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May 14, 2024

Patrick Wruck  
Commission Secretary and Manager  
Regulatory Services  
British Columbia Utilities Commission  
Suite 410, 900 Howe Street  
Vancouver, BC V6Z 2N3

Dear Patrick Wruck:

**RE: British Columbia Utilities Commission (BCUC or Commission)  
British Columbia Hydro and Power Authority (BC Hydro)  
Annual Reporting of Reliability Indices Annual Response to Directive 26 of  
BCUC Decision on F2005/F2006 Revenue Requirements Application  
(F05/F06 RRA)**

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BC Hydro writes to provide an annual reporting of reliability indices, as required by Directive 26 of BCUC Order No. G-96-04 on BC Hydro's F05/F06 RRA.<sup>1</sup>

Directive 26 states that BC Hydro is expected to present reliability indices (SAIFI, SAIDI, CAIDI, ASAI, SARI, MAIFI, generation forced outages, availability, and generation outage rates), both combined and disaggregated (where applicable), on an annual basis with comparisons to the Canadian Electricity Association averages. The Canadian Electricity Association became Electricity Canada on March 1, 2022, and is therefore referred to as Electricity Canada in this report.

In this filing, BC Hydro is providing reliability indices for distribution, transmission and generation performance through fiscal 2024. As in previous years, BC Hydro's reliability statistics are provided on a fiscal year basis and are compared with Electricity Canada calendar year data.

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<sup>1</sup> BC Hydro submitted its initial distribution and generation reliability indices compliance filing in September 2005, and subsequently reported the available reliability indices in May 2006 as part of the F2007 to F2008 Revenue Requirements Application. Starting in May 2007, BC Hydro began filing annual reports with the BCUC on these reliability indices. Transmission system reliability indices for the years prior to fiscal 2012 were provided separately by the British Columbia Transmission Corporation (**BCTC**) in its Transmission System Capital Plan filings. BC Hydro provided the transmission system reliability indices starting in fiscal 2012, subsequent to the integration of BC Hydro and BCTC in fiscal 2011.

## **Distribution and Transmission Update**

The most recent annual Electricity Canada reports for distribution and transmission performances are the 2022 Annual Service Continuity data on Distribution System Performance in Electrical Utilities and the Bulk Electricity System. Electricity Canada data on distribution and transmission performance for the 2023 calendar year are not yet available. The comparative reliability indices, both combined and disaggregated, for BC Hydro's distribution and transmission systems, are presented in Attachment 1, in tabular and graphical form through to fiscal 2024.

## **Generation Performance Update**

The most recent annual Electricity Canada report on generation performance is the 2022 Generation Equipment Status Annual Report. Electricity Canada data on generation performance for the 2023 calendar year are not yet available.

The comparative reliability indices, both combined and disaggregated, for BC Hydro's generation system are presented in Attachment 2, in tabular and graphical form for the ten-year period ending fiscal 2024.

To reflect BC Hydro's investment strategies and operating practices of prioritizing Key Generating Facilities (large MW capacity units) over Available Generating Facilities (small MW capacity units), weighted averages of the reliability indices are also included in Attachment 2.

Electricity Canada weighted average failure rate was not available at the time of submission. Electricity Canada is currently deciding whether to calculate the weighted average Forced Outage Count in their report. As a result, we have excluded Electricity Canada's historical weighted average Forced Outage Count from this report.

## **Reliability Indices Performance Highlights**

BC Hydro highlights the following with regard to its reliability indices performance through fiscal 2024:

- BC Hydro customers experienced an average of 2.09 power interruptions (SAIFI) in fiscal 2024. BC Hydro's average SAIFI performance from fiscal 2015 to fiscal 2024 is 2.04 and is better than the Electricity Canada average SAIFI of 2.61 from calendar 2014 to calendar 2022;
- BC Hydro customers experienced an average of 5.92 hours of power interruptions (SAIDI) in fiscal 2024. BC Hydro's average SAIDI performance from fiscal 2015 to fiscal 2024 is 6.52 hours and is better than the Electricity Canada average SAIDI of 7.43 hours from calendar 2014 to calendar 2022;

- BC Hydro's overall transmission system reliability performance declined in fiscal 2024 compared to fiscal 2023 due to the extreme wildfire situation in the province, which caused longer outage durations and larger unsupplied energy;
- For generation, the Weighted Average Availability Factor is higher than that of fiscal 2023, while the Weighted Average Forced Outage Factor, Weighted Average Forced Outage Count, Weighted Average Failure Rate, and Weighted Average Operating Factor are all lower compared to fiscal 2023. The main contributor to the lower Weighted Average Operating Factor was the higher Standby Factor, primarily attributed to less system inflow in B.C.; and
- The 60-Month Rolling Forced Outage Factor for Key Facilities, which is included as one of BC Hydro's Service Plan metrics, was 1.03% at the end of fiscal 2024, which meets BC Hydro's Service Plan target of less than or equal to 1.8%.

