Choosing Asset Price Indexes for Ontario and Alberta

Since the technology for providing electricity distributor services is capital intensive, the way that capital costs and quantities are calculated plays an important role in power distribution benchmarking and productivity research. Monetary approaches to capital cost and quantity measurement are widely used in North America due in part to abundant and reasonably standardized data on the value of utility assets. These approaches entail the deflation of asset (aka "plant") values that utilities report to regulators in order to create real plant values that are estimates of capital quantities. The asset price indexes used as deflators in these calculations can have an important impact on productivity trend and cost benchmarking results. These indexes are not just needed for the sample period of a productivity or econometric study because estimates of capital costs and quantities during the sample period are typically based on estimates of quantities added in many prior years.

PEG's 2013 studies for the OEB used Statistics Canada's Electric Utility Construction Price Index ("EUCPI") for distribution systems (CANSIM Table 327-0011) to deflate values of Ontario electricity distributor assets.[1] However, EUCPIs are no longer calculated and alternative asset price trend indexes must be used. For total cost benchmarking updates since 2013, PEG has used the $GDPIPI^{FDD}$ for Canada as the asset price deflator. Other benchmarking studies submitted in OEB proceedings since 2013 have used other asset price deflators.

EUCPIs

EUCPIs were calculated from 1961 to 2014. The trend in each EUCPI was a weighted average of trends in price subindexes. Statistics Canada estimated costs of different kinds of electric utility construction projects and used these estimates to develop cost share weights. We understand that the weights for various EUCPI subindexes were derived from the tracked costs of 100 to 200 items used in construction projects from 1965 to 1973.[2] Statistics Canada used product, labor, and financing price indexes to measure the price growth of these items. Specifically, they used Canadian Industrial Product

[1] Kaufmann, Lawrence, David Hovde, John Kalfayan, and Kaja Rebane, "Productivity and Benchmarking Research in Support of Incentive Rate Setting in Ontario: Final Report to the Ontario Energy Board," EB-2010-0379, November 5, 2013.

[2] Kincannon and Franchet (1997). Source and Methods Construction Price Indices, p. 44.

Price Indexes, Non-Residential Building Construction Price Indexes, Surveys of Employment Payroll and Hours, Construction Union Wage Rate Indexes, and U.S. Bureau of Labor Statistics' ("BLS") Producer Price Indexes ("PPIs"). Additional data were gathered from the Bank of Canada.

The price subindexes were combined with the cost share weights to create summary fixed-weight construction price indexes for distribution systems, transmission systems, and substations.[3] Sub-indexes were created within these categories for important asset subcategories such as transformers and power lines.

The growth rates of the distribution system EUCPI and component sub-indexes are displayed in Table AUC-16-1a. Inspecting the results for the summary distribution systems EUCPI, it can be seen that trends in some sub-periods varied greatly from the long-run trend. Most notably, inflation was especially rapid in the years from 1973 to 1975 and from 1979 to 1982. These were periods of general hyperinflation in North America that were spurred by international oil price shocks. The itemized subindexes for some inputs, such as transformers and overhead conductors, had especially volatile growth rates. This likely reflects the high share of copper and other metals in the cost of their production. Annual price inflation exceeding 10% is noted in boldface in all of the tables in this Attachment.

Growth rates of the transmission systems EUCPI and several of its subindexes are displayed in Table AUC-16-1b. Results are broadly similar to those we noted for the distribution systems EUCPI.

Our examination of EUCPIs revealed several problems. For example, Statistics Canada several years ago acknowledged in response to PEG inquiries that many of the EUCPI models were not updated after the 1970s. For this and other reasons, EUCPIs have been discontinued "until such time as we [Statistics Canada] could acquire new and updated electric utility models."[4] Cost shares for the various inputs likely changed materially over the years. With technological change, for example, there has been greater use of aluminum and aluminum/steel reinforced conductors in transmission and distribution.

[3] The transmission and distribution system EUCPIs do not include substations, but both kinds of systems have substations.

[4] Conversation with Jennifer Winters, Statistics Canada Construction Prices Division

Table AUC-16-1a

Growth Rates of the Distribution Systems EUCPI and Subindexes[1,2]

			Materials											
				Poles, towers and fixtures					Distribution systems equipment					
Year	Distribution Systems	Total Direct Costs	All Materials	Poles, Towers and Fixtures	Wooden poles	Crossarms	Hardware and Insulators	Overhead Conductors	Transformers	Meters and Switches	Street Lighting Systems and Water Heaters	Labour	Construction Equipment	Construction Indirects
1962	1.6%			3.1%	4.1%	**11.0%**	0.8%	-1.3%	0.6%	0.0%		4.5%	-1.5%	
1963	0.5%			3.6%	4.0%	3.7%	2.4%	0.0%	-6.0%	-3.8%		4.3%	1.0%	
1964	2.1%			0.0%	-1.3%	9.5%	0.0%	-0.4%	2.5%	2.5%		3.3%	1.0%	
1965	2.0%			7.3%	**12.4%**	0.0%	0.8%	5.3%	-4.0%	0.0%		4.8%	0.5%	
1966	4.9%			5.8%	7.8%	1.6%	2.3%	5.4%	6.4%	2.5%		4.5%	1.9%	
1967	3.8%			0.0%	-4.4%	2.4%	5.6%	3.4%	-7.1%	0.6%		**11.2%**	5.1%	7.3%
1968	-0.9%			-2.6%	-5.2%	3.9%	1.1%	-4.5%	-8.0%	0.0%		7.0%	2.2%	7.4%
1969	4.1%			5.6%	5.7%	**12.9%**	4.2%	1.1%	0.0%	0.0%		7.7%	3.5%	7.5%
1970	7.3%			**10.8%**	8.6%	**23.2%**	**11.3%**	4.4%	5.7%	1.5%		7.7%	5.8%	8.0%
1971	3.7%			0.0%	2.5%	-4.9%	-2.2%	0.4%	5.7%	0.0%		7.1%	5.1%	7.8%
1972	4.3%	3.8%	0.7%	3.9%	4.4%	2.2%	3.7%	1.8%	-0.6%	0.0%	-0.7%	8.5%	3.4%	9.0%
1973	8.8%	9.0%	8.3%	**21.5%**	**24.9%**	**43.6%**	9.7%	7.8%	1.2%	-0.3%	9.4%	**12.3%**	3.7%	6.3%
1974	**18.5%**	**20.2%**	**26.0%**	**35.1%**	**40.0%**	**16.0%**	**30.0%**	**29.1%**	**26.9%**	7.0%	**17.3%**	9.2%	**13.7%**	**11.5%**
1975	**11.6%**	**10.9%**	7.7%	8.6%	**10.9%**	-28.0%	**12.9%**	1.9%	8.5%	7.8%	**12.1%**	**17.1%**	8.4%	**14.1%**
1976	5.6%	4.9%	-0.4%	2.0%	-2.7%	x	**10.1%**	5.2%	-10.4%	2.1%	8.4%	**13.5%**	**11.7%**	9.8%
1977	6.4%	6.3%	2.6%	1.1%	-2.1%	x	3.8%	5.8%	1.2%	7.1%	2.4%	**10.7%**	**10.2%**	8.4%
1978	7.1%	7.2%	7.4%	**10.8%**	**11.1%**	x	9.6%	6.1%	5.0%	9.9%	5.6%	6.5%	**10.9%**	6.8%
1979	**12.7%**	**13.3%**	**18.1%**	**18.8%**	**22.7%**	x	6.0%	**24.4%**	**22.4%**	4.2%	7.4%	6.1%	**11.5%**	8.2%
1980	**13.1%**	**13.4%**	**15.8%**	**12.6%**	**17.2%**	**14.3%**	0.8%	**23.7%**	**20.3%**	**10.1%**	4.9%	9.3%	**13.0%**	**10.4%**
1981	8.6%	8.5%	6.0%	8.3%	7.9%	3.0%	**10.9%**	3.1%	3.9%	**12.5%**	7.1%	**10.8%**	**18.2%**	**11.1%**
1982	8.9%	8.3%	6.3%	5.6%	5.2%	6.1%	6.3%	2.4%	8.1%	**11.3%**	4.6%	**11.5%**	**10.4%**	**12.1%**
1983	4.1%	3.3%	-1.0%	0.6%	0.7%	-6.9%	2.5%	-0.6%	-6.3%	8.0%	2.8%	9.6%	4.9%	7.6%
1984	4.3%	4.1%	4.8%	1.5%	2.2%	-2.0%	0.9%	6.4%	5.1%	7.8%	6.4%	3.6%	3.1%	5.4%
1985	5.0%	5.3%	6.6%	4.1%	5.6%	3.4%	0.3%	-4.5%	**16.2%**	2.0%	6.1%	3.2%	4.5%	4.4%
1986	2.3%	2.1%	2.2%	2.4%	1.8%	2.0%	3.7%	5.8%	0.2%	3.0%	2.7%	2.6%	-2.8%	3.2%
1987	3.0%	2.8%	2.8%	-1.1%	-2.3%	-1.2%	1.5%	**14.5%**	-0.9%	5.0%	2.0%	3.4%	1.0%	3.8%
1988	5.9%	6.3%	8.6%	-2.2%	-4.9%	4.3%	1.7%	**23.7%**	**11.5%**	1.3%	3.8%	3.5%	-2.0%	4.3%
1989	3.8%	3.9%	3.2%	8.5%	8.2%	**25.0%**	3.0%	1.6%	-0.5%	4.9%	4.0%	5.1%	2.6%	3.2%
1990	3.1%	2.6%	1.8%	8.3%	7.3%	**19.2%**	5.6%	-11.1%	4.4%	5.1%	-0.6%	3.7%	5.6%	5.8%
1991	-0.8%	-2.0%	-8.2%	-1.3%	3.3%	-7.4%	**-10.0%**	-16.2%	-10.0%	-2.1%	-12.2%	6.0%	2.2%	6.4%
1992	2.3%	2.1%	1.5%	0.0%	-0.5%	0.7%	0.8%	-2.5%	6.1%	3.0%	-3.5%	3.1%	0.6%	3.3%
1993	2.5%	2.5%	2.1%	5.1%	6.7%	6.7%	0.1%	1.2%	0.8%	0.9%	0.6%	2.7%	4.7%	2.3%
1994	5.4%	6.2%	9.7%	**13.3%**	**17.2%**	**17.2%**	0.1%	7.7%	**11.7%**	1.3%	4.9%	1.5%	5.7%	1.0%
1995	7.6%	8.4%	**13.0%**	7.1%	8.7%	8.7%	0.1%	-6.1%	**20.4%**	1.7%	8.9%	1.7%	8.0%	2.1%
1996	-0.1%	-0.4%	-1.6%	4.8%	5.6%	5.6%	1.2%	**19.8%**	-7.3%	0.7%	0.2%	0.5%	4.4%	2.2%
1997	1.2%	0.9%	-0.9%	0.7%	-0.3%	-0.3%	4.9%	0.6%	-4.6%	1.9%	1.5%	3.2%	3.2%	2.9%
1998	4.0%	3.1%	0.3%	3.2%	2.4%	2.4%	6.4%	-6.2%	0.0%	2.8%	1.2%	6.6%	6.2%	8.9%
1999	2.7%	2.4%	0.5%	1.0%	1.1%	1.1%	0.5%	-6.9%	2.5%	3.1%	1.0%	5.0%	2.4%	4.4%
2000	2.0%	2.4%	2.0%	1.1%	1.3%	1.3%	0.0%	1.6%	3.6%	0.4%	2.1%	4.1%	-4.5%	-0.2%
2001	0.7%	0.5%	-0.7%	0.1%	0.2%	0.2%	0.1%	-1.3%	-2.7%	1.9%	1.3%	1.5%	4.8%	1.7%
2002	0.7%	0.6%	-0.1%	0.0%	0.0%	0.0%	-0.2%	1.7%	-2.3%	2.8%	1.8%	1.2%	2.4%	0.8%
2003	0.1%	0.2%	0.2%	0.3%	0.4%	0.4%	0.1%	-4.4%	0.3%	1.7%	4.0%	0.3%	0.0%	-0.7%
2004	0.4%	0.3%	3.6%	2.0%	2.2%	2.2%	0.7%	**11.6%**	1.1%	0.7%	6.8%	-4.2%	1.7%	0.7%
2005	1.9%	2.2%	4.2%	0.0%	0.1%	0.1%	-0.4%	4.0%	7.3%	-1.1%	**10.6%**	-1.5%	6.3%	0.4%
2006	6.4%	7.2%	**11.5%**	3.6%	3.4%	3.4%	4.7%	**16.7%**	**22.4%**	1.3%	-0.1%	1.7%	1.4%	1.7%
2007	4.4%	4.4%	6.3%	4.3%	5.3%	5.3%	0.4%	3.7%	**11.2%**	0.0%	2.9%	2.2%	0.0%	4.3%
2008	1.0%	0.8%	1.6%	1.7%	1.4%	1.4%	3.1%	-4.6%	4.1%	-1.4%	2.7%	-2.0%	8.3%	2.1%
2009	0.5%	-0.8%	-0.1%	2.4%	1.9%	1.9%	4.1%	-7.1%	-0.2%	5.7%	-0.4%	-0.4%	-8.8%	8.1%
2010	2.6%	2.9%	1.2%	0.4%	0.1%	0.1%	2.1%	5.7%	0.7%	1.9%	-1.3%	5.8%	2.7%	0.8%
2011	3.2%	2.7%	0.8%	0.8%	0.1%	0.1%	3.5%	1.9%	0.8%	-1.4%	1.0%	6.2%	1.7%	5.2%
2012	0.9%	0.8%	0.0%	0.1%	0.1%	0.1%	-0.1%	0.5%	-0.2%	-2.0%	1.2%	2.5%	-1.8%	1.2%
2013	-0.8%	-0.7%	0.9%	0.9%	0.4%	0.4%	3.0%	3.4%	0.0%	1.3%	-0.1%	-3.5%	0.5%	-1.2%
2014	0.1%	-0.8%	0.3%	1.3%	1.1%	1.1%	2.1%	-1.6%	0.5%	-1.4%	0.4%	-2.3%	-0.9%	4.7%
Average Annual Growth Rates														
1972 - 2001	**5.5%**	**5.4%**	**4.9%**	**6.2%**	**6.8%**	**5.3%**	**4.2%**	**4.6%**	**4.6%**	**4.1%**	**3.7%**	**6.2%**	**5.7%**	**6.0%**
2002 - 2014	**1.6%**	**1.5%**	**2.3%**	**1.4%**	**1.3%**	**1.3%**	**1.8%**	**2.4%**	**3.5%**	**0.6%**	**2.3%**	**0.5%**	**1.0%**	**2.2%**

Notes

[1] All growth rates are computed logarithmically. For example, growth rate of $X = \ln(X_t/X_{t-1})$

[2] Electric Utility Construction Price Index (Statistics Canada, Table 327-0011)

x : suppressed to meet the confidentiality requirements of the Statistics Act

Data for years of rapid inflation are shaded.

