EXHIBIT 2 – RATE BASE

Index

RATE BASE

OVERVIEW

This Exhibit provides CND's distribution rate base forecast for the 2014 Test Year, with variances analysis for the Board Approved 2010, actual years 2010, 2011 and 2012, the Bridge Year 2013 and the Test Year 2014. In accordance with the Board's Filing Requirements, the rate base for the purpose of calculating the revenue requirement is calculated as an average of the net capital balances at the beginning and the end of the 2014 Test Year, plus a working capital allowance, which, in CND's case, is 13% of the sum of the cost of power and OM&A expenditures.

Net capital assets are gross assets in service minus accumulated depreciation and contributed capital from third parties. Capital assets include property, plant and equipment and intangible assets. These have been referred to as "capital, or fixed assets" throughout this evidence.

For purposes of this Exhibit, Distribution assets refer to those assets that are most directly related to the distribution system, such as poles, overhead and underground lines, and transformers. General plant refers to assets that support the operation of the distribution system such, as computer hardware and software, vehicles, certain buildings, equipment and meters.

The net fixed assets (net book value) includes assets that are associated with the delivery of electricity to the inhabitants and businesses of the City of Cambridge and the Township of North Dumfries. CND has no capital assets that are used for non - regulated activities and therefore no adjustments are required to the audited financial statements. CND has not applied for nor received any Incremental Capital Module ("ICM") adjustments.

CND has provided its rate base calculations for the following years: 2010 Board Approved; 2010 Actuals; 2011 Actuals; 2012 Actuals; 2013 Bridge Year; and the 2014 Test Year in Table 2-1 below.

Table 2-1 Summary of Rate Base

Description	2010 Board Approved	2010 Actual	2011 Actual	2012 Actual	2013 Bridge	2014 Test
Gross Fixed Assets	180,874,536	167,445,584	175,521,591	188,843,456	204,926,209	222,575,592
Accumulated Depreciation	91,540,330	84,779,401	90,948,463	96,586,887	100,768,156	105,758,033
Net Book Value	89,334,206	82,666,183	84,573,128	92,256,569	104,158,053	116,817,559
Average Net Book Value	86,980,095	83,193,749	83,619,656	88,414,849	98,207,311	110,487,806
Working Capital	120,855,337	131,154,242	142,330,403	180,318,097	167,708,861	169,005,383
Working Capital Rate %	15%	15%	15%	15%	15%	13%
Working Capital Allowance	18,128,301	19,673,136	21,349,560	27,047,715	25,156,329	21,970,700
Rate Base	105,108,395	102,866,885	104,969,216	115,462,563	123,363,640	132,458,506

CND's has calculated its 2014 rate base as $132,458,506, an increase of $27,350,111 over the 2010 Board Approved rate base of $105,108,395. This increase in rate base of $27,350,111 is attributable to an increase in the average net book value of capital assets of $23,507,711 and an increase in the working capital allowance of $3,842,399.

Details with respect to the Gross Assets are provided at Exhibit 2, Tab 1, Schedule 2.

Details of the Working Capital Allowance are provided at Exhibit 2, Tab 1, Schedule 3.

RATE BASE VARIANCE ANALYSIS

As provided in Exhibit 1, CND has calculated its materiality threshold for purposes of the variance analysis in Exhibit 2 as per Table 2-2 below.

Table 2-2 Calculation of Variance Analysis Threshold

VARIANCE ANALYSIS THRESHOLD	
	2014 TEST
Estimated Distribution Revenue Requirement	27,966,045
0.5% of Proposed Distribution Revenue Requirement	139,830
Variance threshold established for analysis	**125,000**

Table 2-3 below sets out CND's rate base and working capital amounts for 2010 Board Approved, 2010 Actual, 2011 Actual, 2012 Actual, 2013 Bridge Year, and 2014 Test Year, and the following variances:

- 2010 Actual vs. 2010 Board Approved;
- 2011 Actual vs. 2010 Board Approved;
- 2012 Actual vs. 2011 Actual;
- 2013 Bridge Year vs. 2012 Actual; and
- 2014 Test Year vs. 2013 Bridge Year

Table 2-3 Rate Base Variance Analysis

Description	Board Approved 2010	Actual 2010	Variance: Actual 2010 vs. Board Approved 2010	Actual 2011	Variance: Actual 2011 vs. Board Approved 2010	Variance: Actual 2011 vs. Actual 2010	Actual 2012	Variance: Actual 2012 vs. Actual 2011	Bridge 2013	Variance: Bridge 2013 vs. Actual 2012	Test 2014	Variance: Test 2014 vs. Bridge 2013
Gross Fixed Assets	180,874,536	167,445,584	(13,428,952)	175,521,591	(5,352,945)	8,076,007	188,843,456	13,321,865	204,926,209	16,082,753	222,575,592	17,649,383
Accumulated Depreciation	91,540,330	84,779,401	(6,760,929)	90,948,463	(591,867)	6,169,062	96,586,887	5,638,424	100,768,156	4,181,269	105,758,033	4,989,877
Net Book Value	89,334,206	82,666,183	(6,668,023)	84,573,128	(4,761,078)	1,906,945	92,256,569	7,683,441	104,158,053	11,901,484	116,817,559	12,659,506
Average Net Book Value	86,980,095	83,193,749	(3,786,346)	83,619,656	(3,360,439)	425,907	88,414,849	4,795,193	98,207,311	9,792,462	110,487,806	12,280,495
Working Capital	120,855,337	131,154,242	10,298,905	142,330,403	21,475,066	11,176,161	180,318,097	37,987,694	167,708,861	(12,609,236)	169,005,383	1,296,522
Working Capital Rate %	15%	15%		15%	0	0	15%	0	15%		13%	
Working Capital Allowance	18,128,301	19,673,136	1,544,835	21,349,560	3,221,259	1,676,424	27,047,715	5,698,154	25,156,329	(1,891,385)	21,970,700	(3,185,629)
Rate Base	105,108,395	102,866,885	(2,241,510)	104,969,216	(139,179)	2,102,331	115,462,563	10,493,347	123,363,640	7,901,077	132,458,506	9,094,866

Variance: Actual 2010 vs. Board Approved 2010:

Actual 2010 Rate Base of $102,866,885 was $2,241,510 or 2% lower than 2010 Board Approved Rate Base of $105,108,395. The variance was attributable to lower actual average net fixed assets of $3,786,346, partially offset by higher working capital allowance of $1,544,835, principally due to higher cost of power. The average net fixed assets were lower than the 2010 Board Approved as a result of the removal of stranded meters with a net book value of approximately $3.5MM in 2010, as well as lower capital expenditures in 2009 and 2010 than originally planned. The variance in capital expenditures is described in further detail in Exhibit 2, Tab 1 and Schedule 2. The actual cost of power in 2010 was $121,573,775 compared to the 2010 Board Approved amount of $110,823,229.

Variance: Actual 2011 vs. Board Approved 2010:

Actual 2011 Rate Base of $104,969,216 was $139,179 lower than 2010 Board Approved Rate Base of $105,108,395. The variance was attributable to lower actual average net fixed assets of $3,360,439, partially offset by higher working capital allowance of $3,221,259. As noted above, the lower average net fixed assets reflects the removal of $3.5MM in stranded meters in 2010 Actuals, which continued into 2011. The increase in working capital allowance is principally explained by the cost of power, which was $20,744,751 higher in 2011 compared to 2010 Board Approved.

Variance: Actual 2011 vs. Actual 2010:

Actual 2011 Rate Base of $104,969,216 was $2,102,331 higher than 2010 Actual Rate Base of $102,866,885. The variance between Actual 2011 Rate Base and Actual 2010 Rate Base was attributable to an increase in the average net fixed assets of $425,907 and an increase in the working capital allowance of $1,676,424. The increase in working capital was due to an increase in the cost of power of $9,994,205 and increased OM&A expenditures of $1,181,956.

Variance: Actual 2012 vs. Actual 2011:

Actual 2012 Rate Base of $115,462,563 was $10,493,347 higher than 2011 Actual Rate Base of $104,969,216. The increase in rate base was attributable to an increase in the average net fixed assets of $4,795,193 and an increase in the working capital allowance of $5,698,154. The increase in the average net fixed assets was principally as a result of the transfer of $7,787,408 in Smart Meter and related computer hardware and software capital expenditures from the Smart Meter capital variance account 1555. The increase in the working capital allowance was attributable to an increase in OM&A expenditures of $2,913,884 and an increase in the cost of power. The increase in OM&A in 2012 includes the transfer of $1,325,414 in Smart Meter expenditures from Account 1556 Smart Meter OM&A deferral account, as well as $761,382 in incremental costs that were directly attributable to a change in CND's capitalization policies, which is summarized in Exhibit 2, Tab 2, Schedule 2. The cost of power increased by $34,927,672 from $131,567,980 to $166,495,652.

Variance: Bridge 2013 to Actual 2012:

2013 Bridge Year Rate Base is expected to be $123,363,640 or $7,910,077 higher than the Actual 2012 Rate Base of $115,462,563. The increase in rate base reflects an increase in the average net capital assets of $9,792,462, partially offset by a decrease in working capital allowance of $1,891,385. The increase in average net capital assets reflects the increase in CND's capital program, which is further elaborated in the Distribution System Plan ("DSP") provided in Appendix 2-8A. CND has estimated a decrease in the working capital allowance principally as a result of a projected decrease in the cost of power, partially offset by higher OM&A expenses.

Variance: Test 2014 to Bridge 2013:

2014 Test Year Rate Base is expected to be $132,458,506 or $9,094,866 higher than the 2013 Bridge Year Rate Base of $123,363,640. The increase in rate base is explained by an increase in the average net capital assets of $12,280,495, partially offset by a decrease in the working capital allowance of $3,185,629. The addition to gross fixed assets in 2014 is $17,649,383. Details with respect to CND's 2014 capital expenditure program are provided Exhibit 2, Tab 2, Schedule 4 as part of the Material Investments section. The working capital allowance decreased by $3,185,629 principally as a result of a reduction in the working capital allowance percentage from 15% to 13%.

GROSS ASSETS – PROPERTY, PLANT AND EQUIPMENT AND ACCUMULATED DEPRECIATION

In support of its rate base calculation, CND has provided the following information required in the Filing Requirements for Gross Assets and Accumulated Depreciation:

- Fixed Asset Continuity Schedules for 2009 Actual, 2010 Actual, 2011 Actual, 2012 Actual, 2013 Bridge Year and 2014 Test Year (Appendices 2-1 through 2-6);
- Summary of Gross Assets for the years 2008 through 2014 Test Year (Table 2-5), which provides for a breakdown by major plant account; and
- Summary of Accumulated Depreciation for the years 2008 through 2014 Test Year (Table 2-8A), which provides for a breakdown by major plant account.

Table 2-4 below provides a breakdown of the Gross Assets by Function.

Table 2-4 Gross Assets by Function

	GROSS ASSETS							
Description	Actual 2008	Actual 2009	Actual 2010	Board Approved 2010	Actual 2011	Actual 2012	Bridge 2013	Test 2014
Distribution Assets	154,604,239	163,712,414	173,410,806	173,649,971	180,910,217	179,153,138	195,412,738	211,651,530
General Plant Assets	17,848,683	18,370,672	9,521,988	22,048,917	11,441,416	26,888,081	29,752,234	33,568,825
Contributions and Grants	(11,419,225)	(13,745,395)	(15,549,083)	(14,886,225)	(16,891,915)	(17,259,636)	(20,300,636)	(22,706,636)
Property under Capital Lease	61,873	61,873	61,873	61,873	61,873	61,873	61,873	61,873
Total Excluding Work in Process	161,095,569	168,399,563	167,445,584	180,874,536	175,521,591	188,843,456	204,926,209	222,575,592
Work in Process	242,659	117,944	215,252	200,000	197,130	3,798,902	3,798,902	3,798,902
Other Utility Plant - Assets Not in Use	-	-	478,492	-	619,296	28,694	28,694	28,694
Total Including Work in Process	161,338,228	168,517,507	168,139,328	181,074,536	176,338,017	192,671,051	208,753,804	226,403,187

Distribution assets include assets such as overhead and underground infrastructure, wires, poles, and transformers.

General Plant Assets include assets such as Smart Meters, buildings, computer hardware and software, office furniture and equipment, transportation equipment, communications technology, and tools and general equipment.

Contributions and Grants represent amounts collected from customers for customer demand projects in accordance with the Distribution System Code ("DSC") and the provisions of CND's Conditions of Service.

CND confirms that it has not applied for nor received any Incremental Capital Module ("ICM") adjustments.

CND confirms that the calculated depreciation as per Exhibit 4, Tab 7, Schedule 1 reconciles to the Fixed Asset Continuity statements included in Appendices 2-1 through 2-6.

CND's Gross Assets, including Work in Progress and Assets Not In Use, have increased by $65,064,958 over the period 2008 Actual to 2014 Test Year, from $161,338,229 at December 31, 2008 to $226,403,187 at December 31, 2014. The increase is comprised of an increase in Distribution Assets of $49,344,816, which includes Work in Progress and Assets Not in Use of $3,584,937 and is net of increased capital contributions of $11,287,411, and an increase of $15,720,142 in General Plant Assets.

The increase in CND's Distribution System assets is principally attributable to increased investments to support system access projects, principally driven by customer demand, and system renewal projects to improve the reliability of the distribution system. CND's Distribution System Plan, included in Appendix 2-8A, documents CND's Asset Management Plan, including an analysis of the capital projects completed in the last five years, as well as the plans for the 2013 Bridge Year and 2014 Test Year.

The increase in General Plant assets is principally attributable to: (i) Investment in Smart Meters and related technology of $8.4MM; and (ii) Investments in information systems technology of approximately $5.6MM. Investments in information system technology assets include a new Customer Information/Billing System ("CIS/Billing System"), an Enterprise Resource Planning ("ERP") solution, and an Outage Management System. A summary of the investments leading to the increases in General Plant are described in more detailed as part of the Distribution System Plan (Exhibit 2, Appendix 2-8A).

Table 2-5 Gross Assets

		GROSS ASSETS														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
		Actual 2008	Actual 2009	Variance: 2009 vs. 2008 B - A	Actual 2010	Variance: 2010 vs. 2009 D - B	Board Approved 2010	Variance: 2010 Board Approved vs. Actual F - D	Actual 2011	Variance: 2011 Actual vs. 2010 Actual H - D	Actual 2012	Variance: 2012 Actual vs. 2011 Actual J - H	Bridge 2013	Variance: Bridge 2013 vs. Actual 2012 L - J	Test 2014	Variance: Test 2014 vs. Bridge 2013 N - L
OEB	Description	Dec 31/08	Dec 31/09		Dec 31/10		Dec 31/10		Dec 31/11		Dec 31/12		Dec 31/13		Dec 31/14	
1805	Land	395,225	413,171	17,946	488,261	75,091	375,461	(112,800)	466,720	(21,541)	252,923	(213,797)	252,923	-	252,923	-
1806	Land Rights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1808	Buildings and Fixtures	5,823,245	5,826,115	2,870	5,880,544	54,430	5,914,718	34,174	5,884,044	3,500	1,190,197	(4,693,847)	1,190,197	-	1,190,197	-
1810	Leasehold Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1815	Transformer Station Equipment - above 50 kV	9,771,354	9,771,354	-	9,771,354	-	9,771,354	(0)	9,777,743	6,389	10,014,580	236,836	10,018,180	3,600	10,018,180	-
1820	Distribution Station Equipment - below 50 kV	55,653	-	(55,653)	-	-	55,653	55,653	-	-	-	-	-	-	-	-
1825	Storage Battery Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1830	Poles, Towers and Fixtures	23,328,484	24,661,561	1,333,077	26,142,948	1,481,387	26,851,662	708,714	27,673,333	1,530,385	28,069,614	396,281	32,506,015	4,436,401	37,044,320	4,538,305
1835	Overhead Conductors and Devices	24,076,580	25,452,406	1,375,826	27,004,680	1,552,274	27,707,837	703,157	28,607,464	1,602,784	32,947,681	4,340,217	38,113,880	5,166,199	43,398,747	5,284,867
1840	Underground Conduit	21,273,070	22,954,441	1,681,371	24,714,646	1,760,205	24,453,093	(261,553)	25,645,937	931,291	25,759,534	113,597	27,629,524	1,869,990	29,460,761	1,831,237
1845	Underground Conductors and Devices	16,913,970	18,238,766	1,324,796	19,630,896	1,392,130	19,451,179	(179,717)	20,386,645	755,749	36,903,677	16,517,032	39,539,687	2,636,010	42,121,070	2,581,383
1850	Line Transformers	36,801,203	39,005,190	2,203,987	41,119,695	2,114,505	40,448,209	(671,486)	43,046,097	1,926,402	44,014,931	968,834	46,162,331	2,147,400	48,165,331	2,003,000
1855	Services	16,165,455	17,389,410	1,223,955	18,657,781	1,268,371	18,620,805	(36,976)	19,422,233	764,452	-	(19,422,233)	-	-	-	-
1860	Meters	9,136,785	9,240,198	103,413	1,044,324	(8,195,874)	9,431,762	8,387,438	1,329,664	285,340	9,515,126	8,185,462	10,430,143	915,017	11,396,786	966,643
1865	Other Installations on Customer's Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	Land	-	-	-	-	-	-	-	-	-	213,797	213,797	213,797	-	213,797	-
1906	Land Rights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	Buildings and Fixtures	-	-	-	-	-	-	-	-	-	5,187,347	5,187,347	5,635,347	448,000	5,690,347	55,000
1910	Leasehold Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	Office Furniture and Equipment	629,090	629,090	-	537,887	(91,204)	726,090	188,203	565,368	27,482	611,379	46,010	798,680	187,301	879,080	80,400
1920	Computer Equipment - Hardware	1,488,617	1,513,494	24,877	1,559,937	46,443	1,698,767	138,830	1,743,523	183,586	2,384,452	640,929	2,680,952	296,500	3,432,452	751,500
1925	Computer Software	1,191,464	1,126,689	(64,775)	947,211	(179,478)	4,215,644	3,268,433	2,126,649	1,179,438	3,217,340	1,090,691	3,530,240	312,900	4,864,288	1,334,048
1930	Transportation Equipment	3,299,888	3,607,971	308,083	3,621,019	13,048	3,633,815	12,796	3,844,415	223,396	3,867,279	22,863	4,455,064	587,785	4,975,064	520,000
1935	Stores Equipment	105,013	105,013	-	93,729	(11,284)	105,013	11,284	93,729	-	93,729	(0)	93,729	-	93,729	-
1940	Tools, Shop and Garage Equipment	1,283,612	1,434,002	150,390	1,003,667	(430,335)	1,523,612	519,945	1,023,853	20,186	1,083,419	59,566	1,200,069	116,650	1,309,069	109,000
1945	Measurement and Testing Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1950	Power Operated Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	Communication Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1960	Miscellaneous Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1970	Load Management Controls - Customer Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	Load Management Controls - Utility Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	System Supervisory Equipment	714,214	714,214	-	714,214	-	714,214	-	714,214	-	714,214	(0)	714,214	-	714,214	-
1985	Sentinel Lighting Rentals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	Other Tangible Property	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	Contributions and Grants	(11,419,225)	(13,745,395)	(2,326,170)	(15,549,083)	(1,803,688)	(14,886,225)	662,858	(16,891,915)	(1,342,832)	(17,259,636)	(367,722)	(20,300,636)	(3,041,000)	(22,706,636)	(2,406,000)
2005	Property under Capital Lease	61,873	61,873	-	61,873	-	61,873	-	61,873	-	61,873	0	61,873	(0)	61,873	-
	Total before Work in Process	161,095,570	168,399,563	7,303,993	167,445,584	(953,979)	180,874,536	13,428,952	175,521,591	8,076,007	188,843,456	13,321,865	204,926,209	16,082,753	222,575,592	17,649,383
										-		-				
	Work in Process	242,659	117,944	(124,715)	215,252	97,308	200,000	(15,252)	197,130	(18,122)	3,798,902	3,601,772	3,798,902	-	3,798,902	-
2070	Other Utility Plant - assets not in use			-	478,492	478,492		(478,492)	619,296	140,804	28,694	(590,602)	28,694	0	28,694	-
	Total after Work in Process	161,338,229	168,517,507	7,179,278	168,139,328	(378,179)	181,074,536	12,935,208	176,338,016	8,198,688	192,671,051	16,333,035	208,753,804	16,082,753	226,403,187	17,649,383

Gross Assets Variance Analysis:

CND submits the following variance analysis on Gross Assets, based on Table 2-5 Gross Assets:

2009 Actual vs. 2008 Actual:

Gross Assets increased by $7,179,279 from $161,338,228 in 2008 to $168,517,507 in 2009. The increase was principally attributable to an increase in Distribution Assets, net of capital contributions, of $6,782,005. General Plant assets increased by $521,989.

2010 Actual vs. 2009 Actual:

Gross Assets decreased by $378,179 from $168,517,507 in 2009 to $168,139,328 in 2010. The decrease was principally attributable to the transfer of $8,286,380 in gross stranded meter assets from the meter assets account 1860 to the Stranded Meter deferral variance account 1555, in accordance with the Board's *Guideline: Smart Meter Funding and Cost Recovery* (G-2008-0002). Distribution Assets, net of capital contributions, increased by $7,894,704 in 2010. Please refer to Exhibit 2, Tab 1, Schedule 4 with respect to the treatment of CND's stranded meter assets.

2010 Actual vs. 2010 Board Approved:

2010 Actual Gross Assets were $12,935,208 less than the 2010 Board Approved Gross Assets. 2010 Actual Distribution Assets, net of capital contributions were $902,023 less than 2010 Board Approved, whereby General Plant Assets were $12,526,929 less than 2010 Board Approved. As noted above, approximately $8,286,380 of the variance is attributable to the transfer of stranded meter assets to the deferral variance account. The remaining variance was attributable to lower than expected capital expenditures incurred in 2009 and 2010 than originally anticipated.

2011 Actual vs. 2010 Actual:

2011 Actual Gross Assets were $176,338,017 or $8,198,688 higher than 2010 Actual Gross Assets of $168,139,328. The increase in gross assets was attributable to an increase in Distribution Assets of $6,156,579, net of capital contributions, and an increase in General Plant of $1,919,428. The increase in General Plant in 2011 was principally attributable to the investment in the new CIS/Billing System.

2012 Actual vs. 2011 Actual:

2012 Actual Gross Assets were $192,671,051 or $16,333,035 higher than 2011 Actual Gross Assets. The increase in 2012 is explained by a net increase in Distribution System Assets of $886,369, including Work in Progress and net of Capital Contributions, and an increase in General Plant of $15,446,665.

Effective January 1, 2012 CND, in accordance with the Board's letter of July 17, 2012, revised its capitalization policies under CGAAP to satisfy the requirement to implement regulatory accounting changes for depreciation expense and capitalization policies by January 1, 2013.

As part of the implementation, CND reclassified certain of its assets to different OEB accounts to more closely align with the asset component structure. The following is a summary of the reclassifications, which affected three groups of assets:

1. Prior to January 1, 2012, all land and buildings were recorded in two OEB accounts 1805 and 1808 respectively, and were incorporated within the Distribution System Assets. CND reclassified the land and building for its corporate office to accounts 1905 and 1908 respectively, which are classified as General Plant. There was no impact on depreciation expense as a result of the transfer as the depreciation rates were the same.

2. Prior to January 1, 2012 CND allocated capital costs to account 1855 Services. With the implementation of the new ERP solution, and to ensure alignment with the new asset components, CND reclassified the balances in Account 1855 Services to Account 1835 Overhead Conductors and Devices and Account 1845 Underground Conductors and Devices. There was no impact on depreciation expense as a result of the transfer as the depreciation rates for these accounts were the same.

3. Prior to January 1, 2012 certain technology based expenditures were recorded in account 1860 Meters. It was determined that such assets would be more appropriately recorded in Account 1920 Computer Hardware and Account 1925 Computer Software. Given that the depreciation rates for Computer Hardware and Software are not the same as the Meters depreciation rate, the depreciation expense will be moderately different than if the transfer had not taken place.

Table 2-6 identifies the Gross Asset accounts impacted and the dollar values associated with the transfer using the same format as the Fixed Asset Continuity Schedules. Table 2-7 identifies the Accumulated Depreciation account impacts and dollar values.

The net increase in Distribution System Assets includes the transfer of $4,907,644 in gross assets to General Plant, as noted above. Excluding this transfer, Distribution System Assets increased by $5,794,013.

The increase in General Plant of $15,446,665 includes $8,355,715 in approved Smart Meters assets that were transferred from the Smart Meter Capital variance account (1555) to capital asset account 1860 as a result of the Board's Decision on CND's Smart Meter Application (EB-2012-0086), as well as $4,907,644 related to the transfer of land and buildings.

2013 Bridge vs. 2012 Actual:

2013 Bridge Year Gross Assets are projected to increase by $16,082,753 to $208,753,804 from $192,671,051. The increase is attributable to an increase in Distribution System Assets of $13,218,600, net of capital contributions of $3,041,000, and an increase in General Plant Assets of $2,864,153. Distribution System Asset investments are increasing as a result of increased system access projects, driven by customer demand, as well as an increase in the asset renewal program. The increase in General Plant Assets is principally driven by an increase in information system technology investments, meter investments, and transportation equipment renewal.

2014 Test vs. 2013 Bridge:

2014 Test Year Gross Assets are projected to increase by $17,649,383 to $226,403,187 from $208,753,804. The increase is attributable to an increase in Distribution System Assets of $13,832,792, net of capital contributions of $2,406,000, and an increase in General Plant Assets of $3,816,591. Distribution System Asset investments are expected to continue to increase as a result of increased system access projects, driven by customer demand, as well as an increase in the asset renewal program. The increase in General Plant Assets is principally driven by an increase in information system technology investments, including the implementation of an Outage Management System, additional meter investments to support customer growth, and transportation equipment renewal.

Table 2-6 Cost Transfer of Assets End of 2011/Beginning of 2012

			Cost		
			Dec 31/11	Jan 1/12	
CCA Class	**OEB**	**Description**	**Closing Balance**	**Opening Balance**	**Difference**
12	1611	Computer Software (Formally known as Account 1925)	$ -		
CEC	1612	Land Rights (Formally known as Account 1906)	$ -		
N/A	1805	Land	$ 466,720	$ 252,923	-$ 213,797
47	1808	Buildings	$ 5,884,044	$ 1,190,197	-$ 4,693,847
13	1810	Leasehold Improvements	$ -	$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 9,777,743	$ 9,777,744	$ 1
47	1820	Distribution Station Equipment <50 kV	$ -	$ -	$ -
47	1825	Storage Battery Equipment	$ -	$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 27,673,333	$ 27,673,333	$ -
47	1835	Overhead Conductors & Devices	$ 28,607,464	$ 32,247,582	$ 3,640,118
47	1840	Underground Conduit	$ 25,645,937	$ 25,645,937	$ -
47	1845	Underground Conductors & Devices	$ 20,386,645	$ 36,168,760	$ 15,782,115
47	1850	Line Transformers	$ 43,046,097	$ 43,046,097	$ -
47	1855	Services (Overhead & Underground)	$ 19,422,233	$ -	-$ 19,422,233
47	1860	Meters	$ 1,329,664	$ 847,732	-$ 481,932
47	1860	Meters (Smart Meters)	$ -		$ -
N/A	1905	Land	$ -	$ 213,797	$ 213,797
47	1908	Buildings & Fixtures	$ -	$ 4,693,847	$ 4,693,847
13	1910	Leasehold Improvements	$ -	$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 565,368	$ 565,368	-$ 0
8	1915	Office Furniture & Equipment (5 years)	$ -		$ -
10	1920	Computer Equipment - Hardware	$ 1,743,523	$ 1,950,065	$ 206,542
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -
12	1925	Computer Software	$ 2,126,649	$ 2,402,039	$ 275,390
10	1930	Transportation Equipment	$ 3,844,415	$ 3,844,415	-$ 0
8	1935	Stores Equipment	$ 93,729	$ 93,729	-$ 0
8	1940	Tools, Shop & Garage Equipment	$ 1,023,853	$ 1,023,853	-$ 0
8	1945	Measurement & Testing Equipment	$ -	$ -	$ -
8	1950	Power Operated Equipment	$ -	$ -	$ -
8	1955	Communications Equipment	$ -	$ -	$ -
8	1955	Communication Equipment (Smart Meters)	$ -		$ -
8	1960	Miscellaneous Equipment	$ -	$ -	$ -
47	1970	Load Management Controls Customer Premises	$ -	$ -	$ -
47	1975	Load Management Controls Utility Premises	$ -	$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214	$ 714,214	-$ 0
47	1985	Miscellaneous Fixed Assets	$ -	$ -	$ -
47	1990	Other Tangible Property	$ -	$ -	$ -
47	1995	Contributions & Grants	-$ 16,891,915	-$ 16,891,915	-$ 0
	2005	Property under Capital Lease	$ 61,873	$ 61,873	$ 0
		Sub-Total	$ 175,521,591	$ 175,521,590	-$ 1
WIP		Work in Process	$ 197,130	$ 197,130	$ -
	2070	Other Utility Plant - assets not in use	$ 619,296	$ 619,296	$ 1
		Total PP&E	**$ 176,338,016**	$ 176,338,016	-$ 0

Table 2-7 Accumulated Depreciation

Accumulated Depreciation					
			Dec 31/11	Jan 1/12	
CCA Class	**OEB**	**Description**	**Closing Balance**	**Opening Balance**	**Difference**
12	1611	Computer Software (Formally known as Account 1925)	$ -		
CEC	1612	Land Rights (Formally known as Account 1906)	$ -		
N/A	1805	Land	$ -	$ -	$ -
47	1808	Buildings	$ 2,460,266	$ 242,013	-$ 2,218,253
13	1810	Leasehold Improvements	$ -	$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 2,386,788	$ 2,386,788	-$ 0
47	1820	Distribution Station Equipment <50 kV	$ -	$ -	$ -
47	1825	Storage Battery Equipment	$ -	$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 13,992,905	$ 13,983,491	-$ 9,414
47	1835	Overhead Conductors & Devices	$ 14,443,288	$ 16,294,885	$ 1,851,597
47	1840	Underground Conduit	$ 12,885,287	$ 12,959,037	$ 73,750
47	1845	Underground Conductors & Devices	$ 10,210,772	$ 18,276,279	$ 8,065,507
47	1850	Line Transformers	$ 21,869,401	$ 21,751,436	-$ 117,965
47	1855	Services (Overhead & Underground)	$ 9,863,476	$ -	-$ 9,863,476
47	1860	Meters	$ 391,525	$ 246,945	-$ 144,580
47	1860	Meters (Smart Meters)	$ -		$ -
N/A	1905	Land	$ -	$ -	$ -
47	1908	Buildings & Fixtures	$ -	$ 2,218,253	$ 2,218,253
13	1910	Leasehold Improvements	$ -	$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 485,579	$ 485,579	-$ 0
8	1915	Office Furniture & Equipment (5 years)	$ -		$ -
10	1920	Computer Equipment - Hardware	$ 1,390,423	$ 1,452,385	$ 61,963
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)	$ -		$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)	$ -		$ -
12	1925	Computer Software	$ 983,944	$ 1,066,561	$ 82,617
10	1930	Transportation Equipment	$ 2,576,140	$ 2,576,140	-$ 0
8	1935	Stores Equipment	$ 93,730	$ 93,729	-$ 1
8	1940	Tools, Shop & Garage Equipment	$ 595,436	$ 595,436	-$ 0
8	1945	Measurement & Testing Equipment	$ -	$ -	$ -
8	1950	Power Operated Equipment	$ -	$ -	$ -
8	1955	Communications Equipment	$ -	$ -	$ -
8	1955	Communication Equipment (Smart Meters)	$ -		$ -
8	1960	Miscellaneous Equipment	$ -	$ -	$ -
47	1970	Load Management Controls Customer Premises	$ -	$ -	$ -
47	1975	Load Management Controls Utility Premises	$ -	$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214	$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets	$ -	$ -	$ -
47	1990	Other Tangible Property	$ -	$ -	$ -
47	1995	Contributions & Grants	-$ 4,456,583	-$ 4,456,583	$ 0
	2005	Property under Capital Lease	$ 61,873	$ 61,873	$ -
		Sub-Total	**$ 90,948,463**	**$ 90,948,461**	-$ 2
WIP		Work in Process	$ -	$ -	$ -
	2070	Other Utility Plant - assets not in use	$ -	$ -	$ -
		Total PP&E	**$ 90,948,463**	**$ 90,948,461**	-$ 2

Accumulated Depreciation/Amortization:

Table 2-8 below summarizes the Accumulated Depreciation/Amortization from 2008 Actual to 2014 Test Year. Accumulated depreciation/amortization has increased by $26,773,952 from $78,984,081 in 2008 to $105,758,033 in 2014 Test Year.

Changes in accumulated deprecation/amortization are directly related to changes in fixed assets that result from capital additions, and the removal or disposition of assets. As noted above, certain accumulated depreciation/amortization balances were reclassified to different OEB Accounts effective January 1, 2012 to align with the asset components.

In accordance with the change in the capitalization policy, as further described in Exhibit 2, Tab 2, Schedule 2, CDN revised the estimated useful lives of its assets effective January 1, 2012. Details with respect to the change in estimated useful lives are provided in Exhibit 4, Tab 7, Schedule 3.

Table 2-8 Accumulated Depreciation/Amortization

		ACCUMULATED DEPRECIATION														
		A	B	C	D	E	F	G	H	I	J	K	L	M	N	O
		Actual 2008	Actual 2009	Variance: 2009 Actual vs. 2008 Actual B - A	Actual 2010	Variance: 2010 Actual vs. 2009 Actual D - B	Board Approved 2010	Variance: Board Approved vs. Actual 2010 F - D	Actual 2011	Variance: Actual 2011 vs. Actual 2010 H - D	Actual 2012	Variance: Actual 2012 vs. Actual 2011 J - H	Bridge 2013	Variance: Bridge Year 2013 vs. Actual 2012 L - J	Test 2014	Variance Test 2014 vs. Bridge 2013 N - L
OEB	Description	Dec 31/08	Dec 31/09		Dec 31/10		Dec 31/10		Dec 31/11		Dec 31/12		Dec 31/13		Dec 31/14	
1805	Land	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1806	Land Rights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1808	Buildings and Fixtures	2,065,442	2,189,343	123,901	2,325,208	135,865	2,316,153	(9,055)	2,460,266	135,058	263,422	(2,196,844)	284,773	21,351	306,124	21,351
1810	Leasehold Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1815	Transformer Station Equipment - Normally Primary above 50 kV	1,653,859	1,898,009	244,150	2,142,424	244,415	2,142,161	(263)	2,386,788	244,364	2,751,157	364,369	3,116,556	365,399	3,482,001	365,445
1820	Distribution Station Equipment - Normally Primary below 50 kV	55,653	-	(55,653)	-	-	55,653	55,653	-	-	-	-	-	-	-	-
1825	Storage Battery Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1830	Poles, Towers and Fixtures	10,683,583	11,961,062	1,277,479	13,009,371	1,048,309	12,589,033	(420,338)	13,992,905	983,534	14,331,401	338,496	14,736,022	404,621	15,247,485	511,463
1835	Overhead Conductors and Devices	11,026,182	12,342,930	1,316,748	13,426,554	1,083,624	12,993,414	(433,140)	14,443,288	1,016,734	16,769,814	2,326,526	17,320,197	550,383	18,015,734	695,537
1840	Underground Conduit	10,397,956	11,133,336	735,380	11,973,808	840,472	12,134,276	160,468	12,885,287	911,479	13,135,418	250,131	13,324,017	188,599	13,536,341	212,324
1845	Underground Conductors and Devices	8,250,339	8,846,112	595,773	9,486,213	640,101	9,631,410	145,197	10,210,772	724,559	18,712,380	8,501,608	19,182,722	470,342	19,716,690	533,968
1850	Line Transformers	18,451,409	19,054,171	602,762	20,339,506	1,285,335	21,363,796	1,024,290	21,869,401	1,529,895	22,319,753	450,352	22,922,739	602,986	23,573,985	651,246
1855	Services	7,915,553	8,433,007	517,454	9,173,194	740,187	9,237,377	64,183	9,863,476	690,282	-	(9,863,476)	-	-	-	-
1860	Meters	4,523,889	4,799,759	275,870	344,050	(4,455,708)	5,187,409	4,843,359	391,525	47,475	1,771,335	1,379,810	2,438,408	667,073	3,155,662	717,254
1865	Other Installations on Customer's Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1905	Land	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1906	Land Rights	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1908	Buildings and Fixtures	-	-	-	-	-	-	-	-	-	3,539,507	3,539,507	3,682,311	142,804	3,837,615	155,304
1910	Leasehold Improvements	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1915	Office Furniture and Equipment	546,111	569,018	22,907	469,850	(99,168)	596,645	126,795	485,579	15,729	502,061	16,482	529,072	27,011	569,468	40,396
1920	Computer Equipment - Hardware	1,278,098	1,257,948	(20,150)	1,287,958	30,010	1,477,294	189,336	1,390,423	102,465	1,643,593	253,170	1,983,140	339,547	2,497,353	514,213
1925	Computer Software	344,552	527,158	182,606	686,069	158,911	969,686	283,617	983,944	297,875	1,487,191	503,248	1,999,591	512,400	2,676,686	677,095
1930	Transportation Equipment	2,576,159	2,372,396	(203,763)	2,531,504	159,107	2,600,668	69,164	2,576,140	44,636	2,616,271	40,131	2,798,917	182,646	3,032,548	233,631
1935	Stores Equipment	104,957	105,013	56	93,730	(11,283)	105,013	11,283	93,730	-	93,729	(1)	93,729	-	93,729	-
1940	Tools, Shop and Garage Equipment	1,017,096	1,079,295	62,199	521,639	(557,656)	1,148,509	626,870	595,436	73,797	662,214	66,778	736,842	74,628	822,752	85,910
1945	Measurement and Testing Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1950	Power Operated Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1955	Communication Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1960	Miscellaneous Equipment	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1970	Load Management Controls - Customer Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1975	Load Management Controls - Utility Premises	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1980	System Supervisory Equipment	714,214	714,214	(0)	714,214	-	714,214	0	714,214	-	714,214	-	714,214	-	714,214	-
1985	Sentinel Lighting Rentals	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1990	Other Tangible Property	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
1995	Contributions and Grants	(2,670,470)	(3,221,873)	(551,403)	(3,807,763)	(585,890)	(3,784,254)	23,509	(4,456,583)	(648,820)	(4,788,445)	(331,862)	(5,156,966)	(368,521)	(5,582,226)	(425,260)
2005	Property under Capital Lease	49,499	61,873	12,374	61,873	-	61,873	(0)	61,873	-	61,873	-	61,873	-	61,873	-
	Total Excluding Work in Process	78,984,081	84,122,770	5,138,689	84,779,401	656,631	91,540,330	6,760,929	90,948,463	6,169,062	96,586,887	5,638,424	100,768,156	4,181,269	105,758,033	4,989,877
	Work in Process	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
2070	Other Utility Plant - assets not in use	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
	Total Including Work in Process	78,984,081	84,122,770	5,138,689	84,779,401	656,631	91,540,330	6,760,929	90,948,463	6,169,062	96,586,887	5,638,424	100,768,156	4,181,269	105,758,033	4,989,877

ALLOWANCE FOR WORKING CAPITAL

The filing requirements indicate that distributors may take one of two approaches for the calculation of its allowance for working capital: (1) the 13% allowance approach; or (2) the filing of a lead/lag study. In CND's last Cost of Service rate rebasing application (EB-2009-0260) it states on page 9 of the Decision that "…the Board will not direct CND to conduct a lead/lag study for its next Cost of Service rate application. The Board will also not approve a deferral account for tracking any costs related to a lead-lag study". As such, CND has used the 13% allowance approach in calculating its Allowance for Working Capital.

A summary of the calculation of the working capital for the Board Approved 2010, Actual 2010, Actual 2011, Actual 2012, Bridge 2013 and Test 2014 is provided in Table 2-9 below.

Table 2-9 Summary of Working Capital

Description	Board Approved 2010	Actual 2010	Actual 2011	Actual 2012	Bridge 2013	Test 2014
Operations	2,872,659	2,516,530	2,839,916	3,306,211	2,204,862	2,501,846
Maintenance	1,166,239	931,863	929,059	2,121,991	2,460,379	2,841,552
Billing and Collecting	1,447,594	1,071,672	1,494,842	2,649,010	2,839,879	2,974,585
Community Relations	46,969	28,248	43,768	104,797	130,555	151,100
Administration & General	4,498,647	5,032,154	5,454,838	5,494,298	7,235,723	7,334,228
Total OM&A	10,032,108	9,580,467	10,762,423	13,676,307	14,871,398	15,803,311
Property Taxes	0	0	0	146,138	150,696	155,664
Total Eligible Distribution Expenses	10,032,108	9,580,467	10,762,423	13,822,445	15,022,094	15,958,975
Costs of Power	110,823,229	121,573,775	131,567,980	166,495,652	152,686,767	153,046,408
Total Working Capital Expenses	120,855,337	131,154,242	142,330,403	180,318,097	167,708,861	169,005,383
Working Capital Rate %	15%	15%	15%	15%	15%	13%
Working Capital Allowance	18,128,301	19,673,136	21,349,560	27,047,715	25,156,329	21,970,700

Total working capital has increased by $48,150,046 or 39.8% from $120,855,337 2010 Board Approved to $169,005,383 in the 2014 Test Year. The most significant component of the Allowance for Working Capital computation is the Cost of Power. Table 2-10 below provides a summary of the components that comprise the total Cost of Power for purposes of the working capital allowance. The 2014 Test Year Cost of Power is expected to be $153,046,408 or $42,223,179 higher than the 2010 Board Approved amount of $110,823,229. Actuals for 2010, 2011, and 2012 were also significantly higher than the 2010 Board Approved.

As further elaborated in Exhibit 4, OM&A expenses have increased by $5,771,203, from $10,032,108 in 2010 Board Approved to $15,803,311 in 2014 Test Year.

Table 2-10 Summary of Total Cost of Power

	Board Approved 2010	Actual 2010	Actual 2011	Actual 2012	Bridge 2013	Test 2014
Power	87,947,710	99,101,056	108,047,115	138,022,491	127,219,666	126,762,108
Wholesale Market Service Charges	7,679,288	8,324,183	8,395,985	9,545,670	6,430,119	6,464,353
Network Charges	9,539,110	7,858,712	8,845,701	11,297,026	12,250,622	12,432,818
Connection Charges	5,572,869	6,207,043	6,178,689	7,439,978	6,324,633	6,735,975
Low Voltage Charges	84,252	82,781	100,490	190,487	101,361	170,662
Smart Meter Entity Charges	0	0	0	0	360,366	480,492
Total Costs of Power	110,823,229	121,573,775	131,567,980	166,495,652	152,686,767	153,046,408

The Cost of Power for 2013 and 2014 was calculated in accordance with the Filing Requirements and incorporates the load forecast and increased cost of power rates. The commodity price estimate used to calculate the Cost of Power was determined by using a split between RPP and non-RPP customers, based on actual data, and using the most current RPP (TOU) price established for May 1, 2013. The rate used for the 2010 Board Approved was $0.0622 compared to the current TOU weighted average rate of $0.08395, an increase of 35%.

CND's calculation also incorporates the most recent Uniform Transmission Rates approved by the Board (EB-2012-0031) effective January 1, 2013, as well as the impacts arising from the new Smart Metering Entity charge approved by the Board on March 28, 2013 in its EB-2012-011/EB-2012-0211 Decision and Order. Tables 2-11 and 2-12 provide the detailed Cost of Power calculation for the 2013 Bridge Year and 2014 Test Year.

Table 2-11 2013 Cost of Power Calculation

Cost of Power 2013			
2013 Load Forecast	**kWh**	**kW**	**2012 %RPP**
Residential	396,735,305		92.24%
General Service < 50 kW	155,766,602		85.56%
General Service > 50 to 999 kW	434,024,250	1,233,396	32.79%
General Service > 1000 to 4999 kW	223,644,135	531,983	0.00%
Large User	204,689,690	424,120	0.00%
Street Lights	9,647,105	25,892	0.00%
Unmetered Loads	1,881,677	-	99.80%
Embedded Distributors - Hydro One	12,809,531	91,971	0.00%
TOTAL	**1,439,198,296**	**2,307,363**	

Electricity - Commodity RPP	**2013**	**2013 Loss**			
Class per Load Forecast RPP	**Forecasted**	**Factor**		**2013**	
Residential	365,948,646	1.0286	376,414,777	$0.08395	$31,600,021
General Service < 50 kW	133,273,905	1.0286	137,085,539	$0.08395	$11,508,331
General Service > 50 to 999 kW	142,316,551	1.0286	146,386,805	$0.08395	$12,289,172
General Service > 1000 to 4999 kW	0	1.0286	0	$0.08395	$0
Large User	0	1.0003	0	$0.08395	$0
Street Lights	0	1.0286	0	$0.08395	$0
Unmetered Loads	1,877,914	1.0286	1,931,622	$0.08395	$162,160
Embedded Distributors - Hydro One	0	1.0286	0	$0.08395	$0
TOTAL	**643,417,016**		**661,818,743**		**$55,559,683**

Electricity - Commodity Non-RPP	**2013**	**2013 Loss**			
Class per Load Forecast	**Forecasted**	**Factor**		**2013**	
Residential	30,786,660	1.0286	31,667,158	$0.08817	$2,792,093
General Service < 50 kW	22,492,697	1.0286	23,135,989	$0.08817	$2,039,900
General Service > 50 to 999 kW	291,707,698	1.0286	300,050,538	$0.08817	$26,455,456
General Service > 1000 to 4999 kW	223,644,135	1.0286	230,040,358	$0.08817	$20,282,658
Large User	204,689,690	1.0003	204,751,097	$0.08817	$18,052,904
Street Lights	9,647,105	1.0286	9,923,013	$0.08817	$874,912
Unmetered Loads	3,763	1.0286	3,871	$0.08817	$341
Embedded Distributors - Hydro One	12,809,531	1.0286	13,175,883	$0.08817	$1,161,718
TOTAL	**795,781,280**		**812,747,907**		**$71,659,983**

Transmission - Network		**Volume**			
Class per Load Forecast		**Metric**		**2013**	
Residential		kWh	408,081,935	$0.0062	$2,530,108
General Service < 50 kW		kWh	160,221,527	$0.0054	$865,196
General Service > 50 to 999 kW		kW	1,233,396	$3.5124	$4,332,179
General Service > 1000 to 4999 kW		kW	531,983	$2.6676	$1,419,119
Large User		kW	424,120	$2.5279	$1,072,134
Street Lights		kW	25,892	$1.7651	$45,702
Unmetered Loads		kWh	3,871	$0.0054	$21
Embedded Distributors - Hydro One		kW	91,971	$2.5279	$232,494
TOTAL					**$10,496,953**

Transmission - Connection		**Volume**			
Class per Load Forecast		**Metric**		**2013**	
Residential		kWh	408,081,935	$0.0036	$1,469,095
General Service < 50 kW		kWh	160,221,527	$0.0034	$544,753
General Service > 50 to 999 kW		kW	1,233,396	$2.0763	$2,560,900
General Service > 1000 to 4999 kW		kW	531,983	$1.6295	$866,867
Large User		kW	424,120	$1.6586	$703,446
Street Lights		kW	25,892	$1.0434	$27,016
Unmetered Loads		kWh	3,871	$0.0034	$13
Embedded Distributors - Hydro One		kW	91,971	$1.6586	$152,544
TOTAL					**$6,324,633**

Wholesale Market Service					
Class per Load Forecast				**2013**	
Residential		kWh	408,081,935	$0.0044	$1,795,561
General Service < 50 kW		kWh	160,221,527	$0.0044	$704,975
General Service > 50 to 999 kW		kWh	446,437,343	$0.0044	$1,964,324
General Service > 1000 to 4999 kW		kWh	230,040,358	$0.0044	$1,012,178
Large User		kWh	204,751,097	$0.0044	$900,905
Street Lights		kWh	9,923,013	$0.0044	$43,661
Unmetered Loads		kWh	1,935,493	$0.0044	$8,516
Embedded Distributors - Hydro One		kWh	13,175,883	$0.0000	$0
TOTAL			**1,474,566,650**		**$6,430,119**

Rural Rate Assistance					
Class per Load Forecast				**2013**	
Residential		kWh	408,081,935	$0.0012	$489,698
General Service < 50 kW		kWh	160,221,527	$0.0012	$192,266
General Service > 50 to 999 kW		kWh	446,437,343	$0.0012	$535,725
General Service > 1000 to 4999 kW		kWh	230,040,358	$0.0012	$276,048
Large User		kWh	204,751,097	$0.0012	$245,701
Street Lights		kWh	9,923,013	$0.0012	$11,908
Unmetered Loads		kWh	1,935,493	$0.0012	$2,323
Embedded Distributors - Hydro One		kWh	13,175,883	$0.0000	$0
TOTAL			**1,474,566,650**		**$1,753,669**

	2013
4705-Power Purchased	$127,219,666
4708-Charges-WMS	$6,430,119
4714-Charges-NW	$10,496,953
4716-Charges-CN	$6,324,633
4730-Rural Rate Assistance	$1,753,669
4750-Low Voltage	$101,361
4751-Smart Meter Entity Charge	$360,365
TOTAL	**152,686,767**

Table 2-12 2014 Cost of Power Calculation

Cost of Power 2014			
2014 Load Forecast	**kWh**	**kW**	**2014 %RPP**
Residential	395,264,057		92.24%
General Service < 50 kW	153,517,084		85.56%
General Service > 50 to 999 kW	431,657,534	1,226,670	32.79%
General Service > 1000 to 4999 kW	221,335,611	526,492	0.00%
Large User	208,256,974	431,512	0.00%
Street Lights	9,649,328	25,898	0.00%
Unmetered Loads	1,756,889		99.80%
Embedded Distributors - Hydro One	12,613,577	90,564	0.00%
TOTAL	**1,434,051,054**	**2,301,136**	

Electricity - Commodity RPP	**2014**	**2014 Loss**			
Class per Load Forecast RPP	**Forecasted**	**Factor**		**2014**	
Residential	364,591,566	1.0286	375,018,885	$0.08395	$31,482,835
General Service < 50 kW	131,349,217	1.0286	135,105,804	$0.08395	$11,342,132
General Service > 50 to 999 kW	141,540,505	1.0286	145,588,564	$0.08395	$12,222,160
General Service > 1000 to 4999 kW	0	1.0286	0	$0.08395	$0
Large User	0	1.0003	0	$0.08395	$0
Street Lights	0	1.0286	0	$0.08395	$0
Unmetered Loads	1,753,375	1.0286	1,803,522	$0.08395	$151,406
Embedded Distributors - Hydro One	0	1.0286	0	$0.08395	$0
TOTAL	**639,234,664**		**657,516,775**		**$55,198,533**

Electricity - Commodity Non-RPP	**2014**	**2014 Loss**			
Class per Load Forecast	**Forecasted**	**Factor**		**2014**	
Residential	30,672,491	1.0286	31,549,724	$0.08817	$2,781,739
General Service < 50 kW	22,167,867	1.0286	22,801,868	$0.08817	$2,010,441
General Service > 50 to 999 kW	290,117,029	1.0286	298,414,376	$0.08817	$26,311,196
General Service > 1000 to 4999 kW	221,335,611	1.0286	227,665,809	$0.08817	$20,073,294
Large User	208,256,974	1.0003	208,319,451	$0.08817	$18,367,526
Street Lights	9,649,328	1.0286	9,925,298	$0.08817	$875,114
Unmetered Loads	3,514	1.0286	3,614	$0.08817	$319
Embedded Distributors - Hydro One	12,613,577	1.0286	12,974,325	$0.08817	$1,143,946
TOTAL	**794,816,390**		**811,654,466**		**$71,563,574**

Transmission - Network		**Volume**			
Class per Load Forecast		**Metric**		**2014**	
Residential		kWh	406,568,609	$0.0063	$2,577,574
General Service < 50 kW		kWh	157,907,672	$0.0055	$871,932
General Service > 50 to 999 kW		kW	1,226,670	$3.5916	$4,405,724
General Service > 1000 to 4999 kW		kW	526,492	$2.7278	$1,436,144
Large User		kW	431,512	$2.5849	$1,115,419
Street Lights		kW	25,898	$1.1159	$28,900
Unmetered Loads		kWh	3,614	$0.0055	$20
Embedded Distributors - Hydro One		kW	90,564	$2.5849	$234,101
TOTAL					**$10,669,813**

Transmission - Connection		**Volume**			
Class per Load Forecast		**Metric**		**2014**	
Residential		kWh	406,568,609	$0.0039	$1,565,348
General Service < 50 kW		kWh	157,907,672	$0.0036	$574,191
General Service > 50 to 999 kW		kW	1,226,670	$2.2206	$2,723,908
General Service > 1000 to 4999 kW		kW	526,492	$1.7427	$917,531
Large User		kW	431,512	$1.7738	$765,436
Street Lights		kW	25,898	$1.1159	$28,900
Unmetered Loads		kWh	3,614	$0.0036	$13
Embedded Distributors - Hydro One		kW	90,564	$1.7738	$160,647
TOTAL					**$6,735,975**

Wholesale Market Service					
Class per Load Forecast				**2014**	
Residential		kWh	406,568,609	$0.0044	$1,788,902
General Service < 50 kW		kWh	157,907,672	$0.0044	$694,794
General Service > 50 to 999 kW		kWh	444,002,940	$0.0044	$1,953,613
General Service > 1000 to 4999 kW		kWh	227,665,809	$0.0044	$1,001,730
Large User		kWh	208,319,451	$0.0044	$916,606
Street Lights		kWh	9,925,298	$0.0044	$43,671
Unmetered Loads		kWh	1,807,136	$0.0044	$7,951
Embedded Distributors - Hydro One		kWh	12,974,325	$0.0044	$57,087
TOTAL			**1,469,171,241**		**$6,464,353**

Rural Rate Assistance					
Class per Load Forecast				**2014**	
Residential		kWh	406,568,609	$0.0012	$487,882
General Service < 50 kW		kWh	157,907,672	$0.0012	$189,489
General Service > 50 to 999 kW		kWh	444,002,940	$0.0012	$532,804
General Service > 1000 to 4999 kW		kWh	227,665,809	$0.0012	$273,199
Large User		kWh	208,319,451	$0.0012	$249,983
Street Lights		kWh	9,925,298	$0.0012	$11,910
Unmetered Loads		kWh	1,807,136	$0.0012	$2,169
Embedded Distributors - Hydro One		kWh	12,974,325	$0.0012	$15,569
TOTAL			**1,469,171,241**		**$1,763,005**

	2014
4705-Power Purchased	$126,762,108
4708-Charges-WMS	$6,464,353
4714-Charges-NW	$10,669,813
4716-Charges-CN	$6,735,975
4730-Rural Rate Assistance	$1,763,005
4750-Low Voltage	$170,662
4751 - Smart Metering Entity charge	$480,492
TOTAL	**153,046,408**

TREATMENT OF STRANDED ASSETS RELATED TO SMART METER DEPLOYMENT

The Board's *Guideline: Smart Meter Funding and Cost Recovery* (G-2008-0002) provides two options to distributors regarding the accounting treatment for stranded meters related to the installation of smart meters: (1) leave them in rate base; or (2) record them in "Sub-account Stranded Meter Costs" of Account 1555. CND has accounted for its stranded meter costs using option (2) and has specifically applied in Exhibit 9 for the disposal of the balance in deferral/variance account 1555 – Stranded Meter Costs.

CND applied for, and was approved for, the disposition and recovery of costs related to Smart Meter deployment, offset by Smart Meter Funding Adder revenues collected from May 1, 2006 to April 30, 2012 ("Smart Meter Rate Application" EB-2012-0086). As part of the Smart Meter Rate Application, and as approved by the Board in its Decision and Order issued July 26, 2012, CND proposed not to dispose of stranded meter costs at that time, but to deal with the disposition in its next rebasing application, scheduled for 2014 rates. The Smart Meter Rate Application, and Decision and Order, noted an aggregated net book value of stranded meters, for the Residential and GS<50 kW classes, of $2,446,645 as of December 31, 2013 and that the stranded conventional meters would continue to be amortized until disposition.

In accordance with the Board's Guideline G-2011-0001, whereby distributors are to be 'held whole with respect to the cost recovery of stranded meters (i.e. conventional meters replaced as part of the Smart Meter initiative)', CND, as part of this rebasing application, is requesting approval to recover its stranded meter costs as at December 31, 2013 through class-specific rate riders from the applicable customer classes.

In accordance with the Board's *Guideline: Smart Meter Funding and Cost Recovery (G-2008-002)*, CND has followed the Scenario A accounting treatment of stranded meter costs and as such has transferred the stranded meter costs from Account 1860 - Meters to a "Sub-account Stranded Meter Costs of Account 1555". Table 2-13 provides a summary of the gross costs, accumulated amortization, net asset costs, proceeds on dispositions, and residual net book value of $2,446,645 as at December 31, 2013. This information can also be found in Appendix 2-7.

Table 2-13 Stranded Meter Treatment (Appendix 2-S OEB).

Appendix 2-S Stranded Meter Treatment							
Year	Notes	Gross Asset Value	Accumulated Amortization	Contributed Capital (Net of Amortization)	Net Asset	Proceeds on Disposition	Residual Net Book Value
		(A)	(B)	(C)	(D) = (A) - (B) - (C)	(E)	(F) = (D) - (E)
2006					$ -		$ -
2007					$ -		$ -
2008					$ -		$ -
2009					$ -		$ -
2010		$ 8,286,380	$ 4,862,272		$ 3,424,107	$ 7,598	$ 3,416,510
2011		$ 8,286,380	$ 5,194,876		$ 3,091,503	$ 7,598	$ 3,083,906
2012		$ 8,286,380	$ 5,521,064		$ 2,765,316	$ 7,598	$ 2,757,719
2013		$ 8,286,380	$ 5,832,138		$ 2,454,242	$ 7,598	$ 2,446,645

CND proposes to recover the net book value of Stranded Meter Costs of $2,446,645 through a customer class-specific rate rider, over a one year period beginning May 1, 2014. The customer class-specific rate rider is based on the 2010 Cost Allocation study that CND undertook for purposes of the 2010 rate application. Once the percentages of Residential and General Service <50 kW are taken from the Allocation Model, each of the two customer classes is determined as a percentage of 100%. The total stranded meter costs are allocated on this basis and that total is divided by the forecast number of customers to determine the annual and monthly stranded meter costs. Table 2-14 below provides the specific calculations of the rate riders proposed.

Table 2-14 Stranded Meter Customer Class Rate Rider

Customer Class Rate Rider			
Net Stranded Meter Costs	$2,446,645		
	Residential	GS <50kW	Total
Number of customers - 2014 Forecast	48,091	4,740	52,831
Allocation of Meter Capital Costs as per 2010 Cost Allocation Model I7.1	49.37%	15%	64.37%
Allocation of Residential and GS<50 only	76.70%	23.30%	100.00%
Allocation of Net Stranded Meter Costs	$1,876,577	$570,068	$2,446,645
Stranded Meter Rate Rider per Customer Class (SMRR)	$3.25	$10.02	
Annual Cost	$39.02	$120.27	

CAPITAL EXPENDITURES

PLANNING

CND has developed a Consolidated Distribution System Plan ("DSP") in accordance with Chapter 5 of the Ontario Energy Board's *Filing Requirements for Electricity Distribution Applications, Consolidated Distribution System Plan Filing Requirements* dated March 28, 2013 ("Chapter 5"). The DSP incorporates matters pertaining to asset management, renewable energy generation, and regional planning. The DSP has been prepared by AESI on behalf of CND. The Consolidated DSP is filed as a standalone document in Exhibit 2, Appendix 2-8A.

CND's Distribution System Plan is designed to present CND's fully integrated approach to capital expenditure planning. This includes comprehensive documentation of its asset management process that supports its future 5 year capital expenditure plan while detailing the history of its past 5 years' activities. It recognizes CND's responsibilities to provide its customers with reliable service that is acknowledged as excellent value for money, by ensuring that its asset management activities maintain a focus on customers, operational effectiveness, public policy responsiveness and financial performance.

CND's DSP builds on the Asset Management Strategy that formed part of CND's 2010 Cost of Service Rate Rebasing Application (EB-2009-0260) and will continue to evolve over time. CND's main objective with respect to managing its distribution system assets continues to be to optimize performance of the assets at a reasonable cost with due regard for system reliability, public and worker safety, and customer service requirements.

CND has pursued the best practices of the electricity distribution industry for many years. This has included adhering to the OEB's Distribution System Code that sets out both good utility practice, minimal performance standards for electricity distribution systems in Ontario, and minimal inspection requirements for distribution equipment. Consistent with best practices, over the years CND has diligently maintained its equipment in a safe and reliable working order and, only when economically justified, upgraded or replaced its equipment. The diligent maintenance of its equipment has permitted CND, in some circumstances, to extract an extended useful working life from certain assets. Historically, this has been achieved with only a moderate increase in the customers' bills.

CND has been careful when incurring costs, since in past customer satisfaction survey results, customers have indicated that the low price of electricity is an important factor to them.

By carefully controlling all expenditures and therefore moderating any increases in its customers' bills, the distribution system has evolved into an array of equipment of different vintages spanning a number of technological eras. Funds were not spent on replacing functioning equipment in order to simply have more modern technologies in place.

In developing the long-term DSP, CND's objective is to ensure that the future distribution system is designed to deliver power at the quality and reliability levels required by customers and to minimize the lifetime cost by balancing preventative maintenance, life-extending refurbishment, and end-of life replacement. In short, the system will meet the customers' needs for quality and reliability of power at the minimal cost to customers.

CND considers performance-related asset information including, but not limited to, data on reliability, asset age and condition, loading, customer connection requirements, and system configuration, to determine investment needs of the distribution system.

The following are the guiding principles that have been used to determine CND's capital expenditure program for the 2014 Test Year, as well as shape CND's capital expenditures plans over the next 5-10 years:

1. Priority will be given to CND's legislated and/or mandatory requirements, including:

    i. System access including the obligation to connect customers - Residential, Commercial and Industrial. This includes intensification of the downtown core consistent with the Provincial government's long-term "Places to Grow" infrastructure plan (The "Plan"). The Plan recognizes Cambridge as one of the 25 urban growth centres in the Greater Golden Horseshoe.

    ii. Accommodate City, Region, Township and Ministry of Transportation, mandatory project requirements.

iii. Embrace the requirements of the Green Energy Act for the accommodation of renewable generation, integration of the smart grid, and the CDM conditions of license, in order to fully support public policy directives.

iv. Meet the performance standards of the OEB and other regulatory bodies, including: quality, reliability, health, safety, environmental performance standards. Generally, funds will be spent to maintain current reliability levels. Where a higher level of reliability is required, the additional cost will be allocated to specific customers or customer class by the appropriate regulatory mechanism.

2. In order to safeguard the major investments already made in its key assets, continue to maintain and upgrade as necessary, the Control Room and related system automation equipment (e.g. GIS, SCADA systems, etc.). Similarly, to ensure public safety and system security, maintain and refurbish the Transformer Station as required.

3. Continue to leverage the GIS system and functionality and build on the data base in order to harvest operational efficiency improvements. These improvements include the preparation of electronic documentation in support of the asset management system, and leveraging the investment in Smart Meters to improve outage management.

4. Continue to invest prudently in modern information systems technology in order to meet customer expectations, particularly in the area of improved communication, and access to information to assist them in understanding their electricity bills and managing their electricity usage.

5. Optimal life extension of assets, including:

   - Intensify condition monitoring to minimize uncertainty regarding decisions relating to equipment maintenance, renewal and replacement.

   - Where economically viable, refurbish distribution equipment in-situ to extend their reliable working lives.

6. Leverage the supply capacity available from the Transformer Stations by installing additional feeders as required.

7. Where the optimal life of an asset has already been reached, and to the extent that funding is available, undertake an accelerated replacement of the over-aged items (e.g. CND's wood poles and circuits).

8. Prudently acquire smart grid equipment where there will be direct, quantifiable economic and/or efficiency benefits derived.

9. Continue with the cost effective replacement of service vehicles to ensure the utility has a reliable fleet to execute on its maintenance and capital expenditure programs, as well as respond to system outages in a timely manner.

10. Acknowledge that some desirable changes are realistically not affordable.

    - Install new 27.6 kV feeders when additional feeders are required.

Various elements and other activities that factor into the development of CND's capital expenditure plans include:

i. Customer engagement and consultative initiatives, which are described in Exhibit 1, Tab 5, Schedule 2 and incorporated within the DSP in Exhibit 2, Appendix 2-8A.

ii. Consultation with various third parties regarding new development, including customers, building developers, municipalities, Ministry of Transportation, and other parties. CND participates in various local committees including the Utility Co-ordinating Committee, Municipal Site Plan Committee, and Municipal Subdivision Committee.

iii. Regional Planning, and in particular, participation in the Kitchener-Waterloo-Cambridge-Guelph ("KWCG") Working Group that was established to develop a regional plan to address electricity supply and reliability in the KWCG area. A description of these activities is provided in the DSP (Exhibit 2, Appendix 2-8A).

iv. Elimination of environmental, health or safety risks;

v. System reliability and performance measures;

vi. Financial performance metrics;

vii. Financial and/or resource constraints identified as part of the preparation of annual budgets, work plans, and five year forecasts.

CND believes that these guiding principles, combined with these other elements and activities undertaken by CND in developing its capital expenditure program, are aligned and consistent with the Customer Focus, Operational Effectiveness, Public Policy Responsiveness, and Financial Performance outcomes of the Renewed Regulatory Framework.

The annual budget and five year forecast process is an important part of the overall management of the capital expenditure program at CND. The annual budget is prepared annually by Management and is reviewed and approved by CND's Board of Directors prior to the start of the fiscal year. The annual budget and five year plan is prepared and reviewed by Management in the context of CND's Strategic Plan to ensure alignment. The annual budget includes: (i) detailed operating and capital budgets; (ii) a complete set of financial statements for the plan year, including income statement, balance sheet and cash flow statement; and (iii) five year forecast (Financial statements, Key Financial Ratios, 5 Yr. Capital expenditure Plan).

It is the responsibility of each department to prepare a capital budget, based on the area of accountability. The capital expenditure budget for the distribution system assets is primarily the accountability of the Vice President, Engineering and the Vice President, Operations. The capital expenditure budget for general plant is developed in conjunction with various departments.

The Finance department is responsible for coordinating and consolidating the capital expenditure budget for review by the Chief Financial Officer and President and C.E.O. ("CEO"). The CEO approves the capital budget prior to its submission to the Board of Directors.

Capital expenditure budgets are prepared based upon the following categories:

Distribution System Assets

- Transformer Station Equipment
- New Lines – Overhead and Underground

- Rebuilds – Overhead and Underground
- Reliability/Power Factor/Power Quality
- Relocations – Overhead and Underground
- New Servicing – Residential and Industrial General Plant Assets
- Land and Buildings
- Metering
- Computer Hardware/Software
- Fleet
- Office Equipment and Tools

On a monthly basis, each department, with support from the Finance Department through management reporting and analysis, is responsible for reviewing and evaluating actual expenditures compared to the budget for both operating and capital expenditures.

Monthly variance reports (budget to actuals) are prepared and distributed to Management. Monthly financial results, including budget to actual comparisons, are distributed to the Board of Directors. Appropriate management action is taken on a timely basis as actual results are known, to ensure that corporate objectives continue to be achieved.

SUMMARY OF CAPITAL EXPENDITURES

Table 2-15 below provides a summary of historical capital expenditures for the years 2009 through 2012, projections for the 2013 Bridge Year and 2014 Test Year, as well as projections for the period 2015 through 2018. Appendix 2-8B includes OEB Appendix 2-AB Capital Expenditure Summary from Chapter 5 Consolidated Distribution System Plan Filing Requirements.

Table 2-16 summarizes the capital expenditures, by asset category for the years 2009 through 2012 Actual, and projections for the 2013 Bridge Year and 2014 Test Year.

Table 2-15 Capital Expenditure Summary 2009 through 2018

	Historical (Actual)				Forecast (Planned)					
	Test-5 2009	**Test-4 2010**	**Test-3 2011**	**Test-2 2012**	**Test -1 2013**	**Test 2014**	**Test +1 2015**	**Test +2 2016**	**Test +3 2017**	**Test +4 2018**
	Actual	**Actual**	**Actual**	**Actual**	**Forecast**	**Plan**	**Plan**	**Plan**	**Plan**	**Plan**
Category	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
System Access	3,966	4,152	3,140	3,032	8,411	8,123	6,857	4,143	4,020	3,496
System Renewal	5,240	6,262	3,999	2,886	7,089	7,140	7,380	4,033	3,766	3,554
System Service	54	425	716	835	760	975	342	342	342	16,842
General Plant	1,257	1,436	2,187	10,108	2,864	3,817	2,169	2,135	2,270	2,060
Capital Contributions	(2,326)	(1,804)	(1,342)	(368)	(3,041)	(2,406)	(3,800)	(2,100)	(2,000)	(1,800)
Change in WIP	(118)	(576)	(338)	(3,011)						
Total	8,073	9,895	8,362	13,482	16,083	17,649	12,948	8,553	8,398	24,152
System O&M	3,376	3,448	3,769	5,428	4,665	5,343	5,240	5,036	4,929	4,820

CND's capital expenditures, including work in progress, are projected to be $16.1MM in the 2013 Bridge Year and $17.6MM in the 2014 Test Year. This compares to historical levels of between $8MM - $10MM, excluding Smart Meters, in 2009 through 2012. 2012 Actual capital expenditures of $16.5MM included approximately $8MM in Smart Meter investments transferred from the Smart Meter Capital variance account (1555) to capital asset account 1860 as a result of the Board's Decision on CND's Smart Meter Application (EB-2012-0086).

As part of the development of the DSP, CND has categorized its historical and 2013 Bridge Year and 2014 Test Year capital expenditures into four investment categories:

1. System Access Investments – modifications, including asset relocations, to a distributor's distribution system that a distributor is obligated to perform to provide a customer or group of customers with access to electricity services via the distribution system;

2. System Renewal Investments – replacing and/or refurbishing system assets to extend the original service life of the assets and thereby maintain the ability of the distributor's distribution system to provide customers with electricity services;

3. System Service Investments – modifications to a distributor's distribution system to ensure the distribution system continues to meet a distributor's operational objectives while addressing anticipated future customer service requirements;

4. General Plant Investments – modifications, replacements, or additions to a distributor's assets that are not part of the distribution system, including land and buildings, tools and equipment, rolling stock, and electronic devices and software used to support day to day business and operations activities. For purposes of the DSP, CND has included its investments in Smart Meters as part of General Plant.

Chart 2-1 below illustrates the percentage of the cumulative gross capital expenditures incurred by CND for the period 2009 through 2012 in each of these investment categories.

Chart 2-1 Cumulative Gross Capital Expenditures by Investment Category 2009 to 2012

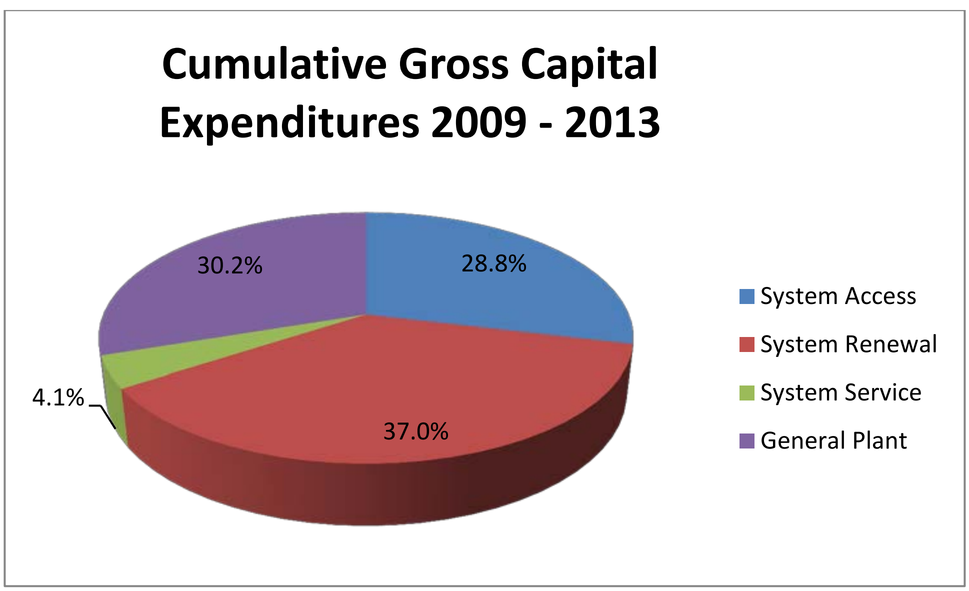


Chart 2-2 illustrates the 2014 Test Year gross capital expenditure percentages by investment category.

Chart 2-2 2014 Test Year Gross Capital Expenditures by Investment Category

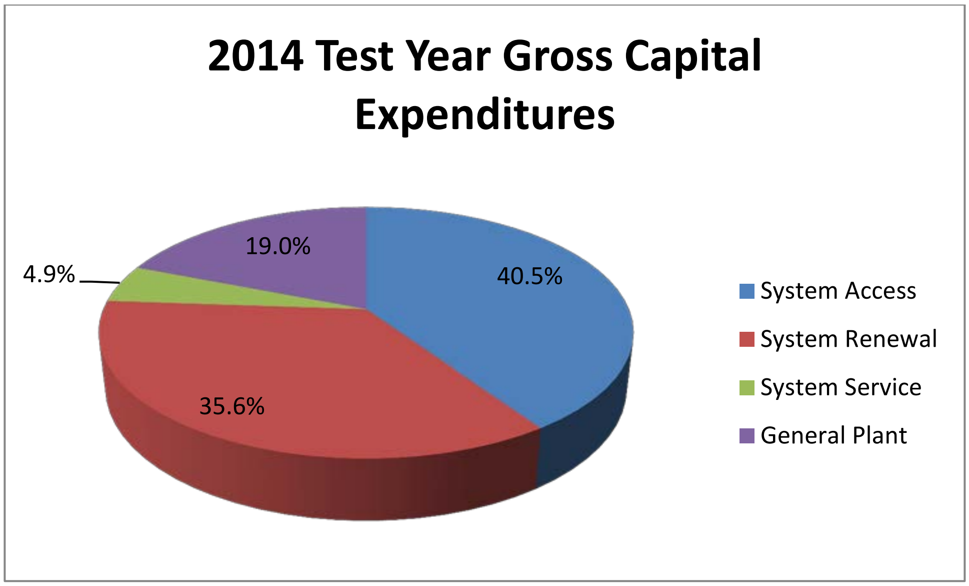
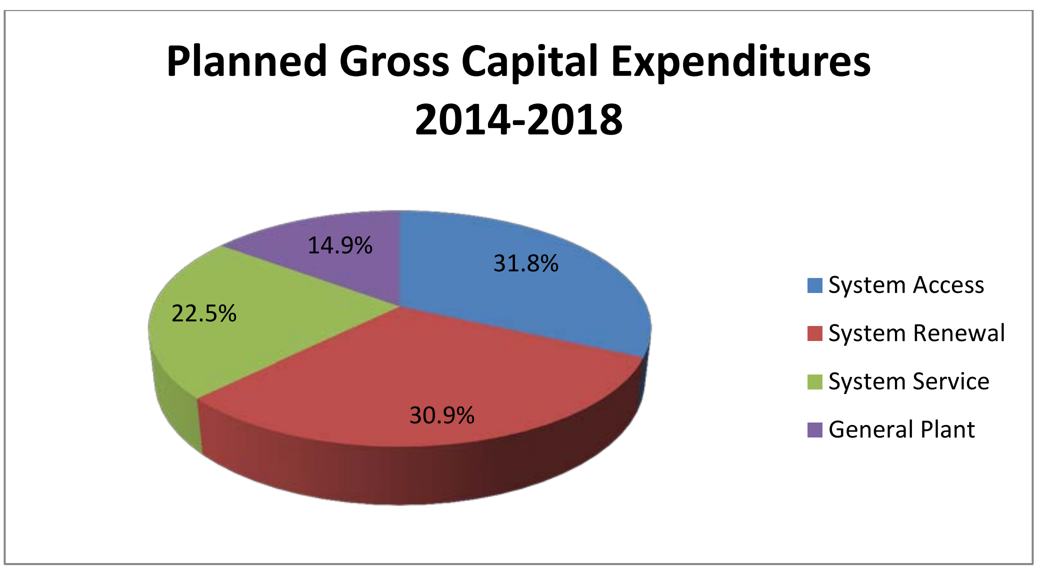


Chart 2-3 2014-2018 Gross Capital Expenditures by Investment Category



Note: System Service includes $16.5MM investment in new Transformer Station based on estimated growth.

System Renewal Investments:

CND has entered into a phase of renewal capital growth. 37% of the total gross investments over the period 2009 through 2013 were with respect to renewal capital projects; with an additional 35.6% in the 2014 Test Year. Gross capital expenditures on renewal investments are estimated at approximately $25.8MM, or 30.9% during the five year forecast period 2014 to 2018 (Chart 2-3). The renewal investments are expected to be approximately $7MM per year over the period 2013 through 2015, reducing to levels of $3MM to $4MM in the period 2015 through 2018.

The increase in System Renewal capital projects for the 2014 Test Year is driven principally by the following capital projects, which are highlighted below and explained in more detail in the DSP (Exhibit 2, Appendix 2-8A):

- Rebuild of approximately $2.7MM in underground distribution system plant, of which the majority of the projects involve direct buried cable installed in the 1970's, and have a mixture of mini-pad and submersible transformers. CND has been experiencing an increasing number of failures in the areas identified for rebuild.

- Replacement of various overhead distribution system plant, principally as a result of ageing poles and related infrastructure that was initially installed to 8.32kV design standards. The existing poles have reached their end of useful life and CND has been experiencing increased power interruptions in the areas identified for replacement. Two of the rebuild projects planned for 2014, Greenfield Road and Shellard Road, represent an investment of approximately $2.9MM.

System Access Investments:

System Access projects are driven by various external parties including current and future customers, developers, regional and municipal governments, and road authorities. Approximately 28.8% of the total gross investments over the period 2009 through 2013 were with respect to System Access capital projects; with an additional 40.5% in the 2014 Test Year. Gross capital expenditures on System Access investments are estimated at approximately $26.6MM, or 31.8% during the five year forecast period 2014 to 2018 (Chart 2-3). The System Access investments are expected to be approximately $8.4MM in 2013, $8.1MM in 2014, and reducing to $6.9MM in 2015 and reducing to levels of $3.5MM to $4.0MM in the period 2016 through 2018.

The increase in System Access capital projects for the 2014 Test Year is driven principally by the following capital projects, which are highlighted below and explained in more detail in the DSP (Exhibit 2, Appendix 2-8A):

- Relocation of overhead triple circuit and double circuit 27.6kV lines to accommodate new roundabouts on Franklin Boulevard in Cambridge. The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period (2014 and 2015). The gross investment is approximately $6MM over two years, with $2.8MM estimated in 2014.

- Rebuild of an existing single circuit 27.6kV line to a double circuit 27.6kV line, which is required to connect a new residential subdivision. There is currently insufficient capacity on the present feeder to accommodate the new growth. This rebuild will also address a reliability issues with an existing feeder. This project represents a gross investment of approximately $0.9MM.

- Various other projects including servicing residential and industrial subdivisions, and other relocations attributable to road projects, represent the balance of the System Access capital expenditure investments.

System Service Investments:

System Service investments over the period 2010 to 2012 have principally been focused on installing remote operated switches (SCADA loadbreak switches) to provide the capability to rapidly restore large part of a locked out feeder. In addition, these switches can be remotely operated from the Control Room during planned switching, thereby reducing the crew time associated with manual switches. These investments are required to maintain reliability. System service investments have ranged from $0.5MM to $0.8MM in 2012. System Service investments are expected to be $0.8MM in 2013 Bridge Year and $1.0MM in 2014 Test Year. The increased level of expenditures in 2013 and 2014 is principally attributable to: (i) replacement of obsolete radio controllers in 2013 and 2014, representing a total investment of $0.7MM; and (ii) replacement of fuses with single-phase reclosers in the rural area of North Dumfries to improve reliability and improve operating efficiencies, representing an investment of $0.4MM.

System Service investments over the five year forecast period 2014 to 2018 are estimated at approximately $18.8MM, or 22.5% during the five year forecast period 2014 to 2018 (Chart 2-3). Included in the 2018 forecast is an investment of $16.5MM with respect to the construction of a new Transformer Station. The estimated investment includes land, equipment, and associated 27.6kV feeders. The Region of Waterloo has targeted the North-West area of the City of Cambridge for significant industrial development. Based on projected load growth, CND expects that a new Transformer Station will be required. The supply for the new transformer is expected to come from Hydro One's 115kV transmission system, which is expected to be reinforced as a result of the planned transmission work in Guelph, Ontario, and the addition of a second feeder at the Preston Transformer Station. With respect to the SCADA loadbreak switches, CND has a target to install 3.5 switches per feeder for the 29 feeders that supply the service area. The five year plan incorporates the installation of 5 switches per year over the next five years.

General Plant Investments:

General Plant capital investments have historically ranged between $1MM to $2MM. Investment levels increased in 2011 and 2012, principally as a result of the investment in Smart Meters, as well as necessary information system technology upgrades including a new CIS/Billing System and ERP Software solutions. General plant investments are projected to be $2.9MM for the 2013 Bridge Year and $3.8MM in the 2014 Test Year. The principle driver of the increase in General Plant is to continue to enhance the information systems technology infrastructure at CND.

In 2014, CND will invest approximately $2.1MM in information systems technology investments required to meet customer expectations, improve operating efficiencies, and to mitigate risks associated with disaster recovery and business continuity planning.

As part of its Strategic Planning process undertaken by CND in the fall of 2012, and as described in Exhibit 1, CND identified three areas of risk within the Information Technology Services ("ITS") area:

1. Inadequate Resources – critical gaps in IT;
2. Lack of integrated IT Systems; and
3. Low capacity for innovation.

As a result, CND undertook a number of initiatives in 2013 to reduce these risks including:

- Hiring of additional resources (Exhibit 4);
- Development of an IT Strategy to ensure that the ITS team is focused on activities that are aligned to CND's strategy and business requirements (Exhibit 1); and
- Development of tactical plans to leverage new and existing information systems technology through integration.

Incorporated within the IT Strategy, and the IT tactical plans are the following information system technology investments required in 2014:

- Business Continuity Planning (BCP) / Disaster Recovery Planning (DRP)
- Distribution Management System (DMS)
- Outage Management System (OMS)
- Interactive Voice Response (IVR) solution
- Storage Area Network Upgrade
- Electronic Document Management (EDM)

The DMS, OMS and IVR capital investments are interrelated projects. These three solutions are the key requirements for the delivery of an Outage Management solution for CND that will ensure that CND is meeting customer expectations. Details with respect to these investments are provided in the DSP (Exhibit 2, Appendix 2-8A).

