EB-2019-0018

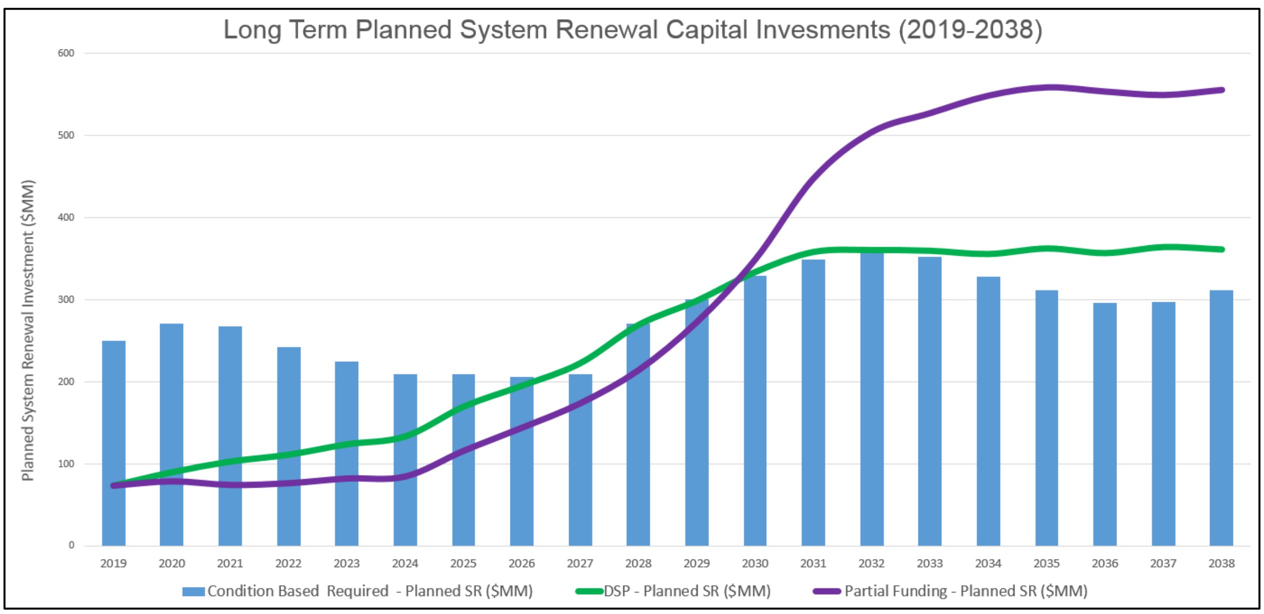
Alectra Utilities Corporation

Application for electricity distribution rates
and other charges effective January 1, 2020

AMPCO Compendium

Requests for Alectra Utilities (Exhibit 2, Tab 1, Schedule 1), the gap between the capital investment required over the 2020-2024 period, as supported in detail by this DSP, and the level funded through the utility's base rates is approximately $60MM per year. Alectra Utilities' customers expect the utility to maintain the distribution system's reliability and accept the rate increase required to do so, as was identified in the Customer Engagement results. When presented with investment options, Alectra Utilities customers indicated preference to fund the level of investment recommended by Alectra Utilities. Accordingly, Alectra Utilities has proposed a mechanism by which capital funding can be provided on a stable, predictable basis over the 2020-2024 period, as set out in the Application Summary. Without the funding requested in this application, the utility will not be able to execute the DSP and will therefore not be able to achieve the outcomes that its customers expect.

Figure 5.0 - 8: Long-Term System Renewal Trends



If Alectra Utilities is unable to invest in system renewal at the level set out in the DSP, the result will be an increasing population of deteriorated assets, leading to a "snowplow" of capital costs for future customers. As illustrated in Figure 5.0 - 8, the system renewal investment proposed in the DSP (the green line) is already significantly below the level that the condition of the utility's assets stipulate. However, if the DSP is not fully funded (i.e., the purple line), the result will be a significant increase in renewal investments over the long term (assuming Alectra Utilities is able to secure resources necessary to execute such a plan). In the meantime, customer reliability is likely to decline further, and inefficient reactive capital expenditures would likely increase.

Should Alectra Utilities not receive sufficient funds to implement the renewal as proposed in this DSP, Alectra Utilities will have to defer essential system renewal investments which are projected to have a significant negative impact on reliability. Under the partial funding scenario reflected in Figure 5.0 - 8 (i.e., purple line), Alectra Utilities' customers would experience a projected worsening of reliability by 50% over the next five years, and a further deterioration of 112% over the next ten years, relative to the most recent five-year outage duration average.

AMPCO-3

Reference

Exhibit 1, Tab 3, Schedule 1, p. 5

Alectra indicates that Figure 2 shows that the level of system renewal investment proposed in the DSP (i.e., the green line) is already significantly below the level dictated by the condition of the utility's assets.

Please show the underlying calculation and provide the numerical values for each year and the calculation of the level dictated by the condition of the utility's assets (Blue Bars-Condition Base Required – Planed SR $MM).

Response:

Alectra Utilities' projected assets that require renewal over the long-term by estimating the number of units expected to fail in each year. Failed assets are replaced with new assets at the cost of the asset in that year. Asset costs are estimated in 2019 and increased by inflation (2.15% per annum).

The failure rate is given by the equation:

$$f(t) = e^{\beta(t-\alpha)}, where$$
$$t: age\ (years)$$
$$\alpha, \beta\text{: constants}$$

The same α, β used in the age component of the Health Index of each asset is used.
The method produced a significant backlog, which Alectra Utilities paced over the projection period.

<u>Example for calculating failure quantities:</u>

Consider an asset distribution of 100 five-year-old units, 20 ten-year-old units, and 50 twenty-year-old units. Assume that the failure rates for 5, 10, and 20 year old units for this asset class are *f(5)* = 0.02, *f(10)* = 0.05, *f(20)* = 0.1 failures per year, respectively. In the current year, the projected failure quantity is 100(.02) + 20(0.05) + 50(0.1) = 2 + 1 + 5 = 8 failures.

In the following year, the resulting asset distribution is as follows: 8 one-year-old units, 98 six-year-old units, 19 eleven-year-old units, and 45 twenty-one-year-old units.

Assume that the failure rates for 1, 6, 11, and 21 year old units for this asset class are *f(1)* = 0, *f(6)* = 0.03, *f(11)* = 0.06, *f(21)* = 0.11 failures per year, respectively. Therefore, the projected failure quantity in year 2 is 8(0) + 98(0.03) + 19(0.06) + 45(0.11) = 0 + 3 + 1 + 5 = 9 failures.

Table 1 shows the corresponding values for the blue bars- Condition Base Required – Planed SR $MM shown in Exhibit 1, Tab 3, Schedule 1, Figure 2, p. 5

Table 1 – Total Cost System Renewal Needs

Year	Total Cost - System Renewal Needs ($MM)
2019	$249.79
2020	$271.49
2021	$267.75
2022	$242.42
2023	$225.12
2024	$209.92
2025	$209.37
2026	$206.59
2027	$209.73
2028	$271.04
2029	$300.55
2030	$328.89
2031	$348.66
2032	$357.67
2033	$352.11
2034	$328.51
2035	$311.23
2036	$296.12
2037	$297.57
2038	$311.32

JT2.3

Reference:

To provide the reference to the response previously provided.

Response:

Please refer to Table 1 below for the number of units that correspond to the condition-based planned renewal requirement, as presented in Figure 5.0 – 8: Long-Term System Renewal Trends on page 12 of the DSP (Exhibit 4, Tab 1, Schedule 1).

Table 1 – Condition Based Required – Planned System Renewal

		Distribution Assets						Station Assets			
Year	Condition-Based System Renewal Required ($MM)	Poles	UG Cable (XLPE) km	UG Cable (PILC) km	Switch-gear	O/H Switch	Trans-former	Power Trans-former	Switch-gear	Circuit Breaker	Total (units and km)
2019	249.79	1312	719	0	78	40	437	0	2	10	2,598
2020	271.49	1312	749	0	83	45	485	0	5	24	2,703
2021	267.75	1312	740	0	83	45	530	0	0	4	2,714
2022	242.42	1312	657	0	83	45	565	0	0	0	2,662
2023	225.12	1312	588	0	83	45	580	2	2	0	2,612
2024	209.92	1312	537	0	83	45	590	0	2	10	2,579
2025	209.37	1609	477	11	87	57	1092	2	2	17	3,354
2026	206.59	2009	421	21	87	67	1292	3	3	17	3,920
2027	209.73	2209	386	23	87	69	1792	4	4	17	4,591
2028	271.04	2309	385	23	87	69	2292	5	5	17	5,192
2029	300.55	2309	418	23	87	69	2792	6	6	17	5,727
2030	328.89	2309	460	23	87	69	2792	9	7	17	5,773
2031	348.66	2309	487	22	87	68	2792	9	8	17	5,799
2032	357.67	2309	487	22	87	68	2792	9	9	17	5,800
2033	352.11	2309	457	21	87	67	2792	9	10	17	5,769
2034	328.51	2259	405	21	87	67	2392	9	11	17	5,268
2035	311.23	2259	356	21	87	67	2392	9	11	17	5,219
2036	296.12	2209	327	21	87	67	2292	9	8	17	5,037
2037	297.57	2259	319	21	87	67	2292	8	7	17	5,077
2038	311.32	2259	335	21	87	67	2292	7	7	17	5,092

JT2.4

Reference:

To update Table 1 to include the planned renewal for the green bar and the purple line, based on number of units expected to fail each year.

Response:

Please see Table 1 below, for the number of units that correspond to the DSP Scenario - Planned System Renewal (green line) and Table 2 below, for the number of units for the Partial Funding Scenario - System Renewal plan (purple line) as provided in Figure 5.0 – 8: Long Term System Renewal Trends on page 12 of the DSP (Exhibit 4, Tab 1, Schedule 1).

Table 1 – DSP Scenario - Planned System Renewal (green line)

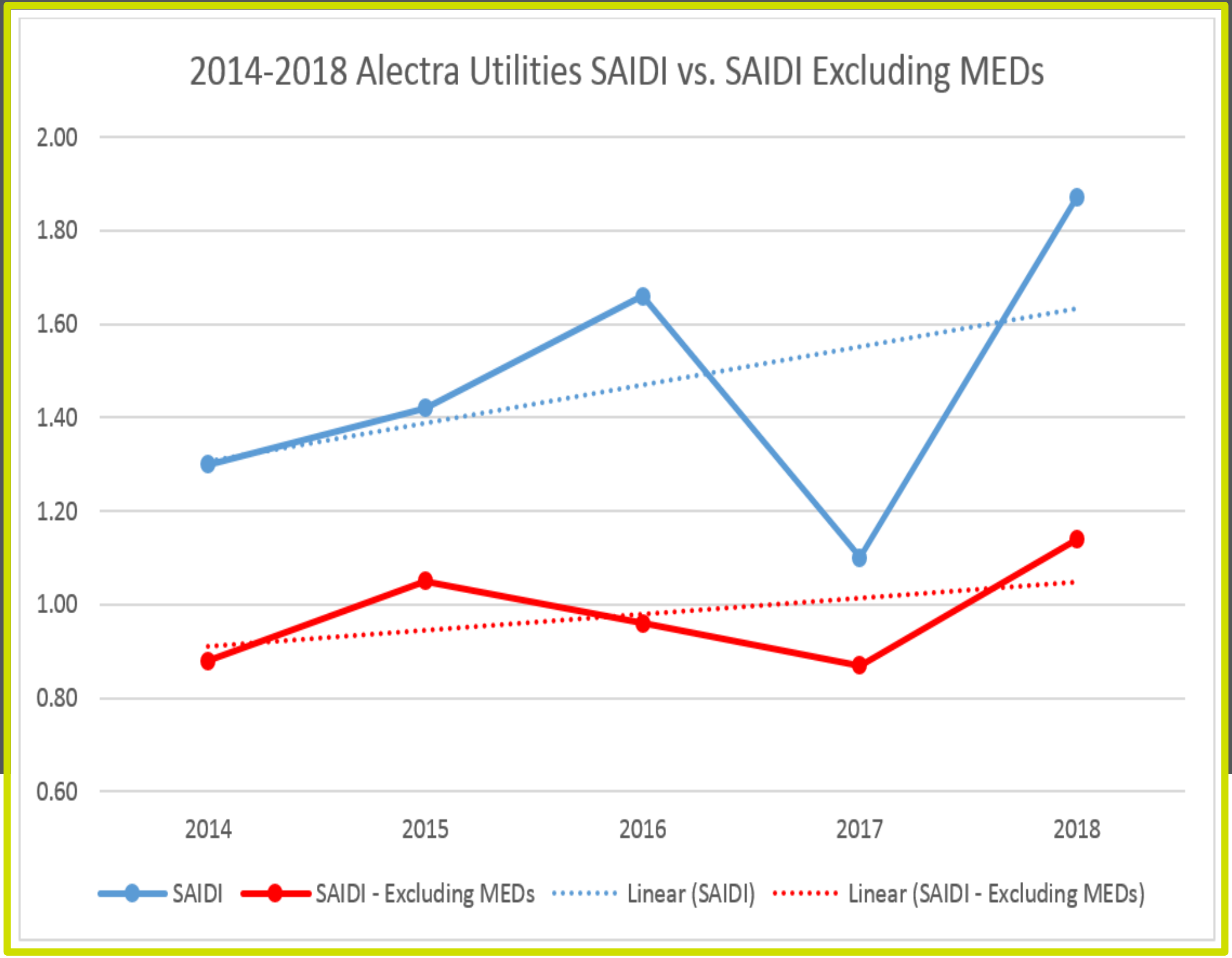
		Distribution Assets						Station Assets			
Year	DSP-Planned System Renewal ($MM)	Poles	UG Cable (XLPE) km	UG Cable (PILC) km	Switch-gear	O/H Switch	Trans-former	Power Transfor-mer	Switch-gear	Circuit Breaker	Total (units and km)
2019	73.72	1,312	216	-	78	40	437	-	2	10	2,095
2020	90.05	1,312	306	-	83	45	485	-	5	24	2,260
2021	103.06	1,312	400	-	83	45	530	-	-	4	2,374
2022	111.46	1,312	445	-	83	45	565	-	-	-	2,450
2023	124.12	1,312	495	-	83	45	580	2	2	-	2,519
2024	133.68	1,312	538	-	83	45	590	-	2	10	2,580
2025	169.94	1,609	724	11	87	57	1,092	2	2	17	3,601
2026	195.47	2,009	651	21	87	67	1,292	3	3	17	4,150
2027	222.88	2,209	687	23	87	69	1,792	4	4	17	4,892
2028	269.62	2,309	634	23	87	69	2,292	5	5	17	5,441
2029	299.09	2,309	415	23	87	69	2,792	6	6	17	5,723
2030	334.07	2,309	472	23	87	69	2,792	9	7	17	5,785
2031	358.53	2,309	508	22	87	68	2,792	9	8	17	5,820
2032	360.91	2,309	494	22	87	68	2,792	9	9	17	5,807
2033	359.96	2,309	474	21	87	67	2,792	9	10	17	5,786
2034	356.06	2,259	463	21	87	67	2,392	9	11	17	5,326
2035	362.79	2,259	461	21	87	67	2,392	9	11	17	5,324
2036	357.19	2,209	448	21	87	67	2,292	9	8	17	5,158
2037	364.52	2,259	450	21	87	67	2,292	8	7	17	5,208
2038	361.60	2,259	431	21	87	67	2,292	7	7	17	5,188

