

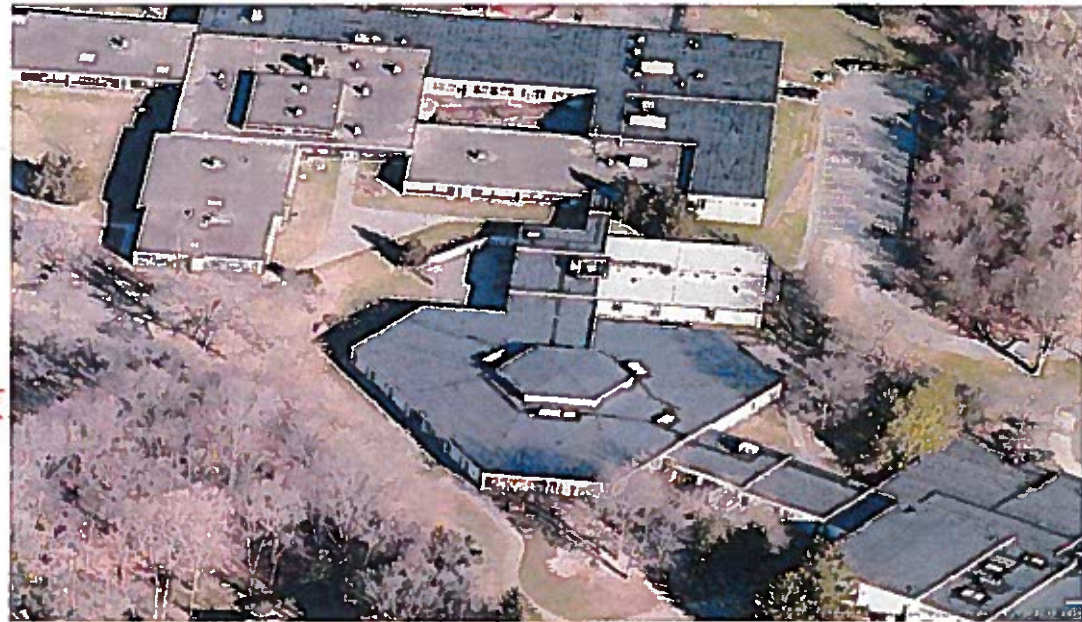


**Town of Woodbridge
Beecher Road School**



Energy Upgrade Update

January 25, 2017



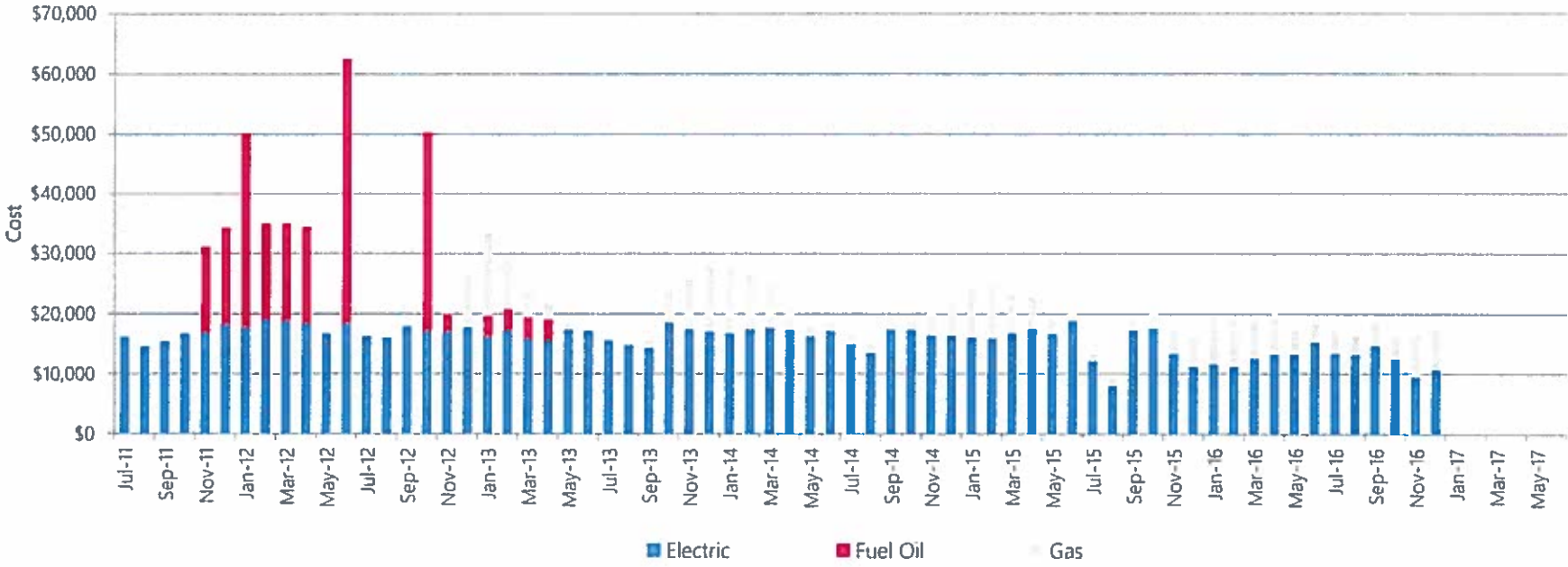
AKF

**John B. Rice, PE, LEED AP
Francisco Arias**

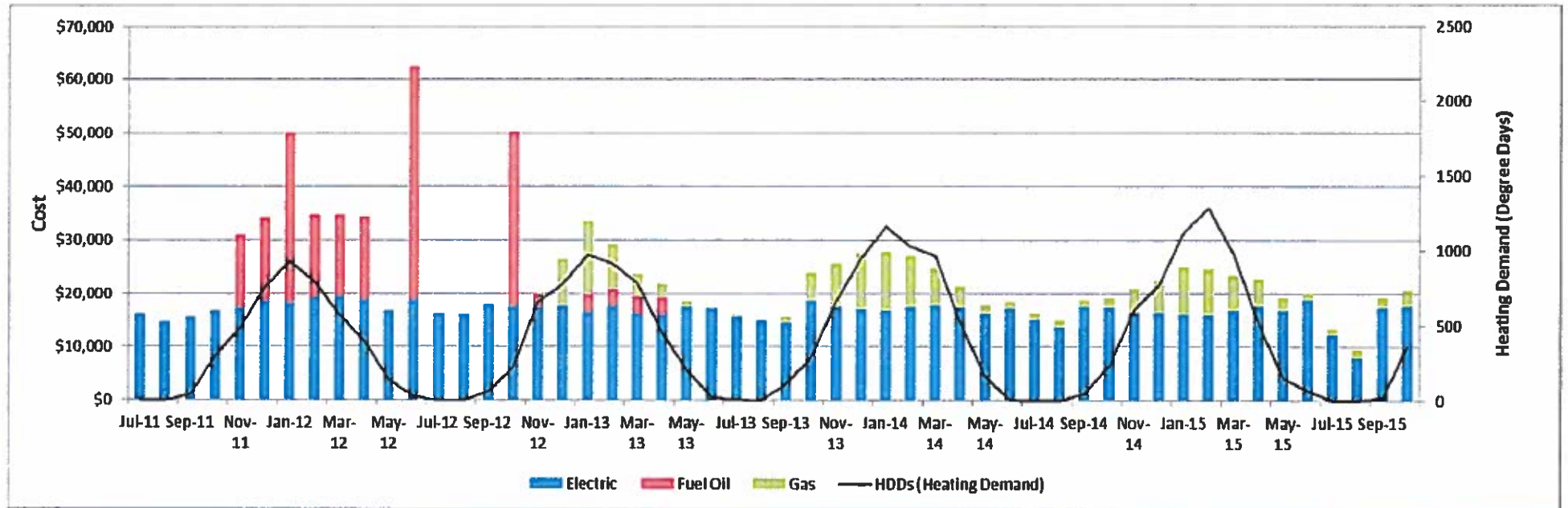
Energy Efficiency Measure	Elec		Oil		Gas		Annual Energy Cost	Energy Cost Savings	
	\$	KWH	\$	Gallons	\$	Therms		\$	%
Base Building	\$ 223,649	1,102,952	\$ 163,336	59,830	\$ -		\$ 386,985	n/a	n/a
Photovoltaic Solar Energy	\$ 196,731	956,952	\$ 163,336				\$ 360,067	\$ 26,918	7.0%
Wind Turbine	\$ 221,975	1,091,944	\$ 163,336	59,830			\$ 385,311	\$ 1,675	0.4%
Solar Thermal Water Heating	\$ 224,033	1,102,952	\$ 161,562	55,278			\$ 385,596	\$ 1,390	0.4%
Micro-Turbine	\$ 103,858	555,392	\$ 120,848		\$ 77,332		\$ 302,039	\$ 84,946	22.0%
Roof Replacement	\$ 224,033	1,102,952	\$ 134,592	49,301			\$ 358,625	\$ 28,360	7.3%
Curtain Wall Upgrade	\$ 224,033	1,102,952	\$ 149,687	54,830			\$ 373,720	\$ 13,265	3.4%
Replacement Gas Boilers	\$ 259,331	1,096,222			\$ 85,537	72,822	\$ 344,868	\$ 42,118	10.9%
Geothermal Heat Pump System	\$ 361,878	1,654,001	\$ 3,756	1,376			\$ 365,633	\$ 21,352	5.5%
BMS Controls	\$ 205,871	1,005,826	\$ 163,336				\$ 369,207	\$ 17,779	4.6%
Lighting Controls	\$ 211,750	851,179	\$ 163,336				\$ 375,086	\$ 11,899	3.1%
All ECM's	\$ 81,952	438,249			\$129,517	107,931	\$ 211,470	\$ 175,516	45.4%