General Plant investments over the five year forecast period 2014 to 2018 are estimated at approximately $12.5MM, or 14.9% during the five year forecast period 2014 to 2018 (Chart 2-3). General Plant investments represent continued investments in: (i) meter assets, including new and replacement meters based on customer growth and required replacements; (ii) information systems technology investments required to mitigate enterprise risks and end of life assets, maximize operating efficiencies, and implement technology that supports customers expectations; (iii) investments in vehicles based on CND's replacement program; and (iv) buildings, furniture and equipment, and tools.

The General Plant forecast over the five year period excludes any estimate with respect to future investments that will be required by CND to upgrade its corporate office and operations facilities, further explained below.

In 2013, CND engaged a third party consultant to undertake a comprehensive space study with respect to its corporate offices and operating facilities. CND's existing facilities were constructed in the 1980's and since that time CND, and the industry, have undergone significant change. The growth in CND's business over the years, as well as an increase in the number of full-time employees, has resulted in insufficient office space, as well as inadequate garage space due to the physical size and growth in the fleet. CND is exploring the various options that may be available, including the expansion of existing facilities or the building of a new facility. At the time of the preparation of the five year forecast, estimated costs were not available.

Table 2-16 Summary of Capital Additions

OEB	Description	2009	2010	2011	2012	2013	2014
DISTRIBUTION SYSTEM ASSETS							
1815	Transformer Station Equipment >50 kV	-	-	6,389	236,836	3,600	-
1830	Poles, Towers & Fixtures	1,333,077	1,481,387	1,530,385	396,281	4,436,401	4,538,305
1835	Overhead Conductors & Devices	1,375,826	1,552,274	1,602,784	700,100	5,166,199	5,284,867
1840	Underground Conduit	1,681,371	1,760,205	931,291	113,596	1,869,990	1,831,237
1845	Underground Conductors & Devices	1,324,796	1,392,130	755,749	734,917	2,636,010	2,581,383
1850	Line Transformers	2,203,986	2,114,505	1,926,402	968,835	2,147,400	2,003,000
1855	Services (Overhead & Underground)	1,223,955	1,268,371	764,452	-	-	-
	Gross Distribution System Assets	**9,143,011**	**9,568,872**	**7,517,452**	**3,150,565**	**16,259,600**	**16,238,792**
1995	Contributions & Grants	(2,326,171)	(1,803,688)	(1,342,832)	(367,721)	(3,041,000)	(2,406,000)
	Work in Process		215,252	197,130	3,601,772	-	-
	Net Distribution System Assets, including Work in Progress	**6,816,840**	**7,980,436**	**6,371,750**	**6,384,616**	**13,218,600**	**13,832,792**

OEB	Description	2009	2010	2011	2012	2013	2014
GENERAL PLANT							
1805	Land	33,413	271,964	-	-	-	-
1808	Buildings	14,802	54,430	3,500	-	-	-
1860	Meters	283,797	90,506	285,340	8,687,870	915,017	966,643
1905	Land		-	-	-	-	-
1908	Buildings & Fixtures		-	-	493,500	448,000	55,000
1915	Office Furniture & Equipment (10 years)	-	24,917	27,482	46,010	187,301	80,400
1920	Computer Equipment - Hardware	66,623	228,081	207,412	473,274	296,500	751,500
1925	Computer Software	(64,776)	466,068	1,179,438	815,301	312,900	1,334,048
1930	Transportation Equipment	772,467	99,206	463,600	123,836	587,785	520,000
1940	Tools, Shop & Garage Equipment	150,390	201,035	20,186	59,566	116,650	109,000
	General Plant	**1,256,717**	**1,436,207**	**2,183,458**	**10,699,357**	**2,864,153**	**3,816,591**
2070	Other Utility Plant - Assets Not In Use		478,492	140,804	(590,602)	-	-
	General Plant, Excluding Assets Not In Use	**1,256,717**	**1,914,699**	**2,324,261**	**10,108,755**	**2,864,153**	**3,816,591**
	Total Capital Additions, including Work in Progress	**8,073,557**	**9,895,135**	**8,699,511**	**16,493,370**	**16,082,753**	**17,649,383**

CAPITALIZATION POLICY

Overview of Policy:

CND's capitalization policies and principles are based on Canadian Generally Accepted Accounting Principles ("CGAAP"), as well as the guidelines as set out by the Ontario Energy Board, where applicable.

Effective January 1, 2012, CND revised its capitalization policies under CGAAP to reflect changes that were required in accordance with regulatory accounting requirements and that align to the capitalization principles if CND were to adopt International Financial Reporting Standards ("IFRS").

The following is a summary of the significant elements of CND's capitalization policies:

- Only those costs directly attributable to the acquisition or construction of a capital asset are capitalized. Specific expenditures that are no longer included in the capital burden rates for CND include: (i) building maintenance costs; (ii) health and safety department expenditures; and (iii) municipal property taxes. CND does not, nor has it previously, capitalized any indirect administrative support costs such as Finance, Human Resources, or Corporate Services. A description of capitalized overheads (burdens) is described in more detail in this Exhibit below.

- Costs incurred to remove an existing asset from service are to be expensed and are no longer eligible to be included in the capital cost of the new asset.

- Assets that are intended to be used on an on-going basis and are expected to provide future economic benefit (generally considered to be greater than one year) are capitalized.

- Individual items with an estimated life greater than one year and that exceed $2,000 will be capitalized.

- CND does not capitalize interest on funds used during construction unless such funds relate to specific borrowings for capital purposes.

Capitalization of Overhead:

As a result of changes to its capitalization policies effective January 1, 2012, CND no longer capitalizes four specific types of costs that were previously included in overhead burden rates charged either to OM&A expenses or to capital projects, as appropriate. The four costs include:

- Health and Safety – Prior to January 1, 2012, such costs were included in an overall payroll burden account that was allocated to labour costs charged to capital or OM&A projects based on time reporting. As of January 1, 2012, health and safety costs are charged to OM&A expenses. The health and safety costs charged to OM&A in 2012 were $226,413 and $258,705 in 2013 Bridge Year.

- Building Expenses – Prior to January 1, 2012, such costs were included in various burden accounts as part of purchasing and stores, vehicles, and engineering costs that ultimately were charged to either capital or OM&A projects. As of January 1, 2012, all building is charged to OM&A expenses. The building expenses charged to OM&A in 2012 were $131,135 and $172,913 in 2013.

- Municipal Taxes – Prior to January 1, 2012, such costs were included in various burden accounts as part of purchasing and stores, vehicles, and engineering costs that ultimately were charged to either capital or OM&A projects. As of January 1, 2012, municipal taxes are charged to OM&A expenses. The municipal tax expenses charged to OM&A in 2012 were $70,581 and $72,652 in 2013.

- Removal Costs – Prior to January 1, 2012, such costs incurred to remove an existing asset from service, including labour, vehicles and material, were included in the capital costs to construct an asset as part of the overall capital project. As of January 1, 2012, removal costs are recorded to OM&A expenses. The removal costs charged to OM&A in 2012 were $333,253 and $600,835 in 2013.

Included in Appendix 2-9 is OEB Appendix 2-DB Overhead Expenses.

Burden Rates:

Table 2-17 below summarizes the historical and projected burden rates related to the capitalization of costs of self-constructed assets. The rates are changed and updated periodically to reflect actual costs or changed circumstances, including the related impacts as a result of the change in accounting policies.

CND has four types of overhead costs: (i) Payroll Benefits; (ii) Engineering Burden; (iii) Stores; and (iv) Fleet. As described previously, CND does not allocate any indirect costs associated with Finance, Human Resources, Information Systems Technology, or other administrative departments.

Table 2-17 Burden Rates

Description	**Unit**	**Budget 2014**	**Budget 2013**	**Actual 2012**	**Actual 2011**	**Actual 2010**	**Actual 2009**
Payroll Benefits	Direct Labour	55.0%	55.0%	55.5%	57.8%	61.9%	58.3%
Engineering Costs	Direct Labour	0.0%	0.0%	0.0%	19.7%	14.7%	13.3%
Engineering Burden	Project	14.0%	14.0%	23.4%			
Design	Project				57.8%	61.9%	58.3%
Inspection	Project				57.8%	61.9%	58.3%
Sub Contractor	Project				19.7%	14.7%	13.3%
Supplies	Project				12.5%	9.4%	7.0%
Stores costs	Material $	14.0%	14.0%	5.9%	13.2%	12.4%	14.4%
Small Truck	Labour Hour	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 10.00	$ 9.00
Large Truck	Labour Hour	$ 35.00	$ 35.00	$ 35.00	$ 35.00	$ 35.00	$ 30.00

REQUIRED INFORMATION

Included in Appendix 2-10 is CND's Capital Projects Table (OEB Appendix 2-AA Capital Projects Table), which provides a summary of all capital projects for the years 2008 through 2012, 2013 Bridge Year and 2014 Test Year.

Written explanations for the capital projects that exceed CND's materiality threshold of $125,000 are provided in the DSP (Appendix 2-8A).

2010 Board Approved Capital Expenditures versus Actual 2010 Capital Expenditures:

The following summarizes the variances with respect to the 2010 Actual Capital Expenditures compared to the 2010 Board Approved Capital Expenditures:

2010 Actual Capital Expenditures were $9,201,391, excluding work in progress and assets not in use, compared to 2010 Board Approved Capital Expenditures of $11,405,000.

Table 2-18 summarizes the 2010 Actual Distribution System asset capital additions compared to 2010 Board Approved. The Actual 2010 Distribution System asset additions were $7,765,184 compared to 2010 Board Approved amount of $7,700,000 (excluding work in process and assets not in use). The overall level of capital expenditures for distribution system assets was not materially different from the 2010 Board Approved and therefore no further explanation is required.

Table 2-18 2010 Board Approved Distribution System Additions

Versus Actual 2010 Distribution System Additions

OEB	Description	Actual 2010	2010 Board Approved	Variance
1830	Poles, Towers, Fixtures	1,481,387	1,665,172	183,785
1835	Overhead Conductors	1,552,274	1,716,284	164,010
1840	Underground Conduit	1,760,205	1,502,869	(257,336)
1845	Underground Conductors	1,392,130	1,198,888	(193,242)
1850	Line Transformers	2,114,505	1,723,457	(391,048)
1855	Services	1,268,371	1,160,330	(108,041)
1955	Contributions and Grants	(1,803,688)	(1,267,000)	536,688
	Total	7,765,184	7,700,000	(65,184)

Table 2-19 summarizes the 2010 Actual General Plant capital additions compared to 2010 Board Approved.

Table 2-19 2010 Board Approved General Plant Additions versus actual 2010 General Plant Additions

OEB	Description	Actual 2010	2010 Board Approved	Variance
1805	Land	271,964	35,000	(236,964)
1808	Buildings and Fixtures	54,430	115,000	60,570
1860	Meters	90,506	100,000	9,494
1915	Office Furniture and Equipment	24,917	83,000	58,083
1920	Computer Equipment - Hardware	228,081	167,000	(61,081)
1925	Computer Software	466,068	2,985,000	2,518,932
1930	Transportation Equipment	99,206	125,000	25,794
1940	Tools, Shop and Garage Equipment	201,035	95,000	(106,035)
	Total	1,436,207	3,705,000	2,268,793

The 2010 Actual General Plant capital additions were $1,436,207 or $2,268,793 lower than the 2010 Board Approved General Plant capital additions of $3,705,000. The variance is principally attributable to the timing of planned expenditures. The following is an explanation of the material variances:

Land:

2010 Actual expenditures of $271,964 were $236,964 higher than the 2010 Board Approved. CND incurred environmental remediation costs of $271,964 at its existing substations in preparation for sale. The remediation costs were higher than originally anticipated. One substation (Wauchope) was disposed of in 2010. Please refer to Exhibit 3, Tab 4, Schedule 1, Page 9 for information regarding the disposal.

Computer Software:

2010 Actual expenditures for computer software were $466,068 or $2,518,932 lower than the 2010 Board Approved amount of $2,985,000. The 2010 Board Approved amount included the following capital projects:

1. CIS/Billing System	1,850,000
2. ERP Software Replacement	650,000
3. IVR Software	135,000
4. Other	350,000

The variance between 2010 Board Approved and 2010 Actual is principally attributable to the timing of implementation of two material planned expenditures, the CIS/Billing System and the ERP Software, well as the deferral of the IVR software implementation. The CIS/Billing System was implemented over a two year period (2010-2011), the ERP Software was implemented over a two year period (2011-2012), and the IVR implementation is planned for the 2014 Test Year.

As detailed in Exhibit 9, Tab 2, Schedule 1 the Board approved capital costs for a new CIS/billing system in 2010 distribution rates of $1.85 million. Actual costs of $1,016,037 were incurred on this project, some of which were incurred in 2010, with the balance incurred in 2011. As at

December 31, 2010, CND had recorded $478,492 in capital expenditures as part of Assets Not In Use. These expenditures related to the implementation of a new CIS/Billing System, which was placed into service in 2011 and subsequently transferred to capital assets in 2011.

As described in the DSP (Exhibit 2, Appendix 2-8A), the ERP Software solution was implemented in 2012 at a total cost of $678,597.

The IVR Software was not been purchased in 2010 due to the delay in the implementation of the CIS/Billing System. The IVR software has been included in the 2014 General Plant capital additions for the 2014 Test Year. Details with respect to the IVR capital project are provided in the DSP (Exhibit 2, Appendix 2-8A).

COSTS OF ELIGIBLE INVESTMENTS FOR THE DISTRIBUTORS

CND has incurred no costs as described in section 79.1 of the OEB Act and Regulation 330/09 under the Act and as such has not completed Appendices 2-FA through 2-FC.

ADDITION OF ICM ASSETS TO RATE BASE

CND has not applied for approval of ICM Assets and therefore has no such assets added to its rate base.

SERVICE QUALITY AND RELIABILITY PERFORMANCE

Service Quality Indicators:

OEB regulations require LDCs to annually report service quality indicators. CND relies upon these service quality and reliability performance indicators to monitor its operational performance. CND's core values, and more specifically the customer focus value "to providing excellent services and solutions to its customers, both anticipating and responding to customer needs", relates directly to ensure CND manages its reliability results.

CND follows the Board's Reporting and Record Keeping Requirements Guideline to report its service quality indicators (SQI's). CND annually reports SQI's to the Board. The SQI's measure:

- Connection of new services
- Appointment scheduling
- Telephone accessibility
- Written responses to enquiries
- Emergency response

The following Tables 2-20 to 2-29 present the summary of CND's 2008 to 2012 SQI's. CND's performance measures over the 2008 to 2012 period exceed the Board's approved standards.

Table 2-20 Connection of New Services – Low Voltage

OEB Approved Standard: at least 90%	2008	2009	2010	2011	2012
Annual # of new LV services connected within 5 days	1,008	1,024	862	667	380
Annual # of new LV services requested	1,055	1,032	875	671	383
Annual % new LV services within 5 days	**95.5%**	**99.2%**	**98.5%**	**99.4%**	**99.2%**

Table 2-21 Connection of New Services – High Voltage

OEB Approved Standard: at least 90%	2008	2009	2010	2011	2012
Annual # of new HV services connected within 10 days	0	0	0	0	0
Annual # of new HV services requested	0	0	0	0	0
Annual % new HV services within 10 days	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**

CND did not connect new high voltage services during the period of 2008 to 2012.

Table 2-22 Appointment Scheduling

OEB Approved Standard: at least 90%	2008	2009	2010	2011	2012
Annual # of appointments scheduled/ completed as required	N/A	668	749	131	87
Annual # of appointment requests received	N/A	668	749	131	87
Annual % appointments scheduled/ completed as required	**N/A**	**100%**	**100%**	**100%**	**100%**

CND did not report the Appointment Scheduling measure in 2008. It was not required at that time. The number of appointments scheduled in 2009 and 2010 were higher due to the implementation of Smart Meters.

Table 2-23 Appointments Met

OEB Approved Standard: at least 90%	2008	2009	2010	2011	2012
Annual # of appointments completed as required	772	668	748	5,569	5,626
Annual # of appointments scheduled with customer/ representative	772	668	749	5,573	5,701
Annual % appointments met	**100%**	**100%**	**99.9%**	**99.9%**	**98.7%**

The increase in the 2011 and 2012 Appointments Met are attributable to a change in reporting for locates. In prior years, locate appointments were not included in this metric.

Table 2-24 Rescheduling a Missed Appointment

OEB Approved Standard: at least 100%	2008	2009	2010	2011	2012
Annual # of appointments rescheduled as required	N/A	0	5	5	0
Annual # of missed/ about missed appointments	N/A	0	5	5	0
Annual % appointments rescheduled	**N/A**	**N/A**	**100%**	**100%**	**N/A**

CND did not report the Rescheduling a Missed Appointment measure in 2008. It was not required at that time.

In 2009, CND did not reschedule missed appointments since all appointments were met. In 2012, CND did not reschedule missed appointments.

Table 2-25 Telephone Accessibility

OEB Approved Standard: at least 65%	2008	2009	2010	2011	2012
Annual # of qualified incoming calls answered within 30 seconds	45,477	46,028	46,956	39,920	44,026
Annual # of qualified incoming calls	53,539	59,432	63,225	60,283	49,956
Annual % qualified incoming calls answered within 30 seconds	**84.9%**	**77.4%**	**74.3%**	**66.2%**	**88.1%**

Table 2-26 Telephone Call Abandonment Rate

OEB Approved Standard: 10% or less	2008	2009	2010	2011	2012
Annual # of qualified incoming calls abandoned within 30 seconds	N/A	4,810	5,195	5,503	1,416
Annual # of qualified incoming calls	N/A	59,432	63,225	60,283	49,956
Annual % qualified incoming calls abandoned within 30 seconds	**N/A**	**8.1%**	**8.2%**	**9.1%**	**2.8%**

CND did not report the Telephone Call Abandonment Rate measure in 2008. It was not required at that time.

Table 2-27 Written Response to Enquiries

OEB Approved Standard: at least 80%	2008	2009	2010	2011	2012
Annual # of written responses provided within 10 days	1,503	1,908	2,252	1,763	2,306
Annual # of qualified enquiries received	1,503	1,924	2,268	1,774	2,306
Annual % written responses within 10 days	**100%**	**99.2%**	**99.3%**	**99.4%**	**100%**

Table 2-28 Emergency Response Urban

OEB Approved Standard: at least 80%	2008	2009	2010	2011	2012
Annual # of urban emergency calls responded within 60 minutes	603	578	632	64	67
Annual # of urban emergency calls	621	590	643	64	67
Annual % urban emergency calls responeded within 60 minutes	**97.1%**	**98.0%**	**98.3%**	**100%**	**100%**

In the past, emergency calls for both urban and rural purposes were recorded based on the customer definition of emergency. Since 2011, CND has adhered to the OEB definition of Emergencies. This resulted in a significant reduction in the number of emergency calls reported.

Table 2-29 Emergency Response Rural

OEB Approved Standard: at least 80%	2008	2009	2010	2011	2012
Annual # of urban emergency calls responded within 120 minutes	78	99	53	10	3
Annual # of urban emergency calls	83	107	57	10	3
Annual % urban emergency calls responeded within 120 minutes	**94.0%**	**92.5%**	**93.0%**	**100%**	**100%**

Reliability Performance:

The reliability of supply is measured by service reliability indices and is reported annually to the Board. The indices are described below:

- System Average Interruption Duration Index (SAIDI) measures system reliability expressed by the length of interruptions that customers experience in a year on average.
- System Average Interruption Frequency Index (SAIFI) is the average number of sustained interruptions each customer experiences per year.

Table 2-30 to 2-34 summarize CND's reliability indices for the last five completed years. Chart 2-4 and Chart 2-5 below show the reliability performance over the period 2008 to 2012. Yearly fluctuations can result from variations in weather such as extreme lightning, excessive snowfalls and ice storms and foreign interference such as animal contacts and motor vehicle accidents.

Table 2-30 SAIDI

SAIDI	2008	2009	2010	2011	2012
Annual Customer Hours of Interruptions	34,595	26,064	49,195	37,866	55,349
Average # of Customers	49,073.00	49,778.50	50,532.50	51,240.83	51,864.58
Total SAIDI	**0.70**	**0.52**	**0.97**	**0.74**	**1.07**

Table 2-31 SAIDI Adjusted for Loss of Supply

SAIDI Loss Supply Adjusted	2008	2009	2010	2011	2012
Adjusted Annual Customer Hours of Interruptions	33,343	25,356	49,154	35,687	52,008
Average # of Customers	49,073.00	49,778.50	50,532.50	51,240.83	51,864.58
Total Loss of Supply Adjusted SAIDI	**0.68**	**0.51**	**0.97**	**0.70**	**1.00**

Chart 2-4 SAIDI Performance

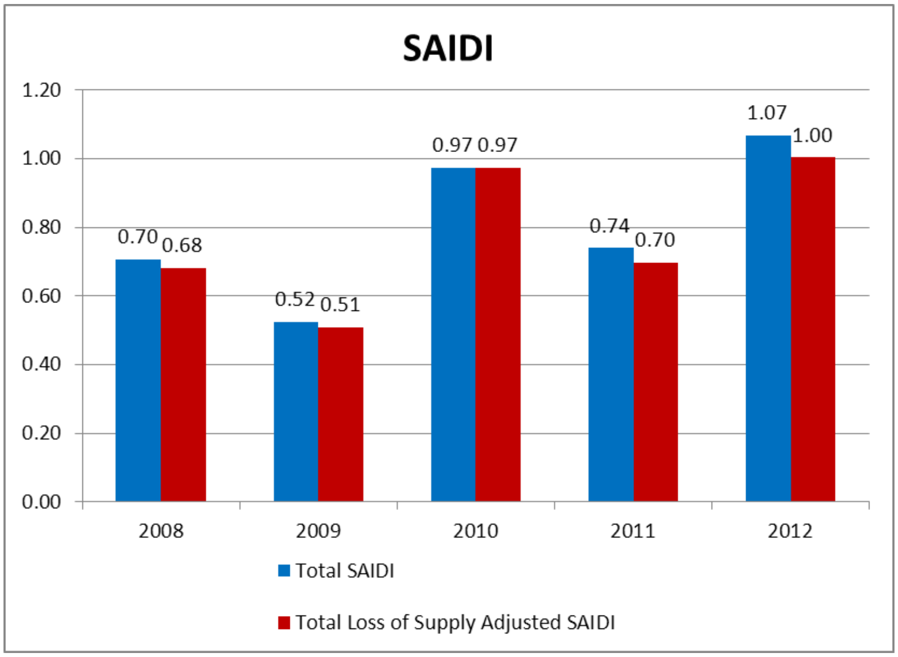


Table 2-32 SAIFI

SAIFI	2008	2009	2010	2011	2012
Annual Customer Interruptions	53,116	49,000	43,099	72,379	77,106
Average # of Customers	49,073.00	49,778.50	50,532.50	51,240.83	51,864.58
Total SAIFI	**1.08**	**0.98**	**0.85**	**1.41**	**1.49**

Table 2-33 SAIFI Adjusted for Loss of Supply

SAIFI Loss Suppy Adjusted	2008	2009	2010	2011	2012
Adjusted Annual Customer Hours of Interruptions	50,906	48,466	43,083	66,825	74,091
Average # of Customers	49,073.00	49,778.50	50,532.50	51,240.83	51,864.58
Total Loss of Supply Adjusted SAIFI	**1.04**	**0.97**	**0.85**	**1.30**	**1.43**

Chart 2-5 SAIFI Performance

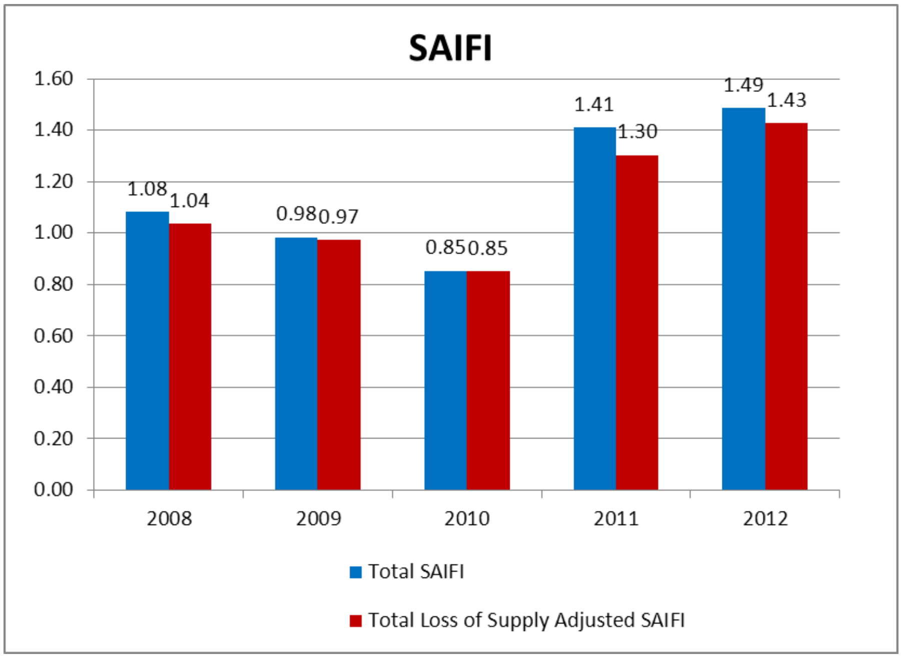


Table 2-34 (Appendix 2-G OEB) Service Reliability Indicators

Index	Includes outages caused by loss of supply					Excludes outages caused by loss of supply				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
SAIDI	0.700	0.520	0.970	0.740	1.070	0.680	0.510	0.970	0.700	1.000
SAIFI	1.080	0.980	0.850	1.410	1.490	1.040	0.970	0.850	1.300	1.430

5 Year Historical Average

SAIDI		0.800		0.772
SAIFI		1.162		1.118

The Board has determined that an LDC's reliability performance should remain within at least its historical 3-year performance range. CND is above the Board standard for both SAIDI and SAIFI in 2012. The leading causes effecting CND's outage duration include Defective Equipment, Foreign Interference, and Adverse Weather. This information is also available in Appendix 9-11.

CND's reliability has deteriorated in terms of both SAIDI and SAIFI between 2008 and 2012. In 2010, nearly half of the Customer-Hours lost were due to trees. Two tree events in 2010 resulted in 21,244 Customer-Hours lost or 81% of the total number of Customer-Hours lost in 2009. These trees fell into CND's lines during severe winds and the events were not as a result of insufficient tree trimming. These two tree events represent most of the reliability performance decline in 2010.

Reliability performance in terms of SAIDI improved in 2011 as compared to 2010 primarily because of fewer outages caused by trees. SAIFI deteriorated significantly in 2011 as the outages that did occur affected a larger number of customers.

2012 SAIDI and SAIFI reliability performance declined from 2011. 8,106 Customer-Hours lost (or 14.6% of the annual total) was due to severe thunderstorms on May 4, 2012. A series of equipment failure outages in the Galt Core Area in February/March, 2012 resulted in 2,703 Customer-Hours of interruption. Half of the top ten outages in 2012 were due to Defective Equipment resulting in the highest number of Customer-Hours lost due to Defective Equipment in the five year period.

Loss of Supply figures increased significantly in 2011 and 2012 due to a pole fire at Hydro One owned Wolverton DS in 2011 and due to an equipment failure at Galt TS in 2012.

Reliability Initiatives:

CND's DS Plan discusses CND's reliability programs and initiatives in greater detail. The following are CND's plans to alleviate service outages in its service area:

- CND is continuing to divide up its 27.6kV feeders with the installation of remotely operated SCADA switches to reduce the length of outages. CND is reconfiguring 27.6kV feeders in the South end of the City of Cambridge to reduce the number of customers affected by a 27.6kV feeder lockout in this area.

- CND is pro-actively changing out "end of life" wood poles and equipment prior to failure through overhead rebuild projects and spot replacements.

- CND is installing single phase 16kV reclosers to prevent sustained outages to rural customers for temporary faults on the distribution system.

- CND is investing in renewal of its underground distribution system in the Galt Core Area to get reliability performance back to an acceptable level for area businesses and residents.

- CND is replacing "end of life" underground primary cable in residential subdivisions that were developed in the 1970's to maintain acceptable reliability performance for affected customers.

- CND is replacing porcelain post type insulators and SMD-20 fused cutouts which have been a source of significant outages.

- CND is investing in additional animal protection on its equipment where feasible to prevent power interruptions.

- CND has a planned program to replace failure prone PMH style switching units.

CND will continue to monitor reliability performance and invest where necessary to meet customer expectations for power reliability and quality.

APPENDIX 2-1

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2009

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year 2009

			Cost				Accumulated Depreciation				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$ 1,191,464	-$ 64,776	$ -	$ 1,126,688	-$ 344,550	-$ 182,608	$ -	-$ 527,158	$ 599,530
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 413,171	$ 33,413	-$ 33,413	$ 413,171				$ -	$ 413,171
47	1808	Buildings	$ 5,826,116	$ 14,802	-$ 14,804	$ 5,826,114	-$ 2,065,442	-$ 138,705	$ 14,804	-$ 2,189,343	$ 3,636,771
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 9,771,354			$ 9,771,354	-$ 1,653,859	-$ 244,151		-$ 1,898,010	$ 7,873,344
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 23,328,484	$ 1,333,077		$ 24,661,561	-$ 11,041,086	-$ 919,976		-$ 11,961,062	$ 12,700,499
47	1835	Overhead Conductors & Devices	$ 24,076,580	$ 1,375,826		$ 25,452,406	-$ 11,379,146	-$ 963,784		-$ 12,342,930	$ 13,109,476
47	1840	Underground Conduit	$ 21,273,070	$ 1,681,371		$ 22,954,441	-$ 10,234,857	-$ 898,479		-$ 11,133,336	$ 11,821,105
47	1845	Underground Conductors & Devices	$ 16,913,970	$ 1,324,796		$ 18,238,766	-$ 8,133,070	-$ 713,042		-$ 8,846,112	$ 9,392,654
47	1850	Line Transformers	$ 36,801,204	$ 2,203,986		$ 39,005,190	-$ 17,696,905	-$ 1,357,266		-$ 19,054,171	$ 19,951,019
47	1855	Services (Overhead & Underground)	$ 16,165,455	$ 1,223,955		$ 17,389,410	-$ 7,748,672	-$ 684,335		-$ 8,433,007	$ 8,956,403
47	1860	Meters	$ 8,956,401	$ 283,797	$ -	$ 9,240,198	-$ 4,523,889	-$ 275,869	$ -	-$ 4,799,758	$ 4,440,440
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land				$ -				$ -	$ -
47	1908	Buildings & Fixtures				$ -				$ -	$ -
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 629,090	$ -	$ -	$ 629,090	-$ 546,111	-$ 22,907	$ -	-$ 569,018	$ 60,072
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 1,488,617	$ 66,623	-$ 41,746	$ 1,513,494	-$ 1,178,040	-$ 121,654	$ 41,746	-$ 1,257,948	$ 255,546
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 3,299,888	$ 772,467	-$ 464,383	$ 3,607,972	-$ 2,576,159	-$ 260,620	$ 464,383	-$ 2,372,396	$ 1,235,576
8	1935	Stores Equipment	$ 105,013		$ -	$ 105,013	-$ 104,957	-$ 56	$ -	-$ 105,013	$ -
8	1940	Tools, Shop & Garage Equipment	$ 1,283,612	$ 150,390	$ -	$ 1,434,002	-$ 1,017,096	-$ 62,199	$ -	-$ 1,079,295	$ 354,707
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 11,419,225	-$ 2,326,171		-$ 13,745,396	$ 2,670,470	$ 551,403		$ 3,221,873	-$ 10,523,523
	2005	Property under Capital Lease	$ 61,873			$ 61,873	-$ 49,499	-$ 12,374		-$ 61,873	$ -
WIP		Work in Process	$ -	$ -	$ 117,944	$ 117,944				$ -	$ 117,944
	2070	Other Utility Plant - assets not in use		$ -		$ -				$ -	$ -
		Sub-Total	**$ 160,880,351**	**$ 8,073,556**	**-$ 436,402**	**$ 168,517,505**	**-$ 78,337,082**	**-$ 6,306,622**	**$ 520,933**	**-$ 84,122,771**	**$ 84,394,734**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets (input as negative)				$ -				$ -	$ -
		Total PP&E	**$ 160,880,351**	**$ 8,073,556**	**-$ 436,402**	**$ 168,517,505**	**-$ 78,337,082**	**-$ 6,306,622**	**$ 520,933**	**-$ 84,122,771**	**$ 84,394,734**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*

Transportation	-$ 260,620
Stores Equipment	
Net Depreciation	-$ 6,046,002

Notes:

1 Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2 The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

3 The table may need to be customized for a utility's asset categories or for any new asset accounts announced or authorized by the Board.

4 The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-2

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2010

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year 2010

			Cost				Accumulated Depreciation				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$ 1,126,689	$ 466,068	-$ 645,547	$ 947,210	-$ 527,158	-$ 168,328	$ 9,417	-$ 686,069	$ 261,141
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 413,171	$ 271,964	-$ 196,873	$ 488,262				$ -	$ 488,262
47	1808	Buildings	$ 5,826,115	$ 54,430		$ 5,880,545	-$ 2,189,343	-$ 135,865		-$ 2,325,208	$ 3,555,337
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 9,771,354			$ 9,771,354	-$ 1,898,009	-$ 244,415		-$ 2,142,424	$ 7,628,930
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 24,661,561	$ 1,481,387		$ 26,142,948	-$ 11,961,062	-$ 1,048,309		-$ 13,009,371	$ 13,133,577
47	1835	Overhead Conductors & Devices	$ 25,452,406	$ 1,552,274		$ 27,004,680	-$ 12,342,930	-$ 1,083,624		-$ 13,426,554	$ 13,578,126
47	1840	Underground Conduit	$ 22,954,441	$ 1,760,205		$ 24,714,646	-$ 11,133,336	-$ 840,472		-$ 11,973,808	$ 12,740,838
47	1845	Underground Conductors & Devices	$ 18,238,766	$ 1,392,130		$ 19,630,896	-$ 8,846,112	-$ 640,101		-$ 9,486,213	$ 10,144,683
47	1850	Line Transformers	$ 39,005,190	$ 2,114,505		$ 41,119,695	-$ 19,054,171	-$ 1,285,335		-$ 20,339,506	$ 20,780,189
47	1855	Services (Overhead & Underground)	$ 17,389,410	$ 1,268,371		$ 18,657,781	-$ 8,433,007	-$ 740,187		-$ 9,173,194	$ 9,484,587
47	1860	Meters	$ 9,240,198	$ 90,506	-$ 8,286,380	$ 1,044,324	-$ 4,799,759	-$ 334,652	$ 4,790,360	-$ 344,051	$ 700,273
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land				$ -				$ -	$ -
47	1908	Buildings & Fixtures				$ -				$ -	$ -
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 629,090	$ 24,917	-$ 116,121	$ 537,886	-$ 569,018	-$ 16,953	$ 116,121	-$ 469,850	$ 68,036
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 1,513,494	$ 228,081	-$ 181,638	$ 1,559,937	-$ 1,257,948	-$ 127,085	$ 97,075	-$ 1,287,958	$ 271,979
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 3,607,971	$ 99,206	-$ 86,159	$ 3,621,018	-$ 2,372,396	-$ 245,266	$ 86,159	-$ 2,531,503	$ 1,089,515
8	1935	Stores Equipment	$ 105,013		-$ 11,284	$ 93,729	-$ 105,013		$ 11,284	-$ 93,729	$ -
8	1940	Tools, Shop & Garage Equipment	$ 1,434,002	$ 201,035	-$ 631,370	$ 1,003,667	-$ 1,079,295	-$ 66,456	$ 624,112	-$ 521,639	$ 482,028
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 13,745,395	-$ 1,803,688		-$ 15,549,083	$ 3,221,873	$ 585,890		$ 3,807,763	-$ 11,741,320
	2005	Property under Capital Lease	$ 61,873			$ 61,873	-$ 61,873			-$ 61,873	$ -
WIP		Work in Process	$ 117,944	$ 215,252	-$ 117,944	$ 215,252				$ -	$ 215,252
	2070	Other Utility Plant - assets not in use		$ 478,492		$ 478,492				$ -	$ 478,492
		Sub-Total	**$ 168,517,507**	**$ 9,895,135**	**-$10,273,316**	**$168,139,326**	**-$ 84,122,771**	**-$ 6,391,158**	**$ 5,734,528**	**-$ 84,779,401**	**$ 83,359,925**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets *(input as negative)*				$ -				$ -	$ -
		Total PP&E	**$ 168,517,507**	**$ 9,895,135**	**-$10,273,316**	**$168,139,326**	**-$ 84,122,771**	**-$ 6,391,158**	**$ 5,734,528**	**-$ 84,779,401**	**$ 83,359,925**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*	
Transportation	-$ 245,266
Stores Equipment	
Net Depreciation	-$ 6,145,892

Notes:

1. Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2. The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

3. The table may need to be customized for a utility's asset categories or for any new asset accounts announced or authorized by the Board.

4. The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-3

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2011

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year 2011

			Cost				Accumulated Depreciation				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$ 947,211	$ 1,179,438		$ 2,126,649	-$ 686,069	-$ 297,875		-$ 983,944	$ 1,142,705
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 488,261		-$ 21,541	$ 466,720				$ -	$ 466,720
47	1808	Buildings	$ 5,880,544	$ 3,500		$ 5,884,044	-$ 2,325,208	-$ 135,058		-$ 2,460,266	$ 3,423,778
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 9,771,354	$ 6,389		$ 9,777,743	-$ 2,142,424	-$ 244,364		-$ 2,386,788	$ 7,390,955
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 26,142,948	$ 1,530,385		$ 27,673,333	-$ 13,009,371	-$ 983,534		-$ 13,992,905	$ 13,680,428
47	1835	Overhead Conductors & Devices	$ 27,004,680	$ 1,602,784		$ 28,607,464	-$ 13,426,554	-$ 1,016,734		-$ 14,443,288	$ 14,164,176
47	1840	Underground Conduit	$ 24,714,646	$ 931,291		$ 25,645,937	-$ 11,973,808	-$ 911,479		-$ 12,885,287	$ 12,760,650
47	1845	Underground Conductors & Devices	$ 19,630,896	$ 755,749		$ 20,386,645	-$ 9,486,213	-$ 724,559		-$ 10,210,772	$ 10,175,873
47	1850	Line Transformers	$ 41,119,695	$ 1,926,402		$ 43,046,097	-$ 20,339,506	-$ 1,529,895		-$ 21,869,401	$ 21,176,696
47	1855	Services (Overhead & Underground)	$ 18,657,781	$ 764,452		$ 19,422,233	-$ 9,173,194	-$ 690,282		-$ 9,863,476	$ 9,558,757
47	1860	Meters	$ 1,044,324	$ 285,340		$ 1,329,664	-$ 344,050	-$ 47,475		-$ 391,525	$ 938,139
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land				$ -				$ -	$ -
47	1908	Buildings & Fixtures				$ -				$ -	$ -
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 537,887	$ 27,482		$ 565,369	-$ 469,850	-$ 15,729		-$ 485,579	$ 79,790
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 1,559,937	$ 207,412	-$ 23,826	$ 1,743,523	-$ 1,287,958	-$ 125,999	$ 23,534	-$ 1,390,423	$ 353,100
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 3,621,019	$ 463,600	-$ 240,204	$ 3,844,415	-$ 2,531,504	-$ 284,840	$ 240,204	-$ 2,576,140	$ 1,268,275
8	1935	Stores Equipment	$ 93,729			$ 93,729	-$ 93,730			-$ 93,730	-$ 1
8	1940	Tools, Shop & Garage Equipment	$ 1,003,667	$ 20,186		$ 1,023,853	-$ 521,639	-$ 73,797		-$ 595,436	$ 428,417
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 15,549,083	-$ 1,342,832		-$ 16,891,915	$ 3,807,763	$ 648,820		$ 4,456,583	-$ 12,435,332
	2005	Property under Capital Lease	$ 61,873			$ 61,873	-$ 61,873			-$ 61,873	$ -
WIP		Work in Process	$ 215,252	$ 197,130	-$ 215,252	$ 197,130				$ -	$ 197,130
	2070	Other Utility Plant - assets not in use	$ 478,492	$ 140,804		$ 619,296				$ -	$ 619,296
		Sub-Total	**$ 168,139,327**	**$ 8,699,512**	**-$ 500,823**	**$ 176,338,016**	**-$ 84,779,402**	**-$ 6,432,800**	**$ 263,738**	**-$ 90,948,464**	**$ 85,389,552**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets (input as negative)				$ -				$ -	$ -
		Total PP&E	**$ 168,139,327**	**$ 8,699,512**	**-$ 500,823**	**$ 176,338,016**	**-$ 84,779,402**	**-$ 6,432,800**	**$ 263,738**	**-$ 90,948,464**	**$ 85,389,552**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*	
Transportation	-$ 284,840
Stores Equipment	
Net Depreciation	-$ 6,147,960

Notes:

1 Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2 The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

3 The table may need to be customized for a utility's asset categories or for any new asset accounts announced or authorized by the Board.

4 The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-4

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2012

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year **2012**

			Cost				Accumulated Depreciation				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$ 2,402,039	$ 815,301		$ 3,217,340	-$ 1,066,561	-$ 420,631		-$ 1,487,192	$ 1,730,148
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 252,923			$ 252,923				$ -	$ 252,923
47	1808	Buildings	$ 1,190,197			$ 1,190,197	-$ 242,013	-$ 21,409		-$ 263,422	$ 926,775
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 9,777,744	$ 236,836		$ 10,014,580	-$ 2,386,788	-$ 364,369		-$ 2,751,157	$ 7,263,423
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 27,673,333	$ 396,281		$ 28,069,614	-$ 13,983,491	-$ 347,909		-$ 14,331,400	$ 13,738,214
47	1835	Overhead Conductors & Devices	$ 32,247,582	$ 700,100		$ 32,947,682	-$ 16,294,885	-$ 474,929		-$ 16,769,814	$ 16,177,868
47	1840	Underground Conduit	$ 25,645,937	$ 113,596		$ 25,759,533	-$ 12,959,037	-$ 176,381		-$ 13,135,418	$ 12,624,115
47	1845	Underground Conductors & Devices	$ 36,168,760	$ 734,917		$ 36,903,677	-$ 18,276,279	-$ 436,101		-$ 18,712,380	$ 18,191,297
47	1850	Line Transformers	$ 43,046,097	$ 968,835		$ 44,014,932	-$ 21,751,436	-$ 568,317		-$ 22,319,753	$ 21,695,179
47	1855	Services (Overhead & Underground)				$ -				$ -	$ -
47	1860	Meters	$ 847,732	$ 8,687,870	-$ 20,476	$ 9,515,126	-$ 246,945	-$ 1,533,876	$ 9,486	-$ 1,771,335	$ 7,743,791
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land	$ 213,797			$ 213,797				$ -	$ 213,797
47	1908	Buildings & Fixtures	$ 4,693,847	$ 493,500		$ 5,187,347	-$ 2,218,253	-$ 1,321,253		-$ 3,539,506	$ 1,647,841
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 565,368	$ 46,010		$ 611,378	-$ 485,579	-$ 16,482		-$ 502,061	$ 109,317
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 1,950,065	$ 473,274	-$ 38,887	$ 2,384,452	-$ 1,452,385	-$ 229,625	$ 38,418	-$ 1,643,592	$ 740,860
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 3,844,415	$ 123,836	-$ 100,972	$ 3,867,279	-$ 2,576,140	-$ 141,103	$ 100,972	-$ 2,616,271	$ 1,251,008
8	1935	Stores Equipment	$ 93,729			$ 93,729	-$ 93,729			-$ 93,729	$ -
8	1940	Tools, Shop & Garage Equipment	$ 1,023,853	$ 59,566		$ 1,083,419	-$ 595,436	-$ 66,778		-$ 662,214	$ 421,205
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 16,891,915	-$ 367,721		-$ 17,259,636	$ 4,456,583	$ 331,862		$ 4,788,445	-$ 12,471,191
	2005	Property under Capital Lease	$ 61,873			$ 61,873	-$ 61,873			-$ 61,873	$ -
WIP		Work in Process	$ 197,130	$ 3,601,772		$ 3,798,902				$ -	$ 3,798,902
	2070	Other Utility Plant - assets not in use	$ 619,296	-$ 590,602		$ 28,694				$ -	$ 28,694
		Sub-Total	**$ 176,338,016**	**$ 16,493,371**	**-$ 160,335**	**$192,671,052**	**-$ 90,948,461**	**-$ 5,787,301**	**$ 148,876**	**-$ 96,586,886**	**$ 96,084,166**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets *(input as negative)*				$ -				$ -	$ -
		Total PP&E	**$ 176,338,016**	**$ 16,493,371**	**-$ 160,335**	**$192,671,052**	**-$ 90,948,461**	**-$ 5,787,301**	**$ 148,876**	**-$ 96,586,886**	**$ 96,084,166**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*

Transportation	-$ 141,103
Stores Equipment	
Smart Meters	-$ 873,857
Add: Chevy Volt	$ 1,714
Net Depreciation	-$ 4,774,055

Notes:

1 Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2 The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

3 The table may need to be customized for a utility's asset categories or for any new asset accounts announced or authorized by the Board.

4 The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-5

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2013

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year 2013

CCA Class	OEB	Description	Cost: Opening Balance	Cost: Additions	Cost: Disposals	Cost: Closing Balance	Accumulated Depreciation: Opening Balance	Accumulated Depreciation: Additions	Accumulated Depreciation: Disposals	Accumulated Depreciation: Closing Balance	Net Book Value
12	1611	Computer Software (Formally known as Account 1925)	$ 3,217,340	$ 312,900		$ 3,530,240	-$ 1,487,191	-$ 512,400		-$ 1,999,591	$ 1,530,649
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 252,923			$ 252,923				$ -	$ 252,923
47	1808	Buildings	$ 1,190,197			$ 1,190,197	-$ 263,422	-$ 21,351		-$ 284,773	$ 905,424
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 10,014,580	$ 3,600		$ 10,018,180	-$ 2,751,157	-$ 365,399		-$ 3,116,556	$ 6,901,624
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 28,069,614	$ 4,436,401		$ 32,506,015	-$ 14,331,401	-$ 404,621		-$ 14,736,022	$ 17,769,993
47	1835	Overhead Conductors & Devices	$ 32,947,681	$ 5,166,199		$ 38,113,880	-$ 16,769,814	-$ 550,383		-$ 17,320,197	$ 20,793,683
47	1840	Underground Conduit	$ 25,759,534	$ 1,869,990		$ 27,629,524	-$ 13,135,418	-$ 188,599		-$ 13,324,017	$ 14,305,507
47	1845	Underground Conductors & Devices	$ 36,903,677	$ 2,636,010		$ 39,539,687	-$ 18,712,380	-$ 470,342		-$ 19,182,722	$ 20,356,965
47	1850	Line Transformers	$ 44,014,931	$ 2,147,400		$ 46,162,331	-$ 22,319,753	-$ 602,986		-$ 22,922,739	$ 23,239,592
47	1855	Services (Overhead & Underground)				$ -				$ -	$ -
47	1860	Meters	$ 9,515,126	$ 915,017		$ 10,430,143	-$ 1,771,335	-$ 667,073		-$ 2,438,408	$ 7,991,735
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land	$ 213,797			$ 213,797				$ -	$ 213,797
47	1908	Buildings & Fixtures	$ 5,187,347	$ 448,000		$ 5,635,347	-$ 3,539,507	-$ 142,804		-$ 3,682,311	$ 1,953,036
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 611,379	$ 187,301		$ 798,680	-$ 502,061	-$ 27,011		-$ 529,072	$ 269,608
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 2,384,452	$ 296,500		$ 2,680,952	-$ 1,643,593	-$ 339,547		-$ 1,983,140	$ 697,812
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 3,867,279	$ 587,785		$ 4,455,064	-$ 2,616,271	-$ 182,646		-$ 2,798,917	$ 1,656,147
8	1935	Stores Equipment	$ 93,729			$ 93,729	-$ 93,729			-$ 93,729	$ -
8	1940	Tools, Shop & Garage Equipment	$ 1,083,419	$ 116,650		$ 1,200,069	-$ 662,214	-$ 74,628		-$ 736,842	$ 463,227
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 17,259,636	-$ 3,041,000		-$ 20,300,636	$ 4,788,445	$ 368,521		$ 5,156,966	-$ 15,143,670
	2005	Property under Caoital Lease	$ 61,873			$ 61,873	-$ 61,873			-$ 61,873	$ -
WIP		Work in Process	$ 3,798,902			$ 3,798,902				$ -	$ 3,798,902
	2070	Other Utility Plant - assets not in use	$ 28,694			$ 28,694				$ -	$ 28,694
		Sub-Total	**$ 192,671,052**	**$ 16,082,753**	**$ -**	**$ 208,753,805**	**-$ 96,586,888**	**-$ 4,181,269**	**$ -**	**-$ 100,768,157**	**$ 107,985,648**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets *(input as negative)*				$ -				$ -	$ -
		Total PP&E	**$ 192,671,052**	**$ 16,082,753**	**$ -**	**$ 208,753,805**	**-$ 96,586,888**	**-$ 4,181,269**	**$ -**	**-$ 100,768,157**	**$ 107,985,648**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*

Transportation	-$ 182,646
Stores Equipment	
Net Depreciation	-$ 3,998,623

Notes:

1 Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2 The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

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4 The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-6

APPENDIX 2-BA FIXED ASSET CONTINUITY SCHEDULE – 2014

Appendix 2-BA
Fixed Asset Continuity Schedule - CGAAP/ASPE/USGAAP

Year **2014**

			Cost				**Accumulated Depreciation**				
CCA Class	**OEB**	**Description**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Opening Balance**	**Additions**	**Disposals**	**Closing Balance**	**Net Book Value**
12	1611	Computer Software (Formally known as Account 1925)	$ 3,530,240	$ 1,334,048		$ 4,864,288	-$ 1,999,591	-$ 677,095		-$ 2,676,686	$ 2,187,602
CEC	1612	Land Rights (Formally known as Account 1906)				$ -				$ -	$ -
N/A	1805	Land	$ 252,923			$ 252,923				$ -	$ 252,923
47	1808	Buildings	$ 1,190,197			$ 1,190,197	-$ 284,773	-$ 21,351		-$ 306,124	$ 884,073
13	1810	Leasehold Improvements				$ -				$ -	$ -
47	1815	Transformer Station Equipment >50 kV	$ 10,018,180			$ 10,018,180	-$ 3,116,556	-$ 365,445		-$ 3,482,001	$ 6,536,179
47	1820	Distribution Station Equipment <50 kV				$ -				$ -	$ -
47	1825	Storage Battery Equipment				$ -				$ -	$ -
47	1830	Poles, Towers & Fixtures	$ 32,506,015	$ 4,538,305		$ 37,044,320	-$ 14,736,022	-$ 511,463		-$ 15,247,485	$ 21,796,835
47	1835	Overhead Conductors & Devices	$ 38,113,880	$ 5,284,867		$ 43,398,747	-$ 17,320,197	-$ 695,537		-$ 18,015,734	$ 25,383,013
47	1840	Underground Conduit	$ 27,629,524	$ 1,831,237		$ 29,460,761	-$ 13,324,017	-$ 212,324		-$ 13,536,341	$ 15,924,420
47	1845	Underground Conductors & Devices	$ 39,539,687	$ 2,581,383		$ 42,121,070	-$ 19,182,722	-$ 533,968		-$ 19,716,690	$ 22,404,380
47	1850	Line Transformers	$ 46,162,331	$ 2,003,000		$ 48,165,331	-$ 22,922,739	-$ 651,246		-$ 23,573,985	$ 24,591,346
47	1855	Services (Overhead & Underground)				$ -				$ -	$ -
47	1860	Meters	$ 10,430,143	$ 966,643		$ 11,396,786	-$ 2,438,408	-$ 717,254		-$ 3,155,662	$ 8,241,124
47	1860	Meters (Smart Meters)				$ -				$ -	$ -
N/A	1905	Land	$ 213,797			$ 213,797				$ -	$ 213,797
47	1908	Buildings & Fixtures	$ 5,635,347	$ 55,000		$ 5,690,347	-$ 3,682,311	-$ 155,304		-$ 3,837,615	$ 1,852,732
13	1910	Leasehold Improvements				$ -				$ -	$ -
8	1915	Office Furniture & Equipment (10 years)	$ 798,680	$ 80,400		$ 879,080	-$ 529,072	-$ 40,396		-$ 569,468	$ 309,612
8	1915	Office Furniture & Equipment (5 years)				$ -				$ -	$ -
10	1920	Computer Equipment - Hardware	$ 2,680,952	$ 751,500		$ 3,432,452	-$ 1,983,140	-$ 514,213		-$ 2,497,353	$ 935,099
45	1920	Computer Equip.-Hardware(Post Mar. 22/04)				$ -				$ -	$ -
45.1	1920	Computer Equip.-Hardware(Post Mar. 19/07)				$ -				$ -	$ -
10	1930	Transportation Equipment	$ 4,455,064	$ 520,000		$ 4,975,064	-$ 2,798,917	-$ 233,631		-$ 3,032,548	$ 1,942,516
8	1935	Stores Equipment	$ 93,729			$ 93,729	-$ 93,729			-$ 93,729	$ -
8	1940	Tools, Shop & Garage Equipment	$ 1,200,069	$ 109,000		$ 1,309,069	-$ 736,842	-$ 85,910		-$ 822,752	$ 486,317
8	1945	Measurement & Testing Equipment				$ -				$ -	$ -
8	1950	Power Operated Equipment				$ -				$ -	$ -
8	1955	Communications Equipment				$ -				$ -	$ -
8	1955	Communication Equipment (Smart Meters)				$ -				$ -	$ -
8	1960	Miscellaneous Equipment				$ -				$ -	$ -
47	1970	Load Management Controls Customer Premises				$ -				$ -	$ -
47	1975	Load Management Controls Utility Premises				$ -				$ -	$ -
47	1980	System Supervisor Equipment	$ 714,214			$ 714,214	-$ 714,214			-$ 714,214	$ -
47	1985	Miscellaneous Fixed Assets				$ -				$ -	$ -
47	1990	Other Tangible Property				$ -				$ -	$ -
47	1995	Contributions & Grants	-$ 20,300,636	-$ 2,406,000		-$ 22,706,636	$ 5,156,966	$ 425,260		$ 5,582,226	-$ 17,124,410
	2005	Property under Capital Lease	$ 61,873			$ 61,873	-$ 61,873			-$ 61,873	$ -
		Work in Process	$ 3,798,902			$ 3,798,902				$ -	$ 3,798,902
	2070	Other Utility Plant - assets not in use	$ 28,694			$ 28,694				$ -	$ 28,694
		Sub-Total	**$ 208,753,805**	**$ 17,649,383**	**$ -**	**$ 226,403,188**	**-$ 100,768,157**	**-$ 4,989,877**	**$ -**	**-$ 105,758,034**	**$ 120,645,154**
		Less Socialized Renewable Energy Generation Investments (input as negative)				$ -				$ -	$ -
		Less Other Non Rate-Regulated Utility Assets (input as negative)				$ -				$ -	$ -
		Total PP&E	**$ 208,753,805**	**$ 17,649,383**	**$ -**	**$ 226,403,188**	**-$ 100,768,157**	**-$ 4,989,877**	**$ -**	**-$ 105,758,034**	**$ 120,645,154**

10		Transportation
8		Stores Equipment

Less: *Fully Allocated Depreciation*	
Transportation	-$ 233,631
Stores Equipment	
Net Depreciation	-$ 4,756,246

Notes:

1 Tables in the format outlined above covering all fixed asset accounts should be submitted for the Test Year, Bridge Year and all relevant historical years. At a minimum , the applicant must provide data for the earlier of: 1) all historical years back to its last rebasing; or 2) at least three years of historical actuals, in addition to Bridge Year and Test Year forecasts.

2 The "CCA Class" for fixed assets should agree with the CCA Class used for tax purposes in Tax Returns. Fixed Assets sub-components may be used where the underlying asset components are classified under multiple CCA Classes for tax purposes. If an applicant uses any different classes from those shown in the table, an explanation should be provided. (also see note 3 below).

3 The table may need to be customized for a utility's asset categories or for any new asset accounts announced or authorized by the Board.

4 The additions column (F) must not include construction work in progress (CWIP).

APPENDIX 2-7

APPENDIX 2-S STANDARD METER TREATMENT

Appendix 2-S
Stranded Meter Treatment

Year	Notes	Gross Asset Value	Accumulated Amortization	Contributed Capital (Net of Amortization)	Net Asset	Proceeds on Disposition	Residual Net Book Value
		(A)	(B)	(C)	(D) = (A) - (B) - (C)	(E)	(F) = (D) - (E)
2006					$ -		$ -
2007					$ -		$ -
2008					$ -		$ -
2009					$ -		$ -
2010		$ 8,286,380	$ 4,862,272		$ 3,424,108	$ 7,598	$ 3,416,510
2011		$ 8,286,380	$ 5,194,876		$ 3,091,504	$ 7,598	$ 3,083,906
2012		$ 8,286,380	$ 5,521,064		$ 2,765,316	$ 7,598	$ 2,757,718
2013	(1)	$ 8,286,380	$ 5,832,138		$ 2,454,242	$ 7,598	$ 2,446,644

Notes:

(1) *For 2013, please indicate whether the amounts provided are on a forecast or actual basis.*

Some distributors have transferred the cost of stranded meters from Account 1860 - Meters to "Sub-account Stranded Meter Costs of Account 1555", while in some cases distributors have left these costs in Account 1860. Depending on which treatment the applicant has chosen. please provide the information under either of the two scenarios (A and B below), as applicable.

Scenario A: *If the stranded meter costs were transferred to "Sub-account Stranded Meter Costs" of Account 1555, the above table should be completed and the following information should be provided in Exhibit 9.*

1 A description of the accounting treatment followed by the applicant on stranded meter costs for financial accounting and reporting purposes.

2 The amount of the pooled residual net book value of the removed from service stranded meters, less any contributed capital (net of accumulated amortization), and less any net proceeds from sales, which were transferred to this sub-account as of December 31, 2010.

3 A statement as to whether or not, since transferring the removed stranded meter costs to the sub-account, the recording of depreciation expenses was continued in order to reduce the net book value through accumulated depreciation. If so, the total depreciation expense amount for the period from the time the costs for the stranded meters were transferred to the sub-account to December 31, 2010 should be provided.

If no depreciation expenses were recorded to reduce the net book value of stranded meter costs through accumulated depreciation, the total depreciation expense amount that would have been applicable from the time that the stranded meter costs were transferred to the sub-account of Account 1555 to December 31, 2010 should be provided. In addition, the following information should be provided:

a) Whether or not carrying charges were recorded for the stranded meter cost balances in the sub-account, and if so, the total carrying charges recorded to December 31, 2010.

b) The estimated amount of the pooled residual net book value of the removed from service meters, less any net proceeds from sales and contributed capital, at the time when the smart meters will have been fully deployed (e.g., as of December 31, 2010). If the smart meters have been fully deployed, the actual amount should be provided.

c) A description as to how the applicant intends to recover in rates the remaining costs for stranded meters, including the proposed accounting treatment, the proposed disposition period, and the associated bill impacts.

Scenario B: *If the stranded meter costs remained recorded in Account 1860, the above table should be completed and the following information should be provided in Exhibit 9:*

1 A description of the accounting treatment followed by the applicant on stranded meter costs for financial accounting and reporting purposes.

2 The amount of the pooled residual net book value of the removed from service stranded meters, less any contributed capital (net of accumulated amortization), and less any net proceeds from sales, as of December 31, 2010.

3 A statement as to whether or not the recording of depreciation expenses continued in order to reduce the net book value through accumulated depreciation. If so, provision of the total (cumulative) depreciation expense for the period from the time that the meters became stranded to December 31, 2010.

4 If no depreciation expenses were recorded to reduce the net book value of stranded meters through accumulated depreciation, the total (cumulative) depreciation expense amount that would have been applicable for the period from the time that the meters became stranded to December 31, 2010.

5 The estimated amount of the pooled residual net book value of the removed from service meters, less any net proceeds from sales and contributed capital, at the time when smart meters will have been fully deployed. If the smart meters have been fully deployed, please provide the actual amount.

6 A description as to how the applicant intends to recover in rates the costs for stranded meters, including the proposed accounting treatment, the proposed disposition period and the associated bill impacts.

Distributors should also provide the Net Book Value per class of meter as of December 31, 2010 as well as the number of meters that were removed / stranded. In preparing this information, distributors should review the Board's letter of January 16, 2007 *Stranded Meter Costs Related to the Installation of Smart Meters* which stated that records were to be kept of the type and number of each meter to support the stranded meter costs.

APPENDIX 2-8A

APPENDIX 2-AB DISTRIBUTION SYSTEM PLAN

Cambridge and North Dumfries Hydro Inc.

Distribution System Plan

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Executive Summary

This Distribution System Plan has been prepared by AESI on behalf of Cambridge and North Dumfries Hydro Inc. (CND) in accordance with Chapter 5 of the Ontario Energy Board's Filing Requirements for Electricity Transmission Distribution Applications, Consolidated Distribution System Plan Filing Requirements dated March 28 ("Chapter 5").

CND's Distribution System Plan (DSP) is designed to present CND's fully integrated approach to capital expenditure planning. This includes a comprehensive documentation of its asset management process that supports its future 5 year capital expenditure plan while detailing the history of its past 5 years' activities. It recognizes CND's responsibilities to provide its customers with reliable service that is acknowledged as excellent value for money, by ensuring that its asset management activities maintain a focus on customers, operational effectiveness, public policy responsiveness and financial performance.

CND's DSP builds on the Asset Management Strategy that formed part of CND's 2010 Cost of Service Rate Rebasing Application (EB-2009-0260) and will continue to evolve over time. CND's main objective with respect to managing its distribution system assets continues to be to optimize performance of the assets at a reasonable cost with due regard for system reliability, public and worker safety, and customer service requirements.

CND is the local distribution company that is responsible for the distribution of electricity to the City of Cambridge and the Township of North Dumfries. It has an area of 306 square kilometers.

CND has prepared an analysis of its capability to accommodate renewable generation facilities. It does not indicate a requirement for any significant capital expenditures for the proposed connections.

System reliability is monitored and recorded by CND. The reliability indexes for the past four years since the last filing are listed in Table 1 and Table 2 below.

Table 1

RELIABILITY VALUES 2009-2012 All Interruptions				
Year	**2009**	**2010**	**2011**	**2012**
CAIDI	0.53	1.14	0.52	0.72
SAIDI	0.52	0.97	0.74	1.07
SAIFI	0.98	0.85	1.41	1.49

Table 2

Reliability Values 2009-2012 Excluding Loss of Supply				
Year	**2009**	**2010**	**2011**	**2012**
CAIDI	0.53	1.14	0.53	0.70
SAIDI	0.51	0.97	0.70	1.00
SAIFI	0.97	0.85	1.3	1.43

CND has set reliability targets:

- SAIDI = 0.8 hours,
- SAIFI = 1.1
- CAIDI = 0.70 hours

These targets will be calculated annually on a five year rolling average basis and exclude loss of supply and exclude exceptional events such as tornados, hurricanes and ice storms. These targets are preliminary and will be reviewed in future and may be adjusted.

CND has pursued the best practices of the electricity distribution industry for many years. This has included adhering to the OEB's Distribution System Code that sets out both good utility practices, minimum performance standards for electricity distribution systems in Ontario, and minimum inspection requirements for distribution equipment. Consistent with best practices, over the years CND has diligently maintained its equipment in safe and reliable working order and, only when economically justified, upgraded or replaced its equipment. The diligent maintenance of its equipment has permitted CND to, in some circumstances, extract an extended useful working life from certain assets. Historically, this has been achieved with only a moderate increase in the customers' bills. CND has been careful when incurring costs since in the past customer satisfaction survey results all customers have indicated that the low price of electricity is an important factor to them.

By carefully controlling all expenditures and therefore moderating any increases in its customers' bills, the distribution system has evolved into an array of equipment of different vintages spanning a number of technological eras. Funds were not spent on replacing functioning equipment in order to simply have more modern technologies in place.

In developing the long-term DSP, CND's objective is to ensure that the future distribution system is designed to deliver power at the quality and reliability levels required by customers and to minimize the lifetime cost by balancing preventative maintenance, life-extending refurbishment, and end-of life replacement. In short, the system will meet the customers' needs for quality and reliability of power at the minimal cost to customers.

CND considers performance-related asset information including, but not limited to, data on reliability, asset age and condition, loading, customer connection requirements, and system configuration, to determine investment needs of the distribution system.

The following are the guiding principles that have been used to determine CND's capital expenditure program for the 2014 Test Year, as well as shape CND's capital expenditures plans over the next 5-10 years:

- Priority will be given to CND's legislated and/or mandatory requirements, including:
    i. System access including the obligation to connect customers - Residential, Commercial and Industrial. This includes intensification of the downtown core consistent with the Provincial government's long-term "Places to Grow" infrastructure plan (The "Plan"). The Plan recognizes Cambridge as one of the 25 urban growth centers in the Greater Golden Horseshoe.
    ii. Accommodate City, Region, Township and Ministry of Transportation, mandatory project requirements.
    iii. Embrace the requirements of the Green Energy Act for the accommodation of renewable generation, integration of the smart grid, and the CDM conditions of license, in order to fully support public policy directives.

iv. Meet the performance standards of the OEB and other regulatory bodies, including: quality, reliability, health, safety, environmental performance standards. Generally, funds will be spent to maintain current reliability levels. Where a higher level of reliability is required, the additional cost will be allocated to specific customers or customer class by the appropriate regulatory mechanism.

- In order to safeguard the major investments already made in its key assets, continue to maintain and upgrade as necessary, the Control Center and related system automation equipment (e.g. GIS, SCADA systems, etc.). Similarly, to ensure public safety and system security, maintain and refurbish the Transformer Station as required.
- Continue to leverage the GIS system and functionality and build on the data base in order to harvest operational efficiency improvements. These improvements include the preparation of electronic documentation in support of the asset management system, and leveraging the investment in Smart Meters to improve outage management.
- Continue to invest prudently in modern information systems technology in order to meet customer expectations, particularly in the area of improved communication, and access to information to assist them in understanding their electricity bills and managing their electricity usage.
- Optimal life extension of assets, including:
  - Intensify condition monitoring to minimize uncertainty regarding decisions relating to equipment maintenance, renewal and replacement.
  - Where economically viable, refurbish distribution equipment in-situ to extend their reliable working lives.
- Leverage the supply capacity available from the Transformer Stations by installing additional feeders as required.
- Where the optimal life of an asset has already been reached, and to the extent that funding is available, undertake an accelerated replacement of the over-aged items (e.g. CND's wood poles and circuits).
- Prudently acquire smart grid equipment where there will be direct, quantifiable economic and/or efficiency benefits derived.
- Continue with the cost effective replacement of service vehicles to ensure the utility has a reliable fleet to execute on its maintenance and capital expenditure programs, as well as respond to system outages in a timely manner.
- Acknowledge that some desirable changes are realistically not affordable.
- Install new 27.6 kV feeders when additional feeders are required.

Various elements and other activities that factor into the development of CND's capital expenditure plans include:

i. Customer engagement and consultative initiatives.

ii. Consultation with various third parties regarding new development, including customers, building developers, municipalities, Ministry of Transportation, and other parties. CND participates in various local committees including the Utility Co-ordinating Committee, Municipal Site Plan Committee, and Municipal Subdivision Committee.

iii. Regional Planning, and in particular, participation in the Kitchener-Waterloo-Cambridge-Guelph ("KWCG") Working Group that was established to develop a regional plan to address electricity supply and reliability in the KWCG area.

iv. Elimination of environmental, health or safety risks.

v. System reliability and performance measures.

vi. Financial performance metrics.

vii. Financial and/or resource constraints identified as part of the preparation of annual budgets, work plans, and five year forecasts.

CND believes that these guiding principles, combined with these other elements and activities undertaken by CND in developing its capital expenditure program, are aligned and consistent with the Customer Focus, Operational Effectiveness, Public Policy Responsiveness, and Financial Performance outcomes of the Renewed Regulatory Framework.

The annual budget and five year forecast process is an important part of the overall management of the capital expenditure program at CND. The annual budget is prepared by Management and is reviewed and approved by CND's Board of Directors prior to the start of the fiscal year.

Table 3 below provides a summary of historical capital expenditures for the years 2009 through 2012, projections for the 2013 Bridge Year and 2014 Test Year, as well as projections for the period 2015 through 2018.

Table 3 Capital Expenditure Summary 2009 through 2018

	Historical (Actual)				Forecast (Planned)					
	Test-5 2009	Test-4 2010	Test-3 2011	Test-2 2012	Test -1 2013	Test 2014	Test +1 2015	Test +2 2016	Test +3 2017	Test +4 2018
	Actual	Actual	Actual	Actual	Forecast	Plan	Plan	Plan	Plan	Plan
Category	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000	$'000
System Access	3,966	4,152	3,140	3,032	8,411	8,123	6,857	4,143	4,020	3,496
System Renewal	5,240	6,262	3,999	2,886	7,089	7,140	7,380	4,033	3,766	3,554
System Service	54	425	716	835	760	975	342	342	342	16,842
General Plant	1,257	1,436	2,187	10,108	2,864	3,817	2,169	2,135	2,270	2,060
Capital Contributions	(2,326)	(1,804)	(1,342)	(368)	(3,041)	(2,406)	(3,800)	(2,100)	(2,000)	(1,800)
Change in WIP	(118)	(576)	(338)	(3,011)						
Total	8,073	9,895	8,362	13,482	16,083	17,649	12,948	8,553	8,398	24,152
System O&M	3,376	3,448	3,769	5,428	4,665	5,343	5,240	5,036	4,929	4,820

CND's capital expenditures, including work in progress, are projected to be $16.1MM in the 2013 Bridge Year and $17.6MM in the 2014 Test Year. This compares to historical levels of between $8MM - $10MM, excluding Smart Meters, in 2009 through 2012. 2012 Actual capital expenditures of $16.5MM included approximately $8MM in Smart Meter investments transferred from the Smart Meter Capital variance account (1555) to capital asset account 1860 as a result of the Ontario Energy Board's Decision on CND's Smart Meter Application (EB-2012-0086).

As part of the development of the DSP, CND has categorized its historical and 2013 Bridge Year and 2014 Test Year capital expenditures into four investment categories:

1. System Access Investments – modifications, including asset relocations, to a distributor's distribution system that a distributor is obligated to perform to provide a customer or group of customers with access to electricity services via the distribution system;
2. System Renewal Investments – replacing and/or refurbishing system assets to extend the original service life of the assets and thereby maintain the ability of the distributor's distribution system to provide customers with electricity services;
3. System Service Investments – modifications to a distributor's distribution system to ensure the distribution system continues to meet a distributor's operational objectives while addressing anticipated future customer service requirements;
4. General Plant Investments – modifications, replacements, or additions to a distributor's assets that are not part of the distribution system, including land and buildings, tools and equipment, rolling stock, and electronic devices and software used to support day

to day business and operations activities. For purposes of the DSP, CND has included its investments in Smart Meters as part of General Plant.

Chart 1 below illustrates the percentage of the cumulative gross capital expenditures incurred by CND for the period 2009 through 2012 in each of these investment categories.

Chart 1 Cumulative Gross Capital Expenditures by Investment Category 2009 to 2012

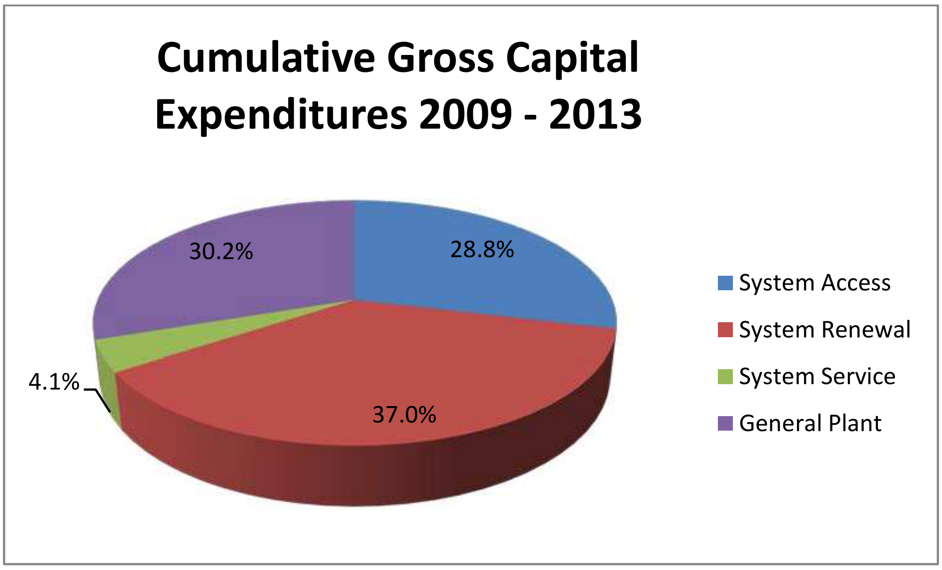


Chart 2 illustrates the 2014 Test Year gross capital expenditure percentages by investment category.

Chart 2 2014 Test Year Gross Capital Expenditures by Investment Category

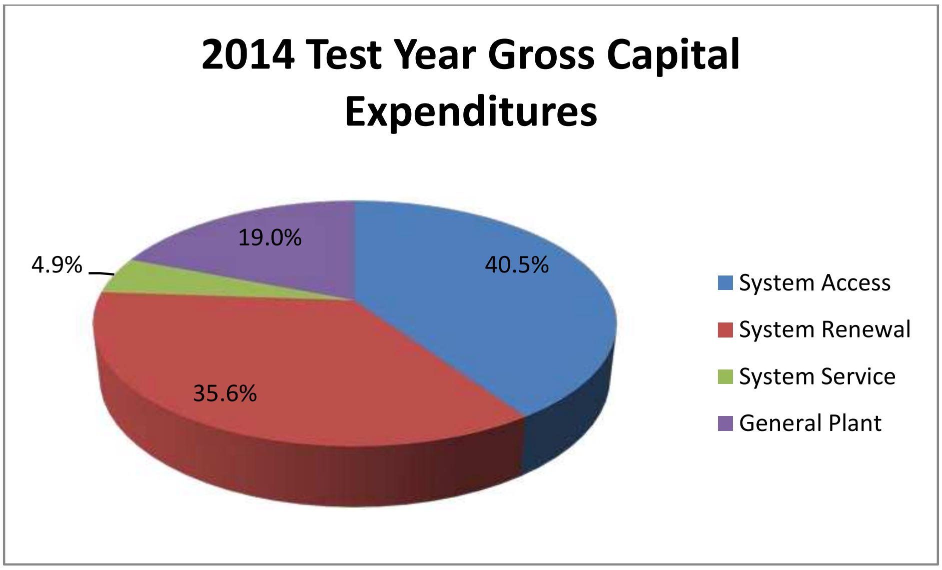
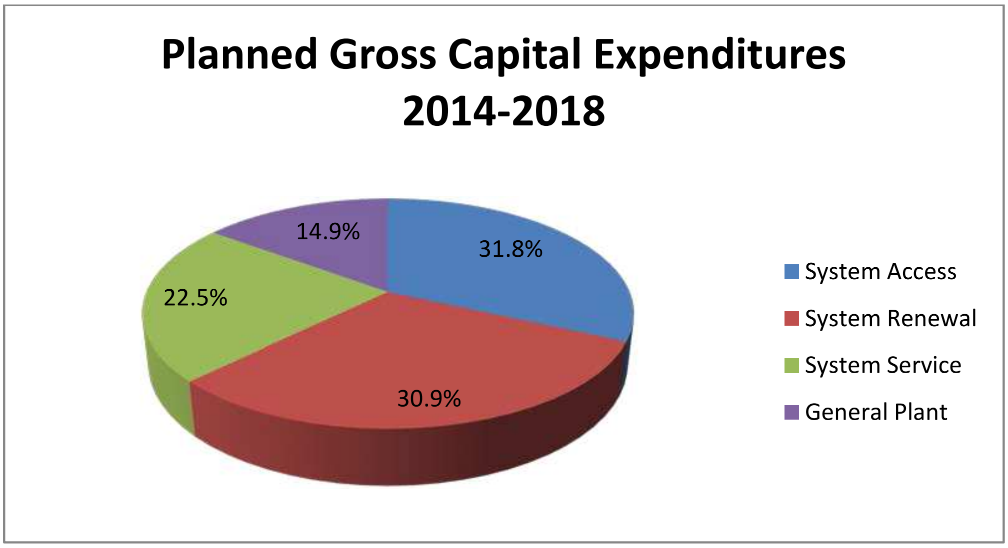


Chart 3 2014-2018 Gross Capital Expenditures by Investment Category



Note: System Service includes $16.5MM investment in new Transformer Station based on estimated growth.

CND has entered into a phase of renewal capital growth. 37% of the total gross investments over the period 2009 through 2013 were with respect to renewal capital projects; becoming 35.6% in the 2014 Test Year. Gross capital expenditures on renewal investments are estimated at approximately $25.8MM, or 30.9% during the five year forecast period 2014 to 2018 (Chart 3). The renewal investments are expected to be approximately $7MM per year over the period 2013 through 2015, reducing to levels of $3MM to $4MM in the period 2015 through 2018.

The increase in System Renewal capital projects for the 2014 Test Year is driven principally by the following capital projects, which are highlighted below:

- Rebuild of approximately $2.7MM in underground distribution system plant, of which the majority of the projects involve direct buried cable installed in the 1970's, and have a mixture of mini-pad and submersible transformers. CND has been experiencing an increasing number of failures in the areas identified for rebuild.
- Replacement of various overhead distribution system plant, principally as a result of ageing poles and related infrastructure that was initially installed to 8.32kV design standards. The existing poles have reached their end of useful life and CND has been experiencing increased power interruptions in the areas identified for replacement. Two of the rebuild projects planned for 2014, Greenfield Road and Shellard Road, represent an investment of approximately $2.9MM.

System Access projects are driven by various external parties including current and future customers, developers, regional and municipal governments, and road authorities. Approximately 28.8% of the total gross investments over the period 2009 through 2013 were with respect to System Access capital projects; becoming 40.5% in the 2014 Test Year. Gross capital expenditures on System Access investments are estimated at approximately $26.6MM, or 31.8% during the five year forecast period 2014 to 2018 (Chart 3). The System Access investments are expected to be approximately $8.4MM in 2013, $8.1MM in 2014, and reducing to $6.9MM in 2015 and reducing to levels of $3.5MM to $4.0MM in the period 2016 through 2018.

The increase in System Access capital projects for the 2014 Test Year is driven principally by the following capital projects:

- Relocation of overhead triple circuit and double circuit 27.6kV lines to accommodate new roundabouts on Franklin Boulevard in Cambridge. The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period. Hydro relocations are required in 2014 and 2015. The gross investment is approximately $6MM over two years, with $2.8MM estimated in 2014.

- Rebuild of an existing single circuit 27.6kV line to a double circuit 27.6kV line, which is required to connect a new residential subdivision and a new industrial subdivision. There is currently insufficient capacity on the present feeder to accommodate the new growth. This rebuild will also address reliability issues with some existing customers. This project represents a gross investment of approximately $0.9MM.
- Various other projects including servicing residential and industrial subdivisions, and other relocations attributable to road projects, represent the balance of the System Access capital expenditure investments.

General Plant capital investments have historically ranged between $1MM to $2MM. Investment levels increased in 2011 and 2012, principally as a result of the investment in Smart Meters, as well as necessary information system technology upgrades including a new CIS/Billing System and ERP Software solutions. General plant investments are projected to be $2.9MM for the 2013 Bridge Year and $3.8MM in the 2014 Test Year. The principle driver of the increase in General Plant is to continue to enhance the information systems technology infrastructure at CND.

In 2014, CND will invest approximately $2.1MM in information systems technology investments required to meet customer expectations, improve operating efficiencies, and to mitigate risks associated with disaster recovery and business continuity planning.

As part of its Strategic Planning process undertaken by CND in the fall of 2012, CND identified three areas of risk within the Information Technology Services ("ITS") area:

1. Inadequate Resources – critical gaps in IT;
2. Lack of integrated IT Systems; and
3. Low capacity for innovation.

As a result, CND undertook a number of initiatives in 2013 to reduce these risks including:

- Hiring of additional resources;
- Development of an IT Strategy to ensure that the ITS team is focused on activities that are aligned to CND's strategy and business requirements ; and
- Development of tactical plans to leverage new and existing information systems technology through integration.

Incorporated within the IT Strategy, and the IT tactical plans are the following information system technology investments required in 2014:

- Business Continuity Planning (BCP) / Disaster Recovery Planning (DRP)
- Distribution Management System (DMS)
- Outage Management System (OMS)
- Interactive Voice Response (IVR) solution
- Storage Area Network Upgrade
- Electronic Document Management (EDM)

The DMS, OMS and IVR capital investments are interrelated projects. These three solutions are the key requirements for the delivery of an Outage Management solution for CND that will ensure that CND is meeting customer expectations.

System Service capital investments are primarily driven by distribution technology to ensure that CND meets operational objectives and a future Transformer Station to address anticipated future customer electricity service requirements.

Approximately 4.1% of the total gross investments over the period 2009 through 2013 were with respect to System Service capital projects. Approximately 4.9% of the total gross investments in the 2014 Test Year will be System Service capital projects. Gross capital expenditures on System Service investments are estimated at approximately $18.8MM, or 22.5% during the five year forecast period 2014 to 2018 (Chart 3). The System Service investments are expected to be approximately $0.8MM in 2013, $1.0MM in 2014, $0.3MM in years 2015 through 2017 and increasing to $16.8MM in 2018.

In 1990, CND began to install remote operated switches to provide the capability to rapidly restore large parts of a locked out feeder. This is essential to maintaining reliability indexes at the higher 27.6 kV distribution system. CND has a target to install 3.5 switches per feeder for the 29 feeders that supply the service area and has steadily been progressing toward this goal. CND plans to install 5 switches per year, for each year of the 5 year plan, in order to reach this level. Once this level is reached, the program will be complete and switches will only be installed beyond this time period as a fine tuning effort—anticipated to be no more than one switch per year and only if required.

In order to ensure the proper working of all the switches installed, CND will replace old obsolete radio controllers that are at end of life in 2013 and 2014.

Also in the rural area of North Dumfries, CND will install single-phase reclosers, replacing fuses, so that transient faults on the mainly rural area can be restored quickly.

These initiatives are in support of providing customer value and reliability.

CND plans to construct a new Transformer Station within its service area in 2018 which it plans to own. The current rate application does not include this project for approval. A separate application will be presented specifically for this project as the need is solidified by actual load increases. This project complete with the construction of new 27.6kV feeders is expected to cost $16.5 million and is the main component of System Service projects over the time period of 2014 to 2018.

1. (5.2) Distribution System Plan

This Distribution System Plan follows the chapter and section headings set out in Chapter 5.. Although the section numbering in this Distribution System Plan does not match the Chapter 5 reference numbers, the Chapter 5 reference numbers are included in each of the heading titles in brackets. The report follows the headings in the sequence required in Chapter 5. The information in this report was provided by CND to AESI for the purpose of preparing this report.

1.1. Utility Overview

CND is the local distribution company that is responsible for the distribution of electricity to the City of Cambridge and the Township of North Dumfries. It has an area of 306 square kilometers. CND also has a small number of customers located in the Counties of Brant and Oxford, as well as the City of Hamilton.

