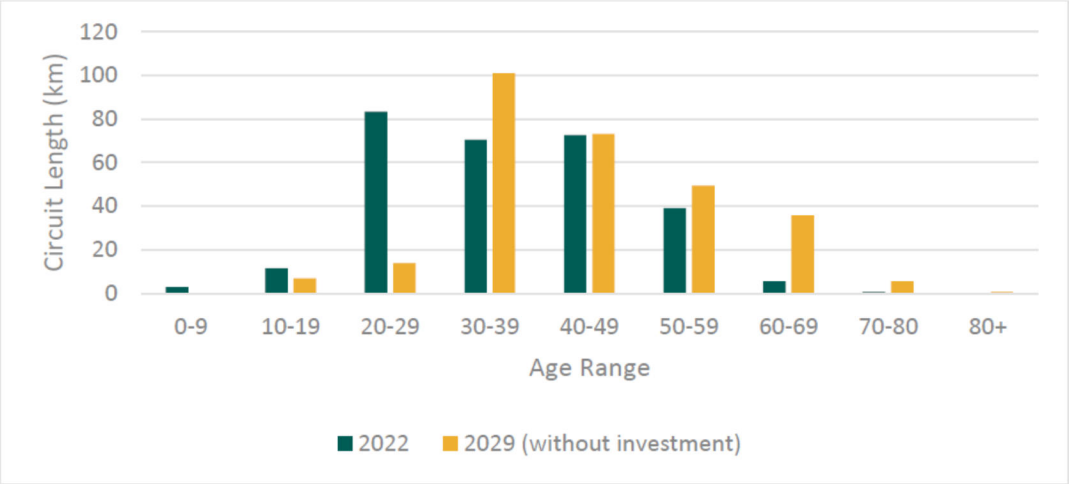

Figure 9: Age Demographics of Direct-Buried ("DB") Cable XLPE in Underground Horseshoe System as of 2022 and by 2029 (without Investment)

a) Please provide the tabular data behind the chart, adding a column showing age demographics in 2029 with investment, i.e., assuming the proposed investment plan is approved by the Board.

2B-PWU-15

Ref 1: Exhibit 2B Section E6.2 ORIGINAL Page 14 of 36

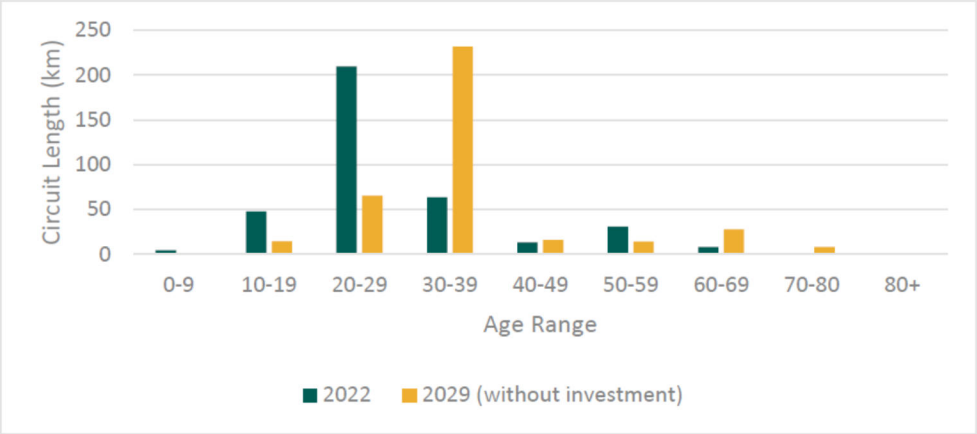

Figure 10: Age Demographics of Direct-Buried Cable in-Duct in Underground Horseshoe System as of 2022 and by 2029 (without Investment)

a) Please provide the tabular data behind the chart, adding a column showing age demographics in 2029 with investment, i.e., assuming the proposed investment plan is approved by the Board.

