ENERGY SAVINGS PLAN

SUBMITTED BY:
DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648
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JERSEY CITY PUBLIC SCHOOLS

ENERGY SAVINGS PLAN

SECTION 1 – PROJECT OVERVIEW

Project Overview

The Energy Savings Plan (ESP) is the core of the Energy Savings Improvement Program (ESIP) process. It describes the Jersey City Public Schools (JCPS) preferred Energy Conservation Measures (ECMs), the budget cost for each ECM and the ECM energy savings calculations that self-fund the project via reduced operating costs. The ESP provides the JCPS with the necessary information to decide which proposed ECMs to implement as part of your (ESIP) project. Working with the JCPS Administration, your selected ESIP project would:

1. Self-fund a $55,909,031 project
2. Generate $3,301,786 in annual energy savings
3. Eligible for $1,733,773 in Large Energy User Rebates through the NJ Clean Energy Program
4. Deliver Indoor Air Quality & HVAC Improvements at 8 Schools (2 per Quadrant) using $64,217,216 in ESSER Grants

NOTE: This submitted ESP doesn't constitute any contractual obligation between JCPS and DCO Energy (DCO). Any contractual obligations will be performed under separate legal documents per mutually signed agreement of the parties involved and subject to the applicable laws and requirements of the ESIP legislation and State of New Jersey.

ESIP MODEL - HYBRID	
ESCO	DCO Energy, LLC
ENGINEER OF RECORD	CHA Consulting
FINANCIAL ADVISOR	Phoenix Advisors, LLC
BOND COUNSEL	McManimon, Scotland & Baumann, LLC

To ensure conformance with the requirements of Public Finance Notice LFN 2009-11, the ESP must address the following elements:

- *The results of the energy audit (Appendix G)*
- *A description of the energy conservation measures that will comprise the program; (Section 3)*
- *An estimate of greenhouse gas reductions resulting from those energy savings; (Section 3)*
- *Identification of all design and compliance issues and identification of who will provide these services; (Section 5)*
- *An assessment of risks involved in the successful implementation of the plan; (Section 5)*
- *Identify the eligibility for, and costs and revenues associated with the PJM Independent System Operator for demand response and curtailable service activities; (Appendix E)*
- *Schedules showing calculations of all costs of implementing the proposed energy conservation measures and the projected energy savings; (Section 3)*
- *Maintenance requirements necessary to ensure continued energy savings, and describe how they will be provided; and (Section 6)*
- *If developed by an ESCO, a description of, and cost estimates of a proposed energy savings guarantee. (Section 7)*

In addition, and per LFN 2009-11, the ESP requires several other important elements:

- *The calculations of energy savings must be made in accordance with protocols for their calculation adopted by the BPU. The calculation shall include all applicable State and federal rebates and tax credits but shall not include the cost of an energy audit and the cost of verifying energy savings. (Section 3)*
- *An independent third party must review the plan and certify that the plan savings were properly calculated pursuant to the BPU protocols.*
- *If an ESCO is used to prepare the plan, the ESCO must provide an estimate of the cost of a guarantee of energy savings. When adopting the plan, the local unit must decide whether to accept the guarantee (covered below). (Section 7)*
- *The plan must be verified by an independent third party to ensure that the calculations were made in accordance with the BPU standards and that all required elements of the ESP are covered.*
- *After verification is completed, the governing body must formally adopt the plan. At that point, the plan must be submitted to the Board of Public Utilities where it will be posted on the BPU website. BPU approval is not required. If the contracting unit maintains its own website, the plan must also be posted on that site.*

DCO Energy looks forward to the third-party review of our energy calculations and JCPS's approval of the Energy Savings Plan to implement via the requirements of the ESIP legislation. Your time, effort, and support are appreciated.

ENERGY SAVINGS PLAN

SECTION 2 – JCPS ENERGY BASELINE

Total Utility Consumption

Jersey City Public School's Energy Savings Plan includes 44 buildings that consist of early childhood centers, elementary schools, grammar schools, middle schools, and high schools, and an administration building. To develop the ESP, DCO Energy was provided with the necessary utility data (Electric, Natural Gas, Fuel Oil, & Domestic Water). DCO Energy documented this utility data and established the baseline period of March 2022 through February 2023. A listing of the buildings and the total utility consumption for the schools is detailed below.

BUILDINGS & FACILITIES		
BUILDING #	BUILDING/FACILITY NAME	SQFT
1	William L. Dickinson High School (PS #43)	356,000
2	James J. Ferris High School (PS #44)	282,511
3	Lincoln High School (PS #48)	272,932
4	Henry Snyder High School (PS #46)	*187,500*
5	Dr. Ronald E. McNair Academic High School (PS #47)	132,311
6	Liberty High School (PS #45)	33,316
7	Academy I Middle School (PS #1)	64,884
8	Franklin L. Williams Middle School (MS #7)	163,855
9	Ezra L. Nolan Middle School (MS #40)	132,483
10	Frank R. Conwell Middle School (MS #4)	169,678
11	Frank R. Conwell School (PS #3)	117,939
12	Dr. Michael Conti School (PS #5)	*148,049*
13	Jotham W. Wakeman School (PS #6)	148,882
14	Charles E. Trefurt School (PS #8)	169,196
15	Martin Luther King, Jr. School (PS #11)	104,509
16	Julia A. Barnes School (PS #12)	86,375
17	Ollie Culbreth Jr. School (PS #14)	98,036
18	Whitney M. Young Jr. School (PS #15)	179,590
19	Cornelia F. Bradford School (PS #16)	61,684
20	Joseph H. Brensinger School (PS #17)	153,864
21	Dr. Maya Angelou School (PS #20)	108,800
22	Reverend Dr. Ercel F. Webb School (PS #22)	157,134
23	Mahatma K. Ghandi School (PS #23)	164,653
24	MarcAnthony Dinardo School (PS #23B)	58,480
25	Chaplain Charles Waters School (PS #24)	118,240
26	Nicolaus Copernicus School (PS #25)	132,860
27	Patricia Noonan School (PS #26)	123,000
28	Alfred E. Zampella School (PS #27)	94,611
29	Christa Mcauliffe School (PS #28)	126,761
30	Gladys Nunery School (PS #29)	66,180
31	Alexander D. Sullivan School (PS #30)	93,129
32	Anthony J. Infante School (PS #31)	36,973
33	Paul Rafalides School (PS #33)	30,607
34	President Barack Obama School (PS #34)	103,444
35	Rafael Cordero Y Molina School (PS #37)	135,534
36	James F. Murray School (PS #38)	120,940
37	Dr. Charles P. Defuccio School (PS #39)	126,429
38	Fred W. Martin Center of the Arts (PS #41)	140,467
39	Annex Early Childhood Development Center (PS #23A)	12,375
40	Danforth Early Childhood Center (PS #16A)	78,996
41	A. Harry Moore School (PS #52)	*65,300*
42	Glenn D. Cunningham Center	12,100
43	Administration Central Office	246,800
44	PS #16 (New School)	

DCO Energy Efficiency Division
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Jersey City Public Schools - Energy Use Summary

JERSEY CITY PUBLIC SCHOOLS BUILDINGS/FACILITIES	ELECTRIC				
BUILDING/FACILITY NAME	CONSUMPTION kWh	DEMAND kW	USAGE BTU / SQFT	TOTAL COST $$	BLENDED COST $$ / kWh
William L. Dickinson High School (PS #43)	1,445,352	639	13,853	$172,323	$0.12
James J. Ferris High School (PS #44)	2,161,582	765	26,106	$233,596	$0.11
Lincoln High School (PS #48)	3,079,092	710	38,493	$307,975	$0.10
Henry Snyder High School (PS #46)	1,101,575	708	20,046	$135,379	$0.12
Dr. Ronald E. McNair Academic High School (PS #47)	1,118,104	744	28,833	$157,081	$0.14
Liberty High School (PS #45)	172,761	106	17,693	$31,582	$0.18
Academy I Middle School (PS #1)	892,582	385	46,937	$84,356	$0.09
Franklin L. Williams Middle School (MS #7)	1,656,576	1,070	34,495	$216,691	$0.13
Ezra L. Nolan Middle School (MS #40)	483,137	310	12,443	$57,486	$0.12
Frank R. Conwell Middle School (MS #4)	1,551,805	801	31,205	$210,740	$0.14
Frank R. Conwell School (PS #3)	1,665,099	816	48,172	$202,449	$0.12
Dr. Michael Conti School (PS #5)	678,639	433	15,640	$98,332	$0.14
Jotham W. Wakeman School (PS #6)	566,716	305	12,988	$63,768	$0.11
Charles E. Trefurt School (PS #8)	533,878	593	10,766	$66,509	$0.12
Martin Luther King, Jr. School (PS #11)	721,311	601	23,549	$83,934	$0.12
Julia A. Barnes School (PS #12)	223,650	218	8,835	$33,450	$0.15
Ollie Culbreth Jr. School (PS #14)	200,057	279	6,963	$26,545	$0.13
Whitney M. Young Jr. School (PS #15)	1,073,744	817	20,400	$114,465	$0.11
Cornelia F. Bradford School (PS #16)	702,411	764	38,853	$102,398	$0.15
Joseph H. Brensinger School (PS #17)	1,304,760	1,161	28,934	$158,946	$0.12
Dr. Maya Angelou School (PS #20)	1,115,752	725	34,990	$160,189	$0.14
Reverend Dr. Ercel F. Webb School (PS #22)	560,447	446	12,170	$70,077	$0.13
Mahatma K. Ghandi School (PS #23)	573,406	350	11,882	$69,084	$0.12
MarcAnthony Dinardo School (PS #23B)	153,465	270	8,954	$27,265	$0.18
Chaplain Charles Waters School (PS #24)	500,552	410	14,444	$57,658	$0.12
Nicolaus Copernicus School (PS #25)	1,019,790	941	26,189	$109,570	$0.11
Patricia Noonan School (PS #26)	1,064,989	746	29,543	$156,886	$0.15
Alfred E. Zampella School (PS #27)	1,065,276	1,460	38,418	$101,822	$0.10
Christa Mcauliffe School (PS #28)	761,136	683	20,487	$97,164	$0.13
Gladys Nunery School (PS #29)	160,400	182	8,270	$23,566	$0.15
Alexander D. Sullivan School (PS #30)	375,194	378	13,746	$59,574	$0.16
Anthony J. Infante School (PS #31)	166,890	216	15,401	$39,123	$0.23
Paul Rafalides School (PS #33)	250,132	134	27,884	$35,825	$0.14
President Barack Obama School (PS #34)	429,955	398	14,182	$53,593	$0.12
Rafael Cordero Y Molina School (PS #37)	282,852	220	7,121	$31,559	$0.11
James F. Murray School (PS #38)	266,860	285	7,529	$36,565	$0.14
Dr. Charles P. Defuccio School (PS #39)	311,190	241	8,398	$36,896	$0.12
Fred W. Martin Center of the Arts (PS #41)	958,012	659	23,270	$118,736	$0.12
Annex Early Childhood Development Center (PS #23A)	69,040	165	19,036	$12,152	$0.18
Danforth Early Childhood Center (PS #16A)	188,200	198	8,129	$33,473	$0.18
A. Harry Moore School (PS #52)	0	0	0	$0	-
Glenn D. Cunningham Center	136,280	101	38,429	$21,624	$0.16
Administration Central Office	3,736,395	1,115	51,656	$473,075	$0.13
TOTALS	**35,479,044**	**1,460**	**22,345**	**$4,383,483**	**$0.12**