Full Building Air Conditioning Alternate Schemes	Elec		Oil		Gas		Annual Energy Cost	Energy Cost Savings versus Base Building		Energy Cost Savings versus HI-Eff'y System	
	\$	KWH	\$	Gallons	\$	Therms		\$	%	\$	%
Base Building w/Full Air Conditioning	\$ 333,050	1,604,927	\$ 163,336	59,830			\$ 496,386	n/a	n/a	n/a	n/a
High Efficiency Gas Boiler & Air-Cooled Chiller	\$ 311,865	1,491,641			\$ 93,813	78,178	\$ 405,678	\$ 90,707	18.3%	n/a	n/a
Geothermal Heat Pump System	\$ 404,938	1,989,357	\$ 3,756	1,376			\$ 408,694	\$ 87,692	17.7%	\$ (3,015)	-3.3%

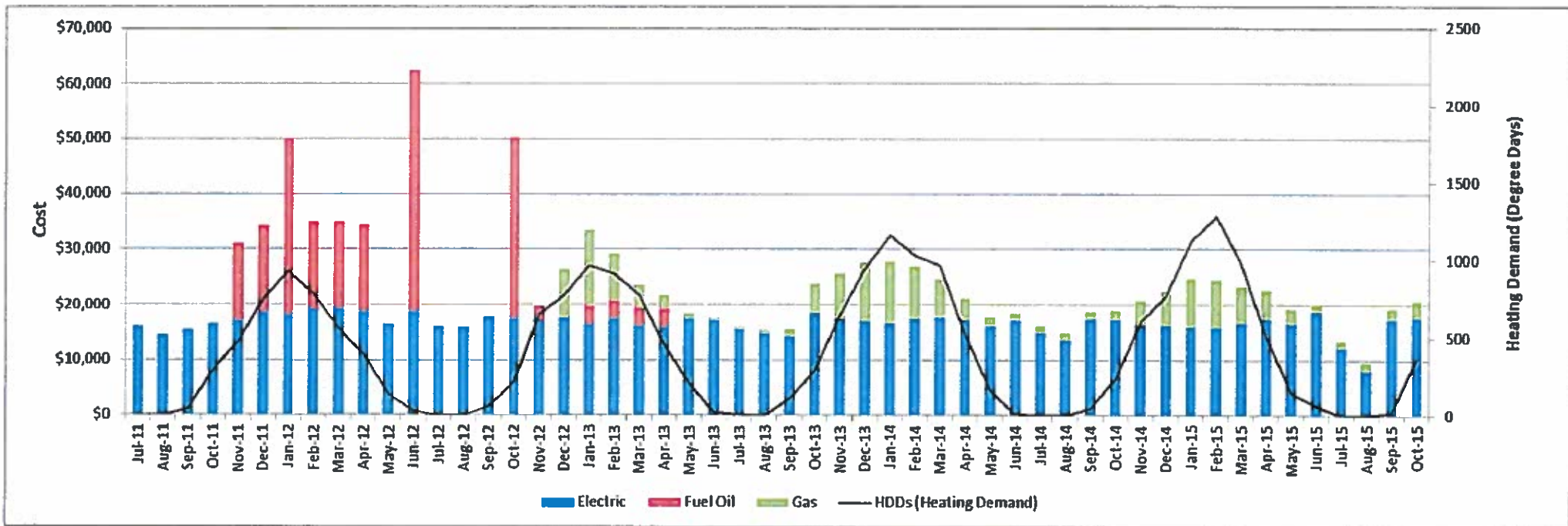
Monthly Utility Cost by Fuel



Monthly Utility Cost by Fuel