2B-PWU-16

Ref 1: Exhibit 2B Section E6.2 ORIGINAL Page 14 of 36

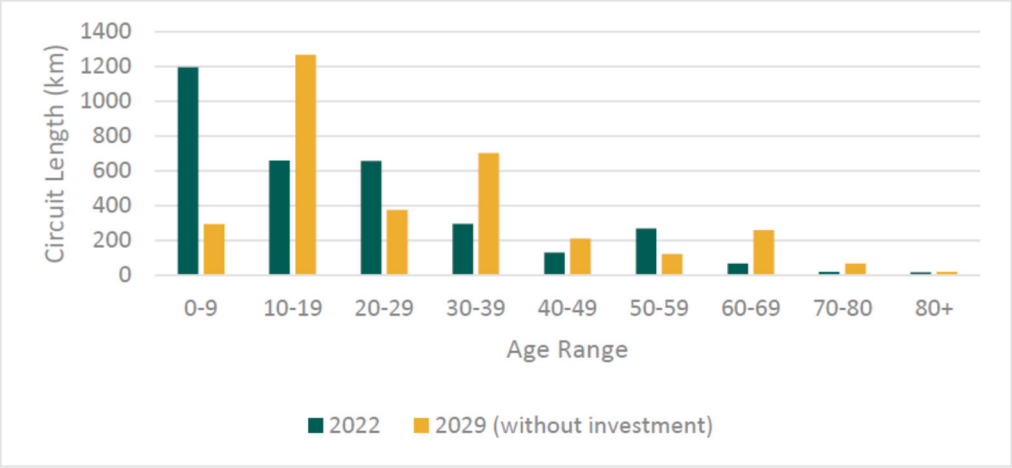

Figure 11: Age Demographic of Cable in in Concrete-Encased Ducts as of 2022 and by 2029 (without Investment)

a) Please provide the tabular data behind the chart, adding a column showing age demographics in 2029 with investment, i.e., assuming the proposed investment plan is approved by the Board.

2B-PWU-17

Ref: Exhibit 2B Section E6.2 ORIGINAL **Page 21 of 36**

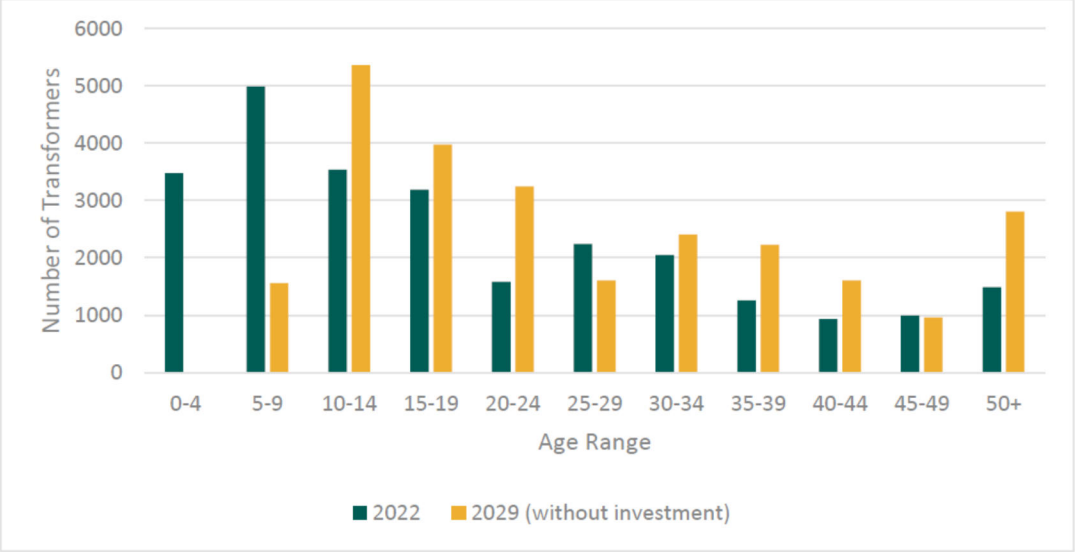

Figure 19: Age Distribution of All Transformers in Underground Horseshoe System as of 2022 and 2029 Without Investment

a) Please provide the tabular data behind the chart, adding a column showing age demographics in 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-18