Table 2 – Partial Funding Scenario – Planned System Renewal (purple line)

		Distribution Assets						Station Assets			
Year	Total Cost - System Renewal Needs ($MM)	Poles	UG Cable (XLPE) km	UG Cable (PILC) km	Switch-gear	O/H Switch	Trans-former	Power Trans-formers	Switch-gear	Circuit Breaker	Total (units and km)
2019	73.72	1312	216	0	78	40	437	0	2	10	2,095
2020	79.07	1312	218	0	79	33	370	0	5	24	2,041
2021	74.64	1312	220	0	79	35	370	0	0	4	2,020
2022	76.69	1312	222	0	79	37	370	0	0	0	2,020
2023	82.48	1312	223	0	79	40	370	2	2	0	2,028
2024	84.84	1312	225	0	79	41	370	0	2	10	2,039
2025	116.07	1609	246	11	80	45	1092	2	2	17	3,104
2026	144.15	2009	271	21	82	50	1292	3	3	17	3,748
2027	173.93	2209	302	23	84	60	1792	4	4	17	4,495
2028	214.27	2309	250	23	90	69	2292	5	5	17	5,060
2029	272.90	2309	350	23	95	80	2792	6	6	17	5,678
2030	349.01	2309	500	23	95	90	2800	9	7	17	5,851
2031	447.74	2309	700	22	95	90	2800	9	8	17	6,051
2032	504.29	2309	800	22	91	90	2800	9	9	17	6,148
2033	527.28	2309	830	21	87	68	2750	9	10	17	6,101
2034	548.60	2259	850	21	87	67	2750	9	11	17	6,071
2035	558.68	2259	850	21	87	67	2650	9	11	17	5,971
2036	553.58	2209	830	21	87	67	2550	9	8	17	5,798
2037	549.34	2259	809	21	87	67	2317	8	7	17	5,592
2038	555.55	2259	800	21	87	67	2310	7	7	17	5,575

2020-2024 DSP: Urgent Needs

Reliability: Customers are experiencing longer and more frequent power outages, particularly from the underground system.



2020-2024 DSP: Urgent Needs

Reliability: Customers are experiencing longer and more frequent power outages, increased investment in system renewal is required to reverse this trend.

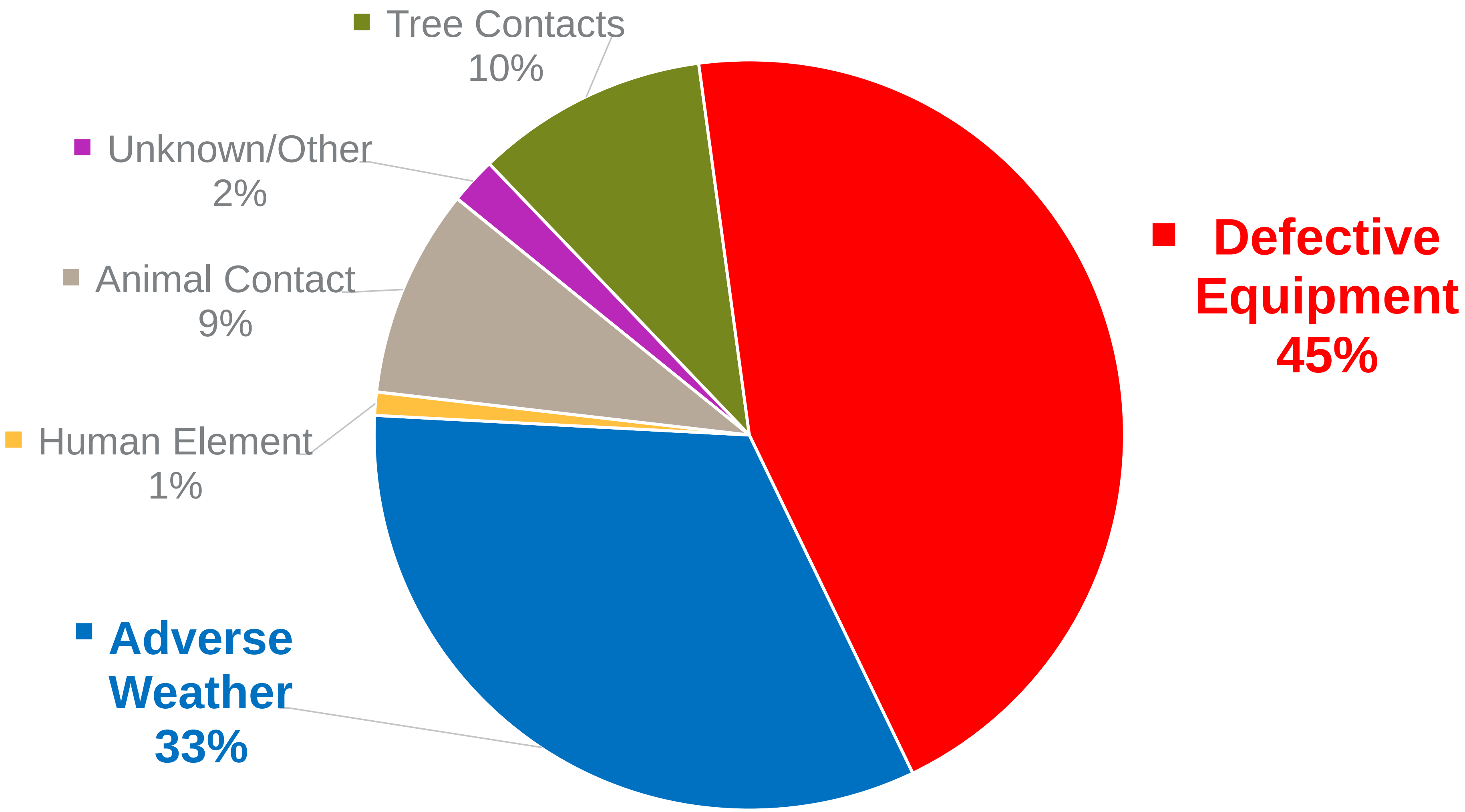


Figure 5.2.3 - 4: Alectra Utilities Five Year (2014-2018) Average Customer Hours of Interruption by Outage Cause Code

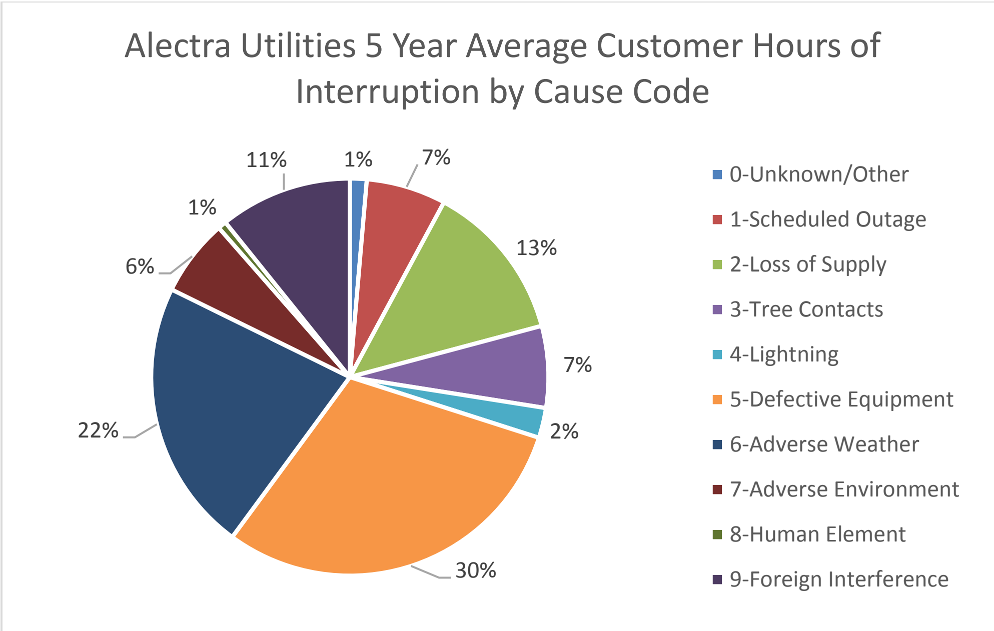


Figure 5.2.3 - 5 provides an outage cause code summary for Alectra Utilities from 2014 to 2018 by the number of outage events, and excludes scheduled outages[40]. Although scheduled outages are necessary for Alectra Utilities to safely and effectively maintain and renew the distribution system equipment, Alectra Utilities has incorporated practices to minimize the duration and inconvenience of customers caused by such outages. The top three contributors to outage event frequency by number of events, excluding scheduled outages, are Defective Equipment, Foreign Interference and Adverse Weather.

[40] Alectra Utilities has consolidated historical outage statistics from predecessor utilities from 2014 to 2016 based on OEB defined System Reliability Measures (EB-2014-0189).

AMPCO-17

Reference

Exhibit 4, Tab 1, Schedule 1, p. 110, Table 5.2.3-4

a) Please provide Figure 5.2.3-4 including Scheduled Outages.

b) Please provide Figure 5.2.3-4 for each of the years 2014 to 2018 including Scheduled Outages.

Response:

a) Alectra Utilities confirms that Figure 5.2.3-4 in Exhibit 4, Tab 1, Schedule 1, Page 112 includes Schedule Outages.

b) Alectra Utilities provides Figures 1-5 as annual allocation of customer hours of interruption by cause code, including scheduled outages.