CND is incorporated under the Ontario Business Corporations Act and is 100% owned by Cambridge and North Dumfries Energy Plus Inc. ("Energy Plus"). Energy Plus is a holding company that is owned 92.1% by The Corporation of the City of Cambridge ("City of Cambridge") and 7.9% by The Corporation of the Township of North Dumfries ("Township of North Dumfries").

CND receives power from Hydro One Networks Inc. ("Hydro One") and delivers power to its customers via four high voltage transformer stations, one of which is owned by CND and the others are owned by Hydro One. Revenue is earned by CND by delivering electric power to the homes and businesses in the service territory. The rates charged for this and the performance standards that the energy delivery system must meet are regulated by the Ontario Energy Board.

This Distribution System Plan documents the Asset Management Plan and the Capital Expenditure Plan that CND has completed in the past 4 years, the CND capital plans for 2013 and the proposed activities for 2014, the Test Year and the CND plans for the 4 years after the

Test Year. The current date for all the information provided is September 15, 2013, except where noted otherwise. This report reflects the costs incurred and the practices in place as of this date. The financial data incorporates the financial results of CND for the year ended December 31, 2012.

For the purposes of this Distribution System Plan, 2009 to 2012 are the previous 4 years, 2013 is the current year, 2014 is the Test Year and the forecast is for 2015 to 2018.

A summary of the type and number of assets, as well as the age distribution, is provided. The maintenance costs per year are documented based on the account structure used by CND. The process CND uses to assess the condition of its assets and the follow-up is also documented in this report.

The Capital Expenditure Forecast for the 2013 to 2018 time period is included in the Capital section of this report (Section 3.5.2). The Historical Capital Budget and Actual Expenditure information for the 2009 to 2012 time period is found in Appendix A.

Also included in the Capital section is an analysis of the renewable generation provisions and enabling costs.

CND gathers relevant information about the assets and uses the judgment and experience of its staff to interpret this information to develop appropriate cost effective programs that deliver reliable service to its customers at a reasonable cost.

1.2. (5.2.1) Distribution System Plan Overview

Key elements of the DS Plan that affect its rates proposal, especially prospective business conditions driving the size and mix of capital investments needed to achieve planning objectives.

- CND has a number of non-discretionary projects that it will need to complete. This includes relocations for road authorities eg. Franklin Blvd Roundabouts as well as providing supply to new subdivision developments. Customer driven projects represent a significant portion of CND's proposed investments over the next five years. Customer driven projects are very sensitive to economic state. This means that information about new subdivisions and new customer connections can change rapidly as the economy changes. CND is using the best information it has available to forecast the activity levels and the subsequent investments it anticipates to be incurred.

- Programs by road and other authorities are also subject to the economy—to a degree, but also subject to the priorities expressed by the electorate and the state of the financial constraints of the authorities.

- CND needs to address its aging and failing overhead and underground plant through a renewal (replacement) program. CND plans to continue to do this but it is a long term plan that will require a significant annual commitment.

- CND requires a significant investment in system renewal over the next five years. This renewal allows maintenance costs in the rebuilt areas to remain the same or drop slightly, since the plant that was in the early stages of failure is being replaced. Without this action, it is expected that maintenance costs—primarily responding to and replacing failed equipment—will increase substantially and that reliability, and hence the customer experience, will suffer.

- Based on forecasted load growth, CND plans to build a new Transformer Station in 2018. This will be the subject of a future application. Proceeding with the new Transformer Station will be contingent on the economy and the load growth that is forecast materializing as anticipated. CND has prepared a “Residential and Industrial Development Report”. This document provides the basis for CND’s plans related to new load and is included as Appendix J.

- CND has included General Plant Capital projects. These include an Outage Management System, a Distribution Management System and an Interactive Voice Response System to provide improved customer service and support the control center operations; Business Disaster Recovery System to reduce risk; Document Management System for the support of the management of key data the utility uses and keeps; enhancements to the corporate Geographic Information System which supports the Engineering, Operations and System Control functions and the replacement of a bucket truck which is at end of life.

The sources of cost savings expected to be achieved over the forecast period through good planning and DS Plan execution

- CND is taking steps to improve its budget to actual performance by advancing the preparation of detailed designs and design estimates before final budget approval. This will reduce the variance from the approved budget and improve the construction completion performance within the fiscal year.

- By renewing old and failing plant it is expected that fewer poles will need to be replaced on a reactive maintenance basis. This will reduce the costs since these are usually replaced one at a time and at overtime rates rather than many adjacent locations replaced in a project context. Because the amount of old plant and the relatively modest rate CND is proposing to renew the plant immediate savings will be low but as the program proceeds the benefits will become apparent. Similarly the replacement of old failing underground plant will show long term benefits by reducing the amount of reactive maintenance over the longer term as the old plant is replaced.

The period covered by the DS Plan (historical and forecast years);

- For the purposes of this Distribution System Plan, 2009 to 2012 are the previous 4 historical years, 2013 is the current year, 2014 is the Test Year and the forecast is for 2015 to 2018.

An indication of the vintage of the information on investment 'drivers' used to justify investments identified in the application (i.e. the information should be considered "current" as of what date?)

- The material presented is current as of September 15, 2013 unless otherwise noted in the report.

Where applicable, an indication of important changes to the distributor's asset management process (e.g. enhanced asset data quality or scope; improved analytic tools; process refinements; etc.) since the last DS Plan filing;

No previous DS plan has been filed.

Aspects of the DS Plan that relate to or are contingent upon the outcome of ongoing activities or future events, the nature of the activity (e.g. Regional Planning Process) or event (Board decision on LTLT) and the expected dates by which such outcomes are expected or will be known.]

CND's DS Plan, with the exception of the new Transformer Station, is not contingent on future outcomes or events. The new Transformer Station will be contingent on OEB approval and Hydro One construction work being completed to allow connection of the new Transformer Station in 2018 to the 115 kV system. OEB approval for the Hydro One work is expected in 2013. The Hydro One in service date is expected to be the end of 2015.

1.3.(5.2.2) Coordinated Planning With Third Parties

KWCG Regional Planning

In 2010, the Kitchener-Waterloo-Cambridge-Guelph (KWCG) area working group was established to develop a regional plan to address electricity supply and reliability needs in the KWCG area. The working group consists of members from the Ontario Power Authority (OPA), the Independent Electricity System Operator (IESO), Hydro One, Kitchener-Wilmot Hydro, Waterloo North Hydro, Guelph Hydro, and CND. CND and other utilities expressed the need for a regional plan and were members of the working group which was initiated by the OPA.

CND actively participates in the working group.

A working draft plan has been compiled by the KWCG working group, but as of the date of this application the plan had not yet been issued.

Some elements of the plan have been acted on by Hydro One as noted in the following paragraph.

Reinforcements are planned on the local 115 kV transmission system. It is already heavily loaded. These proposed improvements are identified in Hydro One's Section 92 Application to the Ontario Energy Board filed on March 11, 2013 (OEB File Number EB-2013-0053). This application details the Guelph Area Transmission Reinforcement Project (GATR). This project proposes to upgrade an existing 115 kV line in Guelph to 230 kV to supply new 230kV -115 kV autotransformers at Cedar TS in Guelph. It also proposes to add a new switching station North of Guelph and a second 230-115 kV autotransformer at Preston TS in Cambridge. The GATR project, if approved, would improve the supply and reliability for customers of CND.

Reliability is as important as supply. Many customers locally will still recall the evening of January 31, 2003 when the whole City of Cambridge and parts of the Township of North Dumfries were without power for four and a half hours when both incoming 230 kV circuits were lost due to salt contamination at Preston TS. A radial - double circuit - 230 kV tap, entering Cambridge from the South, supplies over 97% of CND's peak demand. This situation is a continuing vulnerability. The Independent Electricity System Operator (IESO) made the following comments in "The Ontario Reliability Outlook" published in February, 2013.

> *In the Guelph area, the existing 115 kV transmission facilities are operating close to capacity and have limited margin to accommodate additional load. To improve the transmission capability into the Guelph area, Hydro One will be proceeding with the Guelph Area Transmission Refurbishment project to reinforce the supply into Guelph-Cedar TS, with an expected completion date December 2015. Additionally, a second 230/115 kV autotransformer is expected to be installed at Preston TS in order to help improve the capability of existing transmission infrastructure in the Cambridge area to meet the IESO's load restoration criteria following a contingency. Longer-term solutions to fully address compliance with restoration criteria are being developed.*

Hydro One has improved the local transmission supply in recent years. Two 230 kV motorized, remotely operated disconnect switches were installed at Preston TS in 2011. This allows power to be drawn from the 115 kV transmission system and supplied into the 230 kV -27.6 kV transformers at Preston TS in the event of the loss of both incoming 230 kV circuits from the South. The amount that could be drawn is dependent upon loading at the time on the 115 kV system, but it is an improvement from the past situation.

Hydro One replaced the two defective 230 kV -27.6 kV transformers at Galt TS that had restricted the supply capacity and resulted in abnormal distribution system circuit configuration starting in July, 2008. The first transformer at Galt TS was replaced in the spring of 2010. The second transformer at Galt TS was replaced in the spring of 2012. The end result is an increase in available transformer station capacity at Galt TS and a more reliable supply.

A new transformer station will be required sometime in the future. CND has planned for a new station (MTS#2) in 2018, but the timing greatly depends upon the strength of the economic recovery from the 2008 downturn.

The likely location for a new transformer station is North of Highway 401 in proximity to the planned industrial growth. As a result of the 115 kV capacity created by the Guelph Area Transmission Reinforcement project, MTS#2 will likely be connected to the 115 kV system.

The timing of a new transformer station will also be affected by the amount of local renewable generation that is installed and the effect of the CDM program. Local generation and the CDM program will reduce the peak load seen at area transformer stations.

The consultations have been effective in securing a more reliable supply for CND and providing additional capacity at one Hydro One Transformer Station. It also identified the need for a new transformer station north of Highway 401. This Distribution System Plan takes these factors into account and no changes are expected to this plan as a result of the consultations.

Customer Consultations

CND keeps in contact with its customers generally, and with large users particularly, through meetings and discussions that arise usually in the context of new loads anticipated, opportunities for improvement of performance or events that have occurred that affected these users. Large users electrical requirements can have significant impacts on the capacity CND needs to provide.

CND conducts customer satisfaction surveys on a regular basis. Surveys were conducted in 2012 for the residential customers and in 2013 for the first time for the business customers with load greater than 50 kW. Both surveys show that the customers are very satisfied with CND and the service they provide. In addition the satisfaction levels in the latest residential survey shows an increase in the level of satisfaction from the previous survey. While there are areas where CND can improve this result shows that CND has addressed improvement needs from previous surveys. CND takes the results of the surveys and reviews them in the context of power system events that have occurred and economic impacts to make adjustments to its corporate programs and strategies. CND is committed to continuing this process of improvement by listening to its customers and acting on their input. Copies of the customer surveys are included in Exhibit 1. The Residential survey is in Appendix 1-1A and the Large Customers survey is in Appendix 1-1B of CND's 2014 Cost of Service Application.

CND has taken the customer input into account in developing its Distribution System Plan and does not expect any further effect on its plan as filed.

Other Consultations

CND also coordinates regularly with other authorities such as the City of Cambridge, the Township of North Dumfries, the Region of Waterloo and the Ministry of Transportation of Ontario (MTO).

Many years ago the City of Cambridge initiated a Utilities Coordinating Committee (UCC) to help manage its responsibility to regulate the locations and activities related to all plant located on public right-of-ways. The City invites all parties that have plant located on the public right-of-way. The members are:

- The electrical utility - CND
- The communication utilities eg. Bell Canada, cable TV etc.
- The Gas utility
- The water utility –City of Cambridge
- The sewer utility – City of Cambridge
- The various road authorities eg. The City and the Region.

In addition to coordinating the location of plant of the public right-of-way the committee members also share their work programs and coordinate the timing of the work. This is one of the ways CND becomes aware of other work being planned that may affect its plant.This work is generally in the System Access category.

UCC meetings typically occur once per month. More meetings are possible depending on the issues being addressed.

CND's Distribution System Plan incorporates all the known impacts from projects of which it has been made aware. If new plans are brought forward by others that affect CND's plant in a significant way CND may need to alter this plan to accommodate the non-discretionary project. This is likely to happen, based on past experience. There are frequent changes to municipal projects and the timing of the projects.

The City of Cambridge also holds meetings related to new development. These include Site Plan Meetings which occur every three weeks and Subdivision Coordinating Committee meetings which occur monthly. CND also participates in these meetings and receives insight into the new customer demands that need to be addressed.

The Township of North Dumfries has Site Plan meetings that CND attends. These meetings are scheduled as needed.

OPA Renewable Energy Generation

CND has provided a copy of the material in section 3.3 on the capacity of the system to connect renewable generation to the OPA. The comments received from the OPA are included in Appendix H.

Hydro One Letter KWCG Regional Study

Hydro One has provided a status up date of Regional Planning study and noted CND's participation in the working group. See Appendix R for a copy of the letter.

1.4. (5.2.3) Performance Measurement for Continuous Improvement

Customer Oriented Performance

CND has set a target for consumer bill impact at less than a 10% increase, in line with the OEB's mitigation threshold. The total costs of operating the utility are managed so that this target is met.

CND has set reliability targets:

- SAIDI = 0.8 hours,
- SAIFI = 1.1
- CAIDI = 0.70 hours

These targets will be calculated annually on a five year rolling average basis and exclude loss of supply and exclude exceptional events such as tornados, hurricanes and ice storms. These targets are preliminary and will be reviewed in future and may be adjusted.

CND's power quality target is stated in its Conditions of Service -*the power quality of CND's supply voltage at the Customer's main switch will meet the limits set out in the latest edition of the Canadian Standards Association CAN3-235 "Preferred Voltage Levels for AC Systems 0 to 50,000V".*

Cost Efficiency and Effectiveness With Respect to Planning Quality and DS Plan Implementation

CND, in the development of its Capital Program, has typically developed a budgetary estimate for the work proposed and then after the approval by CND's Board of Directors has proceeded to detailed design. This has resulted in both positive and negative financial variances as the projects were either simpler or more complex than originally considered at budget time once the detailed design was completed. CND will be changing this approach and begin preparing detailed designs prior to the 2015 final budget approval to improve the budget to actual performance. Some variation due to competitive contractor pricing will still occur. Variation in the non- discretionary portion of the Capital Plan, due to the timing changes by other parties, is not avoidable. Again where time permits detailed project design estimates will be completed prior to the inclusion of these projects in the final approved budget.

CND creates a timeline or schedule for approved projects to ensure all the work planned to be completed in a fiscal year is completed. The change to the design process indicated above will also improve CND's ability to complete all work within the year in which it is budgeted. By having the designs completed when the budget is approved this is not a factor in scheduling the work. CND monitors the projects regularly to ensure they are on budget and on schedule both at an operational level and at a management level. It is this monitoring process that precipitated the changes to the budgeting approach indicated above.

Asset and/or System Operations Performance.

CND uses the CAIDI, SAIDI and SAIFI reliability indexes to gauge the system reliability performance and maintain a tight control over its Capital and Maintenance spending. CND prepares the system reliability indexes using the definitions included in Appendix F. Because these definitions reflect total system reliability CND uses the Customer Oriented reliability targets listed above as inputs to develop its Capital and Maintenance programs. CND uses these reliability targets and calculates the actual system performance based on the modified definitions because, in its opinion, this is a better measure to guide the development of these programs. Infrequent, large impact events such as loss of supply and natural weather extremes skew the data and make it less useful to aid maintenance and Capital plan development.

The Maintenance Program is categorized as Predictive, Preventative and Condition based. The Predictive component addresses statutory requirements such as inspection per the Distribution System Code, as well as prudent "testing" of the plant to help identify end of life conditions for poles or overheating problems for load carrying devices on the system. These Predictive components are completed annually as per the developed plan. The performance measure is that these programs are completed per the plan. The Preventative portion of the Maintenance Program consists of components such as vegetation management, cleaning and/or refurbishing specific devices, like switches, to ensure they work properly when needed. This program is completed annually as per the developed plan. The Condition Based Maintenance addresses conditions discovered that require immediate attention, as well as those that can be done on a more planned basis over time. The measure is that all discovered conditions are corrected and addressed without unnecessary delay.

The Predictive Maintenance program, together with the Condition Based Maintenance program, addresses customer oriented performance namely reliability, as well as public safety and the statutory requirements of the DSC.

The Preventative Maintenance program addresses reliability and the ability to effectively operate the system.

System reliability is monitored and recorded by CND. The reliability indexes for the past four years since the last filing are listed in Table 4 and Table 5 below. Appendix F contains information on the analysis CND completes to understand its system performance and develop its capital plans.

Table 4

RELIABILITY VALUES 2009-2012 All Interruptions				
Year	2009	2010	2011	2012
CAIDI	0.53	1.14	0.52	0.72
SAIDI	0.52	0.97	0.74	1.07
SAIFI	0.98	0.85	1.41	1.49

Table 5

Reliability Values 2009-2012 Excluding Loss of Supply				
Year	2009	2010	2011	2012
CAIDI	0.53	1.14	0.53	0.70
SAIDI	0.51	0.97	0.70	1.00
SAIFI	0.97	0.85	1.3	1.43

These figures show that Loss of Supply has not had a significant impact on the reliability performance of CND over the past four years. Historically there have been significant Loss of Supply events and these are being addressed in the coordinated planning for the Region as noted in section 1.3 above.

It shows the impact of having a 27.6 kV distribution system, in that many customers are affected by a single feeder event. CND is addressing this by installing remote operated switches at strategic locations and using the data the switches provides, via the SCADA system, to restore power more quickly through the rapid restoration that this technology enables. The Control Centre is currently not staffed on a 24 hour basis. This delays the restoration process after hours. CND is about to begin a one year trial using EFACEC-ACS “Centrix” distribution management software on three feeders to evaluate the software’s capability to perform automated restoration, which would rapidly restore power to customers in non-faulted sections of the feeder in an after-hours situation. This should help reduce the CAIDI and SAIDI values experienced by the customers. Based on the results of the trial, CND may implement such a system on a permanent basis.

CND creates outage reports and circulates them internally to all relevant parties, complete with action items. Reliability performance is reported to the Board of Directors meetings, CND uses reliability and outage information to modify its practices as appropriate, e.g., it modified its wildlife protection design as a result of customer input. For major outages such as the ice storm in April 2013, a full debrief session is held and action items are identified.

Any significant outages are discussed at the weekly Operations/ Engineering/Metering meetings, and improvements or future actions are discussed and become part of future Capital or Operating plans and budgets.

In addition, CND is looking into methods to use the reliability data to provide more focus on the outages and where they occur. This will be coupled with more stringent review of the outage data, and the root causes of the outage, to further refine its Maintenance and Capital programs in the future. Further, the deployment of remote operated switches is guided by the feeders' reliability performance. CND is working to a target of 3.5 switches per feeder. Based on the proposed Capital budget, this target will be reached in 2018 for the present feeders.

CND plans to initiate more formal processes to be able to generate the kind of metrics that will allow it to manage the system assets and provide clearer insights where changes are warranted. There are several areas where CND is contemplating improvements:

- Capturing additional data about assets (such as cable age) and recording this data in the GIS. This data will enhance regulatory reporting as well as the management of the assets. The target implementation date is the end of 2014.
- Annual review of worst performing feeders, causes, trends, what was done already and what additional steps need to be taken if any. This has been done for 2012 and the 2013 data will be completed in the first quarter of 2014.
- More complete documentation and data capture of equipment failures particularly the salient factors that caused the failure and storing the data in a database for reporting and analysis. The target implementation date is the end of 2014.
- Annual review of power system capacity and identification of system constraints and plans to mitigate the constraints that hamper power system operation. The target implementation date is the third quarter of 2014 in advance of the budget preparation.
- Produce a more detailed annual Development Forecast including the location, type of development, and the ultimate expected load, as well as the expected immediate load based on confirmed customers for new subdivision developments; also a forecast of

new customers in serviced subdivisions or other serviced locations. The target implementation date is the third quarter of 2014 in advance of the budget preparation.

2. (5.3) Asset Management Process

2.1. (5.3.1) Asset Management Process Overview

CND has pursued the best practices of the electricity distribution industry for many years. This has included adhering to the OEB's Distribution System Code that sets out both good utility practice, minimal performance standards for electricity distribution systems in Ontario, and minimal inspection requirements for distribution equipment. Consistent with best practices, over the years CND has diligently maintained its equipment in safe and reliable working order and, only when economically justified, upgraded or replaced its equipment. The diligent maintenance of its equipment has permitted CND to extract an extended useful working life from its assets. Historically, this has been achieved with only a moderate increase in the customers' bills over many years. CND has been careful when incurring costs since in the past customer satisfaction survey results all customers have indicated that the low price of electricity is an important factor to them.

CND is a medium sized utility with seasoned and knowledgeable Engineering and Operations leadership. The organization is small enough that much of the operation is overseen closely by the Engineering and Operations VP's. This means that they become aware of the daily activities as it is related to system and asset performance through regular interaction with different parties in their areas of responsibility. The VP's discuss the system capital requirements, as well as the system maintenance requirements on a regular basis.

By carefully controlling all expenditures and moderating any increases in its customers' bills, the distribution system has evolved into an array of equipment of different vintages spanning a number of technological eras. Funds were not spent on replacing functioning equipment to simply have more modern technologies in place. When assets do need to be replaced, however, CND has standardized on 27.6 kV distribution voltage equipment.

In anticipation of the increasing load growth in the CND service area and to provide relief to heavily loaded parts of the existing distribution system; CND built a new transformer station in 2001/2002.

CND eliminated 4.16 kV and 8.32 kV substations by converting the supply to 27.6kV. The station and line assets were at their end of life and needed to be replaced. Some 4.16 kV and 8.32 kV equipment remains in-service and this load is supplied by smaller 16 kV to 2.4 kV or 16 kV to 4.8 kV step down transformers.

The Desired Future Distribution System

CND’s customers have been surveyed over the past few years to ensure that the utility spends its limited resources consistent with its customers’ needs and wishes. The vision of CND’s desired future distribution system has been influenced by its customer feedback.

The envisaged future distribution system will be designed to deliver power at the quality and reliability levels required by customers, and will minimize the lifetime cost by balancing preventive maintenance, life-extending refurbishment and end-of-life replacement; in short, the system will *meet the customers’* needs for quality and reliability of power at minimal cost to the customer.

The envisaged system in 10 to 20 years will be one where there is even greater emphasis on condition monitoring in order to direct preventive maintenance to specific at-risk equipment and further extend the safe reliable useful life of all equipment. Consequently, equipment is expected to have longer in-service life. This is evident from the longer asset depreciation schedules for many of the distribution system assets as listed in the revised capitalization policies.

CND currently follows Canadian Generally Accepted Accounting Policies (“CGAAP”) for accounting purposes and has deferred its implementation of International Financial Reporting Standards (“IFRS”) until January 1, 2015. In accordance with the Board’s letter of July 17, 2012, electricity distributors electing to remain on CGAAP must implement regulatory accounting changes for depreciation expense and capitalization policies by January 1, 2013. Effective January 1, 2012, CND revised its capitalization policies under CGAAP in accordance with the regulatory accounting changes.

The future distribution system should have sufficient capital available to it to permit the lowest cost solution to be implemented. This will involve adjusting the annual investment levels to allow renewal projects to proceed and remain within the construction capabilities of CND, as they address the bulk replacement of certain equipment that has exceeded its cost-effective life. While extending the useful working life of equipment is intuitively desirable, life-extension “at any cost” (e.g., necessitated by shortage of capital) produces a sub-optimal, more-costly solution.

In order to leverage the efficiencies that are possible through emerging new technologies, the distribution system would judiciously employ additional smart grid equipment.

Underground connections are envisaged as the norm in the downtown core and most new residential subdivisions. This reflects CND’s Conditions of Service which in turn reflect the current City and Township By-Laws.

Distribution-connected renewable generation is expected to be much more commonplace based on applications received to date in CND’s service area. Also, CDM would continue to be an integral part of the system as required by CND’s condition of license.

In order to achieve the foregoing desired distribution system, sufficient well-trained and well-equipped staff is required. This may require an increase in staff levels, in some departments, to accommodate apprenticeship schedules to replace retiring employees.

Drivers and Influencers

Perhaps the factor exhibiting the greatest "influence" on achieving the desired future system is the legacy of the in-situ equipment; this legacy severely restricts the options available to current management to achieve the desired future within traditional funding limits.

While the City's growth rate has diminished over recent years, it is still a moderate growth area. One driver is the Provincial government's long-term "Places to Grow" infrastructure plan, which envisages Cambridge as one of the 25 Urban Growth Centers in the Greater Golden Horseshoe. The government's initiative, together with the City's refurbishment of the downtown core, the development of residential sub-divisions and smaller industrial/commercial parks, places significant pressure on CND's available capital. These connections must be made as CND has a regulatory obligation to connect all would-be customers.

The increasing cost of electricity has led to discussions within the industry around the trade-offs between maintaining or improving reliability, and the cost to do so. CND's feedback from its high-technology and manufacturing customers, based on discussions with CND staff, indicates that even the current reliability standards are insufficient because of the very high cost of lost production from even a momentary outage or a minor power quality variation.

The continued effect of the Green Energy Act and the requirement to give priority connection to solar, wind and other renewable energy sources will place a continuing demand on the utility's human resources and financial resources as these projects materialize.

Provided Conservation and Demand Management activities continue to be financed by the OPA and lost revenue is reimbursable to the LDC, the CDM effect on the distribution system is expected to be mildly positive as load growth continues to be dampened. CND includes the effect of CDM in its load forecast.

Continuing to address environmental challenges such as the removal of all PCB contaminants from transformers presents a short-term need for funding.

Emerging smart grid technologies offer opportunities to reduce operations cost over the long term. The technology improves reliability and efficiency by assisting the system to rapidly restore power to as many as three quarters of the customers supplied by a feeder, even before the responding outage crew(s) arrive on site to address the source of the permanent fault.

Guiding Principles

The following are the guiding principles that have been used to determine CND's capital expenditure program for the 2014 Test Year, as well as shape CND's capital expenditures plans over the next 5-10 years:

- Priority will be given to CND's legislated and/or mandatory requirements, including:
  i. System access including the obligation to connect customers - Residential, Commercial and Industrial. This includes intensification of the downtown core consistent with the Provincial government's long-term "Places to Grow" infrastructure plan (The "Plan"). The Plan recognizes Cambridge as one of the 25 urban growth centers in the Greater Golden Horseshoe.
  ii. Accommodate City, Region, Township and Ministry of Transportation, mandatory project requirements.
  iii. Embrace the requirements of the Green Energy Act for the accommodation of renewable generation, integration of the smart grid, and the CDM conditions of license, in order to fully support public policy directives.
  iv. Meet the performance standards of the OEB and other regulatory bodies, including: quality, reliability, health, safety, environmental performance standards. Generally, funds will be spent to maintain current reliability levels. Where a higher level of reliability is required, the additional cost will be allocated to specific customers or customer class by the appropriate regulatory mechanism.
- In order to safeguard the major investments already made in its key assets, continue to maintain and upgrade as necessary, the Control Center and related system automation equipment (e.g. GIS, SCADA systems, etc.). Similarly, to ensure public safety and system security, maintain and refurbish the Transformer Station as required.
- Continue to leverage the GIS system and functionality and build on the data base in order to harvest operational efficiency improvements. These improvements include the preparation of electronic documentation in support of the asset management system, and leveraging the investment in Smart Meters to improve outage management.
- Continue to invest prudently in modern information systems technology in order to meet customer expectations, particularly in the area of improved communication, and access to information to assist them in understanding their electricity bills and managing their electricity usage.
- Optimal life extension of assets, including:
  - Intensify condition monitoring to minimize uncertainty regarding decisions relating to equipment maintenance, renewal and replacement.

  - Where economically viable, refurbish distribution equipment in-situ to extend its reliable working lives.
- Leverage the supply capacity available from the Transformer Stations by installing additional feeders as required.
- Where the optimal life of an asset has already been reached, and to the extent that funding is available, undertake an accelerated replacement of the over-aged items (e.g. CND's wood poles and circuits).
- Prudently acquire smart grid equipment where there will be direct, quantifiable economic and/or efficiency benefits derived.
- Continue with the cost effective replacement of service vehicles to ensure the utility has a reliable fleet to execute on its maintenance and capital expenditure programs, as well as respond to system outages in a timely manner.
- Acknowledge that some desirable changes are realistically not affordable.
  - Install new 27.6 kV feeders when additional feeders are required.

2.1.1. Purpose

The purpose of this Distribution System Plan is to present CND's Asset Management Strategy and provide justifications for the Capital Investments required to maintain its core business; supplying reliable electrical services to its customers at a reasonable cost. This requires:

- A thorough understanding of the age, condition and performance of its assets
- Documenting its inspection practices in accordance with the Distribution System Code
- Describing its maintenance activities in accordance with good utility practice
- Ensuring that all aspects of employee and public safety are addressed in compliance with all regulatory and legal obligations
- Forecasting and planning for the future growth of load customers and renewable generation facilities
- Recognizing and addressing constraints in the current distribution system and anticipating future capacity requirements
- Demonstrating that the asset management process recognizes the above items and prioritizes projects to accommodate customers and system requirements
- Developing a 5 year forward looking capital expenditure plan that anticipates the future growth, capacity and performance of the distribution system while remaining flexible to accommodate the unknown requirements of its customer base

2.1.2. Objectives

- Prudent Capital Investment Plans and Operations and Maintenance Budgets reflect current priorities and anticipate future spending
- CND employs good utility practices to manage and operate its distribution system. Its Asset Management Strategy prioritizes work to achieve the following objectives:
  - Address significant health and safety issues
  - Address significant environmental risks
  - Maintain its reliability performance and meet customer expectations
  - Meet regulatory and legal obligations
  - Replace end-of-life plant
  - Improve operational efficiency

These objectives are consistent with CND's Mission, Vision and Value Statements.

2.1.3. Our Vision

Be the energy company most admired for its innovative people, reliable service and outstanding performance.

2.1.4. Our Mission

A team dedicated to providing ideas, solutions and value-added services that benefit our customers and stakeholders.

2.1.5. Our Core Values

Each of us strives to demonstrate trust, integrity and respect in everything we do. Our actions demonstrate our commitment to living the following principles:

Customer Focused - We are dedicated to providing excellent services and solutions to our customers, both anticipating and responding to customer needs.

Teamwork, Dialogue and Collaboration - We are a strong, united team of highly skilled professionals, providing reliable electricity to our customers. We actively engage each other in dialogue, listening first, to build shared understanding. We support and respect each other's work and contributions.

Safety and Wellness - We take responsibility for our personal safety, the safety of each other, and the safety of our customers and communities. We encourage and promote wellness at work, at home and in the communities we serve.

Community - We are proud contributors to the communities we serve, improving the quality of life through our leadership and volunteer efforts.

Accountability - We take responsibility and are accountable for doing what we say we will do.

Innovation - We support, encourage and recognize innovative ideas that lead to better solutions.

Environmental Stewardship - We are careful and responsible users of all resources.

The following organizational description includes the key positions that are accountable for the management of the distribution system assets, the asset management data and implementation and control of the Capital Expenditure Plan.

2.1.6. Leadership Team

The CND Leadership Team consists of:

- Ian Miles, President and CEO

With the following direct reports:

- Jane Hale-McDonald, Vice-President, Human Resources
- Sarah Hughes, Chief Financial Officer
- Michael Knox, Vice-President, Energy Measurement & Conservation
- Paul Martinello, Vice President, Information Technology Services
- Barbara Shortreed, Vice-President, Customer Care & Communications
- Ron Sinclair, Vice-President, Engineering
- Jeff Brown, Vice-President, Operations

The Vice-President, Engineering and the Vice-President, Operations together have direct responsibility for System Operation, Asset Management and the relevant Capital Expenditure Plans. The plans and associated budget requirements are presented and vetted by the Leadership Team, and are ultimately included in the proposed corporate budget, as modified by the Leadership Team to a final form, which is in turn, presented to the CND Board of Directors annually for approval.

Asset Management Process

CND's capital planning process aims to achieve a robust, cost effective electrical distribution system that is able to supply power reliably to its customers as it is needed by them.

The Asset Management planning criteria are:

Operate the system within the current and voltage limits of the equipment and regulatory requirements

- Public Safety
- Address causes of significant outages
- Have the capacity to successfully operate the system with a single contingency anywhere on the system except where there are overhead radial feeds
- Achieve a long term sustainable low cost system

Given this planning criteria, CND addresses capacity and operational constraints by ensuring that at the feeder level the system can withstand the loss of any element of the feeder and still restore supply to all the customers. The current, through the remaining elements, must remain below the emergency rating of all the remaining elements, and the voltage must remain within the DSC emergency range. The conditions need to be evaluated for the worse case temperature when the maximum load is being experienced by the power system. In addition, distributed generation is assumed to not be available for the purposes of the analysis.

For stations, a similar analysis is required, but this involves collaboration with Hydro One since they own and operate 3 of the 4 stations that supply the utility.

CND does not have a "policy" on the elimination of capacity or operational constraints, but uses analysis and stewardship to deliver customer service at an affordable cost.

The system must provide power within normal voltage levels as defined by the DSC under normal circumstances and current maintained within normal rated values for all equipment. Under abnormal conditions, the voltage is to be maintained within emergency voltage levels per the DSC, and the current may not exceed the continuous rating of any equipment.

Where these criteria cannot be met technical solutions need to be investigated to overcome the constraints. Sometimes the constraints may be overcome through the rearranging of normally open points and transferring some load from more heavily loaded feeders to more lightly loaded feeders. At other times, existing equipment such as wire may need to be upgraded to a larger size to give more current capacity or voltage regulators may be installed. At other times, new feeders are required from an existing Transformer Station.

CND uses a variety of inputs and considerations when developing its Capital Planning.

Issues to be addressed come forward by reviewing the reliability performance of the system and particularly the events that cause the performance. These events are reviewed to see if there are items that need to be addressed. This reliability review includes the analysis of equipment failures and the identification of common failure modes such as cable failures related to a particular type of cable, the location of the cable (direct buried) and the time in service. Similarly overhead plant failures are investigated. This information is used for the identification of issues but there is no formal data repository that contains this information or formal process to interact with this data. The Leadership Team is aware of the data because they are close to the system performance and have regular meetings with the staff involved with the investigation.

Control Center input is also received if there are system capacity limitations that become apparent in the restoration process. Similarly if restrictions are discovered in the performance of planned work these are also brought forward. The results of the required system inspection and the follow-ups are reviewed to see if there are trends or clusters of issues that indicate the need for additional action. The same kind of review is made of the Predictive Maintenance activities, particularly the results of the pole testing. In addition, the results of the contingency analysis are reviewed, and constraints and the solutions are noted. These are the main inputs to identify potential system renewal capital projects, which are almost exclusively internally driven.

As part of the analysis performed in the preparation of this report, CND reviewed its feeder reliability information and will be setting up a more detailed regular report of feeder performance to help direct its Capital Investments in a more formal manner. This, in conjunction with the current practice of individual outage review, will provide additional insight into areas where prudent investments should be made to maintain or improve system reliability and improve the customer's reliability experience. A worst performing feeder analysis is included in Appendix B.

Another driver in the capital planning process results from external parties. This may include new customer loads ranging from a single house service to a major factory, as well as renewable generation or a subdivision development. It includes entities such as the city or other road authorities. CND regularly attends Utility Coordinating Committee meetings with other utilities and municipalities to coordinate work based on the best available information. CND also attends Municipal Site Plan Committee meetings and Municipal Subdivision Coordinating Committee meetings.

Once the projects are identified, a prioritization review is conducted. Priority is determined based on:

- The state of the equipment – this includes the present state of deterioration, age and future rate of deterioration
- Any exceptional ongoing maintenance investments that are related to repeated failures either on the same type of equipment or within a narrow geographical area
- The size and cost of the project needed to fix or reduce the risk of failure
- The ability to construct large projects in phases, so that not all the work is required to be done in one year
- Road authority originated work must meet the timing requirements of the road authority. Unfortunately, the budget approval cycles of utilities and road authorities do

not coincide. For smaller projects there is often little or no warning and the utility must adjust its capital program to meet the road authority expectations. On larger projects, there is more warning and capital planning can take place, but again because the budget approval cycles do not match, some of the projects are sometimes delayed to a different budget year. The utility must then adjust its budget and bring forward work that is planned for the next year in order to manage workload and budget spending over the different periods.

The selection and pacing of capital work depends on a blend of the following criteria:

- Projects that address reliability issues or known risks and have a positive improvement on reliability
- Customer loads and approved renewable generation projects
- Road authority initiated work
- Available capital budget funding and manpower resources

The pacing of the work is partly determined by customers, developers and road authorities, and partly by resource availability. In order to maintain capability to complete a mix of work, a large project may be able to be split into phases at logical break points and completed over multiple years. Conversely, if external time driven work is delayed, some internally driven projects may be completed earlier to allow the delayed work to be completed after the delay period. Similarly, if urgent new “must do” projects materialize, some internally driven work may be delayed. The key is to have a multi-year plan as accurate as can be determined, and then to have the flexibility to adjust with the real-time changes that materialize. By utilizing budget and manpower, it represents as effectively as possible the current situation and retaining the capability to complete the delayed project when it becomes reality.

A priority ranking was done for all 2014 through 2018 material projects jointly by Engineering and Operations. The philosophy used was as follows:

Priority 1 was assigned to all non-discretionary projects. These projects are in the System Access category. If customers proceed with this work then CND must provide servicing or relocate its plant.

Rankings were done for all remaining projects on a numerical basis starting with 2 being the highest priority discretionary project and the highest number being the lowest priority discretionary project.

The highest priority discretionary projects are pole replacements and overhead line rebuilds. Pole replacements are typically done as a result of pole testing. If a pole is rotted off, it needs to be replaced promptly for safety and reliability reasons. Overhead line rebuilds are also ranked high in priority. Most of these lines are 50 to 60 years old.

They have reached end of life and are vulnerable to failure especially during winter storm conditions. The consequences of prolonged outages during the winter are high. Electricity is required for heating even when it is not the heat source (i.e. furnace motors). Electricity is also required in CND's rural areas for the pumping of water both for humans and livestock. The cost of replacing assets during storm conditions after failure is also very high as compared to planned work. Rebuild order was ranked based on known condition of the plant and past outages.

The next set of projects in terms of priority is underground rebuilds. These rebuilds need to be completed due to end of life and the ongoing increased risk of outages. The underground rebuilds were prioritized lower than the overhead rebuilds for several reasons. First, the public safety risk of underground failures is much less than overhead failures (i.e. poles falling over). Second, most underground areas have a looped supply which allows the impact of an outage to be minimized. The overhead supply on many rural roads is radial so customers are without power until repairs are made. Rebuild order was based on known condition of the plant and past outages.

System Service projects were generally ranked with a lower priority. These projects benefit customers in terms of reliability and are important but can't be ranked ahead of projects affecting public safety or basic delivery of power.

CND engages customers broadly through surveys and specifically with letters to customers affected by proposed work. When work in an area has been designed, and prior to commencing the work, the customers in the immediate vicinity of the proposed work are notified. Customer inquiries are addressed. This may involve more detailed explanation, including meeting on site, and may result in project redesign to mitigate the concerns expressed.

CND uses the following method and criteria to prioritize REI and REG projects:

- REG projects receive a high priority. Typically there is only minor work required on the 27.6 kV system to allow connection. They are considered to be customer connections that are non-discretionary, based on connection timing agreements.
- As can be seen in Section 3.3, CND does not have any REI projects at this time except for a transfer trip at the Parkhill dam hydro-electric project. The system is adequate to accommodate all the known REG projects that they are aware of at this time and hence no prioritization is required. The fact that CND's system is converted to 27.6 kV is a major factor in not having constraints that need to be addressed.

A flowchart outlining the Asset Management process (figure 1) is included below.

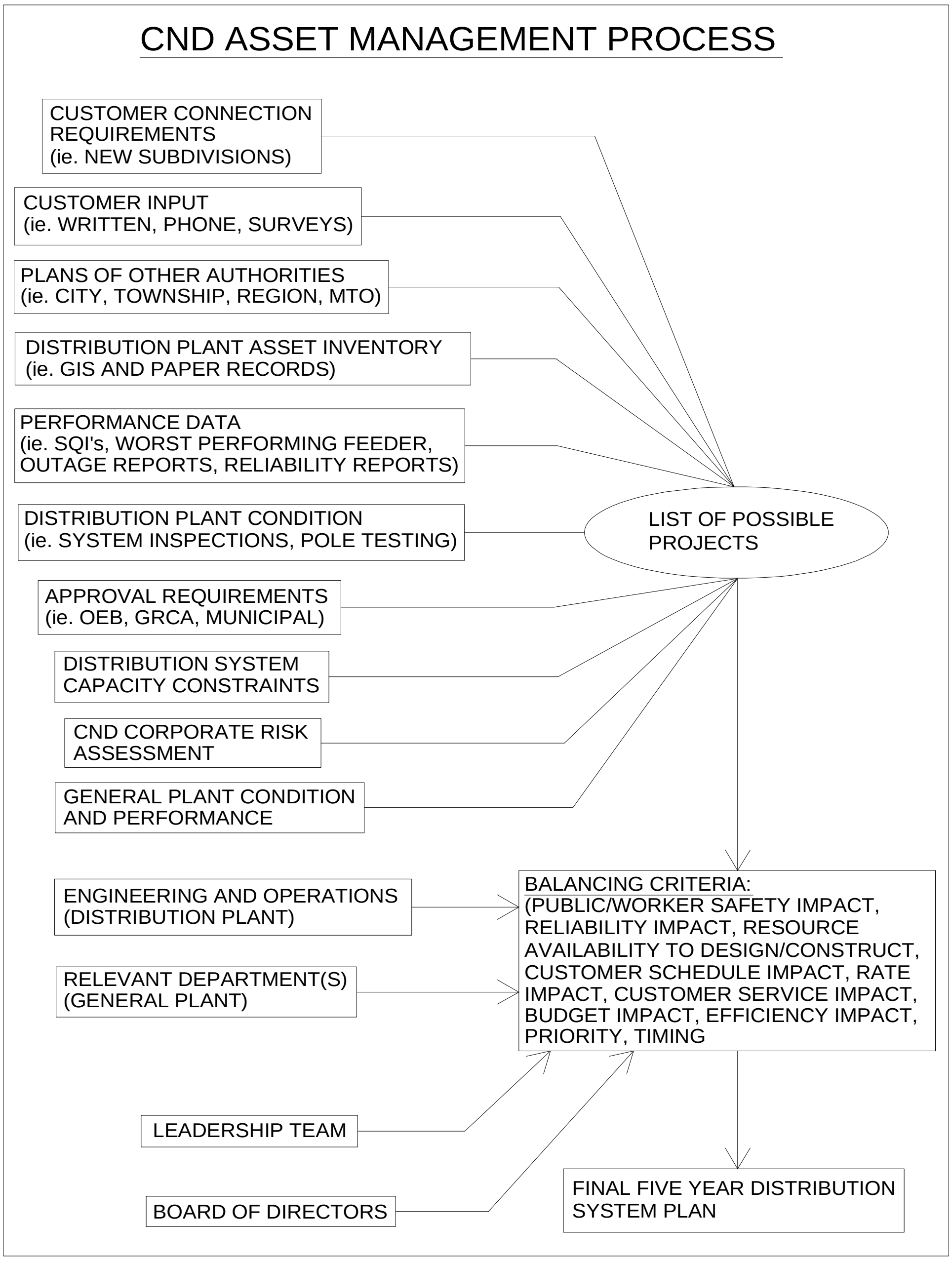


Figure 1. CND Asset Management Process

2.2.(5.3.2) Overview of Assets Managed

The service area that CND operates in is partly an urban area and partly a rural area. The City of Cambridge is mostly urban while the Township of North Dumfries is almost exclusively rural. This is shown on the map in Figure 2.

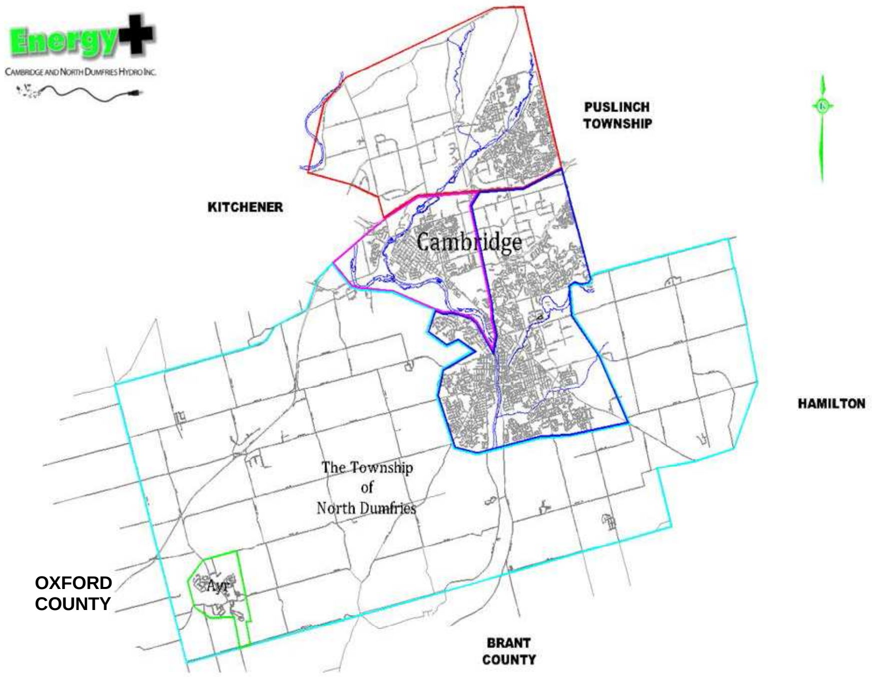


Figure 2

CND has experienced some extreme weather this spring in April. This consisted of a day of freezing rain and high winds that caused many prolonged outages from tree contacts and pole failures. This incident affected the plant on Franklin Blvd and caused two poles to lean. These two poles needed to be supported to prevent them from falling over. In addition this past summer there were severe thunderstorms that also caused many outages. Periods of extreme weather are expected to continue in the future. The likelihood of storms emphasizes the need for system renewal so that CND's distribution system is adequate to withstand most weather events.

Hot summer days have occurred previously and are expected to continue to occur in the future. Extreme heat and high humidity, especially if sustained over several contiguous days creates very high power demand on CND's system as a result of air conditioning load. CND must design its system to this high power demand. CND's system is affected much less by extreme cold weather since the power system components have a higher rating at lower ambient temperatures. Also the electric heating load in the winter is much lower than the air conditioning cooling load in the summer.

CND experienced a severe slowdown in customer growth as a result of the economic downturn in 2008 and 2009. This growth has been rebuilding slowly as the economy recovers. The increased growth in the economy together with the Places to Grow program initiated by the provincial government has resulted in improved growth in the industrial and residential projects. This is reflected in the development projects CND has included in its Capital Plan. Refer to Appendix J for additional information about expected growth.

Stronger than expected economic growth will advance the timing of System Access projects while weaker than expected growth will delay System Access projects.

The area is serviced by four transformer stations that take power from the Hydro One transmission system at 115 and 230 kV and transformed to a voltage of 27.6 kV. CND has 29 feeders that supply power into its service territory. The loads on the stations are shown in Table 6, station utilization is shown in Table 7 and the feeder loads are shown in Table 8. CND owns and operates one of the Transformer Stations. This station was commissioned and put into service in 2002. While there are many discrete elements that make up this station, for the purposes of this report it will be considered as one integrated station.

CND no longer owns or operates any Municipal Stations. All loads previously supplied by Municipal Stations have been converted to a supply from the 27.6 kV distribution system. Some pockets of 8.32 kV and 4.16 kV supplied customers continue to exist, but these are primarily in the rural area and in locations where the replacement of the 4.16 kV plant was cost prohibitive respecting customer rate impacts. In these cases, a localized smaller step down transformer solution is used to convert the voltage from 27.6 kV to the appropriate 8.32 kV or 4.16 kV requirements. In future, these locations will be addressed as load increases materialize or as more expensive assets are replaced. For example, in North Dumfries Township most of the rural 8.32 kV is attached to old poles. When this area is rebuilt, it will be built to 27.6 kV standards and the voltage will be converted to a 27.6 kV supply at that time.

The 27.6 kV main feeders are predominately overhead and mostly rated at 600A at the station egress. The main feeders remain full capacity and usually loop onto other main feeders, and have a normally open switch at the tie point(s) with other feeders. In some subdivisions, the main feeders are underground, but remain at the full 600 A capacity.

Customers may be supplied from this system in a variety of ways. In the case of an overhead system, the distribution transformers supplying the customers may be connected directly to the main feeder.

If the main feeder is not on the street where the customer resides, then lower capacity laterals are installed on these streets to supply the distribution transformer(s).

Where the supply is underground distribution, a lower capacity cable may be supplied by an overhead line at the periphery of, for example, a subdivision. The transformers are connected to the cable and the transformers are loop fed. The loop of cable has a normal open point, so that all customers can have a normal power supply even if one cable section needs to be isolated because it is defective.

Particularly in areas that were developed as a large block, the normal underground design has both underground main feeders (600 A) and the lower capacity underground primary distribution loops. The transition from main feeder to primary distribution loops takes place at Vaults or Switching units. The main feeder configuration is achieved by 600 A load break switches and the distribution loops are connected to the main feeder circuit by way of fused disconnect switches.

In the previous paragraphs, it is not intended to describe a particular technology, but to provide a simple functional description. There are various technologies that allow the preceding description to be achieved.

Table 6 Station Loading

Station Name	10 Day Summer Limited Time Rating (LTR)	Feeders	Rating (MVA)	Actual Load (MVA)	Short Circuit Available (MVA) Note 1	Thermal Available (MVA) Note 1
MTS #1 [2510] (CND OWNED) J Bus-(odd numbered feeders)		4	83.3	33.6	75	50
MTS #1 [2510] (CND OWNED) Z Bus –(even numbered feeders)		4	83.3	44.26	75	50
MTS #1 [2510] (CND OWNED) Total station	113 MVA			77.86	75	60

Station Name	10 Day Summer Limited Time Rating (LTR)	Feeders	Rating (MVA)	Actual Load (MVA)	Short Circuit Available (MVA) Note 1	Thermal Available (MVA) Note 1
Galt TS [65] (H1 OWNED) J-Bus –(odd numbered feeders)		6	125	62.32	99.9	39.3
Galt TS [65] (H1 OWNED) Y-Bus – (even numbered feeders)		6	125	75.84	100.8	39.3
Galt TS [65] (H1 OWNED) Total station	195 MVA			138.16		78.6
Preston [21] TS (H1 OWNED) J-Bus –(even numbered feeders)		4	125	48.92	141.7	11.1
Preston [21] TS (H1 OWNED) Q-Bus – (odd numbered feeders)		4	125	56.63	124.0	10.1
Preston [21] TS (H1 OWNED) Total Station	125 MVA			105.55		21.2
Wolverton DS [W] (H1 OWNED)	N/A	2 Note 2	25	>20	625.5	15.2

Note 1: These values are supplied by Hydro One at http://www.hydroone.com/Generators/Documents/HONI_LSC.PDF and dated May 27, 2013 for Hydro One owned stations. The CND station information is provided by CND.

Note 2: Wolverton DS supplies part of one feeder (F2) to CND. Peak CND load was 6.6 MVA. The remaining load is for the Hydro One system customers. Short circuit and thermal ratings are for F2 only.

Table 7 Station Utilization

Station Utilization				
Station name	LTR	Actual Load MVA	% Utilization	Remaining Capacity MVA
MTS#1	113	78	69	35
Galt TS	195	138	71	57
Preston TS	125	106	84	19
Total	433	322	74	111

CND anticipates that the load increase due to new customers resulting from new subdivisions, as well as new customers in existing serviced areas, but not built or occupied, will result in the need for a new TS in about 2018.

Table 8 Feeder Loads

Feeder Name	Rating (AMPS)	Actual Load (AMPS)
2510M37	600	121
2510M39	600	299
2510M41	600	75
2510M43	600	186
2510M38	600	226
2510M40	600	247
2510M42	600	195
2510M44	600	230
65M11	600	154
65M13	600	55
65M15	600	458
65M17	600	162
65M19	600	97
65M21	600	336
65M12	600	281
65M14	600	155
65M16	600	372
65M18	600	379
65M20	600	292
65M22	600	58

Feeder Name	Rating (AMPS)	Actual Load (AMPS)
21M24	800	469
21M26	600	2
21M28	600	176
21M30	800	344
21M23	600	418
21M25	600	312
21M27	600	122
21M29	600	296
WF2	N/A	134

Note: Some load transfers were in effect so these values do not all reflect "normal" feeder loads at the time of the peak.

The sum of the feeder capacity (excluding Wolverton DS since it is only a part feeder from outside the service area) is about 2.5 times the total actual station loads. This indicates that the average feeder load is about 40% of the feeder capacity.

The 21M26 feeder load will increase when construction work currently in progress is completed.

As a result of the connection agreement, the capacity constraints and subsequent work to replace TS transformers at Galt TS feeder load balancing were not completely carried out when CND's MTS1 station went into service. With the transformer replacement work at Galt TS now complete, CND has included a project to reconfigure feeders to improve the load and customer balance, as well as switching flexibility in the southern part of the service area south of Galt TS. This will also help improve customer-hour statistics and thus customer outage duration experience is expected to improve.

2.2.1. Overhead Asset Details:

Tables 9, 10, and 11 summarize the overhead assets that CND manages and the age groupings. The assets are grouped in ten year timeframes. CND records the decade that the assets were installed in its GIS system to facilitate reporting; hence Table 9 reflects this grouping and recording. The age is also indicated. The data in these tables was compiled as of March 2013.

Table 9

Poles						
Decade Installed	2010	2000	1990	1980	1970	1960 and Earlier
Age	0 to <3	3 to <13	13 to <23	23 to <33	33 to <43	43 +
Number (Each)	805	2425	3556	2796	2316	2246

In addition, CND is a joint use tenant on 1645 poles. The majority of the joint use poles are owned by Bell Canada (1200), with the remainder owned by Hydro One, Kitchener-Wilmot Hydro and Waterloo North Hydro.

Table 10

Overhead Transformers						
Decade Installed	2010	2000	1990	1980	1970	1960 and Earlier
Age	0 to <3	3 to <13	13 to <23	23 to <33	33 to <43	43 +
Number (Each)	210	1097	1008	742	253	249

Table 11

Line lengths in Circuit KM	
Overhead	711
Underground	413
Total	1124
3 Phase	437
2 Phase	0
1 Phase	687
Total	1124

CND has not captured the age or date of installation for all wire or cable in its GIS. CND will do this in future and store the data in the GIS as completed with other asset data. In the past four years, CND implemented a new updated GIS system and populated it with data from the old GIS. In addition, CND has captured new asset data and populated the new GIS with this information. This process has not been completed for all assets and as the OEB filing requirements change, CND is responding by initiating activities to ensure the data will be available for future filings.

CND does not have reliable information about the age of all its overhead switches. It does have information about the manufacturer and the type of switch. CND plans to gather this information and place it in the GIS at a future point in time to allow reporting on this aspect.

It is noteworthy that about 15% of the wood poles in the service area are more than 43 years old. Most of these poles are at end of life—weathered, cracked and failing. This is a major driver to CND's System Renewal projects in the 2013 to 2018 project forecast.

It should be noted that 20 to 25 years ago the decision to supply the rural area in North Dumfries from the 27.6 kV system was precipitated by having old, overloaded 8.32 kV substations that needed to be replaced. A partial conversion to 27.6 kV was carried out to address this issue with a view to ultimately provide 27.6 kV distribution for the whole area. However there was residual asset life and only part of the area was converted. The remaining 8.32 kV load was mostly supplied by 16 kV to 4.8 kV step-down transformers. This allowed the delay of the total area rebuild. This remaining area is now scheduled to be rebuilt since the poles are at the end of life and failing.

2.2.2. Underground Asset Details

Table 12 summarizes CND's Underground transformer assets and age groupings. The data was compiled in March 2013.

Table 12

Underground Transformers						
Decade Installed	2010	2000	1990	1980	1970	1960 and Earlier
Age	0 to <3	3 to <13	13 to <23	23 to <33	33 to <43	43 +
Number (Each)	182	1268	1017	712	112	175

CND does not have reliable information about the age of all the underground switches it has installed. It does have information about the manufacturer and the type of switch. CND plans to gather this information and place it in the GIS at a future point in time to allow reporting on this aspect.

The CND underground cable length information is included in Table 11 in section 2.2.1 above.

CND has experienced repeated failures in the underground system that centers on several aspects. The plant that is failing is largely cable installed in the 1970's at 27.6 kV 3-phase, 4-wire system. This cable was state of the art at the time, but experience in the industry has shown that this cable installed in a wet environment [direct buried] and the construction of the cable—non-jacketed, non– metallic shield, combined with the state of technology for managing voids and contaminants in the cross-linked polyethylene insulation leads to insulation failures that manifest themselves after 25 to 30 years. In addition, some of these subdivisions also use submersible transformers that have corrosion and connection issues. They also employ load Break Elbows that fail in-service in continuously moist conditions. CND has a number of subdivisions of this vintage and older that it is addressing in its capital System Renewal project forecast.

A second area of concern is the repeated failure of the underground plant in the Galt core area. Many transformers and switching points are below grade. The water table in this area is high, with heavy rain and melting snow, often filling these below grade installations with water, placing the electrical system in an adverse environment. The failure of the cable is accelerated by road salt. As a result, the cables fail due to being in a wet, contaminated environment, the transformer tanks corrode and the load break elbows fail due to periodic immersion in water laced with various salts. This issue is also addressed in the capital System Renewal forecast.

Outage information supporting the proposed underground rebuild investments in included in Appendix L.

2.3. (5.3.3) Asset Lifecycle Optimization Policies and Practices

CND has practices that reflect practical and prudent business approaches to implementing its Vision and Core Values. For the future, aspects of policies for asset lifecycle optimization will be addressed. As this study of asset lifecycle optimization and crafting of policy progresses, the practices employed will be reviewed and altered as appropriate. The following description of the practices demonstrates that CND does follow documented steps in the management of its assets, all of which aid in the reliable delivery of power to its customers.

CND owns all the distribution assets within its service area and owns one of the four transformer stations (TS) that transform power from the Hydro One owned 230 kV or 115 kV transmission systems. CND is responsible for the management of all its distribution assets, including the one Transformer Station.

In the course of fulfilling its asset management responsibilities, CND engages in the following type of Maintenance Programs:

- Predictive Maintenance
- Inspection
    - This addresses risk management and actively assessing condition of plant visually. It is also required to meet regulatory requirements. This is done on 1/3 of the system each year.
- Testing
    - This addresses risk management and actively assessing condition of plant. It is more detailed and more focused than inspection and typically involves

the measurement of some aspect of the asset. This is done on an interval basis where the interval is determined by the rate of deterioration of the asset.

- Preventative Maintenance
- Activities to extend the trouble free operation of the asset so that the activity is both economical and ensures the continued reliable operation of the asset. This is done on a cyclical basis and usually coincides with the inspection cycle.
- Condition-Based or Reactive Maintenance.
- Occurrences where plant is discovered to be out of specification or is malfunctioning and the condition needs to be corrected. The follow-up activities to restore the asset to full function are included here. Occasionally the most cost effective way to remedy the situation is replacement.

CND completes inspections as prescribed in the Distribution System Code, and in a manner and frequency that addresses public safety and cost efficiency. It does this by having predefined geographical areas designated for inspection so that the entire system is inspected in a three year cycle. The individual areas to be inspected are indicated on maps produced by GIS and are printed for the crews to use for the inspections. These maps together with written deficiency reports are returned by the crews.

After the inspections are carried out, the information is processed and converted into a form that allows the organization to manage all follow-up work and complete within reasonable time periods.

The information is appropriately retained and is available for future review or verification should it be needed.

2.3.1. Predictive Maintenance of Overhead Distribution Assets

Inspections

Asset condition is determined using visual inspection. This is driven by the requirements of the Distribution System Code generally and by the requirements of the Code 'Appendix C' in particular. This Code is followed and the entire service area is inspected on a three year cycle. The overhead and underground assets use inspection areas identified on maps, one set of maps for a particular inspection year. The overhead area uses a street map since the plant is visible when inspecting. While the underground maps show the type of plant and the location of the plant to aid in the inspection. There is a paper process that identifies what to inspect, record deficiencies, identify what needs to be corrected and when the inspection is completed.

There are separate databases containing the information of transformers and switches with pertinent device information such as nameplate data and device characteristics and location. Switch data will be migrated to the GIS in the future. Transformer data is already migrated and available in the GIS.

After the 4 kV conversion / rebuild was completed in 2010, there are no longer any distribution stations in service. There is only one transformer station owned by CND. This station is inspected monthly and is maintained by CND staff on an ongoing basis. A specialized contractor provides maintenance on a two year cycle.

In general, the condition of assets is determined to ensure that:

- They are safe for the public and for competent knowledgeable staff to work on using approved procedures.
- They are working within specifications
    - Within the device current and voltage capabilities
    - With no deterioration to impair the 'normal' function of the asset
    - Secure as it was when it was first properly installed

The asset needs to meet the requirements of the Distribution System Code, the Ontario Regulation 22/04 and the relevant environmental standards such as the regulations addressing the use, storage and handling of PCBs.

The Minimum Inspection Requirements which is Appendix 'C' of the OEBs Distribution System Code, documents, in detail, the inspection standards and cycles required within the Code. Appendix 'C' Table C-1 identifies the maximum intervals for the inspection cycle patrols, which for most urban facilities is 3 years. A definition of Patrol Inspection is included on the first page of the document. CND inspects all its assets on a three year cycle.

CND's supply area is served by a mostly urban distribution system supplying the City of Cambridge and a mostly rural distribution system supplying the Township of North Dumfries. Its supply area is structured into three geographical zones for implementation of systematic and routine visual patrols to comply with the OEB inspection requirements (at a minimum). The visual inspections of the major distribution facilities meet the level of detail for the Patrol Inspection Definition in the Distribution System Code. In addition to fulfilling the requirements of the Distribution System Code, the inspections allow for deficiencies and the general condition of system components and related peripheral equipment and hardware, including vegetation growth, to be realized and documented with sufficient lead time and for subsequent analysis in support of Maintenance and Capital planning activities.

CND currently inspects the overhead distribution system in each geographic zone, completing approximately one-third of the distribution system each year, as per the 'Minimum Inspection Requirements' of the Distribution System Code (DSC). The visual patrol serves as an inspection to assess the condition of overhead assets, including wood/concrete poles and their supports and attachments, pole-mount distribution transformers, switches and surrounding vegetation. Inspection and assessment of each of these assets is described in further detail. A map of the zone subject to inspection along with a Line Inspection Record is used during the visual patrol. The Line Inspection Record documents the completion/date of inspection, as well as the person completing the inspection. If a defect is identified during the inspection, it further identifies the equipment, location and condition details. This information is also documented on CND's Trouble Report, noting the location of the defect and allowing for the inspector to comment on the condition of the overhead asset(s). The Line Inspection Record and the Trouble Report are subsequently submitted for review by supervisors. Follow-up Reactive Maintenance is prioritized and scheduled, through the issuance of the Trouble Report to a crew for correction of defects. Data from inspection activities are compiled and used for reporting.

Poles

Annual visual inspections of CND-owned poles are conducted internally, as described above, allowing each pole to be visited on a 3 year cycle and satisfying the inspection requirements of the DSC. The condition-based assessment allows CND to monitor and identify defects concerning the integrity of the pole or other issues concerning the condition of the pole, supports and attachments including conductor, cross arms, guys and guy guards, cable dips, etc. Such defects and concerns are identified on the Line Inspection Record and detailed further through commentary on the Trouble Report.

The CND-owned poles in the urban areas used for feeders are generally quite new, approximately 20 years old or younger, as a result of the capital programs to replace the 4.16 kV system with a 27.6 kV distribution system. There are older poles that were used to supply the old 4 kV stations and large industrial customers at 27.6 kV prior to the 4 kV to 27.6 kV voltage conversions. These facilities are included in the rebuild plans outlined in the capital projects section and are listed in the System Renewal category. In these urban areas, because of the age of the old plant and the general inability of the old 4 kV system poles to provide the voltage clearances required, the old poles were replaced. However in the rural area, one third of the poles are 40 to 60 years old. Within the last 10 years many poles in the service area were tested. Defective poles were replaced and good poles were treated.

CND reinstituted a pole testing program in 2012 and will be doing further testing in 2013, in addition to the current visual inspection program. Poles are tested after 25 years in-service and then every 10 years after this initial test. The pole testing program will serve to further confirm the condition of these poles and will form the basis of future capital pole replacement programs.

Figure 3 below shows the locations of poles 50 years and older.

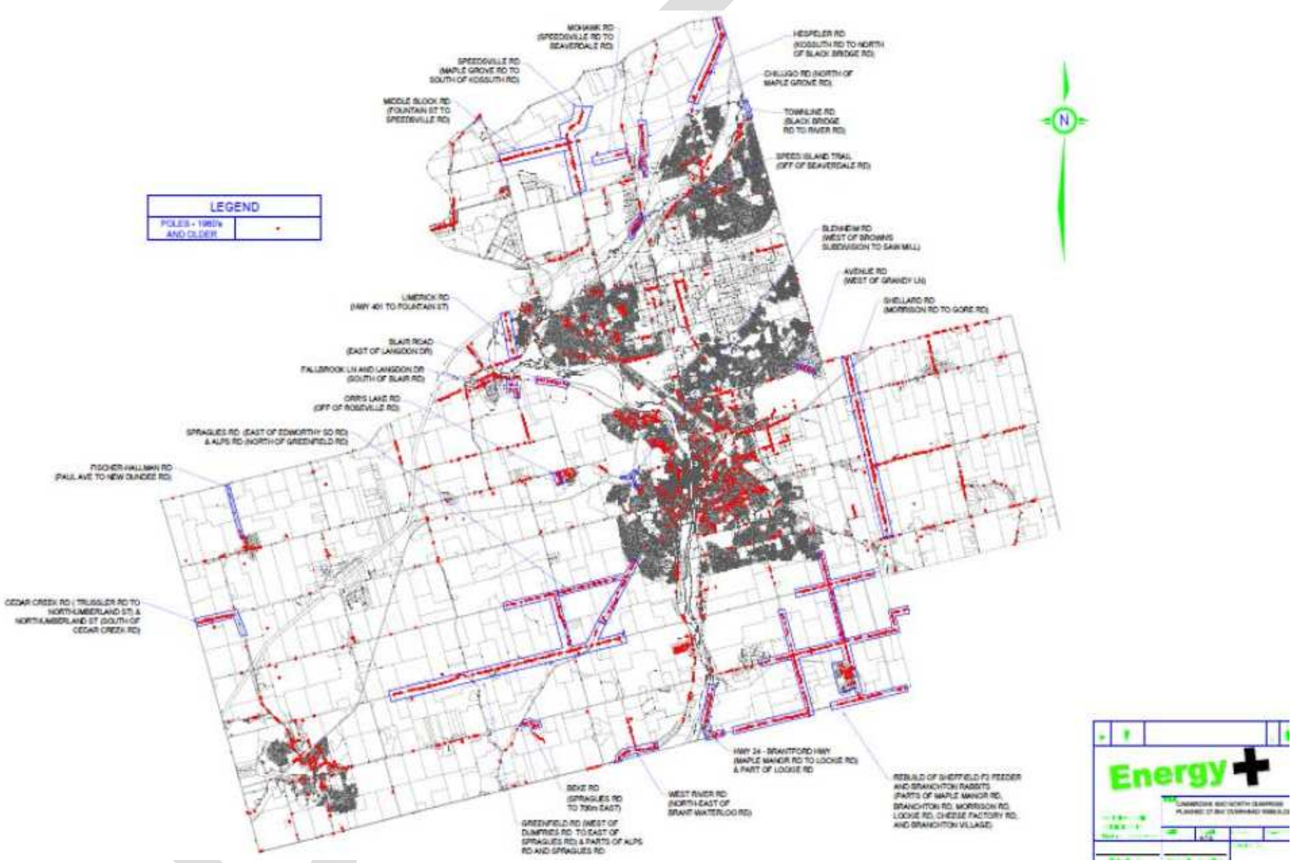


Figure 3 Pole Locations – 50 years and older.

Note: a larger copy of this map is included in Appendix C

Conductors

During the annual visual inspections the conductors are also noted for obvious evidence of deterioration. Any concerns are noted on the inspection sheets and followed up.

Overhead Distribution Transformers, Switches, Protective Devices and Vegetation Growth.

Inspections of pole-mounted transformers, switches and vegetation growth are also a component of the visual patrol of the overhead distribution system as noted in the general practice above and are therefore inspected on a 3 year cycle. Deficiencies related to the transformers, switches and excess vegetation are noted on the Line Inspection Record and subsequently addressed through Reactive Maintenance programs.

The condition of overhead system assets is further identified during Preventative Maintenance activities, including some Insulator Washing, but mainly as a result of Vegetation Management.

Thermographic Infrared Inspection

System wide regular Infrared (IR) thermography of overhead plant is performed. In 2012 it concentrated on the older lines in the north part of the service area and included feeders supplying large customer loads. It is the intention to continue with this program and have it coincide with the part of the system that is visually inspected. Hence the plan is to inspect one third of the plant each year on a rotating basis.

This is a relatively low cost way of identifying otherwise hard to detect problems. If there are a low number of problems discovered, it is an indication that the system electrical connections are in good shape. If this scan is carried out on a regular basis as proposed then it serves as an early warning system for problems and is an excellent way to mitigate risk.

Transformer Oil Testing for PCB Contamination

CND has previously tested a significant number of its distribution transformers, namely those manufactured prior to 1982, as they were returned from the field, prior to being returned to stock. Those transformers that were “contaminated” were set aside and were handled according to environmental guidelines. The current MOE guidelines specify that to be contaminated the oil contains more than 50 PPM of PCB.

CND has tested 356 distribution transformers and eight primary metering units that could be contaminated in 2013.This is the number of units that have not been tested before but could have some level of contamination. This action will move the utility toward its goal which is to be PCB free by the end of 2013.

Once the information on the condition of the oil in these transformers and metering units is known, contaminated units will be replaced in 2013. Provision has been made in the 2013 Capital Budget to allow this to be completed.

2.3.2. Preventative Maintenance of Overhead Assets

Insulator Washing

Insulator washing is done on an infrequent basis and only in the heaviest contaminated areas namely adjacent to Highway 401. This is because most of the at risk contamination area insulators are polymer insulators and have a high tolerance for contamination without resulting in tracking or flash over. In the remaining areas the existing porcelain insulators continue to perform well and the conditions that require insulator washing rarely occur.

Vegetation Management

Vegetation management, or tree trimming, is a Preventative Maintenance Program scheduled on a 4 year cycle, where one of each of four zones of the distribution system is completed each year. This activity is executed by contract utility arborists as they have specialized knowledge of growth rates of various vegetation.

Since growth rates vary with the weather and by plant species, CND responds to these factors. For example, if there is a year with an exceptional growing season due to frequent rain, certain areas may be vulnerable to tree contacts two to three years from now. The inspection program pays attention to this to prevent future problems.

Also some species of plants/trees grow faster than others. CND uses a shorter trimming cycle if the trimming would be too severe on the regular cycle length.

CND takes additional Preventative Maintenance initiatives in its vegetation management program including tree-trimming during the implementation of Capital Projects. Additionally, some Reactive Maintenance is performed in response to requests from the public to trim or remove trees in proximity to power lines.

2.3.3. Condition Based Maintenance of Overhead Assets

Following Pole Inspections and Line Inspections

Poles that are identified as requiring attention in the inspection program have Trouble Reports completed for them. The Trouble Reports are categorized as a Grade 1 or urgent repair, or as a Grade 2 which is a lower priority, follow-up repair. The repairs are tracked and all repairs are completed and signed off per the ESA requirements.

Following Thermographic Imaging

All items that require to be addressed following Thermographic imaging are recorded on Trouble Reports. The Trouble Reports are categorized as a Grade 1 or urgent repair, or as a Grade 2 which is a lower priority, follow-up repair. The repairs are tracked and all repairs are completed and signed off per the ESA requirements.

Following Vegetation Management

Vegetation management, while separate from any inspections does place a CND representative at a specific site on the distribution system. It is prudent to observe and report any defects discovered regardless of the reason. All items of concern that are observed when performing vegetation management are recorded on Trouble Reports. The Trouble Reports are categorized as a Grade 1 or urgent repair, or as a Grade 2 which is a lower priority, follow-up repair. This is handled and managed in the same manner as other Trouble Reports previously noted. The repairs are tracked and all repairs are completed and signed off per the ESA requirements.

2.3.4. Predictive Maintenance of Underground Assets

Underground Inspections

Similar to the general overhead process of inspection and condition assessment, the underground distribution system is also inspected on a 3 year cyclical basis to assess the condition of underground assets including pad-mount transformers, submersible transformers, underground switches, transformer vaults and civil structures. The buried assets cannot be totally inspected visually like the overhead assets, but care is taken to inspect all assets that can be seen to assess their condition. The Line Inspection Record documents the inspection completion, date of inspection and the person completing the inspection. If a defect is identified during the inspection, it further identifies the equipment, location and condition details. This information is also documented on CND's Trouble Report; this Report notes the location of the defect and allows for the inspector to comment on the condition of the underground asset(s). The Line Inspection Record and the Trouble Report are subsequently submitted for review by supervisors. Follow-up Reactive Maintenance is subsequently prioritized and scheduled, through the issuance of the Trouble Report to a crew for correction of defects. Data from inspection activities are compiled and used for reporting.

Underground Distribution Transformers

Inspections of pad-mount, transformer vault and submersible transformers occur within the visual patrol of the underground distribution system and are therefore inspected on a 3 year cycle. Approximately one-third of the transformers within CND's distribution system are inspected on an annual basis. Inspection includes opening the enclosures so a visual check can be made of the condition of the plant. Deficiencies such as broken bushings, oil leaks or paint chips, among others, are noted on the Line Inspection Record.

Underground System Switchgear

Inspections of pad-mounted switches (PMH) and transformer room mounted switches occur within the visual patrol of the underground distribution system and are inspected on a 3 year cycle. Approximately one-third of the switches within CND's distribution system are inspected on an annual basis. Inspection includes opening the enclosures or entering the transformer room so a visual check can be made of the condition of the plant. Deficiencies such as broken bushings, oil leaks or paint chips, among others, are noted on the Line Inspection Record.

Thermographic Infrared Inspection of Underground Assets

System wide regular Infrared (IR) thermography of underground plant is performed. It concentrates on the older part of the underground system in the Galt core area. It is intended that CND will continue with this program and have it coincide with the annual inspection for the identified system portion. The plan is to inspect one third of the plant each year on a rotating basis.

This is a relatively low cost manner of identifying otherwise hard to detect problems. When this scan is carried out on a regular basis, as proposed, then it serves as an early warning system for problems and is an excellent way to mitigate risk.

2.3.5. Preventative Maintenance of Underground Assets

PMH Switchgear Cleaning

CND uses current technology such as dry ice cleaning of the PMH switches. This is a cost effective means of removing surface contamination on the insulators and switch components thus preventing insulator flashover and reliable operation of the switches. This is generally done as required based on the observed condition when the device is inspected but in some cases this may be done on a scheduled basis if the area is particularly susceptible to accumulation of contaminants.

Condition Based Maintenance of Underground Assets

CND uses the same process to respond to items that are discovered in visual or Thermographic inspections. The inspection form identified defect is classified as needing attention immediately or in a less time critical manner. Trouble reports are completed and recorded in the database. The work is dispatched to the appropriate crew(s) and the work is completed. Once the work is completed appropriate sign-offs are made to ensure the distribution system is safe for the public and staff and that the system is restored to proper working order. The original inspection forms are filed by year and are available for review if needed. The signed off trouble reports are logged in the electronic database and the paper copy signed off is retained by year and report number.

2.3.6. Inspection and Condition Assessment of Transformer Stations

CND owns one 230 kV to 27.6 kV transformer station. They do not own any Municipal Stations at this time. All Municipal Stations were removed as a result of conversion of the loads to the 27.6 kV distribution system.

Regular monthly inspections are carried out on the transformer station yard and equipment and these are recorded on forms. In addition, regular Planned Maintenance is carried out by a specialized contractor on a two year cycle. Any defects or deficiencies discovered are corrected as part of the Planned Maintenance activities. If a major deficiency is discovered as a result of the monthly inspection process, this is addressed based on the risk.

2.3.7. Preventative and Condition-Based Maintenance for Transformer Stations

CND contracts with a specialized contractor to have the station maintained on a two year cycle. This entails a thorough condition review of the station and the correction of all deficiencies found.

Any deficiencies reported as a result of the monthly inspections are addressed when the report is submitted. Minor repairs are carried out while the inspection is being done, if it can be done safely. Other aspects relating to the security and the appearance of the station, like the perimeter fence, building access integrity, vegetation within the fenced enclosure and any other work, is scheduled based on urgency and crew availability. The same urgency classification scheme is used as with overhead or underground asset deficiencies.

2.3.8. Maintenance of Customer Substations

There are 81 customer-owned substations. These are inspected by CND staff visually on an annual basis.

The Customer Owned Substation Inspection Form is the form utilized for customer-owned transformers at customer-owned substations and identifies, at a minimum, items at the substation enclosure requiring inspection. If deficiencies are found, the Electrical Safety Authority (ESA) is notified and they ensure that the deficiencies are addressed.

2.3.9. Description of Asset Replacement and Refurbishment Policies

CND endeavors to extend the life of its assets by carrying out regular maintenance of its plant. As issues are discovered either through regular inspections, testing or outages, by way of the system reliability statistics as well as the analysis of each outage, CND first considers what planned maintenance can be carried out to mitigate the issues, the cost of the additional maintenance and the effectiveness of the considered maintenance in solving the issue. It also reviews the extent of the issue. If a maintenance program can cost effectively address the issue and can successfully solve the problem it is implemented as a maintenance program. If the maintenance program strategy cannot address the issue cost effectively or successfully solve the problem then it identifies it as a renewal project.

If the possible mitigation strategies are not cost effective or do not satisfactorily address the problem then a replacement decision is made. For example, old poles that have lost a significant amount of ground level wood fiber have lost a significant amount of pole strength. Treating the pole at ground level will prevent further decay but will not restore the fiber already lost. If the pole is not able to withstand the “heavy loading” criteria then ground level pole treatment with a wood preservative, while not expensive does not restore the strength to the pole and hence it is ineffective in solving the substandard strength problem. The most cost effective way to solve the strength of pole problem in this case is to replace it. On the other hand if the ground level fiber loss is minor and the pole strength is adequate to withstand “heavy loading” conditions then ground level pole treatment with a wood preservative is a good cost effective solution. CND tests and treats all poles more than 25 years old and every 10 years thereafter.

CND uses a similar approach, looking for maintenance strategies and evaluating them, for its underground plant. If mitigation is not cost effective or does not solve the problem a renewal approach will be followed.

Equipment that fails in service is replaced or repaired. For example, a pole that breaks in service is replaced with a new pole. An underground cable that fails due to a fault is repaired at the point of the fault. The appropriate approach depends on the specific asset.

Assets are most often installed a group at a time. For example an underground subdivision installed in a particular year will use the same vintage of cable, connectors, transformers and using the same installation techniques and designs as other subdivisions installed in the same year. As a result if there are problems in one area with primary cable then other similar installations from the same time period also have the same problems. Also if problems appear and the failure mechanism is discovered to be for example water treeing in cables then over time the failures will increase. This means that repairing the fault in a cable does not ensure continued reliable service but may merely allow another failure to occur elsewhere on the same cable. Also cable repair is costly since the fault needs to be located, dug up, repaired and the excavation restored.

CND retains its outage information and reviews it to detect these patterns to aid in the identification of its renewal projects.

CND also uses the condition assessment of its assets as gathered by inspection and testing to identify its renewal projects.

Once renewal projects are identified they are prioritized over a 5 year period based on public safety, ongoing customer outage impact, cost of the renewal project, the ability to complete the work in a given year and the available budget. Large projects are broken into smaller phases to allow a better staging of the work where possible. This provides better budget flexibility as well.

When existing plant is renewed some aspects of the maintenance do not change. Inspections need to be carried out on a three year cycle, Thermographic Testing will be carried out as appropriate and vegetation management will still be required. Some maintenance activities do not need to be carried out. For example pole testing and treatment is only done on poles more than 25 years old. Also with new plant there will be fewer trouble calls or less reactive maintenance. Considering the large amount of old overhead plant and the significant amount of 1970's vintage underground cable that is beginning to fail and the relatively modest rate at which CND can address these issues through renewal. The impact of the reduced maintenance is not likely to be clearly evident for 3 or more years.

2.3.10. Comments

Items of concern are reviewed and discussed informally between CND staff or more formally through regular departmental meetings in which Maintenance activities are typically addressed. These and other meetings also serve as the general forum for addressing distribution network items that may impact system performance and result in additional Maintenance or Capital investments.

CND regularly reviews the industry standard reliability performance indices namely SAIFI, SAIDI and CAIDI. Outages are reviewed and actions are taken to address the causes of outages that have a common root. An example is the decision to replace the porcelain insulator type SMD20 fused-switch with a polymer insulator based SMD20 device to reduce the safety risk to crews and reduce outages affecting system performance. In addition, the outage performance of feeders is reviewed when considering projects for the capital budget. A more recent example is the replacement of a particular style of capacitor bank switch after failures in several units brought a specific vulnerability associated with that design to light. This was addressed together with the manufacturer.

The inclusion of performance data in the preparation of the capital budget is the result of direct involvement and information about system performance. It takes place as a matter of course because of the knowledge and experience of the senior Leadership Team. Feedback from customers is also used when considering projects for the capital budget.

Similarly for Maintenance and Inspection processes, detailed instructions are informally revised based on experience and history.

As has been previously noted, there are several areas where maintenance is not the answer to future reliability and economical operation of the power system. These areas include:

- Old, end of life poles that are failing mechanically
- 1970's vintage high voltage underground cable that is failing and corrosion problems with the connectors, as well as the transformers in the accompanying submersible design of that vintage of underground distribution plant
- Issues in the Galt core area, namely salt corrosion and cable terminator failures involving cables, transformers, terminators and connectors
- Failing porcelain line insulators
- Failing porcelain SMD20 switch/ fuse units

More detailed information is included in section 3.4 [5.4.4] and beyond in support of the capital projects.

3. (5.4) Capital Expenditure Plan

3.1.(5.4.1) Summary

Information on the capability of the distributor's system to connect new load or generation customers.

Based on the applications to connect new renewable energy generation, CND has performed an analysis of the system's ability to connect this generation. There are no limitations to the connections and only in one case is there a likelihood of needing to make expenditures for a transfer trip capability. This project is still preliminary and the final requirements are not established at this time.

CND has several new residential subdivision projects underway and in the planning stages as well as the Boxwood Drive Industrial subdivision that is being completed this year. Appendix J provides information about the developments that impact CND's planning. The Boxwood Drive Industrial subdivision that is being completed in 2013 has an expected load of 10 MW and the East Side Lands development which is expected to be developed in phases has an expected ultimate total load of 60 MW. These and other smaller load increases require the building of new main feeders to accommodate the loads. This will also drive the eventual requirement for a new Transformer Station which is expected in 2018.

