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May 15, 2014

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)  
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 in compliance with Directive 26 of the BCUC'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 BCUC 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 F2014.

**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."

**Distribution and Transmission Update**

The most recent annual Canadian Electricity Association (**CEA**) reports for distribution and transmission include the 2013 Annual Service Continuity Report on Distribution System Performance in Electrical Utilities and the CEA Bulk Electricity System. The

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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**

Previous to 2009, BC Hydro presented generation reliability statistics on a calendar year basis. As a result of changing the system by which generation reliability statistics were recorded, as of April 1, 2009 BC Hydro provided generation statistics 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 2012 Generation Equipment Status Annual Report. CEA data on generation performance for the 2013 calendar year are not yet available. The CEA generation data (2012 and earlier) along with BC Hydro's reliability indices through F2014 are presented in tabular and graphical form in Attachment 2. The CEA Generation Equipment Status Annual Report includes only internal outages (i.e., generation-caused outages); therefore, for comparison purposes, the BC Hydro generation reliability data are reported in the same manner.

For further information, please contact Fred James at 604-623-4317 or by email at [bchydroregulatorygroup@bchydro.com](mailto:bchydroregulatorygroup@bchydro.com).

Yours sincerely,



(for) Janet Fraser  
Chief Regulatory Officer

fj/rh

Enclosure

**F2014 Annual Reporting of Reliability Indices  
(Annual Response to Directive 26  
of BCUC Decision on F05/F06 RRA)**

**Attachment 1**

**Distribution and Transmission Indices**

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**BC Hydro's 2014 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 2014 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%	n/a	n/a	n/a	n/a