Figure 1 - Alectra Utilities' 2014 Customer Hours of Interruption

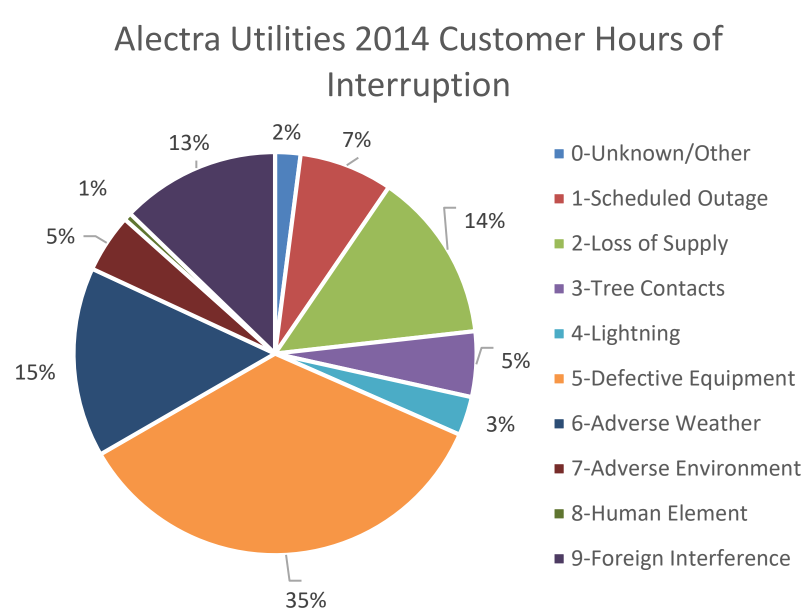


Figure 2 - Alectra Utilities' 2015 Customer Hours of Interruption

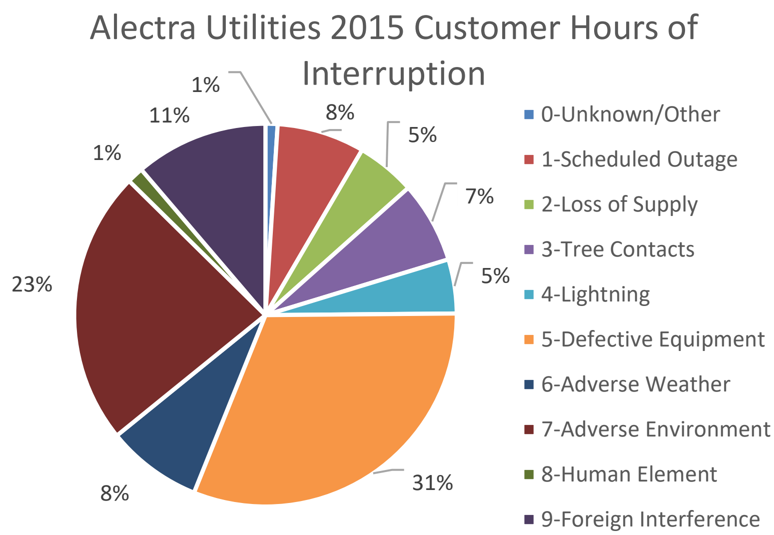


Figure 3 - Alectra Utilities' 2016 Customer Hours of Interruption

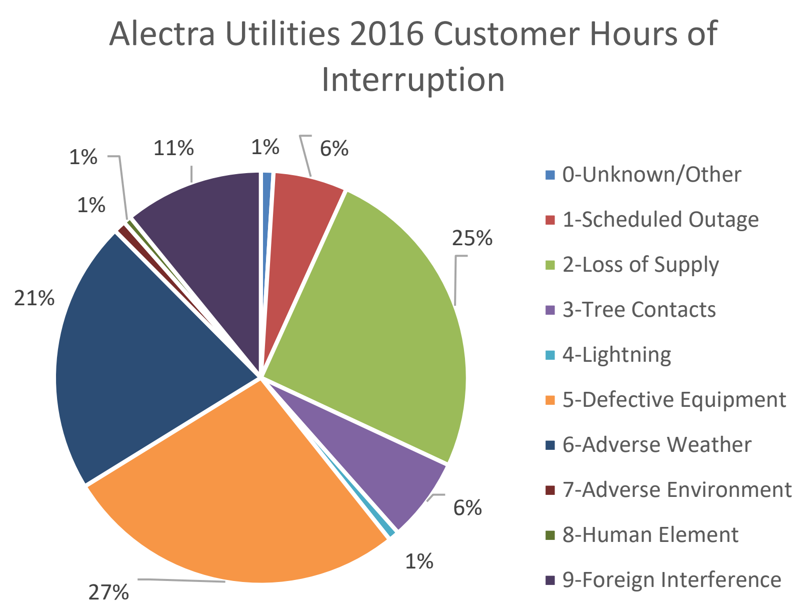


Figure 4 - Alectra Utilities' 2017 Customer Hours of Interruption

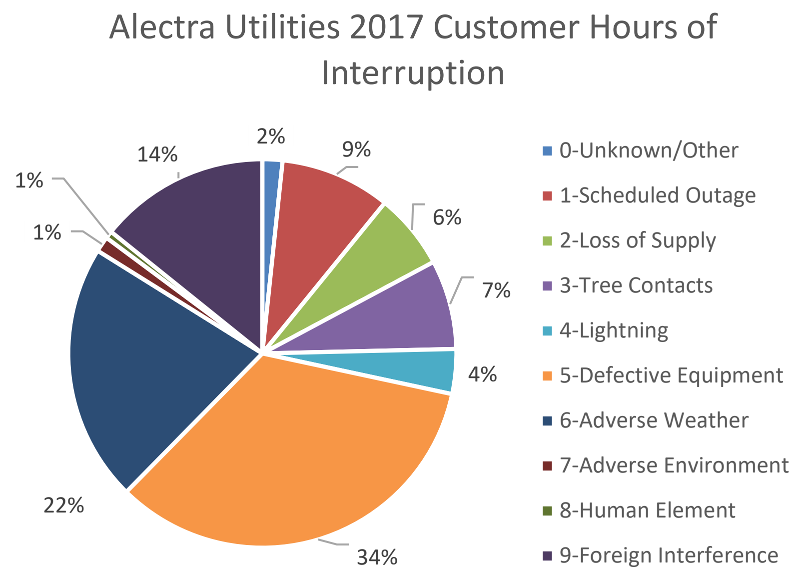
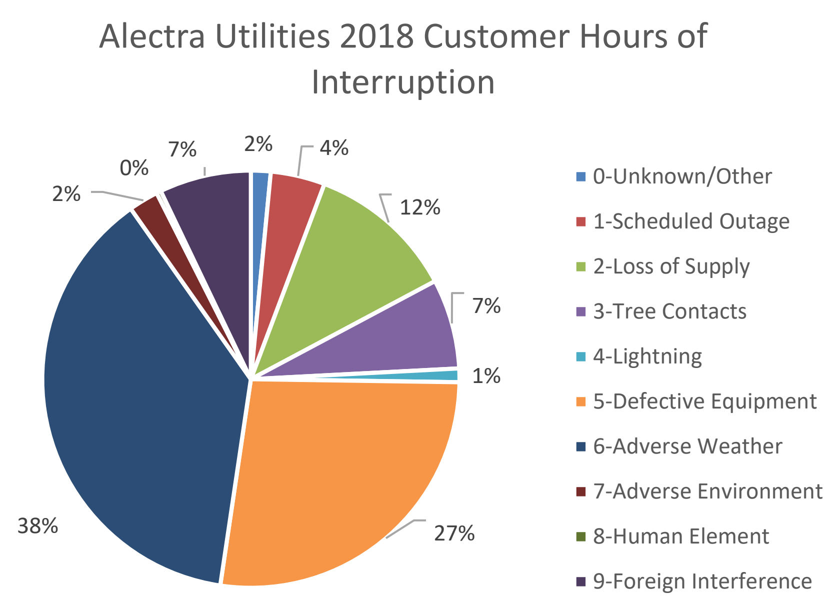


Figure 5 - Alectra Utilities 2018 Customer Hours of Interruption



AMPCO-18

Reference

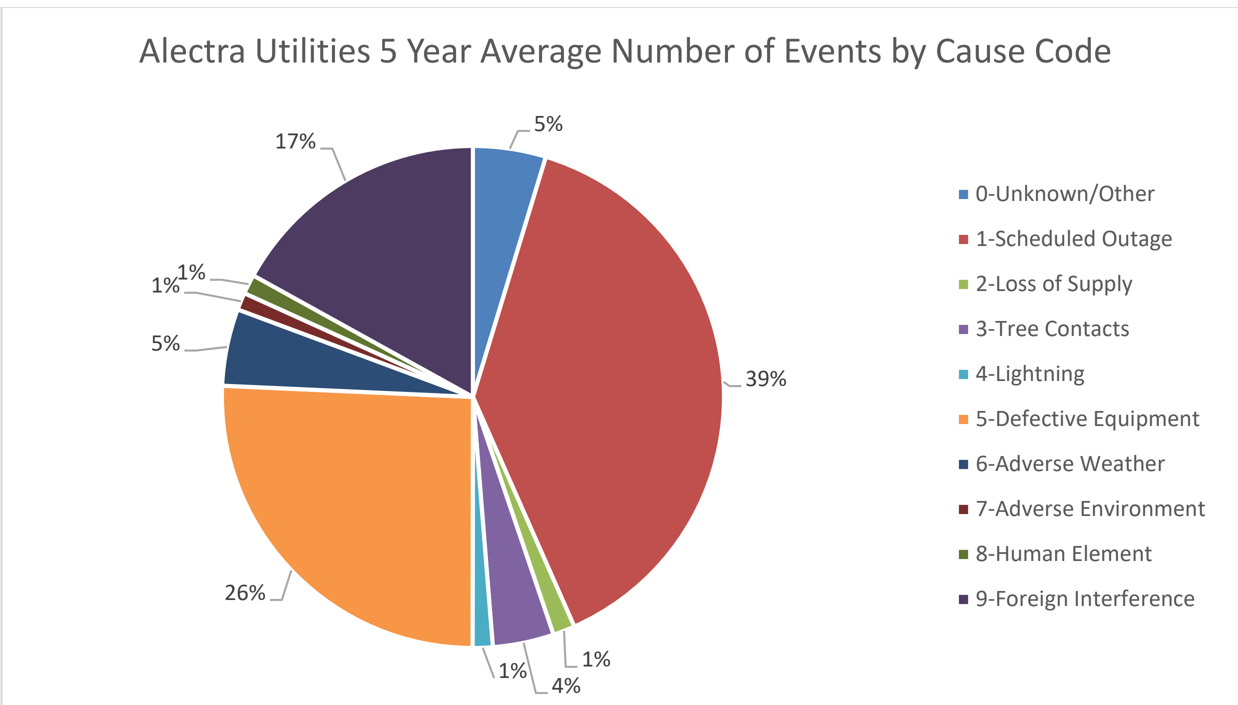
Exhibit 4, Tab 1, Schedule 1, p. 113, Table 5.2.3-5

a) **Please provide Figure 5.2.3-5 including Scheduled Outages.**

b) **Please provide Figure 5.2.3-5 for each of the years 2014 to 2018 including Scheduled Outages.**

a) Alectra Utilities has provided the 5 year (2014 – 2018) average number of events by cause code in Figure 1, including scheduled outages.

Figure 1 - Alectra Utilities' 5 Year Average Number of Events by Cause Code



b) Alectra Utilities has provided the number of events by cause code for each year (2014-2018) in Figures 2-6.