For further information, please contact Alicia Henderson at [bchydroregulatorygroup@bchydro.com](mailto:bchydroregulatorygroup@bchydro.com).

Yours sincerely,



Chris Sandve  
Chief Regulatory Officer

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Enclosure

**F05/F06 Revenue Requirements Application  
Annual Response to Directive 26 of BCUC Decision**

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**F2024 Annual Reporting of Reliability Indices**

**Attachment 1**

**Distribution and Transmission Reliability Indices**

This section includes the following distribution and transmission indices:

SAIFI	A measure of the number of sustained interruptions (longer than one minute) an average distribution customer will experience in a year.
T-SAIFI-MI	A measure of transmission interruptions of less than one minute in duration that a delivery point experiences in a year.
T-SAIFI-SI	A measure of transmission interruptions of one minute or more that a delivery point experiences in a year.
T-SAIDI	A measure of the average total interruption duration, in hours that a delivery point experiences in a year.
SAIDI	A measure of the amount of time, in hours, an average distribution customer is without power in a year.
CAIDI	A measure of the average interruption, in hours, per interrupted distribution customer in a year.
%ASAI	A measure of the percentage of time service is available in the year.
CEMI-4	The percentage of customers experiencing four or more outages in a year.
MAIFI	A measure of the frequency of momentary (less than one minute) interruptions per distribution customer served in a year.
DPUI	A measure of overall bulk electricity system performance in terms of a composite index of unreliability expressed in system minutes in a year. It takes into account all forced and planned outages except interruptions attributed to generators
SARI	A measure of the average restoration.

As noted in Provision 9x of the F2011 Revenue Requirements Application Negotiated Settlement Agreement, BC Hydro is also reporting its CEMI-4 reliability metric, and SAIFI, SAIDI, CAIDI, ASAI, and CEMI-4 metrics normalized using the IEEE 2.5 Beta method. CEMI-4 is not benchmarked externally as utilities are at varying stages in their development of this metric.

The Canadian Electricity Association became Electricity Canada on March 1, 2022, and is therefore referred to as Electricity Canada (**EC**) in this Attachment.

**Table 1 Reliability Indices – BC Hydro Overall and Electricity Canada Overall (All-Event Indices, Not Normalized)**

Year	BC Hydro Overall				Electricity Canada Overall			
	SAIFI	SAIDI	CAIDI	%ASAI	SAIFI	SAIDI	CAIDI	%ASAI
F2015	1.72	5.11	2.97	99.942	2.39	6.38	2.67	99.927
F2016	2.29	10.69	4.66	99.878	2.32	5.08	2.19	99.942
F2017	2.17	5.50	2.53	99.937	3.10	5.65	1.82	99.936
F2018	2.13	6.56	3.08	99.913	2.44	7.72	3.16	99.912
F2019	1.90	8.58	4.51	99.902	2.84	8.46	2.98	99.903
F2020	1.96	4.78	2.44	99.945	2.65	8.38	3.16	99.904
F2021	1.98	5.73	2.90	99.935	2.39	5.35	2.24	99.939
F2022	2.00	6.00	3.00	99.932	2.42	5.57	2.30	99.936
F2023	2.18	6.32	2.90	99.928	2.97	14.32	4.82	99.837
F2024	2.09	5.92	2.83	99.932	n/a	n/a	n/a	n/a

**Table 2 Reliability Indices – BC Hydro (Distribution) and Electricity Canada (Distribution) (All Event Indices, Not Normalized)**

Year	BC Hydro (Distribution)				Electricity Canada (Distribution)			
	SAIFI	SAIDI	CAIDI	%ASAI	SAIFI	SAIDI	CAIDI	%ASAI
F2015	1.34	4.44	3.31	99.949	1.79	5.67	3.16	99.935
F2016	1.91	10.13	5.30	99.884	1.79	4.54	2.53	99.948
F2017	1.74	4.83	2.77	99.945	2.44	5.08	2.08	99.942
F2018	1.69	5.82	3.44	99.934	1.89	5.14	2.72	99.941
F2019	1.63	8.08	4.95	99.908	2.23	7.16	3.21	99.918
F2020	1.41	3.83	2.71	99.956	2.10	7.51	3.57	99.914
F2021	1.61	4.91	3.05	99.944	1.85	4.60	2.49	99.947
F2022	1.54	4.78	3.11	99.945	1.86	4.73	2.54	99.946
F2023	1.78	5.74	3.22	99.934	2.36	13.33	5.65	99.848
F2024	1.62	5.04	3.12	99.942	n/a	n/a	n/a	n/a