Table AUC-16-1b

Growth Rates of the Transmission Systems EUCPI and Subindexes[1,2]

			Materials									
Year	Transmission Line Systems	Transmission Lines	All Materials	Poles, Towers, Fixtures and Overhead Conductors	Foundations, Footings and Anchors	Tower Steel Conductors and Insulators	Grounding Systems and Hardware	Wooden Poles	Crossarms	Installation Labour	Installation Equipment	Construction Indirects
1957	3.0%	2.4%				4.2%		-0.8%	-15.1%	3.6%	4.8%	
1958	-5.5%	1.2%				-0.8%		2.4%	-3.3%	6.8%	4.6%	
1959	3.0%	1.2%				-1.7%		4.6%	**15.6%**	5.3%	3.3%	
1960	-1.5%	2.3%				1.2%		-4.6%	-3.9%	7.0%	3.2%	
1961	-6.3%	0.6%				0.0%		0.8%	-5.1%	4.7%	3.1%	
1962	3.7%	1.1%				-1.2%		0.0%	**11.0%**	5.4%	0.0%	
1963	2.1%	1.7%				0.0%		3.8%	3.7%	3.4%	1.0%	
1964	3.5%	0.0%				-1.7%		-2.3%	9.5%	3.3%	2.5%	
1965	4.8%	5.4%				5.4%		**12.3%**	0.0%	4.8%	1.0%	
1966	4.1%	4.1%				0.8%		**12.8%**	1.6%	6.8%	1.9%	
1967	0.9%	4.9%				0.0%		6.4%	2.4%	**11.7%**	3.7%	
1968	-1.3%	2.8%				0.8%		-2.3%	3.9%	8.1%	3.2%	**15.6%**
1969	3.1%	4.1%				5.4%		-1.2%	**12.9%**	8.1%	3.9%	8.3%
1970	8.8%	6.9%				3.0%		8.4%	**23.2%**	6.4%	3.4%	6.6%
1971	4.3%	3.3%				2.9%		0.0%	-4.9%	8.9%	3.7%	1.4%
1972	4.5%	6.3%	5.2%	5.6%	6.2%	5.2%	4.9%	3.2%	2.2%	8.6%	1.6%	6.1%
1973	7.1%	8.4%	7.7%	8.2%	7.1%	3.3%	**10.3%**	**21.4%**	**43.6%**	**11.1%**	5.0%	5.1%
1974	**19.2%**	**17.6%**	**23.9%**	**17.8%**	**21.9%**	**17.3%**	**25.9%**	**50.5%**	**16.0%**	9.3%	**12.3%**	**12.9%**
1975	**15.9%**	**16.2%**	**18.4%**	**17.9%**	**14.8%**	**22.9%**	**12.9%**	**13.0%**	-28.0%	**16.0%**	**16.7%**	**10.4%**
1976	7.0%	7.0%	3.7%	6.8%	**10.0%**	5.1%	7.4%	-3.6%	9.5%	**13.0%**	6.5%	7.4%
1977	5.2%	7.6%	7.0%	8.8%	3.8%	**10.2%**	2.0%	-6.4%	**13.5%**	**10.1%**	**12.3%**	3.8%
1978	7.4%	7.7%	7.7%	8.1%	7.4%	5.6%	**11.4%**	**12.4%**	**15.8%**	7.6%	**12.0%**	6.0%
1979	**11.0%**	**13.8%**	**21.5%**	**15.8%**	9.8%	**21.5%**	6.2%	**25.5%**	**38.9%**	6.2%	**11.3%**	8.2%
1980	**11.4%**	**12.7%**	**14.9%**	**13.2%**	8.5%	**15.7%**	5.9%	**15.8%**	**14.3%**	8.8%	**14.0%**	**12.3%**
1981	9.6%	**10.7%**	8.0%	9.6%	**12.1%**	8.9%	**14.6%**	2.4%	3.0%	**10.7%**	**15.8%**	**13.5%**
1982	7.5%	4.7%	-0.2%	4.2%	**11.9%**	-2.5%	7.6%	3.2%	6.1%	**11.1%**	**11.1%**	8.5%
1983	2.5%	3.7%	1.5%	4.3%	2.1%	2.1%	2.2%	0.7%	-6.9%	9.1%	4.9%	2.3%
1984	4.6%	5.2%	5.6%	4.8%	-2.1%	8.0%	0.3%	-0.5%	-2.0%	3.5%	4.5%	4.8%
1985	1.2%	1.0%	-1.3%	0.9%	2.0%	-3.8%	-2.6%	8.3%	3.4%	3.1%	5.9%	1.1%
1986	2.9%	2.1%	3.5%	2.5%	5.5%	4.1%	3.8%	1.1%	2.0%	2.3%	-1.5%	0.6%
1987	6.0%	3.8%	5.5%	3.9%	2.9%	7.7%	0.9%	-1.6%	-0.6%	3.4%	-1.8%	3.7%
1988	7.9%	8.7%	**14.8%**	9.3%	5.1%	**19.0%**	2.7%	1.5%	3.7%	3.9%	-3.4%	3.8%
1989	6.1%	3.5%	4.0%	3.8%	3.3%	1.0%	2.6%	**15.4%**	**25.0%**	4.7%	1.1%	2.6%
1990	1.4%	2.5%	0.0%	1.8%	2.1%	-7.2%	2.9%	**23.5%**	**19.2%**	4.6%	3.8%	6.0%
1991	-3.5%	-2.2%	-10.3%	-3.9%	-6.1%	-13.1%	-8.4%	-2.0%	-7.4%	5.4%	1.7%	4.2%
1992	-0.4%	-1.2%	-6.2%	-1.8%	-1.9%	-4.5%	1.3%	-16.0%	0.7%	3.1%	4.6%	1.8%
1993	3.0%	3.1%	3.7%	3.7%	-0.1%	3.7%	0.6%	6.7%	6.7%	2.7%	6.8%	0.9%
1994	4.8%	5.0%	8.1%	5.7%	6.0%	5.8%	3.3%	**17.2%**	**17.2%**	1.5%	5.8%	2.7%
1995	4.3%	5.5%	9.6%	6.3%	3.1%	11.9%	1.4%	8.7%	8.7%	1.7%	3.1%	2.0%
1996	0.6%	1.8%	2.8%	2.0%	-0.8%	1.9%	3.7%	5.6%	5.6%	0.5%	2.4%	0.6%
1997	1.9%	2.0%	1.9%	2.4%	0.8%	2.8%	2.3%	-0.3%	-0.3%	3.2%	2.4%	0.7%
1998	4.5%	3.9%	1.1%	3.3%	1.7%	0.5%	1.9%	2.4%	2.4%	6.6%	5.3%	6.9%
1999	1.0%	1.1%	-2.7%	0.3%	-1.7%	-4.9%	0.7%	1.1%	1.1%	5.0%	2.3%	4.6%
2000	2.0%	2.8%	2.1%	3.1%	0.0%	2.6%	1.8%	1.3%	1.3%	4.1%	4.6%	0.7%
2001	1.8%	0.9%	-0.9%	0.5%	-0.2%	-2.0%	1.7%	0.2%	0.2%	1.5%	4.1%	1.4%
2002	1.7%	1.5%	1.9%	1.7%	1.7%	3.1%	0.0%	0.0%	0.0%	1.2%	2.3%	0.5%
2003	-2.2%	-0.6%	-0.5%	-0.7%	1.3%	-1.3%	0.6%	0.4%	0.4%	0.3%	-4.0%	-1.5%
2004	2.0%	3.3%	9.9%	3.8%	**15.3%**	**11.7%**	**14.1%**	2.2%	2.2%	-4.2%	-2.1%	0.6%
2005	1.5%	1.1%	2.1%	1.1%	0.4%	3.0%	1.8%	0.1%	0.1%	-1.5%	2.8%	-0.8%
2006	4.0%	4.1%	6.3%	4.4%	8.8%	6.4%	**10.6%**	3.4%	3.4%	1.7%	1.2%	1.8%
2007	4.6%	3.9%	4.7%	3.4%	5.8%	4.6%	2.8%	5.3%	5.3%	2.2%	0.1%	4.3%
2008	4.3%	2.1%	2.8%	1.8%	3.1%	3.6%	0.7%	1.4%	1.4%	-2.0%	6.2%	1.6%
2009	0.6%	-0.7%	-3.7%	-2.2%	-10.0%	-4.8%	-5.8%	1.9%	1.9%	-0.4%	1.4%	7.0%
2010	0.5%	1.7%	1.5%	1.6%	5.5%	0.9%	5.7%	0.1%	0.1%	4.3%	-4.5%	2.0%
2011	2.3%	3.3%	2.0%	3.6%	3.4%	2.1%	5.0%	0.1%	0.1%	7.7%	0.5%	3.0%
2012	0.3%	-0.1%	-1.9%	-0.1%	-3.3%	-2.1%	-4.4%	0.1%	0.1%	2.5%	2.0%	-0.6%
2013	0.1%	-0.8%	0.5%	-0.5%	-0.7%	1.1%	-1.9%	0.4%	0.4%	-3.5%	2.4%	-0.4%
2014	2.6%	1.1%	0.8%	0.3%	2.9%	-0.2%	5.0%	1.1%	1.1%	-2.3%	4.8%	4.3%
Average Annual Growth Rates												
1972 - 2001	**5.3%**	**5.5%**	**5.3%**	**5.6%**	**4.5%**	**5.0%**	**4.4%**	**7.0%**	**7.2%**	**6.1%**	**5.8%**	**4.9%**
2002 - 2014	**1.7%**	**1.5%**	**2.0%**	**1.4%**	**2.6%**	**2.2%**	**2.6%**	**1.3%**	**1.3%**	**0.5%**	**1.0%**	**1.7%**

Notes

[1] All growth rates are computed logarithmically. For example, growth rate of $X = \ln(X_t/X_{t-1})$

[2] Electric Utility Construction Price Index (Statistics Canada, Table 327-0011)

Data for years of rapid inflation are shaded.

Another concern with the EUCPI lies in how some asset prices were tracked. Metering is an example. Installation of advanced metering infrastructure ("AMI") began during the mid-2000s and has been widespread in some Canadian provinces, including Ontario. However, the EUCPI tracked "watt hour meters, clock type, single phase, 240 volts" which did not pick up AMI price trends. The price sub-index for Meters and Switches averaged only 0.6 percent annual growth from 2002 to 2014.

Another concern we have about the EUCPI is the slow growth of the labor price sub-index in later years of their calculation. Statistics Canada provided PEG with additional information on the weights and indexes that were used to construct the EUCPI. Labor prices were sourced from "wage rate indexes (basic) plus utility rates." Similarly, an Organisation for Economic Co-operation and Development ("OECD") report states that "labor costs data are obtained from surveys of employers as well as from information on collective wage agreements."[5] Statistics Canada stated in commentary on the EUCPI methodology that "basic union wage rates are used for construction trades. Data from the survey on employment, earnings and hours ("SEPH") on average weekly earnings (including overtime) for salaried employees are used for engineers, technicians, clerks and draftsmen."[6]

We compare the EUCPI distribution labor price subindex to other relevant labor price indexes, including the average weekly earnings, fixed-weighted index of average hourly earnings, and the construction union wage rate index in Table AUC-16-2. It can be seen that trends in the labor price indexes were broadly similar through 2001, after which the EUCPI labor price subindex grew much more slowly than all of the other indexes and declined in several years. No negative growth rates were reported for this sub-index before 2000. This is one reason for the slow growth in the EUCPIs during the 2004-2008 period.

We conclude from this review that the EUCPI produced reliable results only through 2001. Alternative asset price deflators can be usefully appraised by their ability to track the EUCPI in these earlier years. In this Attachment, trends in alternative asset price deflators are compared to the trends in the EUCPIs for transmission and distribution systems and substations in several tables.

[5] Kincannon and Franchet, *op. cit.*, p. 44.

[6] *Capital Expenditure Price Statistics* 62-007-X (October 2013), p. 90.