JERSEY CITY PUBLIC SCHOOLS BUILDINGS/FACILITIES	NATURAL GAS			
BUILDING/FACILITY NAME	USAGE THERMS	USAGE BTU / SQFT	TOTAL COST $$	BLENDED COST $$ / THERM
William L. Dickinson High School (PS #43)	952	267	$1,431	$1.50
James J. Ferris High School (PS #44)	91,185	32,277	$123,850	$1.36
Lincoln High School (PS #48)	93,301	34,185	$112,869	$1.21
Henry Snyder High School (PS #46)	0	0	$0	-
Dr. Ronald E. McNair Academic High School (PS #47)	41,533	31,391	$50,470	$1.22
Liberty High School (PS #45)	148	443	$421	$2.85
Academy I Middle School (PS #1)	0	0	$0	-
Franklin L. Williams Middle School (MS #7)	66,453	40,556	$74,365	$1.12
Ezra L. Nolan Middle School (MS #40)	39,692	29,960	$48,052	$1.21
Frank R. Conwell Middle School (MS #4)	52,819	31,129	$62,938	$1.19
Frank R. Conwell School (PS #3)	39,584	33,563	$50,900	$1.29
Dr. Michael Conti School (PS #5)	63,889	43,154	$66,456	$1.04
Jotham W. Wakeman School (PS #6)	10,955	7,358	$15,661	$1.43
Charles E. Trefurt School (PS #8)	1,343	794	$1,964	$1.46
Martin Luther King, Jr. School (PS #11)	39,578	37,870	$44,942	$1.14
Julia A. Barnes School (PS #12)	35,020	40,544	$40,460	$1.16
Ollie Culbreth Jr. School (PS #14)	37,186	37,931	$45,147	$1.21
Whitney M. Young Jr. School (PS #15)	65,214	36,312	$74,191	$1.14
Cornelia F. Bradford School (PS #16)	20,033	32,477	$22,792	$1.14
Joseph H. Brensinger School (PS #17)	37,553	24,407	$48,185	$1.28
Dr. Maya Angelou School (PS #20)	35,685	32,798	$43,405	$1.22
Reverend Dr. Ercel F. Webb School (PS #22)	51,328	32,665	$63,044	$1.23
Mahatma K. Ghandi School (PS #23)	53,935	32,757	$59,752	$1.11
MarcAnthony Dinardo School (PS #23B)	12,768	21,833	$17,068	$1.34
Chaplain Charles Waters School (PS #24)	223	189	$529	$2.37
Nicolaus Copernicus School (PS #25)	56	42	$302	$5.44
Patricia Noonan School (PS #26)	30,278	24,616	$37,055	$1.22
Alfred E. Zampella School (PS #27)	0	0	$0	-
Christa Mcauliffe School (PS #28)	0	0	$0	-
Gladys Nunery School (PS #29)	5	8	$236	$45.15
Alexander D. Sullivan School (PS #30)	4,768	5,120	$6,357	$1.33
Anthony J. Infante School (PS #31)	11,622	31,433	$15,940	$1.37
Paul Rafalides School (PS #33)	11,898	38,872	$16,535	$1.39
President Barack Obama School (PS #34)	28,423	27,476	$34,509	$1.21
Rafael Cordero Y Molina School (PS #37)	104	76	$367	$3.54
James F. Murray School (PS #38)	1,892	1,564	$2,665	$1.41
Dr. Charles P. Defuccio School (PS #39)	16	12	$253	$16.11
Fred W. Martin Center of the Arts (PS #41)	8,956	6,376	$11,862	$1.32
Annex Early Childhood Development Center (PS #23A)	3,972	32,097	$4,913	$1.24
Danforth Early Childhood Center (PS #16A)	18,229	23,076	$15,446	$0.85
A. Harry Moore School (PS #52)	0	0	$0	-
Glenn D. Cunningham Center	8,296	68,562	$10,637	$1.28
Administration Central Office	0	0	$0	-
TOTALS	**1,018,889**	**18,808**	**$1,225,970**	**$1.20**

JERSEY CITY PUBLIC SCHOOLS BUILDINGS/FACILITIES	Fuel Oil #2 (Gal)			
BUILDING/FACILITY NAME	USAGE GAL	USAGE BTU / SQFT	TOTAL COST $$	UNIT COST $$ /
William L. Dickinson High School (PS #43)	76,082	29,360	$264,233	$3.47
James J. Ferris High School (PS #44)	0	0	$0	-
Lincoln High School (PS #48)	0	0	$0	-
Henry Snyder High School (PS #46)	0	0	$0	-
Dr. Ronald E. McNair Academic High School (PS #47)	0	0	$0	-
Liberty High School (PS #45)	5,526	22,787	$19,705	$3.57
Academy I Middle School (PS #1)	0	0	$0	-
Franklin L. Williams Middle School (MS #7)	0	0	$0	-
Ezra L. Nolan Middle School (MS #40)	0	0	$0	-
Frank R. Conwell Middle School (MS #4)	0	0	$0	-
Frank R. Conwell School (PS #3)	0	0	$0	-
Dr. Michael Conti School (PS #5)	0	0	$0	-
Jotham W. Wakeman School (PS #6)	0	0	$0	-
Charles E. Trefurt School (PS #8)	19,137	15,539	$66,410	$3.47
Martin Luther King, Jr. School (PS #11)	0	0	$0	-
Julia A. Barnes School (PS #12)	0	0	$0	-
Ollie Culbreth Jr. School (PS #14)	0	0	$0	-
Whitney M. Young Jr. School (PS #15)	0	0	$0	-
Cornelia F. Bradford School (PS #16)	0	0	$0	-
Joseph H. Brensinger School (PS #17)	0	0	$0	-
Dr. Maya Angelou School (PS #20)	0	0	$0	-
Reverend Dr. Ercel F. Webb School (PS #22)	0	0	$0	-
Mahatma K. Ghandi School (PS #23)	0	0	$0	-
MarcAnthony Dinardo School (PS #23B)	0	0	$0	-
Chaplain Charles Waters School (PS #24)	0	0	$0	-
Nicolaus Copernicus School (PS #25)	8,195	8,474	$29,678	$3.62
Patricia Noonan School (PS #26)	0	0	$0	-
Alfred E. Zampella School (PS #27)	0	0	$0	-
Christa Mcauliffe School (PS #28)	0	0	$0	-
Gladys Nunery School (PS #29)	14,993	31,123	$50,943	$3.40
Alexander D. Sullivan School (PS #30)	10,876	16,044	$49,680	$4.57
Anthony J. Infante School (PS #31)	0	0	$0	-
Paul Rafalides School (PS #33)	0	0	$0	-
President Barack Obama School (PS #34)	0	0	$0	-
Rafael Cordero Y Molina School (PS #37)	16,089	16,308	$58,729	$3.65
James F. Murray School (PS #38)	23,091	26,230	$79,232	$3.43
Dr. Charles P. Defuccio School (PS #39)	0	0	$0	-
Fred W. Martin Center of the Arts (PS #41)	13,886	13,581	$55,682	$4.01
Annex Early Childhood Development Center (PS #23A)	0	0	$0	-
Danforth Early Childhood Center (PS #16A)	14,019	24,380	$48,647	$3.47
A. Harry Moore School (PS #52)	0	0	$0	-
Glenn D. Cunningham Center	0	0	$0	-
Administration Central Office	0	0	$0	-
TOTALS	**201,895**	**5,120**	**$722,938**	**$3.58**

JERSEY CITY PUBLIC SCHOOLS BUILDINGS/FACILITIES	Domestic Water (CCF)		
BUILDING/FACILITY NAME	USAGE Domestic Water (CCF)	TOTAL COST $$	UNIT COST $$ /
William L. Dickinson High School (PS #43)	3,403	$40,576	$11.92
James J. Ferris High School (PS #44)	4,368	$49,663	$11.37
Lincoln High School (PS #48)	2,480	$35,048	$14.13
Henry Snyder High School (PS #46)	1,790	$23,993	$13.40
Dr. Ronald E. McNair Academic High School (PS #47)	166	$3,476	$20.94
Liberty High School (PS #45)	23	$349	$15.17
Academy I Middle School (PS #1)	25	$706	$28.25
Franklin L. Williams Middle School (MS #7)	5,964	$29,148	$4.89
Ezra L. Nolan Middle School (MS #40)	687	$9,572	$13.93
Frank R. Conwell Middle School (MS #4)	4,557	$37,831	$8.30
Frank R. Conwell School (PS #3)	9,367	$105,324	$11.24
Dr. Michael Conti School (PS #5)	1,503	$18,894	$12.57
Jotham W. Wakeman School (PS #6)	1,943	$23,578	$12.13
Charles E. Trefurt School (PS #8)	871	$12,256	$14.07
Martin Luther King, Jr. School (PS #11)	982	$18,786	$19.13
Julia A. Barnes School (PS #12)	1,803	$22,363	$12.40
Ollie Culbreth Jr. School (PS #14)	675	$8,444	$12.51
Whitney M. Young Jr. School (PS #15)	2,339	$27,328	$11.68
Cornelia F. Bradford School (PS #16)	1,634	$18,868	$11.55
Joseph H. Brensinger School (PS #17)	3,468	$38,638	$11.14
Dr. Maya Angelou School (PS #20)	956	$11,729	$12.27
Reverend Dr. Ercel F. Webb School (PS #22)	3,815	$44,540	$11.67
Mahatma K. Ghandi School (PS #23)	1,324	$16,916	$12.78
MarcAnthony Dinardo School (PS #23B)	339	$4,267	$12.59
Chaplain Charles Waters School (PS #24)	958	$10,739	$11.21
Nicolaus Copernicus School (PS #25)	2,723	$30,668	$11.26
Patricia Noonan School (PS #26)	270	$6,912	$25.60
Alfred E. Zampella School (PS #27)	4,623	$51,468	$11.13
Christa Mcauliffe School (PS #28)	1,018	$12,712	$12.49
Gladys Nunery School (PS #29)	839	$9,672	$11.53
Alexander D. Sullivan School (PS #30)	420	$5,466	$13.01
Anthony J. Infante School (PS #31)	109	$1,815	$16.65
Paul Rafalides School (PS #33)	169	$2,528	$14.96
President Barack Obama School (PS #34)	428	$5,497	$12.84
Rafael Cordero Y Molina School (PS #37)	2,476	$28,441	$11.49
James F. Murray School (PS #38)	741	$9,255	$12.49
Dr. Charles P. Defuccio School (PS #39)	686	$9,255	$13.49
Fred W. Martin Center of the Arts (PS #41)	5,325	$59,990	$11.27
Annex Early Childhood Development Center (PS #23A)	35	$1,203	$34.37
Danforth Early Childhood Center (PS #16A)	268	$3,661	$13.66
A. Harry Moore School (PS #52)	204	$3,661	$17.94
Glenn D. Cunningham Center	67	$1,158	$17.28
Administration Central Office	1,574	$18,708	$11.89
TOTALS	**77,415**	**$875,099**	**$11.30**

JERSEY CITY PUBLIC SCHOOLS BUILDINGS/FACILITIES	TOTAL ENERGY	TOTAL COST
BUILDING/FACILITY NAME	USAGE BTUs	$$
William L. Dickinson High School (PS #43)	15,478,986,293	$478,563
James J. Ferris High School (PS #44)	16,493,793,984	$407,109
Lincoln High School (PS #48)	19,835,923,404	$455,892
Henry Snyder High School (PS #46)	3,758,573,900	$159,372
Dr. Ronald E. McNair Academic High School (PS #47)	7,968,302,548	$211,027
Liberty High School (PS #45)	1,363,401,775	$52,057
Academy I Middle School (PS #1)	3,045,489,784	$85,062
Franklin L. Williams Middle School (MS #7)	12,297,500,812	$320,204
Ezra L. Nolan Middle School (MS #40)	5,617,631,944	$115,110
Frank R. Conwell Middle School (MS #4)	10,576,659,660	$311,509
Frank R. Conwell School (PS #3)	9,639,762,588	$358,673
Dr. Michael Conti School (PS #5)	8,704,445,568	$183,681
Jotham W. Wakeman School (PS #6)	3,029,154,092	$103,008
Charles E. Trefurt School (PS #8)	4,584,909,222	$147,138
Martin Luther King, Jr. School (PS #11)	6,418,899,232	$147,662
Julia A. Barnes School (PS #12)	4,265,070,500	$96,273
Ollie Culbreth Jr. School (PS #14)	4,401,153,684	$80,137
Whitney M. Young Jr. School (PS #15)	10,184,974,428	$215,984
Cornelia F. Bradford School (PS #16)	4,399,912,732	$144,057
Joseph H. Brensinger School (PS #17)	8,207,189,520	$245,768
Dr. Maya Angelou School (PS #20)	7,375,417,624	$215,323
Reverend Dr. Ercel F. Webb School (PS #22)	7,045,040,164	$177,661
Mahatma K. Ghandi School (PS #23)	7,349,992,672	$145,752
MarcAnthony Dinardo School (PS #23B)	1,800,414,680	$48,600
Chaplain Charles Waters School (PS #24)	1,730,189,224	$68,926
Nicolaus Copernicus School (PS #25)	4,610,913,185	$170,219
Patricia Noonan School (PS #26)	6,661,540,768	$200,852
Alfred E. Zampella School (PS #27)	3,634,721,712	$153,290
Christa Mcauliffe School (PS #28)	2,596,996,032	$109,875
Gladys Nunery School (PS #29)	2,607,561,019	$84,417
Alexander D. Sullivan School (PS #30)	3,251,132,266	$121,077
Anthony J. Infante School (PS #31)	1,731,615,380	$56,878
Paul Rafalides School (PS #33)	2,043,211,184	$54,888
President Barack Obama School (PS #34)	4,309,274,160	$93,599
Rafael Cordero Y Molina School (PS #37)	3,185,803,443	$119,095
James F. Murray School (PS #38)	4,271,982,306	$127,717
Dr. Charles P. Defuccio School (PS #39)	1,063,348,880	$46,404
Fred W. Martin Center of the Arts (PS #41)	6,071,994,149	$246,270
Annex Early Childhood Development Center (PS #23A)	632,765,680	$18,269
Danforth Early Childhood Center (PS #16A)	4,391,025,671	$101,227
A. Harry Moore School (PS #52)	0	$3,661
Glenn D. Cunningham Center	1,294,585,760	$33,420
Administration Central Office	12,748,579,740	$491,783
TOTALS	**250,679,841,368**	**$7,207,490**

