



FOR GENERATIONS

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May 14, 2015

Ms. Erica Hamilton
Commission Secretary
British Columbia Utilities Commission
Sixth Floor – 900 Howe Street
Vancouver, BC V6Z 2N3

Dear Ms. Hamilton:

**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 Commission Decision on F2005/F2006
Revenue Requirements Application (F05/F06 RRA)**

BC Hydro writes in compliance with Directive 26 of the Commission's decision on BC Hydro's F05/F06 RRA to provide its annual reporting of reliability indices.

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/F2008 RRA. BC Hydro has since filed annual reports to the Commission on these reliability indices for each year starting in May 2007. Transmission system reliability indices for years prior to F2012 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 F2012, subsequent to the integration of BC Hydro and BCTC in F2011.

In this filing, BC Hydro is providing reliability indices for distribution, transmission and generation performance through F2015.

Directive 26 of the F05/F06 RRA Decision

"The Commission Panel expects BC Hydro and BCTC to present their 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 CEA averages."

May 14, 2015
Ms. Erica Hamilton
Commission Secretary
British Columbia Utilities Commission
Annual Reporting of Reliability Indices
Annual Response to Directive 26 of Commission Decision on F2005/F2006 Revenue
Requirements Application (F05/F06 RRA)

Distribution and Transmission Update

The most recent annual Canadian Electricity Association (**CEA**) reports for distribution and transmission include the 2013¹ Annual Service Continuity Report on Distribution System Performance in Electrical Utilities and the 2013 Bulk Electricity System. The comparative information for BC Hydro is provided in Attachment 1 in tabular and graphical form, both overall and disaggregated for the distribution and transmission system.

Generation Performance Update

As in previous years, BC Hydro generation reliability statistics are provided on a fiscal year basis. CEA calendar year data is provided for comparison, as is done with BC Hydro distribution and transmission reliability statistics.

The most recent annual CEA report on generation performance is the 2013 Generation Equipment Status Annual Report. CEA data on generation performance for the 2014 calendar year are not yet available. BC Hydro's generation reliability indices are presented for the 10-year period ending F2015, along with CEA generation data through 2013, in tabular and graphical form in Attachment 2.

For further information, please contact Fred James at 604-623-4317 or by email at bchydroregulatorygroup@bchydro.com.

Yours sincerely,

Original signed

Geoffrey Higgins
Acting Chief Regulatory Officer

ls/ma

Enclosures (2)

¹ In BC Hydro's submission of the F2014 Annual Reporting of Reliability Indices, BC Hydro incorrectly referred to a 2014 instead of a 2013 Annual Service Continuity Report on Distribution System Performance in Electrical Utilities.

**F2015 Annual Reporting of Reliability Indices
(Annual Response to Directive 26
of BCUC Decision on F05/F06 RRA)**

Attachment 1

Distribution and Transmission Indices

**BC Hydro's 2015 Annual Reporting of Reliability Indices
(Directive 26 of BCUC Decision on F05/F06 RRA)
Attachment 1**

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 over the course of a year
T-SAIFI-MI	a measure of transmission interruptions of less than one minute in duration that a delivery point experiences during a given period
T-SAIFI-SI	a measure of transmission interruptions of one minute or more that a delivery point experiences during a given period
T-SAIDI	a measure of the average total interruption duration, in hours that a delivery point experiences during a given period
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
%ASAI	a measure of the percentage of time service is available in the year
CEMI-4	percentage of customers experiencing four or more outages during a 12-month period
MAIFI	a measure of the frequency of momentary (less than one minute) interruptions per distribution customer served
DPUI	a measure of overall bulk electricity system performance in terms of a composite index of unreliability expressed in system minutes during a year. It takes into account all forced and planned outages except interruptions attributed to generators
SARI	a measure of the average restoration time, in hours, for each transmission delivery point

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.

