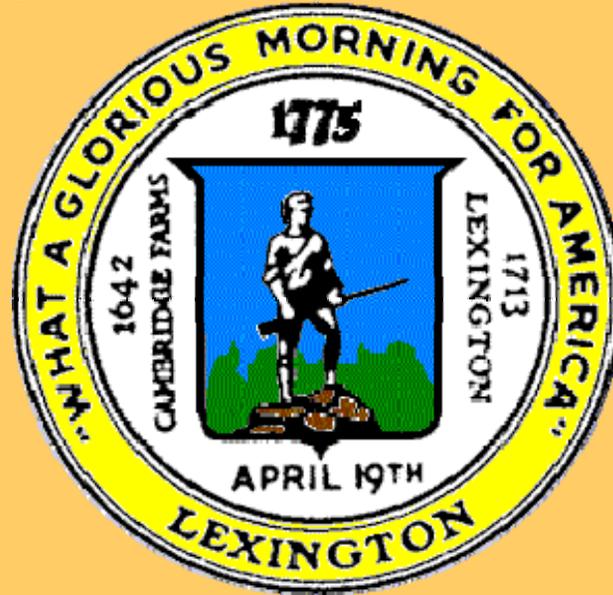


Town Meeting 2009 Energy Projects Review



Department of Public Facilities

DATE April 15, 2009



New DPF School Capital Planning Fall '07

- Several projects funded from feasibilities
- Questionable LHS plan of implementation
- Implementation window summer of 2008
- Prioritized Clarke Project as option for 2008
- Developed Designer Requirements with ECC, with emphasis on Total Life Cycle Costing
- Selected Garcia, Galuska, and DeSousa



Clarke Design

- Three options, reviewed with Life Cycle Costing
- Presented to ECC in January of 2008
- Bid in March of 2008
- 2nd Phase Approved @ Town Meeting 2008



Life Cycle Cost Analysis



GARCIA • GALUSKA • DESOUSA
 Consulting Engineers Inc.

