

Holyrood Continuous Emission Monitoring (CEM) Budget Proposal

Assumptions:

- Discount rate of 8.5%.
- Escalation of O&M and fuel considered as indicated (and as used in current PUB submissions).
- Annual average fuel consumption assumed at 3,000,000 barrels, (1.8 TWh).
- Assumed efficiency gain of 0.25% due to real-time combustion information availability to operators thus allowing combustion adjustment.
- Efficiency improvement results in fuel use reduction of approximately 7500 barrels annually.
- System installed provides information needed to validate CANTOX results.
- Existing Ambient Monitoring system is maintained (SOx only).
- Biannual in-situ stack emission testing will no longer be required by N&L Department of Environment (NLDOE).

Alternative 1: Enhance existing ambient air monitoring system, which will validate CANTOX conclusions, but provide no added operational value.

Alternative 2a: Install CEM system which will validate CANTOX conclusions, provide added operational information, and eliminate requirements for biannual in-situ stack emission testing.

Alternative 2b: Install CEM as in Alternative 2a but assume NLDOE maintains requirement for biannual in-situ testing.

Comparison of Holyrood Emissions Monitoring Alternatives

Year	Alternative 1 Enhanced Ambient Air Monitoring only				Alternative 2a CEM With Efficiency Improvement and Biannual In-Situ Testing Not Required				Alternative 2b CEM With Efficiency Improvement and Biannual In-Situ Testing Required					O&M Escal.	Oil Price Series \$/bbl
	Capital	O&M	In-Situ Stack Sampling	CPW to 2002	Capital	O&M	7500 bbls Annual Eff. Imprv.	CPW to 2002	Capital	O&M	7500 bbls Annual Eff. Imprv.	In-Situ Stack Sampling	CPW to 2002		
2002	\$ 530,000			530,000	\$ 800,900			800,900	\$ 800,900				800,900		
2003		86,570	101,848	703,657		66,201	(195,168)	682,036		66,201	(195,168)	101,848	775,905	1.8	26.0
2004		87,741	0	778,189		67,096	(173,450)	591,694		67,096	(173,450)	0	685,562	1.4	23.1
2005		89,134	104,863	930,071		68,161	(174,418)	508,505		68,161	(174,418)	104,863	684,472	1.6	23.3
2006		90,777	0	995,574		69,418	(179,747)	428,894		69,418	(179,747)	0	604,861	1.8	24.0
2007		92,415	108,723	1,129,340		70,670	(185,239)	352,700		70,670	(185,239)	108,723	600,973	1.8	24.7
2008		94,090	0	1,187,012		71,951	(190,899)	279,792		71,951	(190,899)	0	528,065	1.8	25.5
2009		95,898	112,821	1,304,923		73,334	(196,732)	210,081		73,334	(196,732)	112,821	522,089	1.9	26.2
2010		97,743	0	1,355,815		74,744	(202,743)	143,435		74,744	(202,743)	0	455,444	1.9	27.0
2011		99,623	117,203	1,459,865		76,182	(208,766)	79,811		76,182	(208,766)	117,203	448,063	1.9	27.8
2012		101,539	0	1,504,774		77,647	(214,967)	19,077		77,647	(214,967)	0	387,329	1.9	28.7
2013		103,492	121,755	1,596,592		79,141	(221,352)	(38,894)		79,141	(221,352)	121,755	378,990	1.9	29.5
2014		105,482	0	1,636,222		80,663	(227,927)	(94,221)		80,663	(227,927)	0	323,663	1.9	30.4
2015		107,696	126,701	1,717,386		82,356	(234,697)	(146,972)		82,356	(234,697)	126,701	314,784	2.1	31.3
2016		109,956	0	1,752,478		84,084	(240,536)	(196,903)		84,084	(240,536)	0	264,853	2.1	32.1
2017		112,263	132,074	1,824,347		85,848	(246,521)	(244,163)		85,848	(246,521)	132,074	256,442	2.1	32.9
2018		114,619	0	1,855,420		87,650	(252,654)	(288,895)		87,650	(252,654)	0	211,710	2.1	33.7
2019		117,025	137,676	1,919,059		89,489	(258,940)	(331,234)		89,489	(258,940)	137,676	203,771	2.1	34.5
2020		119,743	0	1,946,634		91,568	(265,382)	(371,260)		91,568	(265,382)	0	163,744	2.3	35.4
2021		122,524	144,146	2,003,234		93,695	(271,724)	(409,046)		93,695	(271,724)	144,146	156,553	2.3	36.2

Conclusions:

- Enhanced Ambient Air Monitoring does not provide any quantifiable value.
- Assuming NLDOE requirements for stack in-situ testing are abandoned, the CPW of the installation starts to decrease immediately, and in fact is less than Enhanced Monitoring after the first year due to efficiency improvements, and indicates that the project will pay for itself after 10 years.
- If NLDOE maintains the in-situ stack testing as at present, the CPW will still immediately start to decrease and is less than the Enhanced Monitoring in 2004.

Year	Alternative 1 Enhanced Ambient Air Monitoring only				Alternative 2a CEM With Efficiency Improvement and Biannual In-Situ Testing Not Required 7500 BBLs				Alternative 2b CEM With Efficiency Improvement and Biannual In-Situ Testing Required 7500 BBLs				O&M Escal.	Oil Price Series	
	Capital	O&M	In-Situ Stack Sampling	CPW to 2002	Capital	O&M	Annual Eff. Imprv.	CPW to 2002	Capital	O&M	Annual Eff. Imprv.	CPW to 2002			
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Enhanced Ambient Air Monitoring does not provide and quantifiable value.

Assuming NDOE requirements for stack in-situ testing are abandoned, the CPW of the installation starts to decrease immediately, and in fact is less than Enhanced Monitoring after the first year due to efficiency improvements, and indicates a positive CPW after 10 years.

If NDOE maintains the in-situ stack testing as at present, the CPW will still immediately start to decrease and is less than the Enhanced Monitoring in 2004.