Figure 2 - Alectra Utilities' 2014 Number of Events by Cause Code

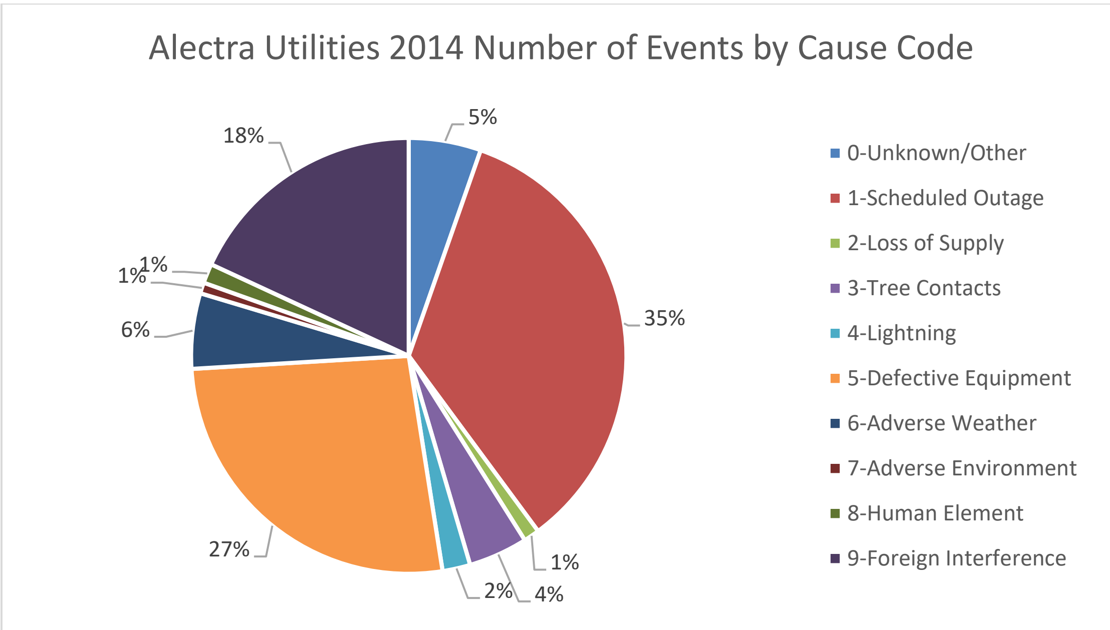


Figure 3 - Alectra Utilities' 2015 Number of Events by Cause Code

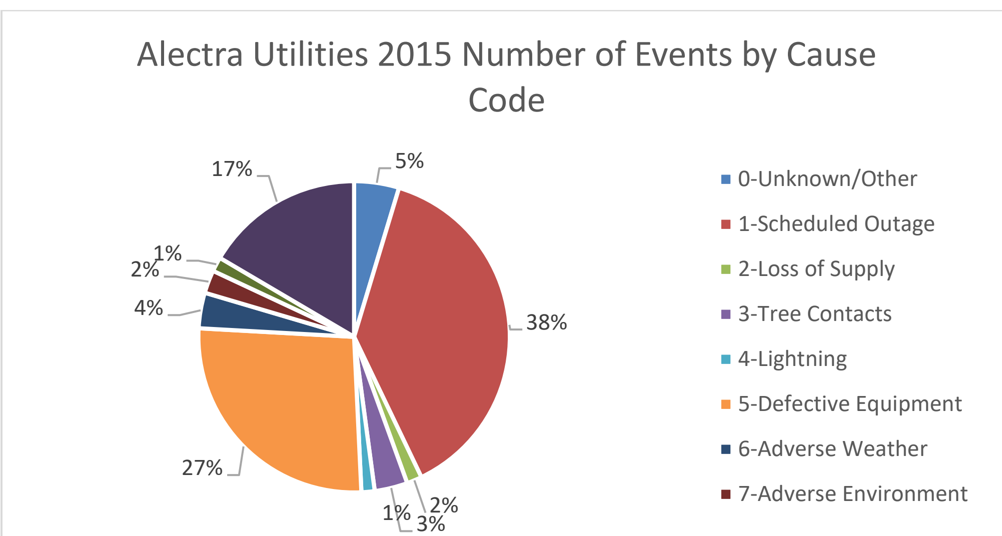


Figure 4 - Alectra Utilities' 2016 Number of Events by Cause Code

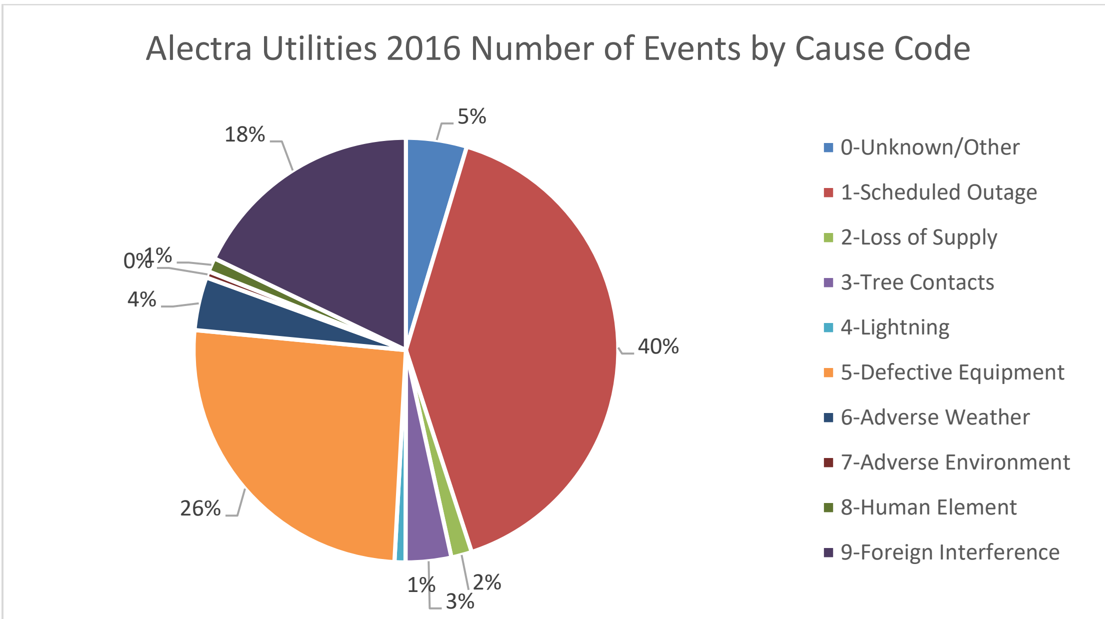
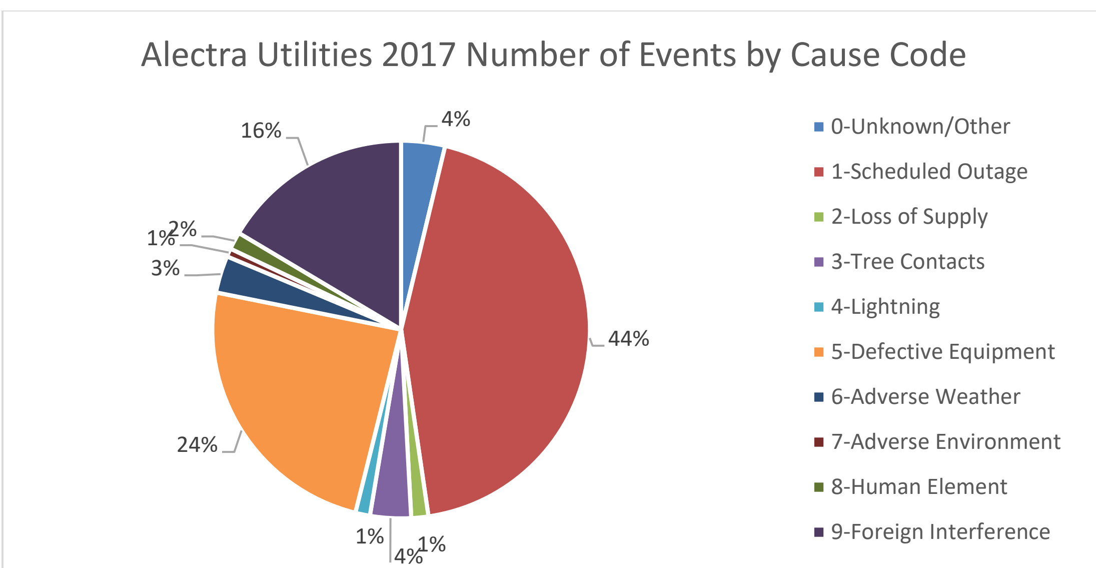
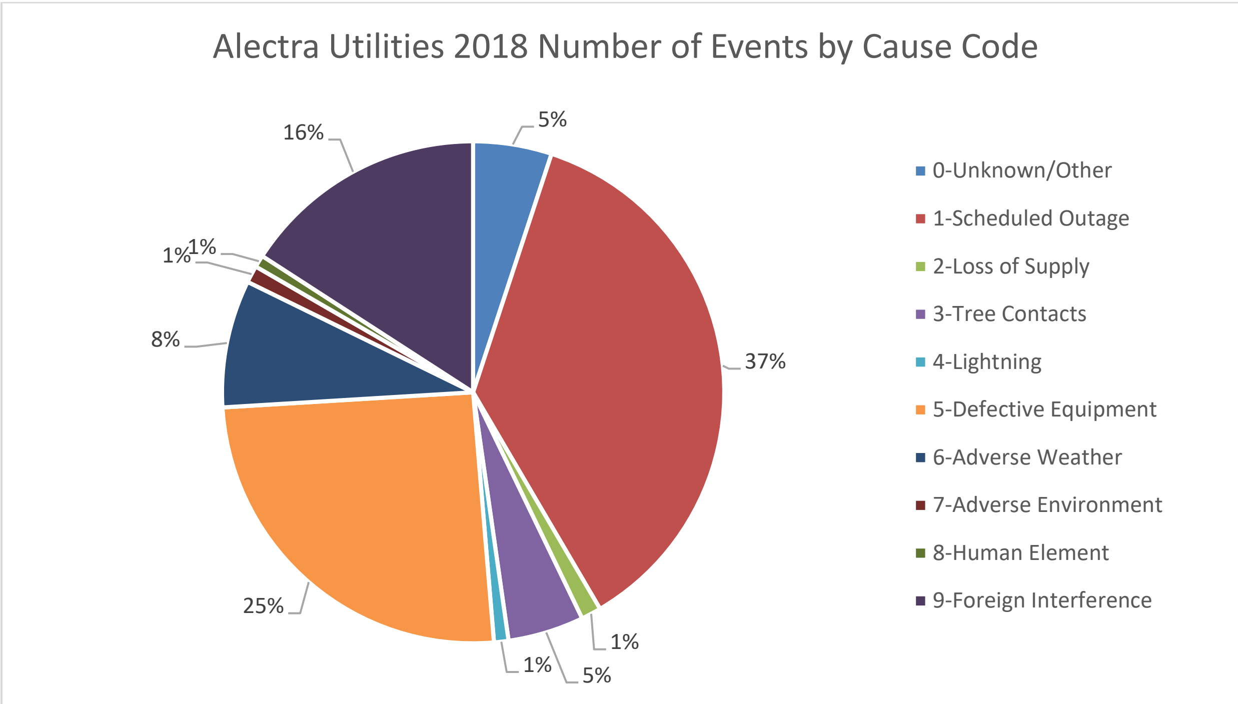


Figure 5 – Alectra Utilities' 2017 Number of Events by Cause Code



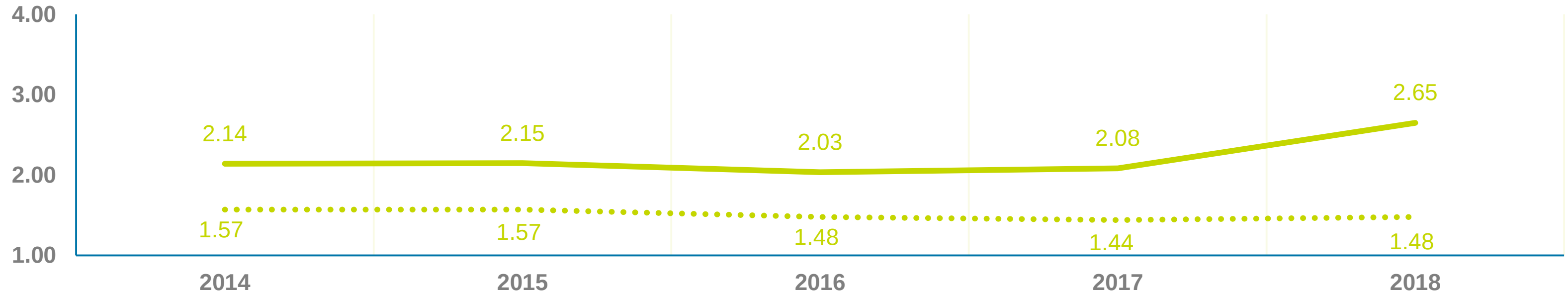
1 **Figure 6 - Alectra Utilities 2018 Number of Events by Cause Code**



2

System Reliability Indicators | SAIFI

Industry Total vs. Adjusted (excluding Loss of Supply & Major Events)

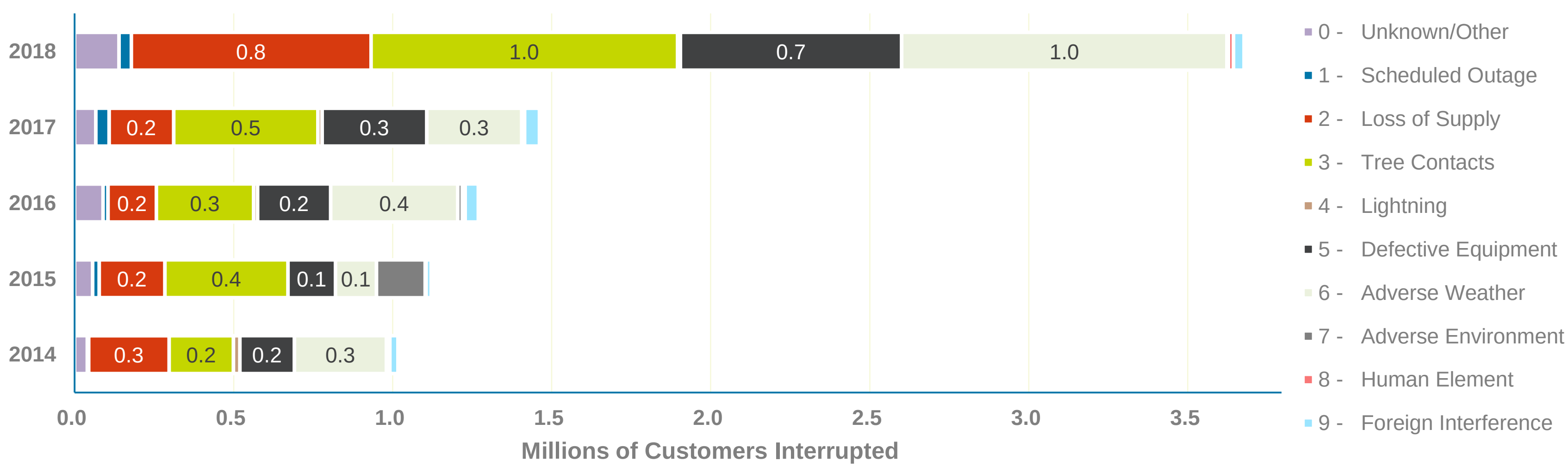


Industry Average ▲

	2014	2015	2016	2017	**2018**
$SAIFI_{TOTAL}$	2.14	2.15	2.03	2.08	**2.65**
$SAIFI_{ADJUSTED}$	1.57	1.57	1.48	1.44	**1.48**

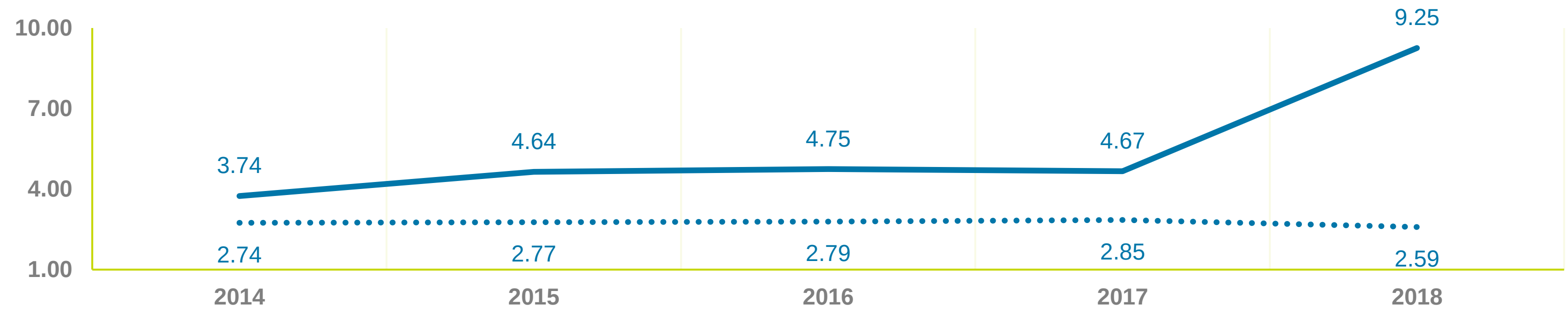
Customers Interrupted - Major Events

by Cause Code



System Reliability Indicators | SAIDI

Industry Total vs. Adjusted (excluding Loss of Supply & Major Events)