**BC Hydro's 2015 Annual Reporting of Reliability Indices
(Directive 26 of BCUC Decision on F05/F06 RRA)
Attachment 1**

Table 1 Reliability Indices – BC Hydro Overall and CEA Overall

Year	BC Hydro Overall				CEA Overall			
	SAIFI	SAIDI	CAIDI	%ASAI	SAIFI	SAIDI	CAIDI	%ASAI
F1996	1.40	3.04	2.17	99.965	2.80	3.06	1.09	99.965
F1997	1.43	2.95	2.03	99.966	2.39	2.86	1.20	99.967
F1998	1.13	2.00	1.76	99.977	2.35	3.70	1.57	99.958
F1999	1.50	4.23	2.82	99.952	2.40	3.32	1.38	99.962
F2000	1.21	2.28	1.88	99.974	2.59	4.31	1.67	99.951
F2001	1.18	2.51	2.13	99.971	2.26	3.23	1.43	99.963
F2002	1.41	3.60	2.55	99.959	2.41	3.67	1.52	99.958
F2003	1.45	3.77	2.60	99.957	2.33	4.06	1.74	99.954
F2004	1.63	4.51	2.77	99.949	2.67	10.65	3.99	99.878
F2005	1.47	3.96	2.69	99.955	1.98	3.95	2.00	99.955
F2006	1.78	3.82	2.15	99.956	2.13	4.80	2.26	99.945
F2007	2.78	11.40	4.09	99.870	2.53	7.85	3.11	99.910
F2008	1.90	5.68	2.99	99.935	2.32	5.47	2.36	99.938
F2009	1.92	5.24	2.73	99.940	2.34	6.29	2.69	99.928
F2010	1.71	4.25	2.49	99.952	2.01	4.20	2.09	99.952
F2011	1.89	5.28	2.80	99.940	2.20	5.17	2.35	99.941
F2012	1.92	5.08	2.65	99.942	2.63	6.16	2.34	99.930
F2013	1.59	3.70	2.33	99.958	2.54	4.66	1.83	99.947
F2014	1.83	5.19	2.83	99.941	2.72	9.49	3.49	99.892
F2015	1.72	5.11	2.97	99.942	n/a	n/a	n/a	n/a

**BC Hydro's 2015 Annual Reporting of Reliability Indices
(Directive 26 of BCUC Decision on F05/F06 RRA)
Attachment 1**

Table 2 Reliability Indices – BC Hydro (Distribution) and CEA (Distribution)

Year	BC Hydro (Distribution)				CEA (Distribution)			
	SAIFI	SAIDI	CAIDI	%ASAI	SAIFI	SAIDI	CAIDI	%ASAI
F1996	0.95	2.66	2.78	99.970	1.85	2.51	1.35	99.971
F1997	0.88	2.35	2.64	99.973	1.74	2.39	1.38	99.973
F1998	0.70	1.60	2.28	99.982	1.70	3.21	1.87	99.963
F1999	1.02	3.61	3.54	99.959	1.69	2.82	1.67	99.968
F2000	0.65	1.80	2.78	99.979	1.93	3.80	1.97	99.957
F2001	0.73	1.98	2.72	99.977	1.77	2.83	1.60	99.968
F2002	0.86	2.94	3.43	99.966	1.86	3.19	1.71	99.964
F2003	0.89	3.18	3.59	99.964	1.74	3.55	2.03	99.960
F2004	1.21	3.50	2.89	99.960	1.89	5.69	3.01	99.935
F2005	1.06	3.57	3.35	99.959	1.56	3.49	2.24	99.960
F2006	1.25	3.27	2.61	99.963	1.74	4.33	2.49	99.951
F2007	2.29	10.49	4.58	99.880	2.11	7.35	3.49	99.916
F2008	1.45	5.01	3.44	99.943	1.86	4.94	2.66	99.944
F2009	1.42	4.54	3.21	99.948	1.88	5.65	3.01	99.936
F2010	1.21	3.61	2.98	99.959	1.59	3.63	2.28	99.959
F2011	1.43	4.77	3.34	99.946	1.74	4.65	2.67	99.947
F2012	1.37	4.40	3.22	99.950	2.09	5.59	2.68	99.936
F2013	1.06	3.08	2.92	99.965	1.86	4.13	2.22	99.953
F2014	1.45	4.66	3.20	99.947	2.05	8.59	4.19	99.902
F2015	1.34	4.44	3.31	99.949	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
F2010	1.52	3.50	2.29	13.18	99.960
F2011	1.61	3.83	2.38	15.26	99.956
F2012	1.67	3.89	2.34	15.37	99.956
F2013	1.46	3.33	2.28	10.45	99.962
F2014	1.68	4.14	2.46	12.52	99.953
F2015	1.35	3.37	2.49	10.13	99.962

**BC Hydro's 2015 Annual Reporting of Reliability Indices
(Directive 26 of BCUC Decision on F05/F06 RRA)
Attachment 1**

Table 4 Reliability Indices – BC Hydro CEMI-4 Overall

Year	BC Hydro Overall	
	CEMI-4 %	
F2010	15.22	
F2011	19.26	
F2012	17.43	
F2013	12.88	
F2014	15.10	
F2015	15.15	