William L. Dickinson High School Baseline Energy Use

William L. Dickinson High School (PS #43)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
118,756	307	$944	$9,804	$554	$376	$11,678	$1.80	$0.091	$0.098	$0.00	$0.00	405,195,472
115,669	302	$913	$11,210	$534	$376	$13,033	$1.77	$0.105	$0.113	$0.00	$0.00	394,662,628
128,260	639	$1,980	$12,975	$3,707	$376	$18,120	$5.80	$0.117	$0.141	$917.54	1%	437,623,120
132,843	333	$1,148	$12,851	$3,887	$376	$18,261	$11.66	$0.105	$0.137	$0.00	$0.00	453,260,316
114,169	197	$1,263	$12,911	$2,290	$376	$16,840	$11.65	$0.124	$0.148	$0.00	$0.00	389,544,628
112,760	219	$1,177	$15,726	$2,550	$376	$19,200	$11.65	$0.150	$0.170	$628.25	3%	384,737,120
143,041	341	$2,303	$14,277	$609	$376	$16,586	$1.79	$0.116	$0.116	$977.52	2%	488,055,892
112,664	306	$1,894	$10,750	$548	$376	$12,690	$1.79	$0.112	$0.113	$878.22	2%	384,409,568
119,818	301	$1,150	$10,703	$540	$376	$12,769	$1.79	$0.099	$0.107	$0.00	$0.00	408,819,016
114,959	302	$903	$10,273	$535	$376	$12,086	$1.77	$0.097	$0.105	$0.00	$0.00	392,240,108
109,616	309	$804	$9,786	$564	$376	$11,530	$1.83	$0.097	$0.105	$0.00	$0.00	374,009,792
122,797	297	$1,225	$7,382	$547	$376	$9,531	$1.84	$0.070	$0.078	$0.00	$0.00	418,983,364
1,445,352	639	$15,703	$138,647	$16,865	$4,509	$172,323	$4.59	$0.107	$0.119	$3,401.53	3%	4,931,541,024

William L. Dickinson High School (PS #43)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
70	$27	$53	$19	$80	$1.14	7,024,500
16	$5	$14	$19	$19	$1.19	1,572,600
117	$39	$125	$19	$183	$1.40	11,731,100
18	$6	$20	$19	$46	$1.50	1,777,200
66	$23	$65	$19	$107	$1.34	6,573,200
18	$6	$21	$19	$47	$1.55	1,775,500
74	$28	$91	$19	$138	$1.59	7,422,300
76	$31	$75	$19	$125	$1.38	7,631,400
113	$48	$95	$19	$162	$1.27	11,250,700
128	$56	$123	$20	$199	$1.39	12,845,900
127	$56	$96	$20	$172	$1.20	12,673,800
129	$57	$77	$21	$154	$1.03	12,920,600
952	$382	$854	$232	$1,431	$1.30	95,198,800

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

William L. Dickinson High School (PS #43)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	12,986	$51,131	$3.94	1,784,084,000
4/1/22	4/30/22	4,870	$19,294	$3.96	669,086,452
5/1/22	5/31/22	861	$4,723	$5.49	118,285,000
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	0	$0	$0.00	0
11/1/22	11/30/22	11,605	$46,152	$3.98	1,594,278,476
12/1/22	12/31/22	19,757	$64,642	$3.27	2,714,208,000
1/1/23	1/31/23	10,617	$35,363	$3.33	1,458,506,255
2/1/23	2/31/23	15,386	$42,929	$2.79	2,113,798,286
TOTALS		76,082	$264,233	$3.47	10,452,246,469

William L. Dickinson High School (PS #43)					
Provider	Jersey City MUA		Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	8/10/21	132	$1,618	$12.26	0
8/11/21	10/12/21	676	$7,748	$11.46	0
10/13/21	11/13/21	760	$8,748	$11.51	0
11/14/21	12/8/21	200	$2,507	$12.53	0
12/9/21	1/10/22	210	$2,830	$13.48	0
1/11/22	12/8/21	216	$2,515	$11.65	0
12/9/21	2/12/21	441	$5,294	$12.00	0
2/13/21	3/12/21	310	$3,836	$12.37	0
3/13/21	1/13/21	458	$5,479	$11.96	0
1/14/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		3,403	$40,576	$11.924	0

James J. Ferris High School Baseline Energy Use

James J. Ferris High School (PS #44)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
195,683	346	$2,558	$13,742	$1,738	$742	$18,781	$5.02	$0.083	$0.096	$0.00	$0.00	667,670,396
193,158	352	$2,682	$13,668	$1,826	$742	$18,917	$5.18	$0.085	$0.098	$0.00	$0.00	659,055,096
195,735	747	$3,099	$14,365	$5,802	$742	$23,782	$7.76	$0.089	$0.122	$225.58	5%	667,847,820
146,267	765	$2,431	$12,089	$5,215	$742	$20,476	$6.82	$0.099	$0.140	$0.00	$0.00	499,063,004
126,668	216	$2,137	$10,792	$2,951	$742	$16,622	$13.69	$0.102	$0.131	$0.00	$0.00	432,191,216
136,001	350	$2,291	$10,349	$4,770	$742	$18,146	$13.63	$0.093	$0.133	$6.32	256%	464,035,412
145,726	729	$2,415	$9,388	$2,057	$742	$14,326	$2.82	$0.081	$0.098	$275.81	3%	497,217,112
188,470	354	$3,260	$11,268	$2,034	$742	$17,012	$5.75	$0.077	$0.090	$292.17	8%	643,059,640
211,723	336	$3,184	$13,647	$1,959	$904	$19,695	$5.83	$0.079	$0.093	$0.00	$0.00	722,398,876
210,057	692	$3,325	$15,904	$1,999	$742	$21,969	$2.89	$0.092	$0.105	$0.00	$0.00	716,714,484
200,080	672	$3,143	$15,399	$1,991	$742	$21,273	$2.96	$0.093	$0.106	$0.00	$0.00	682,672,960
212,014	338	$3,345	$16,500	$2,011	$742	$22,598	$5.94	$0.094	$0.107	$0.00	$0.00	723,391,768
2,161,582	765	$33,871	$157,111	$34,353	$9,062	$233,596	$6.53	$0.088	$0.108	$799.88	15%	7,375,317,784

James J. Ferris High School (PS #44)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
666	$13,868	$520	$1,126	$15,514	$21.60	66,599,600
623	$217	$532	$189	$938	$1.20	62,304,700
16,200	$5,872	$13,798	$359	$20,030	$1.21	1,619,962,700
70,295	$25,552	$57,197	$546	$83,296	$1.18	7,029,450,900
525	$159	$289	$17	$466	$0.85	52,464,700
517	$159	$300	$18	$477	$0.89	51,701,700
379	$116	$241	$18	$375	$0.94	37,885,200
94	$33	$114	$19	$166	$1.56	9,370,300
259	$94	$300	$19	$412	$1.52	25,931,100
501	$209	$470	$19	$698	$1.36	50,083,100
552	$185	$488	$18	$691	$1.22	55,232,400
575	$246	$522	$20	$788	$1.34	57,489,800
91,185	$46,711	$74,771	$2,369	$123,850	$1.33	9,118,476,200

James J. Ferris High School (PS #44)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	11/8/21	1	$26	$25.77	0
11/9/21	7/8/21	0	$14	$0.00	0
7/9/21	10/12/21	411	$4,780	$11.63	0
10/13/21	10/15/20	672	$7,073	$10.53	0
10/16/20	11/13/20	516	$5,934	$11.50	0
11/14/20	2/14/22	15	$184	$12.27	0
2/15/22	12/8/21	489	$5,651	$11.56	0
12/9/21	1/10/22	447	$5,227	$11.69	0
1/11/22	4/19/21	149	$1,655	$11.11	0
4/20/21	2/12/21	497	$5,738	$11.55	0
2/13/21	3/12/21	363	$4,258	$11.73	0
3/13/21	1/13/21	808	$9,122	$11.29	0
TOTALS		4,368	$49,663	$11.370	0

Abraham Lincoln High School Baseline Energy Use

Lincoln High School (PS #48)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
237,314	217	$1,711	$16,825	$4,699	$1,483	$24,719	$21.61	$0.078	$0.104	$0.00	$0.00	809,715,368
229,032	201	$1,578	$15,757	$4,959	$1,483	$23,777	$24.65	$0.076	$0.104	$0.00	$0.00	781,457,184
226,405	390	$2,596	$16,194	$7,046	$1,483	$26,458	$18.06	$0.083	$0.117	$861.57	3%	772,493,860
227,463	359	$1,907	$16,503	$8,239	$1,483	$27,789	$22.96	$0.081	$0.122	$343.25	8%	776,103,756
218,267	188	$2,012	$15,410	$4,958	$1,483	$23,469	$26.33	$0.080	$0.108	$393.76	12%	744,727,004
234,923	461	$2,707	$15,693	$6,129	$1,483	$24,959	$13.30	$0.078	$0.106	$1,053.01	2%	801,557,276
259,858	494	$3,013	$14,862	$2,889	$1,483	$21,215	$5.85	$0.069	$0.082	$1,031.19	2%	886,635,496
252,606	233	$2,994	$14,713	$2,974	$1,483	$21,069	$12.75	$0.070	$0.083	$1,094.33	4%	861,891,672
300,619	240	$3,024	$18,390	$3,056	$1,483	$25,527	$12.75	$0.071	$0.085	$426.20	12%	1,025,712,028
302,439	483	$3,089	$21,518	$3,645	$1,483	$28,654	$7.54	$0.081	$0.095	$1,080.55	2%	1,031,921,868
298,704	710	$3,010	$22,996	$3,011	$1,483	$30,295	$4.24	$0.087	$0.101	$206.20	9%	1,019,178,048
291,462	239	$2,959	$22,853	$2,957	$1,483	$30,044	$12.37	$0.089	$0.103	$208.37	24%	994,468,344
3,079,092	710	$30,600	$211,713	$54,561	$17,799	$307,975	$15.20	$0.079	$0.100	$6,698.43	3%	10,505,861,904

Lincoln High School (PS #48)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
826	$303	$637	$56	$996	$1.14	82,574,200
850	$315	$771	$56	$1,142	$1.28	84,962,500
236	$79	$261	$203	$544	$1.44	23,572,500
180	$63	$196	$209	$468	$1.44	17,963,100
95	$49	$68	$207	$324	$1.23	9,489,500
176	$110	$167	$209	$485	$1.57	17,649,800
496	$173	$512	$209	$894	$1.38	49,604,800
4,081	$3,395	$4,016	$209	$7,620	$1.82	408,139,500
14,495	$6,233	$13,078	$263	$19,574	$1.33	1,449,502,300
22,103	$6,894	$20,951	$216	$28,061	$1.26	2,210,304,100
30,670	$10,621	$22,140	$216	$32,977	$1.07	3,066,969,400
19,093	$8,374	$11,195	$216	$19,784	$1.02	1,909,329,800
93,301	$36,609	$73,994	$2,266	$112,869	$1.19	9,330,061,500

Lincoln High School (PS #48)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	9	$291	$32.31	0
9/15/21	8/11/21	100	$1,441	$14.41	0
8/12/21	7/9/21	1,110	$15,918	$14.34	0
7/10/21	10/8/21	314	$3,857	$12.28	0
10/9/21	11/12/20	97	$1,386	$14.29	0
11/13/20	10/15/20	300	$3,327	$11.09	0
10/16/20	2/14/22	110	$1,880	$17.09	0
2/15/22	1/10/22	100	$2,389	$23.89	0
1/11/22	12/6/21	30	$492	$16.39	0
12/7/21	2/16/21	110	$1,572	$14.29	0
2/17/21	3/13/21	100	$1,248	$12.48	0
3/14/21	1/12/21	100	$1,248	$12.48	0
TOTALS		2,480	$35,048	$14.132	0