Line extensions or line upgrades are required to connect some of the new load as detailed in CND's Capital Plan.

Total Annual Capital Expenditures Over The Forecast Period, By Investment Category

CND plans to make the following investments;

Table 13, Total Annual Capital Expenditures Over The Forecast Period

	Forecast (Planned)					
	2013	2014	2015	2016	2017	2018
	Forecast	Plan	Plan	Plan	Plan	Plan
Category	$'000	$'000	$'000	$'000	$'000	$'000
System Access	8,411	8,123	6,857	4,143	4,020	3,496
System Renewal	7,089	7,140	7,380	4,033	3,766	3,554
System Service	760	975	342	342	342	16,842
General Plant	2,864	3,817	2,169	2,135	2,270	2,060
Capital Contributions	(3,041)	(2,406)	(3,800)	(2,100)	(2,000)	(1,800)
Total	16,083	17,649	12,948	8,553	8,398	24,152
System O&M	4,665	5,343	5,240	5,036	4,929	4,820

A brief description of how for each category of investment, the outputs of the distributor's asset management and capital expenditure planning process have affected capital expenditures in that category and the allocation of the capital budget among categories.

System Access Category

As noted in Section 2.1 [5.3.1] projects and timing for these projects is driven by external parties. The asset management planning process determines if a project is required to address the requirements of the third party and the Capital Expenditure Planning process determines the priority of the project. The impact on the customer's bill is translated into an upper limit on the amount of Capital work that can be accommodated in any year. System Access projects are non-discretionary and hence must be done. Often the timing of the project as requested by the third party is optimistic and judgment is required to program this work accurately. However CND must respond in time to meet the requirements of the projects when they proceed. Several large projects in this category require large amounts of capital investment and this is reflected in the table 13 above. This investment allocation reduces the amount of capital available for other investment categories.

System Renewal Category

Section 2.1 [5.3.1] outlines the methods by which renewal projects are identified. The Capital Expenditure Planning process determines the priority of the identified projects. The impact on the customer's bill is translated into an upper limit on the amount of Capital work that can be accommodated in any year. This work is discretionary but if there are pressing issues that need to be addressed then the priority is not merely a ranking of projects in a list but there are system performance issues that drive the priorities. CND's project priorities have this sense of urgency associated with them. All the discretionary work is prioritized this way.

System Service

Section 2.1 [5.3.1] outlines the methods by which System Service projects are identified. The Capital Expenditure Planning process determines the priority of the identified projects. The impact on the customer's bill is translated into an upper limit on the amount of Capital work that can be accommodated in any year. This work is discretionary but if there are pressing issues that need to be addressed then the priority is not merely a ranking of projects in a list but there are system performance issues that drive the priorities. CND's project priorities have this sense of urgency associated with them. All the discretionary work is prioritized this way. Some System Service projects are ongoing implementations of previously approved plans. For example the installation of remote operated switches. These switches are installed to provide rapid restoration of power to customers in the event of an outage. There are real impacts namely reduced customer hours of interruption when these switches are installed but these benefits only occur when the devices are in place and operable. This gives them a priority in the capital project ranking that another project would not have.

General Plant Five Year Forecast

The following table provides a summary of CND's forecast General Plant capital expenditures over the next five years.

	Bridge Year 2013	Test Year 2014	Budget 2015	Budget 2016	Budget 2017	Budget 2018
Land and Buildings (Note 1)	$ 448	$ 55	$ 100	$ 100	$ 100	$ 100
Meters	915	967	900	900	900	900
Office Equipment and Furniture (Note 1)	187	80	50	50	50	50
Information Technology	609	2,086	604	600	600	600
Vehicles	588	520	465	425	555	345
Tools and Equipment	117	109	50	60	65	65
Gross Capital Expenditures - General Plant	2,864	3,817	2,169	2,135	2,270	2,060

Note 1: Land/Buildings/Office Equipment and Furniture excludes potential impact from results of Space Study.

The forecast has been prepared based on the following assumptions and/or information known at the present time. While specific material projects have not been identified for years 2015 through 2018, CND expects that the General Plant capital expenditures will level to approximately $2MM per year. This investment level excludes any estimate with respect to future investments that will be required by CND to upgrade its corporate office and operations facilities, further explained below.

In 2013, CND engaged a third party consultant to undertake a comprehensive space study with respect to its corporate offices and operating facilities. CND's existing facilities were constructed in the 1980's and since that time CND, and the industry, have undergone significant change. The growth in CND's business over the years, as well as an increase in the number of full-time employees, has resulted in insufficient office space, as well as inadequate garage space due to the physical size and growth in the fleet. CND is exploring the various options that may be available, including the expansion of existing facilities or the building of a new facility. At the time of the preparation of the five year forecast, estimated costs were not available.

Investments in General Plant are required on an annual basis to support the day to day operations of CND. From a priority perspective, investments in General Plant are generally prioritized as follows:

1. Meter Investments – represents the costs to install new and replacement meters to CND's customers. Investment in new meters is based on expected customer growth, while investment in replacement meters is based on the age of the assets, as well as

testing conducted as part of CND's meter verification program, as required by Measurement Canada. These expenditures are not discretionary.

2. Information Systems Technology – CND will continue to invest in information systems technology to realize operating efficiencies and provide customer value. In 2014, CND will undertake a significant investment in an Outage Management System, Distribution Management System, and IVR Solution. These investments are necessary to meet our customer expectations with respect to communication and reliability. CND will replace end of life assets over a three to five year lifecycle. Upgrades to the CIS/Billing System and ERP Solution will be required over the five year forecast period. CND will manage the pace of its IST investments, with due consideration for mitigating enterprise risks, maximizing operating efficiencies, and implementing technology that supports the customers' expectations.
3. Vehicles (Transportation) – investments in vehicles are based on CND's vehicle replacement program, which is based on the estimated useful lives of the vehicles in the fleet, with due consideration for the results of operational and mechanical assessments completed. CND's objective is to maximize the life of its vehicles and equipment through its routine maintenance programs, while at the same time ensuring that the level of capital expenditure on an annual basis is fairly constant.
4. Buildings/Office Furniture and Equipment – investments in buildings and office furniture and equipment have been very modest over the last several years. Investments in the building since it was constructed in the 1980's have been limited. In 2012, the roof was replaced after thirty one years due to leaking in the office and garage areas. As noted above, CND has excluded the potential for increased investments in the building and office furniture and equipment, pending a comprehensive study of the options available to CND with respect to its current and future space requirements. At the time of the preparation of the five year forecast, estimated costs were not available. CND does not anticipate any material investments in the 2014 Test Year.

A List and Brief Description Including Total Capital Cost of Material Capital Expenditure Projects/activities, Sorted by Category

A project list and brief description for 2013 and 2014 projects can be found in Section 3.5.2 [5.4.5.2] and for 2014 through 2018 projects can be found in Appendix K.

Information related to a Regional Planning Process or contained in a Regional Infrastructure Plan that had a material impact on the distributor's capital expenditure plan, with a brief explanation as to how the information is reflected in the plan

CND identified the need for a new Transformer Station in the North-East portion of CND's service area. As a result of this study and the work Hydro One proposes to do to prepare for this transformer Station CND has included the investment in a CND owned new Transformer Station in the 2018 forecast. Separate approvals will be sought with a future application.

A brief description of customer engagement activities to obtain information on their preferences and how the results of assessing this information are reflected in the plan

CND keeps in contact with its customers generally, and with large users particularly, through meetings and discussions that arise usually in the context of new loads anticipated, opportunities for improvement of performance or events that have occurred that affected these customers.

CND communicates its Capital Plan to its customers through its website as "Projects Affecting You" with descriptions and timing and contact information to receive feedback. In addition CND sends letters to customers who will be directly affected in the case of System Renewal projects advising them of the scope of work. These also generate questions and feedback.

CND participates in community events and this brings CND staff in direct contact with customers who provide feedback and express concerns or comments.

In 2013, CND engaged Pollara to conduct a Customer Survey for business and institutional customers (large users) and in 2012, CND engaged Utility Pulse to conduct a survey of its residential customers.

In summary CND views these contacts as opportunities to be made aware of customer preferences and incorporates this information in the plan.

A brief description of how the distributor expects its system to develop over the next five years, including in relation to load and customer growth, smart grid development and/or the accommodation of forecasted renewable energy generation projects

CND expects solid steady load and customer growth over the next 5 years, as indicated in the Residential and Industrial Development Report found in Appendix J. The load increase is expected to be in the order of 43 MW in this period provided the current economic conditions continue to improve.

CND is continuing to install remote operable switches to complete its target of 3.5 switches per feeder. In addition it plans to install Outage Management and Distribution Management (i.e. automated switching) applications to enhance the operation and the management of its distribution system. These investments will provide CND with tools to implement aspects of smart grid.

The distribution system can accommodate existing and forecasted renewable energy generation projects.

A list and brief description including where applicable total capital cost (table format recommended) of projects/activities planned

In response to customer preferences

In 2014 CND will be implementing the following systems to address customer preferences that were raised in customer surveys.

- Outage Management System (OMS) *$465,000*
- Interactive Voice Response (IVR) solution - *$150,000*
- Distribution Management System (DMS) *$225,000*

The DMS, OMS and IVR capital investments are interrelated projects. These three solutions are the key requirements for the delivery of an Outage Management solution for CND that will ensure that CND is meeting customer expectations.

The OMS will meet customer expectations by allowing CND to deliver timely information concerning the extent of the outage, the expected restoration time, and other pertinent information. This information will be communicated to customers and the media via CND's web site, via email, via Interactive Voice Response (IVR) and through social media. The OMS will provide a consolidated list of all outages, providing a coordinated, prioritized methodology to ensure that power is restored to customers as quickly as possible.

The implementation of the DMS is expected to result in improved reliability and quality of service to CND's customers in terms of reducing outages, minimizing outage time, and maintaining acceptable frequency and voltage levels. This investment supports CND's customer feedback with respect to areas of customer service that could be improved upon. Investments in DMS and OMS are expected to improve reliability and reduce the duration of outages.

To take advantage of technology-based opportunities to improve operational efficiency, asset management and the integration of distributed generation and complex loads

CND will implement the systems listed above to also address operational efficiency, asset management and distributed generation and complex loads. The systems serve multiple purposes. Also in order to meet the customer preferences the data needs to be captured and processed first. These tools in concert with each other, provide the full range of data to manage the power system and with this data the customers can be informed.

To study or demonstrate innovative processes, services, business models, or technologies.

CND plans to leverage the DMS capability to implement automated switching to aid in rapid power restoration. This will be a trial of a system wide centralized switching application implemented on three 27.6 kV feeders.

A conventional underground rebuild with trenching was very expensive because of all the required restoration. As a result, CND plans to inject the existing cable to extend its life. CND has not done this before, but the technology has been applied elsewhere. If successful, the technology may be used to try and extend the life of CND's underground primary cables.

3.2. (5.4.2) Capital expenditure planning process overview

With its corporate emphasis on business performance and accountability, CND has developed a prudent capital budget process and system of prioritization. This system reflects its long term investment strategy, recognizes shorter term requirements, and is capable of addressing the ongoing need for CND to respond to external and internal priority changes. It respects the priorities of a wide range of stakeholders, CND's corporate strategies and regulatory requirements.

CND's capital expenditure planning objectives are described in Section 2.1 (5.3.1) above (referred to as guiding principles).

CND's processes and methods for selecting and prioritizing work are described in Section 2.1 (5.3.1) above (referred to as Asset Management Process).

The following high level inputs are investigated and evaluated in detail and collectively contribute to a final capital investment budget.

- New load growth and development projects
- Municipally driven projects
- Elimination of environmental/health or safety risks
- System reliability
- Distribution Automation
- Infrastructure renewal projects
- Regulatory initiatives e.g., Smart meters and the Green Energy and Green Economy Act
- Fleet/Tools
- Information technology and corporate administration

Each of these priorities are addressed individually.

3.2.1. New load growth and development projects

CND has an obligation to connect under Section 28 of the *Electricity Act:*

The City of Cambridge's Intensification Strategy, which has its origins in the the Provincial government's long term "Places to Grow" infrastructure plan is being realized (*as described in the Technical Paper—"Proposed Size and Location of Urban Growth Centres in the Greater Golden Horseshoe" prepared by the Ontario Growth Secretariat Ministry of Public Infrastructure Renewal, Spring 2008*). By close cooperation with staff from the City and the Region, CND has consistently matched the expansion of its distribution system by providing the supply infrastructure and capacity to accommodate this growth. This requires capital investments and realistic estimates of load growth for system planning.

Capital expenditures for new load growth are not discretionary and CND's budgeting process treats load growth as priority items. However, they are part of the long term planning process and the timing of these expenditures can sometimes be shifted as the rate of growth fluctuates (e.g., with economic conditions). The provision for built-in reliability also has to be accommodated and this has to be consistent with customers' high expectations.

CND supports CDM and renewable energy generation projects and factors the effect of these programs and projects into its analysis of new load requirements. CND exceeds the CDM KWH targets that have been set but has not been as successful in meeting the MW reduction targets. The renewable energy generation projects have not provided the needed new capacity significantly enough to offset the requirement for new investments by CND. If further conservation and/or renewable energy generation were available CND would take advantage of these to lower its investments. CND does take them into account through its load forecast which is one of the inputs to the planning process.

3.2.2. Municipally driven projects

Municipal projects are driven primarily by the City of Cambridge, the Township of North Dumfries and the Region of Waterloo with occasional requirements by the Ministry of Transportation. In these circumstances, the relocation of CND facilities is required in accordance with the *Public Service Works on Highways Act*. These projects are planned and funded within municipal, regional and provincial budgets, but historically they are often difficult to schedule for LDCs as they rely on multiple schedules for funding, engineering, approvals and construction schedules outside of its control.

The Act prescribes a formula for the apportionment of costs that allows for the road authority to contribute 50% of the "cost of labour and labour saving devices" towards the relocation costs. Specifically:

Apportionment of costs of taking up

The road authority and the operating corporation may agree upon the apportionment of the cost of labour employed in such taking up, removal or change, but, subject to section 3, in default of agreement such cost shall be apportioned equally between the road authority and the operating corporation, and all other costs of the work shall be borne by the operating corporation. R.S.O. 1990, c. P.49, s. 2 (2).

"cost of labour" means,

(a) the actual wages paid to all workers up to and including the foremen for their time actually spent on the work and in travelling to and from the work, and the cost of food, lodging and transportation for such workers where necessary for the proper carrying out of the work

(b) the cost to the operating corporation of contributions related to such wages in respect of workers' compensation, vacation pay, unemployment insurance, pension or insurance benefits and other similar benefits

(c) the cost of using mechanical labour-saving equipment in the work

(d) necessary transportation charges for equipment used in the work

(e) the cost of explosives

CND is not always able to predict the timing or schedule of municipal projects. CND observes that in every year it is expected to undertake and complete projects that typically cost between $300,000 and $500,000 but can be as high as $3,000,000 as seen with the Franklin Blvd Roundabout projects. Municipal funding can become available at very short notice or conversely projects become delayed through the approvals process. However, close communications with the road authorities are maintained to minimize problems with schedules.

At the time of budgeting and with the best information available from the respective road authorities, CND's capital investment budget carries provision for these projects. CND retains flexibility to accommodate changes identified by the municipal authorities.

3.2.3. Regulatory Initiatives e.g., Smart meters and the Green Energy and Green Economy Act

This is a newer feature of CND's planning and capital investment processes. CND's obligation to install and commission Smart Meters throughout its service area is a prime example of a non-discretionary project initiated by the government. CND successfully deployed Smart Meters and met the government's target completion date while maintaining normal day-to-day operations.

The Green Energy and Green Economy Act (GEGEA) requires distributors to accommodate a wide variety of renewable generation projects under the Ontario Power Authority's FIT and micro FIT programs. CND has embraced the prospects for this new electricity supply model, but it introduces a new set of unknowns into the local supply planning equation and therefore into the capital budgeting process. Within the bounds of land use, approvals and realistic business models uncertainty remains as to where and when renewable generation projects may be proposed, as well as the relative size of the proposals.

While this uncertainty creates complexity from a planning perspective, it is also capable of bringing supply opportunities to market that may result in reduced capital expenditures and improvements to the overall efficiency of the distribution system. To date, such opportunities have not materialized within CND's system.

All licenced distributors, in Ontario, have to comply with Ontario Regulation 22/04 Electrical Distribution Safety and compliance with this regulation is subject to an annual external audit. Section 4 of the regulation sets the public safety standards and includes the statement:

> *"All distribution systems and the electrical installations and electrical equipment forming part of such systems shall be designed, constructed, installed, protected, used, maintained, repaired, extended, connected and disconnected so as to reduce the probability of exposure to electrical safety hazards. O. Reg. 22/04, s. 4 (2)."*

To confirm compliance with the above, the auditors reference the Distribution System Code, specifically the section on System Inspection Requirements and Maintenance. CND also engages an independent third party to perform an ESA Audit which verifies that the processes required in O.Reg 22/04 and the safety and qualifications of the staff performing the work are all correct and appropriate in relation to O.Reg 22/04. A copy of the ESA Audit letter is included in Appendix I. This reinforces CND's commitment to maintaining its system in accordance with good utility practice and performance standards that could result in unscheduled capital expenditure priorities.

3.2.4. System reliability

CND's priority and close monitoring of its reliability is a prime feature of its annual performance. Attention is given to the annual performance of every feeder. Feeder outage times and momentary interruptions are reviewed and analyzed for trends and potential recommendations for improvement. For example, such reviews have highlighted reliability issues that are directly related to tree limbs or animal interference. This has resulted in more intensive tree trimming in some areas and the introduction of insulator guards to reduce wildlife contacts.

In accordance with Section 7.3.2 of the OEB's Electricity Distribution Rate Handbook, CND records and reports the overall Service Reliability Indices for its distribution system.

By this measure CND's reliability performance has been maintained, consistent with current, reasonable industry expectations.

In planning expenditures, based on reliability, consideration is also given to the nature of particular customers, who are not necessarily assessed equally. The priorities for a single residential customer and an industrial customer employing hundreds of staff with production reliance on electrical power require different evaluation criteria that are factored into the budget allocation process.

3.2.5. Distribution Automation

Distribution automation is a general term covering a wide range of technology applications that can enhance the operation and reliability of a distribution system. CND is typical of many LDCs, of similar size, and has operated its Supervisory Control and Data Acquisition (SCADA) system for many years, enabling the remote monitoring and control of its 27.6 kV distribution feeders. Operation of 27.6 kV circuit breakers is performed by Hydro One operators, with direction given by CND except MTS#1 where CND directly operates the breakers.

Over 20 years ago, CND committed to a program for the installation of remotely operated switches within its 27.6 kV distribution system. This greatly enhanced the operation of the system allowing control center operators much greater insight into the status of feeder conditions and the location of system faults. This proved to be a major step forward in responding to serious system outages. It improved response times and the flexibility of the system resulting in increased reliability to large numbers of customers.

Distribution automation has been a strategic commitment by CND that has been supported annually by its capital investment plans. This automation is applied to the 27.6 kV feeders. The experience gained has positioned CND well for the potential of future applications and is consistent with the government's emphasis on Smart Grid technologies.

3.2.6. Infrastructure renewal projects

CND has an on-going commitment to infrastructure renewal through its Asset Management Strategy. The following items provide a high level summary of its approach to infrastructure renewal projects.

Overhead

Pole testing and pole replacements are ongoing priorities and are continuously addressed. For example, spot replacements are identified and addressed through an annual pole replacement program. CND's overhead systems grew in the 1940s, 50s and 60s, and for reliability reasons and to pre-empt safety concerns associated with degraded insulation, are becoming due for major rebuild investments. The timing and amount of expenditure for renewal of the overhead system are items for continuous consideration within the capital budget process.

Underground

Since the 1970s CND, along with most LDCs in southern Ontario, made large commitments to underground residential distribution (URD) construction. This infrastructure has exhibited its own signs of aging. Primary cable failures have increased and are tracked annually. Submersible transformers are also a feature of some older neighbourhoods and are an expensive legacy. Underground system rebuilds are very capital intensive and have become an important priority that is evaluated annually, and is a significant feature of the long term infrastructure renewal plans.

Buildings

The CND office facilities were originally constructed in 1981/1989. While enhancements have been made over the years, it will continue to require capital investments to maintain its physical integrity and so that CND can provide suitable working conditions for all its employees.

The most critical (and material) building related capital project in 2013 is for a generator. The building's original generator was installed in 1981 at the time of initial building construction. That same generator cannot currently power the computer, telephone, control center and building electrical systems that have been upgraded and added to over the years. The generator must be upgraded to keep pace, to avoid the risk of system and equipment failure.

CND has received estimates from various suppliers to determine the $200,000 total cost of the new generator. CND has engaged the services of an electrical engineering firm to assist with the project. The total costs include engineering costs to redesign the upgraded electrical system, the generator itself, and the costs of the electrical system changes including upgraded wiring in certain parts of the building. The engineering firm is preparing the design and the tender documents for a September 2013 launch of the project with installation by the end of the year.

It is anticipated at this time that the new generator will be a 350 kV A unit even though the present building load is 200 kV A. The extra capacity will allow for future growth, as the generator being considered has a 35 year life.

In 2013, CND engaged a third party consultant to undertake a comprehensive space study with respect to its corporate offices and operating facilities. CND's existing facilities were constructed in the 1980's and since that time CND, and the industry, have undergone significant change. The growth in CND's business over the years, as well as an increase in the number of full-time employees, has resulted in insufficient office space, as well as inadequate garage space due to the physical size and growth in the fleet. CND is exploring the various options that may be available, including the expansion of existing facilities or the building of a new facility. At this time estimated costs were not available.

Although the generator is the only material capital project identified in 2013, there are other less material capital projects that have arisen due to the building's age. Such projects include an upgrade to the paving in certain areas surrounding the building, new fuel pumps that replace the original 1980's pumps, and renovations to certain parts of the building to accommodate either new staff or redesign based on work flow. These projects total $448,000.

Summary

Infrastructure renewal projects; buildings, overhead, underground, and substations are an essential component of CND's investment strategies. The ratio of residential underground to overhead installations is continuing to increase in accordance with current practices. Inherently, this will increase the future capital investments in infrastructure renewal due to the additional costs of underground projects. The timing of all renewal investments can be somewhat discretionary, allowing for some flexibility in the capital budget process, but renewals cannot be ignored in the long term investment strategy.

3.2.7. Elimination of environmental/health or safety risks

CND has always respected environmental/health or safety issues and addresses them through the appropriate budget allocations.

For a number of years, the most significant environmental issue for LDCs has been the elimination of Polychlorinated Biphenyl's (PCB) contaminated transformers. CND has completed its entire transformer testing work and has eliminated any units from sensitive locations. To reduce the environmental risk, it has budgeted for the replacement of the remaining units and is proceeding with the replacement of all remaining locations in 2013.

3.2.8. Fleet/Tools

The nature of CND's business requires the use of very specialized vehicles and tools to build, operate and maintain the distribution system. They are necessary to work effectively under live high voltage situations, often under extreme weather conditions where worker and public safety are the prime consideration.

CND has built up its fleet of vehicles and equipment to deal with all aspects of its work environments. Maintaining this fleet in safe and reliable operating conditions is a continuous process requiring annual commitments for replacement or upgrades under a planned budgetary process.
CND is replacing a 2002 vintage with a Single Bucket Small Aerial Service Truck (Hybrid replacement) in 2013 at a cost of $365,000. In addition CND is replacing an existing vehicle that was purchased in 1997 and is a Double Bucket Truck with a Freightliner Cab and Chassis, and an Amador aerial device. CND will purchase a new Double Bucket Truck in 2014 at a cost of $450,000. The cost of this investment includes the vehicle cab and chassis, the aerial device and

the fiberglass utility body, tools, and the preparation costs to put the vehicle on the road and available to work.

3.2.9. Information Technology and Services

Information Technology and Services (ITS) is an essential investment in any utility business. The applications include sophisticated customer information, financial and work management systems, personal computing, Geographic Information System and SCADA system.

They are all major capital expenditures requiring periodic upgrades or replacements that are carefully reviewed and prioritized, with input from all stakeholders within the company.

3.2.10. Renewable generation

CND has prepared an analysis of its capability to accommodate renewable generation facilities. This analysis is included in Section 3.3 [5.4.3] of this Distribution System Plan. It does not indicate a requirement for any significant capital expenditures for the proposed connections beyond the possibility of a transfer trip capability for one generator applicant. The amount of proposed renewable energy generation (REG) does not offer any significant capacity relief to CND's distribution system and therefore has no impact on its regional planning.

3.2.11. Impact on customer bills

Care is taken to introduce only gradual increases in capital expenditures to minimize the impact on customer bills and to ensure smooth changes year to year. CND has a target to manage the increase to less than 10%. Mechanisms used in reviewing proposed budget increases include determining the reliability and quality of service improvements to customers, changes in revenue requirement from one year to the next (which is a proxy for the expected change in distribution rates), and impacts on CND's resources (e.g., work force, capital).

3.2.12. Customer engagement

CND has a wide range of customer engagement activities that communicate on items of interest and importance. These are communicated through community events, retail locations, a web portal, the local newspaper, bill inserts and Customer Satisfaction Surveys. Items include energy conservation, financial assistance programs, and time-of-use pricing.

In 2013, CND engaged Pollara to conduct a Customer Survey for business and institutional customers (large users). The survey covers a wide range of issues relating to customer satisfaction, namely, service levels, business operations, reliability, conservation, smart meters and smart grid. The results of the survey indicate that CND has a high level of customer satisfaction with the customers surveyed with an opportunity for additional improvement. Four points stand out and contribute most strongly to the customer satisfaction:

1. Is a respected company in your community
2. Provides good value for your money
3. Beyond creating jobs and paying taxes, is a socially responsible company
4. Maintains high standards of business ethics

In 2012, CND engaged Utility Pulse to conduct a survey of its residential customers. This survey included provincial and national references, as well as a comparison of the most recent previous survey of CND's customers. This survey indicated a higher degree of satisfaction than the provincial or national comparators, and also showed the same high degree or a higher degree of satisfaction by CND's customers in all the survey dimensions.
Copies of the customer surveys are included in Exhibit 1. The Residential survey is in Appendix 1-1A and the Large Customers survey is in Appendix 1-1B of CND's 2014 Cost of Service Application.

CND uses the customer engagement information in the preliminary phases of the planning process.

Summary

The above items give some insight into the degree of CND's discretionary and non-discretionary spending and the limitations within the capital budget process. The following items are a high level summary of these items:

Required Non-Discretionary Budget Items

- Projects to accommodate new customers and load growth
- Projects to accommodate municipal requirements
- Expenditures to satisfy regulatory initiatives, environmental or health & safety risks

Required Discretionary Budget Items (With some timing flexibility)

- Infrastructure renewal projects
- Fleet/tools
- Distribution Automation
- Information technology

In developing its capital investment plans, CND is challenged to satisfy its non-discretionary obligations and balance them with projects that have been evaluated and supported by data from its Asset Management Strategy and good judgement from its professional management team.

CND supports CDM and renewable energy generation projects and factors the effect of these programs and projects into its analysis of new load requirements. The renewable energy generation projects have not provided the needed new capacity significantly enough to offset the requirement for new investments in plant by CND. If further conservation and/or renewable energy generation were available CND would take advantage of these to lower its investments. CND will continue to utilize this resource as opportunities arise.

It can be concluded that current levels of expenditures on rebuild projects, distribution automation, and maintenance have kept CND's reliability performance at reasonable levels. However, long term planning has identified expenditures for renewals as the distribution system infrastructure ages.

3.3.(5.4.3) System Capability Assessment for Renewable Energy Generation

CND has connected 16 FIT projects for a total of 2,685 kW and 138 micro-FIT projects for a total of 1,096 kW. CND has received 69 FIT applications for a total of 16,456 kW and 79 micro-FIT for a total of 736 kW. This data is as of March 5, 2013. The known future projects are in various degrees of readiness ranging from application to "Approved", but not yet connected.

For the purposes of determining capacity limitations for connection, the analysis includes all the connected and known future projects. This presents a reasonable upper bound on the system impact based on what is known at present. Any additional capacity shown in the tables indicates the capability to connect additional generation should projects come forward in the future.

A significant portion of the service area is rural, specifically the North Dumfries Township part of the service territory. There is significant potential for future solar installations in this area, but to date the applications from this area have been very modest. In addition to solar generation, CND has connected a bio-gas installation. These are well within the system capability and are included in the REG analysis included in the following sections.

3.3.1. Supply Station Ratings

Table 14 shows the individual station rating for the stations that supply CND as well as the current and known possible future REG and the connected REG.

Table 14 Supply Station Ratings and Connected and Future REG

Station Name	Rating (MVA)	Min Load (MVA)	SC Available (MVA) Note 1	Thermal Available (MVA) Note 1	Connected REG MW	Future REG MW
MTS #1 [2510] (CND OWNED)	83.3	19.8	75	60	1.863	5.960
Galt TS [65] (H1 OWNED) J-Bus	125	14	99.6	39.3	0.346	2.675

Station Name	Rating (MVA)	Min Load (MVA)	SC Available (MVA) Note 1	Thermal Available (MVA) Note 1	Connected REG MW	Future REG MW
Galt TS [65] (H1 OWNED) Y-Bus	125	13.2	100.5	39.3	1.043	4.645
Preston [21] TS (H1 OWNED) J-Bus	125	10	141.5	11.1	0.010	1.210
Preston [21] TS (H1 OWNED) Q-Bus	125	9.9	123.8	10.1	0.464	2.442
Wolverton DS [W] (H1 OWNED)	25	3.2	625.5	15.2	0.055	0.260

Note 1: These values are supplied by Hydro One at http://www.hydroone.com/Generators/Documents/HONI_LSC.PDF and dated March 27, 2013 for Hydro One owned stations. The CND station information is provided by CND.

3.3.2. Analysis of Station Capacity

The current and known possible future REG is well within the capacity of the stations based on published ratings; hence the stations do not present any limitations for these generators. Future requests will need to be reviewed to ensure the ratings are not exceeded. Preston T.S. has the smallest thermal capacity, but it has the capability to connect new generation more than three times greater than the current connected and known possible future generation combined.

3.3.3. Supply Feeder Ratings

Table 15 shows the individual feeder ratings based on Hydro One's "Distributed Generation Technical Interconnection Requirements – Interconnections at Voltages 50 kV and Below" DT-10-015 R2. These requirements are listed in Appendix D.

Table 15 FEEDER LOADS

Feeder Name	Rating (AMPS)	Max Line Loading (AMPS) Note 1	Line Loading (MW)	Existing Generation (MW) Note 2	Pending Generation (MW) Note 2	Available Capacity at Breaker (MW)	Actual Minimum Feeder Load at Breaker (MW)

Feeder Name	Rating (AMPS)	Max Line Loading (AMPS) Note 1	Line Loading (MW)	Existing Generation (MW) Note 2	Pending Generation (MW) Note 2	Available Capacity at Breaker (MW)	Actual Minimum Feeder Load at Breaker (MW)
2510M37	600	400	19	0.084	0.625	18.291	1.751
2510M39	600	400	19	0.155	1.046	17.799	3.560
2510M41	600	400	19	0.008	0.150	18.842	0.900
2510M43	600	400	19	0.316	0.807	17.877	1.783
2510M38	600	400	19	0.560	0.540	17.900	2.970
2510M40	600	400	19	0.290	2.092	16.618	3.200
2510M42	600	400	19	0.200	0.200	18.600	2.733
2510M44	600	400	19	0.250	0.500	18.250	3.490
65M11	600	400	19	0.030	0.315	18.655	3.283
65M13	600	400	19	0.048	0.375	18.577	0.650
65M15	600	400	19	0.023	1.405	17.572	2.370
65M17	600	400	19	0.080	0.050	18.870	2.997
65M19	600	400	19	0.035	0.520	18.445	1.713
65M21	600	400	19	0.130	0.010	18.860	2.830
65M12 Note 3	600	400	19	0.627	1.318	17.055	3.880
65M14	600	400	19	0.004	1.000	17.996	2.070
65M16	600	400	19	0.107	0.693	18.200	2.052
65M18	600	400	19	0.048	0.138	18.814	3.220

Feeder Name	Rating (AMPS)	Max Line Loading (AMPS) Note 1	Line Loading (MW)	Existing Generation (MW) Note 2	Pending Generation (MW) Note 2	Available Capacity at Breaker (MW)	Actual Minimum Feeder Load at Breaker (MW)
65M20	600	400	19	0.257	1.246	17.497	1.498
65M22	600	400	19	0.000	0.250	18.750	0.630
21M24	800	400	19	0.000	0.000	19.000	2.847
21M26	600	400	19	0.000	0.000	19.000	4.530
21M28	600	400	19	0.010	1.210	17.790	3.110
21M30	800	400	19	0.000	0.000	19.000	2.144
21M23	600	400	19	0.200	1.262	17.538	2.940
21M25 Note 4	600	400	19	0.066	0.655	18.279	2.847
21M27	600	400	19	0.151	0.169	18.680	1.362
21M29	600	400	19	0.047	0.356	18.597	2.710
WF2 Note 3	N/A			0.055	0.260		3.2

Note 1: Line capacity per Hydro One's "Distributed Generation Technical Interconnection Requirements – Interconnections at Voltages 50 kV and Below" DT-10-015 R2

Note 2: Present and future REG amounts based on actual connected generation and the FIT and Micro-Fit applications that have been received as of March 5, 2013.

Note 3: Wolverton F2 and Galt TS 65M12 are shared with Hydro One. Detailed discussions are required to determine the capacity once a potential project materializes.

Note 4: Preston 21M25 is shared with Waterloo North Hydro. Detailed discussions are required to determine the capacity once a potential project materializes.

Note 5: At this time, none of the TS feeder breakers are equipped for reverse power capability.

3.3.4. Analysis of Feeder Capacity

As can be seen from the values in Table 15, based on existing and preliminary projects that CND is aware of, all feeders except the feeder supplied by Wolverton F2 have significant capacity to connect REG without alteration. The Galt 65M12 and the Preston 21M25 have capacity, but because these are feeders that are shared with others, the REG capacity needs to be coordinated with the other parties. Before any new generation is connected, the Station capacity needs to be reviewed to ensure the capacity to connect is adequate. If new generation projects were to take place in the rural 8.23 kV supplied area, then the planned rebuild schedule for this area may be altered to allow the connection of REG to the 27.6 kV system. This rebuild is planned to be completed by the end of 2015. This is not anticipated to cause difficulties if sufficient lead time for the REG project is provided or if the projects materialize in this area after 2015. It is expected that Renewable Enabling Improvements in the form of a transfer trip scheme will be required on the Galt 65M20 feeder for the 1.2 MW hydro-electric project at Parkhill Dam, likely in 2016.

The minimum feeder load values are the lowest daytime values experienced independent of the day of the week. This represents the worst case from the point of reverse power calculation. This has validity for solar projects since the minimum power condition of interest is during daylight hours. This is when solar generation takes place. The values in Table 15 show that there is capacity to connect all the known REG projects.

Hence, with the exception of the potential transfer trip scheme for the Parkhill Dam project, CND has no other requirements and therefore has no plans to undertake any special REG enabling projects.

3.4.(5.4.4) Capital expenditure summary

All proposed expenditures in 2013, the test year (2014), and 2015 to 2018 Capital Expenditure Plan are categorized as follows:

1. System Access
2. System Renewal
3. System Service
4. General Plant

These are described in Section 3.5.2 [5.4.5.2] Material Investments. Project listings and descriptions for 2013, 2014, and 2015 to 2018 are included in Appendix K.

The categorization is derived from the capital expenditure planning process that prioritizes items based on whether they are discretionary or non-discretionary. These, in turn, were developed from CND's annual performance reporting, Asset Management Strategy and the Regional Planning Process. CND's systems planning for new load and forecasts for renewable generation are captured within this DSP.

The planned expenditures reflect continued moderate new customer growth that is informed by the Provincial government's long term "Places to Grow" infrastructure plan, the City of Cambridge, the Township of North Dumfries and Region of Waterloo planning data. Distribution automation and smart grid development also continue to be a strategic commitment and are supported annually by CND's capital expenditure plans. As indicated in Section 3.3 [5.4.3], CND does not anticipate major expenditures to accommodate renewable energy generation projects.

Table 16 included the historical 2009 to 2012 expenditures, as well as the current year (2013), the test year (2014), as well as the forecast expenditures from 2015 to 2018.

Capital Expenditure Summary																				
	Historical (Previous Plan and Actual)														Forecast (Planned)					
	Test-5 2009			Test-4 2010			Test-3 2011			Test-2 2012			Test -1 2013			Test 2014	Test +1 2015	Test +2 2016	Test +3 2017	Test +4 2018
	Plan	Actual	% Var	Plan	Actual	% Var	Plan	Actual	% Var	Plan	Actual	% Var	Plan	Forecast	% Var	Plan	Plan	Plan	Plan	Plan
Category	$'000			$'000			$'000			$'000			$'000			$'000	$'000	$'000	$'000	$'000
System Access		3,966			4,152			3,140			3,032			8,411		8,123	6,857	4,143	4,020	3,496
System Renewal		5,240			6,262			3,999			2,886			7,089		7,140	7,380	4,033	3,766	3,554
System Service		54			425			716			835			760		975	342	342	342	16,842
General Plant		1,257			1,436			2,187			10,108			2,864		3,817	2,169	2,135	2,270	2,060
Capital Contributions		(2,326)			(1,804)			(1,342)			(368)			(3,041)		(2,406)	(3,800)	(2,100)	(2,000)	(1,800)
Change in WIP		(118)			(576)			(338)			(3,011)									
Total		8,073			9,895			8,362			13,482			16,083		$17,649	12,948	8,553	8,398	24,152
System O&M		3,376			3,448			3,769			5,428			4,665		5,343	5,240	5,036	4,929	4,820

Table 16 Capital Expenditure Summary

3.5.(5.4.5) Justifying capital expenditures

3.5.1. (5.4.5.1) Overall plan

System Access

CND's System Access Projects are driven by others. CND is obligated to connect the new load or the new renewable generation. They are also required to respond to the road authorities by obligations under the *Public Service Works on Highways Act*. The act prescribes a formula for the apportionment of costs that allows for the road authority to contribute 50% of the "cost of labour and labour saving devices" towards the relocation costs.

The annual budget has historically varied from $3.5 million to $8 million, depending on the requirements for new serviced lots (subdivisions), both industrial and residential customers, as well as providing services to the lots as they are built on and occupied. Also included in the budget figures above is the line construction outside the subdivisions to supply the required load. This work is customer driven and non-discretionary.

The next significant project in this category is the result of the Region planning to proceed with the installation of roundabouts on Franklin Blvd. This relocation project is anticipated to cost in the order of $6 million over two years. There is uncertainty as to the exact start and finish dates of this project, but it is expected to be within the scope of this rate application. The best information at present is that relocation work will start in 2014, not in 2013 as was communicated to CND at the time of the 2013 budget preparations. The remaining work budgeted is road work initiated by the province, the region or the city. This work is driven by the road authorities and is non-discretionary.

Another System Access work type is customer driven investment which is also non-discretionary. This includes the internal servicing of new subdivisions as well as the work required to be done by and funded by CND to bring an adequate capacity supply to the boundary of the new subdivision. CND's line capacities at the new subdivision locations are not adequate to supply the new load and new lines need to be constructed to bring sufficient capacity to the subdivisions. The annual budget for customer driven investment varies from $3.5 million to $8 million based on the present forecast of new serviced lots (subdivisions) both Industrial and residential, as well as providing services to the lots as they are built and occupied. Also included in the budget figures, is the line construction outside the subdivisions to supply the required load. This work is customer driven and non-discretionary.

There is one renewable energy enabling project in 2016, providing for a transfer trip scheme to a hydroelectric dam project. This work is customer driven and in non-discretionary.

System Renewal

The annual investment for system renewal has varied historically from $2,000,000 to $4,000,000. In 2013 and 2014 CND expects to invest about $6,500,000 per year to address its aging infrastructure. Investments beyond 2014 will average about $3,000,000 to $4,000,000 per year as the aging infrastructure continues to be addressed.

About 15% of CND's overhead pole assets are 43 or more years old and were initially installed to 8.32 kV design standards. This means that they are not suitable for upgrading to 27.6 kV standard clearances. The poles are weathered and cracked and a number of them have failed in-service causing power interruptions. When the original 27.6 kV conversion was carried out about 20 to 25 years ago, selected roads were rebuilt to 27.6 kV standards, but these poles were left in place and the customers were supplied at 8.32 kV from the 27.6 kV system through 16 kV to 4.8 kV step-down transformers. This solution has been cost effective, but these remaining poles are failing and should be replaced. The areas CND plans to address are North Dumfries, the north rural area of Hespler and Blair. From the attached pole map (Appendix C), these areas can be seen to have significant quantities of old poles. Rebuilding these areas will improve the reliability, and replacing these poles as a capital program will reduce the cost of replacement as compared to a run to failure replacement cost. This project will also replace the 8.32 kV that still exists and reduce the stocking and inventory requirements. While this work is discretionary, it is necessary to consider the large number of old poles that are at end of life and replace these at a reasonable pace, as CND is planning to do—preventing a steady deterioration in service levels to the customers supplied from these circuits.

Many of the old poles are 35 feet long and in treed areas where the branches are above the conductors. The trees are also generally old and either a branch will fall down or the whole tree will be broken particularly in higher wind situations. This often causes the small gauge conductors to break and adjacent old poles to break. When these areas are rebuilt to the 27.6 kV standard, taller poles will be used and the wire will be higher. The overhanging vegetation will need to be trimmed to provide clearance to the conductors. This will make the new lines less prone to tree contacts.

As indicated in section 2.3.9, CND has experienced problems with porcelain line insulators. CND has experienced 52 incidents with a particular style and vintage of insulator in the 2006 to 2013 time period. This is an industry recognized situation as can be seen in a Ontario Hydro report, dated March 10, 1993, which is included in Appendix E. CND has responded by replacing these insulators with an appropriate polymer based insulator at a modest pace. Since 1998, about 2366 insulators have been replaced; there are 13,710 such insulators estimated to be on the system. CND replaces approximately 160 annually on average. CND continues to have failures of these insulators still in-service at a rate of 4 to 10 per year. If this number increases substantially, CND may increase the rate of replacement to improve reliability and reduce safety concerns. This project is currently below the materiality threshold.

CND has also experienced failures with the older porcelain insulator style of the SMD20 switch/fuse assembly. In some cases, the insulator fails and causes an outage, and at other times the insulator fails when the crew operates the device. When a failure occurs, CND replaces the porcelain insulated unit with a polymer insulated unit. CND has about 3759 porcelain insulated units and has replaced about 455 of these units since 2009—averaging 113 per year. Since 2006, CND has experienced 99 failures or about 12 per year. If this number increases substantially, CND may increase the rate of replacement to improve reliability and reduce safety concerns. This project is currently below the materiality threshold.

These projects demonstrate CND's desire to address the issues, while balancing the cost of the work required by proceeding with the work at a modest pace. If circumstances change a new balance will be struck as appropriate.

The plan for 2013 and 2014 is firm, but the specific pole line rebuild locations and plans for 2015 to 2018 are not detailed at this time. The expected investments for these projects are included in the forecast for 2015 and beyond and are called 27.6 kV Pole Line Rebuilds. In the next budget cycle, the 2015 specific pole line rebuild projects will be identified.

The underground rebuild CND is embarking on addresses two main issues.

First is the repeated failure of the underground plant in the Galt core area. Information on these outages is included in Appendix L. The failure of the cable is accelerated by the salt contamination that is the result of the liberal use of salt on the roads and sidewalks in winter. Many transformers and switching points are below grade and the fact that the water table is high in this area often results in water entering these installations. This places the electrical system in an adverse environment. As a result, the cables fail due to being in a wet contaminated environment, the transformer tanks corrode and the load break elbows fail due to periodic immersion in water laced with various salts. This issue is addressed in the capital System Renewal projects listed.

Second, CND has experienced repeated failures in the underground system that is caused by several aspects. Information on these outages is included in Appendix L. The plant that is failing is largely cable installed in the 1970's at 27.6 kV 3 phase, 4 wire system. This cable was state of the art at the time, but experience in the industry has shown that this cable installed in a wet environment [direct buried] and the construction of the cable—non-jacketed, non–metallic shield, combined with the state of technology for managing voids and contaminants in the cross-linked polyethylene insulation, leads to insulation failures that manifest themselves after 25 to 30 years. In addition, some of these subdivisions also use submersible transformers that have corrosion and connection issues. They also employ load Break Elbows, which fail in-service in continuously moist conditions. CND has a number of subdivisions of this vintage that are addressed in its capital System Renewal projects. Information on the outages experiences is included in Appendix L. The areas addressed are generally in Galt, Hespler, Preston and North Dumfries. These areas had "new" subdivision work in the 1970s.

In addition, CND has experienced outages due to failures in older style 27.6 kV PMH pad mounted switching units. These units are subject to moisture build-up and flashover, despite cleaning. CND has 25 remaining PMH type 27.6 kV switching units on its underground distribution system. Three were replaced in 2012. A new type of switching unit was selected to improve reliability. CND plans to change out the remaining units over a nine year period to ensure long term reliability and maximize the life of the existing equipment as much as possible.

Figure 4 shows the locations CND plans to address in the capital program.

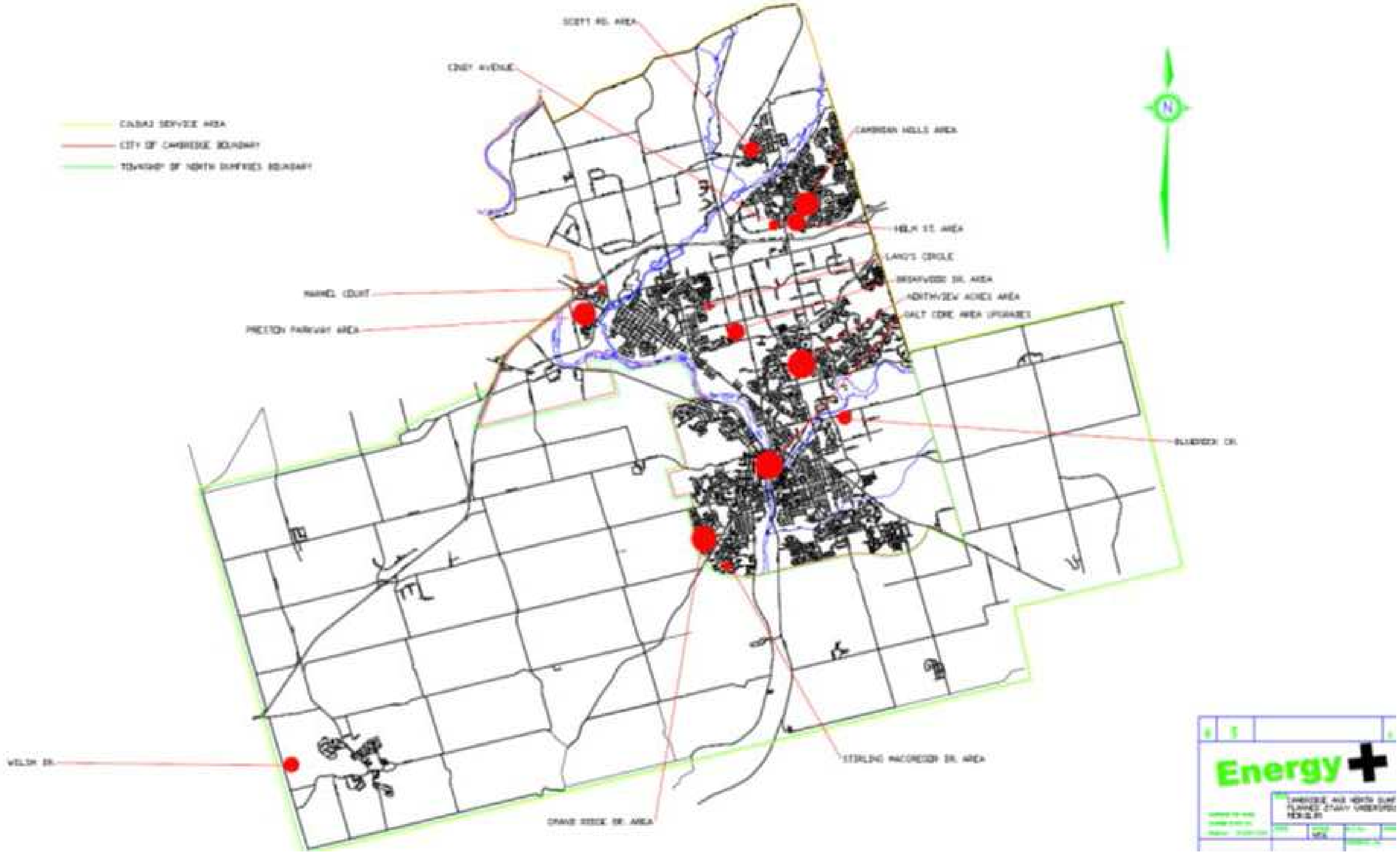


Figure 4 Locations of Underground Renewal Projects for 2013 to 2018
Note: A larger version of this map is available in Appendix G.

While CND has not used worst performing feeder analysis to develop its capital program 2013 to 2018, Appendix B shows this analysis for 2009 to 2012. CND intends to perform this analysis annually in future. It is noteworthy that the proposed capital program aligns closely to resolving the issues identified by the worst performing feeder analysis.

Table 17 illustrates the high rate of investment on the worst performing feeders compared to the total plant budget for 2013 to 2015.

Table 17: The Portion of Distribution Plant Budget Addressing Worst Performing Feeder Issues

Year	Budget $ related to Worst Performing Feeders	Budget $ Total Distribution Plant
	$(000)	$(000)
2013	5,320	5,783
2014	5,683	8,837
2015	1,798	11,579
Total	12,711	26,194

It is clear that CND has used its internal consultation process to arrive at a Distribution Plant Capital Program that addresses the causes of the outages, which is highlighted in the worst performing feeder analysis.

System Service

The annual investment for System Service has varied historically from $400,000 to $800,000. In 2013 and 2014 CND expects to invest about $800,000 to $900,000 per year to address its aging infrastructure. Investments beyond 2014 will average about $300,000 per year as continues to install remote operated switches to meet its design target of 3.5 switches per feeder. The $16,500,000 investment in 2018 is for the new Transformer Station.

In 1990, CND began to install remote operated switches to provide the capability to rapidly restore large parts of a locked out feeder. This is essential to maintaining reliability indexes at the higher 27.6 kV distribution system. CND has a target to install 3.5 switches per feeder for the 29 feeders that supply the service area and has steadily been progressing toward this goal. CND plans to install 5 switches per year, for each year of the 5 year plan, in order to reach this level. Once this level is reached, the program will be complete and switches will only be installed beyond this time period as a fine tuning effort—anticipated to be no more than one switch per year and only if required.

In order to ensure the proper working of all the switches installed, CND will replace old obsolete radio controllers that are at end of life in 2013 and 2014. More information is included in the project description for material projects.

Also in the rural area of North Dumfries, CND will install single-phase reclosers, replacing fuses, so that transient faults on the mainly rural area can be restored quickly.

These initiatives are in support of providing customer value and reliability.

CND plans to construct a new Transformer Station within its service area in 2018, which it plans to own. This application does not include this project for approval. A separate application will be presented specifically for this project as the need is solidified by actual load increases that result from the construction of the projects which are only forecasts at this time.

Maintenance Impact

When existing plant is renewed some aspects of the maintenance do not change. Inspections need to be carried out on a three year cycle, Thermographic Testing will be carried out as appropriate and vegetation management will still be required. Some maintenance activities do not need to be carried out. For example pole testing and treatment is only done on poles more than 25 years old. Also with new plant there will be fewer trouble calls or less reactive maintenance. Considering the large amount of old overhead plant and the significant amount of 1970's vintage underground cable that is beginning to fail and the relatively modest rate at which CND can address these issues through renewal. The impact of the reduced maintenance is not likely to be clearly evident for 3 or more years.

3.5.2. (5.4.5.2) Material investments

This section lists the material projects by year from 2013 to 2018. The format is to present a table of material projects sorted by investment category and within each category sorted by decreasing dollar value. A project description is provided for each project in the same order as the listing in the table. Project justifications follow the 2014 project listing and descriptions. For some projects, there are additional supporting materials that are included in an appendix. These are referenced in the project descriptions.

Effective January 1, 2012, CND revised its capitalization policies under CGAAP to reflect changes that were required in accordance with regulatory accounting requirements and that align to the capitalization principles if CND were to adopt International Financial Reporting Standards ("IFRS").

In accordance with these accounting requirements, the cost of plant removals is charged to O&M work orders. With this change, the O&M costs will increase with the amount of system renewal work being done.

In the following table of 2013 material projects the Budget is the value the CND Board of Directors approved when the 2013 Budget was approved. The Projected value is the amount CND management expects will be spent on the projects given 8 months of actual expenditure, detailed design estimates for the work and changes in project timing by customers and road authorities.

2013 Projects

2013 Material projects			
Classification	**Budget item and description**	**Budget**	**Projected**
System Access	Underground Feeder (Boxwood/Maple Grove)	3,200,000	0
System Access	Franklin Boulevard Roundabouts Overhead	3,000,000	0
System Access	2 new 27.6 kV feeders in North West Industrial Area Overhead (Preston Feeders)	2,550,000	4,000,000
System Access	Subdivision Capital Investment (by developer) - 500 lots Underground	1,271,000	1,271,000
System Access	Boxwood Drive Industrial Subdivision Overhead	1,200,000	850,000
System Access	2013 Servicing Industrial Underground	1,000,000	1,000,000
System Access	Subdivision Capital Investment (by CND Hydro) - 500 lots Underground	729,000	729,000
System Access	Triple Circuit Existing 27.6 kV Line - Speedsville Rd. -North of Royal Oak to Boxwood Dr. Industrial Subdivision - 1km Overhead	400,000	0
System Access	2013 Servicing Industrial Overhead	250,000	250,000
System Access	Riverbank Drive (and extension up to new bridge crossing the Grand River) Overhead	200,000	111,000
System Access	Miscellaneous	309,000	200,000
	Subtotal	**14,109,000**	**8,411,000**
System Renewal	Rebuild -Sheffield F2 Feeder and Branchton Rabbits-parts of Maple Manor Rd., Morrison Rd., Branchton Rd., Cheese Factory Rd., Lockie Rd. - 18.3km Overhead	3,500,000	3,500,000
System Renewal	Preston Parkway Area Underground Rebuild	1,000,000	1,000,000
System Renewal	Northview Acres Area Underground Rebuild	1,000,000	900,000
System Renewal	Galt Core Area Upgrades Underground	500,000	500,000
System Renewal	Upgrades in Various Areas Underground	250,000	250,000

2013 Material projects			
Classification	**Budget item and description**	**Budget**	**Projected**
System Renewal	Fischer Hallman Road - Paul Ave. to New Dundee Rd. - 1.4km Overhead	225,000	225,000
System Renewal	Replacement – Equipment with PCB Contamination	190,000	300,000
System Renewal	Pole Replacements	150,000	150,000
System Renewal	Miscellaneous	260,000	264,000
	Subtotal	**7,075,000**	**7,089,000**
System Service	SCADA Loadbreak Switches (5) Overhead	300,000	300,000
System Service	Upgrade Radios/Controllers at existing SCADA Switch Installations Overhead	200,000	200,000
System Service	16 kV Single Phase Reclosers Overhead	200,000	200,000
System Service	Miscellaneous	60,000	60,000
	Subtotal	**760,000**	**760,000**
	Total	**21,944,000**	**16,260,000**

Project Descriptions for Material Projects 2013

System Access:

Underground Feeder (Boxwood/Maple Grove)

Budgeted Amount = $3,200,000, Projected Amount = $0

This is a customer driven project to provide additional capacity with an underground 27.6 kV feeder. The project is 100% customer funded. The customer's requirement changed from the time of budgeting in the fall of 2012. Therefore, nothing will happen in 2013 on the project and there is no certain date when the project will be constructed. Most of the engineering work is complete. It is subject to a non-disclosure agreement and consequently no additional information can be made available.

Franklin Boulevard Roundabouts Overhead

Budgeted Amount = $3,000,000

Projected Amount = $0

The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period. The budgeted amount covers the first year of relocations. This proposed work results in significant relocation of overhead triple circuit and double circuit 27.6 kV lines. Significant traffic control will be required due to the heavy volume of traffic. Significant switching will be required to maintain power during construction. The timing of this project has been altered and the expected investment for this year is $0. Appendix M provides more data and background about this project. The project is anticipated to begin in 2014.

Two New 27.6 kV Feeders in North West Industrial Area Preston Feeders (Work Order C12-038-1)

Budgeted Amount = $2,550,000 Projected amount = $4,000,000

This project is designed to provide additional 27.6 kV feeder capacity into the North-West industrial area. The project was engineered beginning in the spring of 2012 and tendered in the summer of 2012. Approvals were required from the Ministry of Transportation for the Highway 401 crossing, from Rail America for a railway crossing, from Hydro One for work near its 115 kV transmission lines and its Preston TS and from the Grand River Conservation Authority for the route crossing through the Speed River valley. Private landowners were also involved. Approvals were lengthy. Construction did not begin until January, 2013. Costs in 2012 were primarily for materials. The original design was for two circuits, but with the load growth forecast for this area the facilities being built are four circuits on the pole line. The project will be completed in 2013.

Subdivision Capital Investment (by developer) - 500 lots Underground

Budgeted Amount = $1,271,000 (by developer), Projected Amount =$1,271,000

The amount represents the developer’s contribution to developer installed underground residential subdivisions for 500 lots. The actual amounts vary each year based on the number of residential homes that are serviced.

Boxwood Drive Industrial Subdivision

Budgeted Amount = $1,200,000, Projected Amount = $850,000

The Boxwood Drive Industrial Subdivision is a 175 acre industrial subdivision with 110 acres of serviced lots being developed by the City of Cambridge. The subdivision is serviced with sewer and water, the roads are paved and curbed and electrical servicing has proceeded now with a scheduled completion date of October, 2013. The projected costs are below budget due to very favourable contractor pricing.

Servicing Industrial Underground

Budgeted Amount = $1,000,000; Projected $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Subdivision Capital Investment (by CND Hydro) - 500 lots Underground

Budgeted Amount = $729,000 (by CND Hydro); Projected = $729,000

This amount represents CND's contribution to developer installed underground residential subdivisions for 500 lots. The actual amounts vary each year based on the number of residential homes that are serviced.

Triple Circuit Existing 27.6 kV Overhead Line – Speedsville Rd. – North of Royal Oak Road to Boxwood Dr. Industrial Subdivision

Budgeted Amount = $400,000; Projected = $0

This is a 1 km rebuild of an existing single circuit 27.6 kV line to meet the requirements of new industrial load in the area. Because of delays in the construction of the Boxwood Drive subdivision and delays with other developments in the area the construction of this project was delayed to 2014.

Servicing Industrial Overhead

Budgeted Amount = $250,000; Projected = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Riverbank Drive (and extension up to new bridge crossing the Grand River) Overhead

Budgeted Amount = $200,000; Projected = $111,000

This is Part 2 of relocations and rebuild of an end of life 4.8 kV line. The relocations were required as a result of the new Fairway Road bridge being constructed across the Grand River. The rebuild was done based on the condition of the line. The poles dated back as far as 1949. The new line was built for 16 kV operation. The job scope was reduced by about 25% from what was budgeted. Also, the job progressed more easily than expected and this resulted in additional cost savings.

SYSTEM RENEWAL

Rebuild of Sheffield F2 Feeder and Branchton Rabbits

Budgeted Amount = $3,500,000; Projected = $3,500,000

This project rebuilds 18.3 km of 8.32 kV and 4.8 kV line in the Branchton area that has reached its end of life. The poles range in age from the 1940s to the 1990s. Newer poles will be re-used. Most of the poles are older. The new lines will be operated at 27.6 kV for three phase sections and 16 kV for single phase sections.

Preston Parkway Area Underground Rebuild

Budgeted Amount = $1,000,000; Projected = $1,000,000

The Preston Parkway area underground rebuild involves the replacement of existing submersible transformers with above ground mini-pad transformers, the replacement of a switching unit, the addition of more switches for improved sectionalizing and the treatment of the existing underground direct buried primary cable to extend its life. The distribution system was installed between 1973 and 1976. CND has experienced previous outages in this area. The Preston Parkway area consists of narrow roadways and narrow lot widths. As a result, most of the distribution plant is located on easements and much of the frontage consists of paved driveways. A conventional rebuild with trenching was very expensive because of all the required restoration. As a result, CND plans to inject the existing cable to extend its life. CND has not done this before, but the technology has been applied elsewhere. If successful, the technology may be used at other locations to try and extend the life of CND's underground primary cables.

Northview Acres Area Underground Rebuild

Budgeted Amount = $1,000,000; Projected = $900,000

The Northview Acres area consists of The Greenway, Northview Heights Dr., Glamis Rd., Carter Cr., MacAtee Pl., MacTeith Ct. and Frobisher Ct. The underground rebuild is being staged over two years (2013 and 2014) due to the size of the area. The rebuild involves the replacement of existing submersible transformers with above ground mini-pad transformers, the addition of more switches for improved sectionalizing and the replacement of existing underground primary cable. The distribution system was installed between 1975 and 1978. CND has had a number of previous outages in this area including both transformer failures and underground primary cable failures. The construction work was contracted out and the pricing was very competitive.

Galt Core Area Underground Upgrades

Budgeted Amount = $500,000; Projected = $500,000

This budget amount continues a program of upgrades in the Galt core area of Cambridge. The Galt core area has a high concentration of business customers who suffer a financial loss during power outages. There have been a number of unplanned outages in the Galt core area due to older equipment and the ongoing presence of water, salt and other debris in the underground system. The water table is high because the Galt core area is located in a low spot right next to the Grand River. There is also a lot of salt application and build-up of debris since it is a core area. CND is investing in replacement and additional switching equipment to be able to more promptly sectionalize and restore power in the event of an outage. CND is replacing older cables to reduce the likelihood of failure. CND is eliminating as many underground connections as possible in its underground system to again reduce the likelihood of failure. CND is repairing concrete vaults which have deteriorated due to the salt to keep them safe for pedestrians.

Upgrades in Various Areas

Budgeted Amount = $250,000; Projected = $250,000

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

Fischer-Hallman Rd. (Paul Ave. to New Dundee Rd.)

Budgeted Amount = $225,000; Projected = $225,000

This project rebuilds a 1.4km section of existing 4.8 kV line that has reached the end of its life on Fischer-Hallman Rd. between Paul Ave. and New Dundee Rd. The poles are mostly dated in the 1950s and 1960s. The new line will be operated at 16 kV.

Replacement – Equipment with PCB Contamination

Budgeted Amount = $190,000; Projected = $300,000

In 1977, there was a ban on manufacturing and importing Polychlorinated Biphenyls (PCBs). It took about 5 years for PCBs to be completely eliminated from all the manufacturers' processes and equipment. The ban did not cover PCBs that were already in use in electrical applications, such as transformers. Cambridge and North Dumfries Hydro Inc. (CNDHI) has over 7,000 transformers in its service area. Some of these transformers were purchased prior to 1982 and had an unknown PCB content in the oil. In alignment with CND's Environmental Stewardship core value, CND has made a commitment to our stakeholders to proactively determine which transformers are hazardous and safely remove them from its system and responsibly dispose of them.

Materials are considered hazardous if the PCB content is greater than or equal to 50 parts per million (ppm). In order to determine if CND's transformers are considered hazardous, CND's contractor took samples of the transformer oil and sent them to a laboratory for analysis.

Through CND's Geographical Information System (GIS) CND was able to determine which transformers in its distribution system were installed prior to 1982 and had unknown PCB content. There were a total of 356 distribution transformers and 8 primary metering units (PMUs) discovered that met the unknown PCB criteria. This number does not include transformers that will be replaced as part of the 2013 rebuild program.

Due to the large number of distribution transformers to be sampled, CND contracted out the oil sampling of the transformers to a contractor through a tendering process. CND's linepersons and station technicians sampled the PMUs.

Based on partial results of the testing, one PMU and about 25 distribution transformers will be replaced as a result of PCB levels greater than 50ppm. Test results for the last seven units are still outstanding.

CND will be PCB free by the end of 2013.

Pole Replacements

Budgeted Amount = $150,000; Projected = $150,000

This work replaces poles that are at the end of their useful life. The poles are identified by pole testing, distribution system line patrols or in the normal course of operation of the distribution system.

SYSTEM SERVICE

SCADA Loadbreak Switches

Budgeted Amount = $300,000; Projected = $300,000

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from its control center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are being installed in 2013.

Upgrade Radios/Controllers at Existing Overhead SCADA Switch Installations

Budgeted Amount = $200,000; Projected = $200,000

CND currently has over 70 SCADA switches installed on its 27.6 kV distribution system. The first five SCADA switches were installed in 1990. In 2010, a decision was made to replace the radio system because the existing system was unreliable. Many times the control center could not communicate with a remote operable switch and crews would need to be dispatched to operate the device manually. This adversely affected the restoration times. CND decided to implement the vendor's radio solution. This ensured easy integration with the SCADA system. The technology adopted replaced the old point to point radio system with an IP based system, which allows the radios to operate in a mesh network mode. This allows for multiple paths to ensure reliable communication is achieved. The upgraded controllers and the new "smart" radios allow any switch radio not communicating with the master station in a point to point mode to communicate with an adjacent switch radio in a store and forward mode. This ensures that the messages to and from the master to the desired switch are completed. This system has been partially implemented and the problems with the old system have been solved in the trial installation. This project removes the old controllers that are also at end of life, as well as the old radios which are not compatible with the new system. The new radio system uses an unlicensed frequency band. This will save about $2,000 per year in operating costs. $200,000 is being spent in 2013 on upgrades. The remainder of the conversion will take place in 2014.

16 kV Single Phase Overhead Reclosers

Budgeted Amount = $200,000; Projected = $200,000

Single phase reclosers are being installed on main single phase 16 kV overhead lines to optimize reliability. The replacement of a fuse with a recloser on main 16 kV tap-offs results in only a momentary outage during many system events (i.e., animal contacts, tree branch contacts, lightning strikes, etc.) rather than a prolonged outage. This reduces Customer-Hours lost, improves customer satisfaction and reduces labour/trucking costs to send a crew to replace the fuse.

2013 General Plant Capital Additions

The table below provides a summary of the General Plant capital expenditures for 2013 Bridge Year.

General Plant Capital Additions 2013

OEB	Description	2013 Projection	Projects > $125,000 threshold	Amount
1860	Meters	915,017	New meters Primary meter upgrade Remotely Interrogated Meters	503,017 160,000 170,000
1908	Buildings and fixtures	448,000	Generator	200,000
1915	Office Furniture and Equipment	187,301	None	
1920	Computer - Hardware	296,500	None	
1925	Computer - Software	312,900	None	
1930	Vehicles	587,785	Single Bucket Service Vehicle replacement	365,000
1940	Tools, Shop and Garagae Equipment	116,650	None	
	Total	2,864,153		1,398,017

The following is a description of material General Plant capital additions in 2013:

New Meters - $503,017

Evaluation Criteria: System Access and Reliability

CND budgets annual meter capital expenditures to encompass all new services, including single phase, 3 phase, FIT and microFIT meters for all classes of customers. This expenditure category also includes replacements due to meter failures and the results of CND's meter sampling processes. CND tests meters on a random sample basis in accordance with Measurement Canada rules and will replace meters that are faulty or are expected to fail. Meters will be replaced if a particular meter type has a history of poor reliability or if meters in an area of the service territory are failing due to unique circumstances. CND also replaces meters that have only a few left in service to move towards standardization and to eliminate meters for which parts and service are difficult to obtain.

Capital expenditures for 2013 include $466,120 for 2,350 electronic meters at an average cost of $198.35 per meter, and $36,897 for instrument transformers and ancillary equipment.

Currently, due to its existing AMI Network, CND uses a single source meter supplier. There is an industry lobby group that is working with other meter vendors to encourage the use of the AMI communication module, which would allow for multiple meter vendors.

Primary Metering Units Upgrade Program - $160,000

Evaluation Criteria: Reliability

CND plans to replace four Primary Metering Units ("PMU's"), at a cost of $40,000 each, that have been failing in the field. This is a multi-year project that will result in the replacement of 28 PMU's in total over a 7 year period. PMUs are associated with CND's larger industrial customers.

The existing PMU equipment is made up of multiple parts and contained in one complete unit. As a result, when one part of the unit fails then the entire unit has to be replaced. CND plans to standardize the PMU equipment in the field using a modular design. The modular design allows for replacement of only the part that has failed, as opposed to the entire unit.

The implementation of the modular design is a more cost effective solution because: (i) it allows for the replacement of only the failed part, if required; and (ii) the time required to replace an individual part is expected to be less than replacing the entire unit.

Cellular Remotely Interrogated Metering System ("Cellular RIMS") - $170,000

Evaluation Criteria: Reliability and Efficiency

This project involves the replacement, and upgrade, of the meter assets for the General Service >200 kW demand customers. The existing meter assets are at the end of their service life due to risk of failure, functional obsolescence, and in some cases, substandard performance. CND has budgeted $170,000 for each of 2013 and 2014, based on the replacement of 100 per year at a price of $1,700 per meter.

The existing meters, which use a land line telephone-based internal modem, similar to the outdated dial up modems in computers, have become obsolete and are being replaced by the cellular modem solution. The older technology is no longer supported by the vendor. Cellular RIMS have proven to be faster and more reliable, and in some cases less expensive, due to the elimination of manual meter reads. In addition, the new meters will provide customers with the option for connectivity to obtain real time metering information.

Over the last few years, CND has installed a number of new systems and technologies including: a Customer Information System (CIS), an Advanced Metering Infrastructure System (AMI) and an Operational Data Storage System (ODS). All of these systems work together and the newer technology affects existing processes including as an example, the activation of a meter for a new customer with a demand >200 kW. CND and the industry, is moving away from manual meter reads, and with the new Cellular RIMS meter, communication (and meter readings) begin as soon as power is applied to the meter. Similarly, CND does not have to wait for the customer to install their analogue phone line to the meter in order to download data. Over time, this will replace the manual reading of the old style of meter. The new Cellular RIMS is robust enough to accommodate almost any new technology that CND installs over the next number of years as the life expectancy of the system is 15 to 20 years.

In order to prove the technology before recommending replacement of the existing meter types, a pilot of 20 meters was conducted in early 2012. The pilot was considered successful in that there were no lost data issues using the cellular form of data transmission and virtually no Meter Trouble Reports ("MTR's") associated with the meters tested. An MTR is issued when the host system cannot establish communication with the meter and as a result manual intervention is required to obtain the data necessary to bill the customer.

Although there are a variety of vendors in this competitive market, CND obtains annual pricing from numerous meter vendors and has found that the prices offered from its existing vendor are comparable, considering the established relationship, and the fact that if a new style of meter were to be purchased, all meters would have to be reprogrammed.

Building Generator - $200,000

Evaluation Criteria: Reliability and Safety

CND plans to purchase a new generator for its corporate offices and operating facilities located at 1500 Bishop St. The existing generator was installed in 1981, at the time of initial building construction. That existing generator has reached the end of its useful life and can no longer support the power requirements for the existing infrastructure, including information systems technology assets, telephone system, control center, and the building's electrical systems, all of which have been upgraded and/or expanded over the years. The generator must be upgraded to reduce the increased risk of information system and equipment failure.

CND has engaged the services of an electrical engineering firm to assist with this project, including design specifications and the preparation of the Request for Proposal ("RFP") documents. The total budgeted cost includes engineering costs to redesign the upgraded electrical system, the acquisition of the generator, and the costs of upgrades to the electrical system, including upgraded wiring in certain parts of the building. CND expects the RFP to be issued in September 2013, with installation to be completed by the end of the year.

CND has received estimates from various suppliers in arriving at the cost estimate of $200,000. At this time, based on the draft specifications, CND anticipates the acquisition of a 350 kVA generator, which will service the existing load of approximately 200 kVA and provide for future growth.

Single Bucket Small Aerial Service Truck (Hybrid replacement) - $365,000

Evaluation Criteria: Efficiency and Reliability

CND plans to purchase a new service truck in 2013 - a Freightliner Cab and Chassis, with a single bucket aerial device, fiberglass utility body, and an eighteen kilowatt high speed recharge lithium battery system at a cost of $365,000. This new hybrid Service truck is scheduled for delivery in September 2013.

The existing large service bucket truck was purchased in 2002 and presently has in excess of 225,000 kilometers. The existing service truck will be moved from service work and be used by the Operations Department. In particular, CND plans to hire three new apprentices in the fall of 2013 and the existing vehicle will be used to accommodate the new apprentices.

The new hybrid service truck demonstrates CND's commitment to reducing vehicle impacts to the environment. This new hybrid service truck brings several advantages to the Service Truck use:

1) The truck will produce fuel savings as it operates the boom and bucket in electric mode, and thus will have reduced exhaust emissions which will reduce CND's carbon footprint;

2) Noise pollution will be virtually non-existent, allowing the workers to hear and communicate with each other more easily on the job site. This will also be an enhanced safety parameter for the workers. The reduced diesel engine noise will also benefit customers, especially in residential areas as the truck will operate much quieter than a regular Service Truck.

3) The hybrid mode will also allow for the truck lights to operate, thereby allowing the truck to operate safely while parked on the street at a job site with the engine turned off; and
4) There will be zero emissions while in hybrid mode and during aerial device operation.

2014 Projects

Plant Capital Budget 2014 Material Projects			
Classification	**Project descriptions**	**Plan**	***Project Priority***
System Access	Franklin Boulevard Roundabouts	2,782,600	*1*
System Access	Underground Subdivision Capital Investment (by developer) - 500 lots	1,271,000	*1*
System Access	2014 Underground Servicing Industrial	1,000,000	*1*
System Access	Double Circuit Existing 27.6 kV Line - Fountain St. (Shantz Hill to Dickie Settlement Road) - 2.8km	926,300	*1*
System Access	Underground Subdivision Capital Investment (by CND Hydro) - 500 lots	729,000	*1*
System Access	Highway 401 Widening and Bridge Replacements	486,955	*1*
System Access	Triple Circuit Existing 27.6 kV Line - Speedsville Rd. - North of Royal Oak to Boxwood Dr. Industrial Subdivision - 1km	370,520	*1*
System Access	2014 Servicing Industrial	250,000	*1*
System Access	Miscellaneous	306,850	
	Subtotal	**8,123,225**	
System Renewal	Greenfield Road from West of Dumfries Rd. to East of Spragues Rd./parts of Edworthy Rd. and Alps Rd. – 10.1 km	1,968,000	*5*
System Renewal	Northview Acres Area Underground Rebuild	1,475,880	*7*
System Renewal	Shellard Road - Morrison Road to Gore Road - 5.1km	930,300	*4*
System Renewal	Galt Core Area Upgrades	470,520	*8*
System Renewal	Pole Replacements on Franklin Boulevard not affected by Roundabout Relocations	463,767	*1*
System Renewal	Avonlea/Earlwood/Briarwood Area	389,280	*12*
System Renewal	Upgrades in Various Underground Areas	243,300	*9*
System Renewal	Townline Road between River Road and Black Bridge Road - 0.8km - 9 customers (LTLT resolution)	232,600	*15*
System Renewal	Welsh Dr./Trussler Rd. Underground Rebuild	169,640	*13*

Plant Capital Budget 2014 Material Projects			
Classification	**Project descriptions**	**Plan**	***Project Priority***
System Renewal	Pole Replacements	136,600	*1*
System Renewal	Miscellaneous	660,380	
	Subtotal	**7,140,267**	
System Service	Upgrade Radios/Controllers at Existing SCADA switch installations	490,000	*10*
System Service	SCADA Loadbreak Switches (5)	286,600	*11*
System Service	16 kV Single Phase Reclosers	198,700	*14*
	Subtotal	**975,300**	
	Total	**16,238,792**	

PROJECT DESCRIPTIONS AND JUSTIFICATIONS - 2014 PROJECTS

SYSTEM ACCESS:

Franklin Boulevard Roundabouts

Budgeted Amount = $2,782,600.

The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period. The budgeted amount covers the first year of relocations. This proposed work results in significant relocation of overhead triple circuit and double circuit 27.6 kV lines. Significant traffic control will be required due to the heavy volume of traffic. Significant switching will be required to maintain power during construction. The timing of this project has been altered and the expected investment for this year is $2,782,600. Appendix M provides more data and background about this project.

Servicing Underground Residential Subdivision

Budgeted Amount = $1,271,000 (by developer)

The amount represents the developer's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced. The estimated activity level is 500 lots.

Servicing Industrial - Underground

Budgeted Amount = $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Double Circuit existing 27.6 kV Overhead Line – Fountain St. S. (Shantz Hill Rd. to Dickie Settlement Rd.) to Conestoga College – 2.8km

Budgeted Amount = $926,300

This project is required to connect a new residential subdivision in the Limerick Road area and a new industrial subdivision at the intersection of Fountain St. S. and Dickie Settlement Rd. A crossing of the Grand River is required. This project will also improve reliability to the Cambridge campus of Conestoga College as their supply will come from this new line and not from the long rural line they were initially supplied. This will reduce their line exposure. Appendix P provides more data and background about this project.

Servicing Residential- Underground

Budgeted Amount = $729,000 (by CND Hydro)

This amount represents CND's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced. The amount is determined by a calculation prescribed in the Distribution System Code.

Highway 401 Widening and Bridge Replacements

Estimated Amount = $486,955

The Ministry of Transportation plans to widen Highway 401 in Cambridge between Highway 8 and Highway 24. This results in 27.6 kV pole line relocations at 401 crossings and along an adjacent parallel road (Rogers Drive). The relocation work will be done in 2013 and 2014.

Triple Circuit Existing 27.6 kV Line – Speedsville Rd. – North of Royal Oak Road to Boxwood Dr. Industrial Subdivision

Budgeted Amount = $370,520

This is a 1 km rebuild of an existing single circuit 27.6 kV line to meet the requirements of new industrial load in the area. See Appendix O for a more detailed report.

Servicing Industrial Overhead

Budgeted Amount = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

SYSTEM RENEWAL

Greenfield Rd. from West of Dumfries Rd. to East of Spragues Rd./parts of Edworthy Rd. and Alps Rd.

Budgeted Amount = $1,968,000

This project rebuilds a 10.1 km section of existing three phase 8.32 kV and single phase 4.8 kV line that has reached the end of its life along Greenfield Rd. from west of Dumfries Rd. to East of Spragues Rd. as well as parts of Edworthy Rd. and Alps Rd. The poles range in age from the 1940s to the 2000s. Newer poles will be re-used. The new line will operated at 27.6 kV and 16kV.

Northview Acres Area Underground Rebuild

Budgeted Amount = $1,475,880

The Northview Acres area consists of The Greenway, Northview Heights Dr., Glamis Rd., Carter Cr., MacAtee Pl., MacTeith Ct. and Frobisher Ct. The underground rebuild is being staged over two years (2013 and 2014) due to the size of the area. The rebuild involves the replacement of existing submersible transformers with above ground mini-pad transformers, the addition of more switches for improved sectionalizing and the replacement of existing underground primary cable. The distribution system was installed between 1975 and 1978. CND has had a number of previous outages in this area including both transformer failures and underground primary cable failures.

Shellard Rd. (Morrison Rd. to Gore Rd.)

Budgeted Amount = $930,300

This project rebuilds a 5.1 km section of existing 8.32 kV line that has reached the end of its life on Shellard Rd. between Morrison Rd. and Gore Rd. The oldest poles date back to the 1950s. More newly installed poles will be re-used. The new line will be operated at 27.6kV. Previous lengthy outages have occurred on this line.

Galt Core Area Upgrades

Budgeted Amount = $470,520

This budget amount continues a program of upgrades in the Galt core area of Cambridge. The Galt core area has a high concentration of business customers who suffer a financial loss during power outages. There have been a number of unplanned outages in the Galt core area due to older equipment and the ongoing presence of water, salt and other debris in the underground system. The water table is high because the Galt core area is located in a low spot right next to the Grand River. There is also a lot of salt application and build-up of debris since it is a core area. CND is investing in replacement and additional switching equipment to be able to more promptly sectionalize and restore power in the event of an outage. CND is replacing older cables to reduce the likelihood of failure. CND is eliminating as many underground connections as possible in its underground system to again reduce the likelihood of failure. CND is repairing concrete vaults which have deteriorated due to the salt to keep them safe for pedestrians.

Pole Replacements on Franklin Boulevard not affected by Roundabout Relocations

Budgeted Amount = $463,767

This project replaces poles on Franklin Boulevard that are unaffected by planned roundabout relocations. A section of poles fell over in 2007 during an ice storm and were rebuilt. During an ice storm in April 2012, two poles outside of the section, which were replaced in 2007, began to lean. The poles are primarily dated 1971 and just no longer have the strength to handle severe ice/wind loading for the triple circuit 27.6 kV lines attached to them. Some of the poles along Franklin Boulevard are being replaced as part of the planned Franklin Boulevard roundabout relocations. Those poles are included in the Franklin Boulevard roundabouts relocation project. Appendix N provides more data and background about this project.

Avonlea Rd./Earlwood Dr./Briarwood Dr. Underground Rebuild

Budgeted Amount = $389,280

The Avonlea Rd./Earlwood Dr./Briarwood Dr. area is currently serviced underground at 27.6 kV. The distribution system was installed in 1974. The underground cable is direct buried and there are eleven transformers. CND has not had major problems in this area, but based on the age of the plant, CND expects that a rebuild will be required in the 2014 time frame.

Upgrades in Various Underground Areas

Budgeted Amount = $243,300

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND’s Operations group through field inspections or through outage reports where further action is required.

Townline Rd. between River Rd. and Black Bridge Rd.

Budgeted Amount = $232,600

This project resolves a long term load transfer situation with Hydro One and extends their 27.6 kV line further North to ultimately provide a backfeed to the residential subdivision development on Black Bridge Road in Hespeler.

Welsh Dr./Trussler Rd. Underground Rebuild

Budgeted Amount = $169,640

Welsh Dr. is supplied by a 16 kV -4.8 kV stepdown transformer. The underground primary cable was installed by Ontario Hydro in the mid 1970s using 35 kV rated cable (non-standard for CND). The cable is direct buried. There are five transformers in this estate lot sized subdivision. CND has not had major problems in this area, but based on the age of the plant, CND expects that a rebuild will be required in the 2014 time frame.

Pole Replacements

Budgeted Amount = $136,600

This work replaces poles that are at the end of their useful life. The poles are identified by pole testing, distribution system line patrols or in the normal course of operation of the distribution system.