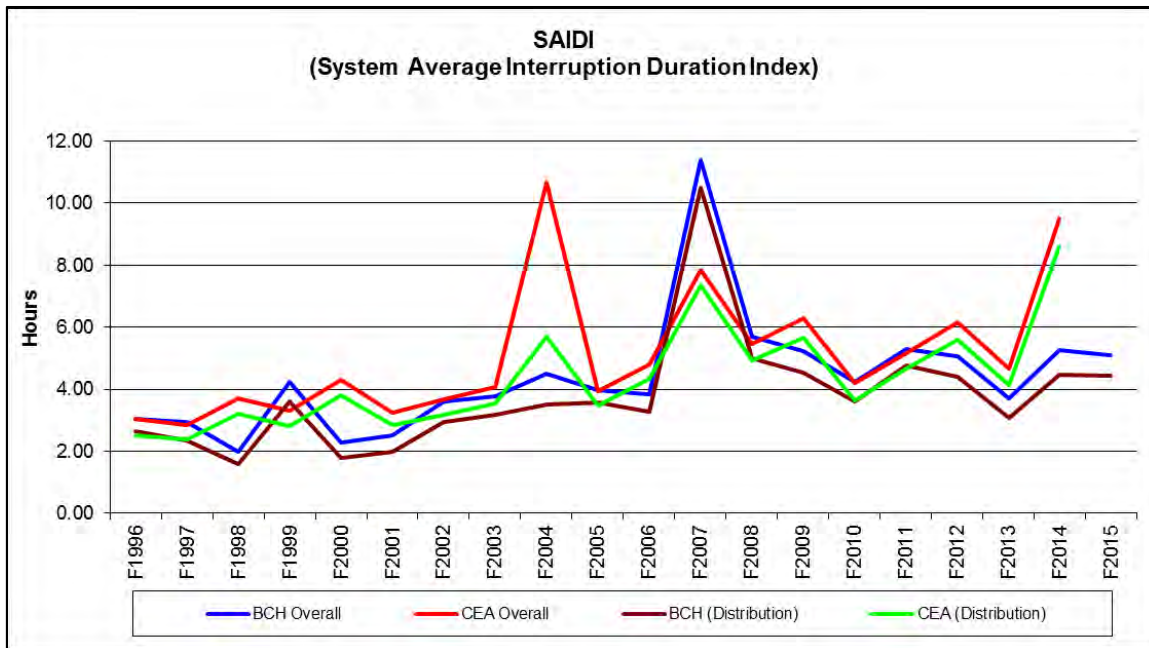
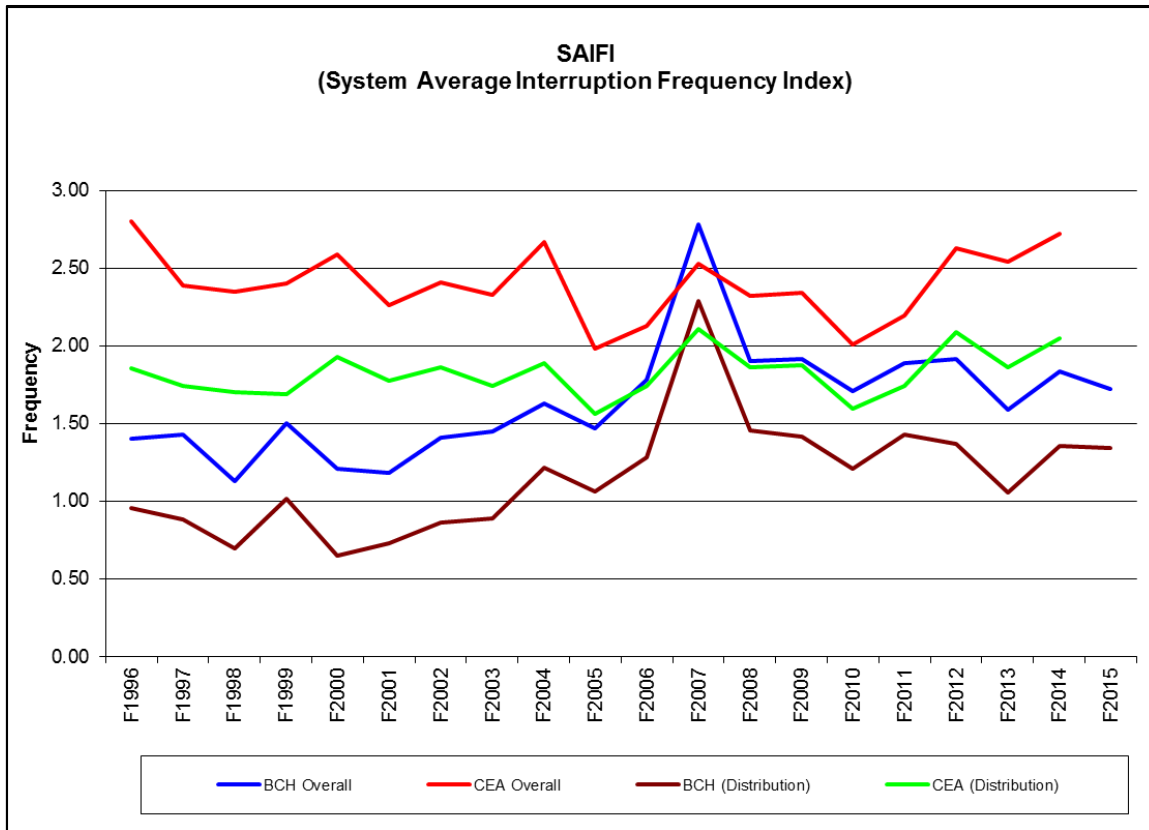
Note: CEA does not survey for CEMI-4 or IEEE 2.5 Beta