**Table 3 Reliability Indices – BC Hydro Overall – Normalized using IEEE 2.5 Beta Method**

Year	BC Hydro Overall – Normalized using IEEE 2.5 Beta method				
	SAIFI	SAIDI	CAIDI	CEMI-4 (%)	%ASAI
F2015	1.35	3.37	2.49	10.13	99.962
F2016	1.60	3.42	2.14	14.00	99.961
F2017	1.88	4.37	2.33	16.43	99.950
F2018	1.67	3.94	2.36	14.55	99.955
F2019	1.39	3.21	2.32	10.65	99.963
F2020	1.68	3.56	2.12	14.59	99.959
F2021	1.56	3.52	2.25	14.35	99.960
F2022	1.74	4.59	2.63	16.38	99.948
F2023	1.78	4.02	2.25	13.42	99.954
F2024	1.88	4.56	2.42	16.46	99.948

**Table 4 Reliability Indices – BC Hydro CEMI 4 Overall (All-Event Indices, Not Normalized)**

Year	BC Hydro Overall
	CEMI-4 (%)
F2015	15.15
F2016	23.77
F2017	19.45
F2018	20.87
F2019	17.14
F2020	18.39
F2021	20.17
F2022	19.31
F2023	17.97
F2024	19.80

Note: Electricity Canada does not survey for CEMI-4 or IEEE 2.5 Beta.

**Table 5 Reliability Indices – BC Hydro (Transmission) and Electricity Canada (Transmission) (Forced Data) (All-Event Indices, Not Normalized)**

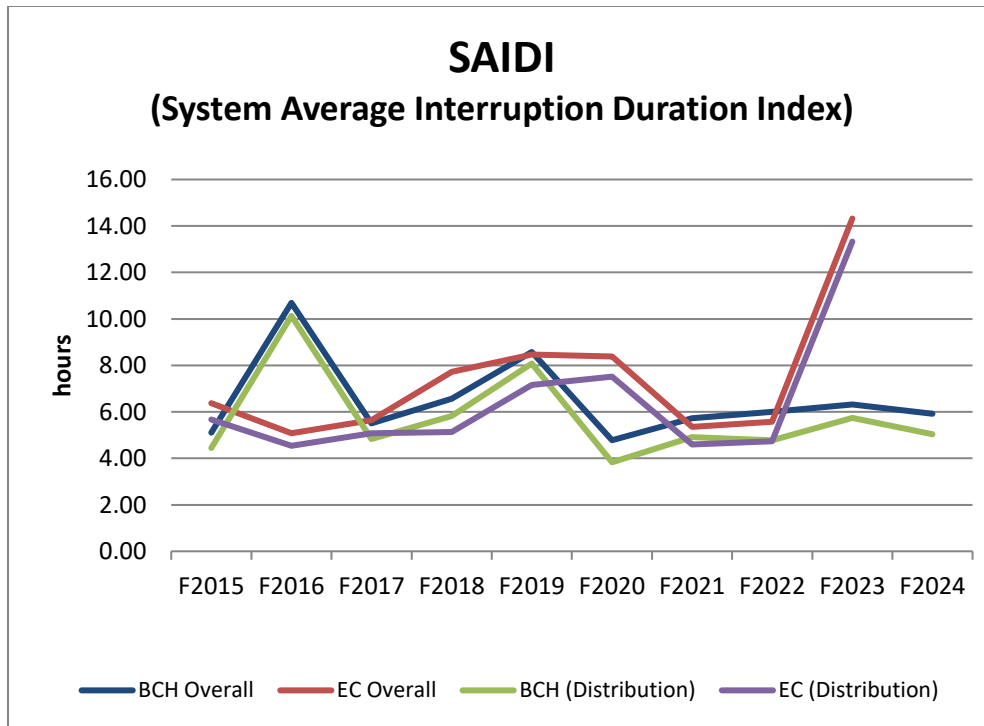
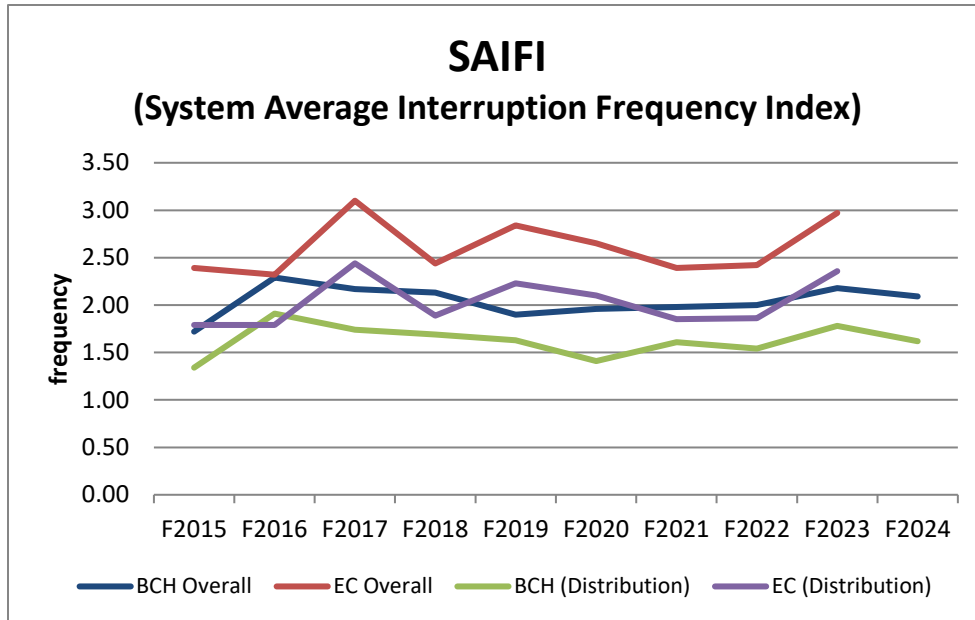
Year	BC Hydro (Transmission) (Forced)					Electricity Canada (Transmission) (Forced)				
	T-SAIFI-MI	T-SAIFI-SI	T-SAIDI	DPUJ	SARI	T-SAIFI-MI	T-SAIFI-SI	T-SAIDI	DPUJ	SARI
F2015	0.83	0.74	2.11	26.41	2.86	0.72	0.83	2.56	19.24	3.10
F2016	0.79	0.63	2.46	27.77	3.90	0.85	0.74	2.15	15.60	2.90
F2017	0.63	0.61	2.52	33.61	4.13	0.70	0.75	1.93	22.33	2.58
F2018	0.30	0.69	2.50	30.13	3.62	0.55	0.77	2.24	20.02	2.90
F2019	0.57	0.34	0.92	7.61	2.71	0.65	1.06	3.48	33.87	3.27
F2020	0.90	0.89	2.74	46.30	3.08	0.82	0.89	2.63	30.07	2.94
F2021	0.70	0.65	3.76	44.42	5.78	0.66	0.75	1.94	21.14	2.57
F2022	0.57	0.70	4.75	65.93	6.79	0.56	0.74	3.53	22.70	4.80
F2023	0.53 <sup>1</sup>	0.57 <sup>1</sup>	3.71 <sup>1</sup>	25.74 <sup>1</sup>	6.48 <sup>1</sup>	0.62	0.83	3.63	26.62	4.39
F2024	0.42	0.78	6.00	96.96	7.67	n/a	n/a	n/a	n/a	n/a