**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%	n/a	n/a	n/a	n/a

**BC Hydro's 2014 Annual Reporting of Reliability Indices  
(Directive 26 of BCUC Decision on F05/F06 RRA)**

**Attachment 1**

**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%

**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%

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

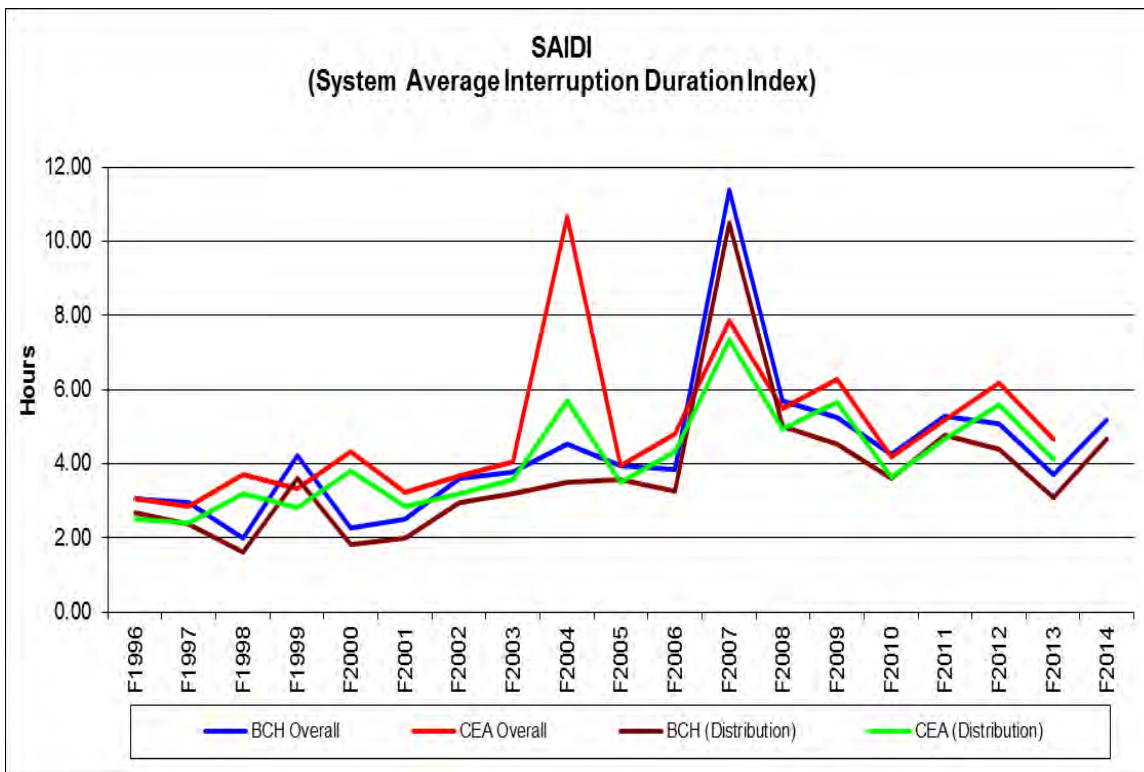
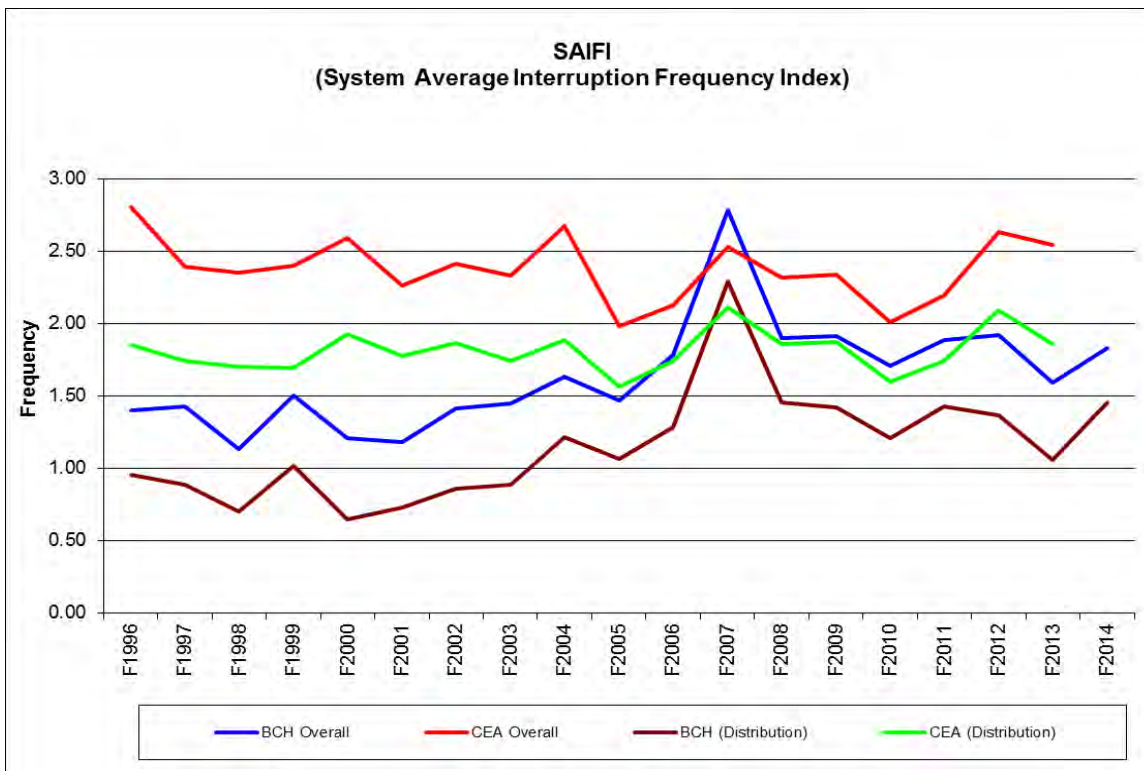
**Table 5 Reliability Indices – BC Hydro (Transmission) and CEA (Transmission) (Forced Data)**