**Table 5 Reliability Indices – BC Hydro (Transmission)
and CEA (Transmission) (Forced Data)**

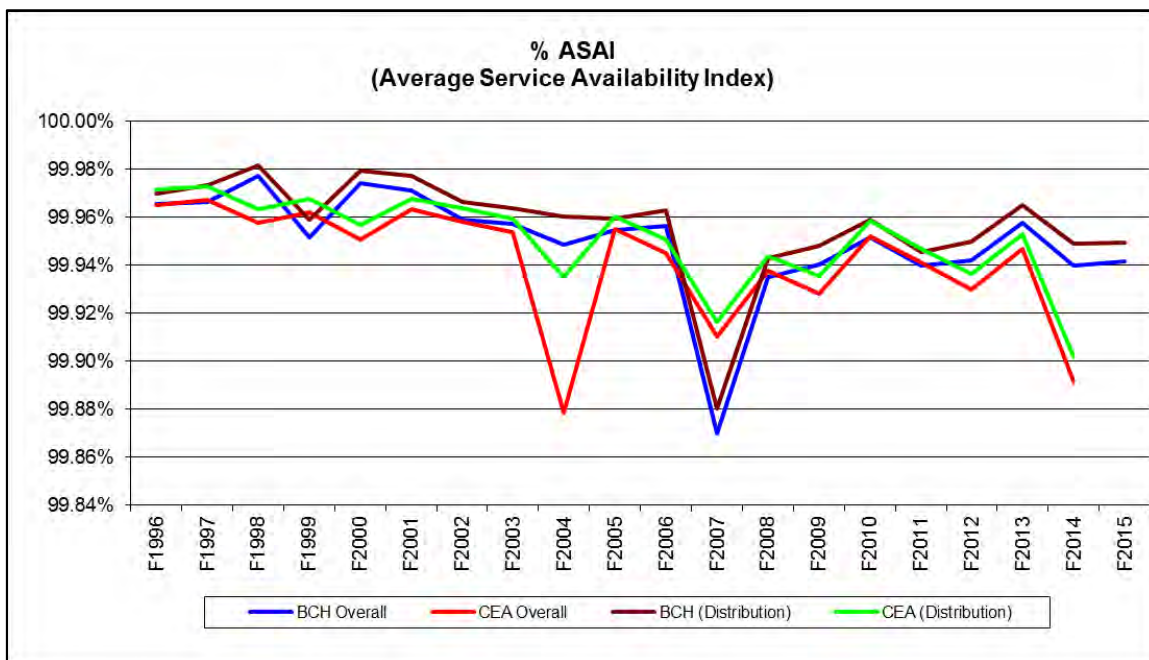
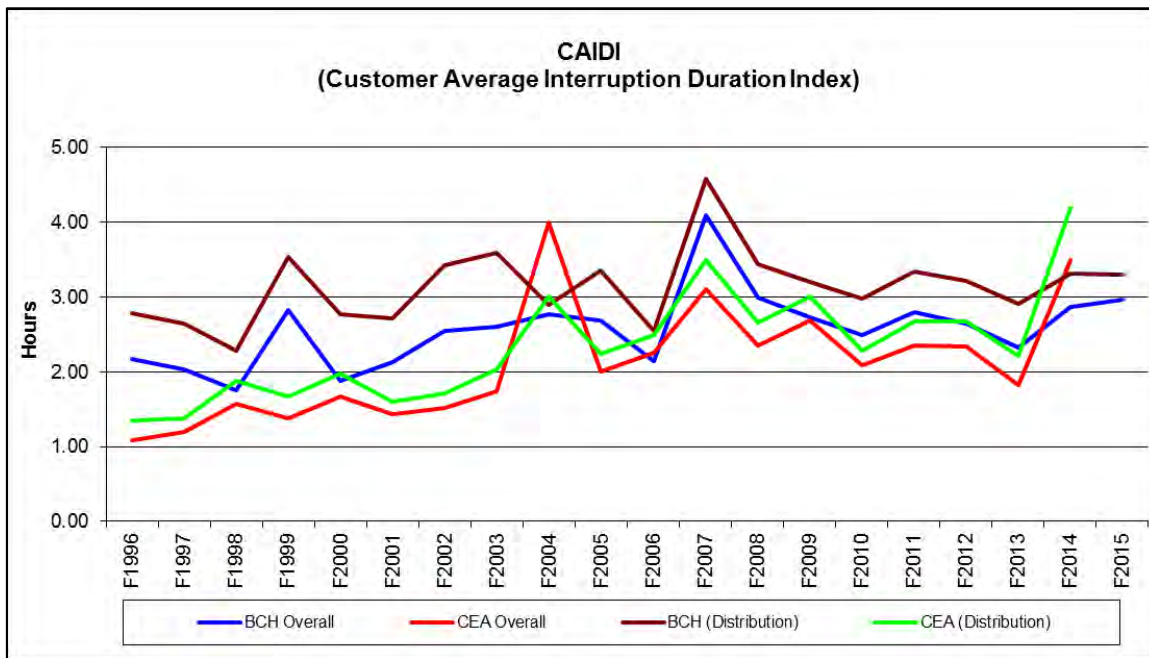
Year	BC Hydro (Transmission) (Forced)					CEA (Transmission) (Forced)				
	T-SAIFI-MI	T-SAIFI-SI	T-SAIDI	DPUI	SARI	T-SAIFI-MI	T-SAIFI-SI	T-SAIDI	DPUI	SARI
F2005	0.90	0.82	1.68	18.02	1.96	0.67	0.85	1.51	21.00	1.65
F2006	0.75	0.91	1.73	25.31	1.87	0.81	0.85	1.29	32.00	1.52
F2007	1.26	1.11	3.80	47.16	1.87	0.91	0.79	1.54	25.51	1.52
F2008	0.87	0.83	2.11	50.54	3.40	0.87	0.74	1.30	18.82	1.94
F2009	0.65	0.72	1.93	35.13	2.42	0.64	0.75	1.23	21.48	1.64
F2010	0.72	1.02	2.31	26.99	2.44	1.01	0.71	1.41	24.98	1.98
F2011	0.38	0.71	1.30	11.31	1.83	0.54	0.64	1.39	13.22	2.16
F2012	0.43	0.86	1.55	19.39	1.81	0.84	0.81	1.73	23.35	2.13
F2013	0.56	0.74	1.64	17.16	2.19	0.84	0.90	4.48	51.18	4.98
F2014	0.74	0.87	2.57	25.18	3.01	0.86	0.83	2.59	27.07	3.11
F2015	0.83	0.74	2.11	26.41	2.86	n/a	n/a	n/a	n/a	n/a