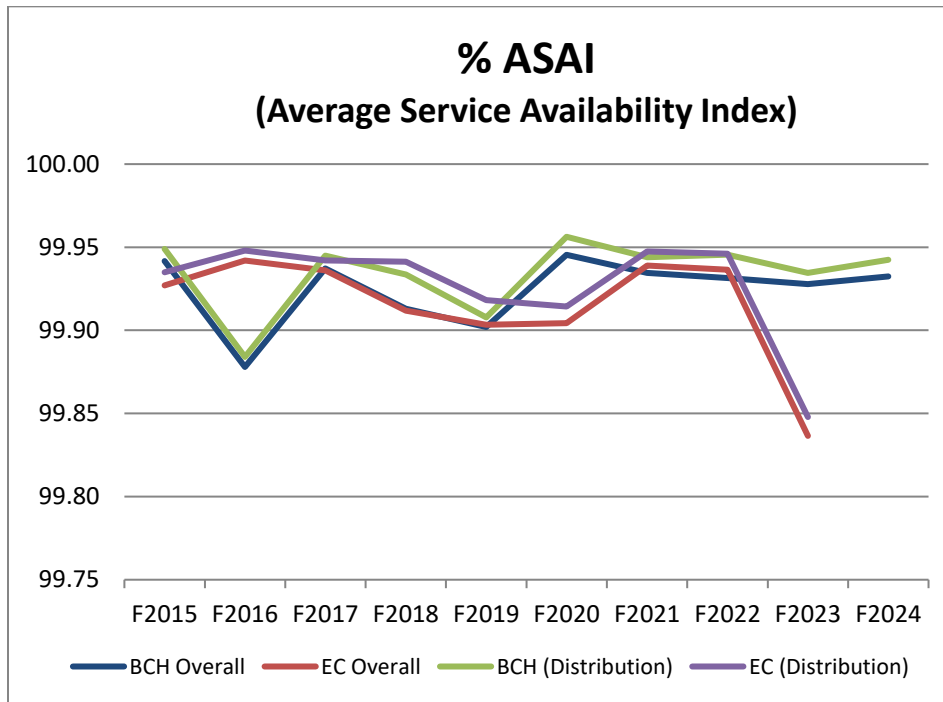
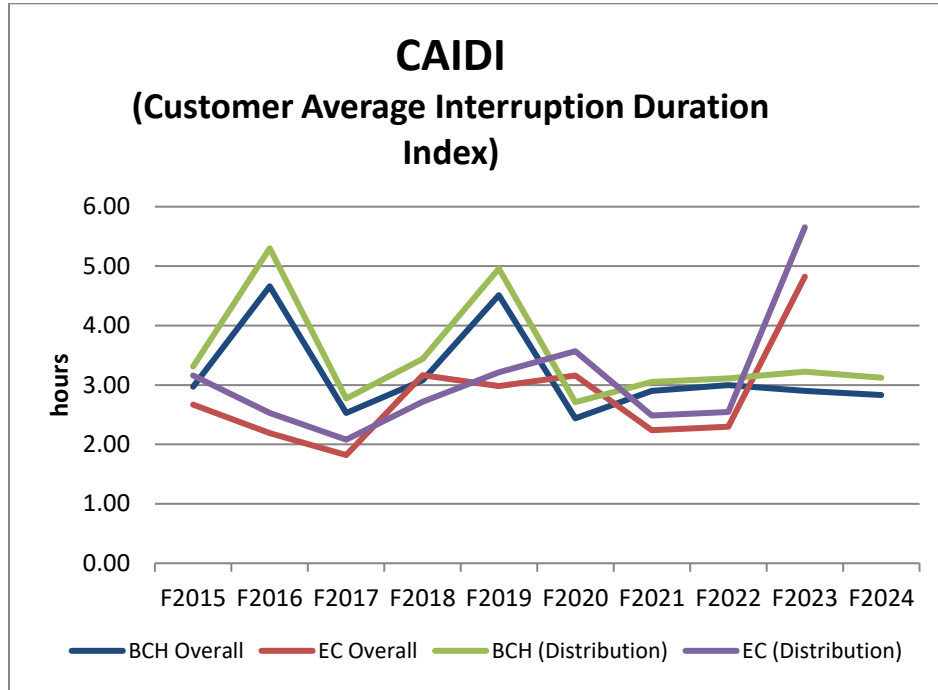
Note: The Electricity Canada Bulk Electricity Study program reports only on forced outage results as not all the participating utilities report planned outages.