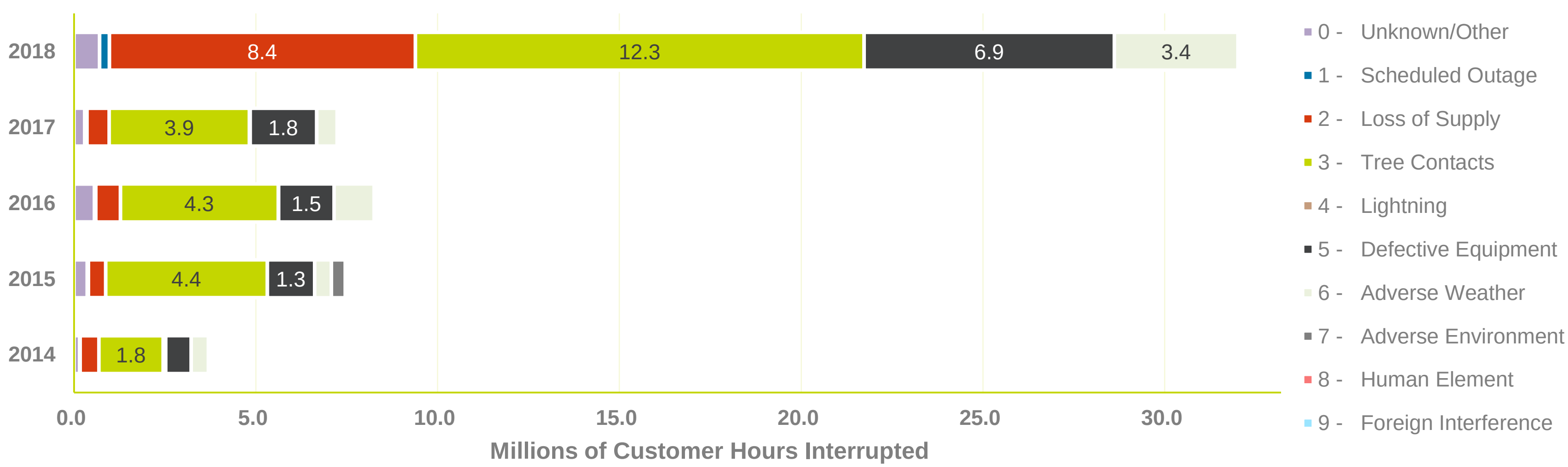


Industry Average ▲

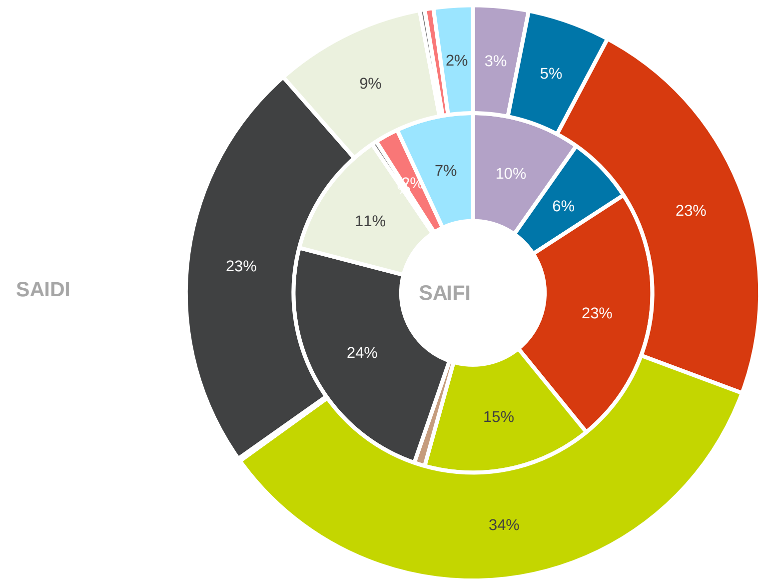
	2014	2015	2016	2017	**2018**
$SAIDI_{TOTAL}$	3.74	4.64	4.75	4.67	**9.25**
$SAIDI_{ADJUSTED}$	2.74	2.77	2.79	2.85	**2.59**

Customer Hours Interrupted - Major Events

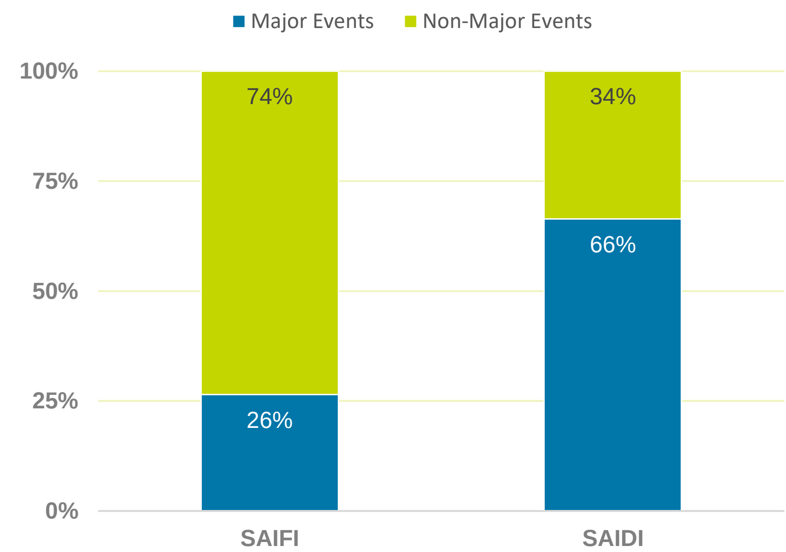
by Cause Code



Frequency & Duration of Industry Total Interruptions | 2018
by Cause Code



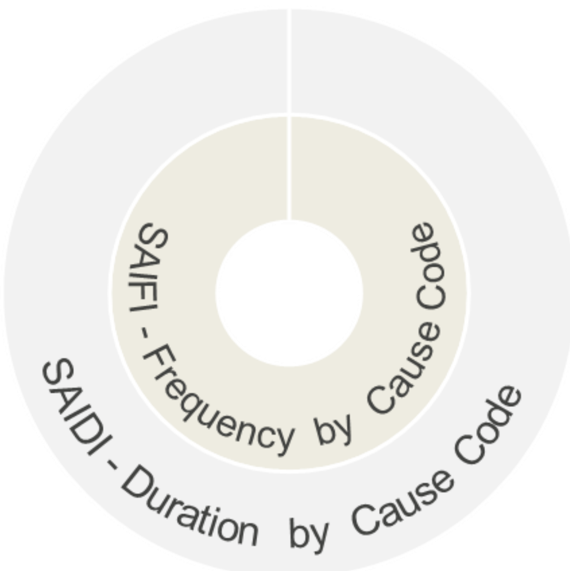
Major Events Contribution to Industry Total Reliability | 2018



Cause Code No. & Description		SAIFI (Customers Interrupted) Non-Major Events	SAIFI (Customers Interrupted) Major Events	SAIDI (Customer Hours Interrupted) Non-Major Events	SAIDI (Customer Hours Interrupted) Major Events
0	Unknown/Other	1,216,521	139,772	807,275	703,249
1	Scheduled Outage	805,864	38,810	1,986,312	270,304
2	Loss of Supply	2,476,109	753,342	2,695,872	8,413,117
3	Tree Contacts	1,149,948	964,376	4,343,182	12,345,424
4	Lightning	125,607	8,095	74,164	764
5	Defective Equipment	2,599,453	696,378	4,416,083	6,883,232
6	Adverse Weather	570,207	1,022,378	729,864	3,399,752
7	Adverse Environment	58,357	4,109	100,524	36,228
8	Human Element	275,846	16,170	159,145	78,998
9	Foreign Interference	930,331	33,052	973,880	94,389
Sub-Totals		**10,208,243**	**3,676,482**	**16,286,300**	**32,225,456**
Industry Total		**13,884,725**		**48,511,756**	

System Reliability by Cause of Interruptions for Loss of Power
For the Year Ended
December 31

Interruption Index by Cause Code

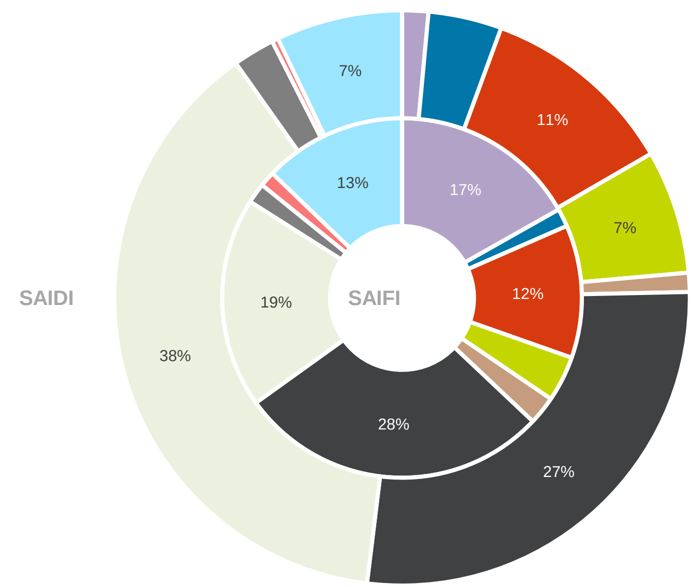


The percentage amounts shown in the distributors' charts represent the total of Non-Major Events and Major Events amounts.

Customers Interrupted is the total **number of customers** affected by all interruptions. See Glossary for more information.

Customer Hours Interrupted is the cumulative **number of hours** of interruptions that all customers experienced (for all hours of interruptions). See Glossary for more information.

Alectra Utilities Corporation



Cause Code No. & Description		SAIFI (Customers Interrupted) Non-Major Events	SAIFI (Customers Interrupted) Major Events	SAIDI (Customer Hours Interrupted) Non-Major Events	SAIDI (Customer Hours Interrupted) Major Events
0	Unknown/Other	303,234	1,765	28,357	118
1	Scheduled Outage	29,379	4	79,703	4
2	Loss of Supply	187,186	29,742	100,254	112,878
3	Tree Contacts	54,320	19,953	74,953	59,432
4	Lightning	46,233	0	20,704	0
5	Defective Equipment	503,082	5,614	519,428	7,359
6	Adverse Weather	136,308	206,775	175,299	563,563
7	Adverse Environment	32,910	0	45,289	0
8	Human Element	24,956	0	6,857	0
9	Foreign Interference	225,214	7,068	123,239	13,825
	Sub-Totals	**1,542,822**	**270,921**	**1,174,083**	**757,179**

The information under Major Events includes the different causes of outages that happened during a Major Event (including low impact causes). Each outage and its cause may not individually constitute a Major Event but when considered in total, the cumulative outages reached the threshold of a Major Event.

Glossary of Terms | System Reliability Indicators

Average Number of Customers Served (by month) by a distributor is the average number of customers served in the distributor's licensed service area during the month. It is calculated by adding the total number of customers served on the first day of the month and the total number of customers served on the last day of the month and dividing by two. On an annual basis, the average number of customers served is calculated as the sum of 12 months, divided by 12.

Interruption is the loss of electrical power, being a complete loss of voltage, of a duration of one minute or more, to one or more customers, including planned interruptions scheduled by the distributor but excluding part power situations, outages scheduled by a customer, interruptions by order of emergency services, disconnections for non-payment or power quality issues such as sags, swells, impulses or harmonics. The "cause of interruption codes" are provided below.

Customer Hours Interrupted is the total number of hours of interruptions that all customers experienced for all hours of interruptions. As an example, if a distributor experienced 2 interruptions, where the first affected 100 customers for 1 hour, and the second affected 200 customers for 1.5 hours, the total customer-hours of interruption would be 400 customer-hours.

Customers Interrupted is the total number of customers affected by all interruptions. As an example, if a distributor experienced 2 interruptions where the first affected 100 customers, and the second affected 200 customers, then the total customers interrupted would be 300.

SAIDI (System Average Interruption Duration Index) is an index of system reliability that expresses the average amount of time per reporting period that the supply to a customer is interrupted. It is calculated by dividing the total monthly duration of all interruptions experienced by all customers, in hours, by the average number of customers served.

It is expressed as follows: Total Customer Hours Interrupted / Average Number of Customers Served.

SAIFI (System Average Interruption Frequency Index) is an index of system reliability that expresses the number of times per reporting period that the supply to a customer is interrupted. The index is calculated by dividing the total number of interruptions experienced by all customers, by the Average Number of Customers Served.