370 Faunce Corner Road, Dartmouth, MA 02747-1217

PROJECT _____ Clarke MS
 CALC BY _____ KL
 CHK BY _____ EG
 DATE _____ 01/14/08

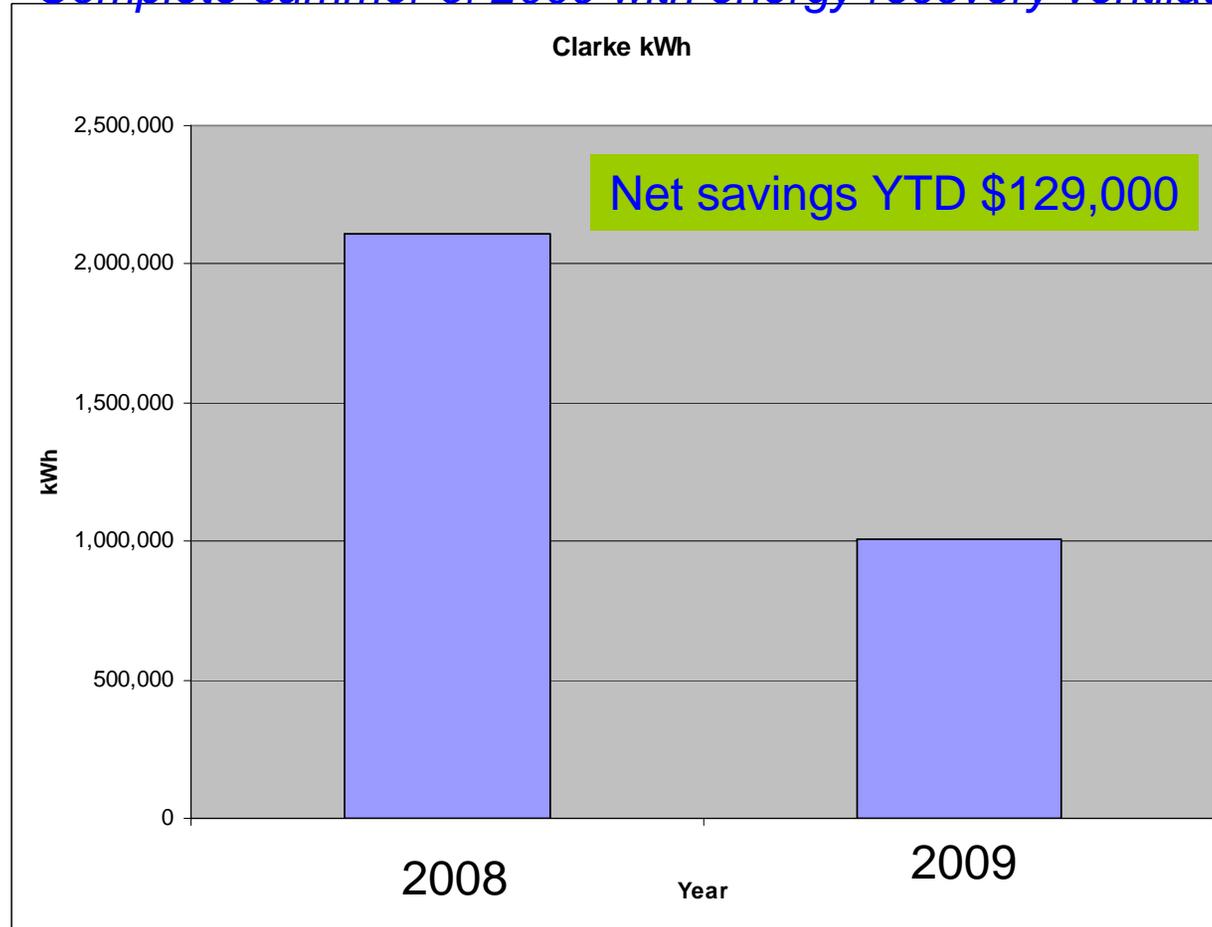
MECHANICAL SYSTEM PAYBACK SUMMARY

SYSTEM OPTION	SYSTEM DESCRIPTION	MECHANICAL SYSTEM INVESTMENT	ANNUAL ELEC. CONS. (KWH)	ANNUAL GAS CONS. (MBTU)	ANNUAL ELECTRIC COST	ANNUAL GAS COST	COMBINED UTILITY COST	COMBINED UTILITY SAVINGS	SIMPLE PAYBACK (YEARS)
1	1. Electric Coil Air Handling Units w/ Perimeter Electric Fin Tube 2. Electric Unit Ventilators	\$1,300,000	1,270,000	0	\$233,305	\$0	\$233,305	-	-
2	1. Gas Fired Air Handling Units w/ Perimeter Electric Fin Tube	\$2,550,000	920,580	1,699.10	\$159,184	\$30,245	\$189,429	\$43,876	28.5
3	1. Hot Water Coil Air Handling Units w/ Perimeter Hot Water Fin Tube 2. Displacement Ventilation w/ Perimeter Fin Tube	\$3,023,950	711,520	1,612.80	\$124,039	\$28,708	\$152,747	\$80,558	21.4
4	1. Hot Water Coil Air Handling Units w/ Perimeter Hot Water Fin Tube 2. Unit Ventilators	\$2,000,000	634,520	2,006.80	\$108,149	\$35,720	\$143,869	\$89,436	7.8



Clarke Projected kWh (9 months act)

Complete summer of 2009 with energy recovery ventilation





LHS Design

- Master Plan Developed by G G & D
- Three options with Life Cycle Costing
- Presented to ECC in Fall of 2009
- Included in 5 year Capital Plan
- Included in LPS preK – 12 Master Plan
- Submitted to Massachusetts as a “shovel-ready” project



LHS Design Features

- Integrated DDC Control (replacing analog/pneumatic controls)
- Oversized univents, reduce classroom db from mid 60 to mid 40
- CO2 monitors to control ventilation
- Phase 2, replace steam system with hot water