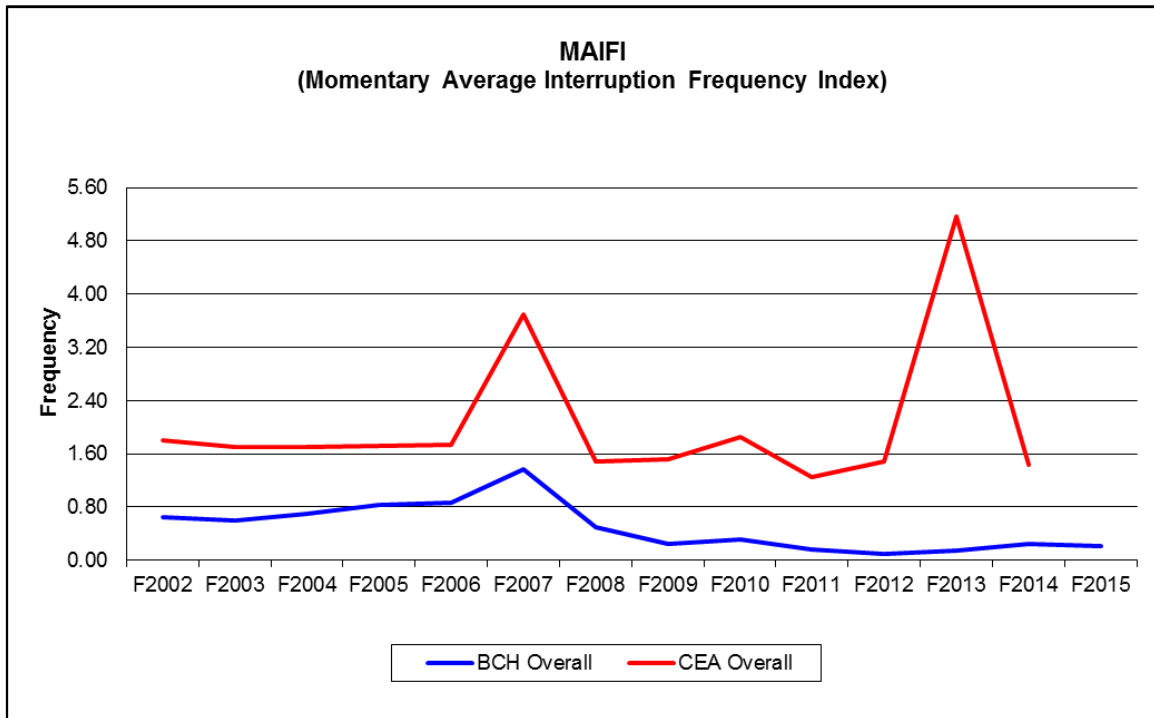
Note: The CEA Bulk Electricity Study program reports only on forced outage results as not all the participating utilities report planned outages.