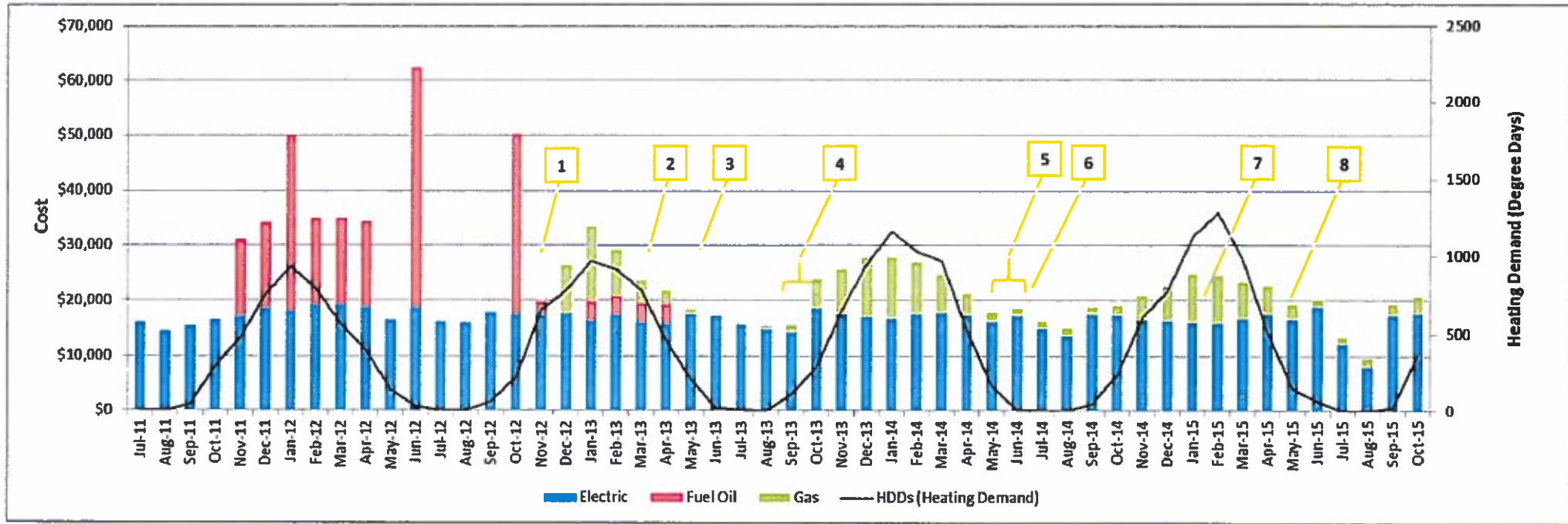
Monthly Utility Cost by Fuel



Project Milestones:

1. 2012: SCG brings gas service & BRS converts 1 existing boiler to gas.
2. Dec. 2013: Emergency replacement of boilers with gas boilers.
3. Feb. 2014: Referendum passes for energy performance contract project.
4. Summer 2014: Construction Phase 1 (Window walls, roof, fan coil units).
5. Summer 2015: Construction Phase 2 (Lighting, mechanical upgrades, controls).
6. Sept. 2015: Micro-turbine comes online.
7. July 2016: Solar PV comes online.
8. Dec. 2016: Construction completion (Commissioning, balancing, controls completion & acceptance).