LHS Design – Phasing Summary

PHASING SUMMARY

PHASE	CALENDER RANGE	DESCRIPTION	AREA	ANTICIPATED CONSTRUCTION COST	FEE*	TOTAL COST
1	6/01/09 - 10/01/09	New classroom unit ventilators. Tie into existing DDC control system. Reuse existing HW main and branch piping.	G, H, J	\$2,000,000	\$194,000	\$2,194,000
		Upgrade existing RTU OA/RA damper feedback. New HW main piping.	A, B, C, D			
2	10/01/09 - 1/01/10	Replace (4) AHU w/ gas-fired ERV units and tied into existing ductwork. New HW terminal units tied into existing condensing HW piping system. All new equipment tied into existing DDC controls. Demolish all steam piping and equipment.	E	\$526,000	\$55,756	\$581,756
3	1/01/10 - 6/01/10	Convert (1) steam boiler to HW, (1) boiler to remain as steam. Add HW coils in supply duct mains. Upgrade steam terminal units to HW. Demolish all steam piping and equipment.	C, D	\$400,000	\$42,400	\$442,400
4	6/01/10 - 10/01/10	Replace steam classroom unit ventilators and terminal units to HW and tie into HW mains provided in Phase 1. Tie all new equipment into existing DDC system. Upgrade existing RTU OA/RA damper feedback. Convert second steam boiler to HW. Demolish all steam piping and equipment.	A, B	\$850,000	\$85,000	\$935,000
TOTAL				\$3,776,000	\$377,156	\$4,153,156