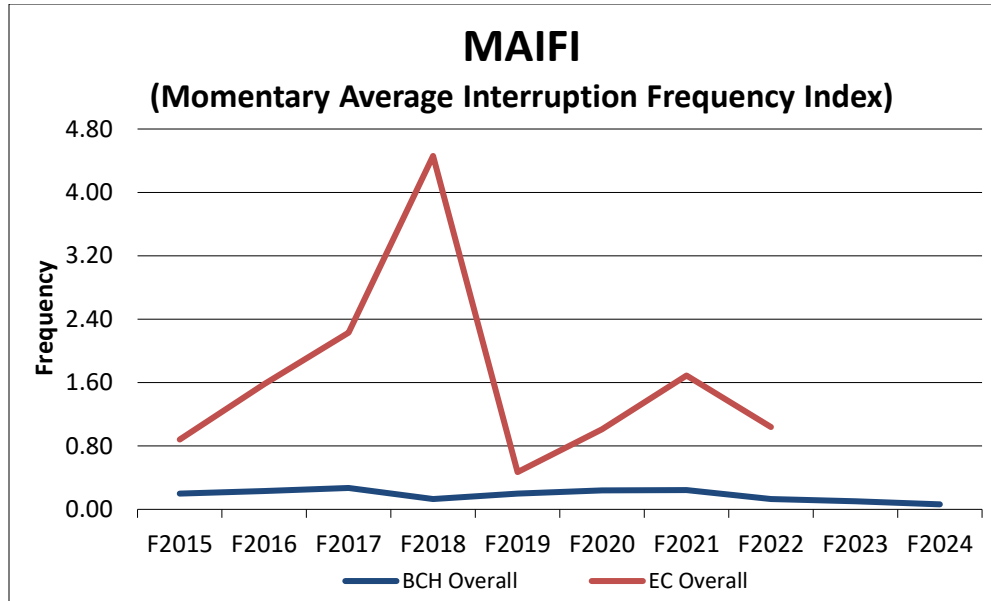
<sup>1</sup> F2023 BCH transmission metrics have been revised due to additional outages reported after fiscal year-end and updated system energy supply values.