Ref: Exhibit 2B Section E6.2 ORIGINAL Page 22 of 36

Table 5: Asset Condition Assessment for Underground Transformers in Underground Horseshoe System in 2022 and 2029 without Investment

Condition	UG TX - Padmounted		UG TX - Submersible		UG TX - Vault		Total	Total
	2022	2029	2022	2029	2022	2029	2022	2029
HI1 – New or Good Condition	4521	3920	7666	6939	6108	4625	18295	15484
HI2 – Minor Deterioration	1009	469	548	585	3618	1533	5175	2587
HI3 – Moderate Deterioration	476	804	130	534	494	3400	1100	4738
HI4 – Material Deterioration	215	561	120	178	225	506	560	1245
HI5 – End-of-Serviceable Life	22	489	46	274	11	392	79	1155
Grand Total	**6243**	**6243**	**8510**	**8510**	**10456**	**10456**	**25209**	**25209**

a) Please reproduce the table such that it includes figures for 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-19

Ref: Exhibit 2B Section E6.2 ORIGINAL Page 22 of 36

Table 5: Asset Condition Assessment for Underground Transformers in Underground Horseshoe System in 2022 and 2029 without Investment

Condition	UG TX - Padmounted		UG TX - Submersible		UG TX - Vault		Total	Total
	2022	2029	2022	2029	2022	2029	2022	2029
HI1 – New or Good Condition	4521	3920	7666	6939	6108	4625	18295	15484
HI2 – Minor Deterioration	1009	469	548	585	3618	1533	5175	2587
HI3 – Moderate Deterioration	476	804	130	534	494	3400	1100	4738
HI4 – Material Deterioration	215	561	120	178	225	506	560	1245
HI5 – End-of-Serviceable Life	22	489	46	274	11	392	79	1155
Grand Total	6243	6243	8510	8510	10456	10456	25209	25209

a) Please reproduce the table such that it includes a column for figures for 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-20

Ref: Exhibit 2B Section E6.3 ORIGINAL Page 17 of 50

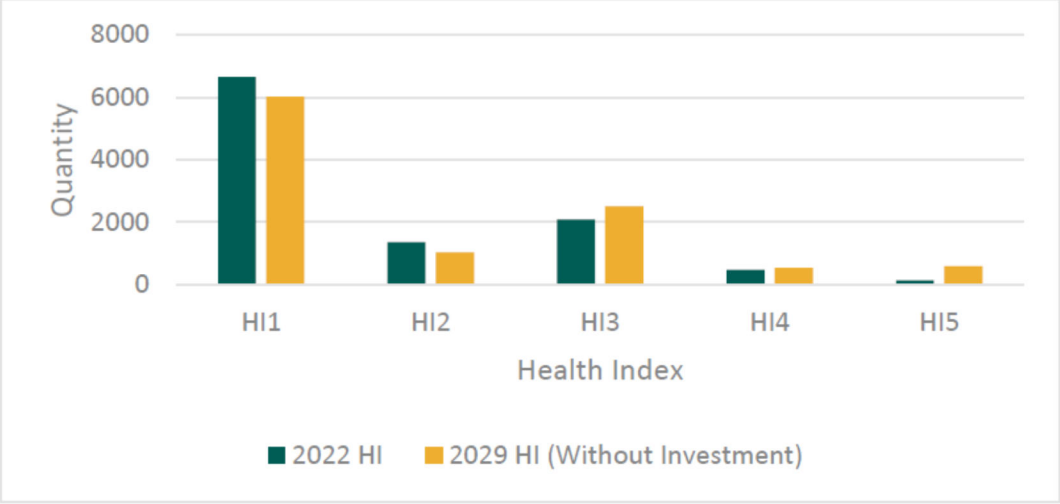

Figure 12: Cable Chamber HI Distribution (Actual and 2029 Forecast)

a) Please provide the tabular data behind the chart, adding a column showing HI distribution in 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-21