Henry Snyder High School Baseline Energy Use

Henry Snyder High School (PS #46)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
101,015	298	$1,509	$8,399	$1,128	$371	$11,408	$3.79	$0.098	$0.113	$0.00	$0.00	344,663,180
116,195	708	$1,777	$10,381	$4,691	$371	$17,219	$6.62	$0.105	$0.148	$0.00	$0.00	396,457,340
170,949	299	$2,657	$13,627	$4,048	$371	$20,703	$13.55	$0.095	$0.121	$0.00	$0.00	583,277,988
173,929	323	$2,704	$13,919	$4,371	$371	$21,364	$13.55	$0.096	$0.123	$0.00	$0.00	593,445,748
154,536	402	$2,402	$9,800	$5,444	$371	$18,017	$13.55	$0.079	$0.117	$0.00	$0.00	527,276,832
95,397	323	$1,559	$7,196	$1,445	$371	$10,570	$4.47	$0.092	$0.111	$0.00	$0.00	325,494,564
91,261	295	$1,491	$7,006	$1,316	$371	$10,183	$4.47	$0.093	$0.112	$0.00	$0.00	311,382,532
97,987	273	$1,601	$8,989	$1,219	$371	$12,180	$4.47	$0.108	$0.124	$0.00	$0.00	334,331,644
100,306	560	$1,639	$10,473	$1,251	$371	$13,734	$2.23	$0.121	$0.137	$0.00	$0.00	342,244,072
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
1,101,575	708	$17,338	$89,790	$24,913	$3,337	$135,379	$7.41	$0.097	$0.123	$0.00	$0.00	3,758,573,900

Henry Snyder High School (PS #46)

Provider		Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	**Actual Reading**	**Domestic Water (CCF)**	**$$**	**Cost / Unit Checksum**	**BTU**
8/9/21	9/13/21	111	$2,017	$18.17	0
9/14/21	11/9/21	211	$2,661	$12.61	0
11/10/21	8/11/21	845	$9,562	$11.32	0
8/12/21	7/8/21	10	$155	$15.47	0
7/9/21	7/12/21	8	$396	$49.47	0
7/13/21	10/8/21	98	$1,450	$14.80	0
10/9/21	4/13/21	146	$2,297	$15.73	0
4/14/21	3/11/21	20	$267	$13.35	0
3/12/21	2/10/22	219	$2,805	$12.81	0
2/11/22	2/11/21	75	$1,244	$16.58	0
2/12/21	3/15/21	15	$461	$30.72	0
3/16/21	1/13/21	32	$679	$21.22	0
TOTALS		1,790	$23,993	$13.404	0

Dr. Ronald E. McNair Academic HS Baseline Energy Use

Dr. Ronald E. McNair Academic High School (PS #47)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
79,679	223	$1,759	$7,621	$843	$371	$10,595	$3.79	$0.118	$0.133	$0.00	$0.00	271,864,748
93,365	308	$13,691	$0	$3,937	$371	$17,999	$12.79	$0.147	$0.193	$0.00	$0.00	318,561,380
70,911	556	$1,078	$8,082	$2,441	$371	$11,441	$4.39	$0.129	$0.161	$532.09	1%	241,948,332
121,478	355	$1,888	$11,477	$4,753	$371	$17,471	$13.39	$0.110	$0.144	$1,018.85	1%	414,482,936
112,852	343	$771	$10,936	$4,330	$371	$16,407	$12.63	$0.104	$0.145	$0.00	$0.00	385,051,024
119,016	744	$1,850	$9,478	$5,039	$371	$15,670	$6.77	$0.095	$0.132	$1,067.35	1%	406,082,592
76,480	256	$1,240	$7,145	$1,208	$371	$9,188	$4.72	$0.110	$0.120	$776.05	2%	260,949,760
85,597	240	$1,398	$7,529	$1,071	$371	$9,681	$4.47	$0.104	$0.113	$688.23	2%	292,056,964
92,096	243	$807	$9,293	$1,086	$371	$11,557	$4.47	$0.110	$0.125	$0.00	$0.00	314,231,552
90,864	481	$1,484	$9,860	$1,075	$371	$12,100	$2.23	$0.125	$0.133	$690.23	1%	310,027,968
92,541	452	$1,195	$10,113	$1,010	$371	$12,689	$2.23	$0.122	$0.137	$0.00	$0.00	315,749,892
83,225	230	$1,037	$9,848	$1,029	$371	$12,285	$4.47	$0.131	$0.148	$0.00	$0.00	283,963,700
1,118,104	744	$28,199	$101,382	$27,823	$4,450	$157,081	$6.36	$0.116	$0.140	$4,772.80	1%	3,814,970,848

Dr. Ronald E. McNair Academic High School (PS #47)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
6,703	$2,632	$4,938	$164	$7,735	$1.13	670,307,100
4,732	$778	$3,841	$164	$4,782	$0.98	473,221,000
211	$28	$115	$153	$296	$0.68	21,080,700
141	$10	$168	$170	$347	$1.26	14,111,500
126	$9	$122	$170	$302	$1.05	12,578,200
126	$9	$146	$170	$326	$1.24	12,590,400
152	$11	$189	$170	$371	$1.32	15,165,900
635	$97	$640	$170	$908	$1.16	63,547,100
3,921	$2,249	$3,276	$170	$5,695	$1.41	392,091,100
9,210	$3,261	$9,042	$176	$12,478	$1.34	920,952,500
7,195	$2,889	$5,730	$176	$8,795	$1.20	719,526,200
8,382	$2,992	$5,267	$176	$8,435	$0.99	838,160,000
41,533	$14,966	$33,474	$2,030	$50,470	$1.17	4,153,331,700

Dr. Ronald E. McNair Academic High School (PS #47)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
6/14/21	9/11/21	56	$1,100	$19.64	0
9/12/21	10/12/21	10	$280	$27.96	0
10/13/21	11/13/20	12	$296	$24.66	0
11/14/20	1/10/22	21	$405	$19.28	0
1/11/22	12/9/21	8	$252	$31.55	0
12/10/21	2/12/21	39	$755	$19.36	0
2/13/21	3/15/21	20	$388	$19.42	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		166	$3,476	$20.939	0

Liberty High School Baseline Energy Use

Liberty High School (PS #45)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
7,938	22	$177	$1,541	$91	$15	$1,823	$4.06	$0.216	$0.230	$0.00	$0.00	27,084,456
11,379	29	$867	$1,068	$194	$15	$2,143	$6.73	$0.170	$0.188	$0.00	$0.00	38,825,148
9,107	98	$158	$1,614	$985	$15	$2,772	$10.10	$0.195	$0.304	$0.00	$0.00	31,073,084
15,604	98	$280	$3,075	$1,926	$25	$5,306	$19.74	$0.215	$0.340	$0.00	$0.00	53,240,848
28,098	43	$647	$2,373	$618	$15	$3,653	$14.44	$0.107	$0.130	$0.00	$0.00	95,870,376
45,751	96	$1,045	$3,248	$784	$15	$5,092	$8.17	$0.094	$0.111	$0.00	$0.00	156,102,412
13,334	106	$312	$2,165	$411	$20	$2,907	$3.89	$0.186	$0.218	$0.00	$0.00	45,495,608
6,206	50	$148	$1,277	$303	$15	$1,742	$6.11	$0.230	$0.281	$0.00	$0.00	21,174,872
11,055	30	$225	$1,541	$263	$15	$2,044	$8.65	$0.160	$0.185	$0.00	$0.00	37,719,660
6,016	22	$806	$3	$118	$10	$937	$5.27	$0.134	$0.156	$0.00	$0.00	20,526,592
9,057	84	$216	$1,199	$131	$10	$1,556	$1.56	$0.156	$0.172	$0.00	$0.00	30,902,484
9,216	30	$221	$1,232	$143	$10	$1,605	$4.69	$0.158	$0.174	$0.00	$0.00	31,444,992
172,761	106	$5,101	$20,337	$5,967	$177	$31,582	$7.78	$0.147	$0.183	$0.00	$0.00	589,460,532

Liberty High School (PS #45)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1	$0	$1	$19	$20	$1.15	104,800
25	$10	$22	$19	$50	$1.25	2,516,200
14	$5	$15	$19	$38	$1.41	1,361,600
8	$3	$10	$19	$32	$1.50	836,300
8	$3	$8	$19	$31	$1.37	834,700
2	$1	$3	$19	$22	$1.57	208,900
8	$3	$10	$19	$32	$1.55	836,300
15	$6	$14	$19	$40	$1.39	1,465,000
19	$8	$16	$19	$44	$1.29	1,892,600
7	$3	$7	$20	$29	$1.31	731,800
21	$9	$16	$20	$45	$1.19	2,096,900
19	$8	$11	$20	$39	$1.03	1,889,000
148	$59	$132	$230	$421	$1.29	14,774,100

Liberty High School (PS #45)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	1,254	$5,059	$4.03	172,275,714
4/1/22	4/30/22	0	$0	$0.00	0
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	1,424	$5,237	$3.68	195,630,476
11/1/22	11/30/22	0	$0	$0.00	0
12/1/22	12/31/22	2,848	$9,409	$3.30	391,260,952
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	0	$0	$0.00	0
TOTALS		5,526	$19,705	$3.57	759,167,143

Liberty High School (PS #45)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
9/14/21	10/12/21	23	$349	$15.17	0
10/13/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		23	$349	$15.174	0

Academy I Middle School Baseline Energy Use

Academy I Middle School (PS #1)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
88,005	331	$403	$5,329	$583	$371	$6,686	$1.76	$0.065	$0.076	$0.00	$0.00	300,273,060
59,508	192	$364	$4,170	$339	$371	$5,244	$1.76	$0.076	$0.088	$0.00	$0.00	203,041,296
35,333	384	$545	$3,167	$2,228	$371	$5,760	$5.80	$0.105	$0.163	$551.61	1%	120,556,196
23,469	169	$376	$1,644	$1,919	$371	$3,826	$11.39	$0.086	$0.163	$483.60	1%	80,076,228
21,237	164	$340	$2,431	$1,741	$371	$4,411	$10.60	$0.130	$0.208	$471.25	1%	72,460,644
37,008	181	$592	$3,707	$2,112	$371	$6,261	$11.64	$0.116	$0.169	$520.62	2%	126,271,296
39,283	201	$643	$2,931	$357	$371	$3,725	$1.78	$0.091	$0.095	$576.59	1%	134,033,596
41,230	158	$693	$2,739	$280	$371	$3,631	$1.78	$0.083	$0.088	$452.60	2%	140,676,760
96,678	272	$848	$6,848	$484	$371	$8,551	$1.78	$0.080	$0.088	$0.00	$0.00	329,865,336
166,459	374	$13,653	$0	$659	$371	$14,683	$1.76	$0.082	$0.088	$0.00	$0.00	567,958,108
188,484	385	$15,519	$0	$678	$371	$16,568	$1.76	$0.082	$0.088	$0.00	$0.00	643,107,408
95,888	218	$1,307	$2,944	$388	$371	$5,010	$1.78	$0.044	$0.052	$0.00	$0.00	327,169,856
892,582	385	$35,284	$35,912	$11,767	$4,450	$84,356	$4.47	$0.080	$0.095	$3,056.27	3%	3,045,489,784

Academy I Middle School (PS #1)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	9	$156	$17.35	0
9/14/21	11/9/21	0	$101	$0.00	0
11/10/21	8/11/21	0	$58	$0.00	0
8/12/21	7/12/21	6	$171	$28.51	0
7/13/21	10/13/20	0	$47	$0.00	0
10/14/20	2/15/22	10	$173	$17.32	0
2/16/22				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		25	$706	$28.247	0