Distribution Graphs



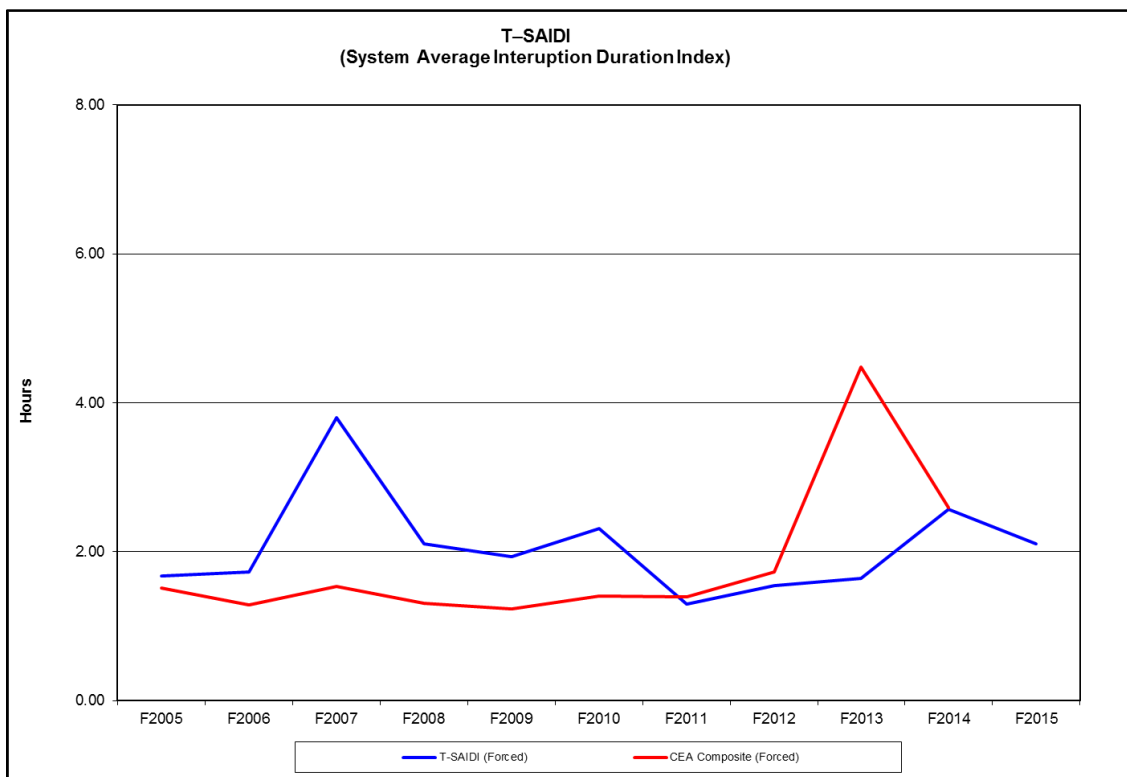
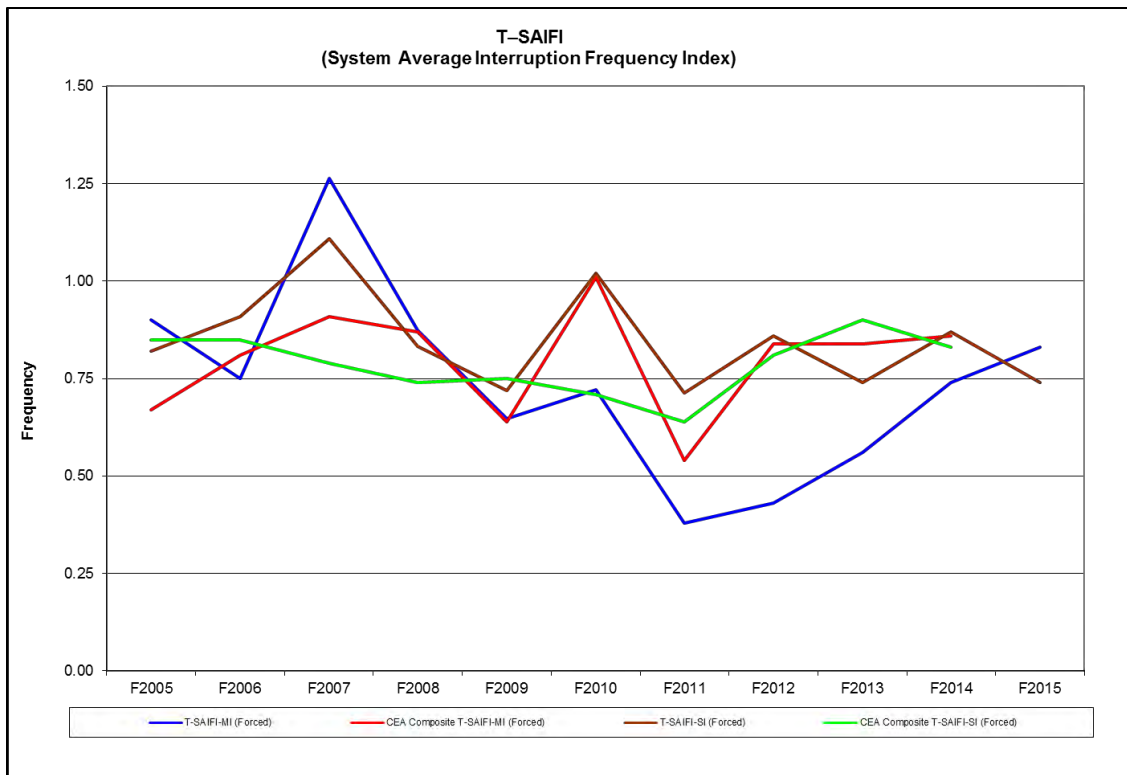
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Attachment 1**