Ref: Exhibit 2B Section E6.3 ORIGINAL Page 32 of 50

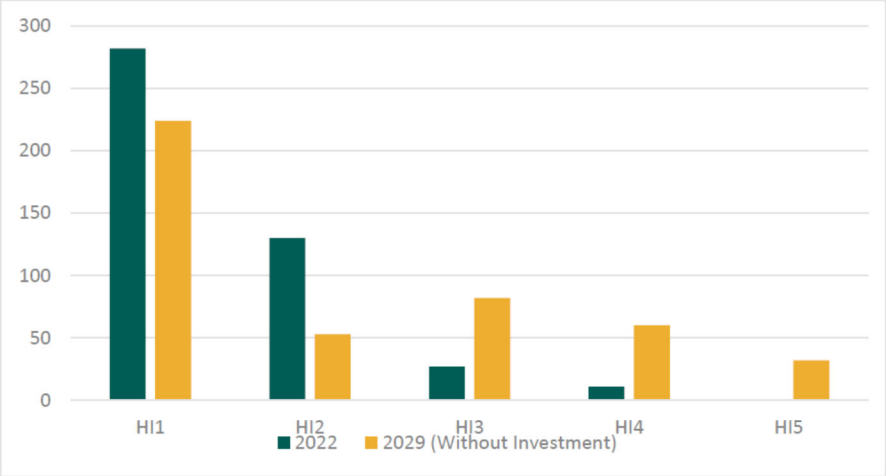

Figure 33: URD Transformer Asset Condition as of 2022 and 2029 (without investment)

a) Please provide the tabular data behind the chart, adding a column showing asset condition in 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-22

Ref: Exhibit 2B Section E6.3 ORIGINAL Page 34 of 50

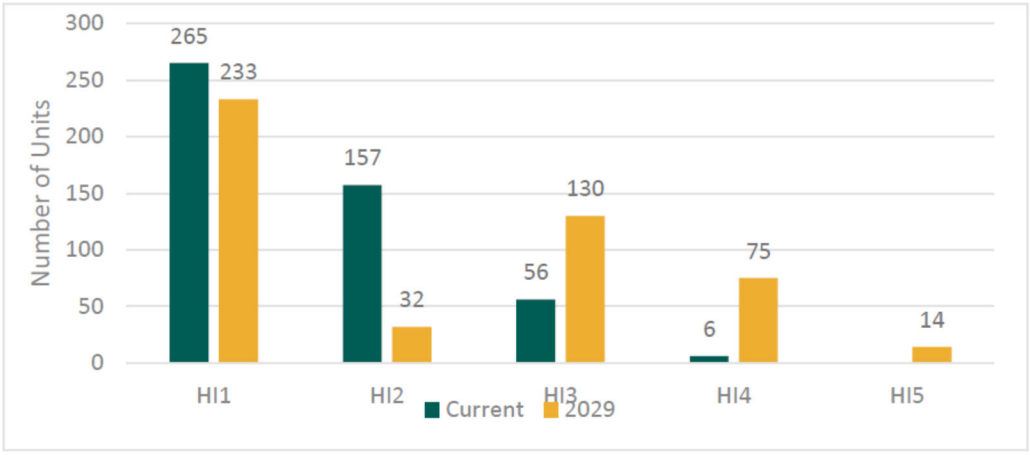

Figure 35: Underground Switchgear ACA distribution

a) Please provide the tabular data behind the chart, adding a column showing ACA distribution in 2029 with investment, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-23