Franklin L. Williams Middle School Baseline Energy Use

Franklin L. Williams Middle School (MS #7)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Developme nt Credit	Load Factor	BTU
139,181	322	$1,169	$14,630	$1,217	$371	$17,386	$3.79	$0.114	$0.125	$0.00	$0.00	474,885,572
131,519	295	$1,132	$15,438	$1,118	$371	$18,059	$3.79	$0.126	$0.137	$0.00	$0.00	448,742,828
52,732	448	$541	$5,568	$1,927	$371	$7,978	$4.30	$0.116	$0.151	$428.78	1%	179,921,584
169,683	964	$1,236	$17,476	$6,491	$371	$25,575	$6.73	$0.110	$0.151	$0.00	$0.00	578,958,396
144,588	509	$786	$15,807	$6,587	$371	$23,552	$12.94	$0.115	$0.163	$0.00	$0.00	493,334,256
162,005	515	$2,518	$15,946	$8,389	$371	$25,425	$16.29	$0.114	$0.157	$1,800.06	1%	552,761,060
167,530	1070	$2,631	$14,235	$2,390	$371	$18,091	$2.23	$0.101	$0.108	$1,535.16	0%	571,612,360
105,172	422	$1,718	$11,297	$1,886	$371	$14,061	$4.47	$0.124	$0.134	$1,211.14	1%	358,846,864
151,691	355	$1,461	$14,252	$1,584	$371	$17,667	$4.47	$0.104	$0.116	$0.00	$0.00	517,569,692
154,627	362	$2,526	$14,945	$1,618	$371	$18,421	$4.47	$0.113	$0.119	$1,039.23	2%	527,587,324
136,825	660	$1,765	$11,372	$1,474	$371	$14,981	$2.23	$0.096	$0.109	$0.00	$0.00	466,846,900
141,023	320	$1,858	$11,837	$1,430	$371	$15,496	$4.47	$0.097	$0.110	$0.00	$0.00	481,170,476
1,656,576	1070	$19,341	$162,804	$36,111	$4,450	$216,691	$5.85	$0.110	$0.131	$6,014.37	1%	5,652,237,312

Franklin L. Williams Middle School (MS #7)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
7,511	$1,190	$5,756	$164	$7,110	$0.92	751,086,900
5,617	$869	$5,087	$164	$6,121	$1.06	561,738,200
685	$49	$750	$166	$965	$1.17	68,546,400
2,454	$2,762	$170	$170	$3,102	$1.19	245,407,400
22	$2	$23	$170	$195	$1.11	2,202,600
8	$1	$9	$170	$180	$1.29	771,700
3,497	$537	$4,096	$170	$4,804	$1.33	349,683,500
5,500	$1,344	$5,191	$170	$6,706	$1.19	550,029,500
3,448	$1,171	$2,996	$172	$4,338	$1.21	344,834,200
14,792	$3,459	$13,609	$176	$17,244	$1.15	1,479,175,500
12,430	$4,192	$9,037	$176	$13,405	$1.06	1,242,995,100
10,488	$3,954	$6,054	$188	$10,196	$0.95	1,048,792,500
66,453	$19,528	$52,779	$2,058	$74,365	$1.09	6,645,263,500

Franklin L. Williams Middle School (MS #7)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
8/11/21	9/14/21	1,477	$6,952	$4.71	0
9/15/21	8/11/21	1,592	$7,479	$4.70	0
8/12/21	7/8/21	1,319	$6,184	$4.69	0
7/9/21	10/12/21	1,030	$4,872	$4.73	0
10/13/21	4/14/21	26	$301	$11.57	0
4/15/21	11/13/20	24	$270	$11.24	0
11/14/20	10/15/20	20	$238	$11.89	0
10/16/20	2/14/22	118	$733	$6.21	0
2/15/22	3/12/21	15	$217	$14.50	0
3/13/21	2/12/21	14	$229	$16.39	0
2/13/21	1/13/21	329	$1,672	$5.08	0
1/14/21				$0.00	0
TOTALS		5,964	$29,148	$4.887	0

Ezra L. Nolan Middle School Baseline Energy Use

Ezra L. Nolan Middle School (MS #40)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
35,600	105	$229	$3,026	$396	$371	$4,022	$3.79	$0.091	$0.113	$0.00	$0.00	121,467,200
36,066	93	$251	$3,066	$350	$371	$4,038	$3.78	$0.092	$0.112	$0.00	$0.00	123,057,192
37,609	310	$571	$3,398	$1,360	$371	$5,404	$4.39	$0.106	$0.144	$296.48	2%	128,321,908
31,677	76	$275	$3,037	$1,026	$371	$4,708	$13.55	$0.105	$0.149	$0.00	$0.00	108,081,924
34,010	80	$301	$3,182	$1,077	$371	$4,931	$13.55	$0.102	$0.145	$0.00	$0.00	116,042,120
52,452	303	$815	$3,512	$2,054	$371	$6,317	$6.77	$0.083	$0.120	$435.09	2%	178,966,224
41,702	238	$677	$2,909	$531	$371	$4,146	$2.23	$0.086	$0.099	$341.24	2%	142,287,224
45,622	113	$745	$3,071	$505	$371	$4,368	$4.47	$0.084	$0.096	$324.31	5%	155,662,264
44,266	114	$395	$3,727	$511	$371	$5,004	$4.47	$0.093	$0.113	$0.00	$0.00	151,035,592
44,927	259	$363	$3,684	$578	$371	$4,995	$2.23	$0.090	$0.111	$0.00	$0.00	153,290,924
42,725	117	$1,533	$2,547	$523	$371	$4,975	$4.47	$0.096	$0.116	$0.00	$0.00	145,777,700
36,481	102	$453	$3,299	$457	$371	$4,579	$4.47	$0.103	$0.126	$0.00	$0.00	124,473,172
483,137	310	$6,608	$38,459	$9,367	$4,450	$57,486	$5.68	$0.093	$0.119	$1,397.12	5%	1,648,463,444

Ezra L. Nolan Middle School (MS #40)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
6,876	$2,811	$5,065	$164	$8,040	$1.15	687,564,900
2,224	$365	$1,806	$164	$2,335	$0.98	222,437,700
1,121	$163	$910	$153	$1,226	$0.96	112,106,500
1	$0	$1	$170	$171	$1.29	110,500
438	$33	$427	$170	$630	$1.05	43,832,300
423	$32	$492	$170	$694	$1.24	42,331,500
506	$38	$632	$170	$840	$1.32	50,648,400
1,468	$227	$1,478	$170	$1,875	$1.16	146,758,900
2,684	$2,140	$2,245	$170	$4,556	$1.63	268,364,100
9,751	$9,397	$3,660	$176	$13,233	$1.34	975,119,300
5,438	$2,686	$4,332	$176	$7,194	$1.29	543,838,200
8,761	$1,576	$5,506	$176	$7,258	$0.81	876,056,200
39,692	$19,467	$26,556	$2,030	$48,052	$1.16	3,969,168,500

Ezra L. Nolan Middle School (MS #40)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
8/9/21	9/13/21	107	$1,533	$14.33	0
9/14/21	11/9/21	0	$154	$0.00	0
11/10/21	8/9/21	67	$883	$13.18	0
8/10/21	7/12/21	29	$470	$16.20	0
7/13/21	10/12/21	73	$971	$13.30	0
10/13/21	4/13/21	60	$813	$13.54	0
4/14/21	11/13/20	0	$171	$0.00	0
11/14/20	10/14/20	80	$948	$11.85	0
10/15/20	2/11/22	30	$505	$16.84	0
2/12/22	3/15/21	82	$1,063	$12.96	0
3/16/21	2/12/21	159	$2,061	$12.96	0
2/13/21				$0.00	0
TOTALS		687	$9,572	$13.932	0

Frank R. Conwell Middle School Baseline Energy Use

Frank R. Conwell Middle School (MS #4)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Developme nt Credit	Load Factor	BTU
117,680	292	$969	$10,983	$515	$371	$12,838	$1.76	$0.102	$0.109	$0.00	$0.00	401,524,160
92,415	335	$445	$11,004	$591	$371	$12,410	$1.76	$0.124	$0.134	$0.00	$0.00	315,319,980
123,768	801	$1,910	$13,774	$4,637	$371	$19,542	$5.79	$0.127	$0.158	$1,150.00	1%	422,296,416
146,696	428	$1,100	$15,378	$4,987	$371	$21,836	$11.64	$0.112	$0.149	$0.00	$0.00	500,526,752
151,108	411	$1,240	$17,091	$4,782	$371	$23,484	$11.64	$0.121	$0.155	$0.00	$0.00	515,580,496
183,318	502	$2,934	$25,780	$5,838	$371	$33,485	$11.64	$0.157	$0.183	$1,439.31	1%	625,481,016
134,072	459	$2,159	$15,000	$815	$371	$17,029	$1.78	$0.128	$0.127	$1,316.18	1%	457,453,664
113,757	313	$1,911	$12,327	$555	$371	$14,267	$1.78	$0.125	$0.125	$896.88	2%	388,138,884
119,318	280	$1,201	$12,311	$497	$371	$14,380	$1.78	$0.113	$0.121	$0.00	$0.00	407,113,016
118,978	282	$1,022	$12,275	$498	$371	$14,166	$1.76	$0.112	$0.119	$0.00	$0.00	405,952,936
128,779	285	$1,165	$13,287	$502	$371	$15,325	$1.76	$0.112	$0.119	$0.00	$0.00	439,393,948
121,916	280	$1,658	$9,453	$497	$371	$11,980	$1.78	$0.091	$0.098	$0.00	$0.00	415,977,392
1,551,805	801	$17,715	$168,662	$24,715	$4,450	$210,740	$4.57	$0.120	$0.136	$4,802.37	2%	5,294,758,660

Frank R. Conwell Middle School (MS #4)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
9,422	$3,284	$9,213	$176	$12,672	$1.33	942,206,200
14,767	$3,709	$10,488	$164	$14,361	$0.96	1,476,720,700
10,908	$3,316	$9,932	$164	$13,413	$1.21	1,090,830,000
6,196	$1,011	$4,645	$164	$5,821	$0.91	619,616,300
3,325	$525	$2,781	$164	$3,470	$0.99	332,549,900
276	$20	$294	$165	$479	$1.14	27,639,700
332	$24	$385	$170	$579	$1.23	33,213,900
165	$12	$164	$170	$346	$1.07	16,519,700
206	$15	$245	$170	$431	$1.26	20,614,500
157	$12	$191	$170	$373	$1.30	15,669,000
2,091	$1,897	$2,069	$170	$4,136	$1.90	209,103,900
4,972	$2,429	$4,256	$171	$6,856	$1.34	497,217,200
52,819	$16,254	$44,663	$2,021	$62,938	$1.15	5,281,901,000

Frank R. Conwell Middle School (MS #4)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
8/11/21	9/14/21	1,555	$7,988	$5.14	0
9/15/21	11/8/21	766	$4,348	$5.68	0
11/9/21	7/8/21	293	$3,496	$11.93	0
7/9/21	8/11/21	196	$2,320	$11.84	0
8/12/21	10/12/21	161	$1,906	$11.84	0
10/13/21	4/13/21	187	$2,194	$11.73	0
4/14/21	11/12/20	200	$2,341	$11.71	0
11/13/20	10/13/20	600	$6,154	$10.26	0
10/14/20	2/14/22	209	$2,488	$11.90	0
2/15/22	2/16/21	219	$2,570	$11.74	0
2/17/21	1/13/21	171	$2,026	$11.85	0
1/14/21				$0.00	0
TOTALS		4,557	$37,831	$8.302	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Frank R. Conwell School Baseline Energy Use

Frank R. Conwell School (PS #3)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
84,555	222	$977	$8,116	$394	$371	$9,857	$1.78	$0.108	$0.117	$0.00	$0.00	288,501,660
96,270	388	$916	$9,986	$690	$371	$11,963	$1.78	$0.113	$0.124	$0.00	$0.00	328,473,240
129,925	816	$2,005	$13,383	$4,724	$371	$19,895	$5.79	$0.118	$0.153	$587.81	1%	443,304,100
137,005	398	$1,600	$14,942	$4,636	$371	$21,548	$11.64	$0.121	$0.157	$0.00	$0.00	467,461,060
145,686	499	$1,613	$17,504	$5,809	$371	$25,298	$11.64	$0.131	$0.174	$0.00	$0.00	497,080,632
166,388	423	$2,663	$23,055	$4,929	$371	$30,408	$11.64	$0.155	$0.183	$609.70	3%	567,715,856
411,479	436	$2,279	$14,759	$775	$371	$17,556	$1.78	$0.041	$0.043	$627.84	6%	1,403,966,348
102,924	416	$1,729	$10,956	$739	$371	$13,197	$1.78	$0.123	$0.128	$598.75	2%	351,176,688
105,525	388	$1,231	$10,766	$690	$371	$13,057	$1.78	$0.114	$0.124	$0.00	$0.00	360,051,300
92,019	214	$1,546	$15,723	$381	$371	$17,712	$1.78	$0.188	$0.192	$308.45	6%	313,968,828
99,319	234	$1,333	$9,565	$417	$371	$11,685	$1.78	$0.110	$0.118	$0.00	$0.00	338,876,428
94,004	229	$1,259	$8,235	$407	$371	$10,273	$1.78	$0.101	$0.109	$0.00	$0.00	320,741,648
1,665,099	816	$19,153	$156,990	$24,589	$4,450	$202,449	$4.58	$0.106	$0.122	$2,732.55	3%	5,681,317,788