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	n/a	n/a	n/a	n/a	n/a

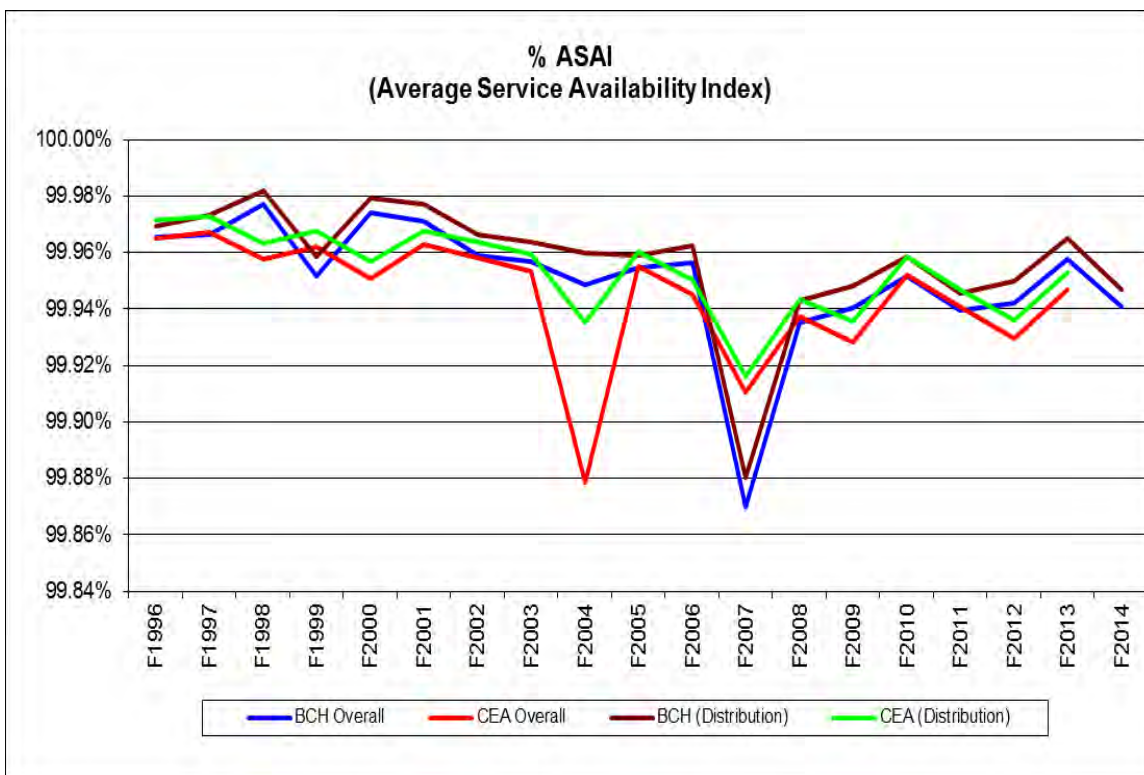
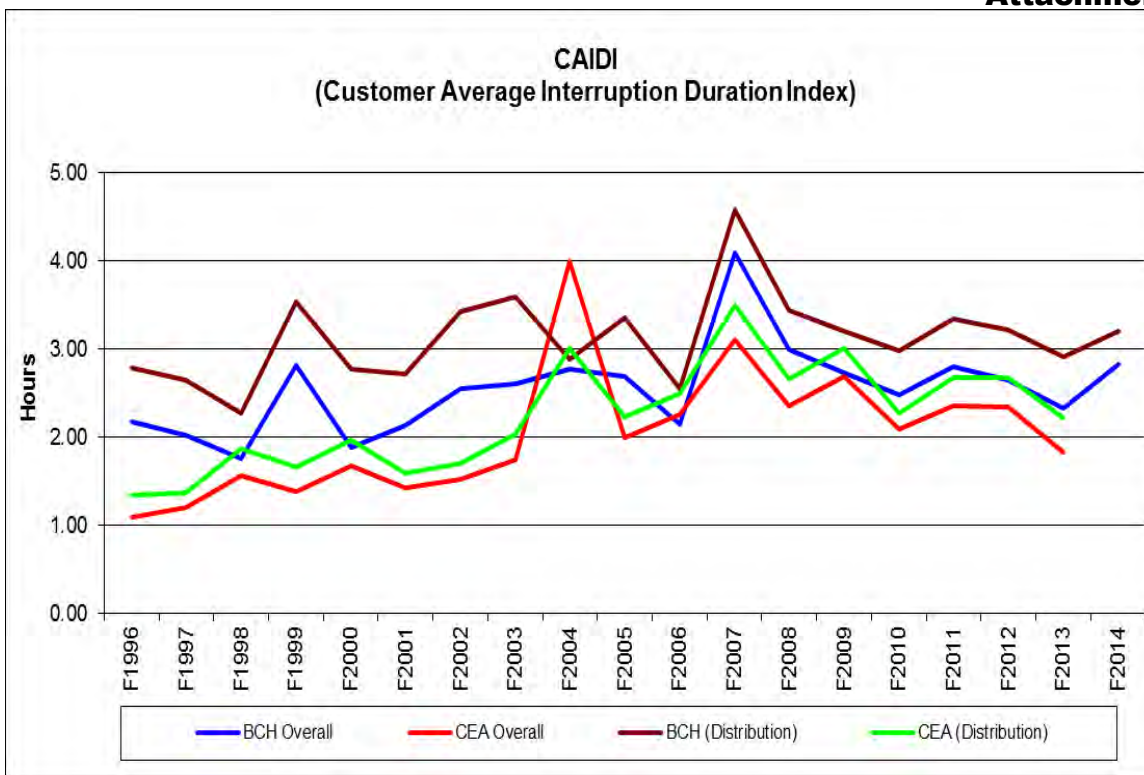
Note: The CEA Bulk Electricity Study program reports only on forced outage results as not all the participating utilities report planned outages.