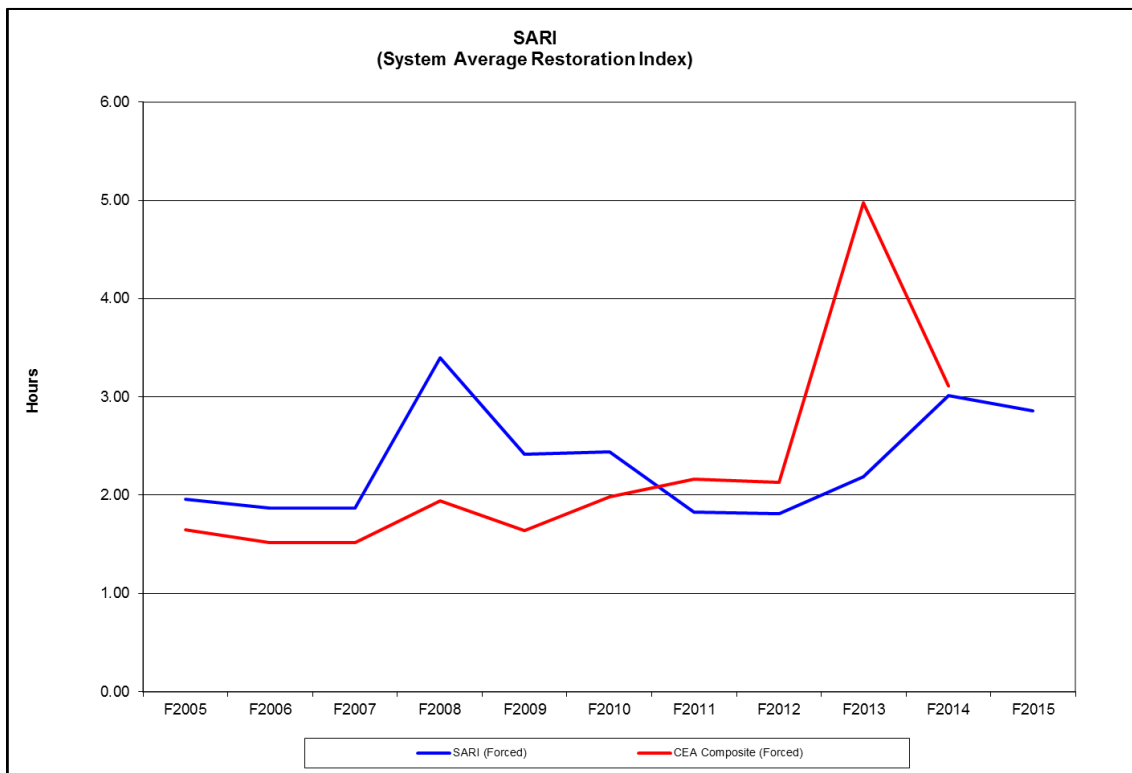
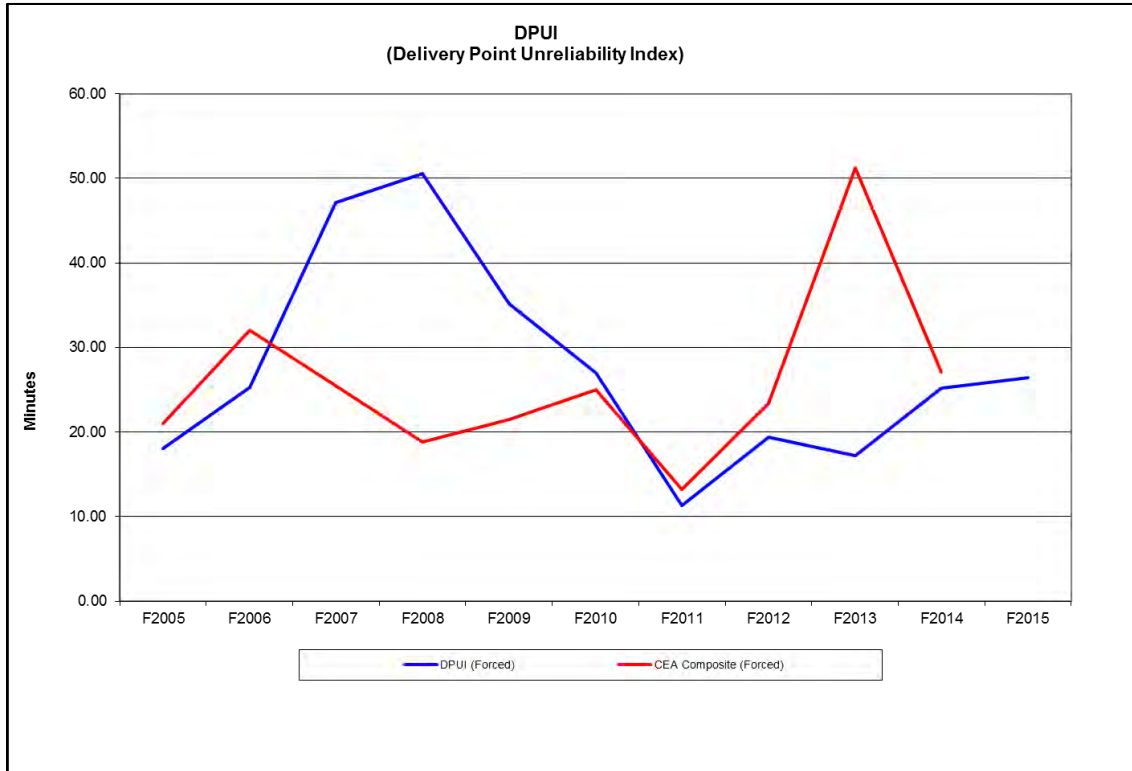