Ref: Exhibit 2B Section E6.4 ORIGINAL Page 7 of 30

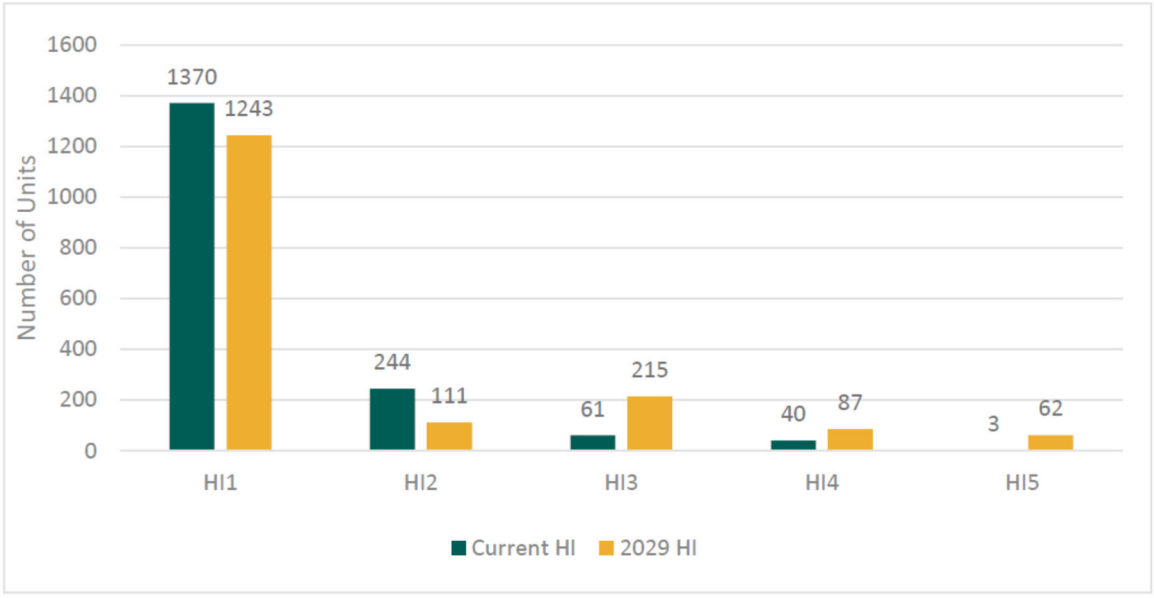

Figure 3: Network Transformers Condition Demographics – Current and Forecasted HI (without Renewal)

a) Please provide the tabular data behind the chart, adding a column showing condition demographics in 2029 with Renewal, i.e., assuming THESL's proposed investment plan is approved by the Board.

2B-PWU-24

Ref: Exhibit 2B Section E6.4 ORIGINAL Page 24 -28 of 30

The reference shows the three options considered for Network Unit Renewal and Network Vault Renewal

a) Please complete the table, making any corrections to the numbers that have already been provided.

OPTION (Network Unit Renewal)	**Estimated Cost**
Option 1 – Reduced Pace	
Option 2 – Moderate Pace (selected)	$ 51.2 M
Option 3 - Accelerated Pace	

b) Please complete the table, making any corrections to the numbers that have already been provided.

OPTION (Network Vault Renewal)	**Estimated Cost**
Option 1 – Reduced Pace	
Option 2 – Moderate Pace (selected)	$ 69.1M?
Option 3 - Accelerated Pace	

2B-PWU-25

Ref 1: Exhibit 2B Section E6.5 ORIGINAL Page 3 of 43, lines 6-8

> "Approximately 9 percent of wood poles are already showing signs of material deterioration (as of 2022) and, without intervention, this proportion is forecast to increase to 30 percent by 2029."