**BC Hydro's 2014 Annual Reporting of Reliability Indices  
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Attachment 1**

**Distribution Graphs**

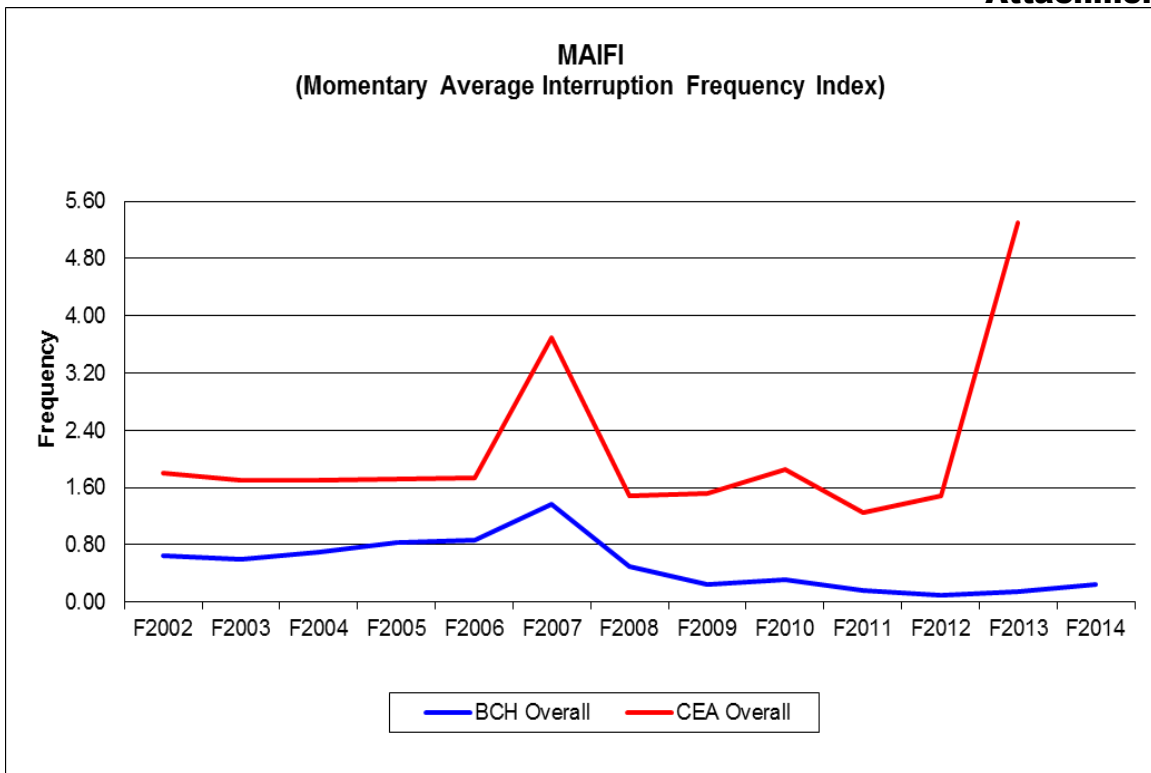