Table AUC-16-2

Canadian Labour Price Indexes[1] (Growth Rates)

	EUCPI[2]	Construction Union Wage Rate Index[3]		SEPH Average Weekly Earnings Index[4]			
	Canada	Canada	Ontario	Canada		Ontario	
Year	Distribution Systems Labour	Composite	Composite	FWI AHE Utilities[4]	AWE Non-Fixed Electric Power GTD[5]	FWI AHE Utilities[4,6]	AWE Non-Fixed Electric Power GTD[5]
1962	4.5%						
1963	4.3%						
1964	3.3%						
1965	4.8%						
1966	4.5%						
1967	11.2%						
1968	7.0%						
1969	7.7%						
1970	7.7%						
1971	7.1%						
1972	8.5%	9.8%					
1973	12.3%	9.3%					
1974	9.2%	9.2%					
1975	17.1%	13.1%					
1976	13.5%	13.3%					
1977	10.7%	10.6%					
1978	6.5%	6.2%					
1979	6.1%	6.0%					
1980	9.3%	7.5%					
1981	10.8%	8.8%					
1982	11.5%	8.8%	7.5%				
1983	9.6%	11.6%	12.0%				
1984	3.6%	3.1%	2.8%				
1985	3.2%	2.2%	2.7%				
1986	2.6%	2.4%	3.5%				
1987	3.4%	2.4%	3.8%				
1988	3.5%	3.2%	4.8%				
1989	5.1%	4.2%	5.6%				
1990	3.7%	5.0%	6.1%				
1991	6.0%	5.4%	7.0%				
1992	3.1%	3.8%	2.6%				
1993	2.7%	1.9%	1.7%				
1994	1.5%	1.6%	2.7%				
1995	1.7%	1.3%	1.3%				
1996	0.5%	0.3%	0.0%				
1997	3.2%	1.3%	1.4%				
1998	6.6%	1.0%	0.8%				
1999	5.0%	1.1%	0.5%				
2000	4.1%	1.9%	1.2%				
2001	1.5%	1.6%	1.7%				
2002	1.2%	2.9%	2.4%	5.1%	5.8%	4.9%	5.8%
2003	0.3%	2.2%	2.1%	5.1%	3.6%	7.3%	5.3%
2004	-4.2%	1.4%	2.0%	1.8%	0.4%	1.8%	-0.5%
2005	-1.5%	1.9%	2.2%	2.1%	3.5%	2.4%	3.6%
2006	1.7%	3.0%	2.0%	1.7%	3.0%	1.5%	1.6%
2007	2.2%	3.0%	1.8%	5.4%	4.5%	4.9%	5.0%
2008	-2.0%	4.6%	3.4%	1.3%	0.5%	-1.4%	-4.0%
2009	-0.4%	3.9%	3.0%	5.6%	3.8%	6.0%	6.1%
2010	5.8%	2.9%	1.9%	3.1%	4.3%	3.6%	-0.4%
2011	6.2%	2.2%	1.8%	1.6%	5.4%	-6.1%	3.5%
2012	2.5%	2.2%	2.2%	2.8%	0.1%	5.5%	0.4%
2013	-3.5%	2.1%	1.9%	-0.4%	-1.1%	2.3%	1.1%
2014	-2.3%	2.4%	2.1%	4.9%	9.0%	7.0%	10.6%
2015	na	2.2%	2.4%	-2.7%	-0.4%	-3.7%	-0.6%
2016	na	2.0%	1.7%	1.8%	-3.0%	-0.6%	-6.4%
2017	na	1.6%	1.7%	5.6%	7.2%	3.9%	5.0%
2018	na	1.3%	1.9%	-2.1%	0.1%	-3.0%	-0.8%
2019	na	1.5%	1.8%	3.2%	0.2%	6.5%	2.5%
2020	na	1.3%	2.0%	4.2%	0.8%	6.3%	-1.2%
2021	na	1.4%	2.2%	-0.6%	0.7%	-6.1%	-2.0%
2022	na	2.2%	3.5%	2.0%	4.7%	2.6%	5.2%
2023	na	4.3%	4.0%	5.3%	7.0%	4.1%	8.0%
2024	na	4.4%	3.7%	-0.2%	0.2%	1.5%	-0.2%
Average Annual Growth Rates							
1972 - 2001	**6.2%**	**5.3%**	**3.5%**	**NA**	**NA**	**NA**	**NA**
1982 - 2001	**4.1%**	**3.2%**	**3.5%**	**NA**	**NA**	**NA**	**NA**
2002 - 2014	**0.5%**	**2.7%**	**2.2%**	**3.1%**	**3.3%**	**3.0%**	**2.9%**
2015 - 2024	**NA**	**2.2%**	**2.5%**	**1.7%**	**1.8%**	**1.1%**	**0.9%**

Notes

[1] All growth rates are computed logarithmically. For example, growth rate of $X = \ln(X_t/X_{t-1})$

[2] Electric Utility Construction Price Index (Statistics Canada, Table 327-0011)

[3] Construction Union Wage Rate Index, basic construction wage rate indexes (Statistics Canada, Table 327-0045)

[4] Fixed weighted index of average hourly earnings for all employees (Statistics Canada, Table 281-0039).

[5] Average weekly earnings, including overtime, for all employees in current dollars (Statistics Canada, Table 281-0026).

[6] We replaced the missing Ontario 2009 fixed utilities average hourly earnings value with the simple average of 2008 and 2010.

Handy Whitman Indexes

Summary (i.e., total plant) Handy Whitman Indexes ("HWIs") are available for electric utility transmission and distribution, various kinds of generation plant, and building construction for six geographic regions of the contiguous United States but not for any region of Canada. The two Handy Whitman regions adjacent to Ontario are the North Atlantic and North Central states. Handy Whitman's Plateau region is adjacent to Alberta.

The summary HWIs for transmission and distribution reflect growth in subindexes representing inflation in the construction costs of various kinds of assets (e.g., station equipment). Like the EUCPIs, the HWIs have been constructed with cost-share weights for various labor, materials, equipment, and other inputs based on historic projects. Price data on these items have been gathered from sources like the *Engineering News-Record*, the Construction Labor Research Council, and major manufacturers and utilities.[7]

In benchmarking research and testimony for several Ontario utilities in CIR proceedings, Steven Fenrick derived the asset price deflators for these utilities using the HWI of Total Power Distribution Plant (or its transmission counterpart) in the North Atlantic states. To make these results more relevant to Canada, Mr. Fenrick used as his asset price indexes for Canada the product of the HWI and U.S./Canadian purchasing power parities ("PPP") that were calculated by the OECD.[8]

Table AUC-16-3a displays the growth rates of HWI indexes for various groups of distribution assets in the North Atlantic region. It can be seen that inflation in the summary distribution cost index and several subindexes was quite rapid in the 1973-1975 and 1979-1981 periods but also in the periods from 2005 to 2008 and from 2022 to 2023. In both of these periods the unusually brisk growth in the summary regional distribution HWIs was due chiefly to brisk growth in the prices of conductors, services, and transformers. These are all assets in which metals represent a substantial portion of manufacturing cost. Table AUC-16-3b displays a similar if more muted pattern in the summary North Atlantic HWI of power transmission construction costs.

[7] Whitman, Requardt, and Associates, *The Handy-Whitman Index of Public Utility Construction Costs* (2017).

[8] This is to say that he used the general formula *WKA* = *HWI* x *PPP*.

Table AUC-16-3a

North Atlantic Handy-Whitman Distribution Construction Cost Growth Trends[1,2]