It is expressed as follows: Total Customers Interrupted / Average Number of Customers Served.

Loss of Supply Adjusted System Reliability Indicators exclude outages caused by a loss of supply. Loss of supply refers to customer interruptions due to problems in the bulk electricity supply system. For this purpose, the bulk electricity supply system is distinguished from the distributor's system based on established ownership demarcation points.

Loss of Supply and Major Event Adjusted System Reliability Indicators exclude outages caused by a loss of supply and outages related to Major Event(s).

Glossary of Terms | Cause of Interruption Codes

Cause Code 0 (Unknown/Other) includes customer interruptions with no apparent cause that contributed to the outage.

Cause Code 1 (Scheduled Outage) includes customer interruptions due to the disconnection at a selected time for the purpose of construction or preventive maintenance.

Cause Code 2 (Loss of Supply) includes customer interruptions due to problems associated with assets owned and/or operated by another party, and/or in the bulk electricity supply system. For this purpose, the bulk electricity supply system is distinguished from the distributor's system based on ownership demarcation.

Cause Code 3 (Tree Contacts) includes customer interruptions caused by faults resulting from tree contact with energized circuits.

Cause Code 4 (Lightning) includes customer interruptions due to lightning striking the distribution system, resulting in an insulation breakdown and/or flash-overs.

Cause Code 5 (Defective Equipment) includes customer interruptions resulting from distributor equipment failures due to deterioration from age, incorrect maintenance, or imminent failures detected by maintenance.

Cause Code 6 (Adverse Weather) includes customer interruptions resulting from rain, ice storms, snow, winds, extreme temperatures, freezing rain, frost, or other extreme weather conditions (exclusive of Code 3 and Code 4 events).

Cause Code 7 (Adverse Environment) includes customer interruptions due to distributor equipment being subject to abnormal environments, such as salt spray, industrial contamination, humidity, corrosion, vibration, fire, or flowing.

Cause Code 8 (Human Element) includes customer interruptions due to the interface of distributor staff with the distribution system.

Cause Code 9 (Foreign Interference) includes customer interruptions beyond the control of the distributor, such as those caused by animals, vehicles, dig-ins, vandalism, sabotage, and foreign objects.

Major Event is defined as an event that is beyond the control of the distributor and is:
a) unforeseeable; b) unpredictable; c) unpreventable; or d) unavoidable.

Such events disrupt normal business operations and occur so infrequently that it would be uneconomical to take them into account when designing and operating the distribution system. Such events cause exceptional and/or extensive damage to assets, they take significantly longer than usual to repair, and they affect a substantial number of customers.

"Beyond the control of the distributor" means events that include, but are not limited to, force majeure events and Loss of Supply events.

Distributors shall include all outages that occurred during the Major Event, including those that may be unrelated to the event itself, but occurred at the same time.

AMPCO-22

Reference

Exhibit 4, Tab 1, Schedule 1, p. 112

Defective Equipment is the leading contributor in both duration and frequency of outages over the last five years.

a) **Please provide a breakdown of Defective Equipment events by Cause for each of the years 2014 to 2018.**

b) **Please provide a breakdown of Defective Equipment hours of interruption by Cause for each of the years 2014 to 2018.**

Response:

a) Alectra Utilities provides Table 1 listing the number of Defective Equipment events by cause for each of the years 2014-2018.

Table 1 - Alectra Utilities Defective Equipment Events by Cause (2014-2018)

Causes	2014	2015	2016	2017	2018
Cable & Accessories PILC	16	18	12	11	14
Cable & Accessories XLPE	410	559	541	477	534
Switches	101	97	58	90	90
Switchgear	66	60	53	46	60
OH Line Hardware	209	170	116	137	151
Service	69	62	75	72	76
TX	333	306	321	297	327
TX Cutout	68	79	46	49	40
UG Secondary	10	23	10	5	7
Others	93	82	91	76	60

b) Alectra Utilities provides Table 2 listing the Hours of Interruption due to Defective Equipment events by cause for each of the years 2014-2018.

Table 2 - Alectra Utilities' Defective Equipment Hours of Interruption by Cause (2014-2018)

Causes	2014	2015	2016	2017	2018
Cable & Accessories PILC	34,007	6,805	17,371	30,537	31,111
Cable & Accessories XLPE	174,043	209,621	208,444	190,354	227,553
Switches	14,487	25,881	12,609	27,516	80,240
Switchgear	40,160	34,026	41,451	31,552	58,304
OH Line Hardware	140,071	112,866	39,223	53,235	83,830
Service	1,039	799	1,644	509	497
TX	35,927	27,995	28,401	35,243	35,764
TX Cutout	3,104	10,455	1,426	1,586	1,282
UG Secondary	80	743	170	122	69
Others	12,604	18,483	105,872	16,597	12,549

AMPCO-23

Reference

Exhibit 4, Tab 1, Schedule 1, p. 118, Table 5.2.3-9

a) Please provide the number of hours by year for each of the years 2014 to 2018 due to Defective Equipment.

b) Please provide the number of outage events by year for each of the years 2014 to 2018 due to Defective Equipment.

Response:

a) Alectra Utilities has provided the Hours of Interruption by year for each of the years 2014 to 2018 due to Defective Equipment in Table 1.

Table 1 - Alectra Utilities' Hours of Interruptions by Defective Equipment (2014-2018)

Cause Code	2014	2015	2016	2017	2018
Defective Equipment	455,522	447,675	456,610	387,250	531,199

b) Alectra Utilities has provided the number of outage events each year for 2014 to 2018 due to Defective Equipment in Table 2.

Table 2 - Alectra Utilities' Number of Interruptions by Defective Equipment (2014-2018)

Cause Code	2014	2015	2016	2017	2018
Defective Equipment	1,375	1,456	1,323	1,260	1,359

JT2.6

Reference:

Re AMPCO-22, Table 1 and 2, stripping out total defective outages of major event days.

Response:

Alectra Utilities has provided the values for the impact of defective equipment on SAIDI and SAIFI, with and without MEDs in Table 1 and Table 2.

Table 1: Alectra Utilities SAIDI from Defective Equipment with and without MEDS (2014-2018)

Defective Equipment - SAIDI	2014	2015	2016	2017	2018
MEDs Included	0.457	0.443	0.446	0.374	0.508
MEDs Removed	0.397	0.435	0.375	0.365	0.501

Table 2: Alectra Utilities SAIFI from Defective Equipment with and without MEDs (2014-2018)

Defective Equipment - SAIFI	2014	2015	2016	2017	2018
MEDs Included	0.492	0.385	0.425	0.409	0.495
MEDs Removed	0.465	0.385	0.389	0.406	0.488

AMPCO-2

Reference

Exhibit 1, Tab 3, Schedule 1, p. 3

Alectra Utilities is entering a period of heightened capital asset renewal, as a large population of deteriorating assets are reaching their end-of-life.

a) Please provide Alectra's definition of end-of-life.

b) Please provide the total number of Alectra's assets and the corresponding total percentage that are beyond end-of-life at the end of 2018.

c) Please provide the percentage at end-of-life at the end of 2013.

d) Please provide the total number of assets by operational area and the percentage in each area that are beyond end-of-life.

Response:

a) From the asset management perspective, beyond end-of-life is when an asset reaches deteriorated conditions and can no longer perform its intended function in a reliable and economical manner or becomes functionally obsolete. Please refer to Exhibit 4, Tab 1, Schedule 1, p. 235 of 438.

Deteriorated assets include assets with Health Index categorization of Very Poor and Poor according to asset condition assessment. For more information on Health Index Categorization, please refer to Exhibit 4, Tab 1, Schedule 1, Appendix D – Asset Condition Assessment -2018, p.17.

b) There are a total of 303,600 assets in Alectra Utilities' service territories – of which 17,782 or 6% are past their end-of-life (Very Poor and Poor). Table 1 below shows the breakdown of the total number based on two asset groups: individual assets quantified in units, and linear assets quantified in kilometers.

c) **Table 1 - Percentage of Assets at end-of-life in 2018**

Asset Group Category	Count of Assets in Very Poor & Poor	% of Assets in Very Poor & Poor	Total Count	Unit
Non-linear/Individual Assets	14,229	5%	265,060	unit
Linear Assets (cables and conductors)	3,553	9%	38,540	km
All Assets - Total	**17,782**	**6%**	**303,600**	

d) As defined in AMPCO-2 (a), end-of-life is condition-based. Asset Condition Assessment using Health Indices is a snapshot in time of the assets' health. Former legacy companies performed ACAs at different periods of time and frequencies as shown in Table 2. In addition to conducting the legacy ACAs at different periods in time, each legacy ACA was informed by different sets of information and models. As a result, Alectra Utilities is not able to provide the percentage at end-of-life at the end of 2013.

Table 2 – Predecessor Utility ACA – Year Performed

Legacy Utility	ACA Year
PowerStream	2017
Guelph Hydro	2014
Enersource	2015
Horizon Utilities	2013
Brampton Hydro	2013

Please refer to Table 3 and Table 4 below for the breakdown of assets past end-of-life based on Alectra Utilities' operating areas. Please note that assets past end-of-life is defined as assets that are in Very Poor and Poor condition based on the Health Index categorization.

Table 3 – Breakdown of Linear Assets (Cable & Conductors) Past EOL by Operating Area

Operating Area	Linear Assets Past EOL (km)	Total Linear Assets (km)	Linear Assets Past EOL (%)
Central North	430	4,514	9.5%
Central South	1,042	11,338	9.2%
West	1,161	5,439	21.3%
East	808	15,091	5.4%
South West	112	2,158	5.2%
Total	**3,553**	**38,540**	**9.2%**

Table 4 – Breakdown of Non-linear/Individual Assets Past EOL by Operating Area

Operating Area	Non-linear Assets Past EOL (units)	Total Non-linear Assets EOL (units)	Non-linear Assets Past EOL (%)
Central North	2,135	30,068	7.1%
Central South	5,307	49,426	10.7%
West	5,352	77,502	6.9%
East	1,045	91,371	1.1%
South West	390	16,693	2.3%
Total	**14,229**	**265,060**	**5.4%**

JT2.2

Reference:

To respond to Ms. Grice's eight questions in writing.

Response:

<u>Question #1</u>

Ref: G-Staff-4

Alectra provides the Proposed M-Factor Funded Capital Investment by Rate Zone in Tables 1 to 6. Please provide an excel spreadsheet of Tables 1 to 6.

Response:

Alectra Utilities provides the excel spreadsheet of Tables 1 to 6 of G-Staff-4 in attachment Technical Conference JT2.2 Q1 Attachment 1.

<u>Question #2</u>

Ref: AMPCO-2

Alectra is not able to provide the percentage at assets at end-of-life at the end of 2013. In Table 2, Alectra provides the ACA year of each of the legacy utilities.

Please add the following to Table 2:

a) A column that shows total asset count.
b) A column that shows % of assets in very poor and poor condition.

Response:

Table 1 below includes the total asset population (linear km and individual unit quantities) and percentages of these assets in Very Poor and Poor condition for each legacy utility at the time of each Asset Condition Assessment study. Alectra Utilities wishes to clarify the information in Table 1:

- The legacy ACAs were performed at different times;

- The legacy ACAs were developed using different practices;
- The legacy ACAs included different asset categories;
- Each kilometer of cable or conductor is calculated as 1 unit; and
- Alectra Utilities' harmonized ACA (2018) did not include the same asset classes that were used in the legacy ACAs of former utilities.

Table 1 - Predecessor Utility ACA – Year Performed/Asset Population/VP&P %

Legacy Utility	ACA Year	Total Asset Population (Unit & km) at the time of each ACA	% of Assets in VP & P Condition at the time of each ACA
PowerStream (PS)	2017	93,763[1]	10%[2]
Guelph (GH)	2014	19,702	2%
Enersource (EH)	2015	57,606	9%
Horizon (HR)	2013	95,024	11%
Brampton (BH)	2013	30,882	6%

<u>Question #3</u>

Ref: AMPCO-11

In Figures 1 to 5, Alectra provides the ACA results by legacy utility.

a) Please provide the results in Figures 1 to 5 in the same format as Table 2 of AMPCO-26.

b) Please provide an excel version of the tables provided in response to part (a).

Response:

a) Alectra Utilities provides the results of Figures 1 to 5 in table format in Tables 2 to Table 6.

[1] Total asset population in PowerStream includes all asset classes specified in Table 2, as well as the 8,388 km of Underground Cable.

[2] Legacy Powerstream ACA does not include Health Index categorization of underground cable, hence Very Poor and Poor percentage does not include underground cables for legacy PSRZ.