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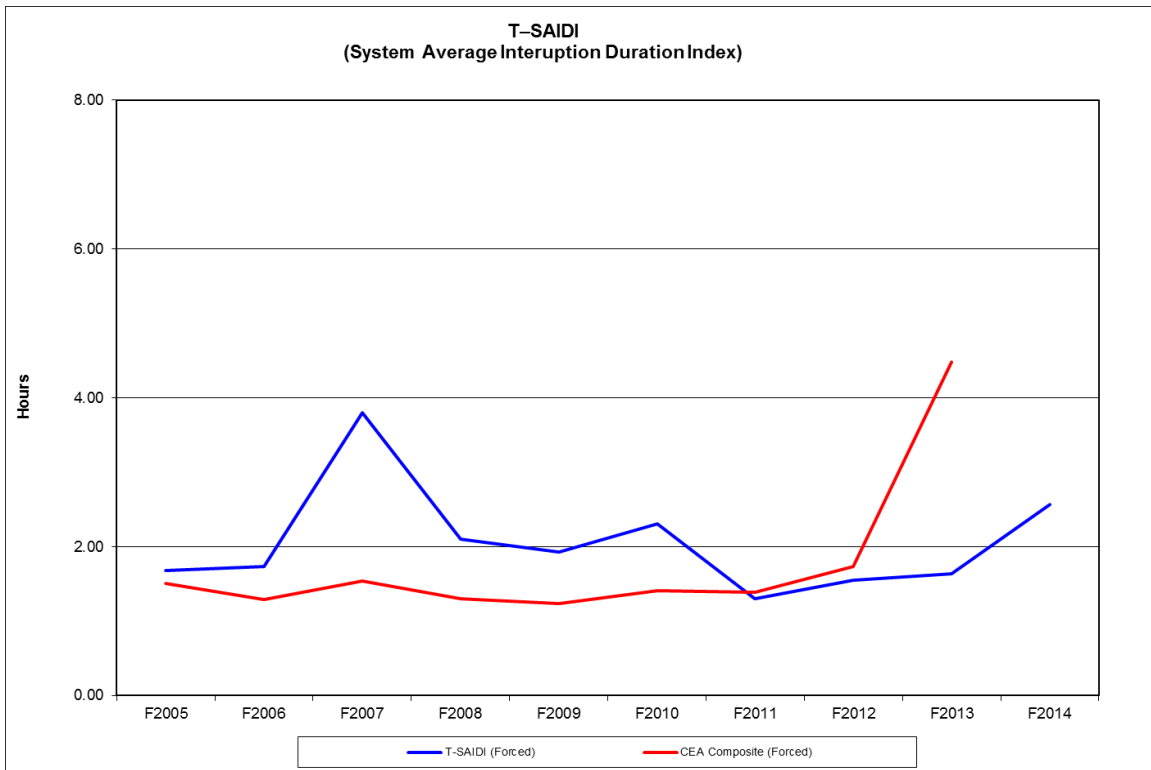
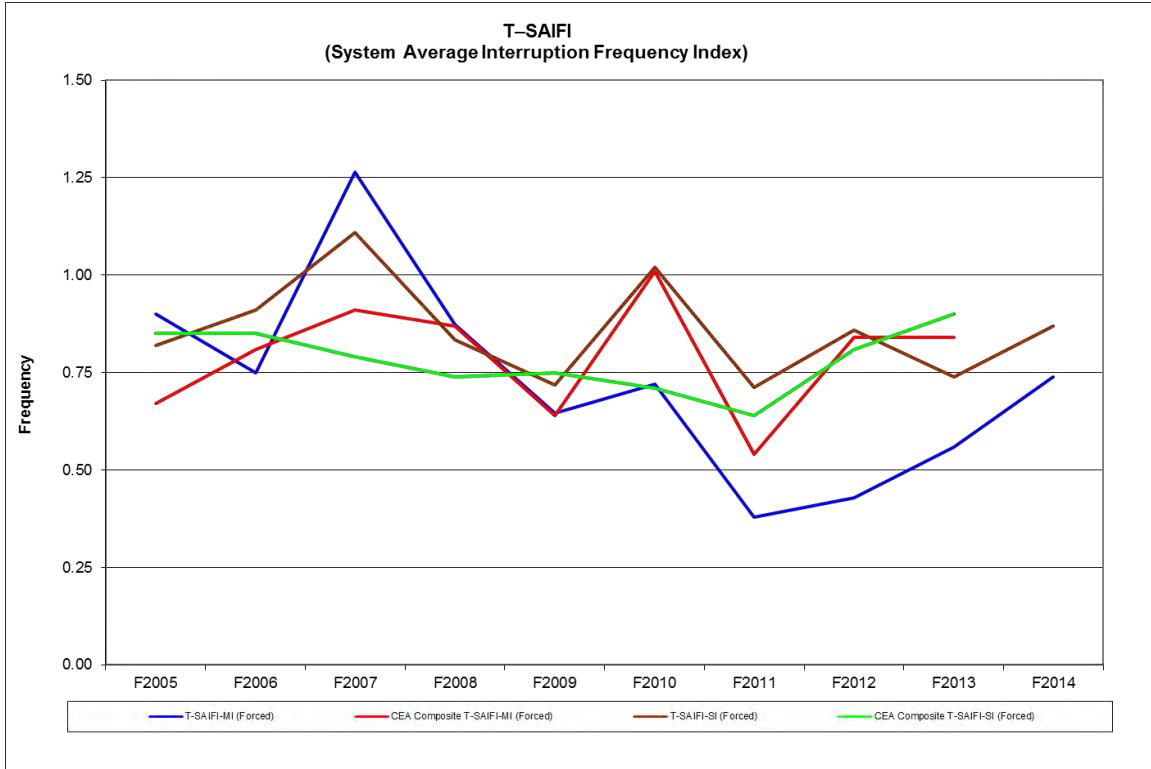
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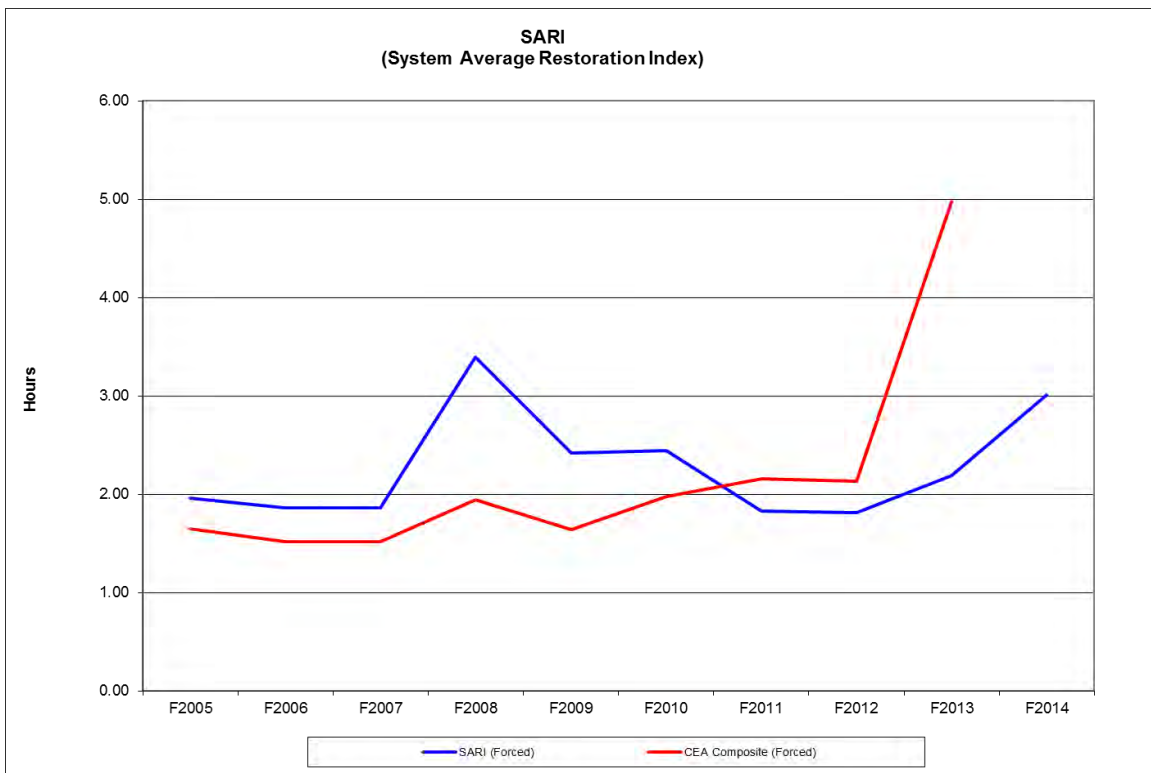