Energy Projects - Funds as of 9/07

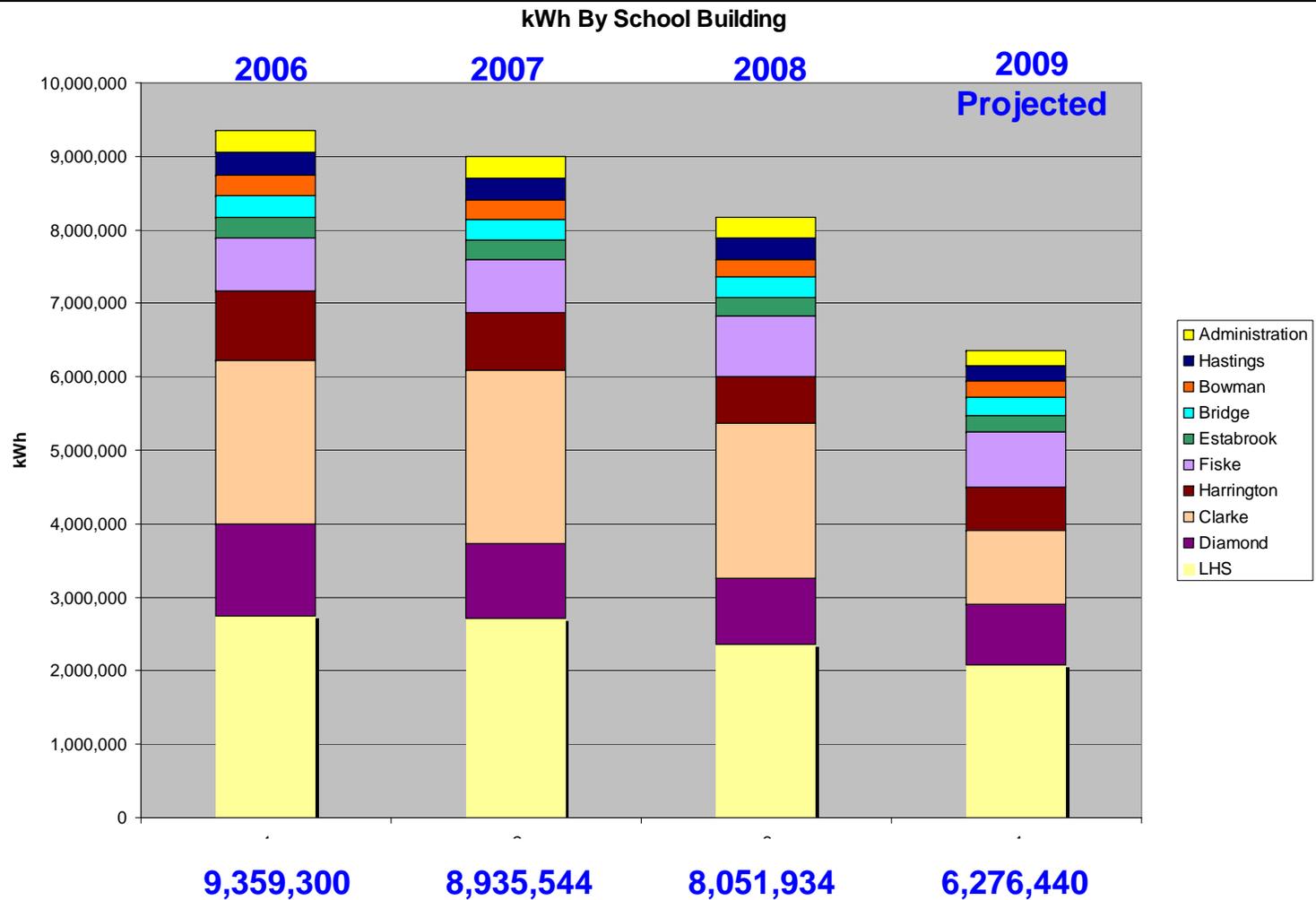
• 2006 TM - LHS Univent and Pipe Replacement	\$493,000
• 2007 TM – LHS Mechanical Systems, G,H,J,F	\$205,000
• 2007 TM – LHS Mechanical Systems G, H, J, F	<u>\$420,000</u>
Available in 2009 for Mechanical Upgrade	\$1,065,000
2009 TM – LHS Mechanical Phase 1	<u>350,000</u>
Total Funding	\$ 1,415,000
• 2007 TM – Clarke Mechanical System Replacement	\$710,000
• 2007 TM - Elementary Insulation	\$250,000
• 2007 TM – Elementary Steam Traps	\$50,000
• 2007 TM – Hastings Lockers	<u>\$70,000</u>
Available in 2008 for Clarke Conversion	\$1,080,000
• 2008 TM – Clarke Mechanical System Replacement	<u>1,290,000</u>
Total Funding	\$2,370,000