SYSTEM SERVICE

Upgrade Radios/Controllers at Existing SCADA Switch Installations

Budgeted Amount = $490,000

CND currently has over 70 SCADA switches installed between 1990 and 2013 on its 27.6 kV distribution system. In 2010, a decision was made to replace the radio system because the existing system was unreliable. Many times the control center could not communicate with a remote operable switch and crews would need to be dispatched to operate the device manually. This adversely affected the restoration times. CND decided to implement the vendor's radio solution. This ensured easy integration with the SCADA system. The technology adopted replaced the old point to point radio system with an IP based system which allows the radios to operate in a mesh network mode. This allows for multiple paths to ensure reliable communication is achieved. The upgraded controllers and the new "smart" radios allow any switch radio not communicating with the master station in a point to point mode to communicate with an adjacent switch radio in a store and forward mode. This ensures that the messages to and from the master to the desired switch are completed. This system has been partially implemented and the problems with the old system have been solved in the trial installation. This project removes the old controllers that are also at end of life, as well as the old radios which are not compatible with the new system. The new radio system uses an unlicensed frequency band. This will save about $2000 per year in operating costs. The first phase of the upgrade is being completed in 2013. This project is the remainder of the upgrade, and when completed will provide reliable uniform communication to all the RTU's. This in turn will assist in the rapid restoration of power to the majority of customers on a feeder should a feeder lock out occur.

Technology has changed significantly over that period. CND is upgrading the electronic controllers and SCADA radio system to ensure that the switches operate when needed. $490,000 is proposed to be spent in 2014 on upgrades to complete the project.

SCADA Loadbreak Switches

Budgeted Amount = $286,600

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from its control center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2014.

16 kV Single Phase Reclosers

Budgeted Amount = $198,700

Single phase reclosers are being installed on main single phase 16 kV overhead lines to optimize reliability. The replacement of a fuse with a recloser on main 16 kV tap-offs results in only a momentary outage during many system events (i.e., animal contacts, tree branch contacts, lightning strikes, etc.) rather than a prolonged outage. This reduces Customer-Hours lost, improves customer satisfaction and reduces labour/trucking costs to send a crew to replace the fuse.

2014 Test Year General Plant Capital Additions

The table below provides a summary of the General Plant capital expenditures for 2014 Test Year.

General Plant Capital Additions 2014

OEB	Description	2014	Projects > $125,000 threshold	Amount
1860	Meters	966,643	New meters	513,643
			Primary meter upgrade	240,000
			Remotely Interrogated Meters	170,000
1908	Land and Buildings	55,000	None	
1915	Office Furniture and Equipment	80,400	None	
1920	Computer Hardware	751,500	Business Continuity and Disaster Recovery	185,000
			IVR Solution	150,000
			Storage Upgrade	225,000
1925	Computer Software	1,334,048	Distribution Management System	225,000
			Outage Management System	465,000
			Document Management System	125,000
			GIS Enhansement	200,000
1930	Vehicle	520,000	Double Bucket Truck replacement	450,000
1940	Tools, Shop and Garage Equipment	109,000	None	0
	Total	3,816,591		2,948,643

The following is a description of material General Plant capital additions in 2014:

New Meters and Equipment - $513,643

Evaluation Criteria: System Access and Reliability

CND budgets annual meter capital expenditures to encompass all new services, including single phase, 3 phase, FIT and microFIT meters for all classes of customers. This expenditure category also includes replacements due to meter failures and the results of CND's meter sampling processes. CND tests meters on a random sample basis in accordance with Measurement Canada rules and will replace meters that are faulty or are expected to fail. Meters will be replaced if a particular meter type has a history of poor reliability or if meters in an area of the service territory are failing due to unique circumstances. CND also replaces meters that have only a few left in service to move towards standardization and to eliminate meters for which parts and service are difficult to obtain.

Capital expenditures for the 2014 Test Year include $475,757 for 2,350 electronic meters at an average cost of $202.45 per meter and $37,886 for instrument transformers and ancillary equipment.

Primary Metering Upgrade Program - $240,000

Evaluation Criteria: Reliability

CND plans to replace four Primary Metering Units ("PMU's"), at a cost of $40,000 each, that have been failing in the field. This is a multi-year project that will result I the replacement of 28 PMU's in total over a 7 year period. This expenditure is $240,000 for instrument transformers. This cost includes 6 units at $40,000 each. Details with respect to this program are included in the 2013 Bridge Year Project Description.

Cellular Remotely Interrogated Metering System - $170,000

Evaluation Criteria: Reliability and Efficiency

This project involves the replacement, and upgrade, of the meter assets for the General Service >200 kW demand customers. The existing meter assets are at the end of their service life due to risk of failure, functional obsolescence, and in some cases, substandard performance. CND has budgeted $170,000 for each of 2013 and 2014, based on the replacement of 100 per year at a price of $1,700 per meter. Details with respect to this program are included in the 2013 Bridge Year Project Description.

Overview of Information System Technology Investments in 2014

In 2014, CND will invest approximately $2.1MM in information systems technology investments required to meet customer expectations, improve operating efficiencies, and to mitigate risks associated with disaster recovery and business continuity planning.

As part of its Strategic Planning process undertaken by CND in the fall of 2012, and as described in Exhibit 1, CND identified three areas of risk within the Information Technology Services (“ITS”) area:

4. Inadequate Resources – critical gaps in IT;
5. Lack of integrated IT Systems; and
6. Low capacity for innovation.

As a result, CND undertook a number of initiatives in 2013 to reduce these risks including:

- Hiring of additional resources (Exhibit 4);
- Development of an IT Strategy to ensure that the ITS team is focused on activities that are aligned to CND’s strategy and business requirements (Exhibit 1); and
- Development of tactical plans to leverage new and existing information systems technology through integration.

Incorporated within the IT Strategy, and the IT tactical plans are the following information system technology investments required in 2014:

- Business Continuity Planning (BCP) / Disaster Recovery Planning (DRP)
- Distribution Management System (DMS)
- Outage Management System (OMS)
- Interactive Voice Response (IVR) solution

- Storage Area Network Upgrade
- Electronic Document Management (EDM)

The DMS, OMS and IVR capital investments are interrelated projects. These three solutions are the key requirements for the delivery of an Outage Management solution for CND that will ensure that CND is meeting customer expectations. Each of these initiatives is discussed in more detail below.

Business Continuity Plan and Disaster Recovery Plan - $185,000

Evaluation Criteria: Reliability and Safety

In 2014, CND will develop formal plans and purchase incremental computer hardware at a total cost of $185,000 to support a Disaster Recovery Plan ("DRP") and Business Continuity Plan ("BCP"). This investment is required to reduce a significant information systems technology ("IST") risk that currently exists. This risk was identified as part of CND's Strategic Planning and Risk Management review conducted in the fall of 2012.

A BCP includes planning for non-IST related requirements for keeping all aspects of a business functioning in the event of a significant disruptive event, including such things as key personnel, facilities, crisis communication and reputation protection. DRP is a subset of the BCP and includes planning for the resumption of IST applications, data, hardware, electronic communications (such as networking) and other IST infrastructure. The BCP should refer to the DRP for IST related infrastructure recovery / continuity.

Currently CND has limited BCP and DR capabilities and information technology infrastructure to mitigate the risk to CND from a significant event (e.g. major power disruption, fire, etc. to its building) that has the potential to disrupt the normal business operations for an extended period of time.

The capital expenditure amount of $185,000 is based on an estimate provided by a vendor who specializes in business continuity and recovery services, and incorporates the following key factors and/or assumptions:

- 24 hours to recover all key systems supporting CND
- Full recovery of CND's five (5) physical servers
- Full recovery of CND's firewalls
- Full recovery of CND's production storage environment
- Full recovery of CND's tape library and tape drive environment

- Full recovery of CND's Backup Exec and VRanger applications that allow for tape restoration of the CND computing environment
- Internet connectivity at 5Mbps (approximately half of CND's current capability)

Interactive Voice Response System - $150,000

Evaluation Criteria: Customer Value and Efficiency

CND will invest $150,000 for an Interactive Voice Response System ("IVR") in 2014. This investment is required to enhance Customer Care services and respond to CND's customer demands for accurate, timely and informative service. CND's Commercial Customer Survey (Exhibit 1, Appendix 1-1B, Page 7) highlighted that roughly half of CND's surveyed customer say in the future, they will depend more heavily on CND's services in the areas of follow up concerning causes of outages, restoration time estimates, and the opportunity to provide feedback for how to mitigate future outages. The IVR system has the capabilities to provide detailed information to customers concerning all aspects of the outage, including the breadth and depth of the outage, its causes and the anticipated restoration time. In CND's Residential Customer Survey, 84% of customers believe that CND is proactive in communicating changes and issues which may affect customers (Exhibit 1, Appendix 1-1A, Page 12). The implementation of an IVR system will assist in improving this metric and ensuring that CND's customers continue to receive an appropriate level of service.

The implementation of an IVR system will provide the following benefits to CND's customers:

- Provide automated outgoing messages to inform customers of planned outages. Currently, CND provides written, hand delivered notifications to customers concerning planned outages.
- The use of IVR and voice automation will provide CND's customers with an option to choose an automated service, wait in the queue, or request a callback. With the introduction of automated services, incoming IVR services effectively extend business hours to a full 24/7 operation.

- Integration with the CIS/Billing system would provide customers with current information with respect to their account, including the current account balance, payment options, and general queries.

- The IVR system can identify and segment callers; this functionality allows services to be tailored according to the customer profile. IVR also enables customer prioritization and the ability to move customers to the front of a specific queue, depending on caller authentication and/or call reason.

The implementation of an IVR system will also improve operating efficiencies, including: (i) reduction in the number of customer queries that need to be resolved in person by a Customer Care Representative; (ii) automation of call logging and improved performance reporting; and (iii) reduction in time spent hand delivering planned outage notices.

The IVR system also has functionality to capture caller details. The ability to capture caller details is a key feature required to support CND's implementation of an Outage Management System (OMS). The OMS implementation is discussed further in this Exhibit. The ability to capture caller details and transfer this information to the OMS is expected to result in improved response times for customers. The IVR system can be programmed with outage details pertinent to a customer, including the area affected, time expected to power restoration, and other details as appropriate.

Storage Upgrade $225,000

Evaluation Criteria: Reliability and Efficiency

CND plans to invest $225,000 in computer hardware to upgrade its existing Storage Area Network (SAN). The current storage solution at CND, currently at 81% of capacity, is nearing end of life as the existing product is being phased out by the vendor. CND requires additional capacity to support other IST requirements in 2014 including the OMS solution, Distribution Management System, DCP and DR projects described in this Exhibit. Each of these projects will result in increased data storage requirements.

The SAN will be used to create a virtual server environment to host CND's key business applications including the CIS, ERP, and GIS. A virtual server assists in increasing storage capacity utilization as multiple servers are able to consolidate their private storage space onto the formatted disk arrays.

The SAN also provides storage/archival capabilities of files. The SAN is the main storage medium for storing corporate documents. Increased data storage capacity will also provide for the ability for CND to move from paper based documentation to on-line documentation and provide for the retrieval of records faster and more efficiently.

Distribution Management System - $225,000

Evaluation Criteria: Customer Value, Reliability, Co-ordination, Interoperability, Efficiency

CND will invest $225,000 in a Distribution Management System ("DMS") in 2014, as part of its overall Smart Grid strategy. DMS is defined as a collection of applications designed to monitor and control the entire distribution network efficiently and reliably. The DMS acts as a decision support system to assist the Control Center and field operating personnel with the monitoring and control of the electricity distribution system.

The DMS relies on a computer network model of the electrical system from the Geographical Information System (GIS). The DMS also retrieves information from the SCADA system since power flow calculations and load estimates must be done by the DMS in real time. CND's SCADA system will soon have the capability to open and close the remotely operated SCADA switches immediately after a fault on the distribution system to minimize the number of customers affected and to reduce the duration of the outage. The automated switching capability will leverage the technology of CND's existing and proposed SCADA loadbreak switches. Customer hours lost can be reduced by starting the switching process immediately, in as little as 20 seconds from the time of the fault. Other capabilities include switch order management and outage scheduling. The DMS will automate the steps necessary to restore power to as many customers as possible without the intervention of utility staff.

The implementation of the DMS is expected to result in improved reliability and quality of service to CND's customers in terms of minimizing outage time and maintaining acceptable frequency and voltage levels. This investment supports CND's customer feedback with respect to areas of customer service that could be improved upon. While offering better rates to customers is the number one area of improvement identified in CND's Commercial Customer Survey, the second area was "reduce power outages and/or voltage spikes" (Exhibit 1, Appendix 1-1B, Page 14). In CND's Residential Customer Survey, approximately 26% of customers identified having outage problems. Investments in DMS and OMS are expected to improve reliability and reduce the duration of outages.

Outage Management System - $465,000

<u>Evaluation Criteria: Customer Value, Co-ordination, Interoperability, Efficiency</u>

CND plans to implement an Outage Management System in 2014 at a cost of $465,000. The capital investment of $465,000 includes two servers, the acquisition of the OMS, and consulting and project management expertise to support the implementation.

This investment is required to improve the operating efficiency of CND and to support CND's customer needs for improved communication with respect to outages and expected restoration times. Based on the survey results of CND's Commercial Customers (Exhibit 1, Appendix 1-

1B, Page 7), customers will depend more heavily in the future on services from CND with respect to:

- A follow up regarding the causes of outages;
- Restoration time estimates; and
- Opportunity to provide feedback as to how to mitigate future outages.

An Outage Management System (OMS) is an automated solution that works in conjunction with the GIS, CIS, SCADA, Advanced Metering Control Computer ("AMCC") and IVR that provides the capability to efficiently identify and resolve outages, as well as to generate reporting. The GIS provides information with respect to each customer that exists on the electrical grid (i.e. which feeder and transformer) as well as their geographic location. Smart Meters also provide notification of outages without customer intervention. The SCADA system provides information for feeder breakers and remotely operated switches including fault indication. The OMS assists in more timely restoration of power by gathering information from all of these sources to predict the exact location of the source of the outage. Corrective action can be initiated more quickly and accurately than by using the SCADA system alone.

The OMS will meet customer expectations by allowing CND to deliver timely information concerning the extent of the outage, the expected restoration time, and other pertinent information. This information will be communicated to customers and the media via CND's web site, via email, via IVR and through social media. The OMS will provide a consolidated list of all outages, providing a coordinated, prioritized methodology to ensure that power is restored to customers as quickly as possible.

The OMS contains extensive reporting capabilities, including the capturing of historical data that can be used to provide operational and reliability data on the distribution system, which can be used by CND to prioritize maintenance and capital investments.

Electronic Document Management System (EDM) - $125,000

Evaluation Criteria: Efficiency

CND will invest $125,000 to expand the implementation of its existing electronic document management system to other departments. The Customer Care department implemented EDM in 2011 as part of the implementation of the CIS/Billing system.

This investment is required to realize operating efficiencies and aligns with CND's strategic imperatives of innovation, leveraging existing technologies, environmental stewardship, and promoting teamwork, dialogue and collaboration through the ability to share electronic documentation in a seamless and more efficient manner. The investment is also a key component of the BCP and DRP initiatives as it will support the retention of key documents.

Operating efficiencies and benefits derived from the implementation of EDM include: (i) reduce paper storage costs; (ii) ability to retrieve documentation quickly thereby reducing the time and effort required to retrieve records and allowing staff to focus on more value added tasks; (iii) electronic retention of key corporate records; (iv) enable the automation of routine business tasks and workflow; and (v) automatic archiving or deletion of records based on record retention rules.

Geographic Information System (GIS) Enhancements - $200,000

<u>Evaluation Criteria: Reliability, Co-ordination, Interoperability, Efficiency</u>

CND's GIS was implemented in 1996. Since that time, CND has invested in periodic upgrades and enhancements to maximize the systems capabilities. The GIS system is a critical element of CND's distribution system in that it contains essential asset management records, including CND's customer information (i.e. name, address, phone number, estimated peak demand, meter number), pole information (i.e. installation date, type, height, class, testing results), wire/cable information (i.e. size, type, installation date), transformer information (i.e. kVA, voltages, installation date, manufacturer, weight, impedance, estimated peak demand) and switch installation (i.e. type). The information is geographically located with electrical connectivity.

In 2014, CND will invest $200,000 to enhance the GIS through the capturing and storing of additional inspection and maintenance records in the GIS. This investment will support CND's OMS investment, as well as provide important data and records to CND as part of its asset management strategy and distribution system planning process.

Vehicle – Double Bucket Truck Replacement - $450,000

<u>Evaluation Criteria: Efficiency and Reliability</u>

CND will purchase a new Double Bucket Truck in 2014 at a cost of $450,000. The cost of this investment includes the vehicle cab and chassis, the aerial device and the fiberglass utility body, tools, and the preparation costs to put the vehicle on the road and available to work.

This investment is required to replace an existing vehicle that is at the end of its useful life and to reduce the repair costs that have been incurred on this vehicle. The existing vehicle was purchased in 1997 and is a Double Bucket Truck with a Freightliner Cab and Chassis, and an Amador aerial device. The Amador aerial units have not been produced for a number of years. Over the past year, the vehicle has been experiencing boom and bucket control problems, and repair parts are difficult to obtain, as well as more expensive. This difficulty in obtaining parts for repair has caused the truck to be unavailable for use during critical times of the year. This impacts CND's ability to execute its maintenance and capital programs.

3.5.3. Justifications for the 2014 Capital Program – Material Projects

Category-specific requirements for each project/activity

SYSTEM ACCESS PROJECTS

The material System Access projects for 2014, the test year, are in response to road authority requests and new customer load requests. In both of these types of requests, CND has an obligation to respond; this is non-discretionary.

For Road Authority Projects

Description of work

Road Authority driven work is initiated by the City of Cambridge, the Township of North Dumfries, the Region of Waterloo or the Ministry of Transportation of Ontario. These authorities have jurisdiction over the various public rights-of way. The road authorities allow CND's distribution plant to be located on these rights-of-way with various limitations, one of which is that in the event of roadway alterations which conflict with the existing locations of previously approved plant, the owner of the plant will relocate their plant to a new agreed upon location. This is a statutory requirement.

Why needed now

Hence CND has no discretion in acting on plant relocation requests from these authorities. The timing of the relocation is entirely driven by the road authority and their plans but advanced notice is given so that relocation work can proceed in an orderly manner.

CND has been notified by the road authority for each of the relocation project locations. They have taken the steps required to become aware of the requirements and have engaged in the projects as required. CND is responding to the timing and requirements set by the road authorities respectively to be ready to meet its obligations. CND is responding to the information, including timing requirements, to have its facilities relocated to allow the road authority to proceed with their work. The budgets for these projects allow this to be accomplished.

Why the project is the preferred alternative.

Because the alternatives considered are project specific, this information is included in the project description in the project listing following the capital program for the appropriate year.

For New Subdivision and Servicing Projects

Description of work

New Residential Subdivisions are required to be installed with underground distribution per CND's Conditions of Service and municipal By-Laws. This is a standard requirement in most urban residential subdivisions in southern Ontario. The developer makes the investment for the installation of the entire underground distribution system and for the underground services to the individual customers. CND calculates a rebate for each lot serviced in accordance with the Economic Model documented in the OEB Distribution System Code.

New Industrial Subdivisions are primarily installed with main overhead 27.6kV pole lines along the roadways with underground servicing to individual lots per CND's Conditions of Service. If the developer decides on a completely underground design then the developer makes the additional investment. CND calculates a rebate for each lot serviced in accordance with the Economic Model documented in the OEB Distribution System Code.

Why needed now

The timing of the work is not at the discretion of CND but at the customer's discretion. The customer funds the initial plant installation. The figure shown in forecasts is CND's best estimate of the work the customer will undertake. When the plant is installed the actual costs may become a partial capital contribution to CND subject to CND's Economic Evaluation Policy.

Based on the recent rate of residential subdivision development CND estimates that 500 new lots will be developed each year for the next 5 years. Appendix J contains a planning analysis report developed by CND that provides the basis for this estimate. CND requires the developer to make the initial investment and provides the developer with rebates as the load materializes. CND estimates this to be $1,271,000 in developer investment and $729,000 in CND investment for 2014. These amounts are reflected in the two Underground Subdivision Capital Investment projects included in the 2014 budget, one identified as developer contribution and the second identified as CND's contribution.

Underground Servicing Industrial is a project covers the cost of servicing industrial, institutional, commercial, high rise apartment/condo towers and senior citizen developments. The amount budgeted is based on historical activity. In this mix of customer demands, the high rise apartment/condo tower has been the more active segment in recent years. In 2014, the industrial segment will be more active with the development of the Boxwood Drive Industrial subdivision. Appendix J contains a planning analysis report developed by CND which provides the basis for the estimated activity levels. The investment requirement for 2014 is $1,000,000.

"Servicing Industrial Overhead" is used for the investment in overhead industrial services. Most of the investment relates to overhead three phase transformer banks. Activity has been low in recent years as a result of the 2008/2009 recession and the delays in servicing of the Boxwood Drive Industrial Subdivision. With lots for sale in the Boxwood Drive Industrial Subdivision in the fall of 2013, it is expected that many three phase transformer banks will be installed in 2014. Appendix J contains a planning analysis report developed by CND which provides the basis for the estimated activity levels. Given the strong projected future industrial growth in the City of Cambridge, CND has estimated an investment requirement of $250,000 in 2014.

All the projects are included to meet the timing determined by the customer.

Why the project is the preferred alternative.

The project is initiated by the customer and is implemented within CND's Conditions of Service as the customer prefers. The rebates given are in accordance with OEB requirements.

For New Lines to Supply Subdivision Projects

Description of work

Subdivisions are areas with specific boundaries where new customers will be located. The justification for the installation of electrical plant in subdivisions is covered in Appendix J. A new subdivision represents new load that needs to be supplied by the power system. Where there are lines adjacent to the new subdivision and they have sufficient capacity to supply the new load including the ability to transfer load to adjacent feeders (single contingency design) then only minor work or no additional work is required. However if the capacity is not sufficient additional investment is required by CND.

This work is customer driven and non-discretionary.

Why needed now

CND needs to provide adequate supply to new subdivisions. Based on the subdivision initial loading and the ultimate expected load CND may defer building new lines. However if the existing power system cannot supply the initial loads then the new lines need to be built and be available when the subdivision goes into service. The lines CND has included in the forecast investments are required by this criterion and are not discretionary.

Why the project is the preferred alternative.

CND considers various alternative routes a well as overhead and underground alternatives when it considers how to supply the new load. CND's designs proposed in its investment plan are all overhead which is lower cost than underground. CND also considers the shortest route but takes into account specific design challenges on routes to arrive at the lowest cost means of supplying the load that meets system requirements. All the lines included in the investment plan meet this "lowest cost, system acceptable" criterion.

SYSTEM RENEWAL PROJECTS

For Overhead Renewal Projects

Description of work

About 15% of CND's overhead pole assets are 43 or more years old and were mostly initially installed to 8.32 kV design standards. This means that they are not suitable for upgrading to 27.6 kV standard clearances. The poles are weathered and cracked and a number of them have failed in-service causing power interruptions. When the original 27.6 kV conversion was carried out about 20 to 25 years ago, selected roads were rebuilt to 27.6 kV standards. The poles now being replaced are poles that were left in place. The customers were supplied at 8.32 kV from the 27.6 kV system through 16 kV to 4.8 kV step-down transformers. This solution has been cost effective, but these remaining poles are failing and should be replaced. CND will be replacing the existing overhead plant with new overhead plant designed to the current 27.6 kV design standards.

Why needed now

While the decision to retain the existing poles was a prudent decision when the voltage conversion to 27.6 kV took place 20 to 25 years ago, currently these remaining poles are failing and should be replaced. The areas CND plans to address are North Dumfries, the North rural area of Hespeler and Blair. From the pole map found in Appendix C, it can be seen that these areas have significant quantities of old poles.

Many of these poles were installed in the late 1940s and the 1950s. These poles are deteriorated at the ground line and have a loss of wood fiber due to bacteria, insects and/or fungus consuming the wood fiber. Once this occurs to a significant degree, especially on the outside diameter of the pole, the remaining fibers do not have sufficient strength to support the pole under "heavy loading conditions", which is a design requirement of the Distribution System Code. These poles become a safety hazard when they fail mechanically by failing to maintain proper ground clearance for the live conductors. If the broken pole causes the line to fault then an outage results and reliability is negatively impacted.

Once the wood fiber is consumed, pole treatment is not effective since it does not restore the consumed wood fiber and hence does not restore the pole strength required.

Similarly, these poles are also attacked from the top. The rain saturates the wood and makes a habitat for bacteria, insects and fungus to start destroying the top of the pole. Cracks in the pole provide for the start of the pole rotting process. This destruction of the pole is largely the result of the original pole treatment deterioration with time and weather, to the point it no longer protects the poles from the natural biological processes.

Once these deterioration mechanisms reduce the pole strength sufficiently, the only resolution is to replace the pole.

CND has 2246 poles more than 43 years old.

Some poles within the projects described have been replaced as a result of previous failures. These will be reused by CND.

CND has also experienced this deterioration mechanism in poles that are only 25 or so years old. This is because of the specific ground environment where the poles are located has caused the original pole protective treatment to deteriorate more quickly and making the pole susceptible to decay earlier. These poles are identified through the maintenance inspection cycles.

Rebuilding these areas will improve the reliability, and replacing these poles as a capital program will reduce the cost of replacement as compared to a run to failure replacement cost. These projects will also replace the 8.32 kV that still exists and reduce the stocking and inventory requirements. While this work is discretionary, it is necessary to consider the large number of old poles that are at end of life and replace these at a reasonable pace, as CND is planning to do preventing a steady deterioration in service levels to the customers supplied from these circuits.

Many of the old poles are 35 feet long and in treed areas where the branches are above the conductors. The trees are also generally old and either a branch will fall down or the whole tree will be broken particularly in higher wind situations. This often causes the small gauge conductors to break and adjacent old poles to break. When these areas are rebuilt to the 27.6 kV standard, taller poles will be used and the wire will be higher. The overhanging vegetation will need to be trimmed to provide clearance to the conductors. This will make the new lines less prone to tree contacts.

Why the project is the preferred alternative.

The existing plant is overhead which is the standard low cost design alternative for this area. CND is continuing with this design and merely replacing it with new plant at the current design standards. This is the most economical design and meets CND's 27.6 kV standard system voltage implementation.

For Underground Renewal Projects

Description of work

CND has direct buried, bare concentric neutral underground cable that was installed in subdivisions in the mid-1970s. The projects also utilize a mixture of mini-pad and submersible transformers.

This vintage of cable fails due to the cable construction and the cable environment. While the cable was state of the art when it was installed, cable technology has improved significantly since then. Moisture can move along the core conductor strands and migrate from the core conductor through the insulation. Also in a direct buried installation, water can migrate from the outside of the cable at the concentric neutral into the insulation. This coupled with the voids and the contaminants present in the cross-linked polyethylene insulation itself, causes water treeing that over time results in a fault or short circuit. Research has demonstrated and documented this mechanism and it is well known in the industry. CND has a significant amount of this cable installed and has experienced several outages due to this vintage of cable failing.

These existing installations utilize a mixture of submersible and mini-pad transformers. Submersible transformers are generally in a wet environment and the transformer tanks rust over time and eventually leak oil when the tanks rust through and ultimately fail in service. Also the primary and secondary connections are in an almost constant moist environment and eventually develop either short circuits or high resistance connections. For the investments proposed, where the supply voltage is changed all the transformers will be replaced and mini-pad transformers will be installed. Where the supply voltage is not changed the submersible transformers will be replaced with mini-pad transformers and where the existing transformers are mini-pad transformers they will not be changed out.

Why needed now

CND has significant future outage risk exposure in the subdivisions installed in the 1970s and into the 1980s because of the cable that was available at the time as well as the use of submersible transformers. CND has 13 subdivisions remaining from the 1970s and 52 subdivisions from the 1980s and the direct buried, bare concentric neutral underground cable in these subdivisions is beginning to fail. After these installations CND purchased TRXLPEI – tree retardant cross linked polyethylene insulated – cable which overcomes the treeing problem. Appendix R illustrates the failures that have occurred in the recent past. The failure mechanism of this plant manifests itself in an increasing probability of failure over time. This means that failure is inevitable but the exact date of the failure in not known. Because CND has a significant number of subdivisions where this failure will occur in future and because the remediation, namely the replacement of the plant, is costly, it is prudent to begin the replacement of these facilities at a modest rate before the failures severely impact the system reliability and future costs. Also when failures occur, the repair is generally only a temporary measure for example removing the immediate faulted few feet of cable and splicing in a small piece of cable to restore power, while the remainder of the cable is still prone to failure. Locating and repairing cable in this manner is also expensive (labour intensive) and will increase maintenance costs.

Why the project is the preferred alternative

CND is replacing existing underground plant with an equivalent underground design as was installed originally, but improvements are made to prevent the same issues that are causing the current failures. CND will be using current state of the art cable to prevent a recurrence of the cable failure mechanisms. In addition to minimize costs, they will employ micro-tunneling and install a duct for the cable to further limit the effect of water on the cable. They will remove the submersible transformers and use surface mounted mini-pad transformers to provide a better environment for the transformers and the connections. This is a widely used industry standard design that has fewer problems that the previous submersible designs.

The result will be a system that is cost effective and is expected to provide problem free service for many years into the future.

SYSTEM SERVICE PROJECTS

For System Service Projects

The upgrade of radios/controllers at existing SCADA switch installations project replaces the existing old, obsolete and poorly performing RTU hardware at existing motor operated switches with new state of the art “smart” radios and control equipment. The old equipment did not communicate with the SCADA system reliably and thus did not fully perform the function for which it was intended. As a result, longer outages were experienced by customers.

The new SCADA switch project is an ongoing project that installs five new remote operated switches at strategic locations to allow the speedy reconfiguration of the power system to restore service to customers in the event of a power interruption. This is part of a program that will achieve the installation of three and one half switches per feeder, so that in general three quarters of the customers on any one feeder can be restored from the control center.

The 16 kV single phase reclosure program replaces fuses with reclosing switches on main laterals in the rural 27.6 kV system, so that momentary faults can be cleared without sustaining a permanent outage, as is the case now with fuses. CND will install 9 reclosers in 2014.

Why the projects are needed now.

The radio/controller upgrade was started in 2013. This project completes the upgrade. Once this upgrade is completed the CND control center will have reliable high speed communications to all the remote operated switches on the system. This is highly desirable and necessary to be able to be able to restore power quickly to customers once a power interruption occurs.

The five SCADA switches to be installed are part of a multi-year project to bring the number of remote operable switches to the design level of three and one half switches per feeder. The switches provide the rapid restoration benefits of reducing the outage duration to customers only when they are installed and working reliably. Particularly on 27.6 kV systems, the number of customers per feeder is high because of the megawatt capacity of the lines. In order to maintain low customer-hours of interruption, these switches allow up to three quarters of the customers power to be restored in a few minutes by isolating the faulted section. Only those customers within the faulted section experience a longer interruption of power. CND needs to continue this program to its completion to achieve the full benefit.

The single phase reclosure project replaces 9 single phase lateral fuses that are in use now in the rural part of CND's system. Rural areas are susceptible to lightning strikes, animal contacts and tree branches. These cause high currents to flow that cause fuses to operate. A fuse is a one-time device and once it operated, the fuse link needs to be replaced. With a reclosure, the device, which is a current sensing switch, will open when excessive current is sensed, but has the capability of closing after an intentional delay. Reclosers can close multiple times and have variable current sensitivity settings. If the fault is transient such as in the case of a lightning strike, the intentional delay allows the ionization to dissipate and the insulation capability of the air to be restored. Once the switch is closed, power is restored. If a fuse was installed, it would likely blow and a sustained interruption would be incurred. If there is a sustained fault, the switch would operate the number of times prescribed by the settings and lock out protecting the line and interrupting only those customers in the sustained fault area. These reclosers are required in order to improve the reliability of the rural area particularly with the renewal of the old lines planned and the removal of the 8.32 kV lines supplied by step down transformers.

Why the project is the preferred alternative.

The radio/controller upgrade uses "smart" radios that automatically move into a store and forward mode when they lose direct communication with the SCADA system. This means that when a radio senses it has lost communication with the SCADA system it establishes contact with an adjacent "smart" radio and forwards the information it was trying to communicate to that adjacent radio. The adjacent radio recognizes the data and forwards it to the SCADA system. Similarly the SCADA communications are routed through the adjacent radio. Thus the required messages are transmitted and received and the system operation is successful. This technology is proven and is readily available. It is the most cost effective means to solve the communications reliability issue.

For the remote operated switch, CND has been implementing these devices and has proven the effectiveness of the approach. CND use standard mounting and installation practices that are standard in the industry. This is a low cost effective means of improving the restoration of power to up to three quarters of the customers particularly on 27.6 kV feeders which have a large number of customers connected.

For the single phase reclosers, this is a cost effective means of restoring power quickly on lines that are prone to transient faults without needing to send out crews. It also reduces the number of permanent interruptions the customer experiences and does so at a modest cost.

Evaluation criteria and information requirements for each project/activity Specific Material Projects

This section provides a description of the material projects in 2014, the test year, and the outcomes that are achieved. The projects are listed in the order of materiality by category. The Category of each project is included in the project information.

Franklin Boulevard Roundabouts

Category: System Access

Description:

The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period. The budgeted amount covers the first year of relocations. This proposed work results in significant relocation of overhead triple circuit and double circuit 27.6 kV lines. Significant traffic control will be required due to the heavy volume of traffic. Significant switching will be required to maintain power during construction.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. In this case, the customer is the Region of Waterloo which requires pole relocations to allow the reconstruction of Franklin Boulevard in Cambridge including the installation of eleven roundabouts. The source of the information used to justify this investment is the Region of Waterloo through its staff, its engineering firm and the detailed plans for the roadway.

b) The priority of this project is 1 (highest priority). It is a System Access project involving relocations for a municipality. If CND did not proceed with this project, the Region of Waterloo could not proceed with the road work since the poles would end up in conflict with the pavement and/or the trail beside the roadway. This would not be in the public interest.

c) Underground alternatives were considered instead of relocating the poles. The underground option was rejected due to significantly higher cost. Scheduling is dependent upon when the Region of Waterloo acquires all necessary property and easements for the road project to allow the hydro relocation work to proceed. The Region of Waterloo will fund part of the cost of the project based on 50% of labour and labour saving devices as per the Public Service Works on Highways Act. There is a benefit to the system since the poles dating back to the 1970's which support two to three 27.6kV circuits have proven too weak to withstand major storms. They will be replaced as part of the relocation work. This will be a benefit to customers since reliability and public safety will be enhanced versus the existing conditions. Reliability will improve.

2. Safety

   This project will enhance safety since the current weak early 1970's poles will be replaced with stronger new poles which will meet current standards for ice and wind loading. The likelihood of leaning poles or pole failure, both experienced in the past, will be dramatically reduced.

3. Cyber-security, Privacy

   This isn't applicable to this project.

4. Co-ordination, Interoperability

   The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards. It is being coordinated with the Region of Waterloo, Bell Canada, Rogers and Union Gas since all utilities are located in the roadway. Necessary planned outages during construction will be coordinated with customers.

5. Economic Development

   Franklin Boulevard is frequently clogged with traffic. The proposed work should help improve traffic flow. That is a benefit for economic development.

6. Environmental Benefits

   Improved traffic flow on Franklin Boulevard should reduce pollution from vehicles. However, there is no direct environmental benefit from the electrical work.

Underground Subdivision Capital Investment (by developer) – 500 lots

Category: System Access

Description:

This amount represents the developer's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are serviced.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. The subdivision developer, home builder and ultimately the homeowner wants electrical power. It is the responsibility of CND to provide it. The source of the information used to justify this investment is municipal planning studies and direct contact with subdivision developers.

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new residential developments. If CND did not proceed with this work, new homeowners would not have power.

c) There are few alternatives. The installation must be underground as per municipal By-Laws. There is one electrical connection per lot. Common utility practice of 28kV 1/0 Aluminum primary cable and mini-pad transformers are utilized.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is inspected by CND Hydro and signed off as safe prior to energization. CND provides underground cable locates at no charge to customers and contractors for any future excavations in the underground area.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. The trench is joint use between CND, Bell Canada and Rogers (also Union Gas in the City of Cambridge) to minimize cost and minimize the space requirements in the road allowance.

5. Economic Development

Timely electrical servicing of new residential subdivisions is important for economic growth and job creation as the home building industry and associated industries are large employers.

6. Environmental Benefits

There are no environmental benefits associated with residential subdivision servicing.

2014 Underground Servicing Industrial

Category: System Access

Description:

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. This investment provides electrical power to new industrial, commercial, residential (high rise and multi-unit) and institutional customers. The source of the information used to justify this investment is direct contact with customers and/or their representatives (ie. Planning consultants, engineering firms).

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new industrial, commercial, residential (high rise and multi-unit) and institutional developments. If CND did not proceed with this work, new businesses, homeowners and institutions would not have power.

c) There are few alternatives. The installation must be underground as per municipal By-Laws. Common utility practice of 28kV 1/0 Aluminum primary cable and three phase padmount transformers are utilized.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is inspected by CND Hydro and signed off as safe prior to energization. CND provides underground cable locates at no charge to customers and contractors for any future excavations in the underground area.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customer.

5. Economic Development

These investments have a strong, positive effect on Ontario economic growth. They provide electrical power for new industry and commercial, residential (high rise and multi-unit) and institutional developments.

6. Environmental Benefits

There are no environmental benefits associated with industrial servicing.

Double Circuit Existing 27.6kV Line – Fountain St. (Shantz Hill to Dickie Settlement Road) – 2.8km

Category: System Access

Description:

This project is required to connect a new residential subdivision in the Limerick Road area and a new industrial subdivision at the intersection of Fountain St. S. and Dickie Settlement Rd. A crossing of the Grand River is required. This project will also improve reliability to the Cambridge campus of Conestoga College as their supply will come from this new line and not from the long rural line they were initially supplied. This will reduce their line exposure.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. This investment provides the necessary electrical capacity to connect new residential and industrial customers. The source of the information used to justify this investment is municipal planning studies. A secondary driver is reliability. The existing 27.6kV circuit has poor reliability due to its rural nature as compared to urban feeders. The new 27.6kV circuit will improve reliability to existing residential customers and the Cambridge campus of Conestoga College. It will also ensure that the new customers receive an acceptable standard of reliability.

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new industrial and residential customers. If CND did not proceed with this work, new businesses and homeowners would not have sufficient power.

c) CND looked at alternative routes and determined that this route was the best choice. The other possible routes were less desirable from environmental and roadway width perspectives. This project will improve reliability to existing customers in the area.

2. Safety

   The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization.

3. Cyber-security, Privacy

   This isn't applicable to this project.

4. Co-ordination, Interoperability

   The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation will be coordinated with the Region of Waterloo who have jurisdiction over the road allowance. Location of poles will be coordinated with the proposed Region of Waterloo bridge replacement at the Grand River. Construction timing will be coordinated with the Ospreys in the area.

5. Economic Development

   This project allows industrial and residential development to proceed which is beneficial to economic growth in Ontario.

6. Environmental Benefits

   There are no environmental benefits associated with this project.

Underground Subdivision Capital Investment (by CND Hydro) – 500 lots

Category: System Access

Description:

This amount represents CND's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced. The amount is determined by a calculation prescribed in the Distribution System Code.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability
   a) The main driver is Customer Value. The subdivision developer, home builder and ultimately the owner of the home wants electrical power. It is the responsibility of CND to provide it. The source of the information used to justify this investment is municipal planning studies and direct contact with subdivision developers.

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new residential developments. If CND did not proceed with this work, new homeowners would not have power.

c) There are few alternatives. The installation must be underground as per municipal By-Laws. There is one electrical connection per lot. Common utility practice of 28kV 1/0 Aluminum primary cable and mini-pad transformers are utilized.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is inspected by CND Hydro and signed off as safe prior to energization. CND provides underground cable locates at no charge to customers and contractors for any future excavations in the underground area.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. The trench is joint use between CND, Bell Canada and Rogers (also Union Gas in the City of Cambridge) to minimize cost and minimize the space requirements in the road allowance.

5. Economic Development

Timely electrical servicing of new residential subdivisions is important for economic growth and job creation as the home building industry and associated industries are large employers.

6. Environmental Benefits

There are no environmental benefits associated with residential subdivision servicing.

Highway 401 Widening and Bridge Replacements

Category: System Access

Description:

The Ministry of Transportation plans to widen Highway 401 in Cambridge between Highway 8 and Highway 24. This results in 27.6 kV pole line relocations at 401 crossings and along an adjacent parallel road (Rogers Drive).

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. In this case, the customer is the Ministry of Transportation Ontario who require pole relocations to allow the widening of Highway 401 between Highway 8 and Highway 24 in Cambridge along with the required bridge replacements. The source of the information used to justify this investment is the Ministry of Transportation Ontario through its staff, its engineering firm and the detailed plans for the roadway.

b) The priority of this project is 1 (highest priority). It is a System Access project involving relocations for the Ministry of Transportation Ontario. If CND did not proceed with this work, the Ministry of Transportation Ontario could not proceed with the road or bridge work since the poles would end up in conflict with the roadway. This would not be in the public interest.

c) There are alternatives with respect to the location of the relocated poles but there is no alternative to relocating the poles. They are in the conflict with the planned roadway work. Scheduling is dependent upon the timing of the Ministry of Transportation Ontario. Relocations must be done prior to commencement of the road and bridge work. The Ministry of Transportation Ontario will fund part of the cost of the project based on 50% of labour and labour saving devices as per the Public Service Works on Highways Act. There is a benefit to the system as the poles that are replaced will meet the CSA Overhead Systems standard for ice and wind loading.

2. Safety

This project will enhance safety since the current poles will be replaced with stronger new poles which will meet current standards for ice and wind loading.

3. Cyber-security, Privacy

This isn’t applicable to this project.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards. It is being coordinated with the Ministry of Transportation Ontario, Bell Canada, Rogers and Union Gas.

5. Economic Development

Highway 401 is frequently clogged with traffic. The proposed work should help improve traffic flow. That is a benefit for economic development.

6. Environmental Benefits

Improved traffic flow on Highway 401 should reduce pollution from vehicles. However, there is no direct environmental benefit from the electrical work.

Triple Circuit Existing 27.6kV Line – Speedsville Rd. – North of Royal Oak Rd. To Boxwood Industrial Subdivision

Category: System Access

Description:

This is a 1 km rebuild of an existing single circuit 27.6 kV line to meet the requirements of new industrial load in the area.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Customer Value. This investment provides the necessary electrical capacity to connect new industrial customers and future residential customers. The source of the information used to justify this investment is municipal planning studies and direct contact with customers. A secondary driver is reliability. This work will enhance reliability to existing customers in the area by providing additional 27.6kV supply options during contingencies.

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new industrial and residential customers. If CND did not proceed with this work, new businesses and homeowners would not have sufficient power.

c) This is the most direct route and utilizes a current alignment. There are no better alternatives. This project will improve reliability to existing customers in the area.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization.

7. Cyber-security, Privacy

   This isn't applicable to this project.

8. Co-ordination, Interoperability

   The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation will be coordinated with the City of Cambridge who have jurisdiction over the road allowance. Construction timing will be coordinated with development in the area.

9. Economic Development

   This project allows industrial and residential development to proceed which is beneficial to economic growth in Ontario.

10. Environmental Benefits

    There are no environmental benefits associated with this project.

2014 Servicing Industrial Overhead

Category: System Access

Description:

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Customer Value. This investment provides electrical power to new industrial, commercial, residential (high rise and multi-unit) and institutional customers. The source of the information used to justify this investment is direct contact with customers and/or their representatives (ie. Planning consultants, engineering firms).

b) The priority of this project is 1 (highest priority). It is a System Access project to provide electricity to new industrial, commercial, residential (high rise and multi-unit) and institutional developments. If CND did not proceed with this work, new businesses, homeowners and institutions would not have power.

c) The alternative would be completely underground servicing. It is permitted under municipal By-Laws to install polemount transformers on hydro poles as long as the low voltage service cables going to buildings are underground. For smaller services, polemount transformers are feasible and are less costly than a completely underground installation with a padmount transformer and underground 27.6kV cables.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is inspected by CND Hydro and signed off as safe prior to energization.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customer.

5. Economic Development

These investments have a strong, positive effect on Ontario economic growth. They provide electrical power for new industry and commercial, residential (high rise and multi-unit) and institutional developments.

6. Environmental Benefits

There are no environmental benefits associated with industrial servicing.

Greenfield Road from West of Dumfries Rd. To East of Spragues Rd./parts of Edworthy Rd. And Alps Rd. – 10.1km

Category: System Renewal

Description:

This project rebuilds a 10.1 km section of existing three phase 8.32 kV and single phase 4.8 kV line that has reached the end of its life along Greenfield Rd. from Dumfries Rd. to East of Spragues Rd. as well as parts of Edworthy Rd. and Alps Rd. The poles range in age from the 1940s to the 2000s. Newer poles will be re-used. The new line will operated at 27.6 kV and 16kV.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Reliability. The existing overhead 8.32kV lines have reached end of life. A secondary driver is Efficiency. It is more cost effective to replace the existing poles, insulators, wire and transformers in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and pole testing information.

   b) The priority of this project is number 5 out of all 2014 material projects. It is a System Renewal project to replace overhead 8.32kV lines which have reached end of life. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a high priority to replacement of end of life overhead lines since they are vulnerable to failure especially during winter storm conditions. Such failures take a significant time to repair and have a major impact especially with respect to customer heating systems and water supply (in rural areas).

   c) An alternative to full replacement is “run to failure”. This is costly both in terms of customer reliability and per pole replacement cost. Underground is an alternative but the cost especially considering the long line lengths in rural areas is cost prohibitive. Full replacement has many benefits. It allows operation at 27.6/16kV. This reduces system losses and allows eventual standardization of CND inventory to one primary voltage eliminating many inventory items. 27.6kV increases available supply capacity in the area both for load customers and for possible renewable generation. Reliability will improve.

2. Safety

   The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization. The rebuilt lines are installed to 2013 standards versus standards typically from the 1950’s. Clearances are increased. Grounding is improved. Lines are typically relocated from difficult to access off-road locations. Insulators and cutouts are changed from porcelain to polymer reducing the likelihood of breakages. Aged, often small diameter Aluminum Conductor Steel Reinforced (ACSR) conductors subject to mechanical failure are replaced with new wire.

3. Cyber-security, Privacy

   This isn't applicable to this project.

4. Co-ordination, Interoperability

   The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers. The voltage conversion to 27.6kV allows future connection of renewable generation.

5. Economic Development

   This investment improves reliability and supply capacity in this area which supports rural development. As well, the project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

   This rebuild removes poles which are treated with chemicals that do not meet today's environmental standards. This is positive for the environment. Reduced system losses with the higher primary voltage is also positive for the environment.

Northview Acres Area Underground Rebuild

Category: System Renewal

Description:

The Northview Acres area consists of The Greenway, Northview Heights Dr., Glamis Rd., Carter Cr., MacAtee Pl., MacTeith Ct. and Frobisher Ct. The underground rebuild is being staged over two years (2013 and 2014) due to the size of the area. The rebuild involves the replacement of existing submersible transformers with above ground mini-pad transformers, the addition of more switches for improved sectionalizing and the replacement of existing underground primary cable. The distribution system was installed between 1975 and 1978. CND has had a number of previous outages in this area including both transformer failures and underground primary cable failures.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Reliability. The existing direct buried underground 27.6kV cables have reached end of life. CND has already experienced failures resulting in power interruptions to customers. Some of the transformers in the area are submersible which have been failing as a result of corrosion due to a wet environment. A secondary driver is Efficiency. It is more cost effective to replace the underground 27.6kV cables and transformers in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and technical information about the failure mechanism of similar cables.

   b) The priority of this project is number 7 out of all 2014 material projects. It is a System Renewal project to replace underground cables and transformers which have reached end of life. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a medium priority to replacement of end of life underground cables and transformers. They are not vulnerable to failure during winter storm conditions like end of life overhead lines therefore the urgency of replacement is less. However, failures have a high impact to affected customers as it is often time consuming to troubleshoot problems on a buried electrical system.

   c) An alternative to full replacement is "run to failure". This is costly both in terms of customer reliability and repair costs. Reliability will improve.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers.

5. Economic Development

The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

The removal of submersible transformers which are prone to rusting reduces the likelihood of an oil leak.

Shellard Road – Morrison Road to Gore Road – 5.1km

Category: System Renewal

Description:

This project rebuilds a 5.1 km section of existing 8.32 kV line that has reached the end of its life on Shellard Rd. between Morrison Rd. and Gore Rd. The oldest poles date back to the 1950s. More newly installed poles will be re-used. The new line will be operated at 27.6kV. Previous lengthy outages have occurred on this line.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Reliability. The existing overhead 8.32kV lines have reached end of life. A secondary driver is Efficiency. It is more cost effective to replace the existing poles, insulators, wire and transformers in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and pole testing information.

   b) The priority of this project is number 4 out of all 2014 material projects. It is a System Renewal project to replace overhead 8.32kV lines which have reached end of life. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a high priority to replacement of end of life overhead lines since they are vulnerable to failure especially during winter storm conditions. Such failures take a significant time to repair and have a major impact especially with respect to customer heating systems and water supply (in rural areas).

c) An alternative to full replacement is “run to failure”. This is costly both in terms of customer reliability and per pole replacement cost. Underground is an alternative but the cost especially considering the long line lengths in rural areas is cost prohibitive. Full replacement has many benefits. It allows operation at 27.6/16kV. This reduces system losses and allows eventual standardization of CND inventory to one primary voltage eliminating many inventory items. 27.6kV increases available supply capacity in the area both for load customers and for possible renewable generation. Reliability will improve.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization. The rebuilt lines are installed to 2013 standards versus standards typically from the 1950’s. Clearances are increased. Grounding is improved. Lines are typically relocated from difficult to access off-road locations. Insulators and cutouts are changed from porcelain to polymer reducing the likelihood of breakages. Aged, often small diameter Aluminum Conductor Steel Reinforced (ACSR) conductors subject to mechanical failure are replaced with new wire.

3. Cyber-security, Privacy

This isn’t applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers. The voltage conversion to 27.6kV allows future connection of renewable generation.

5. Economic Development

This investment improves reliability and supply capacity in this area which supports rural development. As well, the project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

This rebuild removes poles which are treated with chemicals that do not meet today's environmental standards. This is positive for the environment. Reduced system losses with the higher primary voltage is also positive for the environment.

Galt Core Area Upgrades

Category: System Renewal

Description:

This project continues a program of upgrades in the Galt core area of Cambridge. The Galt core area has a high concentration of business customers who suffer a financial loss during power outages. There have been a number of unplanned outages in the Galt core area due to older equipment and the ongoing presence of water, salt and other debris in the underground system. The water table is high because the Galt core area is located in a low spot right next to the Grand River. There is also a lot of salt application and build-up of debris since it is a core area. CND is investing in replacement and additional switching equipment to be able to more promptly sectionalize and restore power in the event of an outage. CND is replacing older cables to reduce the likelihood of failure. CND is eliminating as many underground connections as possible in its underground system to again reduce the likelihood of failure. CND is repairing concrete vaults which have deteriorated due to the salt to keep them safe for pedestrians.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Reliability. The existing underground 27.6kV cables, connections, transformers and switches have been failing with a significant outage impact to primarily business customers in the area. A secondary driver is Efficiency. It is more cost effective to replace the underground 27.6kV cables, connections, transformers and switches in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and technical information about the failure mechanism of similar cables.

   b) The priority of this project is number 8 out of all 2014 material projects. It is a System Renewal project to replace underground cables, connections, transformers and switches which are failing. The wet environment and high use of salt in the core area both contribute to reduced life of equipment. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a medium priority to replacement of end of life underground cables, connections, transformers and switches. They are not vulnerable to failure during winter storm conditions like end of life overhead lines therefore the urgency of replacement is less. However, failures have a high impact to affected customers especially to businesses in the core area who suffer financial losses during outages. It is often time consuming to troubleshoot problems on a buried electrical system which increases the impact of each outage.

c) An alternative to full replacement is "run to failure". This is costly both in terms of customer reliability, customer business losses and repair costs. Reliability will improve.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization. Repair of the underground vaults ensures public safety for pedestirans since the vault lids deteriorate as a result of the salt.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers.

5. Economic Development

The project will contribute to an acceptable standard of reliability. Reduced reliability would directly impact the financial success of area businesses which would be detrimental to job growth and the economy. The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

The removal of submersible transformers which are prone to rusting reduces the likelihood of an oil leak.

Pole Replacements on Franklin Boulevard not affected by Roundabout Relocations

Category: System Renewal

Description:

This project replaces poles on Franklin Boulevard that are unaffected by planned roundabout relocations. A section of poles fell over in 2007 during an ice storm and were rebuilt. During an ice storm in April 2012, two poles outside of the section, which were replaced in 2007, began to lean. The poles are primarily dated 1971 and just no longer have the strength to handle severe ice/wind loading for the triple circuit 27.6 kV lines attached to them. Some of the poles along Franklin Boulevard are being replaced as part of the planned Franklin Boulevard roundabout relocations. Those poles are included in the Franklin Boulevard roundabouts relocation project.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Reliability. Broken poles cause power interruptions. Poles that are in imminent danger of breaking are a high risk to the power system continuity. The poles along Franklin Boulevard have failed previously during severe weather conditions. The poles which were installed in the early 1970's no longer have the strength to support triple and double circuit 27.6kV lines during severe weather. A secondary driver is Efficiency. Planned replacements are more cost effective than replacements during emergency conditions. The source of the information is pole testing, past failures and engineering calculations.

b) The priority of this project is 1. It is a System Renewal project. It has a high impact to public safety and to reliability since Franklin Bouelvard is a major power corridor in CND's distribution system.

c) The poles need to be replaced to prevent more failures. The alternative is underground but the cost would be much higher especially given the power rating of these lines.

2. Safety

This project has direct safety impact. When poles fail they can affect public safety depending on how and where they fall.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards.

5. Economic Development

Not applicable.

6. Environmental Benefits

This does not apply to this project.

Avonlea/Earlwood Underground Rebuild

Category: System Renewal

Description:

The Avonlea Rd./Earlwood Dr./Briarwood Dr. area is currently serviced underground at 27.6 kV. The distribution system was installed in 1974. The underground cable is direct buried and there are eleven transformers. CND has not had major problems in this area, but based on the age of the plant, CND expects that a rebuild will be required in the 2014 time frame.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

   a) The main driver is Reliability. The existing direct buried underground 27.6kV cables have reached end of life. A secondary driver is Efficiency. It is more cost effective to replace the underground 27.6kV cables and transformers in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and technical information about the failure mechanism of similar cables.

   b) The priority of this project is number 12 out of all 2014 material projects. It is a System Renewal project to replace underground cables and transformers which have reached end of life. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a medium priority to replacement of end of life underground cables and transformers. They are not vulnerable to failure during winter storm conditions like end of life overhead lines therefore the urgency of replacement is less. However, failures have a high impact to affected customers as it is often time consuming to troubleshoot problems on a buried electrical system.

c) An alternative to full replacement is "run to failure". This is costly both in terms of customer reliability and repair costs. Reliability will improve.

2. Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers.

5. Economic Development

The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

The removal of submersible transformers which are prone to rusting reduces the likelihood of an oil leak.

Upgrades in Various Underground Areas

Category: System Renewal

Description:

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

    a) The main driver is Reliability. The existing direct buried underground 27.6kV cables, connections, transformers and switches that are being replaced have reached end of life. A secondary driver is Efficiency. It is more cost effective to complete the replacements in a planned way rather than during an unplanned outage. It is also better for customers than unplanned outages. The source of the information is CND records, CND System Inspections, past CND Outage Reports and technical information about the failure mechanism of similar cables.

    b) The priority of this project is number 9 out of all 2014 material projects. It is a System Renewal project to replace underground cables, connections, transformers and switches which have reached end of life. If CND did not proceed with this work, the risk of failure and the resulting negative effect on reliability to customers would increase each year as the system continued to deteriorate. CND assigns a medium priority to replacement of end of life underground cables and transformers. They are not vulnerable to failure during winter storm conditions like end of life overhead lines therefore the urgency of replacement is less. However, failures have a high impact to affected customers as it is often time consuming to troubleshoot problems on a buried electrical system.

    c) An alternative to full replacement is "run to failure". This is costly both in terms of customer reliability and repair costs. Reliability will improve.

    d) Safety

The installation work is done according to CND Hydro standards and Ontario Regulation 22/04 to ensure no undue safety hazards. The work is signed off as safe prior to energization.

    e) Cyber-security, Privacy

This isn't applicable to this project.

f) Co-ordination, Interoperability

The installation is completed to CND Hydro Standards and Ontario Regulation 22/04. Installation is coordinated with the customers.

g) Economic Development

The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

h) Environmental Benefits

The removal of submersible transformers which are prone to rusting reduces the likelihood of an oil leak.

Townline Rd. between River Rd. and Black Bridge Rd.

Category: System Renewal

Description:

This project resolves a long term load transfer situation with Hydro One and extends CND's 27.6 kV line further North to ultimately provide a backfeed to the residential subdivision development on Black Bridge Road in Hespeler.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main drivers are Efficiency and Customer Value. The most immediate driver is Customer Value. The customers affected by this project are currently supplied by Hydro One on a long term load transfer. By building this project they will be supplied by CND. This will keep their billing rate the same and would prevent a substantial increase in rates, in the order of 30%, that would be experienced if they were transferred to Hydro One as customers. The other driver is to satisfy CND's requirement to ultimately provide a 27.6 kV backfeed to the residential subdivision development on Black Bridge Road in Hespeler.

b) The priority of this project is 15. It is a System Renewal project.

c) The system operation will be enhanced in future by providing a looped feed to enhance the existing radial feed to an existing residential subdivision. The route selected for this includes this section of line and will need to be built to provide the loop feed capability. This LTLT resolution only advances part of this project at this time. The net benefit for the customer is to prevent large rate increases that would happen if the customers were transferred to Hydro One. There is little or no expected impact on reliability at this time.

2. Safety

This does not apply to this project.

3. Cyber-security, Privacy

This does not apply to this project.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards.

5. Economic Development

This does not apply to this project.

6. Environmental Benefits

This does not apply to this project.

Welsh Dr./Trussler Rd. Underground Rebuild

Category: System Renewal

Description:

Welsh Dr. is supplied by a 16 kV -4.8 kV stepdown transformer. The underground primary cable was installed by Ontario Hydro in the mid 1970s using 35 kV rated cable (non-standard for CND). The cable is direct buried. There are five transformers in this estate lot sized subdivision. CND has not had major problems in this area, but based on the age of the plant, CND expects that a rebuild will be required in the 2014 time frame.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Reliability. Cable failures have occurred with the type of cable installed in this subdivision. The issue with this type of cable is described in Section 3.5.1 of this report.

b) The priority of this project is 13. It is a System Renewal project.

c) The benefit to customers is that they will experience a reduced number of interruptions originating from within their subdivision. The impact on reliability is that there will be a lower frequency of interruptions.

2. Safety

This does not apply to this project.

3. Cyber-security, Privacy

This does not apply to this project.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Underground Systems standard, Ontario Regulation 22/04 and CND standards.

5. Economic Development

The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

This does not apply to this project.

Pole Replacements

Category: System Renewal

Description:

This work replaces poles that are at the end of their useful life. The poles are identified by pole testing, distribution system line patrols or in the normal course of operation of the distribution system.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Reliability. Broken poles cause power interruptions. Poles that are in imminent danger of breaking are a high risk to the power system continuity.

b) The priority of this project is 1. It is a System Renewal project.

c) In the case of a broken pole replacement is usually required to restore power. In the case of poles about to fail, replacement will prevent power failure.

2. Safety

This project has some direct safety impact. When poles fail they can affect public safety depending on how and where they fall.

3. Cyber-security, Privacy

This isn't applicable to this project.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards.

5. Economic Development

The project utilizes Ontario labour and a significant amount of materials from Ontario suppliers. This has a positive effect on Ontario economic growth.

6. Environmental Benefits

Pole replacements typically remove poles which are treated with chemicals that do not meet today's environmental standards.

Upgrade Radios/Controllers at Existing SCADA Switch Installations

Category: System Service

Description:

CND currently has over 70 SCADA switches installed on its 27.6 kV distribution system. The first five SCADA switches were installed in 1990. In 2010, a decision was made to replace the radio system because the existing system was unreliable. Many times the control center could not communicate with a remote operable switch and crews would need to be dispatched to operate the device manually. This adversely affected the restoration times. CND decided to implement the vendor's radio solution. This ensured easy integration with the SCADA system. The technology adopted replaced the old point to point radio system with an IP based system which allows the radios to operate in a mesh network mode. This allows for multiple paths to ensure reliable communication is achieved. The upgraded controllers and the new "smart" radios allow any switch radio not communicating with the master station in a point to point mode to communicate with an adjacent switch radio in a store and forward mode. This ensures that the messages to and from the master to the desired switch are completed. This system has been partially implemented and the problems with the old system have been solved in the trial installation. This project removes the old controllers that are also at end of life, as well as the old radios which are not compatible with the new system. The new radio system uses an unlicensed frequency band. This will save about $2000 per year in operating costs. The first phase of the upgrade is being completed in 2013. This project is the remainder of the upgrade, and when completed will provide reliable uniform communication to all the RTU's. This in turn will assist in the rapid restoration of power to the majority of customers on a feeder should a feeder lock out occur.

Technology has changed significantly between 1990 and 2013. CND is upgrading the electronic controllers and SCADA radio system to ensure that the switches operate when needed. $490,000 is proposed to be spent in 2014 on upgrades to complete the project.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Reliability. The radio system is the means by which the Control Center systems communicate with distributed field devices. Without reliable consistent communications the value of the investment into remote operable switches and Control Center SCADA systems is greatly diminished.

b) The priority of this project is 10. It is a System Service project.

c) This project improves the efficiency of system operation as well as the cost effectiveness. It does this by allowing the operation of remote operated switches without needing to send a crew to the switch location. It also allows data available at the remote operated switch to be sent to the Control Center to aid the System Control Operator restore power. If a chain is only as strong as its weakest link then reliable radio communications is a very important link.

2. Safety

This project has some direct safety impact. There is less driving required in areas of no power because there is less switching required by the crews. Also from a public safety perspective more operating traffic lights mean safer traffic flow.

3. Cyber-security, Privacy

A third party is currently conducting a security audit on CND's SCADA system to confirm cyber-security and privacy.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Industry Canada radio requirements, Ontario Regulation 22/04 and CND standards.

5. Economic Development

Reliable communication to SCADA switches allows prompt restoration of power to business customers which has a significant positive financial impact and contributes to economic growth.

6. Environmental Benefits

This does not apply to this project.

SCADA Loadbreak Switches

Category: System Service

Description:

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from its Control Center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2014.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

a) The main driver is Reliability. These devices will allow the System Control Operator to quickly reconfigure the power system through the SCADA system in the event of a power failure and thus restore power to up to 3/4 of the customers within minutes of the feeder trip.

b) The priority of this project is 11. It is a System Service project.

c) This project improves the efficiency of system operation as well as the cost effectiveness. It does this by restoring power to up to 3/4 of the customers supplied by a feeder within minutes of the feeder trip without needing to dispatch crews for switching. This provides for fast restoration of power to a large number of customers connected to the feeder and eliminates the labour hours needed for switching crews to get the same number of customers restored to power.

2. Safety

This project has some direct safety impact. There is less driving required in areas of no power because there is less switching required by the crews. Also from a public safety perspective more operating traffic lights mean safer traffic flow.

3. Cyber-security, Privacy

A third party is currently conducting a security audit on CND's SCADA system to confirm cyber-security and privacy.

4. Co-ordination, Interoperability

The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards. Necessary planned outages during construction will be coordinated with customers.

5. Economic Development

Prompt restoration of power to business customers provided by SCADA switches has a significant positive financial impact and contributes to economic growth.

6. Environmental Benefits

These switches will result in CND crews to do less driving in areas where the traffic is sure to be slow due to the traffic signals being out of service. This consumes less fuel. Also in the restored areas, general traffic flow can be restored reducing the amount of vehicle idling.

16 kV Single Phase Reclosers

Category: System Service

Description:

Single phase reclosers are being installed on main single phase 16 kV overhead lines to optimize reliability. The replacement of a fuse with a recloser on main 16 kV tap-offs results in only a momentary outage during many system events (i.e., animal contacts, tree branch contacts, lightning strikes, etc.) rather than a prolonged outage. This reduces Customer-Hours lost, improves customer satisfaction and reduces labour/trucking costs to send a crew to replace the fuse.

Outcomes Evaluation:

1. Efficiency, Customer Value, Reliability

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a) The main driver is Reliability. These devices will be installed in a predominantly rural area replacing fuses. This area is prone to many faults of which the majority are transient in nature. These transient faults can be caused by animal contacts, tree contacts, lightning strikes etc. When the line is protected by a fuse these transient faults typically blow the fuse or at least weaken it. A recloser will sense the fault and trip to clear the line and then after an intentional delay close again automatically. This may happen several times in succession usually with different timing.

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b) The priority of this project is 14 (lower priority). It is a System Service project.

c) This project improves the efficiency of system operation as well as the cost effectiveness. It does this by clearing transient faults by opening and removing power from the downstream line and allowing the source of the fault to clear be it ionization in the case of a lightning stroke, an animal falling clear of the line or branch falling clear etc. Then after an intentional delay the circuit is re-energized and if the source of the initial fault is cleared then the power stays on and the system is returned to normal. This provides for fast restoration of power and does not require a trouble response, which saves maintenance costs.

2. Safety

This project has no direct safety impact.

3. Cyber-security, Privacy

   This isn't applicable to this project.

4. Co-ordination, Interoperability

   The project is being designed to meet the CSA Overhead Systems standard, Ontario Regulation 22/04 and CND standards. Necessary planned outages during construction will be coordinated with customers.

5. Economic Development

   Not applicable.

6. Environmental Benefits

   Not applicable.

APPENDIX A

HISTORICAL CAPITAL BUDGET INFORMATION 2009 TO 2012

Historical Capital Budget Information 2009 to 2012

This appendix contains the Historical Capital Budget and Actual Expenditure information that is summarized in section 3.4. (5.4.4) Capital Expenditure Summary - Table 15 and meet the "materiality" criteria.

A separate index table is provided for the "material" projects in each year and the Project Descriptions, the Budget and the Actuals for the project and the variance (actual minus budget so that under expenditures show as negative and over expenditures show as positive variances). The section below each table provides explanations for the projects listed in the table. The materiality threshold is $125,000. The entries in the table are projects that either have a budget greater than or equal to $125,000 or have a variance of greater than or equal to $125,000 or both.

2009 Projects

Capital Projects 2009 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
System Access	Subdivision Capital Investment (by developer)	$925,000	$1,059,862	$134,862
System Access	Subdivision Capital Investment (by CND Hydro)	$630,000	$849,704	$219,704
System Access	Kossuth Rd. - East of Chilligo Rd. to Fountain St. (last phase)	$550,000	$731,584	$181,584
System Access	Servicing Industrial (Underground)	$450,000	$784,875	$334,875
System Access	Boxwood Dr. Industrial Subdivision	$350,000	$0	($350,000)
System Access	Townline Rd. - River Rd. to Black Bridge Rd. (Load Transfer Resolution)	$250,000	$0	($250,000)
System Access	Maple Grove Rd. - Cherry Blossom Rd. to Fountain St.	$250,000	$143,808	($106,192)
System Access	Townline Rd. - Can Amera Parkway to Avenue Rd.	$200,000	$2,543	($197,457)
System Access	Servicing Industrial (Overhead)	$150,000	$189,122	$39,122
System Access	Miscellaneous	$225,000	$204,705	($20,295)
System Access	**Subtotal**	**$3,980,000**	**$3,966,204**	**-$13,796**
System Renewal	Area supplied by remaining three 4 kV stations (Grand, Domm's and Wauchope) (Underground)	$2,750,000	$2,140,315	($609,685)
System Renewal	Area Supplied by Remaining Three 4 kV Stations (Grand, Domm's and Wauchope) (Overhead)	$1,750,000	$1,458,310	($291,690)
System Renewal	Clyde Rd. - Extend 16 kV to New Generation	$220,000	$203,316	($16,684)
System Renewal	Trussler Rd. - Brant Waterloo Rd. to Township Rd. 9	$150,000	$174,993	$24,993
System Renewal	Miscellaneous	$290,000	$1,264,032	$974,032
System Renewal	**Subtotal**	**$5,160,000**	**$5,240,966**	**$80,966**
System Service	Miscellaneous	$47,000	$53,831	$6,831
System Service	**Subtotal**	**$47,000**	**$53,831**	**$6,831**
	Total	**$9,187,000**	**$9,261,000**	**$74,000**

Overhead and Underground Line Project Descriptions – Budget versus Actual – Year 2009

This report compares budgeted spending to actual spending on overhead and underground line projects for 2009. Please note that budgeted dollar amounts are prepared at budget time before a detailed engineering design is done in most cases. Detailed estimates are prepared prior to issue of the work order.

SYSTEM ACCESS

Subdivision Capital Investment Underground (by developer)

Budgeted Amount = $925,000

Actual Amount = $1,059,862

This amount represents the developer's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are serviced.

Subdivision Capital Investment Underground (by CND Hydro)

Budgeted Amount = $630,000

Actual Amount = $849,704

This amount represents CND's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are connected.

Kossuth Road – East of Chilligo Road to Fountain Street (last phase)

Budgeted Amount = $550,000

Actual Amount = $731,584

Construction of this project continued in 2009. There were some delays due to unavailability of the contractor, acquisition of land at the roundabout by the Region of Waterloo and final approval from the Region of Waterloo Airport (flight path of runway). At the time of 2009 budget preparation (fall, 2008), it was estimated that more work would occur than actually did before year-end 2008.

Servicing Industrial Underground

Budgeted Amount = $450,000

Actual Amount = $784,875

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Boxwood Drive Industrial Subdivision

Budgeted Amount = $350,000

Actual Amount = $0

The Boxwood Drive Industrial Subdivision is a 175 acre industrial subdivision being developed by the City of Cambridge that was planned again for 2009 construction but approval delays resulted in no activity on the site until 2012. Therefore, there was not a need for hydro servicing. Hydro servicing will be provided in 2013.

Townline Road – River Road to Black Bridge Road (Load Transfer Resolution)

Budgeted Amount = $250,000

Actual Amount = $0

No construction work was completed. CND again delayed resolution of the long term load transfer customers with Hydro One along Black Bridge Road. The solution requires a rebuilt pole line to be completed by Hydro One with one 27.6 kV circuit on the poles for CND and one 8.32 kV circuit on the poles for Hydro One.

Maple Grove Road – Cherry Blossom Road to Fountain Street

Budgeted Amount = $250,000

Actual Amount = $143,808

This work was done by a contractor in the fall of 2009 to relocate hydro poles along Maple Grove Road between Cherry Blossom Road and Fountain Street for a Region of Waterloo road widening. The scope of the work turned out to be less than at the time that the budget was set in the fall of 2008. Contractor pricing also came in 8.5% below estimate. The final total cost of the project was $144,809.71 with some minor work in 2010.

Townline Road – Can Amera Parkway to Avenue Road

Budgeted Amount = $200,000

Actual Amount = $2,543

This work was budgeted to relocate poles along Townline Road required as part of a Region of Waterloo road project. Construction of the road was delayed. 2009 costs were only for engineering work. See the 2010 section for continuing work on this project.

Servicing Industrial Overhead

Budgeted Amount = $150,000

Actual Amount = $189,122

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

SYSTEM RENEWAL

Area supplied by remaining three 4 kV stations (Grand, Domm's and Wauchope) - Underground

Budgeted Amount = $2,750,000

Actual Amount = $2,140,315

This work was part of CND's 4 kV rebuild project and conversion to 27.6/16kV. The civil work (ie. trenching, duct installation, precast concrete enclosure installation, etc.) was done by a contractor. The electrical work (ie. terminations, switching, etc.) was done by CND crews. Work included the rebuild and conversion of the underground distribution system on Dolman Ct., Sunset Blvd., Bruce Park Ct., Saxony Circle, Linndale Rd., Leslie Ave., Ronald Rd., Pricess St., Dianne Ave., Blair Rd., Newman Dr., Esther Ave., George St.N., Templar Lane, Bismark Dr., Templar Ct., Dunedin Ct. and Westmount Mews. Further work was continued in 2010. There were also some late 2008 design costs of $8,075.45.

Area Supplied by remaining three 4 kV Stations (Grand, Domm's and Wauchope) Overhead

Budgeted Amount = $1,750,000

Actual Amount = $1,276,819.44 (76062-208)

+ $181,490.59 (76059-208)

= $1,458,310

This work was the last phase of CND's 4 kV rebuild project and conversion to 27.6/16kV. Grand, Domm's and Wauchope were their last remaining 4 kV stations. Work was done by CND and Phase 1 included rebuild and conversion of the overhead distribution system on St. Andrews St., Fraser St., Cant Ave., George St., Churchill Dr., Cedar St., Gilholm St., Park Avenue, Clearview Dr. and Ramore St. Phase 1 was issued for construction in early 2009. Phase 2 was a 27.6 kV line extension on George St. between Riverwalk townhouses and Blair Road to allow a looped supply for the underground part of the rebuild work. Phase 2 was issued for construction in October, 2009 after much discussion with area residents and the City over whether the line should be overhead or underground. Phase 3 was the rebuild and conversion of an apartment building at 202 Hespeler Road. Phase 3 was issued for construction in October, 2009. Phase 4 included removal of 4 kV on the East side of the Grand River. Phase 4 was issued for construction in December, 2009. Some work could not be completed by year-end and carried over into 2010. See the 2010 section for continuing information about this project. There was also $5,467.18 spent on this project in 2008 for engineering work.

Jaffray Street also had to be rebuilt from 4 kV to 27.6kV. Work was issued in 2008 to rebuild Jaffray Street. Work was done by CND crews beginning in late 2008. Most of the work was done in early 2009 with some finish up work in 2010.

Clyde Road – Extend 16 kV to New Generation

Budgeted Amount = $220,000

Actual Amount = $203,316

This was a combination of an extension of 16 kV to connect a new 499kW biogas generator at #2120 10th Concession West, Hamilton, ON and a rebuild of a depreciated 4.8 kV single phase line. Ontario Energy Board approval was sought and obtained for a service area amendment [EB-2007-0099] to connect the generator located in Hydro One's service area. The rebuild work was done by a contractor starting in October, 2009. Work continued into 2010.

Trussler Road – Brant Waterloo Road to Township Road 9

Budgeted Amount = $150,000

Actual Amount = $174,993 (with a capital contribution of $26,943.50 from Hydro One for the joint pole line to reduce the net cost to $148,049)

This project rebuilt a depreciated 1.2km 4.8 kV CND overhead line and resolved a long term load transfer situation between Hydro One and CND. CND used a contractor to install the poles and rebuild its line to 16kV. Hydro One installed its 4.8 kV circuit on the CND poles. The project went about 350m further up to Piper Street once detailed design was complete. It was the best solution for both CND and Hydro One.

2009 General Plant Capital Expenditures

The table below provides a summary of the General Plant capital expenditures for 2009 Actual.

General Plant Capital Additions 2009

OEB	Description	2009 Additions	Projects > $125,000 threshold	Amount
1805	Land	33,413	None	
1808	Buildings	14,802	None	
1860	Meters	283,797	Meter Replacements	179,346
1920	Computer Equipment - Hardware	66,623	None	
1925	Computer Software	(64,776)	None	
1930	Vehicles	772,467	Large Double Bucket Aerial Truck Large Double Bucket Aerial Truck	350,791 372,960
1940	Tools & Equipment	150,390	None	
	Total	1,256,716		903,097

The following is a description of material General Plant capital additions in 2009:

Meter Replacements $179,346

CND is regulated by Measurement Canada in the area of meters, which regulates the seal life term of meters. CND follows the regulations and sampling replacement program required by Measurement Canada, which results in approximately 2,000 meters replaced each year. The meter replacements in 2009 principally represent the annual replacement of meters.

Replacement Vehicles - $350,791 and $372,960

In 2009, CND purchased two large double bucket aerial trucks. These vehicle additions were required as part of CND's vehicle replacement program. Under CND's replacement program, small vehicles are generally replaced on an eight to ten year timeframe, and large trucks are replaced on a fifteen to twenty year schedule. Equipment and trailers are replaced on a twenty to twenty five year useful life cycle. The timing of the vehicle replacement is dependent upon the operational and mechanical assessments completed on each vehicle.

Operational and mechanical assessments are completed each year to determine the present condition of each vehicle as it comes due for replacement. The following items are reviewed:

1. Safety aspects of the vehicle
2. Operational and body condition
3. Age of the vehicle
4. Kilometers and hours on the vehicle
5. Past major mechanical problems, and
6. Potential major mechanical problems.

2010 Projects

Capital Projects 2010 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
System Access	Subdivision Capital Investment Underground (by developer)	$1,200,000	$1,163,537	($36,463)
System Access	Subdivision Capital Investment Underground (by CND Hydro)	$820,000	$684,915	($135,085)
System Access	Servicing Industrial (Underground)	$500,000	$976,601	$476,601
System Access	Boxwood Dr. Industrial Subdivision Overhead	$350,000	$0	($350,000)
System Access	Hespeler Rd. at CPR Overpass Overhead	$300,000	$76,463	($223,537)
System Access	Townline Rd. - Can Amera Parkway to Avenue Rd.Overhead	$200,000	$44,450	($155,550)
System Access	Green Energy Act (Renewable Energy Investments)	$200,000	$0	($200,000)
System Access	Servicing Industrial (Overhead)	$165,000	$53,019	($111,981)
System Access	Pinebush Rd.Overhead	$140,000	$0	($140,000)
System Access	Riverbank Dr. (in conjunction with Fairway Rd. bridge) Overhead	$100,000	$253,847	$153,847
System Access	City Works Yard - 1310 Bishop St. - Relocate Overhead Lines to Underground	$0	$294,786	$294,786
System Access	Roundabout - Fountain St. at Dickie Settlement Rd.	$0	$121,140	$121,140
	Miscellaneous	$105,000	$482,886	$377,886
System Access	**Subtotal**	**$4,080,000**	**$4,151,644**	**$71,644**
System Renewal	Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo to 700m North)	$750,000	$141	($749,859)
System Renewal	Beke Rd. (West River Rd. to 500m West of Shouldice Rd./Shouldice Rd. to 700m South of Beke Rd.)	$680,000	$428,896	($251,104)
System Renewal	Brant Waterloo Rd. (Spragues Rd. to End) - 3km	$680,000	$0	($680,000)
System Renewal	Hahn Ave./Scott Rd./Valerie Ct./Rudi Ct./Strome Ave./Chapman Ct. Area	$625,000	$948,231	$323,231
System	Highman Ave./Ravine Dr./Glenview	$600,000	$540,871	($59,129)

Capital Projects 2010 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
Renewal	Ave.			
System Renewal	Cameron Rd. (Roseville Rd. to New Dundee Rd.)/Roseville Rd. (Industrial Rd. to 1km East of Cameron Rd.)	$455,000	$354,921	($100,079)
System Renewal	Galt Core Area Upgrades	$300,000	$57,995	($242,005)
System Renewal	Pole Replacements	$200,000	$179,864	($20,136)
System Renewal	Vanier/Ripplewood/Davies	$170,000	$89,808	($80,192)
System Renewal	Edworthy Sideroad (Roseville Rd. to South of CPR) - 1km	$160,000	$17,998	($142,002)
System Renewal	Studiman Rd. (Existing 16 kV to Southern Boundary) - 0.8km	$130,000	$98,292	($31,708)
System Renewal	Area Supplied by Remaining three 4 kV Stations (Grand, Domm's and Wauchope) Underground	$0	$479,195	$479,195
System Renewal	Old Beverly Rd./Village Rd. Rebuild to East Boundary	$0	$307,639	$307,639
System Renewal	Greenfield Rd./Reidsville Rd. from Stepdown Transformer	$0	$246,253	$246,253
System Renewal	Area Supplied by three 4 kV Stations (Grand, Domm's and Wauchope) (Overhead)	$0	$210,324	$210,324
System Renewal	Miscellaneous	$301,000	$2,301,734	$2,000,734
System Renewal	**Subtotal**	**$5,051,000**	**$6,262,165**	**$1,211,165**
System Service	SCADA Loadbreak Switches (10)	$600,000	$412,811	($187,189)
System Service	Miscellaneous	$37,000	$12,380	($24,620)
System Service	**Subtotal**	**$637,000**	**$425,191**	**-$211,809**
		$9,768,000	**$10,839,000**	**$1,071,000**

Overhead and Underground Line Projects – Budget versus Actual – Year 2010

This report compares budgeted spending to actual spending on material overhead and underground line projects for 2010. Please note that budgeted dollar amounts are prepared at budget time before a detailed engineering design is done in most cases. Detailed estimates are prepared prior to issue of the work order.

SYSTEM ACCESS

Subdivision Capital Investment Underground (by developer)

Budgeted Amount = $1,200,000

Actual Amount = $1,163,537

This amount represents the developer's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are serviced.

Subdivision Capital Investment Underground (by CND Hydro)

Budgeted Amount = $820,000

Actual Amount = $684,915

This amount represents CND's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are connected.

Servicing Industrial Underground

Budgeted Amount = $500,000

Actual Amount = $976,601

This budget category covers new underground industrial services. Activity varies each year based on customer requirements. Activity was much stronger than expected in 2010 despite the 2008/2009 recession. The servicing industrial underground category includes all three phase padmount transformer installations. These transformers supply industrial, commercial, high rise residential, municipal and institutional customers. In 2010, there was strength in all these sectors. A large industrial customer did a major upgrade. There were a number of other new/upgraded industrial services. There were several residential installations. Municipal activity included an upgrade at a pool and servicing of a new arena. Institutional activity included servicing of a new school.

Boxwood Drive Industrial Subdivision

Budgeted Amount = $350,000

Actual Amount = $0

The Boxwood Drive Industrial Subdivision is a 175 acre industrial subdivision being developed by the City of Cambridge that was planned again for 2010 construction but approval delays resulted in no activity on the site until 2012. Therefore, there was not a need for hydro servicing. Hydro servicing is being provided in 2013.

Hespeler Road at CPR Overpass

Budgeted Amount = $300,000

Actual Amount = $76,463

Substantial relocations were required by the Region of Waterloo for a CPR overpass on Hespeler Road just North of Dundas Street. Work was timed based on the Region's project schedule. The work was done by a contractor. Work began in the fall of 2010 and continued into the spring of 2011 with some final work in the fall of 2011. Contractor pricing came in at 56.7% above estimate.

Townline Road – Can Amera Parkway to Avenue Road

Budgeted Amount = $200,000

Actual Amount = $44,450

The reconstruction of Townline Road between Can Amera Parkway and Avenue Road was a major road project that ended up spanning the years 2010, 2011 and 2012. In the fall of 2010, CND crews did some initial relocation work at a cost of $44,450.

Green Energy Act (Renewable Energy Investments)

Budgeted Amount = $200,000

Actual Amount = $0

No eligible work was required for the Green Energy Act in 2010. Some work had been expected but it is contingent on generation customers.

Servicing Industrial Overhead

Budgeted Amount = $165,000

Actual Amount = $53,019

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Pinebush Road

Budgeted Amount = $140,000

Actual Amount = $0

This work was budgeted to relocate poles along Pinebush Road required as part of planned road work by the Region of Waterloo. The road work did not happen in 2010.