JT2.2 Q3 Attachment #2

Historical ACA HI Results

Predessessor Utility	ACA Year	Asset Population	HI Quantity VP/P	%
PowerStream	2017	85,375	9,315	11%
Horizon	2013	95,024	10,309	11%
Enersource	2015	57,606	5,172	9%
Brampton	2013	30,882	1,913	6%
Guelph	2014	19,702	399	2%
Total		288,589	**27,108**	9%
Alectra	2018	303,600	**17,782**	6%

Table 2 - Corresponding to AMPCO 11 Figure 1 - PowerStream ACA Results – 2016/2017

Asset Class	Unit of Measure	Total Population	HI Quantity				
			VP	P	F	G	VG
PS Distribution Transformers	unit	44,781	1695	5638	8422	9706	19320
PS Pad Mounted Switchgear	unit	1,817	93	103	375	105	1141
PS Minirupter Switches	unit	270	0	4	202	64	0
PS Automated Switches	unit	481	0	9	136	235	101
PS Wood Poles	unit	36,688	0	1630	7820	27238	0
PS Stations Transformers	unit	95	0	0	5	54	36
PS Stations Circuit Breakers/Reclosers	unit	389	1	26	26	87	249
PS Stations 230 kV Switches	unit	22	0	0	2	6	14
PS MS Primary Switches	unit	58	0	0	0	50	8
PS Stations Capacitors	unit	9	0	0	0	2	7
PS Stations Reactors	unit	38	0	0	0	0	38
PS TS Station Service Transformers	unit	18	0	0	0	4	14
PS 230 KV PMU	unit	30	0	0	0	0	30
PS TS P&C Relays	unit	330	6	78	6	50	190
PS MS P&C Relays	unit	349	3	29	75	13	229

AMPCO-31

Reference

Exhibit 4

a) Please provide Alectra's total asset population at the end of 2018.

b) Please provide the % of total assets to be replaced over the period 2020 to 2024 compared to the period 2015 to 2018.

Response:

a) At the end of 2018, Alectra Utilities' total asset population was 303,600 units. Alectra Utilities provides the count with each kilometer of linear assets (conductors and cables) equivalent to one unit.

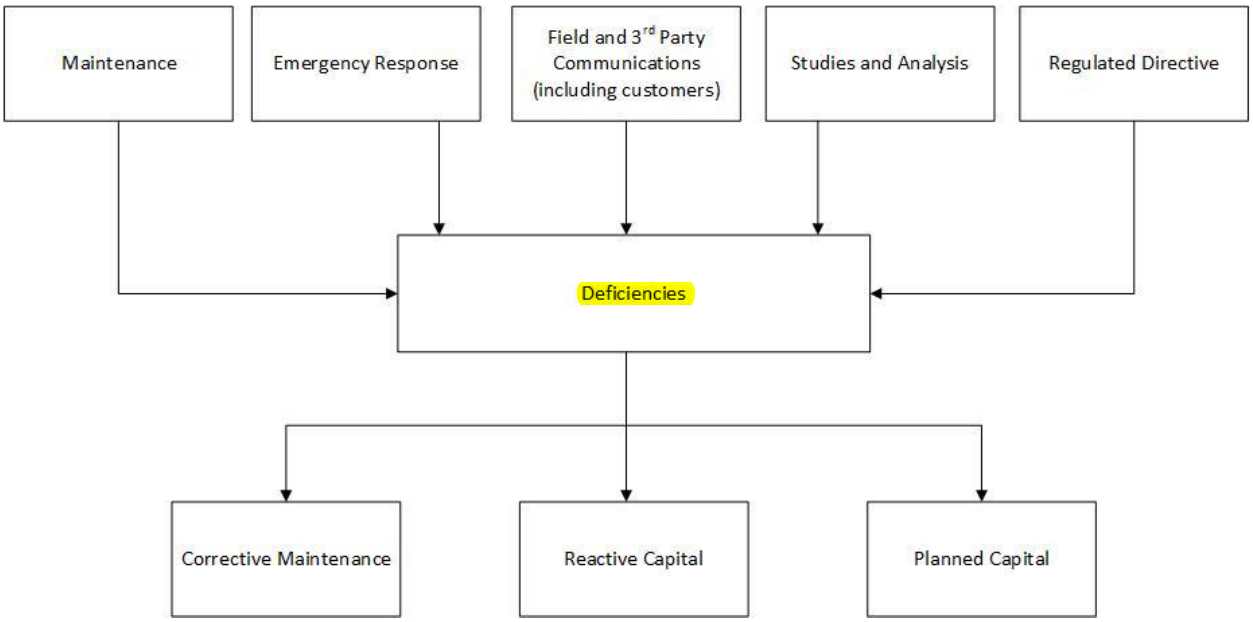
b) Alectra Utilities interprets the question to provide asset quantities by year for asset renewal investments; therefore, it does not consider replacements due to road widening widenings, voltage conversion, rear lot conversion, or other customer requests.

Alectra Utilities cannot predict the future asset population. Therefore, it has used the 2018-year end asset count for each year from 2020 to 2024. Further, Alectra Utilities does not have the asset population quantities for all operational areas for each historic year. Therefore, it has used the 2018-year end asset count for each asset class for 2015-2019. The percentage of total assets replaced from 2015-2018 relative to their population size (at 2018-year end) is provided in Table 1 - Transformer Replacements include the multi-year project to replace transformers indicating signs of leaking oil or oil containing PCBs in the ERZ.

Table 1 - Asset Renewal Quantities and Percentage of Population Replaced (2015-2024)

Asset Type	2015	2016	2017	2018	2019	2020	2021	2022	2023	2024
Wood poles	1.1%	1.1%	1.1%	1.1%	0.9%	0.8%	0.9%	0.9%	0.8%	0.8%
Switches	2.6%	2.9%	2.6%	2.0%	1.3%	1.1%	1.1%	1.1%	1.1%	1.1%
Switchgear	2.4%	3.0%	2.7%	1.4%	2.4%	2.4%	2.4%	2.4%	2.4%	2.4%
TX Replacement	0.7%	0.8%	0.8%	0.7%	0.8%	0.4%	0.4%	0.5%	0.5%	0.5%
Cable Renewal (Injection and Replacement)	0.8%	0.6%	0.6%	0.6%	1.0%	1.4%	1.8%	2.0%	2.2%	2.4%

Figure A06 - 2: Deficiencies Flow Process



Assets may be replaced on a reactive basis, if a field inspection identifies that an asset needs to be replaced immediately. This is called an “inspection-based intervention.” Assets may require immediate intervention for a range of factors, but will primarily be identified for replacement due to advanced deterioration or because they pose a safety risk to public or crews. Alectra Utilities must address these risks quickly, and cannot delay addressing failed or high-risk assets until a planned project is completed.

Assets may also need to be replaced reactively when they are damaged due to extreme weather events, accidents, or vandalism. If these events leave equipment in a state where failure is imminent or pose a safety risk.

V Options Analysis

Alectra Utilities has considered the following two intervention options with respect to reactive capital:

- Do Nothing – do not replace asset following failure
- Replacement of the asset – either reactively following failure, or proactively as inspection-based intervention.

Do Nothing

In this case, the Status Quo option would in effect mean that the utility would do nothing once the asset has failed and allow the outage to be maintained. This is not a viable option, as to leave customers without power is in direct contravention to the Distribution System Code - Section 4.4.

Replacement of the asset

Under this option Alectra Utilities would continue with the status quo and replace asset reactively as required. Per Figure A06 - 2 Alectra Utilities uses Corrective Maintenance and Planned Capital as options where possible, as alternatives to a reactive replacement.

G.2.2 Reactive Capital

Overview	Investments in reactive capital involve the replacement of distribution equipment that has failed during operation and requires immediate attention to restore power. Reactive capital investments also include replacement of assets identified through maintenance and inspections as being of imminent risk of failure or hazard that requires immediate attention to avoid catastrophic failure and safety issues.
Investment Drivers and Need	Primary Driver: Failure Secondary Driver: Reliability, Safety
Investment Description	Reactive capital investment includes, but are not limited to, the replacement of equipment due to storm damage, failure during operations, vehicle accidents or inspection results that require immediate action.
Outcomes and Benefits	Customer Value, Reliability, Safety

AMPCO-33

Reference

Exhibit 4, Tab 1, Schedule 1, Appendix A06, p. 4

a) Page 4: Please provide the number of deficiencies for each of the years 2014 to 2018.

b) Page 10: Please provide the volume of work for each of the years 2014 to 2019.

c) Please provide the Reactive Capital costs to date in 2019.

Response:

a) and b) Alectra Utilities does not have data in a manner that it can report to respond to these questions.

c) Reactive Capital expenditures to date as of June 30, 2019 are $11.5MM.

Table A19 - 14: Planned Fleet Renewal Investment by Vehicle Type

Vehicle Type	2020		2021		2022		2023		2024		2019-2024 Total	
	No.	CAPEX ($MM)	No.	CAPEX ($MM)	No.	CAPEX ($MM)	No.	CAPEX ($MM)	No.	CAPEX ($MM)	No.	CAPEX ($MM)
Heavy Duty Vehicles	8	3.5	15	6.8	14	5.7	12	6.3	10	5.3	59	27.6
Medium Duty Vehicles	12	1.6	11	1.2	9	1.6	6	1.0	7	2.0	45	7.4
Light Duty Vehicles	61	2.7	16	0.8	41	1.9	38	1.7	33	1.6	189	8.7
Equipment	6	0.9	3	0.5	3	0.6	9	0.8	9	0.9	30	3.7
Trailers	0	0.0	1	0.1	0	0.0	8	0.4	8	0.3	17	0.8
Shop Equipment and Tools	5	0.2	3	0.1	3	0.1	2	0.1	5	0.1	18	0.6
Total	**92**	**8.9**	**49**	**9.5**	**70**	**9.9**	**75**	**10.3**	**72**	**10.2**	**358**	**48.8**

Relative to the utility's needs, the planned fleet investments are conservative. To minimize the impact on ratepayers, Alectra Utilities has decided to spend less on Fleet Renewal during the DSP period than prescribed by its vehicle replacement criteria. As shown in Table A19 - 15, if Alectra Utilities were to strictly follow its vehicle replacement criteria, the current condition its fleet would result in expenditures of approximately $12.5MM per year throughout the DSP period.

Table A19 - 15: Vehicle Replacement Criteria vs. Proposed DSP Expenditures

Alectra Utilities Fleet Capital Expenditure ($MM)	2020	2021	2022	2023	2024	Total
Needs Determined Through Condition and Replacement Criteria	$12.8	$12.4	$12.8	$11.9	$13.2	$63.1
Proposed	$8.9	$9.5	$9.9	$10.3	$10.2	$48.8
Difference Between Needs and Proposed	**$3.9**	**$2.9**	**$2.9**	**$1.6**	**$3.0**	**$14.3**

4.4 Investment Pacing and Prioritization

When planning and executing Fleet Renewal investments, Alectra Utilities considers several factors as part of an ongoing screening process for fleet assets. To execute and sufficiently pace and prioritize the Fleet Renewal investment, Alectra Utilities implemented a first pass screening process which includes an assessment of the vehicle type, usage and age. At this time, the vehicles' mileage, engine hours, utilization, and Power Take Off ("PTO") hours are documented. This assessment provides Alectra Utilities a baseline to initiate the capital replacement assessment process. During this time, the vehicle utilization is also examined and internal discussions take place with various business units on the vehicle requirement. Alectra Utilities examines the possibility to re-allocate vehicles to maximize utilization as well as considers replacement options (e.g., like-for-like vehicle replacement or revision of vehicle to match evolved business requirements).[166]

Vehicle refurbishment is also considered, particularly for large and higher investment vehicles such as bucket, digger, and derrick trucks.

[166] Trucks and vehicles may be renewed by different models or types depending on updated operation processes, corporate initiatives and customer requirements.

AMPCO-36

Reference

Exhibit 4, Tab 1, Schedule 1, Appendix A19

Please discuss how Alectra took into account vehicle utilization rates in right sizing the fleet and investment levels for the test period.

Response:

Based on Alectra Utilities' condition and replacement criteria as outlined in Exhibit 4, Tab 1, Schedule 1, Appendix A19, page 5, Table A19 – 4, Vehicle Renewal Assessment Criteria, it found that its required fleet capital expenditures should be $63.1MM over the Distribution System Plan "DSP" period, as outlined in Exhibit 4, Tab 1, Schedule 1, Appendix A19, page 19, Table A19 – 15, Vehicle Replacement vs. Proposed DSP Expenditures.

However, Alectra Utilities has reduced this budget by $13.2MM to $48.8MM over the DSP period, to minimize the impact to the ratepayers.

In order to achieve that reduction, Alectra Utilities will be replacing vehicles manufactured in 2010 or earlier. It also considered utilization rates. Further, it will be reviewing the recommendations to be provided by Mercury Associates in their upcoming utilization study, in order to reduce the fleet capital expenditures, as required during the DSP period. This Utilization Study, which is expected to be completed in Q4, 2019, will further inform Alectra Utilities fleet investment decisions.

C.12 Portfolio Level Initiatives and Project Scheduling

Alectra Utilities utilizes the Primavera P6 software to ensure a standardized process for planning and monitoring the progress of work execution. More specifically, this Integrated Planning and Scheduling Solution ("iPass") process provides a consolidated view of construction projects and allocation of work across crews. The resulting benefits include enhanced ability to manage construction projects and asset procurement, leading to increased customer satisfaction and productivity improvements.

C.13 Project and Work Planning

By applying the iPass process, Alectra Utilities is able to estimate with reasonable accuracy, based on best information available at the time, the length of time required for design and construction. To minimize the risk of delays to construction starts, detailed designs are completed at a minimum of four months prior to construction, so as to accommodate the processes for obtaining all necessary work permits and scheduling resources and materials.

C.14 Work Execution

Alectra Utilities executes capital project design and construction through a combination of internal resources and external contractors. The company has entered into multi-year engineering procurement, and construction master service agreements to ensure resources and materials are available to execute the scheduled work.