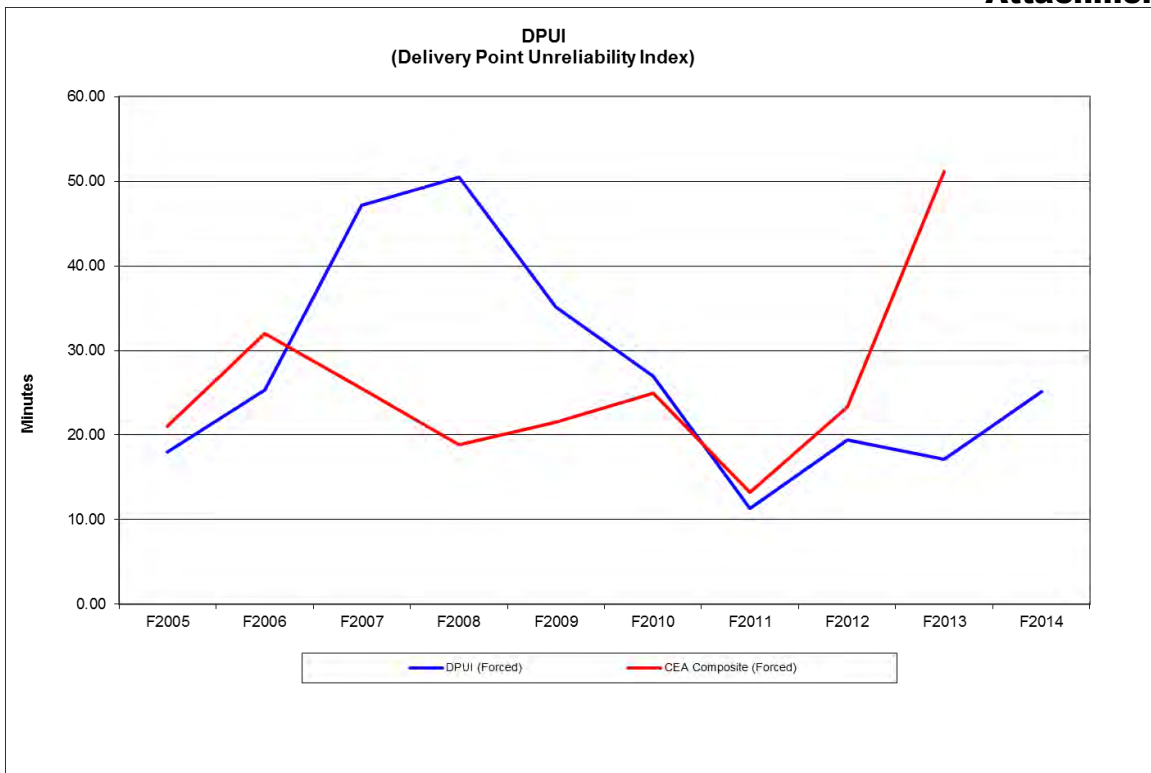
Note: The customer momentary interruptions and the resulting MAIFI may not apply to the utility's total customer population in the CEA comparison. Momentary outages are any interruptions on the feeders of less than one minute duration, caused by disturbance on the distribution, substation or transmission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