Year	Total Distribution	Station Equipment	Poles, Towers & Fixtures	Overhead Conductors and Devices	Underground Conduit	Undeground Conductors and Devices	Line Transformers	Pad-Mounted Transformers	Services-Overhead	Services-Underground	Meters Installed	Street Lighting-Overhead	Mast Arms & Luminaries Installed	Street Lighting Underground
1950	5.0%	4.1%	3.1%	6.1%	5.7%	5.8%	4.5%	0.0%	6.5%	2.6%	0.0%	4.7%	na	-2.4%
1951	7.1%	9.5%	5.9%	8.5%	5.4%	**20.4%**	**12.4%**	0.0%	9.0%	**12.1%**	0.0%	8.7%	na	9.1%
1952	2.2%	1.8%	2.8%	5.3%	2.6%	3.0%	0.0%	0.0%	5.6%	2.2%	0.0%	4.1%	na	0.0%
1953	6.5%	5.2%	5.4%	2.5%	2.5%	0.0%	5.7%	0.0%	5.3%	0.0%	4.2%	2.0%	na	2.2%
1954	2.1%	3.3%	2.6%	4.9%	4.9%	1.5%	2.7%	0.0%	0.0%	-2.2%	1.4%	5.7%	na	8.2%
1955	2.0%	1.6%	2.5%	6.9%	2.4%	4.3%	0.0%	0.0%	7.4%	0.0%	-4.1%	0.0%	na	3.8%
1956	5.8%	9.2%	9.5%	8.5%	6.7%	-1.4%	2.6%	0.0%	6.9%	4.4%	4.1%	5.4%	**11.6%**	1.9%
1957	1.9%	5.7%	4.4%	0.0%	4.3%	**-13.8%**	5.1%	0.0%	-4.5%	-2.2%	5.3%	8.4%	9.0%	-9.7%
1958	3.6%	2.7%	2.2%	-2.1%	4.1%	0.0%	-2.5%	0.0%	0.0%	-4.5%	2.5%	4.7%	0.0%	**21.9%**
1959	0.0%	0.0%	2.1%	4.1%	3.9%	3.2%	-3.4%	0.0%	4.5%	2.3%	2.5%	0.0%	-5.9%	0.0%
1960	1.8%	-2.7%	4.1%	2.0%	3.8%	1.6%	-1.8%	-3.0%	4.3%	-4.7%	1.2%	-1.6%	0.0%	1.6%
1961	0.0%	-7.2%	0.0%	0.0%	1.8%	-1.6%	-3.6%	-4.1%	0.0%	0.0%	-1.2%	0.0%	0.0%	-3.3%
1962	1.7%	1.5%	3.9%	3.8%	3.6%	0.0%	-9.7%	-1.1%	2.1%	6.9%	0.0%	0.0%	-1.5%	0.0%
1963	0.0%	-3.0%	1.9%	1.9%	1.7%	1.6%	-5.2%	1.1%	2.1%	2.2%	0.0%	1.6%	0.0%	1.7%
1964	3.4%	3.0%	1.9%	3.6%	3.4%	7.5%	0.0%	-5.4%	4.0%	4.3%	0.0%	1.5%	3.0%	0.0%
1965	3.3%	2.9%	5.4%	5.2%	1.7%	8.3%	2.1%	0.0%	5.7%	8.0%	0.0%	1.5%	1.5%	1.6%
1966	3.2%	1.4%	3.4%	3.3%	1.6%	1.3%	0.0%	3.3%	5.4%	9.2%	0.0%	1.5%	5.7%	7.8%
1967	4.6%	6.8%	3.3%	6.4%	3.2%	2.6%	3.1%	3.2%	6.8%	5.1%	1.2%	5.7%	-1.4%	9.9%
1968	4.4%	6.4%	3.2%	4.5%	3.1%	-5.3%	5.0%	2.1%	4.8%	6.5%	3.6%	2.7%	0.0%	-4.1%
1969	5.6%	2.4%	7.6%	8.5%	5.9%	7.8%	-4.0%	-4.2%	9.0%	6.1%	3.4%	6.5%	5.5%	5.5%
1970	9.0%	4.7%	8.5%	**13.9%**	**10.8%**	6.1%	1.0%	1.1%	**14.6%**	7.1%	4.4%	8.5%	**16.0%**	**13.7%**
1971	7.1%	2.3%	9.0%	9.0%	**10.9%**	1.2%	1.0%	2.1%	9.4%	5.3%	5.2%	5.7%	5.5%	6.7%
1972	5.6%	3.3%	7.1%	3.2%	7.7%	**12.0%**	-2.0%	2.0%	6.5%	**11.1%**	1.0%	5.3%	3.2%	5.3%
1973	8.3%	8.3%	**13.9%**	4.1%	6.2%	3.0%	1.0%	1.0%	5.1%	**15.1%**	1.0%	4.1%	4.1%	3.0%
1974	**16.6%**	**19.9%**	**20.7%**	**14.0%**	**10.4%**	**22.3%**	8.6%	3.0%	7.7%	**14.0%**	6.8%	**19.1%**	**15.7%**	**18.2%**
1975	**14.2%**	**13.0%**	**14.4%**	**21.8%**	8.6%	3.1%	**17.6%**	1.9%	**10.5%**	-7.2%	**14.7%**	**19.5%**	**15.8%**	**20.3%**
1976	4.3%	3.5%	0.7%	**12.5%**	4.8%	3.1%	3.0%	1.9%	6.5%	4.6%	7.0%	5.3%	9.7%	6.6%
1977	4.8%	7.4%	3.4%	5.4%	6.1%	5.8%	7.9%	9.8%	6.1%	3.5%	3.7%	6.3%	8.9%	6.8%
1978	4.6%	5.6%	5.9%	-3.6%	6.5%	4.8%	6.0%	9.7%	6.4%	6.7%	2.9%	8.7%	7.6%	8.6%
1979	**10.3%**	5.9%	**11.4%**	7.6%	9.3%	**20.7%**	5.7%	5.2%	8.6%	7.8%	2.8%	**10.5%**	9.1%	**10.9%**
1980	7.2%	8.3%	8.2%	**10.1%**	6.7%	**12.4%**	0.0%	**13.6%**	**10.2%**	**17.7%**	-1.4%	8.2%	**10.7%**	7.6%
1981	8.3%	7.6%	8.0%	7.8%	6.3%	1.0%	**15.3%**	**15.9%**	6.1%	9.5%	**10.5%**	9.2%	**10.9%**	8.3%
1982	6.2%	8.0%	6.5%	5.5%	5.9%	-0.5%	8.1%	0.0%	6.3%	0.6%	**15.6%**	6.9%	5.6%	8.0%
1983	3.7%	1.8%	2.7%	6.9%	7.6%	1.9%	1.9%	1.6%	4.0%	**10.7%**	7.2%	1.2%	3.1%	0.8%
1984	2.7%	2.2%	3.9%	2.9%	6.1%	0.9%	1.4%	9.7%	9.3%	3.5%	1.5%	5.3%	7.3%	5.2%
1985	2.2%	2.2%	2.9%	0.8%	2.7%	3.2%	0.9%	1.4%	0.4%	-8.2%	1.5%	4.3%	4.1%	3.9%
1986	1.3%	1.3%	2.0%	0.8%	2.2%	4.9%	0.9%	3.8%	0.4%	-2.7%	2.4%	-0.4%	-2.4%	0.3%
1987	0.8%	2.9%	0.4%	-0.8%	2.2%	1.7%	-0.9%	9.7%	1.7%	6.4%	0.0%	-4.3%	-3.5%	-5.0%
1988	7.2%	9.3%	5.4%	**18.6%**	8.2%	3.6%	1.7%	9.9%	**10.3%**	8.0%	-5.6%	2.4%	1.6%	2.4%
1989	5.8%	7.5%	4.7%	4.5%	9.5%	6.7%	4.1%	5.7%	6.4%	7.8%	-4.2%	4.0%	5.3%	3.6%
1990	2.7%	6.1%	3.8%	0.9%	0.4%	4.4%	1.4%	2.2%	0.7%	1.5%	0.4%	3.1%	3.2%	3.3%
1991	2.6%	1.2%	5.6%	3.7%	0.4%	3.3%	0.3%	3.8%	2.7%	-2.5%	7.7%	4.3%	4.7%	4.1%
1992	1.2%	0.7%	5.1%	-2.3%	1.1%	1.3%	2.1%	0.1%	0.3%	-0.8%	-0.1%	3.6%	3.9%	3.4%
1993	2.6%	1.9%	3.7%	4.6%	3.3%	1.8%	0.8%	2.8%	3.4%	0.8%	1.9%	4.5%	3.2%	4.8%
1994	3.1%	3.4%	5.6%	4.2%	4.0%	1.2%	2.0%	0.7%	3.9%	4.2%	-4.6%	4.6%	5.9%	3.8%
1995	3.0%	4.7%	3.4%	6.4%	1.9%	3.8%	-1.4%	0.6%	4.6%	3.0%	-1.4%	4.2%	3.2%	4.0%
1996	1.6%	0.4%	2.7%	2.0%	1.8%	2.2%	-1.8%	3.9%	0.9%	0.1%	2.1%	5.0%	6.2%	5.1%
1997	1.5%	2.2%	2.9%	2.3%	2.9%	1.0%	-3.8%	1.8%	1.7%	1.3%	6.6%	2.5%	2.6%	2.5%
1998	2.3%	3.3%	1.4%	2.7%	2.5%	1.9%	2.2%	0.7%	2.1%	-1.2%	3.2%	0.9%	-0.6%	1.2%
1999	0.7%	1.3%	1.4%	-2.3%	3.0%	2.3%	0.5%	0.8%	1.1%	-0.1%	-3.3%	1.6%	0.4%	1.9%
2000	2.6%	1.6%	1.8%	5.7%	3.5%	2.0%	0.4%	0.8%	2.7%	4.5%	-1.2%	1.8%	1.4%	2.2%
2001	2.9%	2.2%	2.6%	4.5%	3.2%	-0.1%	3.5%	4.8%	2.8%	1.1%	**11.9%**	2.9%	2.1%	3.2%
2002	3.2%	1.2%	3.5%	2.7%	4.7%	1.2%	3.6%	3.6%	3.0%	3.7%	**12.9%**	6.1%	2.3%	6.9%
2003	2.0%	1.5%	1.9%	2.3%	1.7%	1.1%	1.2%	1.6%	2.3%	1.7%	7.1%	5.2%	2.0%	6.2%
2004	6.3%	9.8%	4.1%	6.7%	4.6%	7.2%	5.1%	**20.3%**	5.8%	3.3%	8.4%	3.2%	4.0%	2.7%
2005	8.0%	8.1%	5.4%	**10.1%**	6.8%	**11.0%**	**10.4%**	**17.2%**	7.0%	**10.1%**	-2.1%	5.5%	8.6%	4.8%
2006	**10.1%**	8.4%	4.4%	**11.0%**	5.8%	**11.0%**	**21.7%**	**17.7%**	5.8%	**17.2%**	2.3%	**12.8%**	9.6%	**13.9%**
2007	**10.7%**	9.9%	4.9%	8.9%	5.4%	**15.6%**	**23.6%**	**15.1%**	6.1%	-1.2%	3.6%	7.6%	5.2%	8.7%
2008	8.9%	7.4%	5.1%	**10.9%**	5.8%	**12.5%**	**15.1%**	-2.6%	5.4%	-2.1%	2.0%	7.9%	5.7%	8.7%
2009	2.7%	4.2%	4.2%	-6.4%	3.7%	6.5%	3.8%	-5.2%	-0.9%	-3.7%	2.2%	**10.3%**	**14.2%**	**10.0%**
2010	3.5%	5.2%	2.4%	4.5%	1.3%	-2.6%	8.4%	-3.7%	5.0%	8.9%	2.9%	-1.6%	2.8%	-2.7%
2011	4.8%	4.5%	1.6%	5.3%	3.5%	7.6%	5.6%	5.9%	6.1%	**13.8%**	-1.5%	2.5%	3.4%	2.4%
2012	4.3%	3.7%	3.2%	1.4%	3.3%	7.0%	6.6%	2.6%	1.0%	9.3%	1.1%	3.8%	4.6%	3.6%
2013	3.3%	2.7%	1.1%	4.3%	0.5%	2.2%	8.0%	-1.9%	1.9%	2.3%	2.1%	-0.5%	-2.0%	-0.3%
2014	2.9%	2.8%	0.9%	3.7%	2.5%	1.7%	7.0%	-1.9%	3.9%	-5.1%	2.1%	-3.2%	-7.5%	-2.2%
2015	2.1%	1.2%	1.3%	2.8%	1.8%	0.3%	4.4%	2.6%	2.8%	-0.1%	1.1%	1.4%	0.7%	1.7%
2016	1.2%	1.5%	1.9%	2.3%	1.5%	-1.9%	3.2%	-1.7%	1.2%	-4.9%	-0.5%	-0.1%	-1.6%	0.2%
2017	2.8%	3.9%	2.1%	2.1%	2.4%	0.4%	5.7%	4.7%	0.5%	4.3%	0.3%	-0.8%	-2.5%	-0.6%
2018	4.4%	5.0%	1.4%	4.6%	4.0%	4.3%	6.1%	4.4%	0.0%	7.8%	2.1%	4.9%	8.0%	4.6%
2019	3.8%	3.2%	3.5%	3.9%	2.3%	4.8%	4.3%	2.6%	2.6%	4.0%	2.1%	6.5%	8.8%	6.0%
2020	4.1%	3.7%	4.2%	1.3%	3.2%	5.9%	6.1%	2.0%	2.5%	3.5%	3.9%	2.9%	-2.1%	4.0%
2021	5.2%	8.1%	2.4%	-3.2%	5.7%	9.5%	7.6%	**28.4%**	2.2%	6.6%	4.6%	-2.9%	-7.9%	-2.1%
2022	**13.7%**	**13.2%**	5.1%	**15.7%**	7.9%	**11.1%**	**20.2%**	**52.8%**	9.6%	**18.8%**	**15.0%**	**11.8%**	**10.9%**	**12.0%**
2023	**19.2%**	9.9%	3.3%	**23.3%**	7.6%	**24.6%**	**31.0%**	**23.3%**	**19.1%**	6.3%	**21.5%**	**10.5%**	6.4%	**11.7%**
Annual Average Growth Rates														
2004 - 2023	**6.1%**	**5.8%**	**3.1%**	**5.6%**	**4.0%**	**6.9%**	**10.2%**	**9.1%**	**4.4%**	**5.0%**	**3.7%**	**4.1%**	**3.5%**	**4.4%**
2009 - 2023	**5.2%**	**4.9%**	**2.6%**	**4.4%**	**3.4%**	**5.4%**	**8.5%**	**7.7%**	**3.8%**	**4.8%**	**3.9%**	**3.0%**	**2.4%**	**3.2%**
2014 - 2023	**5.9%**	**5.3%**	**2.6%**	**5.6%**	**3.9%**	**6.1%**	**9.6%**	**11.7%**	**4.4%**	**4.1%**	**5.2%**	**3.1%**	**1.3%**	**3.5%**

Notes

[1] All growth rates are computed logarithmically. For example, the X in year t is yielded by the formula *growth rate of* $X = \ln(X_t/X_{t-1})$.

[2] *The Handy Whitman Index of Public Utility Construction Costs*, Whitman, Requardt and Associates (2024).

Data for years of rapid inflation are shaded.

Table AUC-16-3b

North Atlantic Handy-Whitman Transmission Construction Cost Growth Trends[1,2]

Year	Total Transmission Plant	Station Equipment	Towers & Fixtures	Poles & Fixtures	Overhead Conductors & Devices	Underground Conduit	Underground Conductors & Devices
1950	7.4%	7.4%	6.1%	3.2%	4.9%	3.1%	8.2%
1951	9.1%	**11.8%**	5.7%	9.0%	9.1%	5.9%	**19.5%**
1952	4.3%	3.1%	5.4%	5.6%	4.3%	5.6%	3.2%
1953	4.1%	4.5%	5.1%	5.3%	4.1%	2.7%	-1.6%
1954	2.0%	1.5%	2.5%	2.5%	5.8%	5.1%	3.1%
1955	3.8%	1.4%	2.4%	2.5%	5.5%	2.5%	4.5%
1956	7.3%	9.5%	6.9%	7.1%	8.6%	7.1%	-3.0%
1957	1.7%	5.1%	6.5%	6.6%	6.4%	6.6%	**-12.9%**
1958	3.4%	3.6%	4.1%	2.1%	-1.6%	4.2%	0.0%
1959	0.0%	-1.2%	3.9%	2.1%	-3.2%	2.0%	3.4%
1960	0.0%	-7.5%	1.9%	4.0%	1.6%	2.0%	1.7%
1961	-3.4%	**-11.0%**	1.9%	0.0%	0.0%	3.8%	-1.7%
1962	0.0%	-1.5%	3.6%	3.8%	1.6%	3.7%	0.0%
1963	0.0%	-6.1%	1.8%	1.9%	-8.1%	1.8%	1.7%
1964	5.0%	6.1%	3.4%	1.8%	6.6%	3.5%	6.4%
1965	4.8%	5.7%	5.0%	3.6%	4.7%	3.4%	8.8%
1966	3.1%	2.7%	4.7%	5.1%	4.4%	3.3%	1.4%
1967	5.9%	5.3%	4.5%	3.3%	2.9%	3.2%	2.7%
1968	2.8%	2.5%	4.3%	3.2%	0.0%	4.6%	-4.1%
1969	5.4%	3.7%	8.1%	7.5%	8.1%	7.2%	6.8%
1970	7.6%	4.7%	6.3%	7.0%	13.4%	9.3%	5.1%
1971	7.1%	2.3%	7.1%	7.8%	9.7%	**11.9%**	0.0%
1972	4.4%	3.3%	6.6%	7.2%	1.0%	7.6%	**11.8%**
1973	8.3%	8.3%	6.2%	**15.1%**	2.0%	4.1%	**10.5%**
1974	**19.9%**	**22.3%**	**19.9%**	**22.3%**	**15.7%**	**10.4%**	**30.0%**
1975	**13.8%**	**16.9%**	**13.0%**	**12.8%**	**22.1%**	9.4%	0.7%
1976	4.9%	2.7%	1.4%	0.0%	**13.4%**	7.1%	1.5%
1977	5.9%	6.4%	3.5%	2.8%	6.4%	6.6%	7.7%
1978	3.2%	6.0%	8.5%	5.3%	-5.8%	6.9%	-0.7%
1979	8.3%	7.3%	9.0%	9.3%	6.9%	8.3%	**17.3%**
1980	**10.3%**	8.3%	**10.9%**	8.5%	**12.0%**	7.7%	**18.6%**
1981	7.4%	7.7%	6.0%	8.8%	7.6%	6.6%	8.6%
1982	5.6%	6.3%	1.9%	7.2%	3.1%	8.7%	5.9%
1983	3.1%	1.7%	3.7%	3.6%	8.1%	3.8%	2.0%
1984	2.6%	2.9%	6.7%	4.8%	-2.1%	4.6%	-0.4%
1985	2.5%	2.4%	5.0%	2.1%	0.8%	3.1%	-2.0%
1986	2.1%	0.8%	2.8%	2.1%	0.8%	2.2%	9.0%
1987	1.2%	3.5%	2.4%	1.2%	-3.8%	2.1%	1.5%
1988	8.8%	4.8%	4.5%	9.1%	**26.7%**	7.6%	6.2%
1989	5.6%	5.6%	3.7%	7.9%	3.4%	6.2%	8.1%
1990	5.0%	5.9%	2.4%	4.2%	1.2%	1.4%	**15.5%**
1991	3.1%	1.7%	-1.4%	7.5%	3.7%	2.4%	**11.9%**
1992	1.8%	2.9%	1.9%	5.0%	-4.8%	1.6%	2.3%
1993	3.5%	3.5%	4.3%	3.0%	3.7%	3.5%	1.4%
1994	4.3%	4.7%	5.6%	5.6%	3.9%	3.1%	0.9%
1995	3.8%	3.7%	2.9%	2.9%	7.6%	1.4%	2.4%
1996	1.3%	0.4%	1.5%	4.1%	1.6%	2.2%	1.4%
1997	2.3%	1.8%	4.3%	3.5%	1.6%	2.5%	1.2%
1998	2.5%	3.0%	2.9%	1.2%	3.0%	3.2%	0.8%
1999	0.5%	1.5%	2.3%	-1.4%	-7.0%	2.6%	2.0%
2000	4.3%	6.0%	3.4%	0.9%	6.4%	2.3%	0.2%
2001	3.3%	4.0%	3.1%	3.5%	4.6%	3.0%	-0.9%
2002	1.9%	1.7%	2.9%	2.4%	-0.1%	3.8%	1.3%
2003	0.8%	-0.2%	2.8%	1.3%	0.4%	1.9%	1.6%
2004	7.6%	8.5%	6.1%	4.1%	7.8%	7.9%	9.1%
2005	7.5%	7.8%	4.4%	6.5%	**11.9%**	7.8%	7.9%
2006	7.3%	7.6%	3.6%	4.4%	**14.0%**	4.4%	7.1%
2007	8.1%	8.9%	7.6%	4.9%	9.0%	5.2%	9.5%
2008	9.3%	6.7%	5.7%	6.2%	**12.8%**	9.2%	**22.0%**
2009	-0.2%	3.5%	-0.6%	4.0%	**-16.7%**	2.5%	2.6%
2010	2.7%	4.0%	1.7%	0.2%	1.7%	2.0%	1.7%
2011	3.9%	4.3%	3.1%	1.0%	3.0%	4.2%	6.0%
2012	2.5%	3.3%	2.6%	2.8%	-2.7%	3.9%	4.3%
2013	2.0%	1.6%	1.5%	0.9%	3.4%	0.6%	4.1%
2014	2.1%	2.0%	1.8%	0.3%	1.9%	3.1%	3.7%
2015	1.9%	2.4%	1.9%	0.8%	1.8%	1.4%	1.7%
2016	1.8%	1.7%	1.4%	1.9%	2.2%	1.9%	1.5%
2017	2.2%	2.4%	0.4%	1.7%	0.5%	2.4%	5.4%
2018	4.6%	4.1%	3.8%	1.6%	7.0%	3.6%	7.0%
2019	2.7%	2.2%	2.0%	2.8%	4.3%	2.6%	4.0%
2020	2.2%	2.8%	3.0%	3.2%	-4.2%	2.9%	4.3%
2021	6.0%	7.9%	**11.7%**	2.4%	**-18.0%**	6.2%	**13.2%**
2022	**11.4%**	**10.9%**	6.1%	4.9%	**20.7%**	7.3%	**16.9%**
2023	**11.5%**	9.1%	0.5%	3.3%	**31.5%**	4.0%	**20.3%**
Annual Average Growth Rate							
2005 - 2023	**4.7%**	**4.9%**	**3.3%**	**2.8%**	**4.4%**	**4.0%**	**7.5%**
2009 - 2023	**3.8%**	**4.1%**	**2.7%**	**2.1%**	**2.4%**	**3.2%**	**6.4%**
2014 - 2023	**4.6%**	**4.6%**	**3.3%**	**2.3%**	**4.8%**	**3.5%**	**7.8%**