Monthly Utility Cost by Fuel

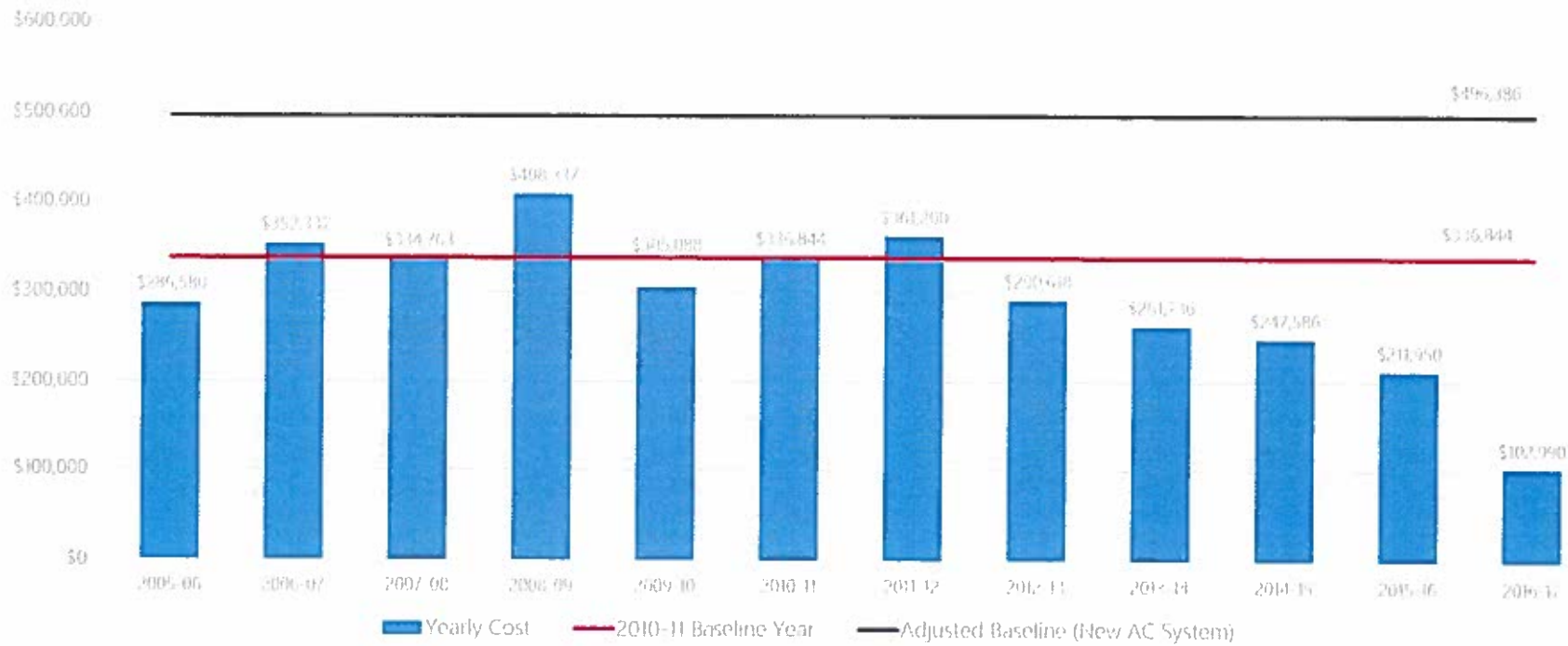


Project Milestones:

1. 2012: SCG brings new gas.
2. Dec. 2013: Emergency replacement to gas boilers.
3. Feb. 2014: Referendum passes for EPC Project.
4. Summer 2014: Construction Phase 1 (Window walls, roof, fan coil units).
5. Summer 2015: Construction Phase 2 (Lighting, mechanical upgrades, controls).
6. Sept. 2015: Micro-turbine comes online.
7. July 2016: Solar PV comes online.
8. Dec. 2016: Construction completion

Yearly Cost – All Utilities

Yearly Cost (As of Dec. 2016)



DATE	Electric			Fuel Oil			Natural Gas			TOTAL ANNUAL COST
	KWH	COST	\$/KWH	GALLONS	COST	\$/GAL	THERMS	COST	\$/THERM	
2005-06	1,398,081	\$182,898	\$ 0.131	60,465	\$103,682	\$1.71	-	\$ -	\$ -	\$ 286,580
2006-07	1,217,328	\$215,391	\$ 0.177	60,171	\$136,946	\$2.28	-	\$ -	\$ -	\$ 352,337
2007-08	1,237,885	\$222,898	\$ 0.180	56,537	\$111,865	\$1.98	-	\$ -	\$ -	\$ 334,763
2008-09	1,148,868	\$215,864	\$ 0.188	58,488	\$192,473	\$3.29	-	\$ -	\$ -	\$ 408,337
2009-10	1,111,586	\$203,260	\$ 0.183	52,432	\$101,828	\$1.94	-	\$ -	\$ -	\$ 305,088
2010-11	1,131,238	\$219,570	\$ 0.194	56,578	\$117,274	\$2.07	-	\$ -	\$ -	\$ 336,844
2011-12	1,127,343	\$208,607	\$ 0.185	55,000	\$152,593	\$2.77	-	\$ -	\$ -	\$ 361,200
2012-13	1,160,919	\$202,744	\$ 0.175	18,499	\$48,485	\$2.62	61,320	\$ 39,389	\$ 0.642	\$ 290,618
2013-14	1,159,482	\$200,172	\$ 0.173	-	-	-	87,550	\$ 61,564	\$ 0.703	\$ 261,736
2014-15	1,009,430	\$197,306	\$ 0.195	-	-	-	74,040	\$ 50,280	\$ 0.679	\$ 247,586
2015-16	956,047	\$156,941	\$ 0.164	-	-	-	76,892	\$ 55,009	\$ 0.715	\$ 211,950
2016-17	447,613	\$73,958	\$ 0.165	-	-	-	37,907	\$ 29,032	\$ 0.766	\$ 102,990