Distribution Graphs

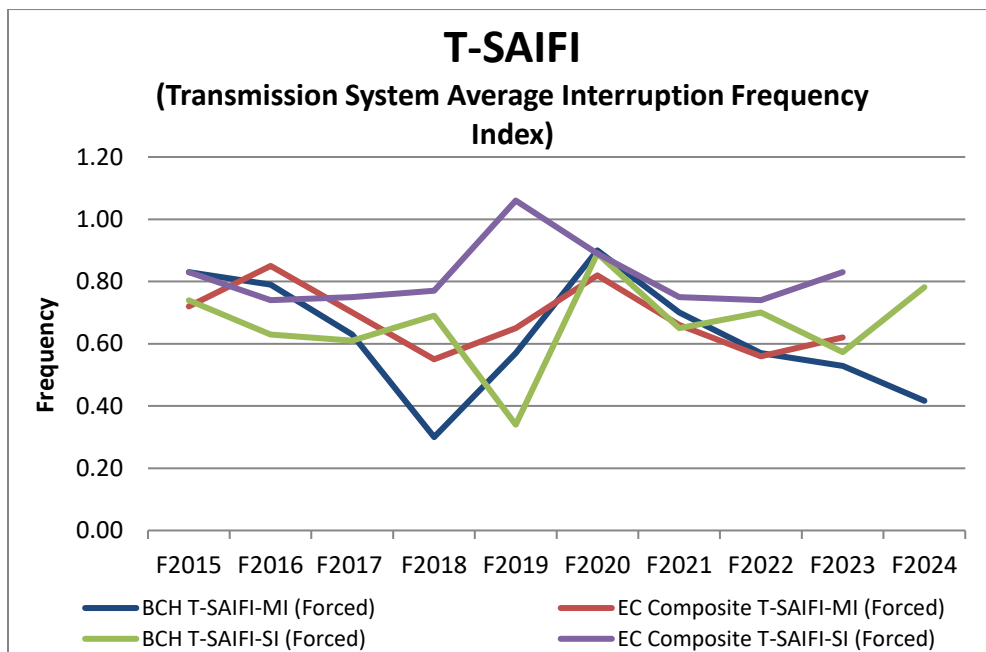


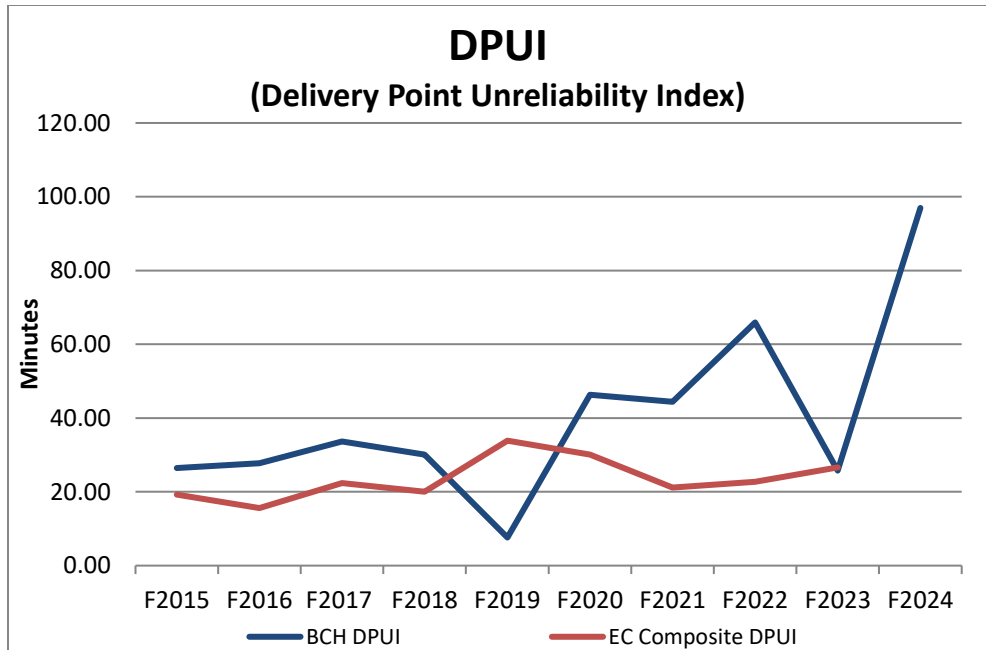
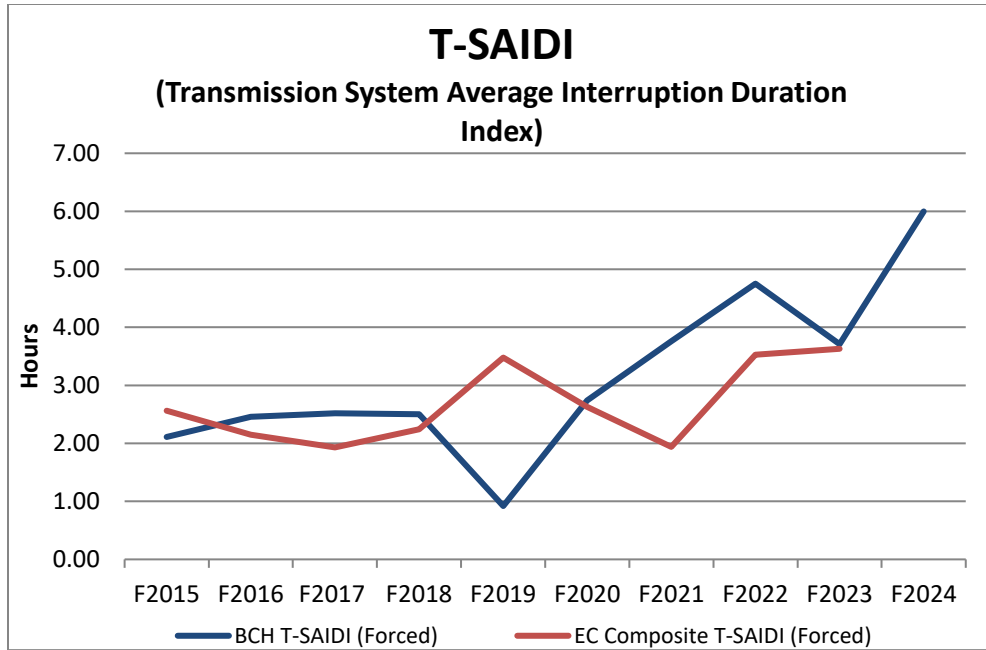