Notes

[1] All growth rates are computed logarithmically. For example, the X in year t is yielded by the formula *growth rate of* $X = \ln(X_t/X_{t-1})$.

[2] *The Handy Whitman Index of Public Utility Construction Costs*, Whitman, Requardt and Associates (2024).

Data for years of rapid inflation are shaded.

In Table AUC-16-4 we compare the trends in some of the rapidly rising Handy-Whitman power distribution sub-indexes for the North Atlantic region to trends in other pertinent input price indexes in the United States and Canada. It can be seen that rapid inflation occurred from 2004 to 2008 and from 2021 to 2023 in the prices of many of the products considered. The Handy Whitman subindexes show similarly rapid inflation during these periods.

Implicit Capital Stock Deflators

Another candidate asset price deflator for Ontario energy utility assets can be calculated from the *Flows and Stocks of Fixed Non-Residential Capital* (CANSIM Table 031-0005) dataset. This is produced by Statistics Canada's Stock and Consumption of Fixed Capital ("SCFC") program. This program uses monetary methods to measure trends in the quantities of capital assets in various sectors of Canada's economy, including the utilities sector. Through 2013, itemized results were reported for the Canadian (but not the Ontario) electric utility sector. Since that year, however, results have been reported only for the broader utilities sector. That sector includes asset prices for electricity generation, transmission, and distribution ("GTD"); natural gas distribution; and water, sewage and other systems.[9] These utility sector calculations are available for Ontario and Alberta as well as for Canada.

Statistics Canada bases this dataset on investment data from the *Annual Capital Repair and Expenditures Survey* ("CES"). This survey tracks actual investment expenditures, investment intentions, and the service lives of assets. Additional surveys are utilized to supplement the CES.[10] After the investment value data are gathered, Statistics Canada deflates values to constant dollars utilizing price deflators appropriate for the asset's broader classification. For the current program, price indexes for imports, Canadian products, and labor are used.[11]

[9] Gas transmission is excluded.

[10] Specifically, investment data are also gathered from the Building Permits Survey, CMHC Starts and Completions Survey, Quarterly Survey of Capital Expenditures – Oil and Gas Activities, Annual Survey of Research and Development in Canadian Industry, Employment Indicators, and Imports/Exports *About the Stock and Consumption of Fixed Capital Program* (February 2016).

[11] Specifically, the New Housing Price Index; Machinery and Equipment Price Index; Industrial Product Price Index; Construction Price Indexes; Commercial Software Price Index; Import Price Indexes; and Average Weekly Earnings. *About the Stock and Consumption of Fixed Capital Program* (February 2016).

Table AUC-16-4

How Handy Whitman Subindexes Compare to Alternative Price Indexes[1] (Growth Rates)

	BLS Producer Price Indexes				Statistics Canada Producer Price Indexes									BLS Employment Cost Indexes		Select Handy-Whitman Sub-Indexes:[7] North Atlantic Power Distribution			
Year	Steel Wire Drawing[3]	Communcation and Energy Wire (non-ferrous)[2]	Current-Carrying Wiring Device[3]	Electric Power and Specialty Transformers[4]	Iron & Steel Wire	Communication and Energy Wire and Cable	Other Engine and Power Transmission Equipment Manufacturing[8]	Communication and Energy Wire and Cable Manufacturing[8]	Insulated Metal Wire and Cable[8]	Power and Distribution Transformers	Other Transformers[8]	Fuses and High-Voltage Power Distribution Equipment[8]	Power, Distribution and Other Transformers	Utilities[5]	All Industries in the Northeast[6]	Overhead Conductors and Devices	Underground Conductors and Devices	Line Transformers	Pad Mounted Transformers
1982		-2.6%	5.1%	6.3%	na	na	na	na	na	2.0%	na	na	na	na	na	5.5%	-0.5%	8.1%	0.0%
1983	-0.8%	-4.0%	4.7%	1.9%	na	na	na	na	na	-4.9%	na	na	na	na	na	6.9%	1.9%	1.9%	1.6%
1984	1.7%	2.8%	3.5%	0.7%	na	na	na	na	na	3.4%	na	na	na	na	na	2.9%	0.9%	1.4%	9.7%
1985	1.0%	0.0%	2.7%	1.8%	na	na	na	na	na	5.7%	na	na	na	na	na	0.8%	3.2%	0.9%	1.4%
1986	-0.1%	0.2%	2.8%	0.2%	na	na	na	na	na	5.8%	na	na	na	na	na	0.8%	4.9%	0.9%	3.8%
1987	0.1%	1.3%	0.9%	1.5%	na	na	na	na	na	-1.3%	na	na	na	na	na	-0.8%	1.7%	-0.9%	9.7%
1988	5.6%	**17.7%**	2.8%	2.2%	na	na	na	na	na	6.0%	na	na	na	na	na	**18.6%**	3.6%	1.7%	9.9%
1989	3.4%	9.5%	2.8%	7.6%	na	na	na	na	na	**10.5%**	na	na	na	na	na	4.5%	6.7%	4.1%	5.7%
1990	1.3%	-6.4%	1.7%	5.2%	na	na	na	na	na	-1.9%	na	na	na	na	na	0.9%	4.4%	1.4%	2.2%
1991	-1.1%	-7.6%	1.7%	2.9%	na	na	na	na	na	-2.6%	na	na	na	na	na	3.7%	3.3%	0.3%	3.8%
1992	0.9%	-1.2%	1.5%	-0.5%	na	na	na	na	na	-5.2%	na	na	na	na	na	-2.3%	1.3%	2.1%	0.1%
1993	2.0%	-1.8%	2.6%	-1.4%	na	na	na	-1.3%	na	0.8%	na	na	na	na	na	4.6%	1.8%	0.8%	2.8%
1994	4.1%	3.1%	0.8%	1.5%	na	na	na	8.6%	na	**11.7%**	na	na	na	na	na	4.2%	1.2%	2.0%	0.7%
1995	3.2%	5.4%	2.5%	2.8%	na	na	na	**12.8%**	na	**20.4%**	na	na	na	na	na	6.4%	3.8%	-1.4%	0.6%
1996	-0.1%	-5.3%	1.1%	0.7%	na	na	na	-5.5%	na	-7.3%	na	na	na	na	na	2.0%	2.2%	-1.8%	3.9%
1997	1.3%	-0.4%	0.5%	-0.1%	na	na	na	-0.2%	na	-4.7%	na	na	na	na	na	2.3%	1.0%	-3.8%	1.8%
1998	1.4%	-5.2%	-0.8%	0.9%	na	na	na	-5.4%	na	0.2%	na	na	na	na	na	2.7%	1.9%	2.2%	0.7%
1999	-2.3%	-0.7%	-0.1%	1.3%	na	na	na	-3.4%	na	2.4%	na	na	na	na	na	-2.3%	2.3%	0.5%	0.8%
2000	-0.5%	6.6%	-0.5%	2.3%	na	na	na	4.5%	na	3.6%	na	na	na	na	na	5.7%	2.0%	0.4%	0.8%
2001	-1.7%	-5.1%	-0.6%	-1.0%	na	na	na	-0.4%	na	-2.7%	na	na	na	na	na	4.5%	-0.1%	3.5%	4.8%
2002	0.0%	-3.0%	-0.3%	-2.0%	na	na	na	-1.7%	na	-2.3%	na	na	na	3.5%	3.2%	2.7%	1.2%	3.6%	3.6%
2003	1.8%	4.5%	-0.4%	0.1%	na	na	na	0.4%	na	0.3%	na	na	na	2.7%	2.8%	2.3%	1.1%	1.2%	1.6%
2004	**23.2%**	9.1%	2.0%	2.8%	na	na	na	7.7%	na	1.2%	na	na	na	3.0%	3.1%	6.7%	7.2%	5.1%	**20.3%**
2005	6.9%	**16.7%**	4.2%	9.9%	na	na	na	6.2%	na	7.3%	na	na	na	2.7%	2.5%	**10.1%**	**11.0%**	**10.4%**	**17.2%**
2006	1.5%	**32.5%**	7.9%	**13.3%**	na	na	na	**19.9%**	na	**22.4%**	na	na	na	3.1%	3.1%	**11.0%**	**11.0%**	**21.7%**	**17.7%**
2007	1.5%	6.2%	5.9%	**11.7%**	na	na	na	1.8%	na	**11.1%**	na	na	na	3.2%	3.3%	8.9%	**15.6%**	**23.6%**	**15.1%**
2008	**24.0%**	2.3%	2.7%	**10.5%**	na	na	na	-3.5%	na	4.1%	na	na	na	3.1%	2.9%	**10.9%**	**12.5%**	**15.1%**	-2.6%
2009	-12.7%	-17.5%	1.8%	-2.7%	na	na	na	-0.7%	na	-0.1%	na	na	na	2.8%	1.8%	-6.4%	6.5%	3.8%	-5.2%
2010	-1.0%	**18.9%**	0.9%	5.9%	na	na	na	4.3%	na	-6.4%	na	na	na	2.4%	1.9%	4.5%	-2.6%	8.4%	-3.7%
2011	5.9%	**10.5%**	2.9%	3.1%	9.9%	3.3%	-0.5%	3.3%	3.5%	-2.3%	na	0.0%	-1.6%	2.7%	1.7%	5.3%	7.6%	5.6%	5.9%
2012	0.3%	-0.3%	4.3%	-0.6%	-2.6%	2.3%	4.6%	2.2%	2.4%	0.1%	na	0.0%	0.3%	2.4%	1.6%	1.4%	7.0%	6.6%	2.6%
2013	-1.7%	-1.6%	1.7%	-0.8%	-5.9%	3.4%	1.2%	3.2%	3.5%	-0.7%	na	0.0%	-0.3%	2.7%	1.7%	4.3%	2.2%	8.0%	-1.9%
2014	-0.5%	-0.4%	1.9%	0.2%	1.5%	-1.7%	2.3%	-1.3%	-1.7%	0.6%	na	0.0%	1.1%	2.7%	2.1%	3.7%	1.7%	7.0%	-1.9%
2015	-3.2%	-4.2%	-0.4%	-4.7%	-1.3%	-0.2%	3.8%	0.4%	-0.2%	3.6%	3.2%	0.0%	3.4%	2.5%	2.6%	2.8%	0.3%	4.4%	2.6%
2016	-3.0%	-8.7%	-2.3%	-1.0%	-1.8%	-0.1%	1.0%	-0.4%	-0.1%	0.6%	4.6%	0.0%	1.3%	2.3%	2.6%	2.3%	-1.9%	3.2%	-1.7%
2017	0.9%	1.6%	-0.1%	2.9%	7.9%	2.8%	1.7%	2.7%	2.8%	2.1%	2.8%	0.0%	1.9%	2.7%	2.6%	2.1%	0.4%	5.7%	4.7%
2018	**16.0%**	8.4%	1.4%	4.7%	**16.5%**	2.5%	0.4%	2.6%	2.6%	0.8%	1.0%	0.0%	1.6%	2.4%	2.8%	4.6%	4.3%	6.1%	4.4%
2019	5.4%	3.8%	1.4%	2.5%	-3.0%	-0.6%	3.4%	-0.7%	-0.6%	-0.1%	3.4%	0.0%	-0.8%	2.7%	3.3%	3.9%	4.8%	4.3%	2.6%
2020	-4.2%	1.8%	0.8%	1.3%	-0.5%	2.0%	-1.4%	-0.8%	-0.7%	-0.2%	-5.3%	0.0%	-0.5%	2.2%	2.6%	1.3%	5.9%	6.1%	2.0%
2021	**22.3%**	**30.1%**	5.8%	**16.0%**	**33.6%**	**43.0%**	na	na	na	3.8%	na	na	4.2%	2.6%	3.8%	-3.2%	9.5%	7.6%	**28.4%**
2022	**26.4%**	**25.2%**	7.8%	**28.0%**	**26.5%**	**22.4%**	na	na	na	**20.7%**	na	na	**21.6%**	3.3%	4.6%	**15.7%**	**11.1%**	**20.2%**	**52.8%**
2023	-11.1%	**24.3%**	**22.4%**	5.0%	-12.2%	-13.9%	na	na	na	8.7%	na	na	9.5%	4.2%	4.2%	**23.3%**	**24.6%**	**31.0%**	**23.3%**
2024	-8.6%	7.7%	2.0%	3.1%	-13.9%	-1.6%	na	na	na	8.7%	na	na	**10.0%**	3.8%	3.6%	na	na	na	na
Annual Average Growth																			
2005 - 2008	**8.5%**	**14.4%**	**5.2%**	**11.3%**	**NA**	**NA**	**NA**	**6.1%**	**NA**	**11.2%**	**NA**	**NA**	**NA**	**3.0%**	**2.9%**	**10.2%**	**12.5%**	**17.7%**	**11.8%**
2005 - 2024	**3.3%**	**7.9%**	**3.6%**	**5.4%**	**3.9%**	**4.6%**	**1.6%**	**2.5%**	**1.1%**	**4.2%**	**1.6%**	**0.0%**	**3.7%**	**2.8%**	**2.8%**	**5.6%**	**6.9%**	**10.5%**	**8.5%**
2010 - 2024	**2.9%**	**7.8%**	**3.3%**	**4.4%**	**3.9%**	**4.6%**	**1.6%**	**1.4%**	**1.1%**	**2.7%**	**1.6%**	**0.0%**	**3.7%**	**2.8%**	**2.8%**	**5.1%**	**5.3%**	**8.9%**	**8.6%**