Riverbank Drive (in conjunction with Fairway Road bridge)

Budgeted Amount = $100,000

Actual Amount = $253,847

Part 1 of the Riverbank Drive relocation/rebuild was done in the summer of 2010 by CND crews. A section of line had to be removed and relocated as a result of the new Fairway Road bridge across the Grand River. As a result of the final relocation requirement and the condition of the plant along this section of Riverbank Drive, CND decided to do a full rebuild. Therefore, the cost was higher than anticipated when the budget was prepared in the fall of 2009.

City Works Yard – 1310 Bishop St. – Relocate Overhead Lines to Underground

Budgeted Amount = $0

Actual Amount = $294,786

This was an unbudgeted project that was initiated by the City of Cambridge. A section of CND's overhead 27.6 kV line had to be buried at the City Works Yard to accommodate construction of new outdoor shelters for trucks. The structures were designed for solar panels on the roofs. The City paid for almost the full cost. CND only paid for work that was independent of the relocation that was logical to do at the same time due to the outages required (i.e., replacement of a pole and a padmount transformer).

Roundabout – Fountain Street at Dickie Settlement Road

Budgeted Amount = $0

Actual Amount = $121,139.95

This was an unbudgeted project that was initiated by the Region of Waterloo. Pole relocations were required for a new roundabout at the intersection of Fountain Street and Dickie Settlement Road. A CND contractor completed the work in the summer of 2010.

SYSTEM RENEWAL

Brant Waterloo Road (Swan St. to 4km East/Reidsville Rd.(Brant Waterloo to 700m North)

Budgeted Amount = $750,000

Actual Amount = $141

This project was not started in 2010 for two reasons. First, resources were required on other projects so there wasn't the staffing to get it approved and engineered. Second, it was a very challenging project. The project was rebuilding a depreciated 4.8 kV CND line and resolving a long term load transfer situation with Hydro One. A service area amendment was required from the Ontario Energy Board [EB-2011-0018]. Timing was such that in February, 2010 CND substituted other 4.8 kV rebuild projects for the two planned Brant Waterloo Road projects budgeted for 2010. The substituted projects and their associated approved project cost estimate were as follows:

1 **Part 2 of Riverbank Drive rebuild**

Approved Project Cost Estimate = $150,000

Actual Amount = $0

Part 2 of the Riverbank Drive rebuild was not done in 2010. The Region of Waterloo requested us to delay the work until after construction of the Fairway Road bridge over the Grand River. CND agreed to their request. Part 2 of the work was done in 2013.

2 **Old Beverly Road/Village Road Rebuild to East boundary $415,000**

Approved Project Cost Estimate = $415,000

Actual Cost = $307,639

This project rebuilt a depreciated 4.8 kV line along part of Old Beverly Road and part of Village Road and converted it for operation at 16kV. The work was done by a contractor in late 2010. There was a cost of $351.96 in early 2011 so the total cost was $307,991.33. The project was relatively straightforward and the cost came in below CND's typical rebuild cost estimate.

3 **Sheffield Road from Morrison Road to South boundary $150,000**

Approved Project Cost Estimate = $150,000

Actual Amount = $ 4,041

This project rebuilt a depreciated 4.8 kV line along Sheffield Road between Morrison Road and CND's South boundary with Hydro One. The line was converted to 16 kV operation. The engineering was done in late 2010 once resources were available. Actual construction was done in early 2011 by CND crews. See 2011 section for further information. $4,041.62 was spent in 2010 on engineering work.

4 **Greenfield Road/Reidsville Road from stepdown transformer to end of line**

Approved Project Cost Estimate = $ 715,000

Actual Amount = $246,253

This project rebuilt a depreciated 4.8 kV line along part of Greenfield Road and part of Reidsville Road and converted it for operation at 16kV. The work was split into two phases. Phase 1 was the rebuild on Greenfield Road and the part of Reidsville Road North of Greenfield Road. Phase 2 was the rebuild on Reidsville Road between Greenfield Road and Wrigley Road. Phase 2 was much more difficult with the existing off-road location of the line and the heavily treed road allowance. Given available resources and the direct communication with property owners along the road, Phase 2 was not rebuilt until 2012.

The Phase 1 work was completed by a contractor in the fall of 2010. The total cost of Phase 1 in 2010 was $246,253.10. $5,027.43 of additional cost was incurred in 2011.

Beke Rd. (West River Road to 500m West of Shouldice Road/Shouldice Road to 700m South of Beke Road)

Budgeted Amount = $680,000

Actual Amount = $428,896

This project rebuilt a depreciated 4.8 kV line along part of Beke Rd. and part of Shouldice Rd. and converted it to 16kV. The work was completed by a contractor in late summer and early fall of 2010. Very competitive pricing was received from the contractor which resulted in savings of over $130,000 as compared to budget. The remaining savings were the difference between a rough estimate prepared at budget time and more precise detailed design done later.

Brant Waterloo Rd. (Spragues Rd. to End) -3km

Budgeted Amount = $680,000

Actual Amount = $0

This project was deferred.

Hahn Ave./Scott Rd./Valerie Ct./Rudi Ct./Strome Ave./Chapman Ct. Area

Budgeted Amount = $625,000

Actual Amount = $948,231

This work was part of CND’s 4 kV rebuild project and conversion to 27.6/16kV. When the 4 kV substation in the area was decommissioned, this residential area was temporarily supplied by a set of stepdown transformers. The civil work (ie. trenching, duct installation, precast concrete enclosure installation, etc.) was done by a contractor. The electrical work (ie. terminations, switching, etc.) was originally planned to be done by CND crews but due to available resources was ultimately completed by a contractor. Work included the rebuild and conversion of the underground distribution system on Hahn Ave., Scott Rd., Valerie Ct., Rudi Ct., Strome Ave., Chapman Ct.and Pino Pl. There were some minor costs in 2009 and

2011 and some credits from returned material in 2011. The total cost of the project was $934,128.65 or almost 50% above the budget.

This proved to be a challenging project. The residential subdivision was initially serviced in the mid 1970's with direct buried 4 kV primary cable and what were called "pole tran" transformers. These "pole-trans" were a combination transformer and street light pole. The City paid its cost to replace the lighting with new poles and luminaires. CND used boring technology to install new primary cable in duct and replaced the "pole-trans" with standard mini-pad transformers. The area was rebuilt to 16 kV operation. CND had previous primary cable failures in the area causing outages to residents. The system needed to be replaced. The records from the 1970's were poor so CND did not have the best information going into the project on the location of existing facilities. The initial contractor prices came in above estimate. The contractor costs further escalated during actual construction. Significantly more hand work and vacuum truck work was required to get the new duct installed due to the proximity of existing facilities. Boring which costs less was not feasible everywhere. The end result was a much higher cost than was estimated at the time of budget preparation.

Highman Ave./Ravine Dr./Glenview Ave.

Budgeted Amount = $600,000

Actual Amount = $540,871

This area remained supplied at 4 kV using pole mounted stepdown transformers after most of the broader area was rebuilt and converted to 27.6 kV and the 4 kV station removed from service. The servicing was overhead in rear yards of homes. Access was difficult. There were a lot of trees. It wasn't feasible to rebuild the high voltage in the rear yards. The best option was to locate the high voltage line out front underground in the road allowance and leave overhead secondary (120/24V) distribution in the rear yards. The project was tendered in the fall of 2010. Contractor prices came in 20% above estimate. During detailed design, it was determined due to condition that many of the rear yard poles would have to be replaced. This wasn't included in the original budget figure established in the fall of 2009. The final estimate for the work order was $798.191. Work began in the fall of 2011 and continued in 2011. CND crews did the pole changes and the electrical termination work.

Cameron Rd. ((Roseville Rd. to New Dundee Rd.)/Roseville Rd. (Industrial Rd. to 1km East of Cameron Rd.)

Budgeted Amount = $455,000

Actual Amount = $354,921

This project rebuilt a depreciated 4.8 kV line along Cameron Rd. and part of Roseville Rd. and converted it to 16 kV operation. The work was completed by a contractor in the summer and early fall of 2010. The total cost to complete the work was $355,380.68 (including $459.52 spent in 2009 on design work). Very competitive pricing was received from the contractor which resulted in savings of over $80,000 as compared to budget. The remaining savings were the difference between a rough estimate prepared at budget time and more precise detailed design done later.

Galt Core Area Upgrades

Budgeted Amount = $300,000

Actual Amount = $57,995

In 2010, deteriorated underground vaults were repaired in the Galt Core Area. The total spending including a slight carryover into 2011 was $59,072.16.

Pole Replacements

Budgeted Amount = $200,000

Actual Amount = $179,864

These are poles that needed replacement and would have an expected useful life after replacement of 50+ years. There was some carryover of work into 2011 so the final cost for the work was $191,246.92 which was very close to budget.

Vanier/Ripplewood/Davies

Budgeted Amount = $170,000

Actual Amount = $89,808

This project rebuilt a depreciated 4.8 kV line on Vanier Rd., Ripplewood Dr. and Davies St. and converted it to 16 kV operation. The work was completed by CND crews in the spring of 2010. There was $1,637.26 of design work in 2009 so the total cost was $91,445.10. The job proceeded well but was so far under budget because CND left one section of line running off the road allowance. This CND owned line originally supplied two customers. One customer was already disconnected in 2010. The other customer has since been disconnected. CND did not want to invest the money rebuilding this particular line in 2010 when it looked like it might not be required in the not too distant future.

Edworthy Sideroad (Rosevllle Road to South of CPR) – 1km

Budgeted Amount= $160,000

Actual Amount = $17,998

This project rebuilt a depreciated 4.8 kV line on part of Edworthy Sideroad and converted it to 16 kV operation. The engineering design work was completed in the summer of 2010. Due to other priorities, the construction work did not take place until early 2011 by CND crews.

Part 2 of Riverbank Drive rebuild

Budgeted Amount = $150,000

Actual Amount = $0

Part 2 of the Riverbank Drive rebuild was not done in 2010. The Region of Waterloo requested us to delay the work until after construction of the Fairway Road bridge over the Grand River. CND agreed to their request. Part 2 of the work was done in 2013.

Sheffield Road from Morrison Road to South boundary (Work Order 78016-210)

Budgeted Amount = $150,000

Actual Amount = $0

This project rebuilt a depreciated 4.8 kV line along Sheffield Road between Morrison Road and CND's South boundary with Hydro One. The line was converted to 16 kV operation. The engineering was done in late 2010 once resources were available. Actual construction was done in early 2011 by CND crews. See 2011 section for further information. $4,041.62 was spent in 2010 on engineering work.

Studiman Rd. (Existing 16 kV to Southern Boundary) – 0.8km

Budgeted Amount = $130,000

Actual Amount = $98,292

This project rebuilt a depreciated 4.8 kV line on part of Studiman Road and converted it to 16 kV operation. The work was done by CND crews in early 2010. The total cost was $102,469.38 including engineering design work done in 2009.

Old Beverly Road/Village Road Rebuild to East boundary

Budgeted Amount = $0

Actual Cost = $307,639

This project rebuilt a depreciated 4.8 kV line along part of Old Beverly Road and part of Village Road and converted it for operation at 16kV. The work was done by a contractor in late 2010. There was a cost of $351.96 in early 2011 so the total cost was $307,991.33. The project was relatively straightforward and the cost came in below CND's typical rebuild cost estimate.

Area Supplied by remaining three 4 kV Stations (Grand, Domm's and Wauchope)

Budgeted Amount = $0

Actual Amount = $210,324

This work was the last phase of CND's 4 kV rebuild project and conversion to 27.6/16 kV. Grand, Domm's and Wauchope were their last remaining 4 kV stations. Work was done by CND and Phase 1 included rebuild and conversion of the overhead distribution system on St. Andrews St., Fraser St., Cant Ave., George St., Churchill Dr., Cedar St., Gilholm St. and Ramore St. Phase 1 was issued for construction in January, 2009. Phase 2 was a 27.6 kV line extension on George St. between Riverwalk townhouses and Blair Road to allow a looped supply for the underground part of the rebuild work. Phase 2 was issued for construction in October, 2009 after much discussion with area residents and the City over whether the line should be overhead or underground. Phase 3 was the rebuild and conversion of an apartment building at 202 Hespeler Road. Phase 3 was issued for construction in October, 2009. Phase 4 included removal of 4 kV on the East side of the Grand River. Phase 4 was issued for construction in December, 2009. Some work could not be completed by year-end and carried over into 2010. There was also $244.70 spent in 2011 for post construction engineering work.

Jaffray Street also had to be rebuilt from 4 kV to 27.6kV. Work was issued in 2008 to rebuild Jaffray Street. Work was done by CND crews beginning in late 2008. Most of the work was done in early 2009 with some finish up work in 2010.

In the end, the total project cost was $1,668,634.53 on a total initial budget of $1,750,000. Therefore, the project was constructed 4.6% under budget.

Area supplied by remaining three 4 kV stations (Grand, Domm's and Wauchope) Underground

Budgeted Amount = $0

Actual Amount = $479,195

This work was part of CND's 4 kV rebuild project and conversion to 27.6/16 kV begun in 2009. The civil work (ie. trenching, duct installation, precast concrete enclosure installation, etc.) was done by a contractor. The electrical work (ie. terminations, switching, etc.) was done by CND crews. Work included the rebuild and conversion of the underground distribution system on Dolman Ct., Sunset Blvd., Bruce Park Ct., Saxony Circle, Linndale Rd., Leslie Ave., Ronald Rd., Pricess St., Dianne Ave., Blair Rd., Newman Dr., Esther Ave., George St.N., Templar Lane, Bismark Dr., Templar Ct., Dunedin Ct. and Westmount Mews. Forty-Two out of forty-seven transformers were placed in 2009. The remaining five were placed in 2010. There was a cost of $14,054.92 in 2011 primarily relating to easement, legal and restoration costs.

In the end, the total project cost was $2,641,640.42 on a total initial budget of $2,750,000. The project cost included placement of a duct for Atria Networks. Atria was billed for this work. Therefore, the project was constructed 3.9% under budget.

SYSTEM SERVICE

SCADA Loadbreak Switches (10 including radio system upgrade)

Budgeted Amount = $600,000

Actual Amount = $412,811

CND installs remotely operable 27.6 kV SCADA switches on its distribution system in order to improve reliability. Ten SCADA switches were budgeted for 2010. $412,811.17 was spent in 2010. Two of the switches were not installed until 2011. One was because of a lack of available crew time in late 2011. The other was because the switch was to be installed on a relocated pole in conjunction with a new railway overpass and the project was not ready until 2011. Therefore, there was an additional cost of $87,959.98 in 2011. Therefore, the total project cost was $500,771.15. The radio system upgrade was started in 2010 with the decision to use faster, more reliable S&C Speednet radios for the switches ordered in 2010. The difference between budget and actual was primarily due to a slower rollout of the new radio system given the challenges of introducing new technology and keeping an existing group of switches in operation.

2010 General Plant Capital Expenditures

The table below provides a summary of the General Plant capital expenditures for 2010 Actual.

General Plant Capital Additions 2010

OEB	Description	2010 Additions	Projects > $125,000 threshold	Amount
1805	Land	271,964	Environmental Remediation - Substations	271,964
1808	Building and Fixtures	54,430	None	
1860	Meters	90,506	None	
1915	Office Furniture	24,917	None	
1920	Computer Equipment - Hardware	228,081	None	
1925	Computer Software	466,068	None	
1930	Vehicles	99,206	None	
1940	Tools & Equipment	201,035	Underground cable puller	112,090
	Total	1,436,207		384,054

The following is a description of material General Plant capital additions in 2010:

Land – Environmental Remediation $271,964

CND incurred environmental remediation costs of $271,964 at its existing substations in preparation for sale. One substation (Wauchope) was disposed of in 2010. Please refer to Exhibit 3, Tab 4, Schedule 1, Page 9 for information regarding the disposal.

Tools and Equipment – Underground Cable Puller $112,090

CND purchased an underground cable puller to improve operating efficiencies with respect to the installation of underground facilities. Prior to the acquisition of this equipment in 2010, CND was using its overhead tension machines to pull underground cable. With the growth in underground distribution assets, and the inefficiencies created from using the overhead tension machines, a decision was made to purchase an underground cable puller. The process for pulling underground cable using overhead tension machines was inefficient as a result of: (i) set up time is significant due to use of lines, pulleys and sheaves in order to get around corners in vaults and to pull straight into underground conduits; (ii) scheduling conflicts between Overhead and Underground crews due to limited availability of the equipment; (iii) non-productive time in changing the rope reels to adapt to different underground conditions (e.g. dirt and mud).

Assets Not in Use

As at December 31, 2010, CND had recorded $478,492 in capital expenditures as part of Assets Not In Use. These expenditures related to the implementation of a new CIS/Billing System, which was placed into service in 2011. The investment in the new CIS/Billing System was to replace an existing system that was end of life, and was required to facilitate the implementation of Time of Use billing, as well as amendments to the Distribution System Code for collections, arrears management, LEAP, and other related regulatory changes. The capital costs related to this project were transferred from Assets Not In Use to Computer Hardware and Software in 2011.

2011 Projects

Capital Projects 2011 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
System Access	Subdivision Capital Investment (by developer)	$1,271,000	$423,138	($847,862)
System Access	Servicing Industrial Underground	$750,000	$1,158,403	$408,403
System Access	Subdivision Capital Investment (by CND Hydro)	$729,000	$626,388	($102,612)
System Access	Boxwood Industrial Subdivision	$450,000	$1,660	($448,340)
System Access	Townline Rd. - Can Amera Parkway to Avenue Rd.	$250,000	$322,783	$72,783
System Access	Servicing Industrial Overhead	$250,000	$106,664	($143,336)
System Access	Pinebush Rd.	$150,000	$12,126	($137,874)
System Access	Hespeler Rd. at CPR Overpass	$0	$317,357	$317,357
	Miscellaneous	$210,000	$171,774	($38,226)
System Access	**Subtotal**	**$4,060,000**	**$3,140,293**	**-$919,707**
System Renewal	Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo Rd. to 700m North)	$1,755,000	$495,403	($1,259,597)
System Renewal	Alps Rd. (Northumberland St. to Dumfries Rd.)/part of Reidsville Rd. - 6.6km	$1,100,000	$612,447	($487,553)
System Renewal	Roseville Rd. (Dumfries Rd. to 700m West of King's Rd.)/King's Rd. - 3.2km	$520,000	$297,208	($222,792)
System Renewal	Galt Core Area Upgrades	$500,000	$99,397	($400,603)
System Renewal	Upgrades in Various Areas (Underground)	$300,000	$158,763	($141,237)
System Renewal	Reidsville Rd. - Greenfield Rd. to Wrigley Rd.	$285,000	$8,973	($276,027)
System Renewal	West Alps Rd. and part of Trussler Rd. - 1.7km	$270,000	$228,261	($41,739)
System Renewal	Pole Replacements	$200,000	$201,827	$1,827
System Renewal	Pole/Switch Replacements - Rear of Galt TS	$200,000	$0	($200,000)
System Renewal	Transformers in Inventory - Capitalized - Not in Capital Projects	$0	$378,000	$378,000
System	Highman Ave./Ravine Dr./Glenview	$0	$363,334	$363,334

Capital Projects 2011 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
Renewal	Ave.			
System Renewal	Sheffield Rd. from Morrison Rd. to South Boundary	$0	$172,886	$172,886
System Renewal	Edworthy Sideroad (Roseville Rd. to South of CPR) - 1km	$0	$151,042	$151,042
	Miscellaneous	$565,000	$830,811	$265,811
System Renewal	**Subtotal**	**$5,695,000**	**$3,998,352**	**-$1,696,648**
System Service	SCADA Loadbreak Switches (10)	$500,000	$560,766	$60,766
System Service	Adjustments - South End Feeders to Improve Reliability	$350,000	$2,170	($347,830)
System Service	16 kV Single Phase Reclosers	$200,000	$0	($200,000)
	Miscellaneous	$90,000	$153,418	$63,418
System Service	**Subtotal**	**$1,140,000**	**$716,354**	**-$423,646**
		$10,895,000	**$7,855,000**	**-$3,040,000**

Overhead and Underground Line Projects – Budget versus Actual – Year 2011

This report compares budgeted spending to actual spending on overhead and underground line projects for 2011. Please note that budgeted dollar amounts are prepared at budget time before a detailed engineering design is done in most cases. Detailed estimates are prepared prior to issue of the work order.

SYSTEM ACCESS

Subdivision Capital Investment Underground (by developer)

Budgeted Amount = $1,271,000

Actual Amount = $423,138

This amount represents the developer's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are serviced.

Servicing Industrial Underground

Budgeted Amount = $750,000

Actual Amount = $1,158,403

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Subdivision Capital Investment Underground (by CND Hydro)

Budgeted Amount = $729,000

Actual Amount = $626,388

This amount represents CND's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are connected.

Boxwood Drive Industrial Subdivision

Budgeted Amount = $450,000

Actual Amount = $1,660

The Boxwood Drive Industrial Subdivision is a 175 acre industrial subdivision being developed by the City of Cambridge that was planned again for 2011 construction but approval delays resulted in no activity on the site until 2012. Therefore, there was not a need for hydro servicing. Hydro servicing is being provided in 2013. The budget amount changed as more details were finalized. There was some engineering done in 2011 which reflects the amount spent in 2011.

Townline Road – Can Amera Parkway to Avenue Road

Budgeted Amount = $250,000

Actual Amount = $322,783

The reconstruction of Townline Road between Can Amera Parkway and Avenue Road was a major road project that ended up spanning the years 2010, 2011 and 2012. In 2011, CND crews and a contractor did further relocation work at a cost of $322,783.16. Please see years 2011 and 2012 for further work. As the project progressed, more work was required than expected. Removals and subsequent re-installations were required so that the machine installing the pilings could work safely. There was a high water table.

Servicing Industrial Overhead

Budgeted Amount = $250,000

Actual Amount = $106,664

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Pinebush Road

Budgeted Amount = $150,000

Actual Amount = $12,126

The Region of Waterloo was upgrading Pinebush Road between Hespeler Road and Franklin Boulevard. The initial road design required much more significant relocations than expected when budgeting was prepared in the fall of 2010. The work was tendered and the total estimated cost came out at $485,496. CND did not want to proceed with the work at such a substantial cost. Ultimately, the Region of Waterloo agreed to shift the road sufficiently to avoid almost all of the relocation. The cost was $12,126.24.

Hespeler Road at CPR Overpass

Budgeted Amount = $0

Actual Amount = $317,357

Substantial relocations were required by the Region of Waterloo for a CPR overpass on Hespeler Road just North of Dundas Street. Work was timed based on the Region's project schedule. The work was done by a contractor. Work began in the fall of 2010 and continued into the spring of 2011 with some final work in the fall of 2011. Contractor pricing came in at 56.7% above estimate. The total cost of the project was $394,787.60.

SYSTEM RENEWAL

Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo Rd. to 700m North)

Note: The title description was truncated in the budget document. The budget dollar figure also included the section of Brant Waterloo Road from Spragues Road to the end.

Budgeted Amount = $1,755,000

Actual Amount = $31,153.18 (Work Order 77074-209)

+ $464,249.85 (Work Order 79038-211)

TOTAL = $495,403

This project rebuilt a depreciated 4.8 kV line and converted it to 16 kV operation. It also resolved long term load transfers with Hydro One. The project was done in two parts. Part 1 consisted of the section of Brant Waterloo Road from Spragues Road to where the line dead-ended to the East. Part 2 consisted of the section of Brant Waterloo Road from just East of Swan Street to just West of Spragues Road and a section of Reidsville Road North of Brant Waterloo Road.

An application was submitted to the Ontario Energy Board on January 14, 2011 ED-2011-018, for a service area amendment for CND to take over Hydro One load transfer customers on the South side of Brant Waterloo Road. Ontario Energy Board approval was granted on April 25, 2011.

Construction of Part 1 began in October, 2011 and continued into early 2011. Work was done by a contractor. Construction of Part 2 did not take place until 2012 due to availability of resources to get it engineered and ready to proceed.

Alps Road ((Northumberland St. to Dumfries Rd.)/part of Reidsville Rd. – 6.6km

Budgeted Amount = $1,100,000

Actual Amount = $612,447

This project rebuilt a depreciated 4.8 kV line along part of Alps Rd. and part of Reidsville Rd. and converted it to 16 kV operation. This project was split into two parts due to its size. Part 1 consisted of the work along Alps Road from Northumberland Street East to just past the CPR tracks and the work on Reidsville Road North and South of Alps Road. Part 2 was a 1.9km section from just past the CPR tracks East to Dumfries Road. Part 2 was deferred until 2012 as a result of available resources and the necessity of a legal survey to establish the roadway property limits. The existing line was out in the field and was being relocated to a more accessible location within the road allowance.

The Part 1 work was done by a contractor. It started in the summer of 2011 and finished early in 2012. There was also an amount of $187.53 spent in 2010 on engineering work.

Roseville Rd. (Dumfries Rd. to 700m West of King’s Rd./King’s Rd. – 3.2km

Budgeted Amount = $520,000

Actual Amount = $297,208

This project rebuilt a depreciated 4.8 kV line along part of Roseville Road and King’s Road and converted it to 16 kV operation. The work was completed by a contractor in the summer of 2011. There was some engineering done in 2010 in an amount of $1,163.04 therefore the total cost of the project was $298,371.31. The successful bidder priced the work 47% below estimate. That was the greatest saving.

Galt Core Area Upgrades

Budgeted Amount = $500,000

Actual Amount = $99,397

Work was completed to repair deteriorated underground concrete vaults and steel lids in the Galt core area. Work was done for the installation of new switching equipment in two key vault rooms in the Galt core area. The switches were a type new to CND intended to improve reliability in the Galt core area. It took some time to determine the exact requirements. The switches were ordered in late August, 2011. The quoted delivery was 16 to 18 weeks. There was a production problem at the supplier's plant which resulted in the switches not arriving until late February, 2012. Therefore, there were no switch costs in 2011. Switch installation was done in 2012.

Upgrades in Various Areas

Budgeted Amount = $300,000

Actual Amount = $157,606.43 + $1,156.99

= $158,763

Work was done to replace three existing 27.6 kV padmounted switching units. A new type of switching unit was selected to improve reliability. The existing units were subject to moisture build-up and flashover despite cleaning. The switches were ordered in June, 2011. Delivery was lengthy and late. CND did not have all the necessary components until January, 2012. The amount shown in 2011 ($157,606.43) was for the main switches which arrived in October, 2011. but weren't installed until 2012. The amount was accrued to 2011.

Reidsville Road – Greenfield Road to Wrigley Road

Budgeted Amount = $285,000

Actual Amount = $8,973

This project was Phase 2 of the 2010 rebuild on parts of Greenfield Rd. and Reidsville Rd. Phase 2 was much more difficult with the existing off-road location of the line and the heavily treed road allowance. Engineering work and legal survey work to establish the property limits of the road allowance was completed in 2011. Given other priorities, the direct communication with property owners and the engineering resources available, there wasn't time to do the reconstruction work in 2011. Given available resources and the direct communication with property owners along the road, Phase 2 was not rebuilt until 2012. The project was re-budgeted in the 2012 capital budget.

West Alps Road and part of Trussler Rd. – 1.7km

Budgeted Amount = $270,000

Actual Amount = $228,261

This project rebuilt a depreciated 4.8 kV line along a section of West Alps Road and along a section of Trussler Road. It also resolved one long term load transfer customer (4045 Trussler Road) with Hydro One. CND applied for a service area amendment with the Ontario Energy Board in August, 2011. CND received approval for a service area amendment from the Ontario Energy Board [EB-2011-0321] in November, 2011 and took over the customer in the summer of 2012. Work was done by CND crews. Most of the work was done in the second half of 2011. The work at the end of the line involving 4045 Trussler Road was done in the summer of 2012. There was also $5,381.20 in engineering costs in 2010.

Pole Replacements

Budgeted Amount = $200,000

Actual Amount = $201,826

These are poles that needed replacement and would have an expected useful life after replacement of 50+ years. The actual amount spent in 2011 came in very close to budget.

Pole/Switch Replacements – Rear of Galt TS

Budgeted Amount = $200,000

Actual Amount = $0

CND intended to replace some poles and 27.6 kV loadbreak switches at the rear of Galt TS in 2011, however CND did not proceed with the work. There were other higher priorities that were being addressed.

Highman Ave./Ravine Dr./Glenview Ave.

Budgeted Amount = $0

Actual Amount = $363,334

This area remained supplied at 4 kV using pole mounted stepdown transformers after most of the broader area was rebuilt and converted to 27.6 kV and the 4 kV station removed from service. The servicing was overhead in rear yards of homes. Access was difficult. There were a lot of trees. It wasn't feasible to rebuild the high voltage in the rear yards. The best option was to locate the high voltage line out front underground in the road allowance and leave overhead secondary (120/240V) distribution in the rear yards. The project was tendered in the fall of 2010. Contractor prices came in 20% above estimate. During detailed design, it was determined due to condition that many of the rear yard poles would have to be replaced. This wasn't included in the original budget figure established in the fall of 2009. The final estimate for the work order was $798.191. Work began in the fall of 2011 and continued in 2011. CND crews did the pole changes and the electrical termination work. The total cost of the work was $905,416.84. It was a very challenging project due to the backyard nature part of the work.

Sheffield Road from Morrison Road to South boundary

Budgeted Amount = $0

Actual Amount = $172,886

This project rebuilt a depreciated 4.8 kV line along Sheffield Road between Morrison Road and CND's South boundary with Hydro One. The engineering was done in late 2010 once resources were available. Actual construction was done in early 2011 by CND crews. The total cost of the work (2010 and 2011) was $176,927.33 or 18% above the initial estimate. The detailed budget estimate prepared after engineering was completed for the work was $179,644.06 so the final cost came in slightly below the detailed estimate. Initial budget figures are based on typical values per pole or per km for rebuilds. Once detailed design is completed, the detailed budget estimate is prepared. It can vary from the original budget.

Edworthy Sideroad (Rosevllle Road to South of CPR) – 1km

Budgeted Amount= $0

Actual Amount = $151,042

This project rebuilt a depreciated 4.8 kV line on part of Edworthy Sideroad and converted it to 16 kV operation. The engineering design work was completed in the summer of 2010. Due to other priorities, the construction work did not take place until early 2011 by CND crews. The total cost was $169,849.13 against an initial budget of $160,000. There was $808.93 in engineering costs in 2009.

SYSTEM SERVICE

SCADA Loadbreak Switches (10)

Budgeted Amount = $500,000

Actual Amount = $560,766

CND installs remotely operable 27.6 kV SCADA switches on its distribution system in order to improve reliability. Ten SCADA switches were budgeted for 2011. $560,766.32 was spent in 2011. The radio system upgrade begun in 2010 was continued in 2011 and accounts for the greatest difference between the budgeted amount and the actual amount. Two of the switches were not installed until 2012. The 2012 costs came to $98,778.04. Therefore, the total project cost was $659,544.36.

Adjustments – South End Feeders to Improve Reliability

Budgeted Amount = $350,000

Actual Amount = $2,170

The purpose of this project was to rework the configuration of CND's 27.6 kV distribution system in the South end of Cambridge to reduce the customer count per feeder. In the past, the number of Customer-Hours lost during an outage event was very high in certain areas. With some work, CND could improve the reliability in this part of the City. Only engineering work was done in 2011. Construction work did not start until 2012. The project was re-budgeted in 2012.

16 kV Single Phase Reclosers

Budgeted Amount = $200,000

Actual Amount = $0

CND investigated the purchase of single phase 16 kV reclosers to improve reliability on single phase 16 kV lines primarily located in the rural areas. Due to other priorities, CND did not complete their investigation and no reclosers were purchased. These devices are still needed for the distribution system and $200,000 has been included in the 2013 capital budget for 16 kV recloser installations.

2011 General Plant Capital Expenditures

The table below provides a summary of the General Plant capital expenditures for 2011 Actual.

General Plant Capital Additions 2011

OEB	Description	2011 Additions	Projects > $125,000 threshold	Amount
1808	Buildings and Fixtures	3,500	None	
1860	Meters	285,340	Meter Capital Additions	172,060
1915	Office Furniture	27,482	None	
1920	Computer Equipment - Hardware	207,412	CIS/Billing System Hardware (Replacement)	126,417
1925	Computer Software	1,179,438	CIS/Billing System Software (Replacement) Topobase GIS Enhancements	890,705 214,778
1930	Vehicle	463,600	Radial Boom Device (Digger Truck)	397,603
1940	Tools, Shop and Garage Equipment	20,186	None	
	Total	2,186,958		1,801,563

OEB	Description	2011 Additions	Projects > $125,000 threshold	Amount
1808	Buildings and Fixtures	3,500	None	
1860	Meters	285,340	Meter Capital Additions	172,060
1915	Office Furniture	27,482	None	
1920	Computer Equipment - Hardware	207,412	CIS/Billing System Hardware (Replacement)	126,417
1925	Computer Software	1,179,438	CIS/Billing System Software (Replacement)	890,705
			Topobase GIS Enhancements	214,778
1930	Vehicle	463,600	Radial Boom Device (Digger Truck)	397,603
1940	Tools, Shop and Garage Equipment	20,186	None	
	Total	2,166,772		1,801,563

The following is a description of material General Plant capital additions in 2011:

Meter Capital Additions - $172,060

In 2011, CND installed 500 remote disconnect meters at a total cost of $78,685 to improve operating efficiencies in a specific area of CND's service territory that was resulting in the highest number of truck rolls. CND also upgraded the 75 remaining 2.5 element services to 3.0 element services, at a cost of $93,375, in order to comply with a requirement by Measurement Canada.

CIS/Billing System – Hardware $126,417 and Software $890,705

As described previously, CND placed into service a new CIS/Billing System in 2011 to replace an existing system that was end of life and to facilitate the implementation of Time of Use billing and other regulatory requirements. CND's existing software at the time was not capable of Time of Use billing. The implementation of a new CIS/Billing System was approved as part of the Board's Decision on CND's 2010 Cost of Service Application Decision (EB-2009-0260). Costs for this project were incurred over a two year period (2010 and 2011).

Geospatial Information System ("GIS") Enhancements (Topobase) - $214,778

Topobase (subsequently renamed to Map 3D) is CND's Geospatial Information System (GIS). The GIS system contains customer information (i.e. name, address, phone number, estimated peak demand, meter number), pole information (i.e. installation date, type, height, class, testing results), wire/cable information (i.e. size, type, installation date), transformer information (ie. kVA, voltages, installation date, manufacturer, weight, impedance, estimated peak demand) and switch installation (i.e. type). The information is geographically located with electrical connectivity.

Capital expenditures incurred in 2011 included an interface with CND's electrical analysis software (Synergee) for a cost of $110,791 and the development and implementation of a geographical drawing index for a cost of $92,951.

CND's Synergee software is used to calculate fault currents, to calculate voltage drop, to optimize capacitor placements, to model the impact of voltage regulators, to calculate losses, and to model generation sources. Prior to the interface with the GIS, separate 27.6kV electrical models had to be maintained in both the GIS and Synergee. The development of an interface resulted in operating efficiencies for CND, including a reduction in staff time of approximately one-half to update data in both systems, as well as ensuring consistent data in both systems.

In late 2011, CND worked with a software vendor to develop a geographical drawing index which graphically represented construction drawings as polygons on the overall map allowing selection based on geography rather than by street name. CND has over 3,100 individual construction drawings. This improved the efficiency of staff in locating construction drawings when required.

Replacement Vehicle - Radial Boom Device (Digger Truck) - $397,603

In 2011, CND purchased a new digger truck to replace a 1991 vehicle that had reached end of life, and was scheduled to be replaced as part of CND's vehicle replacement program. The vehicle being replaced had experienced a number of mechanical and other issues including: hydraulic oil leaks on the digger derrick and boom and heavy rust on the chassis of the truck, as well as mechanical engine work would have been required to pass emissions testing. Given the age of the vehicle, CND proceeded with the replacement of the vehicle.

Assets Not in Use

As at December 31, 2011, CND had recorded $619,296, in capital expenditures as part of Assets Not In Use. Of this amount, $506,498 represented capital costs incurred to date with respect to the implementation of a new Enterprise Resource Planning ("ERP") solution, which was placed into service in 2012. A description of the ERP solution is provided as part of the 2012 Actuals, described below.

2012 Projects

Capital Projects 2012 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
System Access	Two New 27.6 kV Feeders in North West Industrial Area	$2,000,000	$246,924	($1,753,076)
System Access	Subdivision Capital Investment (by developer) - 500 lots	$1,271,000	$850,577	($420,423)
System Access	Boxwood Industrial Subdivision	$900,000	$0	($900,000)
System Access	Servicing Industrial Underground	$875,000	$942,813	$67,813
System Access	Subdivision Capital Investment (by CND Hydro) - 500 lots	$729,000	$181,310	($547,690)
System Access	Purchase of Two 27.6 kV Feeder Breakers	$250,000	$190,752	($59,248)
System Access	Servicing Industrial Overhead	$250,000	$95,795	($154,205)
System Access	Riverbank Dr.	$140,000	$0	($140,000)
System Access	46 Grand Ave. S.	$0	$153,739	$153,739
System Access	Miscellaneous	$270,000	$370,481	$100,481
System Access	**Subtotal**	**$6,685,000**	**$3,032,391**	**-$3,652,609**
System Renewal	Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo Rd. to 700m North) - 4.7km	$700,000	$373,795	($326,205)
System Renewal	Preston Parkway Area Underground Rebuild	$470,000	$133,072	($336,928)
System Renewal	Galt Core Area Upgrades	$450,000	$415,770	($34,230)
System Renewal	Alps Rd. (Dumfries Rd. to 1.9km West)	$300,000	$146,596	($153,404)
System Renewal	Reidsville Rd. - Greenfield Rd. to Wrigley Rd. - 1.7km	$272,500	$238,803	($33,697)
System Renewal	Upgrades in Various Areas Underground	$265,000	$48,855	($216,145)
System Renewal	Fischer Hallman Rd. - Paul Ave. to New Dundee Rd. - 1.4km	$225,000	$0	($225,000)
System Renewal	Upgrade Half of Radios at existing SCADA Switch Installations	$200,000	$64,929	($135,071)
System Renewal	Pole Replacements	$190,000	$182,002	($7,998)
System Renewal	Roseville Rd. - West of Northumberland St. to Trussler Rd. - 0.8km	$130,000	$163,427	$33,427

Capital Projects 2012 Material Projects				
Classification	**Budget Item and Description**	**Budget $**	**Actual $**	**Variance**
System Renewal	Brant Waterloo Rd. (Swan St. to 4km East)	$0	$293,352	$293,352
System Renewal	Spragues Rd. North of Wrigley Rd. - 2.2km	$0	$262,672	$262,672
	Miscellaneous	$410,500	$562,172	($151,672)
System Renewal	**Subtotal**	**$3,613,000**	**$2,885,444**	**-$727,556**
System Service	SCADA Loadbreak Switches (5)	$300,000	$315,091	$15,091
System Service	Adjustments - South End Feeders to Improve Reliability	$250,000	$390,762	$140,762
	Miscellaneous	$160,000	$129,311	($30,689)
System Service	**Subtotal**	**$710,000**	**$835,164**	**$125,164**
		$11,008,000	**$6,753,000**	**-$4,255,000**

Overhead and Underground Line Projects – Budget versus Actual – Year 2012

This report compares budgeted spending to actual spending on overhead and underground line projects for 2012. Please note that budgeted dollar amounts are prepared at budget time before a detailed engineering design is done in most cases. Detailed estimates are prepared prior to issue of the work order.

SYSTEM ACCESS

Two New 27.6 kV Feeders in North West Industrial Area

Budgeted Amount = $2,000,000

Actual Amount = $246,924

This project is designed to provide additional 27.6 kV feeder capacity into the North-West industrial area. The project was engineered beginning in the spring of 2012 and tendered in the summer of 2012. Approvals were required from the Ministry of Transportation for the Highway 401 crossing, from Rail America for a railway crossing, from Hydro One for work near its 115 kV transmission lines and its Preston TS and from the Grand River Conservation Authority for the route crossing through the Speed River valley. Private landowners were also involved. Approvals were lengthy. Construction did not begin until January, 2013. Costs in 2012 were primarily for materials.

Subdivision Capital Investment Underground (by developer) – 500 lots

Budgeted Amount = $1,271,000

Actual Amount = $850,577

This amount represents the developer's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are serviced.

Boxwood Drive Industrial Subdivision

Budgeted Amount = $900,000 (Work Order 78058-110)

Actual Amount = $0.00

The Boxwood Drive Industrial Subdivision is a 175 acre industrial subdivision being developed by the City of Cambridge that was planned again for 2012 construction but approval delays resulted in no activity on the site until 2012. The site was not ready for hydro servicing by year-end 2012. Hydro servicing is being provided in 2013. The budget amount changed as more details were finalized.

Servicing Industrial Underground

Budgeted Amount = $875,000

Actual Amount = $942,813

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Subdivision Capital Investment Underground (by CND Hydro) – 500 lots

Budgeted Amount = $729,000

Actual Amount = $181,310

This amount represents CND's contribution to developer installed residential subdivisions. The actual amount varies each year based on the number of residential homes that are connected.

Purchase of Two 27.6 kV Feeder Breakers

Budget Amount = $250,000

Actual Amount = $190,752

Siemens supplied 27.6kV switchgear for CND owned MTS#1. MTS#1 came into service in July, 2002. In 2008, CND was notified by Siemens that the Siemens type 8BK20 switchgear would be phased out over a period of five years "as part of its continuous product development program". There are two spare 27.6kV breaker positions at MTS#1. These breaker positions will be used in the future either as additional load feeders or to connect to capacitor banks. CND needed to ensure that the two breaker positions could be installed in the future so it waited as long as it could but in 2012 purchased two spare Siemens 8BK20 breakers. The cost was $236,863. These two breakers are used as spares for the existing in-service breakers until they are required for use.

A portion of the switch cost was incurred in 2011 ($46,084) with the balance of $190,752 incurred in 2012. The $46,084 was treated as Asset Not in Use – which is similar to work in progress – in 2011 and then the entire amount was moved to capital in 2012 – thereby showing 236,836 as the total capital cost.

Servicing Industrial Overhead

Budgeted Amount = $250,000

Actual Amount = $95,795

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Riverbank Drive

Budgeted Amount = $140,000

Actual Amount = $0

Part 2 of the Riverbank Drive rebuild was not done in 2012. The Region of Waterloo requested us to delay the work until after construction of the Fairway Road bridge over the Grand River. CND agreed to their request. Part 2 of the work was done in 2013 based on the Region's schedule.

46 Grand Avenue South

Budgeted Amount = $0

Actual Amount = $153,739

Relocations were required as part of construction of the new Dunfield Theatre at 46 Grand Avenue South. This project was customer driven. The work was done by CND crews.

SYSTEM RENEWAL

Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo Rd. to 700m North) – 4.7km

Budgeted Amount = $700,000

Actual Amount = $373,795

This project rebuilt a depreciated 4.8 kV line and converted it to 16 kV operation. It also resolved long term load transfers with Hydro One. This project was the second part of the work on Brant Waterloo Road. Part 1 started in 2011. Part 2 consisted of the section of Brant Waterloo Road from just East of Swan Street to just West of Spragues Road and a section of Reidsville Road North of Brant Waterloo Road.

An application was submitted to the Ontario Energy Board on January 14, 2011, EB-2011-018, for a service area amendment for CND to take over Hydro One load transfer customers on the South side of Brant Waterloo Road. Ontario Energy Board approval was granted on April 25, 2011.

Construction of Part 2 began in the spring of 2012 and was completed in early summer, 2012. Work was done by a contractor. Contractor pricing was very competitive and came in over 40% below estimate. The project was also engineered to take advantage of existing poles where feasible.

Overall, the project came in over 40% less than budget due to competitive contractor pricing.

Preston Parkway Area Underground Rebuild

Budgeted Amount = $470,000

Actual Amount = $133,072

This work was issued for construction in June, 2012 with an estimated amount of $435,514. A legal concern delayed the start of construction so a large part of the work was carried over into 2013. The work involved the replacement of 20 submersible transformers most dating back to the mid 1970's with new mini-pad transformers and the replacement of a switching unit dating back to the mid 1970's. Work restarted in the spring of 2013.

Galt Core Area Upgrades

Budgeted Amount = $450,000

Actual Amount = $415,770

Work was completed for the installation of new switching equipment in two key vault rooms in the Galt core area. The switches were a type new to CND intended to improve reliability in the Galt core area. A new switch was installed in the vault room at 95 Water Street North. A new switch was installed in the vault room at Petty Place. Work was done by CND crews and changeovers had to be done after normal hours to avoid disruptions to business customers. Work was done to repair deteriorated underground concrete vaults and steel lids in the Galt core area. Work was done to replace underground primary cables and eliminate the number of connection points in the Galt core area to maintain reliability.

Alps Rd. (Dumfries Road to 1.9km West) – 1.9km

Budgeted Amount = $300,000

Actual Amount = $146,596

This project was Part 2 of the Alps Road rebuild begun in 2011. It consisted of the section from just East of the CPR tracks to just West of Dumfries Road. The work was done by a contractor in the spring and early summer of 2012.

Line contractor pricing was very competitive coming in at over 30% less than estimate. Forestry costs for the necessary tree trimming/removals came in extremely favourable at over 80% less than estimate. Combined, the savings were over $85,000. Contractor prices dropped as a result of the highly competitive market situation at that time.

Reidsville Road – Greenfield Rd. to Wrigley Rd. – 1.7km

Budgeted Amount = $272,500

Actual Amount = $238,803

This project rebuilt a depreciated 4.8 kV line and converted it to 16 kV operation. The work was done by a contractor. It also relocated the line from a difficult to access off-road location in fields and bush to the road allowance where it can be accessed during any outages. The total project cost including the engineering work done in 2011 was $267,670.29 which was very close to budget.

Upgrades in Various Areas

Budgeted Amount = $265,000

Actual Amount = $48,855

Work was done to replace three 27.6 kV padmount switching units on Saginaw Parkway less the cost of the three switching units themselves. The actual cost of the switching units was accrued to 2011 ($157,606.43). A new type of switching unit was selected to improve reliability. The existing units were subject to moisture build-up and flashover despite cleaning.

Fischer Hallman Road – Paul Avenue to New Dundee Rd. – 1.4km

Budgeted Amount = $225,000

Actual Amount = $0

This project will rebuild a depreciated 4.8 kV line and convert it to 16 kV operation. The work will be done by CND crews. The surveying and preliminary engineering work was completed in 2011. Due to resource availability and other priorities, construction will take place in 2013.

Upgrade HALF of Radios at existing SCADA Switch Installations

Budgeted Amount = $200,000

Actual Amount = $64,929

The program to upgrade CND's SCADA radio system to use faster, more reliable S&C Speednet radios for the switches was slow in 2012 as negotiations to gain access to the location of the main repeater with a municipality took longer than expected. Agreement was finally worked out in 2013 so the radio upgrade program can now continue. The main repeater was key for communication access to many of CND's switches. As a result, CND significantly underspent the budget in 2012 since it didn't make sense to upgrade radios if the repeater was not available.

Pole Replacements

Budgeted Amount = $190,000

Actual Amount = $182,002

These are poles that needed replacement and would have an expected useful life after replacement of 50+ years. The actual amount spent in 2012 came in very close to budget.

Roseville Road – West of Northumberland St. to Trussler Rd. – 0.8km

Budgeted Amount = $130,000

Actual Amount = $163,427

This project rebuilt a depreciated 4.8 kV line along part of Roseville Road West of Northumberland Street and converted it to 16 kV operation. The work was completed by CND crews in 2012. The estimate used at budget time in the fall of October, 2011 proved to be insufficient once detailed design work was complete. The issued work order estimate was $185,588. Therefore, the project came in below estimate but over the initial budget.

Brant Waterloo Rd. (Swan St. to 4km East)

Budgeted Amount = $0

Actual Amount = $293,352

This project rebuilt a depreciated 4.8 kV line and converted it to 16 kV operation. It also resolved long term load transfers with Hydro One. The project was done in two parts. Part 1 which is shown here in the dollar amounts consisted of the section of Brant Waterloo Road from Spragues Road to where the line dead-ended to the East. The work was done by a contractor and began in late 2011. Work was completed in early 2012.

The total dollar cost (in 2011 and 2012) for Part 1 was $793,754.59. The total dollar amount originally budgeted for Part 1 and Part 2 in 2011 was $1,755,000. The amount budgeted for Part 2 alone in 2012 was $700,000. Therefore, Part 1 came in below its original budgeted portion of $1,055,000. The savings came primarily by lower than estimated contractor prices. The tendered amount for the successful bidder came in over 30% less than estimate.

Spragues Road North of Wrigley Road – 2.2km

Budgeted Amount = $0

Actual Amount = $262,672

This project rebuilt a depreciated 4.8 kV line along part of Spragues Road North of Wrigley Road and converted it to 16 kV operation. This project was added to CND's 2012 work to take advantage of favourable contractor prices as a result of the highly competitive market situation at that time. This project was originally planned for 2012 in CND's ten year capital forecast but had been deferred due to financial limitations.

SYSTEM SERVICE

SCADA Loadbreak Switches (5)

Budgeted Amount = $300,000

Actual Amount = $315,091

CND installs remotely operable 27.6 kV SCADA switches on its distribution system in order to improve reliability. Five SCADA switches were budgeted for 2012. $315,091.04 was spent in 2012. All five switches were installed in 2012.

Adjustments – South End Feeders to Improve

Budgeted Amount = $250,000

Actual Amount = $390,762.

The purpose of this project was to rework the configuration of CND's 27.6 kV distribution system in the South end of Cambridge to reduce the customer count per feeder. In the past, the number of Customer-Hours lost during an outage event was very high in certain areas. With some work, CND could improve the reliability in this part of the City. Only preliminary engineering work was done in 2011. Construction work was done by CND crews in 2012. The scope of the work was expanded beyond the budgeted figure. Additional work remains to be completed in 2013.

2012 General Plant Capital Expenditures

The table below provides a summary of the General Plant capital expenditures for 2012 Actual.

General Plant Capital Additions 2012

OEB	Description	2012 Additions	Projects > $125,000 threshold	Amount
1860	Meters	8,687,870	Smart Meters	7,292,744
			Replacement meters and equipment	371,961
1908	Buildings and Fixtures	493,500	Roof replacement	493,500
1915	Office Furniture	46,010	None	
1920	Computer Hardware	473,274	Control room digital wall display	245,604
			Smart Meter Computer Hardware	219,274
1925	Computer Software	815,031	ERP software	678,597
			Smart Meter Computer Software	275,390
1930	Vehicles	123,836	None	
1940	Tools Shop and Garage equipment	59,566	None	
	Total	10,699,087		9,577,070

The following is a description of material General Plant capital additions in 2012:

Smart Meters - $7,292,774

Smart meter expenditures in 2012 represented the approved Smart Meters assets that were transferred from the Smart Meter Capital variance account (1555) to capital asset account 1860 as a result of the Board's Decision on CND's Smart Meter Application (EB-2012-0086).

Replacement Meters and Equipment - $371,961

There were no individual meter capital projects in 2012 over the materiality limit. The total capital expenditures for the year include: (i) a Primary Metering Unit upgrade $40,000; (ii) replacements of 6 wholesale meters $48,000; (iii) replacement of 530 single phase meters $46,248; and (iv) replacement of older meters as the first phase of CND's Cellular Remotely Interrogated Metering System upgrade, described in more detail as part of the 2013 capital projects, $84,000.

Roof Replacement - $493,500

In 2011, CND hired a consulting firm to complete an assessment of the roof at 1500 Bishop St. The original asphalt roof was thirty one years old and was leaking in various places in both the offices and garage areas. As the roof was at end of life, a new roof was constructed in 2012 at a capital cost of $493,500. As 1500 Bishop St. is CND's core operating facility, upgrades are required to ensure the structural integrity of the building and to maintain a productive work environment.

Smart Meter Computer Hardware $219,274 and Software - $275,390

Smart meter computer hardware and software expenditures in 2012 represent the approved Smart Meters assets that were transferred from the Smart Meter Capital variance account (1555) as a result of the Board's Decision on CND's Smart Meter Application (EB-2012-0086).

Control center digital wall display - $245,604

The installation of a digital wall display for the Control Center was required to replace an antiquated, manual display system, for providing graphical representation of CND's 27.6kV distribution system for use by the System Control Center Operators ("SCOs"). Prior to the implementation of the digital wall display, the display system was comprised of metal panels mounted on a wall, with round magnets representing switch positions, and coloured tape to represent the 27.6kV feeder lines. Any changes to the information were done manually. The digital wall display provided CND with the following improved functionality:

- Projection of the GIS maps on a large scale, resulting in improved visibility for SCOs and Operating staff;
- Display of a colour coded feeder map, which provides for improved visual identification of feeders; and
- Provides automated links to other maps and construction drawings.

In the fall of 2013, CND plans to link the digital wall display with the SCADA system, as part of the SCADA upgrade.

ERP Software - $678,597

CND implemented a new ERP software solution effective January 1, 2012. The key objectives of the implementation of a new ERP solution were:

- To replace existing financial software that had reached end of life;
- Reduce the number of software solutions required to manage the businesses of CND;
- To facilitate the required regulatory changes to CND's capitalization policies, including the implementation of new fixed asset components, changes to useful lives, as well as the requirement to track differences in depreciation computations under the old useful lives compared to the new useful lives;
- To increase operational efficiencies through the reduction of manual processes;
- To improve business processes to align with best practices in the areas of:
    - Financial Management and Reporting, including budgeting and forecasting;
    - Accounting, including regulatory requirements;
    - Asset Management;
    - Inventory Management;
    - Human Resources; and
    - Procurement.
- Integrate financial transactions between the CIS/Billing System and ERP

Costs for this project were incurred over a two year period (2011 and 2012). The ERP initiative commenced in approximately July 2011 and went live in early 2012. Throughout 2012, CND continued to work through various implementation and conversion issues. The total cost of the investment included the software, third party consulting support for the implementation and testing, as well as internal labour costs associated with the staff that worked directly on the implementation and testing.

The implementation of a new ERP Solution was approved as part of the Board's Decision on CND's 2010 Cost of Service Application Decision (EB-2009-0260). The estimated cost for the ERP Solution at that time was $650,000.

APPENDIX B

WORST PERFORMING FEEDER ANALYSIS

WORST PERFORMING FEEDER ANALYSIS

As part of the Distribution Plan preparation CND did an analysis of the worst performing feeders based on customer hours of interruption. The tables below show the results for all the feeders that were flagged in this analysis. Unselected feeders are not shown in the table.

The criterion used for flagging was selecting the three or four feeders that accounted for the highest percentage of customer hours lost excluding scheduled interruptions. When these feeders were selected and the major contributing causes were reviewed it was observed that the top three causes contributed in the order of 75+% of the customer hours as well.

CND will incorporate this type of analysis in their regular annual reliability reporting as it provides some additional insight into their systems performance.

2009

	2510M40	2510M41	65M12	65M13	65M16	65M17	65M18	65M19	65M20	TOTALS	
0 - Unknown / Other	19.47	27.5	6	0	2.17	20.58	12.36	600.37	45.17	**1525.74**	9.30%
1 - Scheduled	259.43	0	1343.72	0	38.33	417.29	1183.54	464.75	2162.86	**9656.37**	
2 - Loss of Supply	0	0	65.55	0	0	0	0	0	0	**712.44**	4.34%
3 - Tree Contacts	0	0	959.3	0	14.88	0	63.76	2.93	230.58	**1357.3**	8.27%
4 - Lightning	0	0	245.01	0	648.13	0	8.17	0	251.4	**2511.06**	15.30%
5 - Defective Equipment	441.13	337.12	23.57	0	837.41	0	17.32	47.02	61.58	**2637.05**	16.07%
6 - Adverse Weather	0	0	0	0	0	0	0	0	0	**223.87**	1.36%
7 - Adverse Environment	0	0	0	0	0	0	0	0	0	**0**	0.00%
8 - Human Element	0	0	0	0	0	0	0	0	0	**0**	0.00%
9 - Foreign Interference	0	0	402.54	3.37	1441.5	31.31	575.94	296.03	2308.15	**7446.89**	45.37%
TOTALS:	**720.03**	**364.62**	**3045.69**	**3.37**	**2982.42**	**469.18**	**1861.09**	**1411.1**	**5059.74**	**26070.72**	
exclude scheduled	460.6	364.62	1701.97	3.37	2944.09	51.89	677.55	946.35	2896.88	16414.35	
% of annual Cust-Hr	2.81%	2.22%	10.37%	0.02%	17.94%	0.32%	4.13%	5.77%	17.65%	100.00%	100.00%

2010

	2510M40	2510M41	65M12	65M13	65M16	65M17	65M18	65M19	65M20	TOTALS	
0 - Unknown / Other	461.9	738.23	191.07	0	10.6	9.2	0	0	34.78	**3193.69**	7.28%
1 - Scheduled	312.77	0	119.9	0	214.2	284.4	233.03	0	899.02	**5304.81**	
2 - Loss of Supply	0	0	0	0	0	0	0	0	0	**40.53**	0.09%
3 - Tree Contacts	13370.97	0	1018.53	0	7900.1	0	74.63	0	12	**23925.16**	54.50%
4 - Lightning	0	0	8.92	0	0	0	36.85	0	0	**52.92**	0.12%
5 - Defective Equipment	2165.4	399.5	8.8	188.93	4371.21	7.2	358.17	25.2	144.87	**10535.62**	24.00%
6 - Adverse Weather	0	0	0	0	97.63	0	0.68	0	0	**100.51**	0.23%
7 - Adverse Environment	0	0	0	0	0	0	0	0	0	**0**	0.00%
8 - Human Element	0	0	3.2	0	0	0	0	0	0	**35.2**	0.08%
9 - Foreign Interference	0	92.4	76.62	2772.7	172.13	67.2	36.85	0	218.14	**6011.72**	13.70%
TOTALS:	**16311.04**	**1230.13**	**1427.04**	**2961.63**	**12765.87**	**368**	**740.21**	**25.2**	**1308.81**	**49200.16**	
exclude scheduled	15998.27	1230.13	1307.14	2961.63	12551.67	83.6	507.18	25.2	409.79	43895.35	
% of annual Cust-Hr	36.45%	2.80%	2.98%	6.75%	28.59%	0.19%	1.16%	0.06%	0.93%	100.00%	100.00%

2011

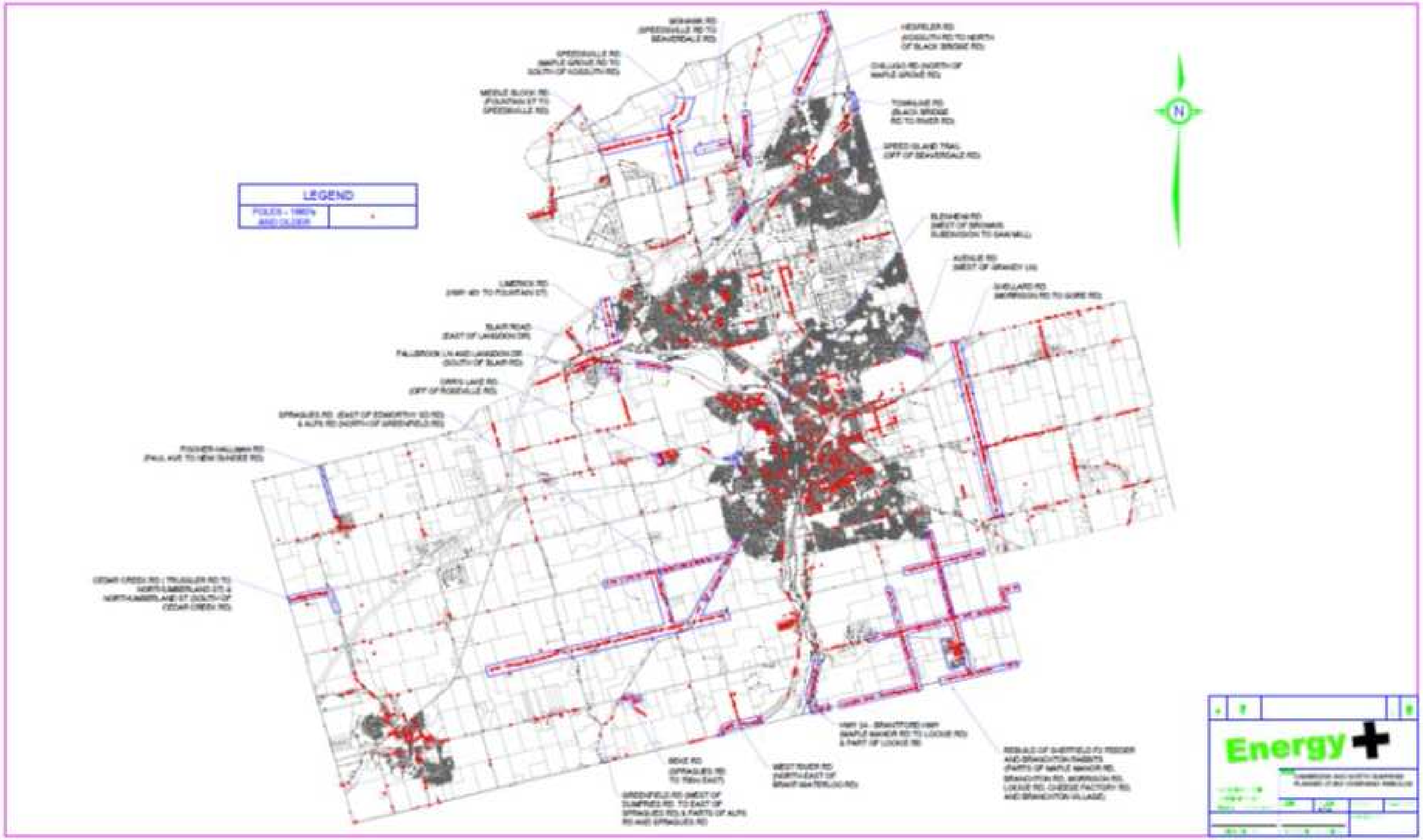
	2510M40	2510M41	65M12	65M13	65M16	65M17	65M18	65M19	65M20	TOTALS	
0 - Unknown / Other	687.43	0	155.94	0	182.87	28.8	9.68	141.83	1035.55	**3192.96**	9.59%
1 - Scheduled	57.6	108.5	342.9	4.78	667.1	604	96.53	709.14	64.3	**4645.63**	
2 - Loss of Supply	0	0	0	0	0	0	0	0	0	**2179.45**	6.55%
3 - Tree Contacts	0	0	2655.25	0	96.25	2599.13	15.28	0	1446.13	**7758.29**	23.31%
4 - Lightning	0	0	108.28	0	137.45	139.2	102.3	0	0	**1176.5**	3.53%
5 - Defective Equipment	1984.29	227.78	121.45	0	2662.79	911.3	69.62	3001.92	1051.2	**12491.36**	37.52%
6 - Adverse Weather	0	0	188.05	0	45.17	0	788.7	0	0	**1396.59**	4.20%
7 - Adverse Environment	0	0	0	0	0	0	0	0	0	**0**	0.00%
8 - Human Element	0	0	0	0	0	0	0	0	0	**0**	0.00%
9 - Foreign Interference	53.23	0	1345.76	0	661.49	166.27	69.65	318.62	130.87	**5093.6**	15.30%
TOTALS:	**2782.55**	**336.28**	**4917.63**	**4.78**	**4453.12**	**4448.7**	**1151.76**	**4171.51**	**3728.05**	**37934.38**	
exclude scheduled	2724.95	227.78	4574.73	0	3786.02	3844.7	1055.23	3462.37	3663.75	33288.75	
% of annual Cust-Hr	8.19%	0.68%	13.74%	0.00%	11.37%	11.55%	3.17%	10.40%	11.01%	100.00%	100.00%

2012

	2510M40	2510M41	65M12	65M13	65M16	65M17	65M18	65M19	65M20	TOTALS	
0 - Unknown / Other	763.99	0	0	0	103.73	0	18.56	0	197.7	**1898.88**	3.65%
1 - Scheduled	0	159.25	333.35	138.09	414.85	303.3	159.34	21.8	147.24	**3383.09**	
2 - Loss of Supply	0	0	0	0	12.05	3328.87	0	0	0	**3340.92**	6.43%
3 - Tree Contacts	0	317.75	5330.55	0	328.19	829.43	5.21	0	0	**7206.3**	13.86%
4 - Lightning	0	0	0	0	0	373.86	36.08	0	0	**487.44**	0.94%
5 - Defective Equipment	352.54	827.08	3352.87	3631.37	223.01	0	3204.04	177.26	125.73	**16140.47**	31.05%
6 - Adverse Weather	0	6944.13	15.28	0	0	0	1161.6	0	342.93	**11667.42**	22.45%
7 - Adverse Environment	0	0	0	0	0	0	0	0	0	**0**	0.00%
8 - Human Element	0	0	0	0	0	0	0	0	0	**277.35**	0.53%
9 - Foreign Interference	23.23	17.6	734.04	2311.4	162.87	370.97	3204.18	311.43	454.9	**10959.1**	21.08%
TOTALS:	**1139.76**	**8265.81**	**9766.09**	**6080.86**	**1244.7**	**5206.43**	**7789.01**	**510.49**	**1268.5**	**55360.97**	
exclude scheduled	1139.76	8106.56	9432.74	5942.77	829.85	4903.13	7629.67	488.69	1121.26	51977.88	
% of annual Cust-Hr	2.19%	15.60%	18.15%	11.43%	1.60%	9.43%	14.68%	0.94%	2.16%	100.00%	100.00%

APPENDIX C

POLE LOCATIONS – 50 YEARS AND OLDER
LARGE SCALE PAPER MAP



Pole Locations – 50 years and older. Large scale paper map

APPENDIX D

HYDRO ONE'S "DISTRIBUTED GENERATION TECHNICAL INTERCONNECTION REQUIREMENTS – INTERCONNECTIONS AT VOLTAGES 50 KV AND BELOW" DT-10-015 R2

The link to this Hydro One document is

http://www.hydroone.com/Generators/Documents/Feed-In%20Tariff/Distributed%20Generation%20Technical%20Interconnection%20Requirements.pdf

Where not specifically covered by CND, the latest version of Hydro One's "Distributed Generation Technical Interconnection Requirements – Interconnections at Voltages 50 kV and Below" DT-10-015 R2 will apply. The relevant part is included below:

1.6 CAPACITY LIMITATIONS ON GENERATOR INTERCONNECTIONS FEEDER LOADING LIMITS

The capacity for all sections of all feeders, the "feeder limitation" is based mainly on the distance from the Hydro One Networks Inc. supply station to the DG's Point of Common Coupling (PCC). The feeder limitation applies to all DGs connected or connecting to the feeder and considers the rated output capacity of each DG. Any single DG connection can affect the capacity available for all sections of the feeder. For all sections of the feeder, the total current shall not exceed:

a) 400 Amps for HONI feeders operating at voltages 13 kV or greater; and

b) 200 Amps for HONI feeders operating at voltages below 13kV.

ACCEPTABLE GENERATION LIMIT AT A TS OR A DS (MS)

The acceptable generation limit at a TS or a DS is established by adding together: 60% of maximum MVA rating of the single transformer and the minimum station load.

SHORT CIRCUIT (SC) LIMITS

The SC limits at TS low voltage bus or at any portion of distribution feeder shall not be exceeded by the addition of DG Facilities. Refer to Section 2.1.16 for requirement.

1.6.1 THREE PHASE GENERATORS

i) The acceptable individual generation limits for three-phase DG Facilities interconnecting to HONI Distribution System feeders shall not exceed:

a) 1 MW per connection on feeders operating below 13kV ; and

b) 5 MW per connection on 27.6 kV feeders supplied via a 44kV :27.6 kV step-down transformer.

ii) The feeder limitation determines the total acceptable three-phase generation allowed for all sections of HONI`s Distribution System feeders and shall not exceed:

a) 30 MW for feeders operating at 44kV ;

b) 19 MW for feeders operating at 27.6kV ;

c) 9.6 MW for feeders operating at 13.8kV ;

d) 4.3 MW for feeders operating at 12.48kV ;

e) 2.9 MW for feeders operating at 8.32kV ; and

f) 1.45 MW for feeders operating at 4.16kV.

1.6.2 SINGLE PHASE GENERATORS

i) The maximum single phase generation limits for specific feeders shall not exceed:

a) 150kW for single phase generators connecting to feeders operating at nominal voltage levels of 13 kV or greater; and

b) 100kW for single phase generators connecting to feeders operating at nominal voltage levels less than 13kV.

Note: While the absolute limits are stated above, the actual acceptable individual single phase generation limit for specific feeders or TS/DS is determined in Connection Impact Assessment (CIA).

APPENDIX E

ONTARIO HYDRO INSULATOR FAILURE NOTIFICATION

Below is part of the communications received from the then Ontario Hydro advising that there are problems with specific insulators sold by specific manufacturers. There were other communications after this clarifying procedures but this information provides the background to the insulator failures CND has experienced and supports their program to replace these insulators. CND has adopted a pace for replacement of these insulators based on the failure rate of these insulators that CND have experienced.

RECEIVED
MAR 15 1993
ENGINEERING DEPT.
H.E.C. of CAMBRIDGE and
N. DUMFRIES

Box 970, 225 Edinburgh Road South, GUELPH, Ontario, N1H 6N2

March 10, 1993

MR. RON SINCLAIR
CAMBRIDGE PUC
1500 BISHOP ST.
CAMBRIDGE, ONTARIO
N1R 6W8

Attention: All Joint Use Partners and Tenants

Re: <u>HAZARDS ASSOCIATED WITH SUSPECT PORCELAIN INSULATORS USED ON ONTARIO HYDRO LINES.</u>

This letter will serve as notification of a safety concern associated with porcelain insulators used on Ontario Hydro lines. The attached information will describe the types of insulators involved and the precautions that Ontario Hydro has in place for its staff.

Ontario Hydro has installed the letter C on all poles which are framed with suspect insulators.

As stated earlier Ontario Hydro has implemented a work restriction on poles with these insulators. The purpose of this letter is to make you aware of the possible problem, but we are not mandating how you deal with this issue.

If you require clarification or further information related to this subject, feel free to contact me.

Yours truly,

Glenn Mcpherson
Area Line Supervisor
Guelph Area

Any Action Required

SRR		GR	
CV		SW	
KM		LF	
RS		PG	
LO		DJ	
MF		File	

Telephone (519) 822-5071, Toll Free 1-800-265-8306, FAX (519) 822-6451

DRAFT TECHNICAL DIRECTIVE

REGIONAL TRADES AND OPERATING INFORMATION SYSTEM

TO:	POWERLINE MAINTAINERS WESTERN REGION	ORIGIN:	RETAIL CUSTOMER WESTERN REGION
TITLE:	CLIMBING RESTRICTION (PORCELAIN INSULATORS)	ISSUE:	MAY 1991
		NUMBER:	WR 35 R1

This directive has been revised to include the following sky tone grey insulators:

Improved Appearance

46kv - Canadian Porcelain
- Canadian Ohio Brass

34.5kv - Canadian Ohio Brass

Pin Type (Two Piece)

46kv - Canadian Porcelain
22kv - Canadian Porcelain

GOVERNING PRINCIPLE

All Powerline Maintainers shall be made aware of the possibility of porcelain insulator failures. When required to work on structures framed with 46kv, 34.5kv, and 22kv sky tone grey porcelain insulators, the structure shall not be climbed unless they are an approved make or unless they can be supported from an aerial device or with sticks from outside the falling path.

RATIONALE

A number of failures involving Canadian Ohio Brass and Canadian Porcelain improved appearance insulators and Canadian Porcelain two piece pin type insulators have been reported by Areas. Initial reports indicated the problem was with units obtained and installed in the years 1977-1981 inclusive. We now have evidence from the field the problem extends to all of these insulators regardless of year. Reports of failures are also beginning to show up in other Regions.

All failed insulators have been Canadian Ohio Brass or Canadian Porcelain. The last delivery of Canadian Porcelain improved appearance units was September 1984. A total of 28,200 Canadian Porcelain sky tone grey two piece porcelain insulators were purchased 1975-1983:

25,000 - 27.6kv
3,200 - 46kv

Both high consequence electrical and falling hazards exist. The climbing restriction represents a safety barrier. Replacement of the non-approved units eliminates the hazard.

PROCEDURE

1. **Improved Appearance**

   As the need arises to work on a pole framed with suspect (Canadian Ohio Brass or Canadian Porcelain rated at >15kv) sky-tone grey <u>improved appearance</u> porcelain insulators the insulators shall be replaced using an aerial device or supported with the insulator support systems described in TB 2083-R1 before climbing the structure. This restriction applies to both energized and de-energized lines where the Powerline Maintainer is in a position to be hit should the insulator fail.

2. **Two piece pin type**

   Before working on a pole with sky-tone grey <u>two piece pin type</u> (Canadian Porcelain rated at >15kv) insulators the insulators shall be replaced using an aerial device before climbing the structure. The pole can be climbed if the line is isolated and de-energized.

Once the insulators have been changed the poles should be identified by installing an aluminum letter "L" or "O" on the pole.

KEY TERMS

Insulator
Climbing
Porcelain Insulator
Restriction
Porcelain

DRAFT

Western Region Addendum to WR35-R1 Climbing Restriction (Porcelain Insulators)

This addendum is issued to clarify WR 35-R1 and should be filed in your RTOS manual.

The suspect insulators are of the following class and manufacture.

Improved Appearance (Sky Tone Grey)

46 kv	- Canadian Porcelain (horizontal clamp) - Canadian Ohio Brass (horizontal clamp)
34.5kv	- Canadian Ohio Brass (horizontal clamp)

Pin Type (Two Piece - Sky Tone Grey)

46 kv	- Canadian Porcelain
27.6kv	- Canadian Porcelain

WR 35-R1 only applies to suspect post type insulators, framed improved appearance in the horizontal position. We have not experienced breakage problems with the post insulators in the vertical position either on top pin or cross arm framing.

When work is to be performed on structures framed with the above suspect insulators (improved appearance or pin type) WR35-R1 does not apply for, routine switching operations, fuse replacement, isolation of transformers and services (including live line clamp operation), or to situations where an insulator is broken and the conductor is floating clear of the structure.

The situations mentioned above shall be handled applying approved work practices and being alert to the possibility of an insulator failure.

For any work other than the tasks mentioned above the steps in WR35-R1 apply.

Improved Appearance

46 kV	Canadian Porcelain Canadian Ohio Brass LAPP (1982)	(CP) (OB or COB)
34.5 kV	Canadian Ohio Brass	(OB or COB)

Risk is defined as **frequency** (probability of occurrence) times **consequence**.

Risk cannot be entirely eliminated, but must be managed to **"As Low As Reasonably Acceptable"**.

(i) **The frequency** of failure has been very low and to date has not occured with someone working on the pole. There are no controls available to affect the frequency of failure.

(ii) **The consequence** of a failed insulator carrying a live conductor is high, if someone is working on the pole. A circuit outage, insulator change out and/or mehtods to catch a falling conductor are controls to affect the consequence.

Install the conductor catcher, or temporary support guy barrier before staring "work" on the pole.	The magnitude of stress on an insulator due to conductor weight, conductor vibrations and abnormal weather, are greater than vibrations due to climbing.
"Work" is defined as activity that may cause movement of the pole such as dead-ending conductor, pulling guys and/or changing transformers.	Because the probability of failure (frequency) is not increased, the risk of climbing high enough to install the conductor support system is "as low as reasonably acceptable".
The risk caused by climbing high enough to install the conductor support system is acceptable.	Two support systems are found in Technical Bulletin HO 2083 -R1

METHOD	ADDITIONAL INFORMATION
3. **Other Utilities Working on Our Poles** Climbing and minor service work that does not cause movement to the pole would not require additional protection. Ontario Hydro will need to provide protection as described in #1 and #2 if work such as stringing cable is carried out. Where potentially defective types of insulators have been identified, the pole shall be marked with the letter "C"	The risk for others working on our poles must also be managed to "as low as reasonably possible".

KEY TERMS

Insulators
Horizontal Post
Conductor Catcher
Hazard

Here is a list of Areas that have reported incidents and the type of insulators involved:

Strathroy	-	34.5kv Canadian Ohio Brass Improved appearance Breaking at the base due poor manufacturing quality control
Essex	-	46 kv Canadian Ohio Brass and Canadian Porcelain improved appearance and 46kv/27.6kv Canadian Porcelain two piece insulators Cement growth
Simcoe	-	27.6kv Canadian Porcelain two piece insulators Cement Growth
Peninsula Dundas	-	46kv Canadian Porcelain improved appearance (1976)
Kent	-	46kv/27.6kv Canadian Porcelain two piece insulators

Lapp. 82-83 Problem.

APPENDIX F

OUTAGE DATA

RELIABILITY PERFORMANCE - 2008 TO 2012

As CND is looking forward with capital and operating planned expenditures, it is helpful to look back at the past five years of reliability performance in detail.

Below are the service reliability indicators for SAIDI and SAIFI for the period 2008 to 2012.

Index	Includes outages caused by loss of supply					Excludes outages caused by loss of supply				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
SAIDI	0.700	0.520	0.970	0.740	1.070	0.680	0.510	0.970	0.700	1.000
SAIFI	1.080	0.980	0.850	1.410	1.490	1.040	0.970	0.850	1.300	1.430

5 Year Historical Average

SAIDI		0.800		0.772
SAIFI		1.162		1.118

SYSTEM AVERAGE INTERRUPTION DURATION INDEX (SAIDI)

SAIDI is the average outage duration for each customer served. SAIDI is measured in units of time, often minutes or hours. It is calculated by taking the sum of all Customer-Interruption Durations and dividing by the total number of Customers Served. It is usually measured over the course of a year, and according to IEEE Standard 1366, the median value for North American utilities is approximately 1.50 hours.

SYSTEM AVERAGE INTERRUPTION FREQUENCY INDEX (SAIFI)

SAIFI is the average number of interruptions that a customer experiences. SAIFI is measured in units of interruptions per customer. It is calculated by taking the total number of Customer-Interruptions and dividing by the total number of Customers Served. It is usually measured over the course of a year, and according to IEEE Standard 1366, the median value for North American utilities is approximately 1.10 interruptions per customer.

Reliability has deteriorated in terms of both SAIDI and SAIFI between 2008 and 2012. This report will look in detail behind the reasons for the deterioration. The knowledge gained is used in the preparation of CND’s Distribution System Capital Plan.

CND prepares outage reports for all unplanned interruptions on its distribution system. These reports are circulated internally. They detail the outage including the area, the cause, the number of customers interrupted, the duration of the interruption, the supply feeder and the voltage level. Any required follow-up action is also detailed. CND uses industry standard cause codes. They are listed below.

Outage Cause Codes

Unknown – Customer interruptions with no apparent cause or reason.

Scheduled – Customer interruptions due to the disconnection at a selected time for the purpose of construction or preventive maintenance.

Loss of Supply – Customer interruptions due to problems in the bulk electricity system (i.e., supply from Hydro One).

Trees – Customer interruptions caused by faults due to trees or tree limbs contacting energized circuits.

Lightning – Customer interruptions due to lightning striking the distribution system, resulting in an insulation breakdown and/or flashovers.

Defective Equipment – Customer interruptions due to deterioration from age, incorrect maintenance, or imminent failures detected by maintenance.

Adverse Weather – Customer interruptions resulting from rain, ice storms, snow, winds, extreme ambient temperatures, freezing fog, or frost and other extreme conditions.

Adverse Environment – Customer interruptions due to equipment being subjected to abnormal environment such as salt spray, industrial contamination, humidity, corrosion, vibration, fire or flooding.

Human Element – Customer interruptions due to the interface of the utility staff with the system such as incorrect records, incorrect use of equipment, incorrect construction or installation, incorrect protection settings, switching errors, commissioning errors, deliberate damage or sabotage.

Foreign Interference – Customer interruptions beyond the control of the utility such as birds, animals, dig-ins, vandalism, sabotage and foreign objects.

System Control Centre logs are used as the source of information for all unplanned and planned outages. Information is entered into a data base where monthly reports are prepared and then summarized for reporting to CND’s Board of Directors through KPI’s and for annual reporting.

The SAIDI and SAIFI numbers are greatly impacted by major events on the distribution system in any given year. Therefore, CND looks at the “Top Ten” unplanned outages in each calendar year. These are the events that resulted in the greatest number of Customer-Hours lost.

Top Ten Unplanned Outages in 2008

Date	Cause	Cust-Hours Lost	Details
Dec. 28	Trees	2,848	Tree on line during high winds – Guelph Ave.
Nov. 28	Defective Equipment	2,338	Divider board fell into bus of PMH switching unit on Christopher Dr.
July 15	Foreign Interference	2,253	Crane Contact – MacDonald Ave.
Dec. 8	Defective Equipment	2,211	Failed termination at U/G Riser – Dundas St. at Samuelson St.
March 5	Defective Equipment	2,140	Pole Fire – Harmony Rd.
Nov. 29	Defective Equipment	1,444	Tracking of PMH switching unit – Christopher Dr
May 18	Defective Equipment	1,374	Pole Fire – Walker St.
Sept. 14	Trees	660	Tree contact during high
Dec. 26	Defective Equipment	587	Blown elbow in vault – Blair Lane
April 12	Defective Equipment	573	Faulty secondary connections in submersible transformer vault on Preston Parkway.

In 2008, there were 200 unplanned outages resulting in a total of 28,931 Customer-Hours of power interruptions. The top ten outages accounted for 16,428 Customer-Hours or 57% of the total of unplanned outages in 2008.

Top Ten Unplanned Outages in 2009

Date	Cause	Cust-Hours Lost	Details
March 15	Defective Equipment	2,253	Failed lightning arrester at customer owned station - Hespeler Road
Feb. 12	Trees	637	Large tree came down –Clyde Rd
Aug. 6	Foreign Interference	622	Animal Contact – Franklin Blvd.

Date	Cause	Cust-Hours Lost	Details
Aug. 20	Lightning	600	Thunderstorm – Cheese Factory Rd.
March 6	Defective Equipment	586	Blown J3 and elbow – Petty Pl. (Galt Core Area)
July 11	Lightning	557	Blown transformer – Bayne Cr.
April 15	Foreign Interference	549	Animal Contact – South Galt
May 6	Foreign Interference	488	Motor Vehicle Accident – Greenfield Rd.
Sept. 2	Loss of Supply	464	Stolen Grounding –Wolverton DS
Dec. 11	Defective Equipment	457	Failed transformer – Aldridge Cr.

In 2009, there were 195 unplanned outages resulting in a total of 16,369 Customer-Hours of power interruptions. The top ten outages accounted for 7,213 Customer-Hours or 44% of the total of unplanned outages in 2009.

Top Ten Unplanned Outages in 2010

Date	Cause	Cust-Hours Lost	Details
May 9	Trees	13,371	Tree on lines during high winds- Townline Rd.
July 28	Trees	7,873	Tree on lines during thunderstorm – Main St.
August 9	Defective Equipment	4,235	Two broken SMD-20 switches – West River Rd.
March 25	Foreign Interference	2,773	Motor vehicle accident – Townline Rd.
March 12	Defective Equipment	1,696	Broken insulator – Balmoral Dr.
May 2	Defective Equipment	1,125	Capacitor bank failure – Pinebush Rd.
June 5	Defective Equipment	978	Broken insulator – Swan St.
May 20	Foreign Interference	805	Animal contact at customer owned station – Eagle St.

Date	Cause	Cust-Hours Lost	Details
May 9	Trees	797	Tree on lines during high winds- Blair Rd.
July 11	Trees	719	Tree on lines during thunderstorm – Adam St.