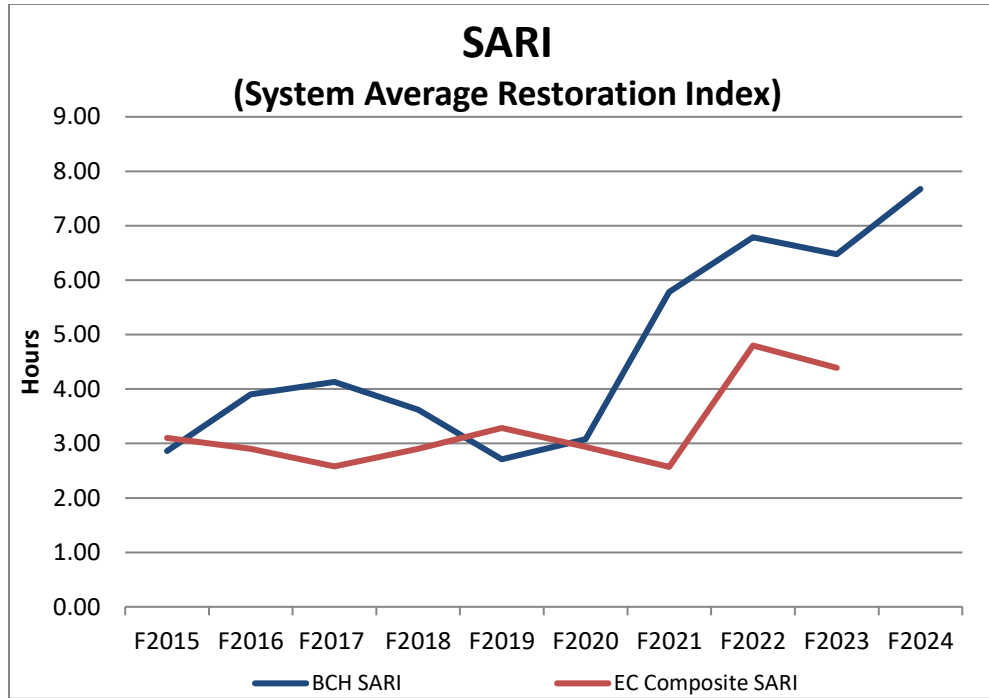


Note: The customer momentary interruptions and the resulting MAIFI may not apply to the utility's total customer population in the Electricity Canada comparison. Momentary outages are any interruptions on the feeders of less than one-minute duration, caused by disturbance on the distribution, substation, or transmission system. Electricity Canada did not benchmark MAIFI in calendar 2022.