Frank R. Conwell School (PS #3)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
10,908	$3,316	$9,932	$164	$13,413	$1.21	1,090,830,000
6,196	$1,011	$4,645	$164	$5,821	$0.91	619,616,300
3,325	$525	$2,781	$164	$3,470	$0.99	332,549,900
249	$16	$230	$165	$411	$0.99	24,890,600
130	$10	$151	$170	$331	$1.23	13,020,700
187	$15	$184	$170	$370	$1.06	18,722,300
141	$11	$168	$170	$349	$1.27	14,110,400
214	$19	$247	$170	$435	$1.24	21,407,000
553	$1,798	$546	$170	$2,514	$4.24	55,282,900
4,721	$3,872	$2,734	$171	$6,778	$1.40	472,134,400
6,391	$2,904	$6,251	$176	$9,330	$1.43	639,051,100
6,568	$2,561	$4,940	$176	$7,677	$1.14	656,829,200
39,584	$16,057	$32,810	$2,033	$50,900	$1.23	3,958,444,800

Frank R. Conwell School (PS #3)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	315	$3,774	$11.98	0
9/14/21	9/11/21	606	$7,271	$12.00	0
9/12/21	7/12/21	269	$3,129	$11.63	0
7/13/21	10/12/21	83	$958	$11.54	0
10/13/21	4/13/21	1,532	$16,881	$11.02	0
4/14/21	1/7/22	37	$563	$15.22	0
1/8/22	1/10/21	180	$2,242	$12.45	0
1/11/21	2/10/22	47	$626	$13.33	0
2/11/22	2/14/22	3,408	$38,015	$11.15	0
2/15/22	12/9/21	19	$260	$13.66	0
12/10/21	3/15/21	619	$6,938	$11.21	0
3/16/21	2/12/21	2,252	$24,667	$10.95	0
TOTALS		9,367	$105,324	$11.244	0

Jotham W. Wakeman School Baseline Energy Use

Jotham W. Wakeman School (PS #6)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
57,888	182	$361	$4,117	$784	$380	$5,642	$4.31	$0.077	$0.097	$0.00	$0.00	197,513,856
43,388	149	$229	$3,324	$622	$380	$4,556	$4.18	$0.082	$0.105	$0.00	$0.00	148,039,856
42,816	288	$643	$3,438	$2,097	$381	$6,146	$7.28	$0.095	$0.144	$413.28	1%	146,088,192
38,971	305	$167	$3,321	$2,190	$381	$6,058	$7.17	$0.089	$0.155	$0.00	$0.00	132,969,052
32,404	74	$293	$2,862	$1,173	$381	$4,708	$15.89	$0.097	$0.145	$0.00	$0.00	110,562,448
32,871	288	$512	$2,687	$2,128	$381	$5,295	$7.39	$0.097	$0.161	$413.28	1%	112,155,852
44,586	282	$326	$2,847	$691	$381	$4,246	$2.45	$0.071	$0.095	$0.00	$0.00	152,127,432
42,529	139	$715	$2,745	$697	$381	$4,141	$5.03	$0.081	$0.097	$397.78	3%	145,108,948
53,734	169	$410	$3,565	$890	$381	$5,245	$5.26	$0.074	$0.098	$0.00	$0.00	183,340,408
55,805	162	$420	$3,719	$740	$381	$5,259	$4.56	$0.074	$0.094	$0.00	$0.00	190,406,660
59,050	165	$454	$3,934	$740	$381	$5,508	$4.49	$0.074	$0.093	$0.00	$0.00	201,478,600
62,674	157	$838	$4,937	$809	$380	$6,965	$5.15	$0.092	$0.111	$0.00	$0.00	213,843,688
566,716	305	$5,367	$41,497	$13,561	$4,568	$63,768	$6.10	$0.083	$0.113	$1,224.34	6%	1,933,634,992

Jotham W. Wakeman School (PS #6)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
5,328	$2,700	$4,716	$160	$7,576	$1.39	532,849,100
286	$19	$223	$164	$406	$0.85	28,579,400
251	$18	$193	$164	$375	$0.84	25,121,100
261	$19	$227	$164	$410	$0.94	26,117,100
270	$19	$207	$164	$391	$0.84	27,002,400
1,785	$267	$1,607	$164	$2,039	$1.05	178,503,500
199	$14	$217	$166	$397	$1.16	19,900,600
298	$19	$325	$158	$502	$1.15	29,845,600
309	$19	$337	$158	$514	$1.15	30,896,600
121	$9	$146	$170	$326	$1.28	12,126,200
287	$34	$336	$170	$540	$1.29	28,689,700
1,559	$505	$1,511	$170	$2,186	$1.29	155,887,800
10,955	$3,644	$10,045	$1,973	$15,661	$1.25	1,095,519,100

Jotham W. Wakeman School (PS #6)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	184	$2,466	$13.40	0
9/14/21	11/9/21	167	$1,987	$11.90	0
11/10/21	8/11/21	55	$781	$14.21	0
8/12/21	7/9/21	35	$551	$15.75	0
7/10/21	10/12/21	179	$2,139	$11.95	0
10/13/21	4/13/21	36	$551	$15.32	0
4/14/21	1/13/21	162	$1,950	$12.04	0
1/14/21	10/13/20	72	$868	$12.05	0
10/14/20	1/7/22	33	$377	$11.41	0
1/8/22	2/10/22	521	$5,955	$11.43	0
2/11/22	3/15/21	368	$4,175	$11.34	0
3/16/21	2/12/21	131	$1,778	$13.57	0
TOTALS		1,943	$23,578	$12.135	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Charles E. Trefurt School Baseline Energy Use

Charles E. Trefurt School (PS #8)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
53,771	185	$799	$3,623	$702	$371	$5,495	$3.79	$0.082	$0.102	$0.00	$0.00	183,466,652
44,652	175	$665	$3,119	$662	$371	$4,818	$3.79	$0.085	$0.108	$0.00	$0.00	152,352,624
47,500	340	$710	$3,506	$2,179	$371	$6,766	$6.41	$0.089	$0.142	$0.00	$0.00	162,070,000
40,906	357	$632	$3,389	$2,405	$371	$6,797	$6.73	$0.098	$0.166	$0.00	$0.00	139,571,272
28,334	78	$440	$2,546	$1,058	$371	$4,415	$13.55	$0.105	$0.156	$0.00	$0.00	96,675,608
33,755	356	$525	$2,665	$2,409	$371	$5,970	$6.77	$0.095	$0.177	$0.00	$0.00	115,172,060
48,881	378	$770	$3,006	$844	$371	$4,992	$2.23	$0.077	$0.102	$0.00	$0.00	166,781,972
42,096	176	$688	$2,677	$786	$371	$4,522	$4.47	$0.080	$0.107	$0.00	$0.00	143,631,552
45,968	194	$751	$3,113	$867	$371	$5,102	$4.47	$0.084	$0.111	$0.00	$0.00	156,842,816
48,176	378	$787	$3,757	$844	$371	$5,760	$2.23	$0.094	$0.120	$0.00	$0.00	164,376,512
48,981	593	$802	$3,806	$883	$371	$5,862	$1.49	$0.094	$0.120	$0.00	$0.00	167,123,172
50,858	179	$836	$4,004	$801	$371	$6,012	$4.47	$0.095	$0.118	$0.00	$0.00	173,527,496
533,878	593	$8,406	$39,212	$14,442	$4,450	$66,509	$5.03	$0.089	$0.125	$0.00	$0.00	1,821,591,736

Charles E. Trefurt School (PS #8)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
140	$48	$108	$19	$174	$1.11	14,049,000
106	$35	$95	$19	$149	$1.23	10,589,200
106	$35	$115	$19	$169	$1.43	10,578,900
99	$35	$111	$19	$165	$1.46	9,931,300
107	$33	$120	$18	$170	$1.42	10,746,700
39	$14	$47	$19	$79	$1.56	3,864,200
95	$36	$111	$19	$167	$1.55	9,513,100
98	$40	$93	$19	$152	$1.35	9,845,700
111	$46	$97	$19	$162	$1.28	11,134,800
151	$65	$139	$20	$223	$1.35	15,053,700
135	$58	$98	$20	$176	$1.16	13,524,800
154	$67	$89	$21	$177	$1.01	15,426,800
1,343	$512	$1,222	$230	$1,964	$1.29	134,258,200

Charles E. Trefurt School (PS #8)					
Provider	Varies	Fuel Oil #2 (Gal)			
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	4,046	$16,010	$3.96	555,843,333
4/1/22	4/30/22	925	$3,473	$3.75	127,077,381
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	3,600	$13,244	$3.68	494,571,429
11/1/22	11/30/22	1,645	$6,622	$4.03	225,991,667
12/1/22	12/31/22	1,365	$4,739	$3.47	187,525,000
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	7,556	$22,322	$2.95	1,038,050,476
TOTALS		19,137	$66,410	$3.47	2,629,059,286

Charles E. Trefurt School (PS #8)					
Provider		Domestic Water (CCF)			
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/9/21	150	$1,919	$12.79	0
10/10/21	11/13/20	33	$690	$20.90	0
11/14/20	2/14/22	252	$3,184	$12.63	0
2/15/22	1/7/22	213	$3,056	$14.35	0
1/8/22	12/6/21	195	$2,452	$12.58	0
12/7/21	2/11/21	18	$527	$29.25	0
2/12/21	3/12/21	10	$429	$42.85	0
3/13/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		871	$12,256	$14.071	0

Martin Luther King, Jr. School Baseline Energy Use

Martin Luther King, Jr. School (PS #11)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
50,100	166	$268	$4,351	$629	$371	$5,619	$3.79	$0.092	$0.112	$0.00	$0.00	170,941,200
49,939	159	$288	$4,326	$601	$371	$5,587	$3.79	$0.092	$0.112	$0.00	$0.00	170,391,868
64,983	601	$972	$5,501	$2,577	$371	$8,846	$4.29	$0.100	$0.136	$574.86	1%	221,721,996
63,592	178	$478	$5,677	$2,408	$371	$8,933	$13.55	$0.097	$0.140	$0.00	$0.00	216,975,904
60,569	126	$212	$5,415	$565	$371	$6,563	$4.47	$0.093	$0.108	$0.00	$0.00	206,661,428
59,494	342	$925	$4,855	$2,314	$371	$7,974	$6.77	$0.097	$0.134	$490.20	1%	202,993,528
60,117	367	$955	$4,333	$820	$371	$5,952	$2.23	$0.088	$0.099	$526.93	1%	205,119,204
53,496	163	$874	$4,011	$730	$371	$5,516	$4.47	$0.091	$0.103	$468.67	3%	182,528,352
66,596	176	$582	$5,133	$787	$371	$6,874	$4.47	$0.086	$0.103	$0.00	$0.00	227,225,552
69,377	169	$1,133	$5,819	$755	$371	$7,593	$4.47	$0.100	$0.109	$485.04	4%	236,714,324
60,079	504	$743	$5,191	$750	$371	$7,055	$1.49	$0.099	$0.117	$0.00	$0.00	204,989,548
62,969	166	$797	$5,514	$740	$371	$7,422	$4.47	$0.100	$0.118	$0.00	$0.00	214,850,228
721,311	601	$8,228	$60,126	$13,676	$4,450	$83,934	$4.85	$0.095	$0.116	$2,545.70	2%	2,461,113,132

Martin Luther King, Jr. School (PS #11)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
4,007	$651	$3,054	$164	$3,869	$0.92	400,710,700
1,467	$222	$1,287	$164	$1,673	$1.03	146,675,600
180	$13	$199	$167	$379	$1.18	18,015,600
168	$13	$186	$170	$369	$1.18	16,830,900
168	$13	$174	$170	$357	$1.11	16,798,200
994	$74	$1,200	$170	$1,444	$1.28	99,425,300
928	$125	$974	$170	$1,270	$1.18	92,831,100
1,089	$1,112	$1,057	$170	$2,339	$1.99	108,931,700
5,264	$1,883	$4,587	$172	$6,642	$1.23	526,383,500
9,392	$2,663	$8,863	$176	$11,702	$1.23	939,183,800
2,246	$1,340	$1,598	$176	$3,114	$1.31	224,574,200
13,674	$3,728	$7,875	$182	$11,784	$0.85	1,367,425,500
39,578	$11,837	$31,053	$2,052	$44,942	$1.08	3,957,786,100