Note: The customer momentary interruptions and the resulting MAIFI may not apply to the utility's total customer population in the CEA comparison. Momentary outages are any interruptions on the feeders of less than one minute duration, caused by disturbance on the distribution, substation or transmission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

Transmission Graphs



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Attachment 1**



**F2015 Annual Reporting of Reliability Indices
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of BCUC Decision on F05/F06 RRA)**

Attachment 2

Generation Reliability Indices

**BC Hydro's 2015 Annual Reporting of Reliability Indices
(Directive 26 of BCUC Decision on F05/F06 RRA)
Attachment 2**

Fiscal Year	BC Hydro Hydroelectric Units					CEA Hydroelectric Units				
	Average Availability Factor (%)	Average Forced Outage Factor (%) (Including starting failures) (Internal) ^{Note 1}	Average Forced Outage Count (Including starting failures) (Internal) ^{Note 1}	Failure Rate	Average Operating Factor (%)	Average Availability Factor (%)	Average Forced Outage Factor (%) (Including starting failures) (Internal) ^{Note 1}	Average Forced Outage Count (Including starting failures) (Internal) ^{Note 1}	Failure Rate	Average Operating Factor (%)
F2006	90.5	0.9	2.5	2.1	74.4	90.2	1.6	3.2	2.3	74.2
F2007	88.6	1.6	2.1	2.0	73.6	90.2	1.8	2.8	2.1	73.0
F2008	85.8	2.9	2.2	2.1	74.8	92.2	1.8	2.5	2.0	74.2
F2009	85.6	5.2	2.0	2.1	71.3	93.5	2.0	2.5	2.1	80.0
F2010	84.7	2.2	2.1	2.3	68.7	91.8	1.4	2.4	2.0	77.1
F2011	81.9	5.1	2.0	1.9	68.0	90.4	3.0	2.2	1.9	70.3
F2012	82.2	5.0	2.4	2.7	69.8	88.4	3.9	2.5	2.2	72.5
F2013	82.7	3.4	2.0	2.3	72.6	89.2	3.8	2.5	2.3	72.0
F2014 ^{Note 2}	80.5	4.7	2.5	2.7 ^{Note 5}	64.7	87.9	3.9	2.4	2.1	74.0
F2015 ^{Note 3}	81.1	3.7	2.4	2.9	65.1	n/a	n/a	n/a	n/a	n/a

Definitions

- Availability Factor** = Operating Time + Available-But-Not-Operating Time / In Commercial Service Time ^{Note 4}
- Forced Outage Factor** = Forced Outage Time (including Starting Failures)(Internal) / In Commercial Service Time ^{Note 4}
- Forced Outage Count** = Average Number of Forced Outages / Unit / Year (including Starting Failures)(Internal)
- Failure Rate** = Forced Outage Count (excluding Starting Failures)(Internal) / Operating Time X In Commercial Service Time ^{Note 4}
- Operating Factor** = Generating Time + Sync-Condense Time / In Commercial Service Time ^{Note 4}

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. In Commercial Service Time represents the number of hours in the measurement period that the unit(s) were considered part of the active fleet.
5. The BC Hydro Failure Rate for F2014 was incorrectly reported as 2.4 last year. This has been corrected in the current report.