BACK UP



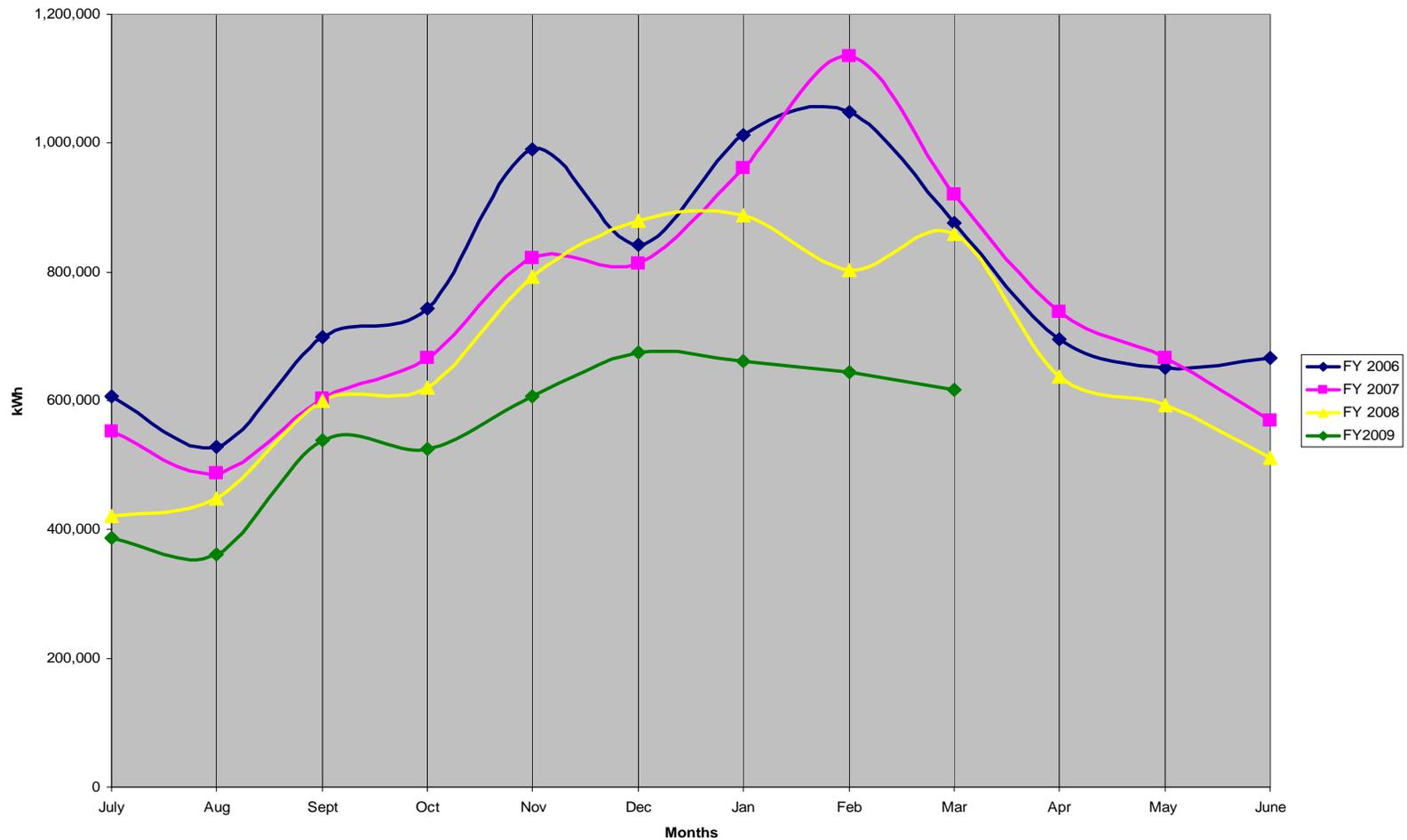
Reduction, By Building, Over 4 Years





School Electric Reduction Over 3 3/4 Years

School Electric Use



Department of Public Facilities



FY 2010 DPF Energy Budget

		FY 2008 Actual		FY 2009 Budget		New Supply Contracts			FY 2010 Budget		Comments
		School	Town	School	Town	2009 Supply	2010 Supply	Contract Savings	School	Town	
Electric	Units										
	KWH	8,053,854	2,084,892	8,492,350					8,053,854	2,084,892	
	Rate \$/KWH	1.896				0.0958	0.091				
	Cost	\$1,526,443	\$395,504	\$1,610,977	\$405,080			\$26,000	\$1,537,452	\$398,136	DPW Building 301,700 kwh
									\$100,000	\$32,564	Clarke Gas Conversion
									\$1,437,452	\$430,700	
Gas	Therm	416,515	87,499	350,222					416,515	87,499	
	Rate \$/Therm	1.5918				1.325	1.247				
	Cost	\$597,129	\$149,186	\$605,078	\$167,500			\$39,000	\$690,618	\$143,911	
									\$45,000	\$68,164	DPW Building 44,200 Therms
									\$735,618	\$212,075	
Oil	Gallon	151,601		144,405					151,601	5,160	
	Rate \$/Gallon	1.96				4.28	2.2382				
	Cost	\$297,473		\$567,245	\$12,900			\$230,000	\$339,313	\$11,549	
								\$295,000			