Notes

[1] All growth rates are computed logarithmically. For example, growth rate of $X = \ln(X_t/X_{t-1})$

[2] PPI industry data for Other communication and energy wire mfg-Power wire and cable, made from nonferrous metals (purchased wire), not seasonally adjusted (U.S. Bureau of Labor Statistics)

[3] PPI industry data for Current-carrying wiring device mfg, not seasonally adjusted (U.S. Bureau of Labor Statistics); 2018 data for Jun-Oct is missing so the average of the remaining 7 months was computed for the annual average

[4] PPI industry data for Electric power and specialty transformer mfg, not seasonally adjusted (U.S. Bureau of Labor Statistics)

[5] Wages and salaries for private industry workers, not seasonally adjusted, Employment Cost Index (U.S. Bureau of Labor Statistics)

[6] Wages and salaries for private industry workers, not seasonally adjusted, in the Northeast census region, Employment Cost Index (U.S. Bureau of Labor Statistics)

[7] *The Handy Whitman Index of Public Utility Construction Costs* , Whitman, Requardt and Associates (2024).

[8] Data has been archived (as of September 2020) and is no longer regularly updated to reflect new information (Statistics Canada, Table 18-10-0030-01)

Data for years of rapid inflation are shaded.

After asset values are deflated to constant dollars, depreciation is determined and net stocks are calculated. The net stock in a given year is the level of net stock from the previous year, plus new investment, less depreciation. Once net stock has been calculated for the current year, assets are re-inflated using the same price indexes utilized for deflation. Statistics Canada reports capital stocks in current, constant, and chained-Fisher dollars. When current dollar levels are divided by the analogous constant or chained Fisher dollar levels, the quantity component cancels out leaving the ratio of the prices in the two years, which is an asset price growth index. By applying this methodology to time series, it is possible to generate implicit capital stock deflators ("ICSDs") for the utilities sector by province.

Statistics Canada reports itemized results for the utilities sector of the economy in the following asset categories: machinery and equipment, engineering construction, non-residential buildings, and intellectual property products. The inclusion of the latter two categories is noteworthy since these are not covered by the HWIs for electricity transmission or distribution. The aggregation of these capital asset quantities is also published as total non-residential capital in the utilities sector.

Attached to the Stock and Consumption of Fixed Non-Residential Capital program's description page is a publication titled *Investment Flows and Capital Stocks Methodology*. This document discusses the deflation of asset categories in some detail. We found some contradictions between this report and other Statistics Canada publications. When we asked Statistics Canada about these discrepancies, they stated that the *Investment Flows and Capital Stocks Methodology* document is outdated, and that they do not have a publicly available methodological document to replace it. However, the agency informed us that an older Flows and Stocks of Fixed Non-Residential Capital (CANSIM Table 031-0002) dataset, which was disseminated through 2013, utilized the older methodology.

When we compared our ICSDs for the utilities sector between both datasets we observed similar growth rates. Therefore, we believe that the methodologies are similar and that it is constructive to offer a brief discussion of the previous deflation methodology.[12] Engineering construction and machinery and equipment together average over 95 percent of the assets over the full sample period (93% more recently) in the utilities sector, so we focus on these categories. For engineering construction assets, indexes that measure prices of sold construction projects and assets were used.

[12] This discussion is based on Statistics Canada's *Investment Flows and Capital Stocks Methodology* (2001).

They were weighted using data from Statistics Canada's publications: *Construction in Canada* from 1971 to 1991 and *Capital Expenditures by Type of Asset* after 1991. Previously, weighted averages of construction input price indexes were used to deflate engineering construction assets. Statistics Canada began to switch to selling price indexes in 1971 and only used selling price indexes after 1980.

Machinery and equipment assets were deflated differently. Asset class and industry weights were derived from Statistics Canada's input-output model. It is worth noting that there was a three-year lag before weights could be revised to reflect the latest input-output models. After the weights were determined for all goods other than computers and software the associated product price indexes from Statistics Canada's Price Division were used.[13]

We have identified several reasons for the differences in results between the two ICSD methodologies. The old report states that indexes of Paasche form were used for Machinery and Equipment, but the more recent Flows and Stocks dataset uses indexes of Laspeyres form.[14] Furthermore, in our correspondence with the National Economic Accounts Division of Statistics Canada, they stated that the Machinery and Equipment category incorporates import price indexes, something that the old methodological publication makes no reference to. Further change may have resulted from adjustments in how assets and price indexes are matched.

Since a current methodology statement is not published for the SCFC, we cannot explicitly state how it is different from the EUCPI in terms of weighting. However, the SCFC uses prices indexes of both the Paasche and Laspeyres forms, instead of fixed year weights. Moreover, given the recent updates to the SCFC, the base year is likely more recent than 1973. Therefore, capital assets are likely paired with price indexes and weights that are more in line with current construction practices and technology.

Since there are differences in what the EUCPI and this ICSD are measuring, it is worth comparing them to help determine whether this alternative is a good substitute. As we have noted, the utility sector ICSD is easy to calculate, the program is reviewed regularly, and the data are Canadian, but it has the drawback of having a higher level of aggregation than indexes that are specific to electric utilities.

[13] Price indexes for computers and software come from the System of National Accounts. *Investment Flows and Capital Stocks Methodology* (2001).

[14] Canadian System of Macroeconomic Accounts: Chapter 7 Price and Volume Measures (November 2016)

Prior to 2014, in CANSIM Table 031-0002, the utilities sector was itemized at the four-digit level, and electric power GTD was given its own category. Between 2002 and 2013, electric power generation, distribution, and transmission averaged approximately 80 percent of total utility assets valued in constant dollars. We compared the growth rates for the deflator of utilities with the current methodology with the deflator for GTD using the historic methodology in Table AUC-16-5. For Canada as a whole, we found that the current deflator for utilities averaged 4.2% percent annual growth from 1962 to 2013; over the same period, electric power GTD averaged 4.2%. While the utilities-sector ICSD picks up some additional information that we do not want, it historically tracked the longer-term trend in the GTD price deflator fairly closely.

Tables AUC-16-6a and AUC-16-6b provide information on pertinent EUCPIs, ICSDs, and HWIs for power distribution and transmission respectively.[15] We report the HWIs for North Atlantic transmission and distribution and the product of these and the U.S./Canadian PPP. As noted above, the credibility of the EUCPI has been dubious in recent years. Therefore, we focused on the ability of alternative asset price deflators to track EUCPIs from 1962 to 2001, when the EUCPIs were more accurate. Results for this period are boxed in the table averages.

Inspecting the table for power distribution, it can be seen that, over the full 1962-2001 period when we believe that the EUCPIs worked reasonably well, the 4.8% AAGR in the EUCPI for distribution systems was very similar to the 4.7% AAGRs in the ICSDs for the utility sector. The EUCPI growth trend was also quite similar to the 4.6% AAGR of the summary North Atlantic HWI for distribution. However, the PPP-adjusted North Atlantic distribution HWI grew more rapidly, averaging 5.2% annually. All indexes displayed inflation surges during the two oil price shock periods that occurred in the 1962-2001 interval. However, this is not surprising since these were periods of general hyperinflation.

[15] We computed an EUCPI for transmission by taking a weighted average of the EUCPIs for transmission systems and substations.

Table AUC-16-5

Comparing Current and Historic Canadian ICSDs[1]

	Current Methodology[2]		Historic Methodology[3]		
	Canada	Ontario	Canada		Ontario
Year	Utilities	Utilities	Utilities	Electric GTD Assets[4]	Utilities
1961					
1962	1.9%	2.0%	2.2%	2.3%	2.5%
1963	2.3%	2.1%	2.7%	2.4%	2.4%
1964	4.1%	3.9%	3.3%	3.4%	3.1%
1965	4.2%	4.2%	5.8%	5.7%	5.8%
1966	4.3%	4.3%	5.0%	4.9%	4.3%
1967	3.4%	2.8%	3.4%	3.3%	2.9%
1968	1.4%	0.8%	0.6%	0.5%	0.2%
1969	4.6%	4.1%	4.2%	4.0%	3.3%
1970	5.6%	5.6%	5.6%	5.7%	6.0%
1971	5.2%	5.1%	4.9%	4.8%	4.9%
1972	5.5%	4.9%	5.4%	5.3%	4.5%
1973	7.0%	6.5%	7.0%	6.9%	6.3%
1974	**16.4%**	**16.2%**	**17.4%**	**17.4%**	**17.1%**
1975	**14.9%**	**15.4%**	**14.8%**	**14.8%**	**15.3%**
1976	7.3%	6.9%	7.1%	6.9%	6.3%
1977	7.1%	6.9%	6.5%	6.4%	6.5%
1978	8.8%	8.9%	8.1%	8.3%	8.3%
1979	**10.0%**	9.9%	9.9%	**10.1%**	9.7%
1980	9.7%	9.6%	**10.4%**	**10.5%**	**10.2%**
1981	**10.6%**	**14.0%**	**10.7%**	**10.6%**	**10.4%**
1982	7.1%	7.2%	7.4%	7.1%	7.5%
1983	3.1%	2.4%	3.1%	2.9%	2.3%
1984	3.5%	3.8%	3.4%	3.4%	3.6%
1985	3.2%	3.1%	3.3%	3.4%	3.3%
1986	4.4%	5.5%	4.2%	4.3%	5.0%
1987	2.9%	2.5%	2.8%	2.8%	2.4%
1988	3.7%	2.9%	3.5%	3.2%	2.7%
1989	2.7%	2.8%	2.6%	2.4%	2.8%
1990	4.4%	4.2%	4.3%	4.3%	4.0%
1991	-1.2%	-1.3%	-1.3%	-1.8%	-1.3%
1992	-0.9%	-0.4%	-0.8%	-1.3%	-0.3%
1993	0.5%	-1.2%	0.6%	0.7%	-0.9%
1994	3.9%	4.0%	3.9%	3.9%	4.0%
1995	1.7%	2.1%	1.9%	2.1%	2.4%
1996	3.1%	2.9%	3.1%	3.1%	3.0%
1997	3.7%	5.5%	3.3%	3.2%	4.7%
1998	3.2%	3.5%	3.4%	3.6%	3.7%
1999	0.8%	1.1%	1.0%	1.0%	1.2%
2000	2.1%	2.4%	2.0%	2.0%	2.4%
2001	2.2%	1.4%	2.4%	2.5%	1.5%
2002	0.8%	0.0%	1.0%	1.2%	0.3%
2003	-0.7%	0.2%	-1.1%	-1.5%	-0.6%
2004	3.3%	2.8%	3.0%	2.6%	2.7%
2005	2.9%	1.3%	2.8%	2.5%	1.2%
2006	3.7%	1.4%	3.5%	3.3%	1.2%
2007	3.9%	2.8%	3.8%	3.7%	2.7%
2008	6.3%	6.4%	4.7%	4.8%	4.1%
2009	2.9%	4.4%	3.7%	3.9%	4.5%
2010	1.0%	1.1%	2.3%	1.9%	1.5%
2011	2.4%	1.6%	2.6%	2.5%	2.1%
2012	2.7%	1.2%	2.9%	2.8%	2.9%
2013	2.9%	3.0%	2.9%	2.9%	2.9%
2014	2.7%	3.1%	na	na	na
2015	2.7%	3.4%	na	na	na
2016	2.1%	1.9%	na	na	na
2017	0.6%	0.2%	na	na	na
2018	2.7%	2.9%	na	na	na
2019	1.7%	1.7%	na	na	na
2020	0.1%	0.0%	na	na	na
2021	**13.4%**	**12.5%**	na	na	na
2022	7.6%	8.3%	na	na	na
2023	-0.4%	0.1%	na	na	na
Annual Average Growth					
1973-1975	**12.8%**	**12.7%**	**13.1%**	**13.0%**	**12.9%**
1979-1982	**9.4%**	**10.2%**	**9.6%**	**9.6%**	**9.4%**
1962 - 2001	**4.7%**	**4.7%**	**4.7%**	**4.7%**	**4.6%**
2005-2008	**4.2%**	**3.0%**	**NA**	**NA**	**NA**
2022-2023	**3.6%**	**4.2%**	**NA**	**NA**	**NA**
2004 - 2023	**3.3%**	**3.0%**	**3.2%**	**3.1%**	**2.6%**
2009 - 2023	**3.0%**	**3.0%**	**2.9%**	**2.8%**	**2.8%**

Notes for Table AUC-16-5

[1] All growth rates are computed logarithmically. For example, growth rate of X = ln(Xt/Xt-1)

[2] Flows and Stocks of Fixed Non-Residential Capital (Statistics Canada, Table 36-10-0096-01, formerly Table 031-0005), using Geometric End-Year Net Stock, deflated with Chained (2017) Dollars

[3] Flows and Stocks of Fixed Non-Residential Capital (Statistics Canada, Table 36-10-0236-01, formerly Table 031-0002), using Geometric (infinite) End-Year Net Stock, deflated with Chained (2007) Dollars

[4] Electric GTD stands for Electric Generation, Transmission and Distribution. This report is not available in the current methodology reports & is "suppressed to meet the confidentiality requirements of the Statistics Act for Ontario."