Ref 2: Exhibit 2B Section E6.5 ORIGINAL Page 9 of 43, Table 3

Table 3: Asset Demographics

	Population	Typical Useful Life (Years)	Assets Past Useful Life as of 2022 (%)	Assets Past Useful Life in 2029 without Investment (%)
Wood Poles	108,988	45	23	29
Concrete Poles	49,059	55	13	22
Overhead Transformers	27,690	35	8	17
Overhead Load Break Gang Operated Switches	3,015	30	18	26
Overhead Disconnect Switches	4,425	30	33	54

Ref 3: Exhibit 2B Section E6.5 ORIGINAL Page 9 of 43, Table 4

Table 4: Condition Data for Wood Pole

Asset Condition Index	2022	2029 (Without Investment)
HI1 – New or Good Condition	68,193	60,253
HI2 – Minor Deterioration	7,536	8,310
HI3 – Moderate Deterioration	21,015	5,544
HI4 – Material Deterioration	8,918	24,404
HI5 – End-of-serviceable Life	504	7,655

a) Given the total number of poles is 108,988 (Ref 2); 9% of wood poles with material deterioration (Ref 1) means 9,808 poles have shown material deterioration. However, that number is given as 8,918 in Ref 3. Please reconcile.

b) Please reproduce Table 3 in Ref 2 adding a column showing Asset Past Useful Life in 2029 with investment, i.e., assuming the Board approves THESL's investment plans proposed in the current application)

c) Please reproduce Table 4 in Ref 3 adding a column showing condition data for wood pole in 2029 with investment, assuming the Board approves THESL's investment plans proposed in the current application)

2B-PWU-26

Ref 1: Exhibit 2B Section E6.5 ORIGINAL Page 34 of 43

Table 7: Historical & Forecast Segment Cost ($ Millions)

	Actual			Bridge		Forecast				
	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029
Overhead System Renewal	36.1	38.2	38.2	32.5	73.9	50.5	49.4	53.3	60.3	58.9

Table 8: 2020 – 2024 Overhead Asset Replacement Volumes

Asset Class	Actual			Bridge		Total
	2020	2021	2022	2023	2024	
Poles	1,418	1,263	1,137	790	2,674	7,282
Transformers	401	584	579	215	1,892	3,671
OH Switches	185	290	71	43	114	703
Conductors* (km)	53.0	60.0	76.0	4.8	45.1	238.8

*Primary cables only

"The level of spending and overall unit volumes are both lower than forecast in the 2020-2024 DSP ($265.7 million and e.g. over 11,000 poles) as Toronto Hydro reduced the segment budget to support meeting overall capital funding limits and faced supply chain challenges and other pressures impacting pacing and costs.

a) Please clarify whether the $265.5 M spending and the over 11,000 poles mentioned above are 2020-2024 DSP plans or Board-approved amounts. If plans/forecasts, what were the corresponding Board-approved amounts?

2B-PWU-27

Ref 1: Exhibit 2B Section E6.5 ORIGINAL Page 38-40 of 43

The reference lists and describes three options for Overhead System Renewal

a) Please complete the table, making any corrections to the numbers that have already been provided.

OPTION (Overhead system Renewal)	**Forecasted/Estimated Cost**
Option 1 – Limited rebuild/renewal	
Option 2 – Proactive rebuild/renewal (selected)	$272.4 M
Option 3 - Replace all assets in deteriorated condition (or beyond useful life)	Over $350 million

E4-PWU-28

Ref 1: Exhibit 4 Tab 1 Schedule 1 ORIGINAL Page 20 of 55, Figure 11 (2015-2029 FTE Complement)

> Figure 11 indicates a total FTE increase of 11.5% for the 2024-2029 period.

Ref 2: Exhibit 4 Tab 1 Schedule 1 ORIGINAL Page 23 of 55, line 20

> "From 2024 to 2029, as the utility's workforce grows by approximately 11.5 percent…"

Ref 3: Exhibit 4 Tab 1 Schedule 1 ORIGINAL Page 22 of 55, lines 11-12

> "As Toronto Hydro prepares to enter its next rate period, staffing levels are forecasted to grow by 25 percent over the 2024 through 2029 period."

a) Please confirm Toronto Hydro uses "workforce" to mean FTE

b) Please confirm if the "staffing levels" in Ref 3 implies headcount and describe how the 25% increase in staffing levels is calculated.