In 2010, there were 151 unplanned outages resulting in a total of 43,897 Customer-Hours of power interruptions. The top ten outages accounted for 34,372 Customer-Hours or 78% of the total of unplanned outages in 2010.

Top Ten Unplanned Outages in 2011

Date	Cause	Cust-Hours Lost	Details
August 24	Trees	4,300	Trees into lines in several areas during violent thunderstorm
April 17	Defective Equipment	3,002	Broken insulator – Dundas St.
April 20	Trees	2,591	Tree into double circuit line during electrical storm – Hespeler Rd.
January 21	Defective Equipment	2,135	Broken insulator – Grand Ridge Dr.
August 16	Defective Equipment	1,662	Broken loadbreak switch – Balmoral Rd.
March 11	Loss of Supply	1,538	Pole fire – Wolverton DS
August 26	Foreign Interference	1,191	Transport truck contacted pole – Morrison Rd.
July 2	Defective Equipment	1,051	Blown J4 connection in underground vault – Coronation Blvd.
July 29	Defective Equipment	911	Pole fire – Rear of Galt TS
Sept. 7	Defective Equipment	788	Load break elbow failure – Poplar Dr.

In 2011, there were 195 unplanned outages resulting in a total of 33,349 Customer-Hours of power interruptions. The top ten outages accounted for 22,647 Customer-Hours or 68% of the total of unplanned outages in 2011.

Top Ten Unplanned Outages in 2012

Date	Cause	Cust-Hours Lost	Details
May 4	Adverse Weather	8,106	Severe thunderstorms move through service area.
Oct. 19	Trees	4,605	Tree into lines – Highway 8
July 25	Defective Equipment	3,631	Elbow failure at switching unit – Saginaw Parkway
July 5	Loss of Supply	3,329	65M17 breaker locked out for unknown cause. Hydro One equipment failure caused extended outage
Feb. 29	Defective Equipment	2,920	Broken pole during freezing rain- Melair Dr.
April 21	Defective Equipment	2,851	Broken insulator – Clyde Rd.
Aug. 4	Defective Equipment	2,511	Failure of Scada-Mate switch during switching – Rear of Pinebush Rd.
Sept. 4	Foreign Interference	2,489	Pole contact by roofing truck – Winston Blvd.
Jan. 28	Foreign Interference	1,909	Motor vehicle accident – Spragues Rd.
Feb. 16	Defective Equipment	1,505	Failed switch – Galt core area

In 2012, there were 169 unplanned outages resulting in a total of 51,956 Customer-Hours of power interruptions. The top ten outages accounted for 33,856 Customer-Hours or 65% of the total of unplanned outages in 2012.

Aggregate outage information which includes outages affecting one customer through outages affecting thousands of customers is detailed below by cause code.

Customer Hours Lost By Cause

Cause	2008	2009	2010	2011	2012
0 - Unknown / Other	1511.1	1525.7	3193.7	3192.9	2697.1
1 - Scheduled	5662.6	9702.4	5304.8	4645.1	3383.1
2 - Loss of Supply	1094.6	712.5	40.5	2179.5	3340.9
3 - Tree Contacts	3871.8	1357.3	23925.2	7758.3	7206.3
4 - Lightning	1351.1	2511.1	52.9	1176.5	487.5
5 - Defective Equipment	14273.0	2637.1	10535.6	12490.4	15342.2
6 - Adverse Weather	561.4	223.9	100.5	1396.6	11667.5
7 - Adverse Environment	162.0	0.0	0.0	0.0	0.0
8 - Human Element	0.0	0.0	388.5	0.0	277.4
9 - Foreign Interference	5949.7	7401.9	5658.4	5093.9	10953.3
	34437.5	**26071.7**	**49200.2**	**37933.2**	**55355.2**

System Interruptions By Cause

Cause	2008	2009	2010	2011	2012
0 - Unknown / Other	24	26	28	34	20
1 - Scheduled	119	90	94	74	91
2 - Loss of Supply	3	5	1	5	2
3 - Tree Contacts	19	16	21	24	21
4 - Lightning	27	33	4	13	11
5 - Defective Equipment	57	38	44	46	38
6 - Adverse Weather	4	4	3	10	10
7 - Adverse Environment	1	0	0	0	0
8 - Human Element	0	0	2	0	1
9 - Foreign Interference	65	73	47	62	67
	319	**285**	**244**	**268**	**261**

Customer Interruptions By Cause

Cause	2008	2009	2010	2011	2012
0 - Unknown / Other	4428	8077	4484	8337	12955
1 - Scheduled	5482	7894	4723	3412	5078
2 - Loss of Supply	2194	984	16	5554	3015
3 - Tree Contacts	3752	704	15978	22257	9312
4 - Lightning	4222	5785	81	524	160
5 - Defective Equipment	23608	3116	11014	22371	11824
6 - Adverse Weather	402	79	60	319	12562
7 - Adverse Environment	81	0	0	0	0
8 - Human Element	0	0	16	0	4012
9 - Foreign Interference	8932	22361	6727	9631	18188
	53101	**49000**	**43099**	**72405**	**77106**

ANALYSIS

The years 2008 and 2009 were characterized by moderate weather. The Customer-Hours lost due to tree contacts (which are greatly impacted by weather), lightning and adverse weather were low as compared to later years.

Nearly half of the Customer-Hours lost in 2010 were due to trees. Two tree events in 2010 resulted in 21,244 Customer-Hours lost or 81% of the total number of Customer-Hours lost in 2009. These trees fell into CND's lines during severe winds and the events were not as a result of insufficient tree trimming. These two tree events represent most of the reliability performance decline in 2010.

Reliability performance in terms of SAIDI improved in 2011 as compared to 2010 primarily because of fewer outages caused by trees. SAIFI deteriorated significantly in 2011 as the outages that occurred affected a larger number of customers. As a result, the number of Customer-Interruptions increased 68% from 2010.

2012 SAIDI and SAIFI Reliability Performance declined from 2011. 8,106 Customer-Hours lost (or 14.6% of the annual total) was due to severe thunderstorms on May 4, 2012. A series of equipment failure outages in the Galt Core Area in February/March, 2012 resulted in 2,703 Customer-Hours of interruption. Half of the top ten outages in 2012 were due to Defective Equipment resulting in the highest number of Customer-Hours lost due to Defective Equipment in the five year period. The number of Customer-Interruptions increased 6.5% from 2011.

Loss of Supply figures increased significantly in 2011 and 2012 due to a pole fire at Hydro One owned Wolverton DS in 2011 and due to an equipment failure at Galt TS in 2012.

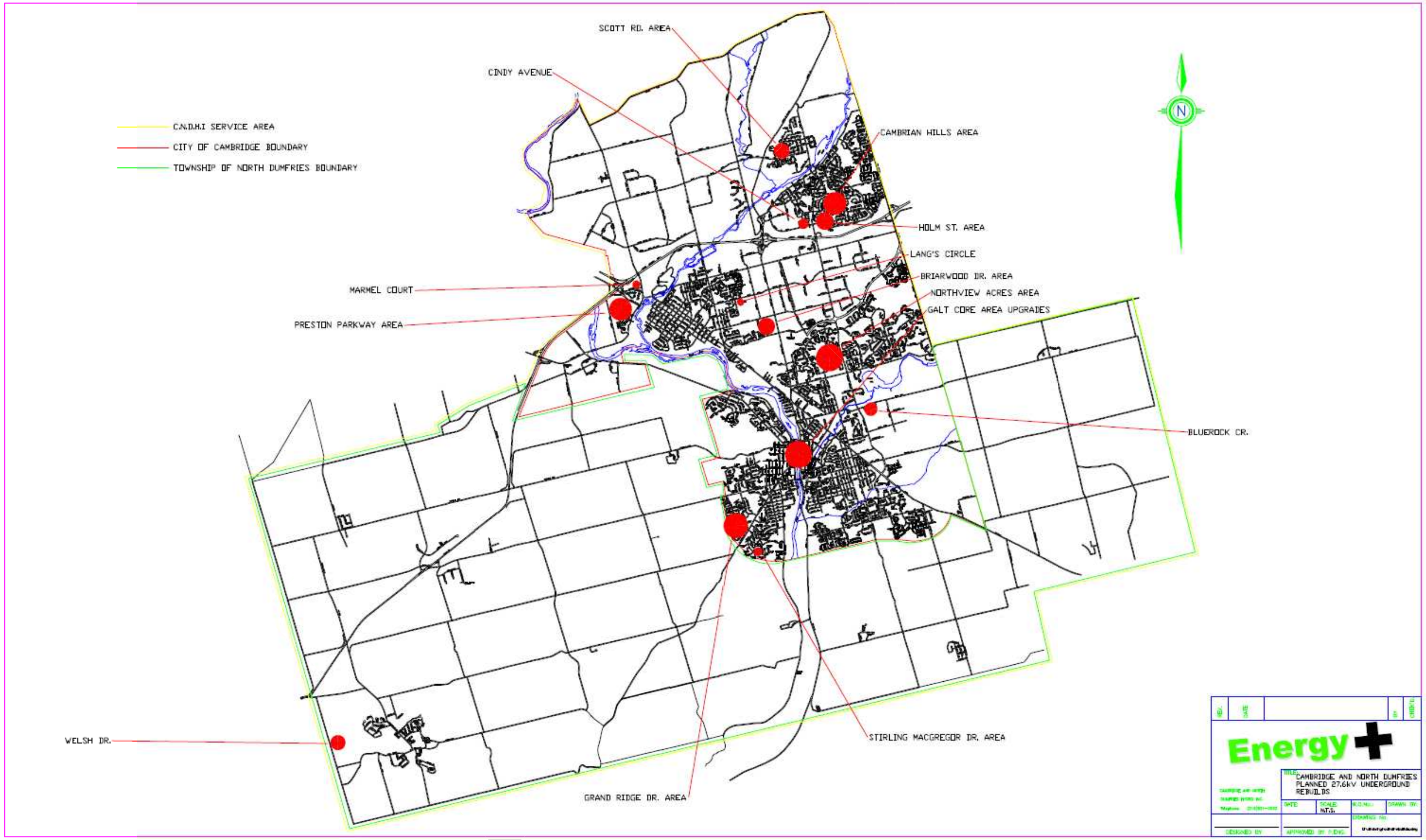
GOING FORWARD

CND's Distribution System Capital Plan provides the detailed justification for future planned expenditures. Many of the projects relate directly back to system events over the past five years. CND is continuing to divide up its 27.6 kV feeders with the installation of remotely operated SCADA switches to reduce the length of outages. CND is reconfiguring 27.6 kV feeders in the South end of the City of Cambridge to reduce the number of customers affected by a 27.6 kV feeder lockout in this area. CND is pro-actively changing out "end of life" wood poles and equipment prior to failure through overhead rebuild projects and spot replacements. CND is installing single phase 16 kV reclosers to prevent sustained outages to rural customers for temporary faults on the distribution system. CND is investing in renewal of its underground distribution system in the Galt Core Area to get reliability performance back to an acceptable level for area businesses and residents. CND is replacing "end of life" underground primary cable in residential subdivisions that were developed in the 1970's to maintain acceptable reliability performance for affected customers. CND is replacing porcelain post type insulators and SMD-20 fused cutouts which have been a source of significant outages. CND is investing in additional animal protection on its equipment where feasible to prevent power interruptions. CND has a planned program to replace failure prone PMH style switching units.

CND will continue to monitor reliability performance and invest where necessary to meet customer expectations for power reliability and quality.

APPENDIX G

MATERIAL UNDERGROUND RENEWAL PROJECTS. LARGE SCALE PAPER MAP



C.N.D.H.I SERVICE AREA
CITY OF CAMBRIDGE BOUNDARY
TOWNSHIP OF NORTH DUMFRIES BOUNDARY
SCOTT RD. AREA
CINDY AVENUE
CAMBRIAN HILLS AREA
HOLM ST. AREA
LANG'S CIRCLE
BRIARWOOD DR. AREA
NORTHVIEW ACRES AREA
GALT CORE AREA UPGRADES
MARMEL COURT
PRESTON PARKWAY AREA
BLUEROCK CR.
WELSH DR.
STIRLING MACGREGOR DR. AREA
GRAND RIDGE DR. AREA
N
Energy+
CAMBRIDGE AND NORTH DUMFRIES PLANNED 27.6kV UNDERGROUND REBUILDS

APPENDIX H

OPA Reply For Section 1.2 [5.2.2] Coordinated Planning With Third Parties

AESI

OPA Letter of Comment:

Cambridge and North Dumfries Hydro Inc.

System Capability Assessment for Renewable Energy Generation as part of its Distribution System Plan

July 31, 2013

ONTARIO POWER AUTHORITY

Introduction

On March 28, 2013, the Ontario Energy Board (the OEB" or "Board) issued its Filing Requirements for Electricity Transmission and Distribution Applications; Chapter 5 – Consolidated Distribution System Plan Filing Requirements (EB-2010-0377). Chapter 5 implements the Board's policy direction on 'an integrated approach to distribution network planning', outlined in the Board's October 18, 2012 Report of the Board - A Renewed Regulatory Framework for Electricity Distributors: A Performance Based Approach.

As outlined in the Chapter 5 filing requirements, the Board expects that the Ontario Power Authority (OPA) comment letter will include:

- the applications it has received from renewable generators through the FIT program for connection in the distributor's service area;
- whether the distributor has consulted with the OPA, or participated in planning meetings with the OPA;
- the potential need for co-ordination with other distributors and/or transmitters or others on implementing elements of the REG investments; and
- whether the REG investments proposed in the DS Plan are consistent with any Regional Infrastructure Plan.

Cambridge and North Dumfries Hydro Inc. – Distribution System Plan

The OPA received a System Capability Assessment for Renewable Energy Generation (Assessment) from Cambridge and North Dumfries Hydro Inc. (CND) on June 25, 2013. The Assessment is included as part of Section 5.4.3 in CND's Distribution System Plan. The OPA has reviewed the Assessment of CND and has provided its comments below.

OPA FIT/microFIT Applications Received

On page 4 of its Assessment, CND indicates that currently it has 16 connected FIT projects for a total of 2,685 kW (2.69 MW) and 138 connected microFIT projects for a total of 1,096 kW (1.10 MW) (together the total connected capacity equals 3.79 MW of renewable generation). The Assessment also indicates that as of March 5, 2013, CND has received 69 FIT applications, representing a total of 16,456 kW, and 79 microFIT applications, representing a total of 736 kW.

According to OPA's information, prior to July 3, 2013, the OPA has received, and offered contracts to 26 FIT applications. Of these, 15 FIT applications totalling 2.67

MW have come into commercial operation and 11 FIT applications totalling 2.63 MW remain active as of July 2013.

In addition to the above, the OPA offered contracts to 15 small FIT projects totalling 4.44 MW on July 3, 2013, through the latest round of contract offers in the FIT program.

With respect to microFIT projects located in CDN's distribution area, the OPA has received, and offered contracts to 156 microFIT applications, totalling approximately 1.24 MW of capacity.

The OPA finds that CND's Assessment is reasonably consistent with the OPA's information regarding renewable energy generation applications to date.

Consultation / Participation in Planning Meetings

As indicated on page 2 of the CND Assessment, in 2010, a Kitchener-Waterloo-Cambridge-Guelph (KWCG) area working group was established to develop a regional plan to address the electricity supply and reliability needs of the KWCG area. The working group consists of members from the OPA, the Independent Electricity System Operator, Hydro One Networks, Kitchener-Wilmot Hydro, Waterloo North Hydro, Guelph Hydroelectric Systems, and Cambridge and North Dumfries Hydro. Between 2010 and 2013, the KWCG working group has held a number of planning meetings to discuss the electricity supply and reliability needs of the KWCG area, of which CND has been an active participant.

Consistency with Regional Plans

At this time, neither a Regional Infrastructure Plan, nor an Integrated Regional Resource Plan (IRRP) has been completed for CND's service territory. As discussed on page 2 of the CND Assessment, a draft of the KWCG working group report (the KWCG area IRRP) has been prepared. CND has not identified any renewable energy generation investments in its Assessment, which is consistent with the draft KWCG area IRRP. The draft KWCG area IRRP was filed by Hydro One Networks Inc. in its Guelph Area Transmission Refurbishment Project application before the Ontario Energy Board. To access a copy, please see EB-2013- 0053, Exhibit I-2-30, Attachment 1, page 302 of the following link:
http://www.rds.ontarioenergyboard.ca/webdrawer/webdrawer.dll/webdrawer/rec/396926/view/HONI_I_RR_GATR_20130516.PDF

Distribution System Plan

The OPA appreciates the opportunity to comment on the information provided as part of the Cambridge and North Dumfries Hydro Inc. Distribution System Plan.

APPENDIX I

CND - ESA Audit Letter

AESI
Acumen Engineered Solutions International Inc.

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775 Main St. East, Suite 1B
Milton, Ontario, Canada L9T 3Z3
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website: www.aesi-inc.com

May 9, 2013

RECEIVED
MAY 1 3 2013
ENGINEERING DEPT.
CAMBRIDGE AND NORTH
DUMFRIES HYDRO INC.

Mr. Ron Sinclair, P. Eng.,
Director of Engineering,
Cambridge and North Dumfries Hydro Inc.,
1500 Bishop St.
Cambridge, ON N1R 5X6

Dear Ron:

Please find enclosed two copies of my report on the O. Reg. 22/04 audit carried out on May 7 and 8, 2013 for Cambridge and North Dumfries Hydro Inc. Your system was found to be in very good compliance with the regulation. There are no areas of noncompliance or need improvements identified in this audit.

ESA will request that you submit your audit report for review. The audit findings may be reviewed with ESA at a follow up meeting.

Thank you for your hospitality. I very much enjoyed working with you and your staff. I found everyone I encountered professional, helpful, forthcoming with available information and generous with his or her valuable time.

Please contact me if you have any questions on this report or require any additional information.

Yours truly,

Kris Paszkowiak, P. Eng.

APPENDIX J

CND Residential and Industrial Development Report – 2013-08

Residential and Industrial Development Report

August, 2013

Prepared by: Ron Sinclair, P.Eng.
V.P. Engineering

Residential and Industrial Development Report

Growth is a significant driver of projects in CND's capital budget. These projects fall into the category of "System Access". This report will look back at past growth and look ahead to project future growth requirements in the 2014 to 2018 capital forecast. Growth is very much related to the strength of the economy. On July 17, 2013, the Bank of Canada made the following statement.

"In Canada, economic growth is expected to be choppy in the near term, owing to unusual temporary factors, although the overall outlook is little changed from the Bank's projection in its April Monetary Policy Report *(MPR). Annual GDP growth is projected to average 1.8 per cent in 2013 and 2.7 per cent in both 2014 and 2015, supported by very accommodative financial conditions."*

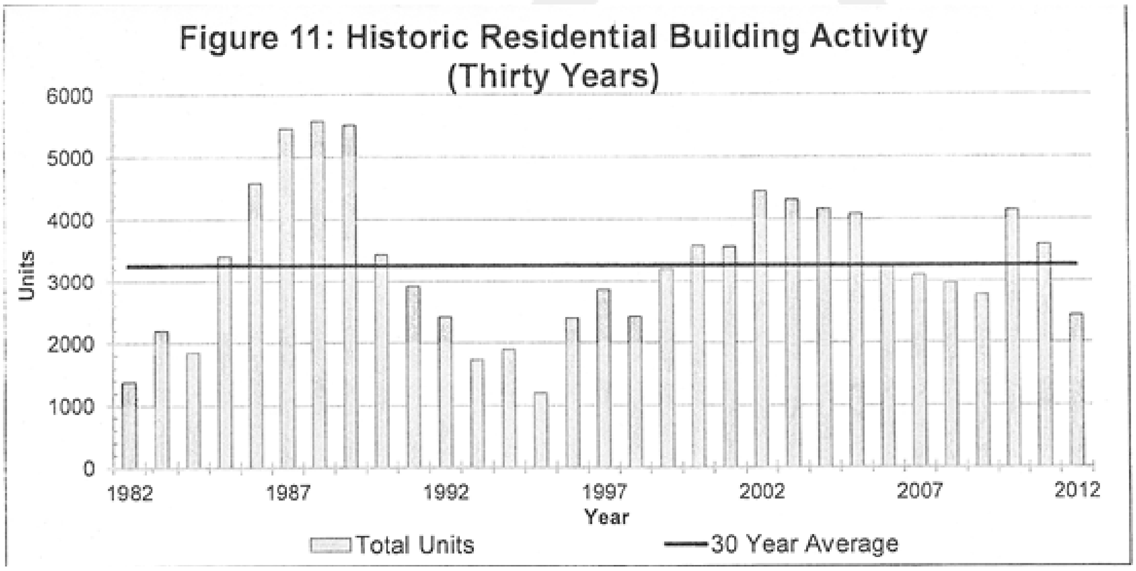
Therefore, growth is expected to pick up in 2014 and 2015 from its current level.

The City of Cambridge and the Township of North Dumfries are located in the Region of Waterloo (ROW). The ROW is included in the Province of Ontario's "Places to Grow" Act. Using ROW published population numbers, the City of Cambridge is expected to grow from its current population of 132,900 to 173,000 by 2029. The Township of North Dumfries is expected to grow from its current population of 9,410 to 16,000 by 2029. Therefore, within CND's service area, most of the residential growth will occur in the City of Cambridge.

Residential

Long Term Trends

The ROW tracks residential building activity on a long term basis. A graph of Region wide building permit activity is shown below.



Source: ROW 2012 Building Permit Activity and Growth Monitoring Report dated March 19, 2013

The ROW provides the following commentary.

The graph clearly shows the cyclical nature of residential building activity, which reflects many factors including demand, housing prices and mortgage rates. The long-term annual average over the 30-year period of new residential units is 3,250. The residential permit activity in 2012, at 2,433 new units, was 25% below the long term average.

Recent Data

The significant annual variation in building permit activity make long term predictions difficult. For CND's purposes, it is helpful to look at recent data drilled down to the two main communities that it services (City of Cambridge and Township of North Dumfries). Below is the data using ROW annual Building Permit Activity and Growth Monitoring Reports.

Single Detached Units

	2009	2010	2011	2012
Cambridge	366	300	221	147
North Dumfries	39	42	51	40
ROW Total	1,389	1,409	1,334	943

Semi Detached Units

	2009	2010	2011	2012
Cambridge	3	0	3	1
North Dumfries	0	0	20	18
ROW Total	156	142	91	121

Townhouse Units

	2009	2010	2011	2012
Cambridge	136	80	76	109
North Dumfries	0	0	34	18
ROW Total	516	533	301	480

Apartment Units

	2009	2010	2011	2012
Cambridge	237	234	132	41
North Dumfries	0	0	0	0
ROW Total	704	2,054	1,860	889

Total Residential Units

	2009	2010	2011	2012
Cambridge	742	614	432	298
North Dumfries	39	42	105	76
ROW Total	2,765	4,138	3,586	2,433

As can be seen from the recent data, there has been a significant drop in residential building activity in the City of Cambridge between 2009 and 2012. That has been due to several factors. The 2008/2009 recession impacted the Cambridge economy. Over one quarter of the Cambridge labour force is employed in manufacturing [Source: City of Cambridge]. There are also fewer lots available in the area adjacent to Highway 401 which is a prime area for commuters.

Single detached, semi detached and townhouse units are supplied by CND with single phase power at 120/240 Volts. Most apartment (and high rise condo) units are supplied with three phase power at either 120/208 Volts or 347/600 Volts. They are budgeted in different categories. Therefore the total of single detached, semi detached and townhouse units is summarized below.

Total Single Detached, Semi Detached and Townhouse Units

	2009	2010	2011	2012
Cambridge	505	380	300	257
North Dumfries	39	42	105	76
ROW Total	2,061	2,084	1,726	1,544
Cambridge and North Dumfries Total	544	422	405	333

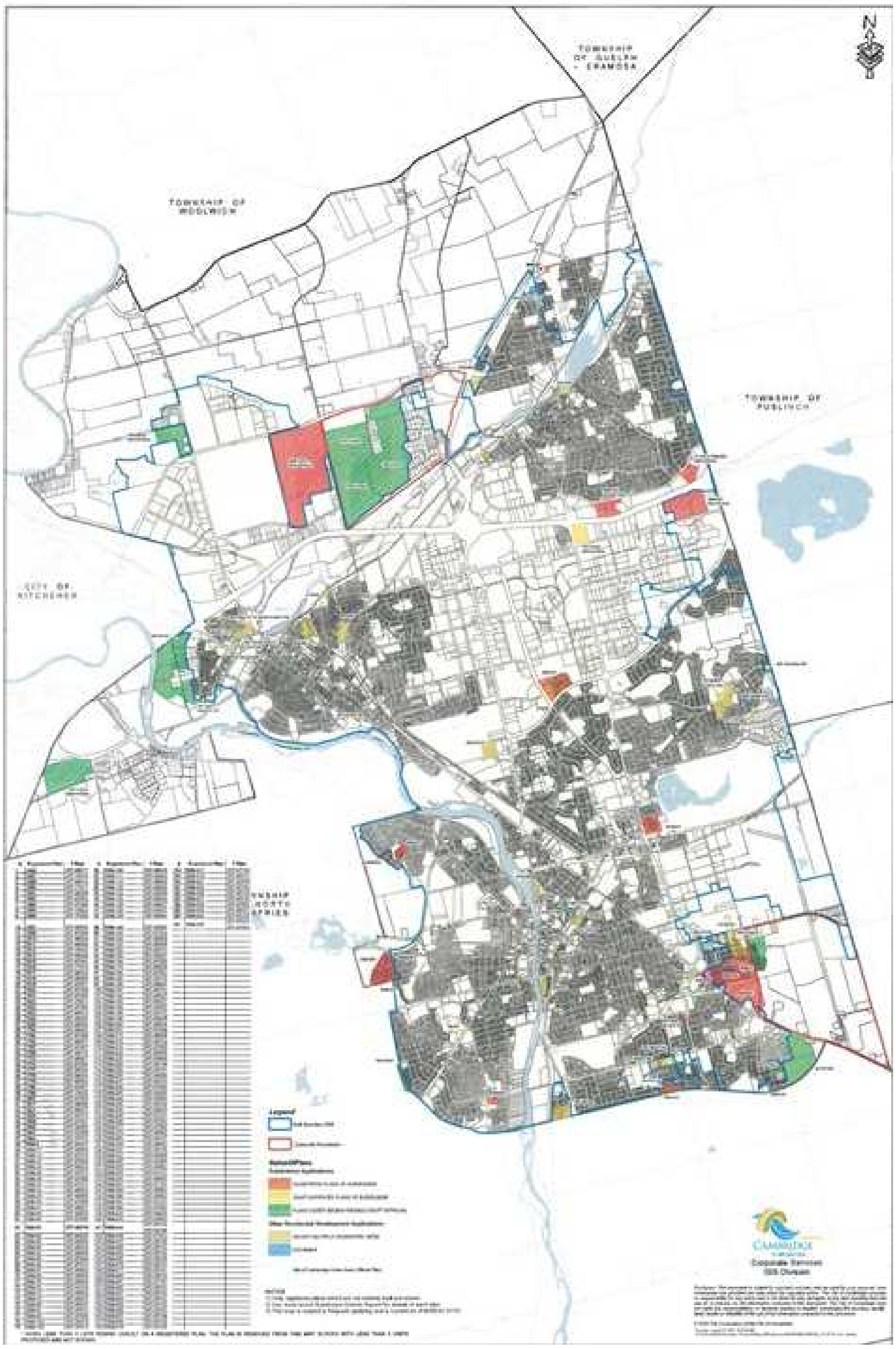
Residential development has continued to be slower than in many past years during 2013. As of March 31, 2013, there were 248 single detached units, 0 semi-detached units, 28 row house units and 193 apartment units in existing registered plans that were unbuilt based on a City of Cambridge report. The same report identified another 3,933 residential units in draft approved or pending plans of subdivision. In addition, there are 2,403 unbuilt residential units in vacant multiple residential blocks in built out subdivisions.

A “Status of Plans of Subdivisions” map provided by the City of Cambridge is attached. The shaded red areas are existing registered plans of subdivision. Much of the current growth is coming from these areas. Specifically, the South East Galt area bounded by Franklin Boulevard, Main Street, Highway 8 and the East limit of the City boundary is being actively developed (Maple Crown and Green Gate subdivisions). There is some land still being developed along the South boundary (ie. Gouda Place). On the West side of Cambridge, there is residential activity in Grand Ridge Estates (Freure Dr, Hardcastle Dr., Cox St.) and on Blossomfield Crescent.

As well, current growth is coming from multiple residential sites shown in a gold colour. Examples include Margaret Street and Lawrence Street in the Preston area of Cambridge and Saginaw Parkway and Lena Crescent in the Galt area of Cambridge. Some of the development is townhouses and some of it is apartments.

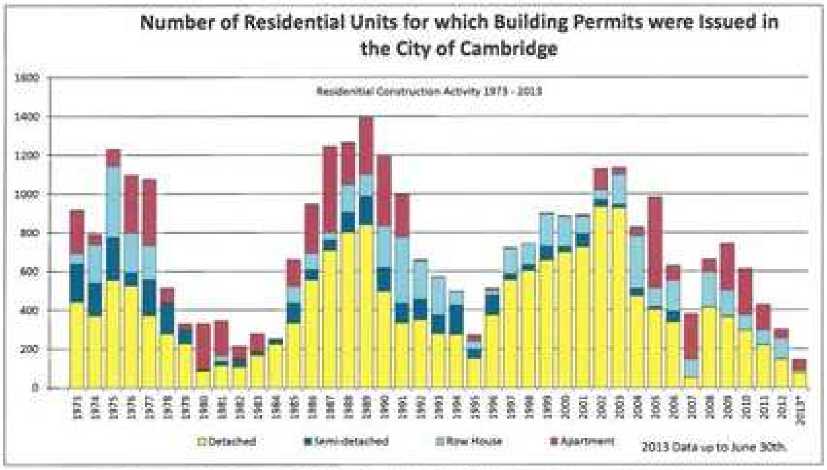
Significant future growth will come from planned subdivisions in the Hunt Club area (East side of Speedsville Road North of Highway 401) where over 1,800 residential units are proposed. Other main areas of residential growth include the South East Galt Area where over 900 residential units are proposed in the near term with more to follow and the Limerick Road area in the Preston part of Cambridge where over 700 residential units are proposed.

STATUS OF PLANS OF SUBDIVISIONS



Going back to 1973, residential construction activity in the City of Cambridge has been as low as 213 units per year and as high as 1,392 units per year [Source: City of Cambridge]. The information is shown below. Averages per unit type are as below:

	Detached	Semi-Detached	Row House	Apartment
30 year average	422	67	118	133
10 year average	365	12	138	157
5 year average	290	1	117	143



Number of Residential Units for which Building Permits were Issued in the City of Cambridge

RESIDENTIAL CONSTRUCTION ACTIVITY 1973 - 2013*

Year	Detached Units	%	Semi-detached Units	%	Row House Units	%	Apartment Units*	%	Total Units	%
1973	447	48.7%	194	21.1%	55	6.0%	222	24.2%	918	100.0%
1974	373	47.3%	168	21.3%	199	25.2%	49	6.2%	789	100.0%
1975	559	45.3%	216	17.5%	369	29.9%	89	7.2%	1233	100.0%
1976	529	48.2%	64	5.8%	207	18.9%	298	27.1%	1098	100.0%
1977	374	34.8%	184	17.1%	179	16.6%	339	31.5%	1076	100.0%
1978	281	54.4%	160	30.9%	0	0.0%	76	14.7%	517	100.0%
1979	230	69.3%	72	21.7%	0	0.0%	30	9.0%	332	100.0%
1980	85	25.5%	14	4.2%	0	0.0%	234	70.3%	333	100.0%
1981	118	34.1%	18	5.2%	32	9.2%	178	51.4%	346	100.0%
1982	110	51.6%	40	18.8%	0	0.0%	63	29.6%	213	100.0%
1983	169	60.4%	17	6.1%	0	0.0%	94	33.6%	280	100.0%
1984	225	88.2%	28	11.0%	0	0.0%	2	0.8%	255	100.0%
1985	335	50.5%	104	15.7%	86	13.0%	139	20.9%	664	100.0%
1986	559	59.0%	48	5.1%	90	9.5%	251	26.5%	948	100.0%
1987	711	57.1%	50	4.0%	40	3.2%	445	35.7%	1246	100.0%
1988	803	63.4%	102	8.1%	146	11.5%	216	17.0%	1267	100.0%
1989	847	60.8%	138	9.9%	117	8.4%	290	20.8%	1392	100.0%
1990	500	42.0%	118	9.9%	220	18.5%	353	29.6%	1191	100.0%
1991	336	33.7%	100	10.0%	342	34.3%	219	22.0%	997	100.0%
1992	351	53.0%	106	16.0%	200	30.2%	5	0.8%	662	100.0%
1993	282	49.1%	92	16.0%	198	34.5%	2	0.3%	574	100.0%
1994	277	55.5%	150	30.1%	69	13.8%	3	0.6%	499	100.0%
1995	154	56.0%	42	15.3%	48	17.5%	31	11.3%	275	100.0%
1996	375	73.0%	102	19.8%	26	5.1%	11	2.1%	514	100.0%
1997	559	77.3%	26	3.6%	135	18.7%	3	0.4%	723	100.0%
1998	605	81.3%	32	4.3%	106	14.2%	1	0.1%	744	100.0%
1999	662	73.4%	68	7.5%	169	18.7%	3	0.3%	902	100.0%
2000	702	79.1%	26	2.9%	157	17.7%	3	0.3%	888	100.0%
2001	729	81.6%	64	7.2%	92	10.3%	8	0.9%	893	100.0%
2002	937	82.9%	32	2.8%	54	4.8%	107	9.5%	1130	100.0%
2003	931	82.0%	14	1.2%	156	13.7%	35	3.1%	1136	100.0%
2004	477	57.3%	34	4.1%	273	32.8%	48	5.8%	832	100.0%
2005	403	41.0%	12	1.2%	101	10.3%	467	47.5%	983	100.0%
2006	340	53.7%	52	8.2%	165	26.1%	76	12.0%	633	100.0%
2007	52	13.7%	0	0.0%	96	25.3%	232	61.1%	380	100.0%
2008	415	62.3%	0	0.0%	182	27.3%	69	10.4%	666	100.0%
2009	367	49.3%	2	0.3%	137	18.4%	238	32.0%	744	100.0%
2010	297	48.5%	0	0.0%	80	13.1%	235	38.4%	612	100.0%
2011	221	51.3%	2	0.5%	76	17.6%	132	30.6%	431	100.0%
2012	149	49.7%	0	0.0%	109	36.3%	42	14.0%	300	100.0%
2013*	76	52.1%	0	0.0%	14	9.6%	56	38.4%	146	100.0%
10 year average	365	54.4%	12	1.7%	138	20.5%	157	23.4%	672	100.0%
5 year average	290	52.6%	1	0.1%	117	21.2%	143	26.0%	551	100.0%
39 year average	422	57.0%	67	9.1%	118	15.9%	133	18.0%	740	100.0%

Note:Apartment figures include units created through the conversion of existing dwellings to create additional units as well as mixed residential uses (e.g. dwelling units above commercial uses).
*2013 figures reflect units up to June 30th and are NOT included in averages.

The Township of North Dumfries Official Plan projects that over 70% of the residential growth will be located in the village of Ayr. The remainder of the growth will be located in rural settlement areas and more broadly in rural areas.

Residential Growth Impact on 2013 to 2018 Capital Plan

The largest impact of residential growth to CND's 2013 to 2018 capital plan is in the budget category of "Servicing Residential Underground". All of the new residential subdivisions in the City of Cambridge and the Township of North Dumfries are constructed underground using 28 kV primary cable and mini-pad transformers and 120/240 Volt services. The budget category "Servicing Industrial Underground" includes institutional, high rise apartment/condo towers and senior citizen developments so they are not reflected in "Servicing Residential Underground". These types of developments typically require large three phase services.

CND minimizes the risk to itself and customers by requiring that the developer fund 100% of the initial servicing cost. CND provides rebates to the developer only after the electric meter is installed on the constructed residential unit. The rebate amount is based on CND's Economic Evaluation Policy which has been drafted in accordance with the Distribution System Code. For 2013, the rebate amount per residential detached, semi-detached or townhouse unit is $1,633. The amount varies per year.

Given the slowdown in residential development, CND has estimated approximately 500 new detached, semi detached and townhouse units per year maintaining $729,000 in CND investment and $1,271,000 in developer investment throughout the 2013 to 2018 time period. If activity returns to pre 2008/2009 recession normal amounts and new residential land becomes developed as expected then investment will be higher.

CND has budgeted $250,000 in 2015 and $250,000 in 2017 to extend 27.6 kV overhead lines to new residential subdivision developments. This work is funded by a deduction in the Economic Evaluation Policy residential rebate amount. In 2013, $234 per detached, semi detached and townhouse unit is retained to cover external line costs based on an historical average cost which is updated yearly. The rebate amount prior to this deduction is $1,867 in 2013.

$50,000 is budgeted per year in “Servicing Residential Overhead” for new overhead residential services. Most of this activity occurs in rural areas or where there is in-fill of new residential units in an area with existing overhead distribution.

Residential development also impacts our total system load and the requirement for a new transformer station however much less so than industrial load given that almost all new residential development in CND’s service area is heated with natural gas.

Industrial

Long Term Trends

The City of Cambridge current report of “Industrial Sites and Buildings” states the following.

“Cambridge is an “Industrial City” with a history rich in industrial development dating back to the 1800’s. Planned industrial building lots were marketed as early as the mid 1800’s and established the cornerstone for the momentum in industrial development that exists today. Cambridge now has 4,315 acres of land zoned for industrial use.”

The City of Cambridge actively develops and markets parcels of industrial land to local, national and international companies. There are three main industrial business parks. Please refer to the attached map. The 300 acre Eastern Industrial Park is located in the South-East corner of the City and is substantially built-up.

The 1,300 acre L.G. Lovell Industrial Park is located on the South side of Highway 401. It is substantially built-up but there are a number of vacant industrial buildings for sale or lease. The 850 acre Cambridge Business Park is located North of Highway 401 adjacent to the 400 acre Toyota Motor Manufacturing Canada assembly plant. The Boxwood Industrial Subdivision is the latest phase of the Cambridge Business Park and makes available 110 acres of serviced industrial land in 2013.

Below is the history of City of Cambridge Industrial Land Sales [Source: City of Cambridge].

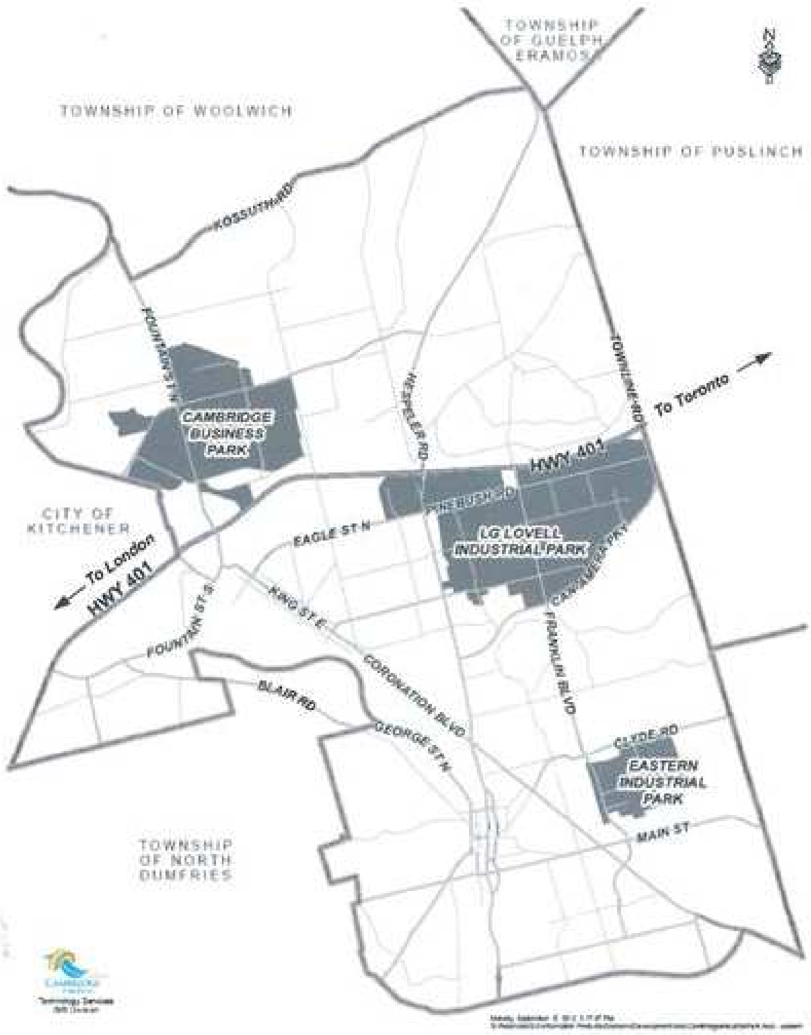
Year	Total Closed Land Sales (Acres)
2013	0 (to date)
2012	7.9
2011	14.5
2010	2.6
2009	0
2008	11.9
2007	19.8
2006	29.6
2005	36.8
2004	44.8
2003	57.4

2002	58.7
2001	91.1
2000	189.7

SITES
AND
BUILDINGS

CAMBRIDGE

CAMBRIDGE INDUSTRIAL PARKS – OVERVIEW MAP



ECONOMIC
DEVELOPMENT
DIVISION

7

CITY
OF
CAMBRIDGE

As can be seen from the history, there is significant variation in land sales year to year. The economy is a major factor. In recent years, the City has not had land available to sell. That has changed in 2013 with the Boxwood Industrial Subdivision providing 110 acres of new serviced industrial land. There is also some private industrial land development in the City of Cambridge.

In the Township of North Dumfries, most recent industrial development has occurred at the intersection of Highway 401 and Cedar Creek Road. Additional development is proposed in that area.

Outside of the major industrial development areas, there is non-residential (ie. commercial and institutional) growth. Conestoga College developed a Cambridge campus in 2011 that has space for future growth. The Dunfield Theatre opened in the spring of 2013. Ongoing residential development creates the need for new schools (ie. St. Gabriel School in the Hespeler area of Cambridge presently under construction and planned to open in 2014). Ongoing commercial development (ie. new Lowe's store presently under construction) and redevelopment particularly in the core areas is expected to continue.

There remains a significant inventory of vacant industrial buildings primarily as a result of the 2008/2009 recession. These buildings are already serviced and could quickly add to CND's system load if the economy continues to recover.

Looking beyond the current Boxwood Industrial Subdivision, significant industrial development is expected in the North-West part of the City of Cambridge in the "East Side Lands". Please refer to the attached page prepared by the Region of Waterloo for a public information meeting in January, 2013.

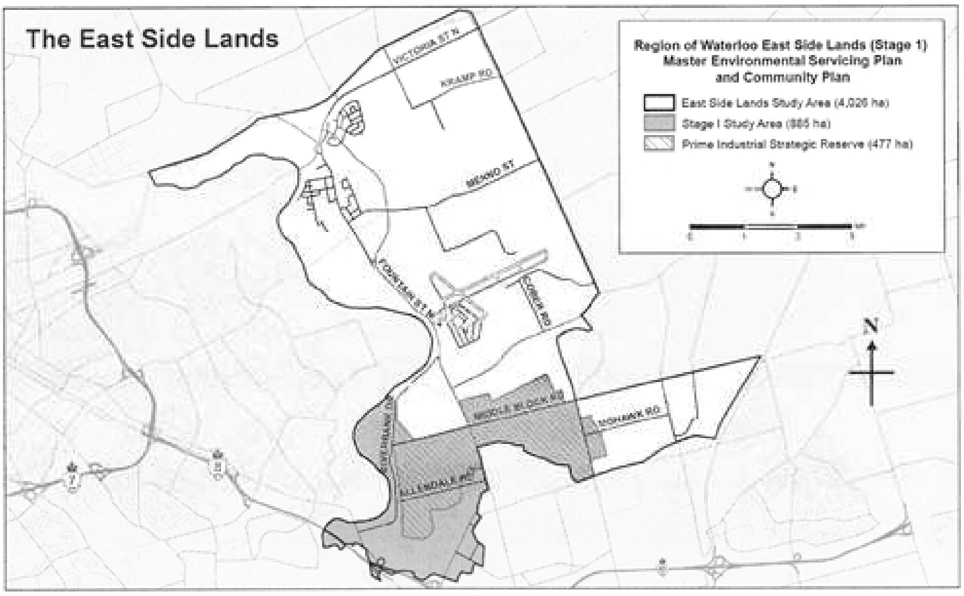
East Side Lands (Stage 1) Master Environmental Servicing Plan

Background

The Region of Waterloo, the City of Cambridge and the Grand River Conservation Authority, in consultation with the City of Kitchener and the Township of Woolwich, are preparing a **Master Environmental Servicing Plan (MESP) and Community Plan** to advance the development of the East Side Stage 1 Lands. These lands are being planned to bring approximately 300 net hectares (741 net acres) of additional large lot employment lands to development readiness within the Region of Waterloo. The lands are strategically positioned for future development due to their proximity to the Region of Waterloo International Airport, Highway 401 and major inter-regional roads (Highways 8 and 24).

Where are the East Side Lands?

In June 2003, the Regional Growth Management Strategy (RGMS) was approved by Regional Council. The RGMS is a long-term strategic framework which identifies where, when and how future residential and employment growth will be accommodated. One of the goals of the RGMS is to "foster a strong economy". The RGMS identified the lands around the Regional airport (known as the East Side Lands) as a future development area intended primarily for employment purposes.



- **The East Side Stage 1 Lands:** Lands identified as being the first stage of development within the broader East Side Lands. The Stage 1 study area includes the land designated for future employment development (the Prime Industrial Strategic Reserve land) as well as the Subwatershed Study Area. The Creekside Lands are within the Stage 1 Lands and also within the existing urban boundary.
- **The Prime Industrial Strategic Reserve Land (PISR):** The Regional Official Plan designates a 477 gross hectare (1178 gross acres) area as PISR to accommodate approximately 300 net hectares for future large lot employment use development.

Page 1

The development of the "East Side Lands" will have a major impact on CND. Timing is still uncertain but the Region of Waterloo advised in January, 2013 that "quick start lands could be ready for development in 2015".

Recent Data

A summary of recent CND spending on industrial development (which also includes institutional, commercial, high rise apartment/condo towers and senior citizen developments) is shown below.

Servicing Industrial

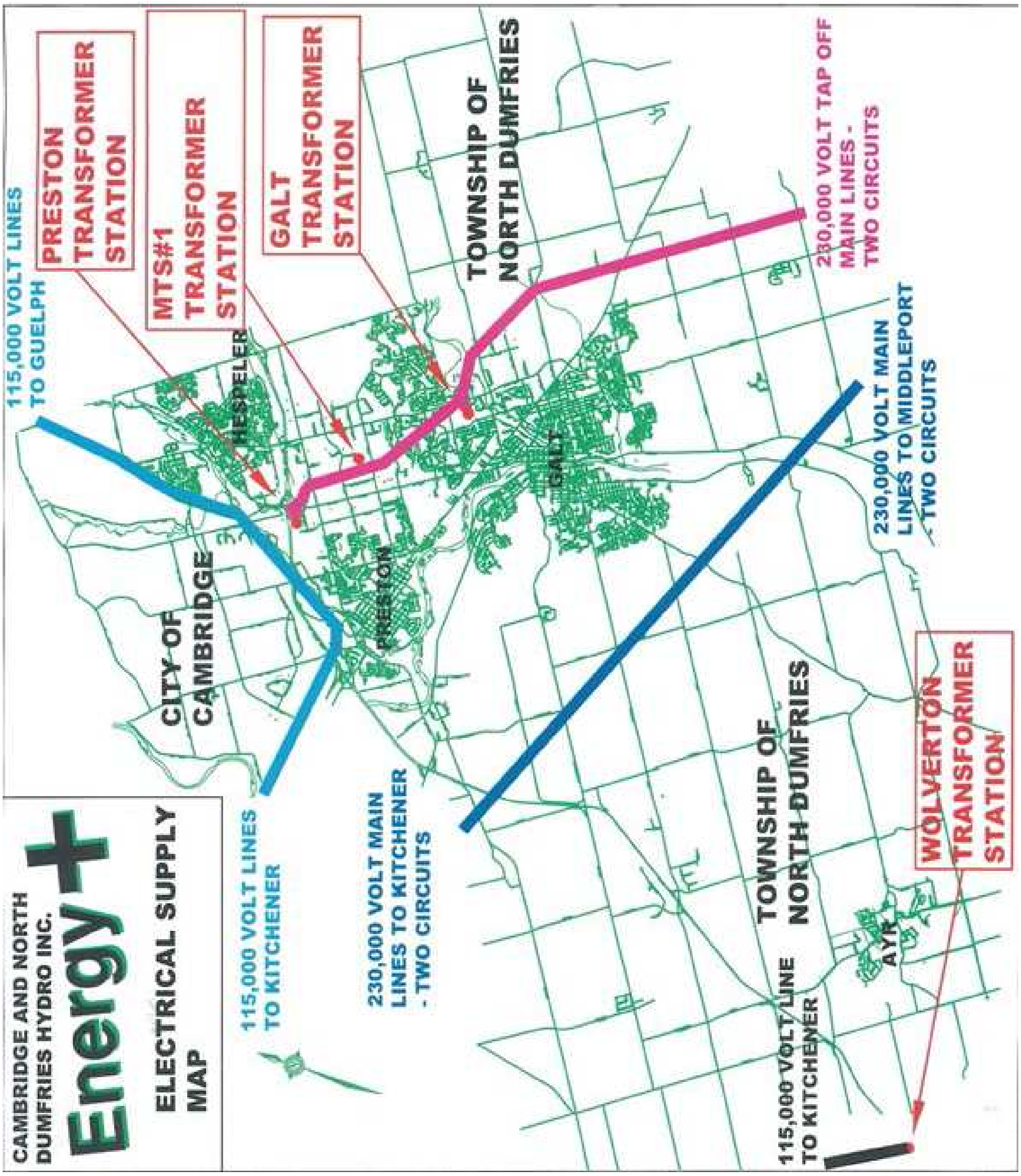
	Overhead	Underground
2009	$189,122	$784,875
2010	$53,019	$976,601
2011	$106,664	$1,158,403
2012	$95,795	$942,813

Industrial Growth Impact on 2013 to 2018 Capital Plan

The biggest impact to CND's capital plan over the next five years is the planned construction of a 115kV -27.6 kV transformer station (MTS#2) in the North-West part of the City of Cambridge North of Highway 401 in the area of the "East Side Lands". This station would be supplied by Hydro One's existing 115 kV transmission lines that will have sufficient capacity by the end of 2015 if the Guelph Area Transmission Reinforcement project is approved by the Ontario Energy Board (EB-2013-053). The planned in-service date is 2018 based on the current load forecast of 3% growth per year. MTS#2 will be constructed only when necessary. Industrial development has a high degree of variability in kiloWatts (kW) per acre. The use of the land area could range from a warehouse with primarily lighting load to a large industrial plant. Looking at a completed industrial subdivision, the peak demand ranged from 5kW per acre to nearly 700kW per acre. On average, the peak demand was 92kW per acre in one particular subdivision. During the planning stages, it is usually unknown exactly which industries will develop in an industrial subdivision. It depends upon land sales.

CND must ensure that capacity is always available. Even conservatively, the development of over 700 acres of industrial land in the "East Side Lands" will result in over 60 Mega Watts (MW) of peak demand at 92kW per acre. The actual demand could be much higher since the Region of Waterloo is targeting the creation of large lot employment use lands (20 acres or more per lot).

The present 27.6 kV feeders servicing the North-West industrial area are 21M23, 21M25, 21M28 and 21M29 supplied from Preston TS. These four feeders averaged 300 Amps of peak load in 2012. That is the ideal maximum so that loads can be transferred to an adjacent feeder during a contingency. With the planned Boxwood Industrial Subdivision and other increasing industrial load in the North-West part of the City of Cambridge, a decision was made by CND in 2012 to construct new 27.6 kV feeder lines into the area from Preston TS which is the closest supply point. These feeder lines will also supply the over 1,800 residential units planned in the Hunt Club area subdivisions (East side of Speedsville Road North of Highway 401). Work was begun in 2012 and will be completed in 2013. $2 million was budgeted in 2012. Part of the work includes re-arranging feeders to transfer existing load from Preston TS to MTS#1 since Preston TS has the highest utilization of capacity yet will be having the greatest growth. Preston TS is the closest source of power geographically. An electrical supply map is attached.


CAMBRIDGE AND NORTH DUMFRIES HYDRO INC.
Energy+
ELECTRICAL SUPPLY MAP
115,000 VOLT LINES TO GUELPH
PRESTON TRANSFORMER STATION
MTS#1 TRANSFORMER STATION
GALT TRANSFORMER STATION
TOWNSHIP OF NORTH DUMFRIES
230,000 VOLT TAP OFF MAIN LINES - TWO CIRCUITS
HESPELER
GALT
PRESTON
CITY OF CAMBRIDGE
230,000 VOLT MAIN LINES TO MIDDLEPORT TWO CIRCUITS
115,000 VOLT LINES TO KITCHENER
230,000 VOLT MAIN LINES TO KITCHENER - TWO CIRCUITS
TOWNSHIP OF NORTH DUMFRIES
WOLVERTON TRANSFORMER STATION
AYR
115,000 VOLT LINE TO KITCHENER

Servicing of the Boxwood Industrial Subdivision was budgeted in 2009, 2010, 2011, 2012 and 2013. After many approval delays, the City of Cambridge was finally able to begin construction in 2012. The site was ready for hydro servicing in the summer of 2013. Hydro servicing will be complete in the fall of 2013 for this project with a budget of $1.2 million.

The triple circuiting of the existing single circuit 27.6 kV line along Speedsville Road from North of Royal Oak Road to the Boxwood Industrial Subdivision was budgeted in 2013. The engineering design is complete but construction has been postponed until 2014. This work is required to meet the needs of new industrial load in the area. The load requirement has been delayed until 2014 so CND delayed the $400,000 project. CND has allowed $500,000 in 2016 for extension of 27.6 kV lines to accommodate future industrial subdivision development.

As can be seen from the delays in servicing of the Boxwood Industrial Subdivision, it is difficult to accurately predict timing of industrial servicing. CND has forecasted a $350,000 expenditure in 2015 and a $350,000 expenditure in 2017 for servicing of future industrial subdivisions. CND minimizes the risk to itself and customers by requiring that the developer fund 100% of the initial servicing cost. CND provides rebates to the developer only after buildings are constructed and CND has at least one year of revenue to accurately determine the load. The rebate amount is based on CND’s Economic Evaluation Policy which has been drafted in accordance with the Distribution System Code.

The budget category “Servicing Industrial Overhead” is used for the cost of overhead industrial services. Most of the cost relates to overhead three phase transformer banks. Activity has been low in recent years as a result of the 2008/2009 recession and the delays in servicing of the Boxwood

Industrial Subdivision. With lots for sale in the Boxwood Industrial Subdivision in the fall of 2013, it is expected that many three phase transformer banks will be installed in 2014. Given the strong projected future industrial growth in the City of Cambridge, CND has estimated continued investment of $250,000 in each year through 2018. Transformer deposits are taken for industrial servicing to minimize the risk to CND and its customers. Rebates, if applicable, are made after a minimum of one year of electric consumption history as per CND’s Economic Evaluation Policy.

The budget category “Servicing Industrial Underground” (which also includes institutional, commercial, high rise apartment/condo towers and senior citizen developments) has remained active during the period 2009 through 2012 averaging an investment of $965,673 per year. Most of these installations involve new or enlarged three phase padmount transformers. Existing industrial lots were occupied. High rise residential activity increased significantly over past years. Institutional/senior citizen development has continued to be strong. Transformer deposits are taken for industrial servicing to minimize the risk to CND and its customers. Rebates, if applicable, are made after a minimum of one year of electric consumption history as per CND’s Economic Evaluation Policy.

Given the new lots for sale in the Boxwood Industrial Subdivision and other projected industrial growth, CND expects that underground industrial servicing will continue to be strong and has budgeted $1 million per year. If the economy strengthens further, the investment will increase to beyond $1 million per year.

The Cambridge and North Dumfries area is poised for substantial growth in the years ahead. Substantial amounts of residential and industrial land is available now with more planned in future years. CND will deliver the electricity necessary for that growth through prudent, well timed investments in its capital infrastructure.

APPENDIX K

CND Future Budget Forecast 2015 to 2018

Plant Capital Budget 2015 Material Projects			
Classification	**Budget Item and Description**	**Budget Amount $**	**Priority**
SYSTEM ACCESS	Franklin Boulevard Roundabouts	$2,782,600	1
SYSTEM ACCESS	Subdivision Capital Investment (by developer)	$1,271,000	1
SYSTEM ACCESS	Servicing Industrial U/G	$1,000,000	1
SYSTEM ACCESS	Subdivision Capital Investment (by CND Hydro)	$729,000	1
SYSTEM ACCESS	Industrial Subdivisions	$347,000	1
SYSTEM ACCESS	Servicing Industrial O/H	$250,000	1
SYSTEM ACCESS	New Overhead Lines to Service Residential Subdivisions	$232,000	1
SYSTEM ACCESS	Miscellaneous	$245,400	
	Subtotal	$6,857,000	
SYSTEM RENEWAL	27.6 kV Pole Line Rebuilds	$1,860,000	6
SYSTEM RENEWAL	Cambrian Hills Area (1975/76) - Winston/Gunn/Randall/Ashwood/Westbury/ Grey Abbey/Rideau/Thomas/Erindale/Ivanhoe/Woodgate/Cottontail/Kribs Area - (presently 27.6kV)	$1,131,600	13
SYSTEM RENEWAL	Part of Spragues Road and Part of Alps Road (1950's to 1990's) (8kV) - 4.1km	$660,300	4
SYSTEM RENEWAL	Highway 24 South of Maple Manor Road to Township Boundary/part of Lockie Road (mostly 1960's) (8kV) - 3.2km	$520,800	9
SYSTEM RENEWAL	Hespeler Road between Kossuth Road and Black Bridge Road (1950) (8kV) - 2.5km	$404,550	3
SYSTEM RENEWAL	Speedsville Road from Maple Grove Road to South of Kossuth Rd (couple poles dating back to 1939, mostly 1965) (8kV) - 3.1km	$381,300	11
SYSTEM RENEWAL	Galt Core Area Upgrades	$282,312	15

SYSTEM RENEWAL	West River Road past Alex Mills Subdivision(1950's to 1990's) (8kV) - 1.7km	$279,000	5
SYSTEM RENEWAL	Blair Road near Langdon Hall (1960's to 1990's) (8kV) - 1.7km	$279,000	10
SYSTEM RENEWAL	Middle Block Road from Fountain Street to Speedsville Road (1950's) (8kV) - 2km	$246,450	7
SYSTEM RENEWAL	Southern Part of Chilligo Road and section of line South of Maple Grove Road (mostly 1957) (8kV) - 1.8km	$241,800	8
SYSTEM RENEWAL	Limerick Road (1950) (8kV) - 13 customers - 1.5km Note:This project may be cancelled or substantially scaled back as a result of proposed draft plan of subdivision in the area.	$241,800	12
SYSTEM RENEWAL	Upgrades in various areas	$243,300	14
SYSTEM RENEWAL	PMH Switching Unit Replacements	$168,000	16
SYSTEM RENEWAL	Pole Replacements	$127,500	1
SYSTEM RENEWAL	Miscellaneous	$311,288	
	Subtotal	$7,379,000	
SYSTEM SERVICE	SCADA Loadbreak Switches	$286,600	17
SYSTEM SERVICE	Miscellaneous	$55,400	
	Subtotal	$342,000	

2015 Material Projects

Franklin Boulevard Roundabouts (SYSTEM ACCESS)

Budgeted Amount = $2,782,600

The Region of Waterloo plans to install eleven roundabouts at road intersections on Franklin Boulevard over a two year period. The budgeted amount covers the second year of relocations. An equal amount was included in 2014 for the first year of relocations. This proposed work results in significant relocation of overhead triple circuit and double circuit 27.6 kV lines. Significant traffic control will be required due to the heavy volume of traffic. Significant switching will be required to maintain power during construction.

Servicing Residential (SYSTEM ACCESS)

Budgeted Amount = $729,000 (by CND Hydro) and $1,271,000 (by developer)

This first amount represents CND's contribution to developer installed residential subdivisions. The second amount represents the developer's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced.

Servicing Industrial U/G (SYSTEM ACCESS)

Budgeted Amount = $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Industrial Subdivisions (SYSTEM ACCESS)

Budgeted Amount = $347,000

Industrial subdivisions are not developed on an annual basis in Cambridge. An allowance is made in the projected budget for $350,000 every other year. Exact amounts will depend upon customer requirements which is tied to the level of economic growth.

Servicing Industrial O/H (SYSTEM ACCESS)

Budgeted Amount = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

New Overhead Lines to Service Residential Subdivisions (SYSTEM ACCESS)

Budgeted Amount = $232,000

Periodically, CND must extend 27.6 kV distribution lines to service new residential subdivision developments. This budget amount covers that cost.

27.6 kV Pole Line Rebuilds (SYSTEM RENEWAL)

Budgeted Amount = $1,860,000

Over the past thirty years, CND has significantly invested in the rebuild of its 4.16 kV and 8.32 kV distribution systems and the growth of its 27.6 kV distribution system. As these rebuilds near completion, CND needs to invest in rebuilds of its oldest 27.6 kV lines. Some of these lines originally supplied the 4.16 kV stations. Others were early 27.6 kV distribution lines.

Cambrian Hills Area Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $1,131,600

The Cambrian Hills area in Hespeler consists of Winston Blvd, Westbury Cr., Randall Rd., Grey Abbey Trail, Rideau Gate, Thomas St., Gunn Ave., Erindale Cr., Ivanhoe Ct., Woodgate Circle, Ashwood Dr., Cottontail Pl. and Kribs St. It was serviced underground originally by Ontario Hydro in 1975/1976 at 27.6 kV using direct buried 35 kV rated cable (non-standard for CND). CND has started to have problems in this area with some primary connection points and with some transformers. The plant in the area is reaching the end of its life.

Part of Spragues Road and part of Alps Road (SYSTEM RENEWAL)

Budgeted Amount = $660,300

This project rebuilds a 4.1km section of existing 4.8 kV line that has reached the end of its life along part of Alps Rd. and part of Spragues Rd. The poles are dated between the 1950's and 1990's. Newer poles will be re-used. The new line will be operated at 16kV.

Highway 24 South of Maple Manor Road to Lockie Road (SYSTEM RENEWAL)

Budgeted Amount = $520,800

This project rebuilds a 3.2km section of existing three phase 8.32 kV and single phase 4.8 kV line that has reached the end of its life along Highway 24 South of Maple Manor Rd. to Lockie Rd. and a part of Lockie Rd. The poles are mostly dated in the 1960's. The new line will be operated at 16kV.

Hespeler Rd. from Kossuth Rd. to Black Bridge Rd. (SYSTEM RENEWAL)

Budgeted Amount = $404,550

This project rebuilds a 2.5km section of existing 8.32 kV line that has reached the end of its life on Hespeler Rd. between Kossuth Rd. and Black Bridge Rd. The poles are mostly dated in the 1950's. The new line will be operated at 27.6kV.

Speedsville Road from Maple Grove Road to South of Kossuth Road (SYSTEM RENEWAL)

Budgeted Amount = $381,300

This project rebuilds a 3.1km section of existing 4.8 kV line that has reached the end of its life on Speedsville Road between Maple Grove Road and Kossuth Road. The poles are mostly dated in the 1960's. The new line will be operated at 16kV.

Galt Core Area Upgrades (SYSTEM RENEWAL)

Budgeted Amount = $282,312

This budget amount continues a program of upgrades in the Galt core area of Cambridge. The Galt core area has a high concentration of business customers who suffer a financial loss during power outages. There have been a number of unplanned outages in the Galt core area due to older equipment and the ongoing presence of water, salt and other debris in the underground system. The water table is high because the Galt core area is located in a low spot right next to the Grand River. There is also a lot of salt application and build-up of debris since it is a core area. CND is investing in replacement and additional switching equipment to be able to more promptly sectionalize and restore power in the event of an outage. CND is replacing older cables to reduce the likelihood of failure. CND is eliminating as many underground connections as possible in its underground system to again reduce the likelihood of failure. CND is repairing concrete vaults which have deteriorated due to the salt to keep them safe for pedestrians.

West River Road (SYSTEM RENEWAL)

Budgeted Amount = $279,000

This project rebuilds a 1.7km section of existing 4.8 kV line that has reached the end of its life on West River Rd. past the Alex Mills Subdivision. The poles are dated from the 1950’s to 1990’s. Newer poles will be re-used. The new line will be operated at 16kV.

Blair Road (near Langdon Hall) (SYSTEM RENEWAL)

Budgeted Amount = $279,000

This project rebuilds a 1.7km section of existing 4.8 kV line that has reached the end of its life on Blair Rd. near Langdon Hall. The poles are dated between the 1960’s and 1990’s. Newer poles will be re-used. The new line will be operated at 16kV.

Middle Block Rd. from Fountain St. N. to Speedsville Rd. (SYSTEM RENEWAL)

Budgeted Amount = $246,450

This project rebuilds a 2km section of existing 4.8 kV line that has reached the end of its life on Middle Block Rd. between Fountain St. N. and Speedsville Rd. The poles are mostly dated in the 1950’s. The new line will be operated at 16kV.

Southern Part of Chilligo Rd. and Section of Line South of Maple Grove Rd. (SYSTEM RENEWAL)

Budgeted Amount = $241,800 This project rebuilds a 1.8km section of existing 4.8 kV line that has reached the end of its life on Chilligo Rd. The poles are mostly dated 1957. The new line will be operated at 16kV.

Limerick Road (SYSTEM RENEWAL)

Budgeted Amount = $241,800

This project rebuilds a 1.5km section of existing 4.8 kV line that has reached the end of its life on Limerick Rd. The poles are mostly dated 1950. The new line will be operated at 16kV. This project may be cancelled or substantially scaled back as a result of a proposed draft plan of subdivision in the area.

Upgrades in Various Areas Underground (SYSTEM RENEWAL)

Budgeted Amount = $243,300

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

PMH Switching Unit Replacements (SYSTEM RENEWAL)

Budgeted Amount = $168,000

CND has twenty-five remaining PMH type 27.6 kV switching units on its underground distribution system. Three were replaced in 2012. A new type of switching unit was selected to improve reliability. The existing units are subject to moisture build-up and flashover despite cleaning. CND plans to change out the remaining units over a nine year period to ensure long term reliability but also maximize the life of the existing equipment as much as possible.

Pole Replacements (SYSTEM RENEWAL)

Budgeted Amount = $127,500

This work replaces poles that are at the end of their useful life. The poles are identified by pole testing, distribution system line patrols or in the normal course of operation of the distribution system.

SCADA Loadbreak Switches (SYSTEM SERVICE)

Budgeted Amount = $286,600

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from their Control Center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2015.

Plant Capital Budget 2016 Material Projects			
Classification	**Budget Item and Description**	**Budget Amount**	**Priority**
SYSTEM ACCESS	Subdivision Capital Investment (by developer)	$1,271,000	1
SYSTEM ACCESS	Servicing Industrial U/G	$1,000,000	1
SYSTEM ACCESS	Subdivision Capital Investment (by CND Hydro)	$729,000	1
SYSTEM ACCESS	New Overhead Lines to Accommodate Industrial Growth	$464,000	1
SYSTEM ACCESS	Servicing Industrial O/H	$250,000	1
SYSTEM ACCESS	Renewable Energy Projects	$237,500	1
SYSTEM ACCESS	Miscellaneous	$191,500	
SYSTEM ACCESS	Subtotal	$4,143,000	
SYSTEM RENEWAL	27.6 kV Pole Line Rebuilds	$1,860,000	2
SYSTEM RENEWAL	Blenheim Road - Three Phase Overhead Line from West of Brown's Subdivision to Saw Mill - 2km plus addition of two phases for 1km	$697,500	3
SYSTEM RENEWAL	Holm St./Gillespie Ct./Foxridge Dr./Barnicke Dr. (1978) - (presently 27.6kV)	$349,320	4
SYSTEM RENEWAL	Upgrades in various areas Underground	$243,300	6
SYSTEM RENEWAL	Lang's Circle (1978) - (presently 27.6kV)	$196,800	5
SYSTEM RENEWAL	PMH Switching Unit Replacements	$168,000	8
SYSTEM RENEWAL	Cindy Avenue (1977) - (presently 27.6kV)	$167,280	7
SYSTEM RENEWAL	Miscellaneous	$350,800	
	Subtotal	$4,033,000	
SYSTEM SERVICE	SCADA Loadbreak Switches	$286,600	9
SYSTEM SERVICE	Miscellaneous	$55,400	
	Subtotal	$342,000	

2016 Material Projects

Subdivision Capital Investment (SYSTEM ACCESS)

Budgeted Amount = $729,000 (by CND Hydro) and $1,271,000 (by developer)

This first amount represents CND's contribution to developer installed residential subdivisions. The second amount represents the developer's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced.

Servicing Industrial U/G (SYSTEM ACCESS)

Budgeted Amount = $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

New Overhead Lines to Accommodate Industrial Growth (SYSTEM ACCESS)

Budgeted Amount = $464,000

Periodically, CND must extend 27.6 kV distribution lines to service new industrial subdivision developments. This budget amount covers that cost.

Servicing Industrial O/H (SYSTEM ACCESS)

Budgeted Amount = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

Renewable Energy Projects (SYSTEM ACCESS)

Budgeted Amount = $237,500

This budget category covers Green Energy Act investments. A $237,500 investment is expected in 2016 for transfer trip/protection changes to allow connection of the proposed 1.2MW Parkhill Dam hydro generator.

27.6 kV Pole Line Rebuilds (SYSTEM RENEWAL)

Budgeted Amount = $1,860,000

Over the past thirty years, CND has significantly invested in the rebuild of its 4.16 kV and 8.32 kV distribution systems and the growth of its 27.6 kV distribution system. As these rebuilds near completion, CND needs to invest in rebuilds of its oldest 27.6 kV lines. Some of these lines originally supplied the 4.16 kV stations. Others were early 27.6 kV distribution lines.

Blenheim Rd. – Three Phase Overhead Line from West of Brown's Subdivision to Saw Mill (SYSTEM RENEWAL)

Budgeted Amount = $697,500

This project rebuilds a 2km section of existing single phase 4.8 kV line that has reached the end of its life along Blenheim Rd. from West of Brown's Subdivision to the Saw Mill. It includes the addition of two phases to existing poles for 1km. The poles range in age between the 1940's and 2000's. The new line will be operated at 27.6kV. The new line will allow the remaining 4.16 kV on Blenheim Rd. to be converted to 27.6 kV and will also provide a backfeed to planned future residential development along the West side of Cambridge.

Holm St./Gillespie Ct./Foxridge Dr./Barnicke Dr. Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $349,320

The Holm St./Gillespie Ct../Foxridge Dr./Barnicke Dr. area in Hespeler is currently serviced underground at 27.6kV. The distribution system was installed in 1978. The underground cable is direct buried and there are eleven transformers. CND has had some issues in this area with electrical connections and the condition of the transformers.

Upgrades in Various Areas Underground (SYSTEM RENEWAL)

Budgeted Amount = $243,300

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

Lang's Circle Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $196,800

The Lang's Circle area is currently serviced underground at 27.6kV. The distribution system was installed in 1978. The underground cable is direct buried and there are seven transformers. CND has had previous transformer failures in this area and the feed is radial. CND plans to rebuild the area in 2016.

PMH Switching Unit Replacements (SYSTEM RENEWAL)

Budgeted Amount = $168,000

CND has twenty-five remaining PMH type 27.6 kV switching units on its underground distribution system. Three were replaced in 2012. A new type of switching unit was selected to improve reliability. The existing units are subject to moisture build-up and flashover despite cleaning. CND plans to change out the remaining units over a nine year period to ensure long term reliability but also maximize the life of the existing equipment as much as possible.

Cindy Ave. Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $167,280

The Cindy Avenue area in Hespeler is currently serviced underground at 27.6kV. The distribution system was installed in 1977. The underground cable is direct buried and there are five transformers. CND has not had major problems in this area yet but based on the age of the plant they plan to rebuild this area in the 2016 time frame.

SCADA Loadbreak Switches (SYSTEM SERVICE)

Budgeted Amount = $286,000

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from their Control Center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2016.

Plant Capital Budget 2017 Material Projects			
Classification	**Budget Item and Description**	**Budget Amount $**	**Priority**
SYSTEM ACCESS	Subdivision Capital Investment (by developer)	$1,271,000	1
SYSTEM ACCESS	Servicing Industrial U/G	$1,000,000	1
SYSTEM ACCESS	Subdivision Capital Investment (by CND Hydro)	$729,000	1
SYSTEM ACCESS	Industrial Subdivisions	$347,000	1
SYSTEM ACCESS	Servicing Industrial O/H	$250,000	1
SYSTEM ACCESS	New Overhead Lines to Service Residential Subdivisions	$232,000	1
SYSTEM ACCESS	Miscellaneous	$191,000	
SYSTEM ACCESS	Subtotal	$4,020,000	
SYSTEM RENEWAL	27.6 kV Pole Line Rebuilds	$1,860,000	2
SYSTEM RENEWAL	Byton Lane, part of Grand Ridge Drive, Mark Crescent, Johanna Drive, Duchess Drive, Angela Crescent, part of Wedgewood Drive, part of Delavan Drive, part of Birchlawn Avenue (1977-1979) - (presently 27.6kV)	$1,082,400	3
SYSTEM RENEWAL	Upgrades in various areas Underground	$243,300	4
SYSTEM RENEWAL	PMH Switching Unit Replacements	$168,000	5
SYSTEM RENEWAL	Miscellaneous	$413,300	
	Subtotal	$3,767,000	
SYSTEM SERVICE	SCADA Load break Switches	$286,600	6
SYSTEM SERVICE	Miscellaneous	$55,400	
	Subtotal	$342,000	

2017 Material Projects

Subdivision Capital Investment (SYSTEM ACCESS)

Budgeted Amount = $729,000 (by CND Hydro) and $1,271,000 (by developer)

This first amount represents CND's contribution to developer installed residential subdivisions. The second amount represents the developer's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced.

Servicing Industrial U/G (SYSTEM ACCESS)

Budgeted Amount = $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Industrial Subdivisions (SYSTEM ACCESS)

Budgeted Amount = $347,000

Industrial subdivisions are not developed on an annual basis in Cambridge. An allowance is made in the projected budget for $347,000 every other year. Exact amounts will depend upon customer requirements which are tied to the level of economic growth.

Servicing Industrial O/H (SYSTEM ACCESS)

Budgeted Amount = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

New Overhead Lines to Service Residential Subdivisions (SYSTEM ACCESS)

Budgeted Amount = $232,000

Periodically, CND must extend 27.6 kV distribution lines to service new residential subdivision developments. This budget amount covers that cost.

27.6 kV Pole Line Rebuilds (SYSTEM RENEWAL)

Budgeted Amount = $1,860,000

Over the past thirty years, CND has significantly invested in the rebuild of its 4.16 kV and 8.32 kV distribution systems and the growth of its 27.6 kV distribution system. As these rebuilds near completion, CND needs to invest in rebuilds of its oldest 27.6 kV lines. Some of these lines originally supplied the 4.16 kV stations. Others were early 27.6 kV distribution lines.

Byton Lane/Grand Ridge Dr./Mark Cr./Johanna Dr./Duchess Dr./Angela Cr./Wedgewood Dr./Delavan Dr./Birchlawn Ave. Area Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $1,082,400

The Byton Lane/Grand Ridge Dr./Mark Cr./Johanna Dr./Duchess Dr./Angela Cr./Wedgewood Dr./Delavan Dr./Birchlawn Ave. area is currently serviced underground at 27.6kV. The distribution system was installed between 1977 and 1979. The underground cable is direct buried and there are seven transformers. CND has had some failures of electrical connections in this area. Based on the age of the plant they plan to rebuild this area in the 2017 time frame.

Upgrades in Various Areas (SYSTEM RENEWAL)

Budgeted Amount = $243,300

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

PMH Switching Unit Replacements (SYSTEM RENEWAL)

Budgeted Amount = $168,000

CND has twenty-five remaining PMH type 27.6 kV switching units on its underground distribution system. Three were replaced in 2012. A new type of switching unit was selected to improve reliability. The existing units are subject to moisture build-up and flashover despite cleaning. CND plans to change out the remaining units over a nine year period to ensure long term reliability but also maximize the life of the existing equipment as much as possible.

SCADA Load break Switches (SYSTEM SERVICE)

Budgeted Amount = $286,600

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from their Control Center either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2017.

Plant Capital Budget 2018 Material Projects			
Classification	Budget Item and Description	Budget Amount	Priority
SYSTEM ACCESS	Subdivision Capital Investment (by developer)	$1,271,000	1
SYSTEM ACCESS	Servicing Industrial Underground	$1,000,000	1
SYSTEM ACCESS	Subdivision Capital Investment (by CND Hydro)	$729,000	1
SYSTEM ACCESS	Servicing Industrial Overhead	$250,000	1
SYSTEM ACCESS	Miscellaneous	$246,000	
	Subtotal	$3,496,000	
SYSTEM RENEWAL	27.6 kV Pole Line Rebuilds	$1,860,000	2
SYSTEM RENEWAL	Scott Rd./Nickolas Cr./Nora Ct./Limpert Ave./Trinder Ct. (1979/1981) - (presently 27.6kV)	$432,960	6
SYSTEM RENEWAL	Upgrades in various areas	$243,300	4
SYSTEM RENEWAL	Stirling MacGregor Dr., Dalkeith Dr. (1978) - 66 customers (presently 27.6kV)	$211,560	3
SYSTEM RENEWAL	Bluerock Crescent (1979) - 60 customers (presently 27.6kV)	$196,800	5
SYSTEM RENEWAL	PMH Switching Unit Replacements	$168,000	7
SYSTEM RENEWAL	Miscellaneous	$441,380	
	Subtotal	$3,554,000	
SYSTEM SERVICE	New Cambridge MTS#2 (115kV -27.6kV) - Four 27.6 kV Feeders Initially complete with required overhead and underground feeder work.	$16,500,000	1
SYSTEM SERVICE	SCADA Loadbreak Switches	$286,600	8
SYSTEM SERVICE	Miscellaneous	$55,400	
	Subtotal	$16,842,000	

2018 Material Projects

Subdivision Capital Investment (SYSTEM ACCESS)

Budgeted Amount = $729,000 (by CND Hydro) and $1,271,000 (by developer)

This first amount represents CND's contribution to developer installed residential subdivisions. The second amount represents the developer's contribution to developer installed residential subdivisions. The actual amounts vary each year based on the number of residential homes that are serviced.

Servicing Industrial U/G (SYSTEM ACCESS)

Budgeted Amount = $1,000,000

This budget category covers new underground industrial services. Activity varies each year based on customer requirements.

Servicing Industrial O/H (SYSTEM ACCESS)

Budgeted Amount = $250,000

This budget category covers new overhead industrial services. Activity varies each year based on customer requirements.

27.6 kV Pole Line Rebuilds (SYSTEM RENEWAL)

Budgeted Amount = $1,860,000 Removal = $140,000

Over the past thirty years, CND has significantly invested in the rebuild of its 4.16 kV and 8.32 kV distribution systems and the growth of its 27.6 kV distribution system. As these rebuilds near completion, CND needs to invest in rebuilds of its oldest 27.6 kV lines. Some of these lines originally supplied the 4.16 kV stations. Others were early 27.6 kV distribution lines.

Scott Rd./Nickolas Cr./Nora Ct./Limpert Ave./Trinder Ct. Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $432,960 Removal = $7,040

The Scott Rd./Nickolas Cr./Nora Ct./Limpert Ave./Trinder Ct. area in Hespeler is currently serviced underground at 27.6kV. The distribution system was installed in 1979/1981. The underground cable is direct buried and there are thirteen transformers. CND has not had major problems in this area yet but based on the age of the plant they plan to rebuild the area in the 2018 time frame.

Upgrades in Various Areas (SYSTEM RENEWAL)

Budgeted Amount = $243,300 Removal = $6,700

This budget amount is used to replace underground equipment and cables that have reached end of life and needs replacement. The areas vary and the locations for upgrade work are usually determined by CND's Operations group through field inspections or through outage reports where further action is required.

Stirling MacGregor Dr./Dalkeith Dr. Area Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $211,560 Removal = $3,440

The Stirling MacGregor Dr./Dalkeith Dr. area is currently serviced underground at 27.6kV. The distribution system was installed in 1978. The underground cable is direct buried and there are seven transformers. CND has had some failures of electrical connections in this area. Based on the age of the plant they plan to rebuild this area in the 2018 time frame.

Bluerock Cr. Underground Rebuild (SYSTEM RENEWAL)

Budgeted Amount = $196,800 Removal = $3,200

Bluerock Crescent is currently serviced underground at 27.6kV. The distribution system was installed in 1979. The underground cable is direct buried and there are six transformers. CND has not had major problems in this area yet but based on the age of the plant they plan to rebuild this area in the 2018 time frame.

PMH Switching Unit Replacements (SYSTEM RENEWAL)

Budgeted Amount = $168,000 Removal = $7,000

CND has twenty-five remaining PMH type 27.6 kV switching units on its underground distribution system. Three were replaced in 2012. A new type of switching unit was selected to improve reliability. The existing units are subject to moisture build-up and flashover despite cleaning. CND plans to change out the remaining units over a nine year period to ensure long term reliability but also maximize the life of the existing equipment as much as possible.

Transformer Station (SYSTEM SERVICE)

Budgeted Amount = $16,500,000

As a result of projected load growth in the North-West area of the City of Cambridge, a transformer station is expected to be required in 2018. This area is targeted by the Region of Waterloo for significant industrial development. There is already significant industrial load in the area including the Toyota plant. The Boxwood Industrial Subdivision is a 175 acre industrial subdivision being developed by the City of Cambridge. Servicing is nearly complete and land sales will begin soon. The supply for the new transformer station is expected to come from Hydro One's 115 kV transmission system which is expected to be reinforced as a result of the planned transmission work in Guelph and the addition of a second autotransformer at Preston TS. The $16,500,000 figure shown is the estimated cost of a transformer station including land, equipment and the associated 27.6 kV feeders. A separate application would be made to the Ontario Energy Board for this investment. The investment will only be made when required.

SCADA Loadbreak Switches (SYSTEM SERVICE)

Budgeted Amount = $286,600 Removal = $13,400

SCADA loadbreak switches are installed at key locations on CND's 27.6 kV distribution system. These switches can be remotely operated from their control room either during planned switching to reduce the crew time associated with manual switches or to rapidly restore power in the event of an outage. The switches are used to break up a 27.6 kV feeder into smaller sections so that it can be quickly sectionalized in the event of a permanent fault to reduce the number of Customer-Hours lost during an outage. Past outages have shown the need (and the improvement) associated with the use of SCADA switches. Five switches are proposed to be installed in 2018.

General Plant Five Year Forecast

The following table provides a summary of CND's forecast General Plant capital expenditures over the next five years.