Data for years of rapid inflation are shaded.

Table AUC-16-6a

Comparing Candidate Utility Asset Price Deflators for Distribution[1]

	Canadian EUCPIs[2]		Implicit Capital Stock Deflators					Handy-Whitman Indexes[3]	
			Current Methodology[4]						
			Canada		Ontario			Total Distribution Plant	
Year	Distribution Systems	Substations	Utilities (Total)	Utilities - Machinery & Equipment	Utilities (Total)	Utilities - Machinery & Equipment	PPP Growth Rate [A]	North Atlantic Region [B]	North Atlantic Region with PPP Adjustment [A]*[B]
1961									
1962	1.6%	4.6%	1.9%	2.9%	2.0%	3.0%	-0.7%	1.7%	1.0%
1963	0.5%	2.4%	2.3%	0.5%	2.1%	0.5%	0.7%	0.0%	0.7%
1964	2.1%	4.7%	4.1%	2.7%	3.9%	2.7%	1.0%	3.4%	4.4%
1965	2.0%	4.9%	4.2%	3.7%	4.2%	3.8%	0.7%	3.3%	4.0%
1966	4.9%	3.9%	4.3%	3.6%	4.3%	3.6%	1.4%	3.2%	4.6%
1967	3.8%	-1.3%	3.4%	-1.7%	2.8%	-1.7%	1.5%	4.6%	6.1%
1968	-0.9%	-3.0%	1.4%	-3.8%	0.8%	-3.9%	-1.2%	4.4%	3.2%
1969	4.1%	2.2%	4.6%	-0.4%	4.1%	-0.3%	-0.6%	5.6%	4.9%
1970	7.3%	9.8%	5.6%	6.0%	5.6%	6.0%	-3.8%	9.0%	5.3%
1971	3.7%	5.0%	5.2%	4.1%	5.1%	4.1%	-0.1%	7.1%	7.0%
1972	4.3%	3.3%	5.5%	1.5%	4.9%	1.5%	1.4%	5.6%	7.0%
1973	8.8%	6.6%	7.0%	2.9%	6.5%	2.9%	4.0%	8.3%	**12.3%**
1974	**18.5%**	**20.1%**	**16.4%**	**15.4%**	**16.2%**	**15.5%**	5.4%	**16.6%**	**22.0%**
1975	**11.6%**	**15.8%**	**14.9%**	**17.9%**	**15.4%**	**18.0%**	1.4%	**14.2%**	**15.6%**
1976	5.6%	6.8%	7.3%	4.4%	6.9%	4.4%	3.6%	4.3%	7.9%
1977	6.4%	3.9%	7.1%	6.1%	6.9%	6.1%	0.5%	4.8%	5.3%
1978	7.1%	7.3%	8.8%	9.7%	8.9%	9.8%	-0.3%	4.6%	4.3%
1979	**12.7%**	9.5%	**10.0%**	**9.8%**	9.9%	9.8%	1.6%	**10.3%**	**11.9%**
1980	**13.1%**	**10.5%**	9.7%	9.6%	9.6%	9.7%	0.7%	7.2%	8.0%
1981	8.6%	8.9%	**10.6%**	**7.8%**	**14.0%**	**6.6%**	0.8%	8.3%	9.0%
1982	8.9%	9.1%	7.1%	7.7%	7.2%	7.6%	2.5%	6.2%	8.7%
1983	4.1%	1.7%	3.1%	-1.4%	2.4%	-1.6%	1.8%	3.7%	5.4%
1984	4.3%	4.3%	3.5%	5.1%	3.8%	5.1%	-0.1%	2.7%	2.6%
1985	5.0%	1.4%	3.2%	3.7%	3.1%	3.2%	0.2%	2.2%	2.3%
1986	2.3%	3.4%	4.4%	8.2%	5.5%	9.3%	1.1%	1.3%	2.3%
1987	3.0%	7.2%	2.9%	0.2%	2.5%	0.2%	2.2%	0.8%	3.1%
1988	5.9%	7.3%	3.7%	-1.8%	2.9%	-1.7%	1.0%	7.2%	8.1%
1989	3.8%	7.6%	2.7%	3.6%	2.8%	3.8%	0.7%	5.8%	6.5%
1990	3.1%	0.7%	4.4%	3.0%	4.2%	2.9%	-0.3%	2.7%	2.4%
1991	-0.8%	-4.3%	-1.2%	-1.4%	-1.3%	-1.3%	-0.3%	2.6%	2.2%
1992	2.3%	0.1%	-0.9%	2.9%	-0.4%	3.0%	-0.8%	1.2%	0.4%
1993	2.5%	3.0%	0.5%	2.7%	-1.2%	2.8%	-1.1%	2.6%	1.6%
1994	5.4%	4.6%	3.9%	4.7%	4.0%	4.7%	-0.7%	3.1%	2.4%
1995	7.6%	3.6%	1.7%	5.6%	2.1%	5.5%	0.2%	3.0%	3.1%
1996	-0.1%	0.0%	3.1%	1.9%	2.9%	1.6%	-0.1%	1.6%	1.6%
1997	1.2%	1.7%	3.7%	1.6%	5.5%	1.6%	-0.6%	1.5%	1.0%
1998	4.0%	4.9%	3.2%	6.9%	3.5%	9.2%	-1.3%	2.3%	1.0%
1999	2.7%	1.0%	0.8%	1.3%	1.1%	1.6%	0.5%	0.7%	1.2%
2000	2.0%	1.6%	2.1%	1.3%	2.4%	0.7%	3.0%	2.6%	5.6%
2001	0.7%	2.3%	2.2%	4.5%	1.4%	5.0%	-0.6%	2.9%	2.3%
2002	0.7%	1.9%	0.8%	2.3%	0.0%	1.6%	0.7%	3.2%	4.0%
2003	0.1%	-3.0%	-0.7%	-7.3%	0.2%	-5.9%	-0.3%	2.0%	1.7%
2004	0.4%	1.1%	3.3%	-5.2%	2.8%	-6.0%	0.6%	6.3%	6.9%
2005	1.9%	1.8%	2.9%	-1.8%	1.3%	-2.1%	-1.6%	8.0%	6.4%
2006	6.4%	3.8%	3.7%	-0.9%	1.4%	-0.8%	-0.7%	**10.1%**	9.4%
2007	4.4%	5.1%	3.9%	0.2%	2.8%	0.3%	0.6%	**10.7%**	**11.2%**
2008	1.0%	5.6%	6.3%	5.6%	6.4%	5.9%	1.8%	8.9%	**10.8%**
2009	0.5%	1.3%	2.9%	7.6%	4.4%	8.1%	-2.6%	2.7%	0.1%
2010	2.6%	-0.1%	1.0%	-7.2%	1.1%	-7.2%	1.6%	3.5%	5.1%
2011	3.2%	1.7%	2.4%	-1.0%	1.6%	-1.0%	1.5%	4.8%	6.3%
2012	0.9%	0.4%	2.7%	1.3%	1.2%	1.2%	0.4%	4.3%	4.7%
2013	-0.8%	0.8%	2.9%	3.8%	3.0%	4.3%	-1.7%	3.3%	1.6%
2014	0.1%	3.5%	2.7%	6.6%	3.1%	6.7%	0.5%	2.9%	3.4%
2015	na	na	2.7%	10.8%	3.4%	11.2%	1.4%	2.1%	3.5%
2016	na	na	2.1%	0.4%	1.9%	0.2%	-3.3%	1.2%	-2.1%
2017	na	na	0.6%	-2.6%	0.2%	-2.8%	0.4%	2.8%	3.3%
2018	na	na	2.7%	4.0%	2.9%	4.4%	-0.5%	4.4%	3.9%
2019	na	na	1.7%	0.9%	1.7%	1.1%	0.9%	3.8%	4.7%
2020	na	na	0.1%	-0.5%	0.0%	-0.5%	-1.3%	4.1%	2.8%
2021	na	na	**13.4%**	**5.5%**	**12.5%**	**5.8%**	-1.8%	5.2%	3.3%
2022	na	na	7.6%	15.6%	8.3%	15.6%	-1.3%	**13.7%**	**12.3%**
2023	na	na	-0.4%	2.7%	0.1%	2.7%	0.5%	**19.2%**	**19.6%**
Annual Average Growth									
1973 - 1975	**13.0%**	**14.1%**	**12.8%**	**12.1%**	**12.7%**	**12.1%**	**3.6%**	**13.0%**	**16.6%**
1979 - 1982	**10.8%**	**9.5%**	**9.4%**	**8.7%**	**10.2%**	**8.4%**	**1.4%**	**8.0%**	**9.4%**
1962 - 2001	**4.8%**	**4.7%**	**4.7%**	**4.1%**	**4.7%**	**4.1%**	**0.6%**	**4.6%**	**5.2%**
2005 - 2008	**NA**	**NA**	**4.2%**	**0.8%**	**3.0%**	**0.8%**	**0.0%**	**9.4%**	**9.5%**
2022 - 2023	**NA**	**NA**	**3.6%**	**9.1%**	**4.2%**	**9.1%**	**-0.4%**	**16.4%**	**16.0%**
2004 - 2023	**1.9%**	**2.3%**	**3.3%**	**2.3%**	**3.0%**	**2.4%**	**-0.2%**	**6.1%**	**5.9%**
2009 - 2023	**1.1%**	**1.3%**	**3.0%**	**3.2%**	**3.0%**	**3.3%**	**-0.4%**	**5.2%**	**4.8%**

Table AUC-16-6b

Comparing Candidate Utility Asset Price Deflators for Transmission[1]