Martin Luther King, Jr. School (PS #11)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	117	$1,382	$11.81	0
10/13/21	10/15/20	139	$1,409	$10.14	0
10/16/20	11/12/20	132	$1,445	$10.95	0
11/13/20	2/14/22	6	$77	$12.91	0
2/15/22	1/10/22	21	$288	$13.73	0
1/11/22	12/7/21	104	$1,188	$11.42	0
12/8/21	2/12/21	176	$1,978	$11.24	0
2/13/21	3/11/21	132	$1,492	$11.31	0
3/12/21	1/13/21	20	$8,047	$402.34	0
1/14/21	1/13/21	135	$1,479	$10.95	0
1/14/21				$0.00	0
1/1/00				$0.00	0
TOTALS		982	$18,786	$19.130	0

Julia A. Barnes School Baseline Energy Use

Julia A. Barnes School (PS #12)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
28,650	72	$637	$2,489	$285	$5	$3,416	$3.96	$0.109	$0.119	$0.00	$0.00	97,753,800
18,225	67	$406	$1,921	$264	$5	$2,595	$3.96	$0.128	$0.142	$0.00	$0.00	62,183,700
17,400	135	$876	$1,895	$938	$5	$3,139	$6.95	$0.159	$0.180	$574.86	1%	59,368,800
5,925	120	$106	$1,213	$870	$5	$2,195	$7.25	$0.223	$0.370	$0.00	$0.00	20,216,100
6,075	60	$110	$1,223	$878	$5	$2,216	$14.64	$0.219	$0.365	$0.00	$0.00	20,727,900
5,925	120	$597	$1,186	$878	$5	$2,176	$7.32	$0.301	$0.367	$490.20	0%	20,216,100
44,025	162	$1,023	$2,804	$377	$5	$4,209	$2.33	$0.087	$0.096	$0.00	$0.00	150,213,300
18,825	75	$449	$1,678	$349	$5	$2,481	$4.66	$0.113	$0.132	$0.00	$0.00	64,230,900
22,425	76	$535	$1,939	$353	$5	$2,832	$4.66	$0.110	$0.126	$0.00	$0.00	76,514,100
18,375	68	$439	$1,992	$157	$5	$2,593	$2.33	$0.132	$0.141	$0.00	$0.00	62,695,500
19,275	218	$461	$2,097	$339	$5	$2,902	$1.55	$0.133	$0.151	$0.00	$0.00	65,766,300
18,525	34	$444	$2,089	$157	$5	$2,696	$4.66	$0.137	$0.146	$0.00	$0.00	63,207,300
223,650	218	$6,083	$22,525	$5,849	$59	$33,450	$5.36	$0.128	$0.150	$1,065.06	4%	763,093,800

Julia A. Barnes School (PS #12)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
6,334	$1,052	$4,782	$164	$5,997	$0.92	633,449,400
2,136	$340	$1,844	$164	$2,349	$1.02	213,584,500
177	$13	$191	$166	$369	$1.15	17,689,400
88	$6	$101	$170	$277	$1.21	8,827,600
88	$7	$90	$170	$267	$1.09	8,810,500
77	$6	$93	$170	$269	$1.28	7,716,700
452	$68	$497	$170	$735	$1.25	45,241,500
1,756	$986	$1,732	$170	$2,888	$1.55	175,618,500
4,990	$1,605	$4,301	$172	$6,078	$1.18	498,956,200
6,720	$1,940	$6,426	$176	$8,542	$1.24	672,001,400
6,529	$2,225	$4,720	$176	$7,121	$1.06	652,926,600
5,672	$2,066	$3,326	$176	$5,567	$0.95	567,154,400
35,020	$10,314	$28,101	$2,045	$40,460	$1.10	3,501,976,700

Julia A. Barnes School (PS #12)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	7/10/21	1,071	$13,561	$12.66	0
7/11/21	10/12/21	181	$2,124	$11.73	0
10/13/21	1/10/22	164	$1,955	$11.92	0
1/11/22	12/8/21	182	$2,157	$11.85	0
12/9/21	2/16/21	121	$1,504	$12.43	0
2/17/21	3/15/21	84	$1,063	$12.65	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		1,803	$22,363	$12.403	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Ollie Clubreth Jr. School Baseline Energy Use

Ollie Culbreth Jr. School (PS #14)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
287	0	$52	$15	$0	$0	$67	$0.00	$0.232	$0.232	$0.00	$0.00	979,244
247	0	$50	$13	$0	$0	$63	$0.00	$0.257	$0.257	$0.00	$0.00	842,764
21,204	279	$374	$1,623	$1,324	$5	$3,326	$4.75	$0.094	$0.157	$0.00	$0.00	72,348,048
11,499	40	$207	$1,009	$583	$5	$1,804	$14.64	$0.106	$0.157	$0.00	$0.00	39,234,588
12,333	50	$222	$1,062	$731	$5	$2,020	$14.64	$0.104	$0.164	$0.00	$0.00	42,080,196
20,910	224	$377	$1,245	$1,640	$5	$3,266	$7.32	$0.078	$0.156	$0.00	$0.00	71,344,920
24,773	195	$589	$1,382	$455	$5	$2,431	$2.33	$0.080	$0.098	$0.00	$0.00	84,525,476
26,820	104	$640	$1,474	$486	$5	$2,606	$4.66	$0.079	$0.097	$0.00	$0.00	91,509,840
26,425	102	$631	$1,873	$476	$5	$2,985	$4.66	$0.095	$0.113	$0.00	$0.00	90,162,100
24,716	212	$501	$1,873	$494	$5	$2,873	$2.33	$0.096	$0.116	$0.00	$0.00	84,330,992
6,401	201	$633	$1,994	$469	$5	$3,100	$2.33	$0.410	$0.484	$0.00	$0.00	21,840,212
24,442	97	$586	$1,962	$453	$5	$3,006	$4.66	$0.104	$0.123	$0.00	$0.00	83,396,104
200,057	279	$4,863	$15,523	$7,110	$49	$27,545	$6.23	$0.102	$0.138	$0.00	$0.00	682,594,484

Ollie Culbreth Jr. School (PS #14)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
8,577	$2,632	$7,692	$164	$10,488	$1.20	857,657,800
5,378	$2,091	$3,962	$164	$6,217	$1.13	537,834,400
3,353	$560	$2,721	$164	$3,445	$0.98	335,316,500
453	$69	$0	$153	$222	$0.15	45,329,100
155	$11	$184	$170	$364	$1.26	15,463,300
0	$0	$0	$158	$158	$0.00	0
0	$0	$0	$158	$158	$0.00	0
143	$11	$180	$170	$361	$1.33	14,344,900
2,052	$354	$2,058	$170	$2,582	$1.18	205,241,800
4,328	$1,985	$3,614	$170	$5,769	$1.29	432,845,300
6,255	$1,946	$5,286	$163	$7,395	$1.16	625,546,500
6,490	$2,644	$5,168	$176	$7,987	$1.20	648,979,600
37,186	$12,303	$30,864	$1,980	$45,147	$1.16	3,718,559,200

Ollie Culbreth Jr. School (PS #14)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	63	$745	$11.83	0
9/15/21	11/6/21	38	$458	$12.04	0
11/7/21	8/11/21	15	$283	$18.86	0
8/12/21	7/8/21	37	$448	$12.12	0
7/9/21	10/12/21	51	$654	$12.82	0
10/13/21	4/12/21	71	$882	$12.42	0
4/13/21	2/12/21	94	$1,187	$12.62	0
2/13/21	3/12/21	45	$539	$11.98	0
3/13/21	2/15/22	89	$1,105	$12.41	0
2/16/22	1/10/22	72	$896	$12.45	0
1/11/22	12/9/21	69	$862	$12.49	0
12/10/21	3/12/21	31	$387	$12.47	0
TOTALS		675	$8,444	$12.510	0

Whitney M. Young Jr. School Baseline Energy Use

Whitney M. Young Jr. School (PS #15)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
92,229	212	$763	$6,842	$802	$371	$8,778	$3.79	$0.082	$0.095	$0.00	$0.00	314,685,348
177,176	817	$2,659	$13,765	$3,432	$742	$19,414	$4.20	$0.093	$0.110	$1,184.17	1%	604,524,512
86,319	198	$773	$7,104	$2,683	$371	$10,931	$13.55	$0.091	$0.127	$0.00	$0.00	294,520,428
88,560	151	$944	$7,194	$2,043	$371	$10,552	$13.55	$0.092	$0.119	$0.00	$0.00	302,166,720
83,029	392	$1,291	$5,798	$2,658	$371	$9,555	$6.77	$0.085	$0.115	$563.10	2%	283,294,948
77,511	382	$1,246	$5,113	$853	$371	$7,035	$2.23	$0.082	$0.091	$547.59	2%	264,467,532
84,365	207	$1,378	$5,415	$923	$371	$7,494	$4.47	$0.081	$0.089	$592.94	3%	287,853,380
108,519	212	$1,163	$7,687	$949	$371	$10,170	$4.47	$0.082	$0.094	$0.00	$0.00	370,266,828
96,333	402	$1,574	$7,843	$898	$371	$10,109	$2.23	$0.098	$0.105	$576.58	2%	328,688,196
90,545	202	$1,196	$7,664	$901	$371	$10,132	$4.47	$0.098	$0.112	$0.00	$0.00	308,939,540
89,158	203	$1,173	$7,844	$909	$371	$10,296	$4.47	$0.101	$0.115	$0.00	$0.00	304,207,096
1,073,744	817	$14,161	$82,269	$17,050	$4,450	$114,465	$5.84	$0.090	$0.107	$3,464.38	2%	3,663,614,528

Whitney M. Young Jr. School (PS #15)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
10,180	$1,707	$8,551	$164	$10,422	$1.01	1,018,005,300
4,165	$689	$3,236	$164	$4,089	$0.94	416,466,200
1,549	$235	$811	$153	$1,198	$0.68	154,922,900
6	$0	$7	$168	$175	$1.22	624,700
7	$1	$7	$170	$178	$1.10	727,500
6	$0	$7	$170	$178	$1.19	623,500
1,204	$92	$1,470	$170	$1,732	$1.30	120,354,700
10	$1	$11	$170	$182	$1.09	1,040,200
1,300	$387	$1,197	$170	$1,754	$1.22	129,989,200
12,773	$4,261	$11,579	$173	$16,013	$1.24	1,277,253,400
20,544	$5,728	$18,568	$176	$24,472	$1.18	2,054,362,600
13,470	$4,421	$9,201	$176	$13,798	$1.01	1,346,989,700
65,214	$17,521	$54,645	$2,025	$74,191	$1.11	6,521,359,900

Whitney M. Young Jr. School (PS #15)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	11/5/21	122	$1,460	$11.96	0
11/6/21	7/8/21	75	$959	$12.79	0
7/9/21	8/11/21	106	$1,341	$12.65	0
8/12/21	9/14/21	164	$1,972	$12.02	0
9/15/21	10/12/21	227	$2,624	$11.56	0
10/13/21	4/13/21	25	$448	$17.93	0
4/14/21	11/13/20	319	$3,631	$11.38	0
11/14/20	10/15/20	139	$1,553	$11.17	0
10/16/20	2/14/22	210	$2,499	$11.90	0
2/15/22	3/12/21	294	$3,353	$11.40	0
3/13/21	2/12/21	335	$3,810	$11.37	0
2/13/21	1/13/21	323	$3,680	$11.39	0
TOTALS		2,339	$27,328	$11.684	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Cornelia F. Bradford School Baseline Energy Use

Cornelia F. Bradford School (PS #16)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
162,035	62	$2,850	$11,076	$1,106	$10	$15,042	$17.72	$0.086	$0.093	$0.00	$0.00	552,863,420
52,118	91	$1,005	$5,549	$1,505	$10	$8,070	$16.51	$0.126	$0.155	$0.00	$0.00	177,826,616
26,357	125	$499	$4,249	$2,132	$10	$6,890	$17.09	$0.180	$0.261	$0.00	$0.00	89,930,084
41,008	182	$759	$5,065	$2,634	$10	$8,469	$14.44	$0.142	$0.207	$0.00	$0.00	139,919,296
33,751	106	$768	$2,753	$419	$5	$3,945	$3.96	$0.104	$0.117	$0.00	$0.00	115,158,412
57,597	764	$1,225	$10,865	$5,216	$29	$17,334	$6.82	$0.210	$0.301	$0.00	$0.00	196,520,964
52,534	84	$1,237	$4,870	$623	$10	$6,739	$7.44	$0.116	$0.128	$0.00	$0.00	179,246,008
58,207	87	$1,388	$5,027	$627	$10	$7,052	$7.23	$0.110	$0.121	$0.00	$0.00	198,602,284
57,060	87	$1,322	$5,154	$501	$55	$7,032	$5.78	$0.114	$0.123	$0.00	$0.00	194,688,720
56,808	57	$1,310	$5,053	$450	$10	$6,823	$7.85	$0.112	$0.120	$0.00	$0.00	193,828,896
51,096	172	$1,218	$5,617	$515	$10	$7,359	$2.99	$0.134	$0.144	$0.00	$0.00	174,339,552
53,840	61	$1,294	$5,834	$507	$10	$7,644	$8.36	$0.132	$0.142	$0.00	$0.00	183,702,080
702,411	764	$14,874	$71,113	$16,234	$177	$102,398	$9.68	$0.122	$0.146	$0.00	$0.00	2,396,626,332