	Bridge Year 2013	Test Year 2014	Budget 2015	Budget 2016	Budget 2017	Budget 2018
Land and Buildings (Note 1)	$ 448	$ 55	$ 100	$ 100	$ 100	$ 100
Meters	915	967	900	900	900	900
Office Equipment and Furniture (Note 1)	187	80	50	50	50	50
Information Technology	609	2,086	604	600	600	600
Vehicles	588	520	465	425	555	345
Tools and Equipment	117	109	50	60	65	65
Gross Capital Expenditures - General Plant	2,864	3,817	2,169	2,135	2,270	2,060

Note 1: Land/Buildings/Office Equipment and Furniture excludes potential impact from results of Space Study.

The forecast has been prepared based on the following assumptions and/or information known at the present time. While specific material projects have not been identified for years 2015 through 2018, CND expects that the General Plant capital expenditures will level to approximately $2MM per year. This investment level excludes any estimate with respect to future investments that will be required by CND to upgrade its corporate office and operations facilities, further explained below.

In 2013, CND engaged a third party consultant to undertake a comprehensive space study with respect to its corporate offices and operating facilities. CND's existing facilities were constructed in the 1980's and since that time CND, and the industry, have undergone significant change. The growth in CND's business over the years, as well as an increase in the number of full-time employees, has resulted in insufficient office space, as well as inadequate garage space due to the physical size and growth in the fleet. CND is exploring the various options that may be available, including the expansion of existing facilities or the building of a new facility. At the time of the preparation of the five year forecast, estimated costs were not available.

Investments in General Plant are required on an annual basis to support the day to day operations of CND. From a priority perspective, investments in General Plant are generally prioritized as follows:

1. Meter Investments – represents the costs to install new and replacement meters to CND's customers. Investment in new meters is based on expected customer growth, while investment in replacement meters is based on the age of the assets, as well as testing conducted as part of CND's meter verification program, as required by Measurement Canada. These expenditures are not discretionary.

2. Information Systems Technology – CND will continue to invest in information systems technology to realize operating efficiencies and provide customer value. In 2014, CND will undertake a significant investment in an Outage Management System, Distribution Management System, and IVR Solution. These investments are necessary to meet our customer expectations with respect to communication and reliability. CND will replace end of life assets over a three to five year lifecycle. Upgrades to the CIS/Billing System and ERP Solution will be required over the five year forecast period. CND will manage the pace of its IST investments, with due consideration for mitigating enterprise risks, maximizing operating efficiencies, and implementing technology that supports the customers expectations.

3. Vehicles (Transportation) – investments in vehicles are based on CND's vehicle replacement program, which is based on the estimated useful lives of the vehicles in the fleet, with due consideration for the results of operational and mechanical assessments completed. CND's objective is to maximize the life of its vehicles and equipment through its routine maintenance programs, while at the same time ensuring that the level of capital expenditure on an annual basis is fairly constant.

4. Buildings/Office Furniture and Equipment – investments in buildings and office furniture and equipment have been very modest over the last several years. Investments in the building since it was constructed in the 1980's have been limited. In 2012, the roof was replaced after thirty one years due to leaking in the office and garage areas. As noted above, CND has excluded the potential for increased investments in the building and office furniture and equipment, pending a comprehensive study of the options available to CND with respect to its current and future space requirements. At the time of the preparation of

the five year forecast, estimated costs were not available. CND does not anticipate any material investments in the 2014 Test Year.

APPENDIX L

Outage Information Supporting the Underground Rebuild

Outage Information Supporting the Underground Rebuild

The table below is a summary of the outages and their durations for the major underground projects. The causes for the outages are given in the justification for the projects. This data illustrates the frequency and magnitude of the customer impact. It is important to not just consider the history that this represents but also take into account the fact that the deterioration in customer experience resulting from the failing plant will not decrease but continue and more likely increase. Hence the urgency to begin to address the issue through a relatively modest series of underground rebuild projects.

Interruptions Experienced in Underground Areas Budgeted for Rebuild				
Area Name	Capital Budget year	Date of Incident	Customer – hours Interrupted	Total Customer Hours for the Area
Preston Parkway	2012-2013	04/12/2008	573.47	
		5/15/2009	24.53	
		06/03/2009	30.67	
		6/23/2009	395	
		6/23/2009	270.05	
		3/14/2010	388.53	
		4/22/2010	105.35	
		5/26/2010	487.17	
		2/23/2011	279.23	
		03/10/2011	125.23	
			10 Events	**2679.23**
Nothview Acres Underground Rebuild	2013-2014	6/14/2008	116.92	
		5/25/2009	337.12	
		5/26/2010	399.5	
		12/22/2012	67.9	
		07/03/2011	138.97	
		07/07/2012	307.56	
		7/19/2012	443.9	
		10/15/2012	224.83	

			8 Events	**2036.7**
Avonlea/ Earlwood/ Briarwood Area	2014	09/12/2010	157.2	
		9/13/2010	206.63	
			2 Events	**363.83**
Galt Core Area	2013-2014-2015	11/28/2007	74.1	
		8/14/2008	270.62	
		3/15/2009	11.57	
		12/05/2010	19.17	
		4/17/2011	3001.92	
		2/15/2012	1504.82	
		2/16/2012	192.97	
		2/21/2012	269.02	
		03/01/2012	438.63	
		03/02/2012	166.63	
		03/12/2012	591.5	
			11 Events	**6540.95**
Holm/ Gillespie/ Foxridge/ Barniche Area	2016	6/26/2010	0.3	
		7/17/2010	362.43	
		11/25/2011	294.8	
		05/09/2012	310.7	
			4 Events	**968.23**
Lang's Circle area	2016	08/04/2012	306.6	
			1 Event	**306.6**
Byton/ Grand Ridge/ Mark/ Johanna Area	2017	3/26/2007	255.25	
		3/27/2007	191.58	
		06/02/2008	361.55	
		6/22/2009	195.2	
		08/09/2010	4235.17	
		3/23/2013	329.3	
		6/20/2013	946.28	

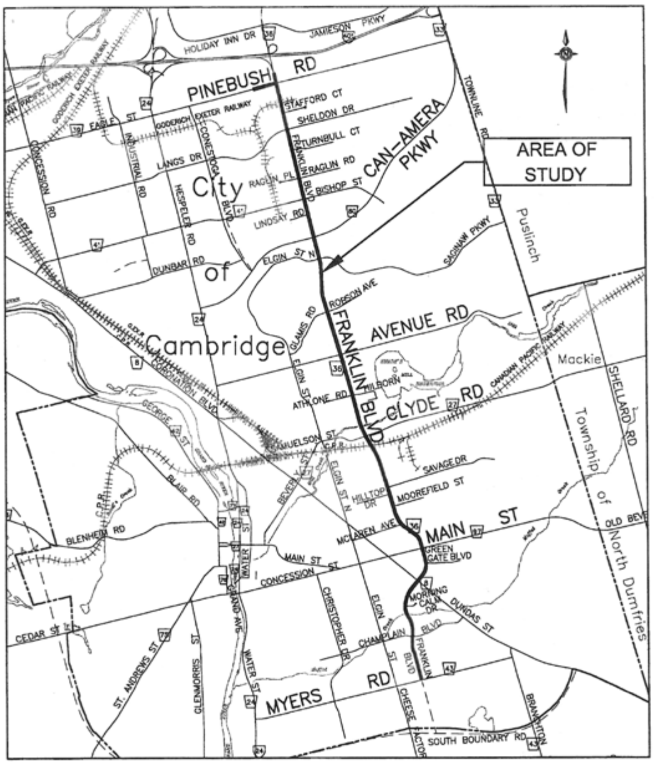
			7 Events	**6514.33**
Scott/ Nicholas/ Nora/ Limpert/ Trinder Area	2018	3/16/2008	19.2	
		09/07/2011	787.95	
		4/17/2012	579.63	
			3 Events	**1386.78**
			Total Customer Hours	**20,797**

APPENDIX M

CND Franklin Blvd Roundabout Project Report

Franklin Boulevard Roundabouts

The Region of Waterloo undertook a planning study to consider road improvements on Franklin Boulevard in Cambridge between Myers Road and Pinebush Road in May, 2007. A map from the Region of Waterloo is shown below. The first public consultation took place on May 17, 2007. A second public consultation took place on October 23, 2008.



CND was kept informed about the project by the Region of Waterloo. In CND's Distribution Plant – Asset Management Plan Years 2010 – 2019 prepared in March, 2010 an allowance of $300,000 in each of 2011, 2012 and 2013 was used. At that time, the extent of required relocations was not known.

A Municipal Class Environmental Study Report was placed on the public record in October, 2010. The projected capital cost of the Region of Waterloo project was $50 million. Existing utilities in the Right-of-Way of Franklin Boulevard were addressed as an issue in the report. Section 3.1.4 from the report is printed below.

3.1.4 Utilities in the Right-of-Way

Several utilities exist within the Franklin Boulevard corridor right-of-way including; Bell (telephone), Cambridge Hydro, Union Gas, Rogers Cable and municipal owned services.

There are a large number of existing hydro poles (carrying overhead wires) along one or both sides of Franklin Boulevard, depending on the section. There is also a significant hydro corridor crossing of Franklin Boulevard, approximately 150m north of the Athlone Road/Hillborn Road intersection with Franklin Boulevard. The hydro corridor connects to an existing hydro distribution facility on the west side of Franklin Boulevard, between Athlone Road and Avenue Road. The impacts to utilities will be assessed in further detail during the development and evaluation of alternative solutions to the problem, and relocation and/or improvements to the existing utilities along the corridor would be addressed along with detail design efforts at future phases of the project.

In January, 2011, CND was provided an initial set of drawings showing the improvements proposed for Franklin Boulevard and the impact on existing utilities. In February, 2011, CND met with the Region of Waterloo and its engineering consultant (Stantec) to begin the detailed discussion of relocation requirements. The project is approximately 8km in length along the Franklin Boulevard corridor with approximately 3.5km of additional work on intersecting arterial and local roadways. The improvements include the installation of 11 roundabout intersections, replacing existing signalized intersections, as well as the reconstruction of the roadway to a four-lane divided urban roadway, with a continuous raised median along the corridor. The new roadway will also include a 3m wide mixed-use trail on both sides.

The Region of Waterloo noted that their preference was for aerial utilities to be relocated underground at the proposed roundabout intersections. CND noted that this would be very costly and that the Region of Waterloo would need to assume the full cost differential of underground placement versus aerial placement.

The tentative project timeline as of February, 2011 was as follows:

Utility Relocations: 2012 to 2014

Road Construction: 2013 to 2015

In mid February, 2011, CND did a preliminary costing scenario of overhead versus underground for the proposed roundabout at the intersection of Franklin Boulevard and Pinebush Road. The estimated overhead relocation cost was $400,000 versus an estimated underground relocation cost of $1,400,000. Both costs were just for relocation work directly at the intersection.

Franklin Boulevard is a key electrical artery for CND consisting of triple circuit and double circuit 27.6 kV lines along the section to be reconstructed. Part of the reason that so much electrical energy flows along Franklin Boulevard is that CND’s largest transformer station (Galt TS which is owned by Hydro One) is located at #666 Franklin Boulevard near Avenue Road mid way along the length of the construction project. A few photos are shown below of poles requiring relocation along Franklin Boulevard.

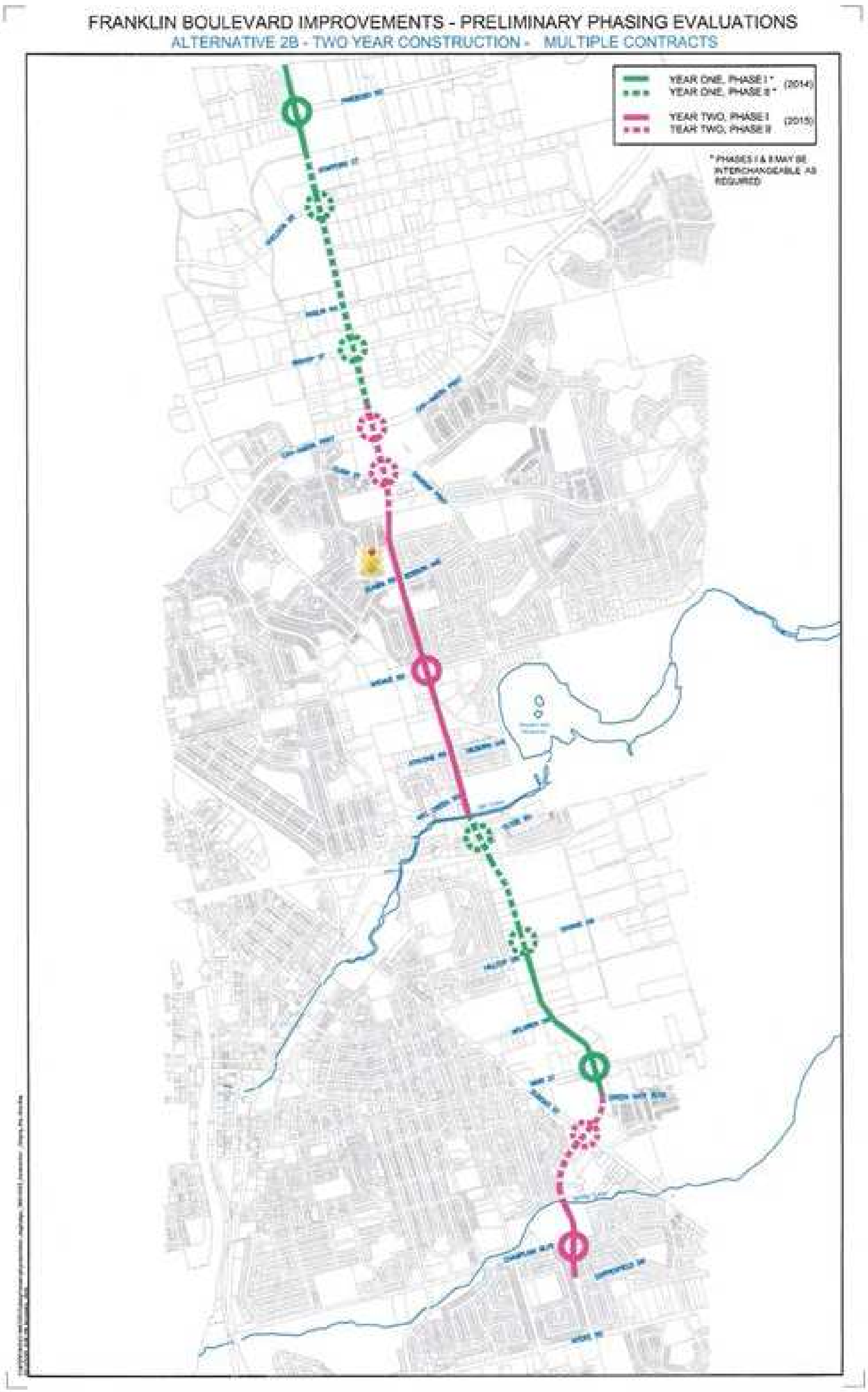
Poles Requiring Relocation in front of Galt TS

Poles Requiring Relocation – Pinebush Road at Franklin Boulevard

Poles Requiring Relocation – Sheldon Drive at Franklin Boulevard

Given the significant difference in cost, it was decided that the relocations would be overhead and all future design work was done on that basis.

In May, 2011, construction phasing was changed to a two year road construction time frame (2014 and 2015). See below for planned phasing.


FRANKLIN BOULEVARD IMPROVEMENTS - PRELIMINARY PHASING EVALUATIONS
ALTERNATIVE 2B - TWO YEAR CONSTRUCTION - MULTIPLE CONTRACTS
YEAR ONE, PHASE I *
YEAR ONE, PHASE II *
(2014)
YEAR TWO, PHASE I
YEAR TWO, PHASE II
(2015)
* PHASES I & II MAY BE INTERCHANGEABLE AS REQUIRED

As requested, CND began detailed design work to determine pole locations and anchoring requirements. This was needed by the Region of Waterloo to begin the process of property acquisition and easement acquisition for the relocated poles. Detailed hydro relocation design work continued throughout 2011 and 2012 by CND working collaboratively with the Region of Waterloo and its engineering consultant (Stantec). The 3m wide trail on both sides of Franklin Boulevard and the median in the centre of Franklin Boulevard created many relocation requirements along the main sections of Franklin Boulevard outside of the actual roundabout installations at the intersections. Where possible, the Region and Stantec made modifications to the roadway design to minimize hydro pole relocations and/or private property impacts. It wasn't possible in many instances due to other restrictions (ie. roadway design safety requirements, trail use safety requirements, grading requirements, etc.). However, each and every pole relocation was evaluated for alternatives to minimize as much as possible the relocation cost to CND and the Region of Waterloo since cost sharing would be done based on 50% of labour and labour saving devices as per the Public Service Works on Highways Act.

CND did not have enough internal engineering resources to keep up with the number of detailed design changes being made to the roadway design and still meet the time schedule of the Region of Waterloo. Schedule was very important to the Region of Waterloo given the time frame for property/easement acquisitions. In October, 2012, CND retained Stantec to provide engineering services for the Franklin Boulevard project. The initial focus was on the required Year 1 relocations. The Year 1 work included roundabouts at Pinebush Road, Sheldon Drive, Bishop Street, Clyde Road, Savage Drive and Main Street. The Year 2 work included roundabouts at Can Amera Parkway, Elgin Street/Saginaw Parkway, Avenue Road, Dundas Street and Champlain Boulevard.

At CND budget preparation time in the fall of 2012, it appeared as if hydro relocation work would begin in 2013 for 2014 construction by the Region of Waterloo for the Year 1 roundabouts. Hydro relocation work would proceed in 2014 for 2015 construction by the Region of Waterloo for the Year 2 roundabouts. A $3,000,000 allowance was made in the 2013 budget for required relocation work. Approximately one third of that cost ($1,000,000) would be recovered from the Region of Waterloo based on cost sharing. A $3,000,000 allowance (again with $1,000,000 contributed by the Region of Waterloo) was made in the 2014 budget prepared in the fall of 2012 for the Year 2 roundabouts.

Hydro design work has continued in 2013 for both Year 1 and Year 2 roundabouts with an increasing level of detail. Property/easement acquisitions by the Region of Waterloo have been slow. There will not be any hydro relocation work taking place in 2013 since it cannot be done without the land rights. As of July, 2013, the plan is for hydro relocations to take place in 2014 for the Year 1 roundabouts. Road construction of the Year 1 roundabouts would take place in 2015. Hydro relocations would take place in 2015 for the Year 2 roundabouts. Road construction of the Year 2 roundabouts would take place in 2016. CND has shifted the timing in its 2014 budget and capital plan so that $3,000,000 is provided for Franklin Boulevard relocations in 2014 and $3,000,000 is provided for Franklin Boulevard relocations in 2015. In each year, $1,000,000 of the cost would be contributed by the Region of Waterloo based on cost sharing.

The estimated $6,000,000 total cost is based on the current design and the number of poles requiring relocation directly at the roundabouts, along main sections of Franklin Boulevard due to the median and the trails and along intersecting side streets. It is a complicated project given the triple circuit and double circuit 27.6 kV poles affected. These poles carry more electrical energy than most other poles on our distribution system. Relocation work must be done while power is maintained except for brief outages to existing customers. The work area consists of both residential and industrial/commercial customers. Work must be completed on one of the busiest roads in Cambridge which increases the cost due to extensive traffic control requirements.

Customer Focus

This project is required by the Region of Waterloo. The road project is approved by the council of the Region of Waterloo who are elected by the citizens of the Region. CND's relocation timing is directly determined by the Region's schedule.

Operational Effectiveness

Many of the poles being relocated were installed in 1971. The expected life is 50 years. CND would likely be replacing many of these poles within ten years anyway as a result of end of life. Replacement as a result of relocation allows CND to receive funding for 50% of the labour and labour saving devices costs from the Region of Waterloo which lowers the cost to CND customers. Most of the poles along Franklin Boulevard do not have sufficient strength to meet the 2001 Canadian Standards Association C22.3 No. 1-01 Overhead Systems Standard for heavy loading (ie. ice and wind). A section of poles fell over in 2007 during an ice storm and were rebuilt. During an ice storm in April, 2012, two poles outside of the section replaced in 2007 began to lean. It is imperative from a safety and reliability perspective that the poles be upgraded to handle heavy ice/wind loading conditions.

CND is working closely with the Region of Waterloo and its engineering consultant (Stantec) to minimize the number of hydro pole relocations required through modifications to the roadway design. This effort minimizes the cost both to CND and the Region of Waterloo.

CND retained the same engineering firm (Stantec) as the Region of Waterloo when it needed external resources to most efficiently complete the necessary design work.

Public Policy Effectiveness

CND is obligated under the terms of the Public Service Works on Highways Act to relocate its plant. CND is working in tandem with the Region of Waterloo.

Financial Performance

This relocation work will be tendered to CND's current list of nine overhead contractors to ensure the best possible price to complete the relocation work. CND has worked with the Region of Waterloo and its engineering firm (Stantec) to minimize the number of required relocations. CND has engaged Stantec for assistance with the detailed design work which has the added benefit of getting a third party perspective and ideas to minimize relocation cost.

Options

For this project, the option to complete the relocations underground was eliminated early on due to the much higher cost. There isn't an option not to relocate otherwise poles would end up in the travelled portion of the roadway and CND would be in violation of its legal obligation to relocate its plant under the Public Service Works on Highways Act. Several options were looked at for all sections requiring relocation work. Considerations included safety, technical feasibility, cost, impact to customer and property/easement requirements.

APPENDIX N

CND Franklin Blvd Pole Replacements Project

Franklin Boulevard Pole Replacements

This project replaces poles on Franklin Boulevard that are unaffected by planned roundabout relocations. A section of poles along Franklin Boulevard between Bishop Street and Sheldon Drive fell over in 2007 during an ice storm and were rebuilt. During an ice storm in April, 2012, two poles outside of the section replaced in 2007 began to lean. A photo of CND's truck holding one of the poles to prevent it from falling over is shown in the article below from the Cambridge Times. Both poles that leaned have since been replaced with new, stronger poles.

The poles are primarily dated 1971 and no longer have the strength to handle severe ice/wind loading for the triple circuit 27.6 kV lines attached to them. This has been confirmed during two actual events. The triple circuit line runs along Franklin Boulevard from Clyde Road to just South of Pinebush Road. Some of the poles along this stretch of Franklin Boulevard are being replaced anyway as part of the planned Franklin Boulevard roundabout relocations and other road improvements. These poles are included in the Franklin Boulevard roundabouts relocation project. CND is trying to replace the poles only once. It does not want to replace them and then have to relocate them. Therefore, it has held off on a complete pole replacement program along Franklin Boulevard. If the Franklin Boulevard roundabout project continues to get delayed then a complete pole replacement program will be required to reduce the risk of any more pole failures.

The drawings shown below detail the proposed Year 1 and Year 2 road improvement work along Franklin Boulevard. For CND, Year 1 represents relocations required in 2014 and Year 2 represents relocations required in 2015. The poles are colour coded based on current roadway design and resulting pole relocation requirements. Roadway design changes are still being made which could reduce the relocation requirements. There are existing underground cables at some of the intersections which need to be relocated. This work is not shown on the drawings.

Green coloured poles can remain "as is" in their current location. There is no conflict with the roadway improvements and the poles are newer. There are 17 of them. Blue coloured poles require relocation as a result of roadway improvements. There are currently 122 main line poles requiring relocation. Stub/secondary poles are additional to this number. Red coloured poles are poles primarily dating from 1971 that contain three 27.6 kV circuits and are at risk of failure during severe ice/wind loading due to age and too low of class (strength) of pole. There are 13 of them. $463,767 has been budgeted in 2014 to replace these poles. Design work will be sufficiently along to confirm that the 13 poles do not have to be relocated in the future.

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Print

UPDATE: The leaning poles of Franklin

April 12, 2013

As of about 4:30 p.m. Friday, hydro crews had restored power to the vast majority of Cambridge and North Dumfries.
A handful of isolated incidents, impacting 40 to 50 customers, have yet to be addressed, but power is expected back on in those areas by 8 p.m.
During the weekend, crews will be responding to customer requests to reconnect, after storm damage took them offline. Safety approvals are needed in some cases before power can be restored.
*****
Several thousand Cambridge residents were left without power Thursday evening, after the supply went down at about 8:30 p.m.

The leaning poles of Franklin. This pole is located on Franklin Boulevard, near Avenue Road. *Richard Vivian*

The outage, which impacted about 26,000 people in Galt and Preston, lasted until about midnight, though it came back sooner in some areas.

"Temporarily we did switching – some of it automatic, some of it manual – where we re-directed the feed so that they were being supplied by the Preston transformer station or from our MTS1 transformer station," explained Barb Shortreed of Cambridge and North Dumfries Hydro.

"We systematically designed a plan and we systematically redirected the 12 feeders one by one to alternate supply source."

As of about 9:20 a.m., a couple hundred customers throughout the utility company's 305-square-kilometre delivery territory remained without power because of isolated problems caused by the freezing rain.

Trucks were also called in to prop up a pair of hydro poles on Franklin Boulevard that need to be replaced.

"We have our digger trucks supporting those two main poles and contractor crews, if they're not on-site they imminently will be on-site, to replace those two poles," Shortreed said.

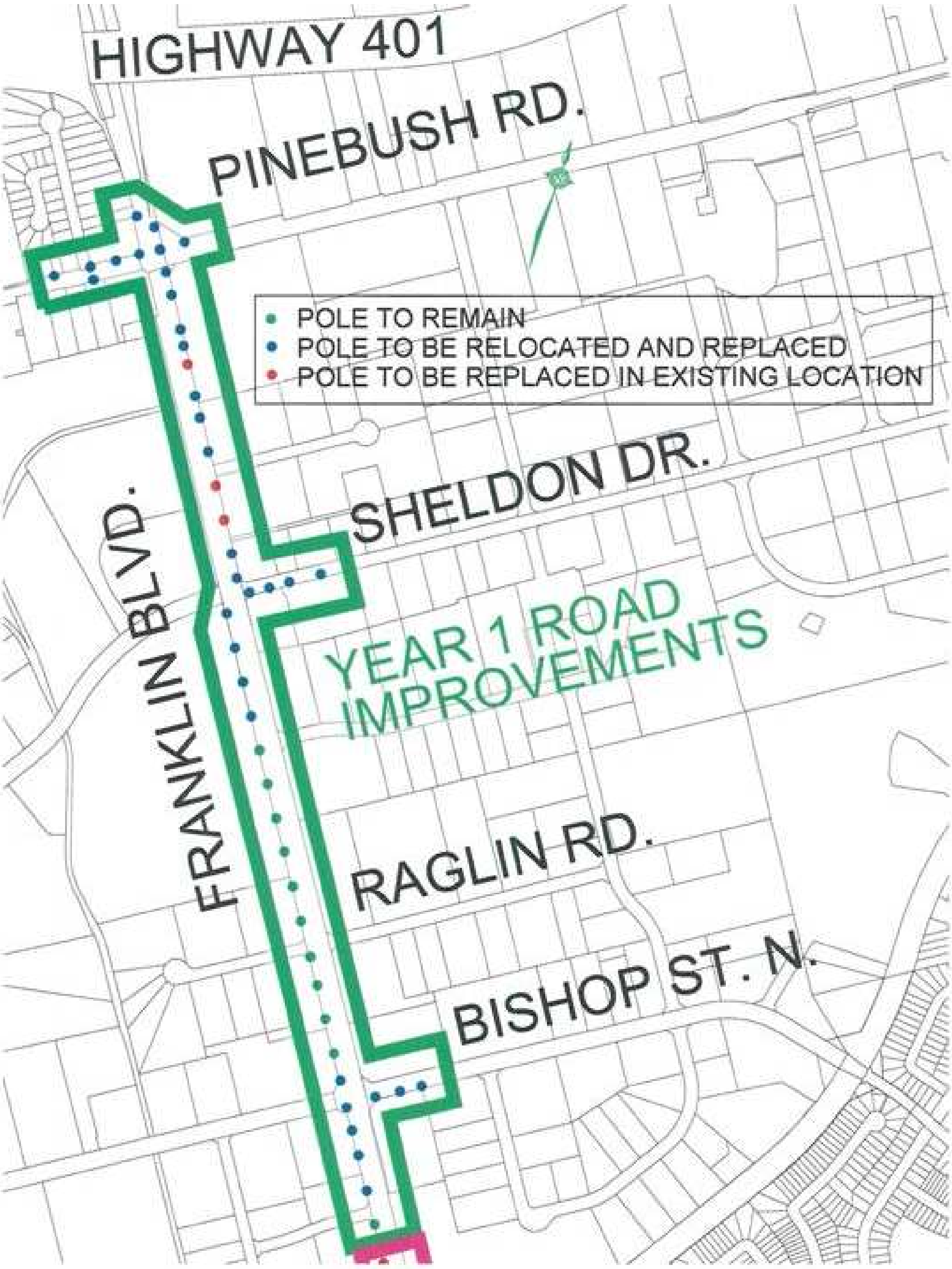
"We have a number of fairly intensive projects that, at this point, are not impacting a large number of customers, but they are fairly labour intensive under these conditions to get repaired.

"We appreciate our customers' patience while we work to get this back to normal."

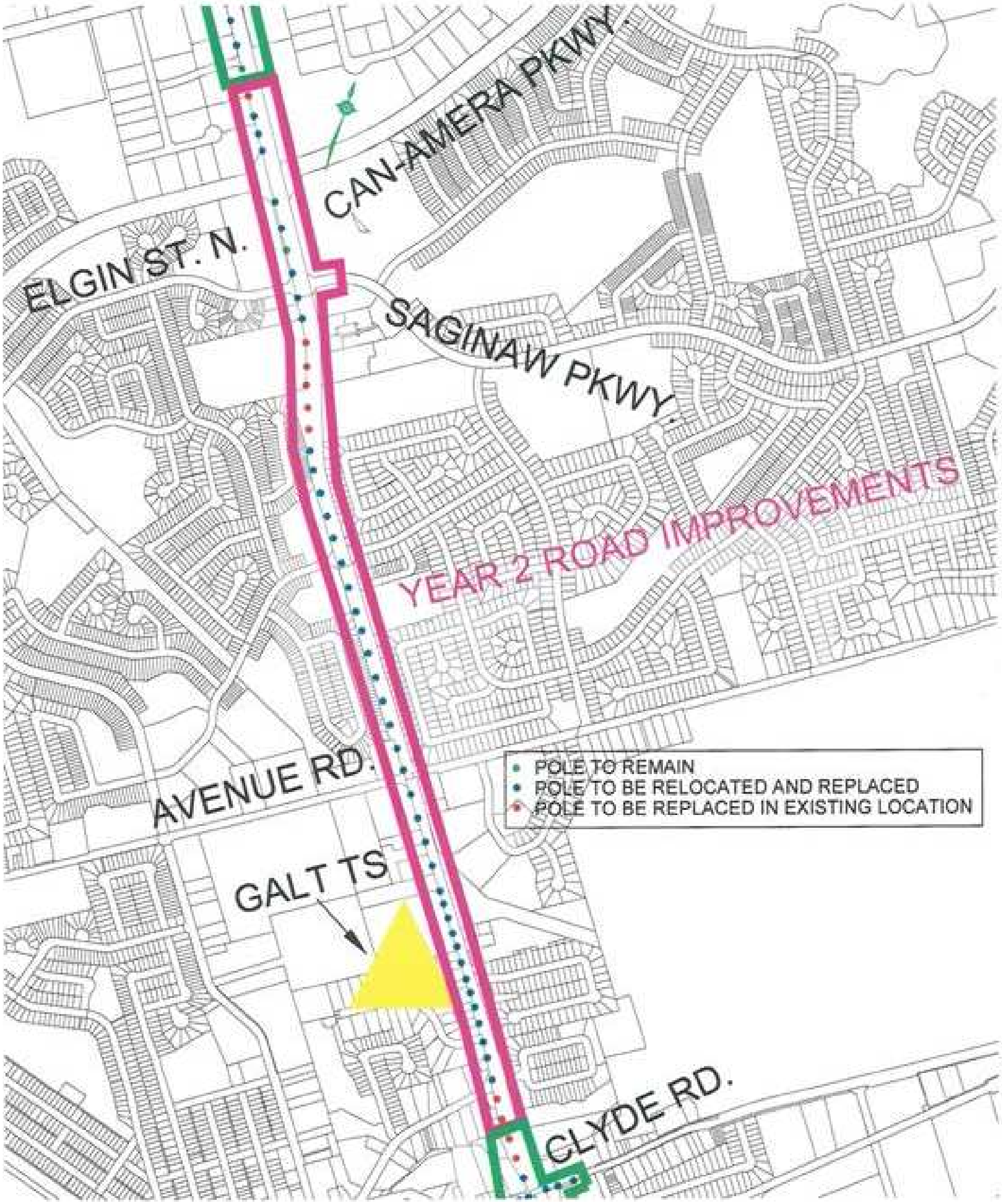
Schools throughout Cambridge are open today, both public and Catholic, after being closed on Thursday. The city, however, has cancelled adult day programs at W.E. Pautler Centre and St. Ambrose Church for the day.

The city has also shut down a portion of Black Bridge Road (expected to remain closed through the weekend because of high water levels) and Dundas Street (related to Friday morning's weather.

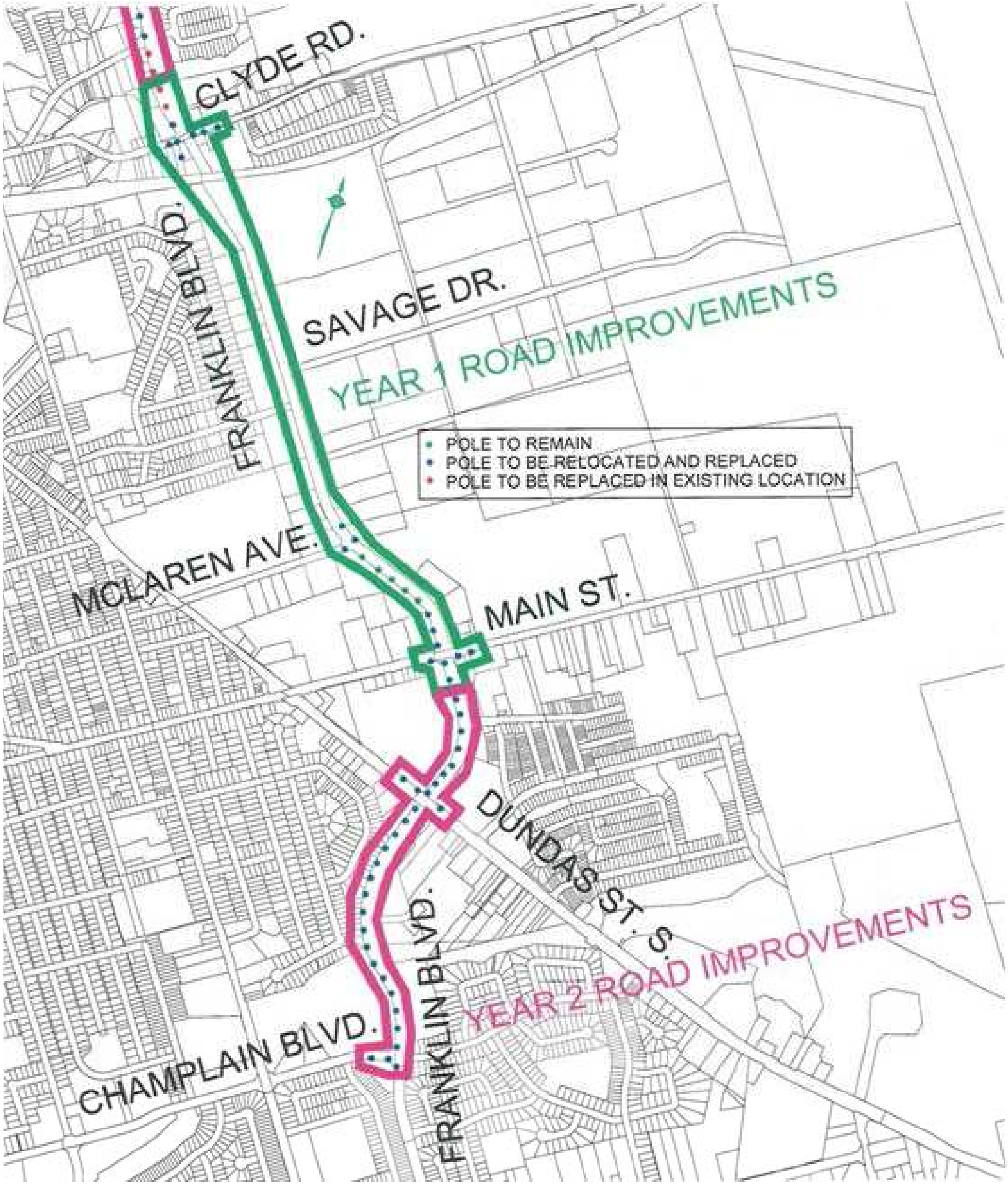
Similarly, the walking trail under Highway 401 is closed and flooding is also expected in Soper Park through Friday.



Franklin Boulevard – South of Bishop Street to Pinebush Road



Franklin Boulevard – Clyde Road to South of Bishop Street



Franklin Boulevard – Champlain Boulevard to Clyde Road

Customer Focus

This project provides value to customers because it ensures that a critical path for power flow can withstand severe ice/wind events. Over 18,000 CND customers are supplied from the 27.6 kV feeders running North and South from Galt TS along Franklin Boulevard.

Operational Effectiveness

Many of the poles being replaced were installed in 1971. The expected life is 50 years. CND would likely be replacing many of these poles within ten years anyway as a result of end of life. Replacement poles not requiring relocation in 2014 to ensure that the poles do not fail during severe ice/wind weather conditions is prudent. Most of the poles along Franklin Boulevard do not have sufficient strength to meet the 2001 Canadian Standards Association C22.3 No. 1-01 Overhead Systems Standard for heavy loading (ie. ice and wind). A section of poles fell over in 2007 during an ice storm and were rebuilt. During an ice storm in April, 2012, two poles outside of the section replaced in 2007 began to lean. It is imperative from a safety and reliability perspective that the poles be upgraded to handle heavy ice/wind loading conditions.

CND is working closely with the Region of Waterloo and its engineering consultant (Stantec) to ensure that poles being replaced under this project do not require relocation later on to avoid the cost of replacing them twice.

Public Policy Effectiveness

The risk of failure is not just theoretical. There have been two separate events in 2007 and 2012 where similar poles have failed in service. These triple circuit poles need to be replaced as soon as possible to prevent future failures and the resulting safety risk and power outages.

Financial Performance

This project will not affect the financial viability of CND.

Options

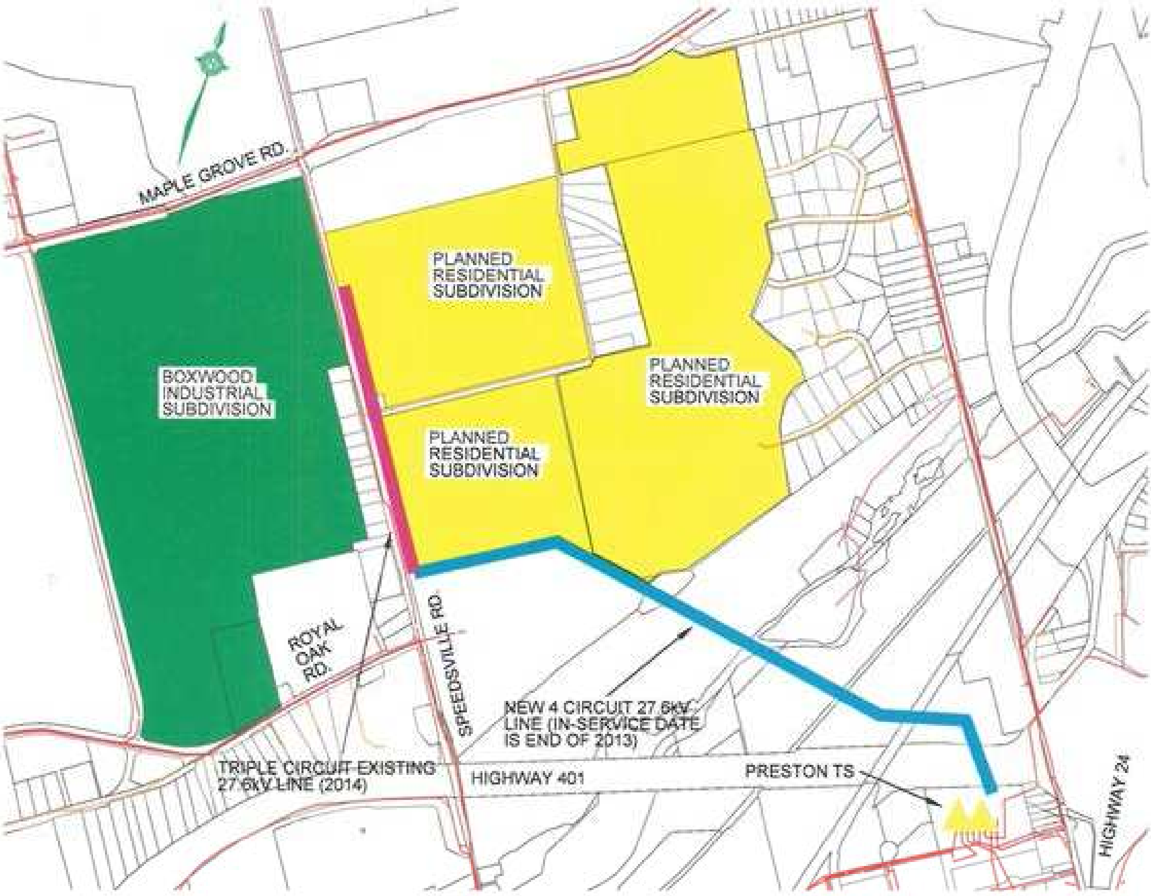
The “do nothing” option is not viable since poles will continue to fail during similar severe ice/wind weather conditions. The cost to convert to underground would be many times higher than pole replacements. The poles, once replaced, should provide 50 years of service.

APPENDIX O

CND Triple Circuit on Speedsville Rd Project Report

Triple Circuit Existing 27.6 kV Line – Speedsville Rd. – North of Royal Oak Rd. to Boxwood Industrial Subdivision

The Boxwood Industrial Subdivision being developed by the City of Cambridge is providing 110 acres of new serviced industrial land in the North-West part of Cambridge. A map is shown below. Industrial lots will be available for sale in the fall of 2013. This industrial subdivision, in conjunction with planned residential subdivisions in the area, has created the need for additional electrical capacity.



The present 27.6 kV feeders servicing the North-West industrial area are 21M23, 21M25, 21M28 and 21M29 supplied from Preston TS. These four feeders averaged 300 Amps of peak load in 2012. That is the ideal maximum so that loads can be transferred to an adjacent feeder during a contingency. With the planned Boxwood Industrial Subdivision and other increasing industrial load in the North-West part of the

City of Cambridge, a decision was made by CND in 2012 to construct new 27.6 kV feeder lines into the area from Preston TS which is the closest supply point. These lines are being constructed between Preston TS and Speedsville Road. These feeder lines will also supply the over 1,800 residential units planned in the Hunt Club area subdivisions (East side of Speedsville Road North of Highway 401). Work was begun in 2012 and will be completed in 2013.

As industrial lots are sold in the Boxwood Industrial Subdivision, additional 27.6 kV feeder capacity will be required to get the power North on Speedsville Road. This 1km project will provide three circuits along Speedsville Road from North of Royal Oak Road to the Boxwood Industrial Subdivision at a cost of $370,520. There is an existing single circuit 27.6 kV line there now. The route chosen is the most direct route and therefore the least costly.

This project was originally budgeted in 2013. Engineering design work was completed by Stantec due to insufficient CND engineering resources. Construction was postponed to 2014 given the actual timing of the Boxwood Industrial Subdivision and delays in other planned industrial load in the area.

Customer Focus

The new industrial and residential customers need an adequate and reliable supply of power. This project delivers on that need.

Operational Effectiveness

This project delivers on CND's system reliability and quality objectives. The 27.6 kV feeder length is being kept as short as possible (ie. diagonal from Preston TS and then directly North on Speedsville Road) to minimize line exposure.

Public Policy Effectiveness

CND is obligated under the terms of its license to supply power to new customers.

Financial Performance

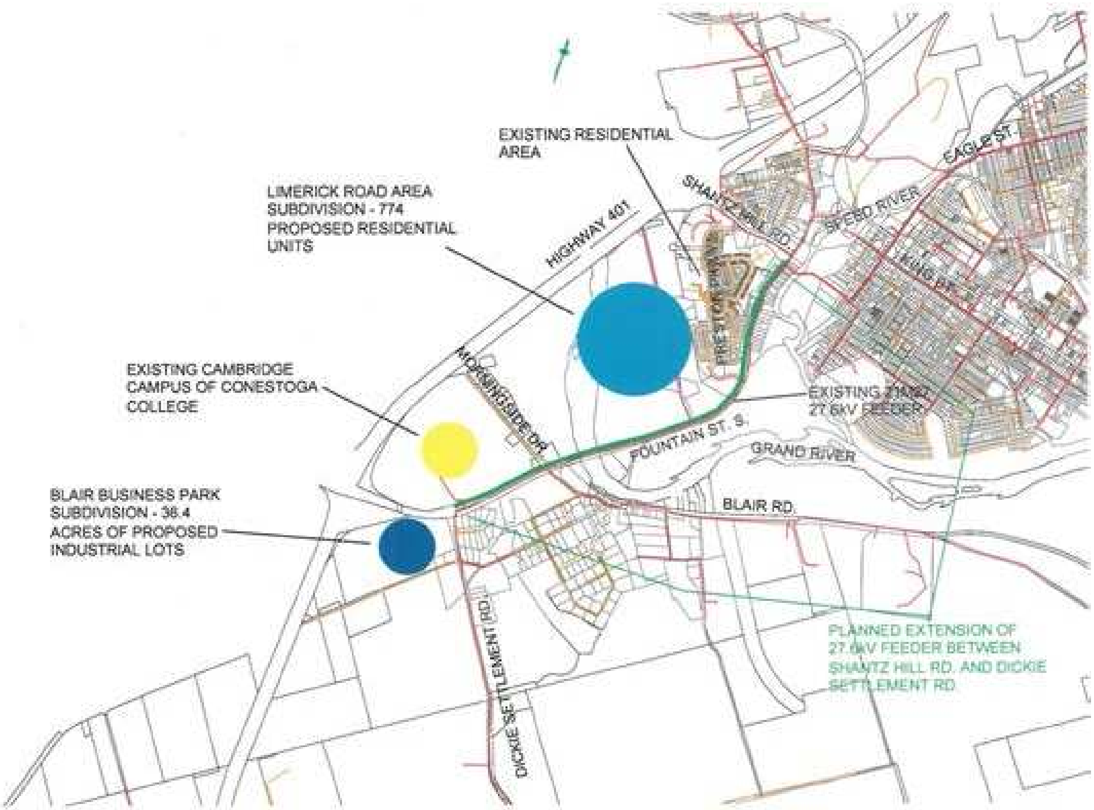
The work will not impair the long term financial viability of CND.

APPENDIX P

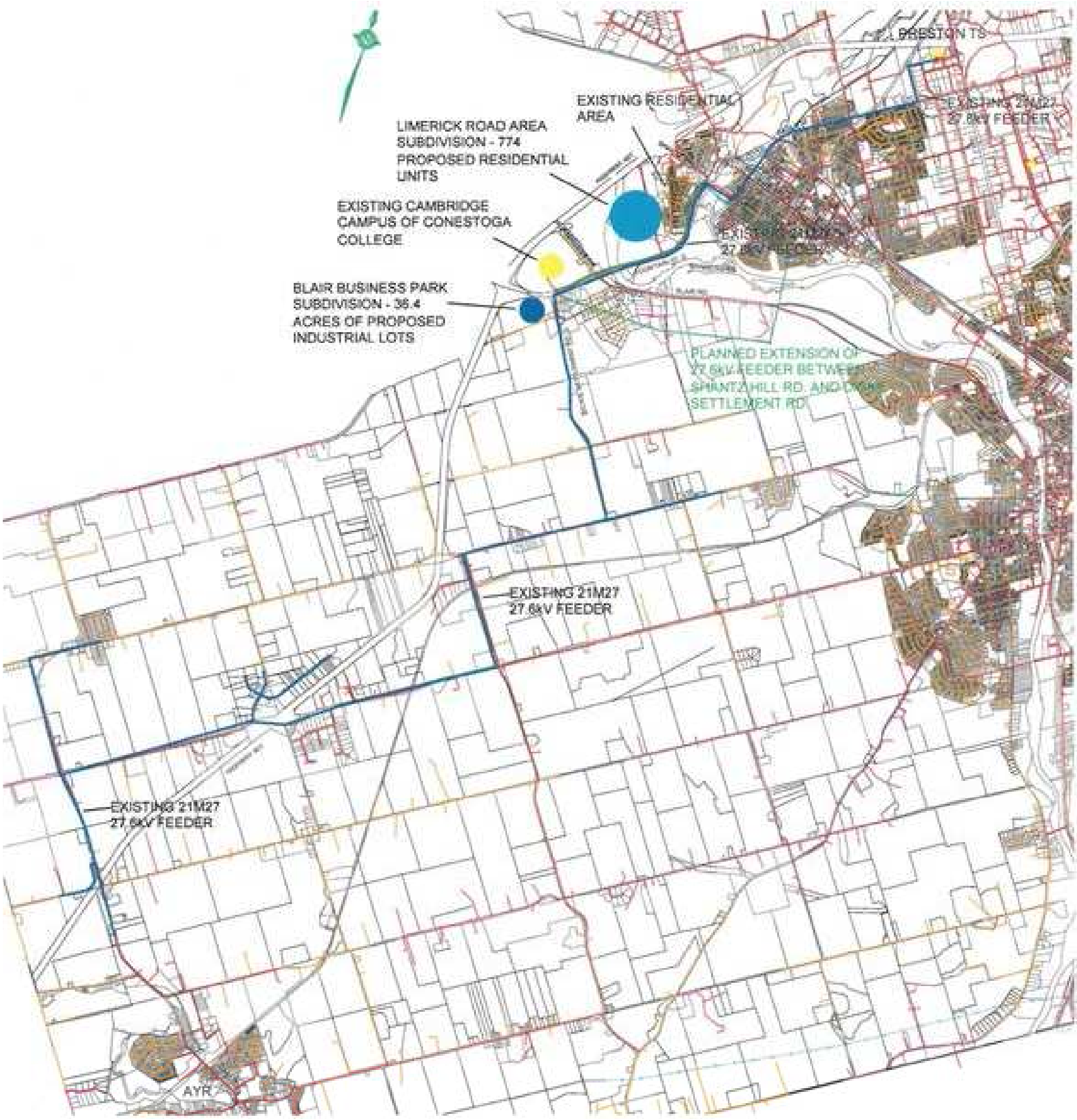
CND Double Circuit Existing 27.6 kV Overhead Line – Fountain St Project Report

Double Circuit Existing 27.6 kV Line – Fountain St. S. (Shantz Hill Rd. to Dickie Settlement Rd.)

This project is required to connect a new residential subdivision in the Limerick Road area. This subdivision will consist of 774 residential units. Using 3kW per residential unit, the additional load will be 2,322kW (774 units x 3kW per unit). The work is also required to connect a new industrial subdivision located at the intersection of Fountain Street South and Dickie Settlement Road. This subdivision will consist of 36.4 acres of serviced industrial lots. Industrial development has a high degree of variability in kiloWatts (kW) per acre. The use of the lots could range from a warehouse with primarily lighting load to a manufacturing plant. Looking at a completed industrial subdivision, the peak demand ranged from 5kW per acre to nearly 700kW per acre. On average, the peak demand was 92kW per acre in one particular subdivision. During the planning stages, it is usually unknown exactly which industries will develop in an industrial subdivision. It depends upon land sales. For planning purposes, the use of 3,349kW (36.4 acres x 92kW per acre) is used.



The present 27.6 kV feeder along this section of Fountain Street South is 21M27 which is shown in blue on the drawing below and is supplied from Preston TS located near the intersection of Highway 24 and Highway 401. In July, 2013, the peak load on the 21M27 feeder was 309A. 300A is the ideal maximum so that load can be transferred to an adjacent feeder during a contingency. There is insufficient capacity on the present feeder to accommodate the new growth which will add about 130A of load at 27.6kV.



Therefore, capacity is one issue. A second issue is reliability. The 21M27 feeder is over 30km in length going from Preston TS to just North of Ayr. It is a long, rural feeder servicing primarily customers in the Township of North Dumfries but also some urban customers primarily in the Preston Parkway area. The number of autorecloses and lockouts on the 21M27 feeder for the past five years are shown below.

	2012	2011	2010	2009	2008
21M27 # of Autorecloses	10	8	5	10	10
Avg. # of Autorecloses (all feeders)	3.9	3.6	3.5	4.6	3.8
21M27 Lockouts	1	1	0	2	2
Avg. # of Lockouts (all feeders)	0.7	0.4	0.4	0.4	0.8

As can be seen from the data, the 21M27 feeder has a much higher rate of both autorecloses and lockouts than our average 27.6 kV feeder. In terms of customer satisfaction, it is not a good choice for 774 new residential units or the new industrial subdivision. Improvements have been made to the 21M27 feeder (ie. installation of lightning arresters, porcelain insulator replacements, etc.) but the sheer length of the feeder (30km+) results in a lot of exposure especially during storms.

Conestoga College developed a Cambridge campus in 2011 at the intersection of Fountain Street South and Dickie Settlement Road that has space for future growth. The extension of a second 27.6 kV circuit along Fountain Street South will allow the supply to the existing campus to be changed from 21M27 resulting in improved reliability. It will also provide additional capacity for future expansion of the campus.

The Region of Waterloo plans to replace the Fountain Street bridge crossing the Grand River. The project will include areas of urban enhancement both East and West of the bridge on Fountain Street. The schedule is presently 2015 but there is the potential that the time frame will be moved back to 2017. CND will work with the Region of Waterloo to ensure that the new double circuit line will not conflict with bridge or roadway plans.

Timing of construction for this project will be critical because of an existing Osprey nest on one of CND's main line poles at the Grand River. There are also bald eagles in the area.

CND plans to rebuild the 2.8km section of existing single circuit 27.6 kV line along Fountain Street South between Shantz Hill Road and Dickie Settlement Road in 2014 to a double circuit 27.6 kV line to address the capacity and reliability issues. Building permits are expected to be issued in the residential subdivision in late 2014 or early 2015. The industrial subdivision plan is expected to be registered in 2014 or 2015.

CND considered other options to get additional power into this area. One option was to extend three phase 27.6 kV along Blair Road from where it currently dead-ends on

George Street, connect into the existing three phase 27.6 kV in Blair and then double circuit along Fountain Street South between Dickie Settlement Road and Preston Parkway. This would reduce the double circuit requirement along Fountain Street South from 2.8km to 2km. However, a new 1km section of line would be required along Blair Road beginning at George Street. As well, an “end of life” 1.7km section of 4.8 kV line would have to rebuilt at three phase 27.6 kV along Blair Road. The plan was to rebuild this line at single phase 16 kV in 2015. The Blair Road option would require more line work than double circuiting the line from Shantz Hill Road as proposed. The Blair Road option would also be difficult to construct since that part of Blair Road is narrow, has some curves in the road and some larger trees. Guying easements might be required and tree trimming/removals would be required. The Blair Road route would also take the new feeder directly through the “rare charitable research reserve”. Overall, the Blair Road option would be more costly and less desirable than the option of an extension from Shantz Hill Road.

Part of the line extension along Blair Road could potentially be made along a walking trail instead of along the roadway but extensive forestry would be required and the line would become inaccessible. There would be a significant impact to the trail.

A transformer station has been considered in the Western part of the Township of North Dumfries near to where the 230 kV transmission lines going to Detweiler TS in Kitchener are located. This would reduce the length of the 21M27 feeder and reduce the feeder loading. There is not enough development forecasted to justify the cost of a transformer station solution.

Customer Focus

New customers need to be connected and they need an adequate and reliable supply of electricity. This project meets all of those requirements. The project will be engineered in consultation with the Region of Waterloo to ensure that pole locations do not conflict with future roadway and bridge improvements.

Operational Effectiveness

This project will ensure an adequate and quality supply of electricity in the area. It will also improve the present supply for existing customers including the Cambridge campus of Conestoga College.

Public Policy Effectiveness

CND is providing the necessary electrical infrastructure to support development in accordance with the obligations of its license.

Financial Performance

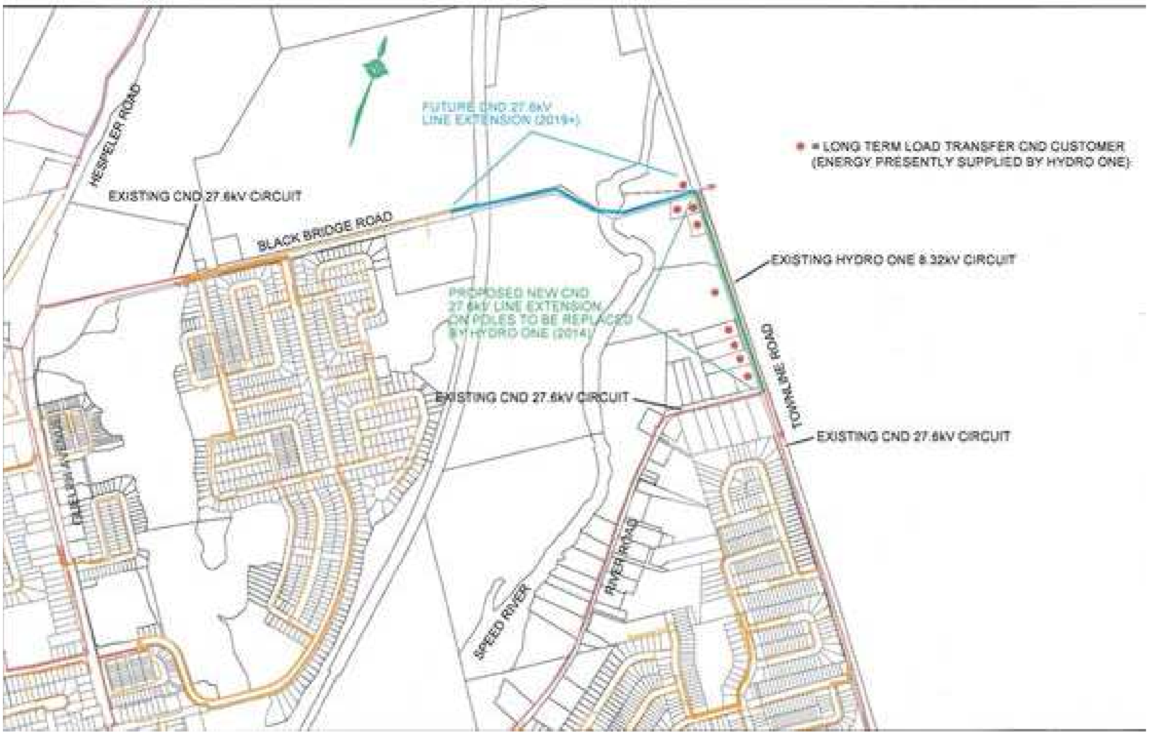
The scale of the project will not affect CND's financial viability.

APPENDIX Q

CND Townline Rd Project Report

Townline Rd. between River Rd. and Black Bridge Rd.

There are nine long term load transfer customers located along Townline Road between Black Bridge Road and River Road in Cambridge. They are CND customers but the energy is supplied by Hydro One from its 8.32 kV overhead line. CND presently does not have any existing primary lines along this section of Townline Road. A sketch of the area is shown below.



In 2008, CND and Hydro One jointly studied resolution of long term load transformers given an approaching Ontario Energy Board deadline. The deadline has subsequently been extended until June 30, 2014. The relevant section from the Distribution System Code is shown below.

6.5.4 During the period between May 1, 2002 and June 30, 2014, a geographic distributor that services a load transfer customer shall either:
a. negotiate with a physical distributor that provides load transfer services so that the physical distributor will be responsible for providing distribution services to the

customer directly, including application for changes to the licensed service areas of each distributor; or
b. expand the geographic distributor's distribution system to connect the load transfer customer and service that customer directly.
Once a load transfer customer enters into a Connection Agreement or implied contract with the physical distributor, the physical distributor shall have sole responsibility for that customer.

CND selected the option to extend its facilities in this case to service the nine long term load transfer customers directly. The customers will be retained by CND with Hydro One replacing its current poles with taller ones to accommodate construction of a CND 27.6 kV line on top of the new poles with Hydro One's 8.32 kV line located below it. CND would be a tenant on these Hydro One owned poles.

CND has held off completing the work as the deadline for resolution of long term load transfers gets extended.

The estimated "Make Ready" cost from Hydro One was $164,240 plus tax in 2009. The Hydro One work is the largest part of the project cost.

In the future (2019+), this extended 27.6/16 kV line would be used to loop to the existing 27.6 kV line along Black Bridge Road. Additional residential subdivision development is expected.

CND has budgeted $232,600 to extend 27.6 kV 0.5km along Townline Road between River Road and Black Bridge Road in 2014 to retain the nine existing customers. This work will prevent major bill increases to the nine customers which would occur if transferred to Hydro One. It will also get CND closer to a backfeed of its existing 27.6/16 kV lines along Black Bridge Road.

<u>Customer Focus</u>

The amount of the bill is an ongoing concern with customers. A transfer to Hydro One would result in bill increases in the order of 25% as Hydro One rates and loss factor are much higher than CND rates and loss factor. The proposed work avoids those bill increases. The future loop feed that this project works towards will benefit existing and future customers in this area of Cambridge.

Operational Effectiveness

The future loop feed will improve reliability in the area. The replacement of the existing 4.8 kV transformers mostly inherited from Ontario Hydro in 1978 with new 16 kV transformers will improve reliability to the nine customers going forward.

Public Policy Effectiveness

It is an Ontario Energy Board mandate to resolve long term load transfer situations by June 30, 2014.

Financial Performance

The scale of the project will not affect CND’s financial viability.

APPENDIX R

LETTER FROM HYDRO ONE : REGIONAL PLANNING STATUS KWCG REGION

Hydro One Network Inc.
483 Bay Street
6th Floor, South Tower
Toronto, ON M5G 2P5
www.HydroOne.com

Tel: (416) 345.5420
Fax: (416) 345.4141
ajay.garg@HydroOne.com

September 20, 2013

Ian Miles, President & CEO
Cambridge North Dumfries Hydro Inc.
1500 Bishop Street
P.O. Box 1060
Cambridge, Ontario, N1R 5X6

Dear Mr. Miles:

Sub: Regional Planning Status, Kitchener-Waterloo-Cambridge-Guelph (KWCG) Region

In reference to your request for a regional planning status letter, please note that Cambridge North Dumfries Hydro Inc. (CNDHI) belongs to the Kitchener-Waterloo-Cambridge-Guelph (KWCG) Region. The region includes the municipalities of Kitchener, Waterloo, Cambridge and Guelph, as well as portions of Perth and Wellington counties.

This letter is to confirm that a regional planning process for KWCG Region is already underway. The "KWCG planning group", is led by the OPA and includes representatives from Hydro One, the IESO and the LDCs in the KWCG area. This planning group was established to assess the reliability needs of the KWCG area, and to develop an integrated plan to assess the appropriate mix of investments(e.g., CDM, DG and wires) to address the electricity needs of the area. CNDHI has been an active participant on the KWCG regional planning group. At this time, the planning process is transitioning to align with the new regional infrastructure planning process established by the OEB. Details of the process can be found in the Process Planning Working Group (PPWG) Report.[1] It is expected that an Interim KWCG Integrated Regional Resource Plan (IRRP) to address near and medium-term needs will be complete in 4th quarter of 2013 and a final KWCG IRRP addressing longer term needs for this region will be completed by the end of 4th quarter 2014.

In brief, the draft KWCG IRRP confirms that the demand for electricity in the area is expected to grow substantially over the next 20 years, driven by population growth and strong economic activity. Three of the KWCG subsystems, namely the South-Central Guelph, Kitchener-Guelph and Cambridge subsystems, already exceed their supply capacity. In addition, the Kitchener, Cambridge, and Waterloo-Guelph subsystems do not comply with prescribed service interruption criteria. In combination with

[1] Final Planning Process Working Group (PPWG) Report to the Board.

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conservation and distributed generation resources, the KWCG IRRP study results identified the following two transmission reinforcements to address near and medium-term reliability needs of the KWCG area:

- Guelph Area Transmission Refurbishment (GATR) - installing two new 230/115 kV autotransformers, four 115 kV breakers, and rebuilding approximately 5 km of existing 115 kV transmission line between Campbell TS and CGE junction in Guelph to a double-circuit 230 kV transmission line and two 230kV circuit breakers located at Guelph North Junction.

- Preston TS - Install a second 230/115 kV autotransformer at Preston TS and associated switching and reactive support.

The above two wires solutions are now being further developed in as part of the Regional Infrastructure Plan for the KWCG area. A Section 92 application for the GATR project has been already filed with the OEB for approval with an in-service of date of December 2015. The need for second 230/115kV autotransformer at Preston TS is identified to be by the end of 2015 and its in-service date will be confirmed as detailed scope and cost estimates for the project are developed.

Hydro One will later undertake to assess and develop any longer-term Regional Infrastructure Plan(s) following the completion of the IRRP. Hydro One looks forward to working with CNDHI and other stakeholders to complete the Regional Infrastructure Plan for the KWCG region.

If you have any further questions, please feel free to contact me.

Sincerely,

Ajay Garg | Manager, Regional Planning Coordination and Load Connections
Hydro One Networks Inc.

cc:
Bing Young, Director – Transmission System Development
Farooq Qureshy, Manager – Transmission Planning (Central and East)
Brad Colden, Manager – Customer Business Relations

APPENDIX 2-8B

APPENDIX 2-AB CAPITAL EXPENDITURE SUMMARY

Appendix 2-AB
Table 2 - Capital Expenditure Summary from Chapter 5 Consolidated Distribution System Plan Filing Requirements

First year of Forecast Period: *2014*

CATEGORY	Historical Period (previous plan[1] & actual)															Forecast Period (planned)				
	2009			2010			2011			2012			2013			2014	2015	2016	2017	2018
	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual	Var	Plan	Actual[2]	Var					
	$ '000		%	$ '000		%	$ '000		%	$ '000		%	$ '000		%	$ '000				
System Access	-	3,966	--	-	4,152	--	-	3,140	--	-	3,032	--	8,411	-	-100.0%	8,123	6,857	4,143	4,020	3,496
System Renewal	-	5,240	--	-	6,262	--	-	3,999	--	-	2,886	--	7,089	-	-100.0%	7,140	7,380	4,033	3,766	3,554
System Service	-	54	--	-	425	--	-	716	--	-	835	--	760	-	-100.0%	975	342	342	342	16,842
General Plant	-	1,257	--	-	1,436	--	-	2,187	--	-	10,699	--	2,864	-	-100.0%	3,817	2,169	2,135	2,270	2,060
Capital Contributions	-	- 2,326	--	-	- 1,804	--	-	- 1,342	--	-	- 368	--	- 3,041	-	-100.0%	- 2,406	- 3,800	- 2,100	- 2,000	- 1,800
Change in WIP		- 118			- 576			- 338		-	- 3,602	--								
TOTAL EXPENDITURE	-	8,073	--	-	9,895	--	-	8,362	--	-	13,482	--	16,083	-	-100.0%	17,649	12,948	8,553	8,398	24,152
System O&M	$ -	$ 3,376	--	$ -	$ 3,448	--	$ -	$ 3,769	--	$ -	$ 5,428	--	$ 4,665	$ -	-100.0%	$ 5,343	$ 5,240	$ 5,036	$ 4,929	$ 4,820

Notes to the Table:

1. Historical “previous plan” data is not required unless a plan has previously been filed
2. Indicate the number of months of 'actual' data included in the last year of the Historical Period (normally a 'bridge' year): 0

Explanatory Notes on Variances (complete only if applicable)

Notes on shifts in forecast vs. histrical budgets by category

Notes on year over year Plan vs. Actual variances for Total Expenditures

Notes on Plan vs. Actual variance trends for individual expenditure categories

APPENDIX 2-9

APPENDIX 2-DB CAPITALIZATION OF OVERHEAD

File Number:	**EB-2013-0116**
Exhibit:	**2**
Appendix:	**2-9**
Page:	**1 of 1**
Filed:	**October 1,2013**

Appendix 2-DB
Overhead Expense

The following table should be completed based on the information requested below. An explanation should be provided for any blank entries. The entries should include overhead costs that are currently capitalized on self-constructed assets under revised CGAAP or ASPE (with the changes in capitalization and depreciation expense policies).

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Nature of the Overhead Costs	**Dollar Impact on PP&E Historic Year**	**Dollar Impact on PP&E Bridge Year**	**Dollar Impact on PP&E Test Year**	**Dollar Impact - PP&E Variance Test versus Bridge**	**Dollar Impact - PP&E Variance Test versus Historic**	**Directly Attributable? (Y/N)**	**Reasons why the overhead costs are allowed to be capitalized under CGAAP or ASPE (with the changes in policies) given limitations on capitalized overhead**
employee benefits				$ -	$ -		
costs of site preparation				$ -	$ -		
initial delivery and handling costs				$ -	$ -		
costs of testing whether the asset is functioning properly				$ -	$ -		
professional fees				$ -	$ -		
				$ -	$ -		
costs of opening a new facility				$ -	$ -		
costs of introducing a new product or service (including costs of advertising and promotional activities)				$ -	$ -		
costs of conducting business in a new location or with a new class of customer (including costs of staff training)				$ -	$ -		
administration and other general overhead costs				$ -	$ -		
				$ -	$ -		
				$ -	$ -		
				$ -	$ -		
Insert description of additional item(s) and new rows if needed.				$ -	$ -		
Total	$ -	$ -	$ -	$ -	$ -		

The following table should be completed based on the information requested below. An explanation should be provided for any blank entries. The entries should include overhead costs that were capitalized on self-constructed assets under CGAAP but are no longer capitalized under revised CGAAP or ASPE (with the changes in capitalization and depreciation expense policies) and are included in OM&A.

	(A)	(B)	(C)	(D)	(E)	(F)	(G)
Nature of the Overhead Costs	**Dollar Impact on OM&A Historic Year**	**Dollar Impact on OM&A Bridge Year**	**Dollar Impact on OM&A Test Year**	**Dollar Impact - OM&A Variance Test versus Bridge**	**Dollar Impact - OM&A Variance Test versus Historic**	**Directly Attributable? (Y/N)**	**Reasons why the overhead costs are allowed to be capitalized under CGAAP or ASPE (with the changes in policies) given limitations on capitalized overhead**
employee benefits - **health and safety**	$ 226,413	$ 258,705	$ 281,255	$ 22,550	$ 54,842	N	
costs of site preparation - **removal costs**	$ 333,253	$ 600,835	$ 806,208	$ 205,373	$ 472,955	N	
initial delivery and handling costs - **stores**				$ -	$ -		Stores/purchasing /inventory costs that are directly attributable to a capital project are capitalized;otherwise such costs are expensed through OM&A
costs of testing whether the asset is functioning properly				$ -	$ -		If the testing of the asset is prior to installation,it is capitalized;otherwise such costs are expensed through OM&A
professional fees				$ -	$ -		Professional fees are capitalized if they specifically relate to a capital project;otherwise theyare expensed through OM&A
							N/A - no new facilities have been opened
costs of opening a new facility				$ -	$ -		N/A - no new products or services have been introduced
costs of introducing a new product or service (including costs of advertising and promotional				$ -	$ -		N/A - no business in a new location has occurred and no new customer classes have been introduced
costs of conducting business in a new location or with a new class of customer (including costs of				$ -	$ -		
administration and other general overhead costs - **municipal taxes**	$ 70,581	$ 72,652	$ 74,832	$ 2,180	$ 4,251	N	
Building expense	$ 131,135	$ 172,913	$ 186,368	$ 13,455	$ 55,233	N	
				$ -	$ -		
				$ -	$ -		
Insert description of additional item(s) and new rows if needed.				$ -	$ -		
Total	$ 761,382	$ 1,105,105	$ 1,348,663	$ 243,558	$ 587,281		

APPENDIX 2-10

APPENDIX 2-AA CAPITAL PROJECTS TABLE

Appendix 2-AA
Capital Projects Table

Projects	2008	2009	2010	2011	2012	2013 Bridge Year	2014 Test Year
Reporting Basis	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP
SYSTEM ACCESS							
Conestoga Blvd-MTS#1 to Railway Tracks South of Pinebush	199,737						
Guelph Ave. - Relocations	259,008						
Relocations - Wolseley Ct.	143,807						
Subdivision Capital Investment (by developer)	82,647	1,059,862	1,163,537	423,138	850,577	1,271,000	1,271,000
Subdivision Capital Investment (by CND Hydro)	285,819	849,704	684,915	626,388	181,310	729,000	729,000
Kossuth Rd. - East of Chilligo Rd. to Fountain St. (last phase)		731,584					
Servicing Industrial (Underground)	1,175,368	784,875	976,601	1,158,403	942,813	1,000,000	1,000,000
Maple Grove Rd. - Cherry Blossom Rd. to Fountain St.		143,808					
Townline Rd. - Can Amera Parkway to Avenue Rd.		2,543	44,450	322,783			
Servicing Industrial (Overhead)	60,469	189,122	53,019	106,664	95,795	250,000	250,000
Hespeler Rd. at CPR Overpass			76,463	317,357			
Riverbank Dr. (in conjunction with Fairway Rd. bridge)			253,847			111,000	
City Works Yard - 1310 Bishop St. - Relocate Overhead Lines to Underground			294,786				
Other Projects (Underground)			179,029				
Roundabout - Fountain St. at Dickie Settlement Rd.			121,140				
Boxwood Industrial Subdivision				1,660		850,000	
Pinebush Rd.				12,126			
Two New 27.6kV Feeders in North West Industrial Area					246,924	4,000,000	
Purchase of Two 27.6kV Feeder Breakers					190,752		
46 Grand Ave. S.					153,739		
Franklin Boulevard Roundabouts							2,782,600
Double Circuit Existing 27.6kV Line - Fountain St. (Shantz Hill to Dickie Settlement Road) - 2.8km							926,300
Highway 401 Widening and Bridge Replacements							486,955
Triple Circuit Existing 27.6kV Line - Speedsville Rd. - North of Royal Oak to Boxwood Industrial Subdivision - 1km							370,520
Miscellaneous	443,545	204,705	303,857	171,774	370,481	200,000	306,850
Sub-Total	2,650,400	3,966,203	4,151,644	3,140,293	3,032,391	8,411,000	8,123,225

Projects	2008	2009	2010	2011	2012	2013 Bridge Year	2014 Test Year
Reporting Basis	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP
SYSTEM RENEWAL							
Area bounded by Cedar St,City Limits,Blenheim Rd,St Andrew St (Overhead)	1,372,358						
Area bounded by Cedar St,City Limits,Blenheim Rd,St Andrew St and George St (Underground)	795,562						
16kV Rebuild - Elgin St.N. (Overhead)	375,815						
16kV Rebuild - Elgin St.N. (Underground)	132,363						
Area supplied by remaining three 4kV stations (Grand, Domm's and Wauchope) (Underground)		2,140,315	479,165				
Area Supplied by Remaining Three 4kV Stations (Grand, Domm's and Wauchope) (Overhead)		1,458,310	210,324				
Clyde Rd. - Extend 16kV to New Generation		203,316					
Trussler Rd. - Brant Waterloo Rd. to Township Rd. 9		174,993					
Brant Waterloo Rd. (Swan St. to 4km East)/Reidsville Rd. (Brant Waterloo to 700m North / Spragues Rd -2Km East			141	495,403	667,147		
Beke Rd. (West River Rd. to 500m West of Shouldice Rd./Shouldice Rd. to 700m South of Beke Rd.)			428,896				
Hahn Ave./Scott Rd./Valerie Ct./Rudi Ct./Strome Ave./Chapman Ct. Area			948,231				
Highman Ave./Ravine Dr./Glenview Ave.			540,871	363,334			
Cameron Rd. (Roseville Rd. to New Dundee Rd.)/Roseville Rd. (Industrial Rd. to 1km East of Cameron Rd.)			354,921				
Galt Core Area Upgrades			57,995	99,397	415,770	500,000	470,520
Pole Replacements			179,864	201,827	182,002	150,000	136,600
Vanier/Ripplewood/Davies			89,808				
Edworthy Sideroad (Roseville Rd. to South of CPR) - 1km			17,998	151,042			
Studiman Rd. (Existing 16kV to Southern Boundary) - 0.8km			98,292				
Transformers in Inventory - Capitalized - Not in Capital Projects			431,000	378,000	532,716		
Old Beverly Rd./Village Rd. Rebuild to East Boundary			307,639				
Greenfield Rd./Reidsville Rd. from Stepdown Transformer			246,253				
Alps Rd. (Northumberland St. to Dumfries Rd.)/part of Reidsville Rd. - 6.6km				612,447			
Roseville Rd. (Dumfries Rd. to 700m West of King's Rd.)/King's Rd. - 3.2km				297,208			
Upgrades in Various Areas (Underground)				158,763	48,855	250,000	243,300
Reidsville Rd. - Greenfield Rd. to Wrigley Rd.				8,973	238,803		
West Alps Rd. and part of Trussler Rd. - 1.7km				228,261			
Sheffield Rd. from Morrison Rd. to South Boundary				172,886			
Preston Parkway Area Underground Rebuild					133,072	1,000,000	
Alps Rd. (Dumfries Rd. to 1.9km West)					146,596		
Upgrade Half of Radios at existing SCADA Switch Installations					64,929		

Projects	2008	2009	2010	2011	2012	2013 Bridge Year	2014 Test Year
Reporting Basis	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP
Roseville Rd. - West of Northumberland St. to Trussler Rd. - 0.8km					163,427		
Spragues Rd. North of Wrigley Rd. - 2.2km					262,672		
Rebuild -Sheffield F2 Feeder and Branchton Rabbits-parts of Maple Manor Rd., Morrison Rd., Branchton Rd., Cheese Factory Rd., Lockie Rd. - 18.3km Overhead						3,500,000	
Northview Acres Area Underground Rebuild						900,000	1,475,880
Fischer Hallman Road - Paul Ave. to New Dundee Rd. - 1.4km Overhaed						225,000	
Greenfield Road from West of Dumfries Rd. to East of Spragues Rd./parts of Edworthy Rd. and Alps Rd. – 10.1 km							1,968,000
Shellard Road - Morrison Road to Gore Road - 5.1km							930,300
Pole Replacements on Franklin Boulevard not affected by Roundabout Relocations							463,767
Avonlea/Earlwood/Briarwood Area							389,280
Townline Road between River Road and Black Bridge Road - 0.8km - 9 customers (LTLT resolution)							232,600
Welsh Dr./Trussler Rd. Underground Rebuild							169,640
Miscellaneous	576,006	1,264,032	1,870,734	830,811	29,455	564,000	660,380
Sub-Total	3,254,112	5,242,975	6,264,142	4,000,363	2,887,456	7,089,000	7,140,269
SYSTEM SERVICE							
Installation of Voltage Regulators - Cedar Creek Road	204,371						
SCADA Loadbreak Switches	256,152		412,811	560,766	315,091	300,000	286,600
Adjustments - South End Feeders to Improve Reliability				2,170	390,762		
Upgrade Radios/Controllers at existing SCADA Switch Installations Overhead						200,000	490,000
16kV Single Phase Reclosers Overhead						200,000	198,700
Miscellaneous	165,974	53,831	12,383	153,419	129,312	60,000	
Sub-Total	626,497	53,831	425,194	716,355	835,165	760,000	975,300
GENERAL PLANT							
Meter-Residential and General Services & Instrumentation Transformers	568,954						
CIS - SAP Conversion Phase 1	537,503						
Single Bucket Vehicle Replacement	260,829						
Four Vehicles Under Threshold	176,138						
Meter Replacements		179,346			371,961		
Aerial Device Double Bucket Truck - Replacement		350,791					
Aerial Device Double Bucket Truck - Replacement		372,960					
Clean up Substations			271,964				
Uderground Cable Puller			112,090				
Meter Capital Additions				172,060		503,017	513,643
CIS Replacement Hardware				126,417			
CIS Replacement Software				890,705			
Topobase GIS Enhancements				214,778			
Digger Truck Replacement				397,603			

Projects	2008	2009	2010	2011	2012	2013 Bridge Year	2014 Test Year
Reporting Basis	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP	CGAAP
Smart Meter Costs					7,292,744		
Roof Replacement					493,500		
Control Room Digital Wall Display					245,604		
Smart Meter Related Hardware					219,274		
ERP Software					678,597		
Smart Meter Related Software					275,390		
Primary Meter Upgrade						160,000	240,000
Remotely Interrogated Meters						170,000	170,000
Generator						200,000	
Single Bucket Aerial Truck Replacement						365,000	
Business Continuity and Disaster Recovery							185,000
IVR Solution							150,000
Storage Upgrade							225,000
Distribution Management System							225,000
Outage Management System							445,000
Document Management System							124,545
GIS Enhancements							200,000
Bucket Truck Replacement							450,000
Miscellaneous	451,576	353,557	1,052,153	385,395	1,122,017	1,466,136	888,403
Sub-Total	1,997,008	1,258,663	1,438,217	2,188,969	10,701,099	2,864,153	3,816,593
CAPITAL CONTRIBUTIONS							
Contributions and Grants	-658,282	-2,326,000	-1,804,000	-1,343,000	-368,000	-3,041,000	-2,406,000
Sub-Total	-658,282	-2,326,000	-1,804,000	-1,343,000	-368,000	-3,041,000	-2,406,000
Sub-Total	0	0	0	0	0	0	0
Miscellaneous	0	0	0				
Total	**7,869,735**	**8,195,672**	**10,475,197**	**8,702,980**	**17,088,111**	**16,083,153**	**17,649,387**
Less Renewable Generation Facility Assets and Other Non Rate-Regulated Utility Assets *(input as negative)*							
Total	**7,869,735**	**8,195,672**	**10,475,197**	**8,702,980**	**17,088,111**	**16,083,153**	**17,649,387**

Notes:

1 Please provide a breakdown of the major components of each capital project undertaken in each year. Please ensure that all projects below the materiality threshold are included in the miscellaneous line. Add more projects as required.

2 The applicant should group projects appropriately and avoid presentations that result in classification of significant components of the OM&A budget in the miscellaneous category.

APPENDIX 2-11

APPENDIX 2-G SERVICE RELIABILITY INDICATOR

Appendix 2-G
Service Reliability Indicators
2008 - 2012

Index	Includes outages caused by loss of supply					Excludes outages caused by loss of supply				
	2008	2009	2010	2011	2012	2008	2009	2010	2011	2012
SAIDI	0.700	0.520	0.970	0.740	1.070	0.680	0.510	0.970	0.700	1.000
SAIFI	1.080	0.980	0.850	1.410	1.490	1.040	0.970	0.850	1.300	1.430

5 Year Historical Average

SAIDI		0.800		0.772
SAIFI		1.162		1.118

SAIDI = System Average Interruption Duration Index

SAIFI = System Average Interruption Frequency Index