	Canadian EUCPIs[2]			Implicit Capital Stock Deflators					Handy-Whitman Indexes[3]	
				Current Methodology[4]						
				Canada		Ontario			Total Transmission Plant	
Year	Substations [A]	Transmission Systems [B]	All Transmission (1/3 [A] + 2/3 [B])	Utilities (Total)	Utilities - Machinery & Equipment	Utilities (Total)	Utilities - Machinery & Equipment	PPP Growth Rate [C]	North Atlantic Region [D]	North Atlantic Region with PPP Adjustment [C]*[D]
1961										
1962	4.6%	3.7%	4.0%	1.9%	2.9%	2.0%	3.0%	-0.7%	0.0%	-0.7%
1963	2.4%	2.1%	2.2%	2.3%	0.5%	2.1%	0.5%	0.7%	0.0%	0.7%
1964	4.7%	3.5%	3.9%	4.1%	2.7%	3.9%	2.7%	1.0%	5.0%	6.0%
1965	4.9%	4.8%	4.8%	4.2%	3.7%	4.2%	3.8%	0.7%	4.8%	5.5%
1966	3.9%	4.1%	4.0%	4.3%	3.6%	4.3%	3.6%	1.4%	3.1%	4.5%
1967	-1.3%	0.9%	0.1%	3.4%	-1.7%	2.8%	-1.7%	1.5%	5.9%	7.4%
1968	-3.0%	-1.3%	-1.9%	1.4%	-3.8%	0.8%	-3.9%	-1.2%	2.8%	1.6%
1969	2.2%	3.1%	2.8%	4.6%	-0.4%	4.1%	-0.3%	-0.6%	5.4%	4.8%
1970	9.8%	8.8%	9.1%	5.6%	6.0%	5.6%	6.0%	-3.8%	7.6%	3.8%
1971	5.0%	4.3%	4.5%	5.2%	4.1%	5.1%	4.1%	-0.1%	7.1%	6.9%
1972	3.3%	4.5%	4.1%	5.5%	1.5%	4.9%	1.5%	1.4%	4.4%	5.9%
1973	6.6%	7.1%	6.9%	7.0%	2.9%	6.5%	2.9%	4.0%	8.3%	**12.3%**
1974	**20.1%**	**19.2%**	**19.5%**	**16.4%**	**15.4%**	**16.2%**	**15.5%**	5.4%	**19.9%**	**25.3%**
1975	**15.8%**	**15.9%**	**15.8%**	**14.9%**	**17.9%**	**15.4%**	**18.0%**	1.4%	**13.8%**	**15.1%**
1976	6.8%	7.0%	6.9%	7.3%	4.4%	6.9%	4.4%	3.6%	4.9%	8.4%
1977	3.9%	5.2%	4.8%	7.1%	6.1%	6.9%	6.1%	0.5%	5.9%	6.4%
1978	7.3%	7.4%	7.4%	8.8%	9.7%	8.9%	9.8%	-0.3%	3.2%	2.9%
1979	9.5%	**11.0%**	**10.5%**	**10.0%**	**9.8%**	9.9%	9.8%	1.6%	8.3%	9.9%
1980	**10.5%**	**11.4%**	**11.1%**	9.7%	9.6%	9.6%	9.7%	0.7%	10.3%	**11.0%**
1981	8.9%	9.6%	9.4%	**10.6%**	**7.8%**	**14.0%**	**6.6%**	0.8%	7.4%	8.2%
1982	9.1%	7.5%	8.0%	7.1%	7.7%	7.2%	7.6%	2.5%	5.6%	8.1%
1983	1.7%	2.5%	2.2%	3.1%	-1.4%	2.4%	-1.6%	1.8%	3.1%	4.9%
1984	4.3%	4.6%	4.5%	3.5%	5.1%	3.8%	5.1%	-0.1%	2.6%	2.5%
1985	1.4%	1.2%	1.3%	3.2%	3.7%	3.1%	3.2%	0.2%	2.5%	2.7%
1986	3.4%	2.9%	3.1%	4.4%	8.2%	5.5%	9.3%	1.1%	2.1%	3.1%
1987	7.2%	6.0%	6.4%	2.9%	0.2%	2.5%	0.2%	2.2%	1.2%	3.5%
1988	7.3%	7.9%	7.7%	3.7%	-1.8%	2.9%	-1.7%	1.0%	8.8%	9.8%
1989	7.6%	6.1%	6.6%	2.7%	3.6%	2.8%	3.8%	0.7%	5.6%	6.3%
1990	0.7%	1.4%	1.1%	4.4%	3.0%	4.2%	2.9%	-0.3%	5.0%	4.7%
1991	-4.3%	-3.5%	-3.8%	-1.2%	-1.4%	-1.3%	-1.3%	-0.3%	3.1%	2.8%
1992	0.1%	-0.4%	-0.2%	-0.9%	2.9%	-0.4%	3.0%	-0.8%	1.8%	1.0%
1993	3.0%	3.0%	3.0%	0.5%	2.7%	-1.2%	2.8%	-1.1%	3.5%	2.4%
1994	4.6%	4.8%	4.8%	3.9%	4.7%	4.0%	4.7%	-0.7%	4.3%	3.6%
1995	3.6%	4.3%	4.0%	1.7%	5.6%	2.1%	5.5%	0.2%	3.8%	4.0%
1996	0.0%	0.6%	0.4%	3.1%	1.9%	2.9%	1.6%	-0.1%	1.3%	1.2%
1997	1.7%	1.9%	1.8%	3.7%	1.6%	5.5%	1.6%	-0.6%	2.3%	1.8%
1998	4.9%	4.5%	4.6%	3.2%	6.9%	3.5%	9.2%	-1.3%	2.5%	1.2%
1999	1.0%	1.0%	1.0%	0.8%	1.3%	1.1%	1.6%	0.5%	0.5%	0.9%
2000	1.6%	2.0%	1.9%	2.1%	1.3%	2.4%	0.7%	3.0%	4.3%	7.4%
2001	2.3%	1.8%	2.0%	2.2%	4.5%	1.4%	5.0%	-0.6%	3.3%	2.7%
2002	1.9%	1.7%	1.8%	0.8%	2.3%	0.0%	1.6%	0.7%	1.9%	2.6%
2003	-3.0%	-2.2%	-2.5%	-0.7%	-7.3%	0.2%	-5.9%	-0.3%	0.8%	0.5%
2004	1.1%	2.0%	1.7%	3.3%	-5.2%	2.8%	-6.0%	0.6%	7.6%	8.2%
2005	1.8%	1.5%	1.6%	2.9%	-1.8%	1.3%	-2.1%	-1.6%	7.5%	6.0%
2006	3.8%	4.0%	3.9%	3.7%	-0.9%	1.4%	-0.8%	-0.7%	7.3%	6.7%
2007	5.1%	4.6%	4.7%	3.9%	0.2%	2.8%	0.3%	0.6%	8.1%	8.6%
2008	5.6%	4.3%	4.7%	6.3%	5.6%	6.4%	5.9%	1.8%	9.3%	**11.1%**
2009	1.3%	0.6%	0.9%	2.9%	7.6%	4.4%	8.1%	-2.6%	-0.2%	-2.9%
2010	-0.1%	0.5%	0.3%	1.0%	-7.2%	1.1%	-7.2%	1.6%	2.7%	4.3%
2011	1.7%	2.3%	2.1%	2.4%	-1.0%	1.6%	-1.0%	1.5%	3.9%	5.3%
2012	0.4%	0.3%	0.3%	2.7%	1.3%	1.2%	1.2%	0.4%	2.5%	2.9%
2013	0.8%	0.1%	0.3%	2.9%	3.8%	3.0%	4.3%	-1.7%	2.0%	0.3%
2014	3.5%	2.6%	2.9%	2.7%	6.6%	3.1%	6.7%	0.5%	2.1%	2.6%
2015	na	na	na	2.7%	10.8%	3.4%	11.2%	1.4%	1.9%	3.3%
2016	na	na	na	2.1%	0.4%	1.9%	0.2%	-3.3%	1.8%	-1.6%
2017	na	na	na	0.6%	-2.6%	0.2%	-2.8%	0.4%	2.2%	2.7%
2018	na	na	na	2.7%	4.0%	2.9%	4.4%	-0.5%	4.6%	4.1%
2019	na	na	na	1.7%	0.9%	1.7%	1.1%	0.9%	2.7%	3.6%
2020	na	na	na	0.1%	-0.5%	0.0%	-0.5%	-1.3%	2.2%	0.9%
2021	na	na	na	**13.4%**	**5.5%**	**12.5%**	**5.8%**	-1.8%	**16.1%**	**14.3%**
2022	na	na	na	7.6%	**15.6%**	8.3%	15.6%	-1.3%	**10.9%**	9.6%
2023	na	na	na	-0.4%	2.7%	0.1%	2.7%	0.5%	9.1%	9.6%
Annual Average Growth										
1973-1975	**14.1%**	**14.0%**	**14.1%**	**12.8%**	**12.1%**	**12.7%**	**12.1%**	**3.6%**	**14.0%**	**17.6%**
1979-1982	**9.5%**	**9.9%**	**9.8%**	**9.4%**	**8.7%**	**10.2%**	**8.4%**	**1.4%**	**7.9%**	**9.3%**
1962 - 2001	**4.7%**	**4.8%**	**4.8%**	**4.7%**	**4.1%**	**4.7%**	**4.1%**	**0.6%**	**4.9%**	**5.5%**
2005-2008	**NA**	**NA**	**NA**	**4.2%**	**0.8%**	**3.0%**	**0.8%**	**0.0%**	**8.1%**	**8.1%**
2022-2023	**NA**	**NA**	**NA**	**3.6%**	**9.1%**	**4.2%**	**9.1%**	**-0.4%**	**10.0%**	**9.6%**
2004 - 2023	**2.3%**	**2.1%**	**2.1%**	**3.3%**	**2.3%**	**3.0%**	**2.4%**	**-0.2%**	**5.2%**	**5.0%**
2009 - 2023	**1.3%**	**1.1%**	**1.1%**	**3.0%**	**3.2%**	**3.0%**	**3.3%**	**-0.4%**	**4.3%**	**3.9%**

Notes for Table AUC-16-6a and AUC-16-6b

[1] All growth rates are computed logarithmically. For example, growth rate of X = ln(Xt/Xt-1).

[2] Electric Utility Construction Price Index (Statistics Canada, Table 18-10-0047-01, formerly Table 327-0011).

[3] The Handy Whitman Index of Public Utility Construction Costs, Whitman, Requardt and Associates (2024).

[4] Flows and Stocks of Fixed Non-Residential Capital (Statistics Canada, Table 36-10-0096-01, formerly Table 031-0005), using Geometric End-Year Net Stock, deflated with Chained (2017) Dollars.

Data for years of rapid inflation are shaded.

We also compared the same datasets for two more recent periods of rapid inflation in the HWI for power distribution. These were 2005-2008 and 2021-2023. It can be seen that the ICSDs grew discernably more slowly during both of these periods than did the HWIs and the numerous distribution-related PPIs that we reported in Table AUC-16-4. Over the last 20 years ending in 2023, the ICSD for the Ontario utilities sector averaged 3.0% annual growth, well below the 6.1% growth of the distribution HWI of the North Atlantic region and the 5.9% annual growth in the PPP-adjusted distribution HWI.

As a final exercise, we did several econometric runs in which the gross plant additions of Ontario electricity distributors were a function of several sensible external cost drivers. Each run included one of the candidate asset price indexes. The sample period was the ten years from 2014 to 2023.

Results of this exercise are reported in Table AUC-16-7. The table reports econometric parameter estimates with t-statistics in parentheses. It can be seen that the HWIs for power distribution in the North Atlantic and North Central regions (without PPP adjustments) had the highest t-statistics. Other candidates with relatively high t-stats included the HWIs multiplied by the PPP for the U.S./Canada and the ICSD for machinery and equipment. The parameter estimate for the $GDPIPI^{FDD}$ had slightly lower statistical significance but a higher parameter estimate. This suggests that $GDPIPI^{FDD}$ tracked the trend in gross plant additions well but not the occasional surges.

Table AUC-16-7

Explanatory Power of Alternative Asset Price Deflators

Explanatory Variables	Dependent Variable: natural log of nominal Capital Additions									
YN	0.793***	0.638***	0.640***	0.639***	0.642***	0.644***	0.642***	0.650***	0.640***	0.632***
	(4.22)	(3.43)	(3.44)	(3.46)	(3.52)	(3.37)	(3.42)	(3.40)	(3.43)	(3.34)
YN x YN	-0.258**	-0.292***	-0.292***	-0.292***	-0.292***	-0.290**	-0.291***	-0.289**	-0.292***	-0.294***
	(-3.12)	(-3.32)	(-3.32)	(-3.33)	(-3.34)	(-3.25)	(-3.29)	(-3.24)	(-3.31)	(-3.31)
YP	0.0474	0.183	0.182	0.182	0.179	0.177	0.178	0.171	0.182	0.188
	(0.33)	(1.23)	(1.22)	(1.23)	(1.24)	(1.16)	(1.19)	(1.12)	(1.24)	(1.25)
YP x YP	0.239**	0.269**	0.269**	0.269**	0.269**	0.267**	0.268**	0.266**	0.268**	0.270**
	(2.88)	(3.08)	(3.08)	(3.09)	(3.09)	(3.02)	(3.05)	(3.01)	(3.06)	(3.07)
YL	0.340***	0.354***	0.354***	0.354***	0.354***	0.354***	0.355***	0.354***	0.353***	0.355***
	(5.87)	(6.56)	(6.54)	(6.54)	(6.52)	(6.55)	(6.58)	(6.53)	(6.55)	(6.59)
%UGP	0.0774	0.0790	0.0791	0.0792	0.0794	0.0783	0.0784	0.0780	0.0793	0.0788
	(1.02)	(1.07)	(1.07)	(1.08)	(1.08)	(1.06)	(1.06)	(1.05)	(1.07)	(1.07)
dYN	3.902**	3.890**	3.879**	3.861**	3.826**	3.951**	3.956**	3.981**	3.827**	3.913**
	(2.86)	(2.86)	(2.85)	(2.84)	(2.82)	(2.82)	(2.85)	(2.84)	(2.74)	(2.80)
MVA per Station	0.00985	0.0133*	0.0132*	0.0132*	0.0129	0.0140*	0.0140*	0.0142*	0.0128	0.0135
	(1.58)	(1.98)	(1.97)	(1.97)	(1.95)	(2.02)	(2.00)	(2.03)	(1.92)	(1.96)
% Old Transformers (Stat and Line)	0.0451	0.0490	0.0489	0.0488	0.0485	0.0490	0.0491	0.0490	0.0486	0.0492
	(1.54)	(1.69)	(1.68)	(1.68)	(1.66)	(1.69)	(1.70)	(1.69)	(1.67)	(1.70)
%YV non-Residential	0.237	0.232	0.231	0.231	0.231	0.236	0.238	0.238	0.225	0.234
	(1.75)	(1.62)	(1.61)	(1.61)	(1.59)	(1.70)	(1.70)	(1.72)	(1.62)	(1.68)
HWIDx NA		0.655***								
		(10.61)								
HWIDx NC			0.646***							
			(10.28)							
HWIDx NA x PPP				0.736***						
				(10.23)						
HWIDx NC x PPP					0.828***					
					(9.83)					
ICSD TOT						0.973***				
						(6.78)				
ICSD BLDGS							0.615***			
							(7.88)			
ICSD ENGCONST								0.976***		
								(6.07)		
ICSD MACHEQUIP									0.890***	
									(10.11)	
GDPIPI-FDD										1.440***
										(10.03)
Constant	17.15***	17.10***	17.10***	17.09***	17.09***	17.10***	17.09***	17.10***	17.11***	17.11***
	(156.60)	(213.47)	(211.88)	(214.03)	(213.97)	(217.74)	(214.80)	(216.42)	(213.48)	(214.93)
Observations	583	583	583	583	583	583	583	583	583	583
R-squared	0.946	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949	0.949
RMSE	0.474	0.461	0.461	0.461	0.461	0.462	0.462	0.463	0.462	0.461

Conclusion

Having reviewed salient options for measuring trends in Ontario distributor asset prices, we decided to use the HWI of total power distribution construction in the North Atlantic states to deflate the gross plant additions of Alectra Utilities. The HWI for the Plateau region would be used to deflate the gross plant additions of Alberta utilities.

- Results are readily available and in the public domain.
- It was one of the better performers in both exercises that we used to select a new asset price index.
- It is sensitive to the recent rapid construction cost inflation that distributors have experienced.