**Transmission Graphs**







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**F05/F06 Revenue Requirements Application  
Annual Response to Directive 26 of BCUC Decision**

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**F2024 Annual Reporting of Reliability Indices**

**Attachment 2**

**Generation Reliability Indices**

## F2024 Annual Reporting of Reliability Indices Attachment 2 - Generation Reliability Indices

Fiscal Year	BC Hydro Hydroelectric Units Non-Weighted Average					BC Hydro Hydroelectric Units - Weighted Average <sup>Note 8</sup>					Calendar Year	Electricity Canada Hydroelectric Units Non-Weighted Average			
	Non-Weighted Average Availability Factor (%)	Non-Weighted Average Operating Factor (%)	Non-Weighted Average Forced Outage Count (Including starting failures) (Internal) <sup>Note 1</sup>	Non-Weighted Average Forced Outage Factor (%) (Including starting failures) (Internal) <sup>Note 1</sup>	Non-Weighted Average Failure Rate	Weighted Average Availability Factor (%)	Weighted Average Operating Factor (%)	Weighted Average Forced Outage Count (Including starting failures) (Internal) <sup>Note 1</sup>	Weighted Average FOF (%) (Including starting failures) (Internal) <sup>Note 1</sup>	Weighted Average Failure Rate		Non-Weighted Average Availability Factor (%)	Non-Weighted Average Operating Factor (%)	Non-Weighted Average Forced Outage Count (Including starting failures) (Internal) <sup>Note 1</sup>	Non-Weighted Average Forced Outage Factor (%) (Including starting failures) (Internal) <sup>Note 1</sup>
F2015 <sup>Note 3</sup>	81.1	65.1	2.4	3.7	2.9	83.5	62.4	2.6	1.3	3.7	C2014	87.5	73.5	2.4	5.0
F2016 <sup>Note 3</sup>	82.2	65.9	2.0	4.1	2.4	85.1	66.7	1.8	2.6	2.3	C2015	87.9	70.4	3.2	4.7
F2017 <sup>Note 3</sup>	81.7	67.6	1.8	4.4	1.9	83.4	65.2	2.3	3.5	3.2	C2016	86.7	71.7	3.1	4.8
F2018 <sup>Note 3</sup>	80.5	65.5	1.7	2.6	2.0	84.1	66.0	1.8	0.7	2.4	C2017	86.7	73.0	3.3	4.9
F2019 <sup>Note 3</sup>	79.6	61.9	2.0	2.8	2.3	86.0	63.4	1.9	0.6	2.0	C2018	85.6	67.8	3.7	5.0
F2020 <sup>Note 4</sup>	78.8	59.1	2.0	4.3	2.3	81.4	61.3	1.8	1.6	2.1	C2019	87.1	70.8	3.3	3.7
F2021 <sup>Note 4</sup>	81.4	63.8	1.9	2.8	2.2	86.4	68.7	1.8	1.3	1.9	C2020	89.2	73.0	3.9	3.6
F2022 <sup>Note 5</sup>	77.5	64.1	2.2	4.8	2.6	80.2	66.6	2.1	2.2	3.2	C2021	86.1	66.7	2.7	3.5
F2023 <sup>Note 5</sup>	80.8	63.2	2.2	4.2	2.3	83.0	69.8	2.6	1.4	2.9	C2022	86.2	70.1	2.5	3.6
F2024 <sup>Note 7</sup>	80.7	58.0	1.7	4.2	1.9	86.0	59.6	1.3	1.0	1.7	C2023	n/a	n/a	n/a	n/a

**Definitions**

- Availability Factor** = Operating Time + Available-But-Not-Operating Time / In Commercial Service Time <sup>Note 7</sup>
- Forced Outage Count** = Average Number of Forced Outages / Unit / Year (including Starting Failures)(Internal)
- Forced Outage Factor** = Forced Outage Time (including Starting Failures)(Internal) / In Commercial Service Time <sup>Note 7</sup>
- Failure Rate** = Forced Outage Count (excluding Starting Failures)(Internal) / Operating Time X In Commercial Service Time <sup>Note 7</sup>

**Notes**

1. Outages with causes that were external to Generation, such as Transmission System forced outages, are excluded from this measure.
2. Data excludes ALU Unit 1 and SHU Unit 1, which have been forced out of service for an extended period.
3. Data excludes ALU Unit 1, SHU Unit 1 and ELK Units 1 and 2 which have been forced out of service for an extended period.
4. Data excludes ALU Unit 1, SHU Unit 1, ELK Units 1 and 2 and SPN Unit 1,2 and 3 which have been forced out of service for an extended period.
5. Data excludes ALU Unit 1, SHU Units 1 and 2, ELK Units 1 and 2, SPN Unit 1,2,3 and FLS Unit 1 which have been forced out of service for an extended period.
6. Data excludes ALU Unit 1, SHU Units 1, ELK Units 1 and 2, SPN Unit 1,2,3 and FLS Unit 1 which have been forced out of service for an extended period.