C.15 Project Monitoring and Control

The iPass process is an important tool supporting Alectra Utilities in executing all distribution capital and maintenance work on-time and on-budget. The iPass process incorporates continuous project control and monitoring capabilities, as highlighted below:

- Cost Performance Index ("CPI"): measures the utility's ability to complete projects within budget. Actual project costs are measured as a ratio of planned estimated costs. CPI-related variances that exceed 10% are examined for mitigation and improvement.
- Schedule Performance Index ("SPI"): measures the utility's ability to complete projects within a specified duration. SPI is the ratio between the actual versus planned durations of construction, with a target of a maximum 10% variance between the two. Where projects

involve customer connections with an actual target date of completion, both the project duration and expected completion relative to the target and schedule are measured. Alectra Utilities places a high priority on the tracking of SPI for customer connection projects, in support of its commitment to effectively manage and meet customer service obligations, and allowing customers to better plan and manage their internal timelines in relation to expected project completion.

- Request for Change ("RFC"): Change requests (including associated quantity, value, and approval time) are tracked and measured to ensure all changes to work scope, cost and schedule are monitored. Ensuring that work is executed according to plan is crucial to minimizing delays, material stock-outs and cost overruns. Alectra Utilities leverages the information attained from the RFC measure to derive lessons learned to inform and improve future project development, estimation, scheduling and implementation.

D Continuous Improvement

As show in Figure 5.3.1 - 8, Alectra Utilities' continuous improvement process features the following components:

- Review Work and Project Deliverable;
- Reporting Performance Measures (i.e. Key Performance Indicators);
- Develop Continuous Improvement Action;
- Adjust Performance Targets; KPIs, Processes and Procedure; and
- Update Value Framework.

AMPCO-25

Reference

Exhibit 4, Tab 1, Schedule 1, p. 168

a) Please provide the CPI ratio results for 2014 to 2018.

b) Please provide the SPI ratio results for 2014 to 2018.

Response:

a) and b)

As explained in Section 5.2.3.2 of the DSP (Exhibit 4, Tab 1, Schedule 1, Page 99), Alectra Utilities was formed in 2017 and has expanded significant efforts to integrate, harmonize and establish new processes, practices and systems.

Since many of the proposed performance measures developed to track the implementation of Alectra 2020-2024 DSP are new, Alectra Utilities does not have historical data for these new measures which include the Cost Performance and Schedule Performance Indices.

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Reference

Exhibit 4, Tab 1, Schedule 1, Table 5.4.3-5, p. 402 & p. 175

a) Please provide a breakdown of the investments in Table 5.4.3 – 5 by operating area (P175).

b) Please provide a breakdown of the investments in Table 5.4.3 -5 by operating area for the years 2015 to 2019.

Response:

a) In Table 1 below, Alectra Utilities has provided Table 5.4.3-5 by operating area.

1 **Table 1 - Table 5.4.3-5 by Operating Area**

Table 5.4.3-5 by Operating Area	2020	2021	2022	2023	2024
Central North	**$17.4**	**$15.8**	**$19.1**	**$19.8**	**$19.1**
Overhead Asset Renewal	$6.1	$5.6	$8.1	$7.6	$5.3
Reactive Capital	$1.5	$1.6	$1.6	$1.6	$1.7
Substation Renewal	$3.7	$0.8	$0.7	$0.7	$0.9
Transformer Renewal	$0.6	$0.8	$1.0	$1.3	$1.5
Underground Asset Renewal	$5.5	$7.0	$7.7	$8.6	$9.8
Central South	**$37.6**	**$39.8**	**$42.4**	**$45.3**	**$51.8**
Overhead Asset Renewal	$5.9	$5.3	$4.9	$4.6	$7.3
Reactive Capital	$3.4	$3.5	$3.6	$3.6	$3.7
Substation Renewal	$5.1	$0.5	$0.5	$0.9	$3.0
Transformer Renewal	$1.9	$1.9	$1.9	$2.0	$2.0
Underground Asset Renewal	$21.3	$28.7	$31.5	$34.2	$35.8
Guelph	**$6.1**	**$6.3**	**$6.5**	**$6.6**	**$6.8**
Overhead Asset Renewal	$2.0	$2.1	$2.1	$2.1	$2.3
Reactive Capital	$1.0	$1.0	$1.0	$1.1	$1.1
Rear Lot Conversion	$0.1	$0.1	$0.1	$0.1	$0.1
Substation Renewal	$0.1	$0.1	$0.1	$0.1	$0.1
Transformer Renewal	$0.3	$0.3	$0.4	$0.4	$0.4
Underground Asset Renewal	$2.6	$2.6	$2.8	$2.8	$2.9
West	**$25.7**	**$27.9**	**$30.4**	**$23.4**	**$33.5**
Overhead Asset Renewal	$10.9	$12.0	$14.2	$4.5	$11.9
Reactive Capital	$3.4	$3.5	$3.6	$3.7	$3.8
Rear Lot Conversion	$0.0	$0.0	$0.0	$2.3	$4.1
Substation Renewal	$0.5	$0.5	$0.4	$0.5	$0.6
Transformer Renewal	$0.6	$0.7	$0.7	$0.7	$0.7
Underground Asset Renewal	$8.6	$9.5	$9.8	$9.8	$10.6
Other System Renewal	$1.7	$1.7	$1.8	$1.9	$1.9
East	**$52.1**	**$52.2**	**$55.6**	**$61.0**	**$65.9**
Overhead Asset Renewal	$9.4	$9.7	$10.1	$12.0	$10.8
Reactive Capital	$9.4	$9.6	$9.8	$10.0	$10.1
Rear Lot Conversion	$4.7	$1.0	$1.1	$1.8	$4.3
Substation Renewal	$3.3	$2.5	$1.1	$1.0	$1.0
Transformer Renewal	$2.2	$2.6	$3.0	$3.1	$3.3
Underground Asset Renewal	$23.0	$26.7	$30.5	$33.1	$36.5
Grand Total	**$139.0**	**$142.0**	**$154.0**	**$156.1**	**$177.2**

2

3

b) In Table 2 below, Alectra Utilities provides the breakdown of the investments in Table 5.4.3-5 by operating area for the years 2015-2019.

Table 2 - Breakdown of the Investments in Table 5.4.3-5 by Operating Area for 2015-2019

Table 5.4.3-5 by Operating Area	2015	2016	2017	2018	2019
Central North	**$9.8**	**$7.2**	**$11.9**	**$13.6**	**$15.1**
Overhead Asset Renewal	$4.4	$1.5	$3.5	$3.8	$7.2
Reactive Capital	$1.6	$1.8	$1.9	$3.2	$1.5
Substation Renewal	$0.3	$2.3	$0.8	$1.2	$1.2
Transformer Replacements	$0.4	$0.2	$0.8	$0.8	$0.4
Underground Asset Renewal	$3.1	$1.4	$4.9	$4.4	$4.9
Central South	**$44.7**	**$40.4**	**$43.9**	**$41.6**	**$37.9**
Overhead Asset Renewal	$8.1	$10.5	$9.2	$8.4	$10.0
Reactive Capital	$0.3	$0.3	$0.4	$0.2	$3.2
Substation Renewal	$7.2	$5.2	$5.7	$5.4	$1.2
Transformer Replacements	$12.2	$8.5	$8.5	$11.4	$9.3
Underground Asset Renewal	$16.9	$15.9	$20.1	$16.1	$14.1
Guelph	**$3.3**	**$6.2**	**$7.5**	**$4.8**	**$6.0**
Overhead Asset Renewal	$1.5	$2.2	$2.6	$2.8	$1.9
Reactive Capital	$0.1	$0.2	$0.2	$0.5	$1.1
Rear Lot Conversion	$0.0	$0.0	$0.0	$0.1	$0.1
Substation Renewal	$0.0	$0.0	$0.0	$0.2	$0.1
Transformer Replacements	$0.3	$0.4	$0.5	$0.5	$0.3
Underground Asset Renewal	$1.3	$3.5	$4.1	$0.8	$2.5
Other System Renewal	$0.0	$0.0	$0.0	$0.0	$0.0
West	**$17.4**	**$23.0**	**$33.3**	**$31.6**	**$35.1**
Overhead Asset Renewal	$10.8	$10.6	$18.2	$17.2	$17.6
Reactive Capital	$3.4	$3.9	$3.7	$5.4	$2.3
Rear Lot Conversion	$0.7	$1.8	$0.3	$0.0	$4.2
Substation Renewal	$0.0	$0.2	$0.4	$0.4	$0.8
Transformer Replacements	$0.2	$0.3	$0.3	$0.2	$0.4
Underground Asset Renewal	$2.2	$6.1	$8.7	$6.9	$8.1
Other System Renewal	$0.0	$0.0	$1.6	$1.5	$1.6
East	**$47.4**	**$42.2**	**$39.4**	**$38.1**	**$38.1**
Overhead Asset Renewal	$8.4	$10.2	$9.4	$7.2	$8.8
Reactive Capital	$11.2	$8.4	$9.4	$11.3	$9.1
Rear Lot Conversion	$3.3	$2.8	$3.1	$0.0	$0.8
Substation Renewal	$2.0	$2.8	$2.3	$3.2	$1.8
Transformer Replacements	$1.6	$1.5	$1.3	$1.1	$1.9
Underground Asset Renewal	$20.8	$16.4	$13.9	$15.4	$15.8
Grand Total	**$122.5**	**$119.1**	**$136.0**	**$129.5**	**$132.1**

A.1 Cost Control: Planned Capital

A.1.1 Cost Control (A) – Planned Capital (Actual vs. Budget)

Measuring planned capital expenditures relative to actual capital expenditures enables Alectra Utilities to track its implementation of those capital investments that are within its control in terms of scope, schedule and cost. Regular and ongoing communications, meetings and discussions take place among representatives from the company's Program Delivery, Asset Management, Distribution Design, Network Operations (lines, construction) and Supply Chain Management groups to coordinate, provide updates and prioritize ongoing projects to ensure that work is completed on time and within budget. Completion of the planned capital investments within each investment group (e.g., Overhead Asset Renewal, Underground Asset Renewal) is tracked through the Enterprise Resource Planning ("ERP") system, which enables Alectra Utilities to monitor and report on its implementation of capital investments compared to its budgeted capital investments, and identify any areas of concern (i.e. deviations from budget, defined scope of work, timing of implementation) on an investment grouping basis.

Table 5.2.3 - 2(A): Finance: Cost Control Custom Performance Measure

Measure Category	2020-2024 Performance Measure	Historical Performance (2018)	Target (2020-2024)
Finance	Cost-Control: Planned Capital (Actual vs. Budget)	84%	100%

The Cost-Control performance measure tracks the cumulative implementation of planned capital investments relative to the plan as outlined in this DSP over the 2020-2024 period. Planned capital investments include those in the System Renewal and System Service investment categories, but exclude Reactive Capital investments because these are not within the control of Alectra Utilities. Alectra Utilities' DSP-specific performance measure for cost-control has been developed on the basis of the proposals, plans and associated investment funding contained in this Application.

A.1.2 Cost Control (B) – Planned Capital Projects Completed

Measuring planned capital project completion enables Alectra Utilities to track its implementation of those capital investments that are within the company's control in terms of scope, schedule and cost. Completion of the planned capital investments within each investment group (e.g., Overhead Asset Renewal, Underground Asset Renewal) is tracked through the Enterprise

Resource Planning system, which enables Alectra Utilities to monitor and report on its implementation of capital investments compared to its portfolio of planned capital investments, and identify any areas of concern (i.e., deviations from defined scope of work, timing of implementation, cost changes) on an investment grouping basis. Regular and ongoing communications, meetings and discussions take place among representatives from the company's Program Delivery, Asset Management, Distribution Design, Network Operations (lines, construction) and Supply Chain Management groups to coordinate, provide updates and prioritize ongoing projects to ensure that work is completed on time and scope.

Table 5.2.3 - 2(B): Finance: Cost Control Custom Performance Measure

Measure Category	2020-2024 Performance Measure	Historical Performance	Target (2020-2024)
Finance	Cost-Control: % of Planned Capital Projects Completed	N/A	Monitor

Since Alectra Utilities' Planned Capital Project Completed measure was developed in 2019, there are no historical measures available. Alectra Utilities will measure and track its Planned Capital Projects Completed levels using the performance measure over the duration of the DSP implementation period to establish a baseline from which it may in future propose a target.

A.2 Asset Condition – Health Index (Underground Cables)

Alectra Utilities' performance relative to the Financial AM Strategic Principle of prudently investing in and maintaining assets to provide sustainable value is also tracked by monitoring asset condition. Measuring asset condition performance based on the Health Index for Alectra Utilities' underground cable assets enables the company to track its pacing and direction of critical system renewal initiatives aimed at renewing underground cable assets that are in very poor and poor condition. Underground Cable and cable accessory failures are the leading cause of outages, both in terms of frequency and duration. Over the last five years[37], Alectra Utilities has experienced an increasing year-over-year trend of underground cable failures. Alectra Utilities has determined that an increasing rate of underground cable failure over this period is an indication that the deterioration of cables is exceeding the historical renewal rate. Please refer to

[37] Alectra Utilities has consolidated historical outage statistics from predecessor utilities related to cable and cable accessory failures from 2014 to 2018.