**BC Hydro's 2014 Annual Reporting of Reliability Indices  
(Directive 26 of BCUC Decision on F05/F06 RRA)  
Attachment 1**

**Transmission Graphs**



**BC Hydro's 2014 Annual Reporting of Reliability Indices  
(Directive 26 of BCUC Decision on F05/F06 RRA)  
Attachment 1**



**F2014 Annual Reporting of Reliability Indices  
(Annual Response to Directive 26  
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**Attachment 2**

**Generation Reliability Indices**

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**BC Hydro's 2014 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 Operating Factor (%)	Average Forced Outage Count (Including starting failures) (Internal) Note 1	Average Forced Outage Factor (%) (Including starting failures) (Internal) Note 1	Failure Rate	Calendar Year	Average Availability Factor (%)	Average Operating Factor (%)	Average Forced Outage Count (Including starting failures) (Internal) Note 1	Average Forced Outage Factor (%) (Including starting failures) (Internal) Note 1	Failure Rate
F2005	89.0	72.3	2.6	2.3	2.8	C2004	91.2	74.2	3.1	1.5	2.4
F2006	90.5	74.4	2.5	0.9	2.1	C2005	90.2	74.2	3.2	1.6	2.3
F2007	88.6	73.6	2.1	1.6	2.0	C2006	90.2	73.0	2.8	1.8	2.1
F2008	85.8	74.8	2.2	2.9	2.1	C2007	92.2	74.2	2.5	1.8	2.0
F2009	85.6	71.3	2.0	5.2	2.1	C2008	93.5	80.0	2.5	2.0	2.1
F2010	84.7	68.7	2.1	2.2	2.3	C2009	91.8	77.1	2.4	1.4	2.0
F2011	81.9	68.0	2.0	5.1	1.9	C2010	90.4	70.3	2.2	3.0	1.9
F2012	82.2	69.8	2.4	5.0	2.7	C2011	88.4	72.5	2.5	3.9	2.2
F2013	82.7	72.6	2.0	3.4	2.3	C2012	89.2	72.0	2.5	3.8	2.3
F2014 Note 2	80.5	64.7	2.5	4.7	2.4	C2013	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 3
- 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 Note 3
- Failure Rate** = Forced Outage Count (excluding Starting Failures)(Internal) / Operating Time X In Commercial Service Time Note 3

**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. In Commercial Service Time represents the number of hours in the measurement period that the unit(s) were considered part of the active fleet.