Cornelia F. Bradford School (PS #16)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
2,973	$450	$2,230	$164	$2,844	$0.90	297,335,300
1,530	$204	$1,289	$164	$1,657	$0.98	152,966,200
788	$56	$834	$165	$1,056	$1.13	78,766,000
631	$46	$732	$170	$948	$1.23	63,141,900
607	$45	$601	$170	$817	$1.06	60,724,300
465	$35	$553	$170	$758	$1.26	46,475,100
687	$65	$838	$170	$1,073	$1.31	68,682,500
914	$112	$898	$170	$1,181	$1.11	91,367,600
2,933	$476	$2,504	$171	$3,152	$1.02	293,254,400
4,090	$695	$3,988	$176	$4,858	$1.14	408,980,800
4,416	$758	$3,327	$176	$4,261	$0.93	441,592,300
0	$0	$0	$188	$188	$0.00	0
20,033	$2,942	$17,793	$2,056	$22,792	$1.04	2,003,286,400

Cornelia F. Bradford School (PS #16)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	275	$3,043	$11.07	0
10/13/21	2/14/22	60	$695	$11.59	0
2/15/22	1/28/22	135	$2,248	$16.65	0
1/29/22	1/10/22	335	$3,701	$11.05	0
1/11/22	12/9/21	278	$3,078	$11.07	0
12/10/21	2/16/21	315	$3,487	$11.07	0
2/17/21	3/15/21	236	$2,615	$11.08	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		1,634	$18,868	$11.547	0

Joseph H. Brensinger School Baseline Energy Use

Joseph H. Brensinger School (PS #17)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
4,417	30	$15	$664	$261	$385	$1,325	$8.59	$0.154	$0.300	$0.00	$0.00	15,070,804
24,618	32	$376	$1,882	$374	$390	$3,022	$11.68	$0.092	$0.123	$0.00	$0.00	83,996,616
117,043	1161	$2,185	$10,950	$4,338	$390	$16,806	$3.74	$0.112	$0.144	$1,056.72	0%	399,350,716
140,250	896	$2,095	$13,049	$4,542	$391	$19,231	$5.07	$0.108	$0.137	$845.08	1%	478,533,000
147,934	591	$2,266	$13,492	$4,437	$391	$19,747	$7.50	$0.107	$0.133	$838.90	1%	504,750,808
158,576	937	$2,520	$13,498	$4,659	$391	$20,093	$4.97	$0.101	$0.127	$974.09	1%	541,061,312
136,537	681	$2,195	$10,232	$1,820	$391	$13,552	$2.67	$0.091	$0.099	$1,085.72	1%	465,864,244
108,652	330	$1,821	$8,997	$1,813	$391	$11,947	$5.50	$0.100	$0.110	$1,074.53	1%	370,720,624
112,895	231	$1,817	$9,505	$1,308	$391	$12,400	$5.65	$0.100	$0.110	$621.07	3%	385,197,740
117,566	493	$2,185	$11,401	$1,370	$391	$14,502	$2.78	$0.116	$0.123	$844.64	1%	401,135,192
122,177	476	$804	$10,145	$1,384	$391	$12,392	$2.91	$0.090	$0.101	$331.20	3%	416,867,924
114,095	236	$1,945	$11,441	$1,227	$391	$14,687	$5.20	$0.117	$0.129	$316.22	6%	389,292,140
1,304,760	1161	$20,223	$115,257	$27,533	$4,681	$159,706	$5.52	$0.104	$0.122	$7,988.17	1%	4,451,841,120

Joseph H. Brensinger School (PS #17)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
3,354	$649	$2,690	$183	$3,522	$1.00	335,353,500
2,542	$501	$2,268	$183	$2,952	$1.09	254,244,900
315	$111	$314	$185	$610	$1.35	31,497,600
351	$123	$420	$190	$733	$1.55	35,055,800
506	$183	$609	$190	$982	$1.57	50,641,300
526	$212	$512	$190	$913	$1.38	52,575,100
648	$266	$551	$190	$1,007	$1.26	64,815,800
1,521	$2,430	$1,478	$190	$4,098	$2.57	152,113,700
4,180	$2,925	$3,527	$191	$6,643	$1.54	418,047,600
8,377	$3,729	$7,916	$196	$11,841	$1.39	837,719,300
8,415	$2,959	$6,162	$176	$9,297	$1.08	841,487,100
6,818	$1,391	$4,019	$176	$5,586	$0.79	681,796,700
37,553	$15,479	$30,467	$2,238	$48,185	$1.22	3,755,348,400

Joseph H. Brensinger School (PS #17)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	200	$187	$0.94	0
9/15/21	8/11/21	0	$182	$0.00	0
8/12/21	2/3/22	3,192	$37,357	$11.70	0
2/4/22	2/15/22	76	$912	$12.00	0
2/16/22	3/11/21			$0.00	0
3/12/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		3,468	$38,638	$11.141	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Dr. Maya Angelou School Baseline Energy Use

Dr. Maya Angelou School (PS #20)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
60,464	247	$820	$8,570	$944	$376	$10,709	$3.82	$0.155	$0.177	$0.00	$0.00	206,303,168
56,108	181	$761	$7,899	$693	$376	$9,729	$3.82	$0.154	$0.173	$0.00	$0.00	191,440,496
89,402	311	$1,146	$12,530	$4,009	$376	$18,061	$12.90	$0.153	$0.202	$0.00	$0.00	305,039,624
130,745	356	$2,039	$10,877	$4,933	$376	$18,225	$13.85	$0.099	$0.139	$0.00	$0.00	446,101,940
137,326	374	$2,141	$11,498	$5,184	$376	$19,199	$13.86	$0.099	$0.140	$0.00	$0.00	468,556,312
126,981	365	$1,980	$9,816	$5,073	$376	$17,244	$13.91	$0.093	$0.136	$0.00	$0.00	433,259,172
100,095	725	$1,604	$7,196	$1,649	$376	$10,825	$2.28	$0.088	$0.108	$0.00	$0.00	341,524,140
94,247	317	$1,550	$6,880	$1,435	$376	$10,241	$4.53	$0.089	$0.109	$0.00	$0.00	321,570,764
85,225	249	$1,362	$7,187	$1,177	$376	$10,102	$4.73	$0.100	$0.119	$0.00	$0.00	290,787,700
87,144	471	$1,437	$9,076	$1,081	$376	$11,969	$2.30	$0.121	$0.137	$0.00	$0.00	297,335,328
71,444	225	$1,181	$9,099	$1,027	$376	$11,683	$4.57	$0.144	$0.164	$0.00	$0.00	243,766,928
76,571	230	$1,259	$9,548	$1,025	$371	$12,203	$4.47	$0.141	$0.159	$0.00	$0.00	261,260,252
1,115,752	725	$17,280	$110,176	$28,229	$4,504	$160,189	$7.09	$0.114	$0.144	$0.00	$0.00	3,806,945,824

Dr. Maya Angelou School (PS #20)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
4,176	$1,728	$3,337	$164	$5,229	$1.21	417,590,500
3,620	$603	$2,836	$164	$3,603	$0.95	362,023,600
1,210	$164	$948	$164	$1,276	$0.92	120,989,100
158	$11	$184	$169	$364	$1.23	15,800,800
50	$4	$51	$170	$225	$1.10	5,013,000
37	$6	$173	$170	$349	$4.89	3,655,300
191	$14	$236	$170	$421	$1.31	19,130,700
2,676	$471	$2,720	$170	$3,361	$1.19	267,621,400
3,276	$1,634	$2,833	$170	$4,637	$1.36	327,636,400
7,172	$2,367	$6,704	$174	$9,245	$1.26	717,168,500
6,743	$2,297	$5,834	$176	$8,306	$1.21	674,305,300
6,375	$2,191	$4,155	$176	$6,523	$1.00	637,537,200
35,685	$11,491	$30,011	$2,039	$43,540	$1.16	3,568,471,800

Dr. Maya Angelou School (PS #20)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	19	$325	$17.12	0
9/15/21	11/9/21	81	$968	$11.96	0
11/10/21	7/8/21	41	$537	$13.09	0
7/9/21	8/11/21	159	$1,849	$11.63	0
8/12/21	10/12/21	58	$729	$12.56	0
10/13/21	1/13/21	73	$899	$12.31	0
1/14/21	1/13/21	351	$3,924	$11.18	0
1/14/21	2/14/22	62	$803	$12.95	0
2/15/22	2/12/21	15	$216	$14.41	0
2/13/21	12/8/21	37	$519	$14.03	0
12/9/21	3/12/21	49	$730	$14.89	0
3/13/21	4/13/21	11	$231	$21.03	0
TOTALS		956	$11,729	$12.269	0

Reverend Dr. Ercel F. Webb School Baseline Energy Use

Reverend Dr. Ercel F. Webb School (PS #22)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
49,937	164	$742	$3,634	$620	$371	$5,367	$3.79	$0.088	$0.107	$0.00	$0.00	170,385,044
40,324	113	$577	$2,934	$427	$371	$4,309	$3.78	$0.087	$0.107	$0.00	$0.00	137,585,488
49,528	446	$749	$4,031	$1,943	$371	$7,094	$4.36	$0.097	$0.143	$0.00	$0.00	168,989,536
48,199	148	$749	$3,990	$2,000	$371	$7,110	$13.55	$0.098	$0.148	$0.00	$0.00	164,454,988
44,031	105	$684	$3,720	$1,424	$371	$6,199	$13.55	$0.100	$0.141	$0.00	$0.00	150,233,772
50,090	351	$779	$3,422	$2,375	$371	$6,946	$6.77	$0.084	$0.139	$0.00	$0.00	170,907,080
48,058	318	$774	$3,119	$711	$371	$4,975	$2.23	$0.081	$0.104	$0.00	$0.00	163,973,896
46,228	153	$755	$3,021	$685	$371	$4,832	$4.47	$0.082	$0.105	$0.00	$0.00	157,729,936
49,791	159	$813	$3,836	$710	$371	$5,730	$4.47	$0.093	$0.115	$0.00	$0.00	169,886,892
48,264	160	$788	$4,145	$716	$371	$6,020	$4.47	$0.102	$0.125	$0.00	$0.00	164,676,768
43,451	443	$713	$3,970	$659	$371	$5,714	$1.49	$0.108	$0.132	$0.00	$0.00	148,254,812
42,546	148	$700	$4,050	$659	$371	$5,780	$4.47	$0.112	$0.136	$0.00	$0.00	145,166,952
560,447	446	$8,825	$43,873	$12,929	$4,450	$70,077	$5.62	$0.094	$0.125	$0.00	$0.00	1,912,245,164

Reverend Dr. Ercel F. Webb School (PS #22)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
8,726	$2,811	$6,934	$183	$9,928	$1.12	872,621,400
6,057	$1,065	$4,770	$183	$6,018	$0.96	605,667,100
118	$2	$93	$336	$432	$0.81	11,832,200
284	$35	$332	$188	$554	$1.29	28,415,300
204	$28	$206	$190	$423	$1.15	20,365,200
33	$12	$38	$190	$239	$1.49	3,342,000
709	$249	$877	$190	$1,316	$1.59	70,877,800
1,757	$337	$1,795	$190	$2,322	$1.21	175,663,900
3,764	$1,998	$3,188	$190	$5,376	$1.38	376,434,700
10,215	$3,431	$9,736	$194	$13,361	$1.29	1,021,453,100
9,247	$3,908	$8,585	$194	$12,688	$1.35	924,741,900
10,214	$3,589	$6,603	$196	$10,387	$1.00	1,021,380,400
51,328	$17,464	$43,159	$2,421	$63,044	$1.18	5,132,795,000

Reverend Dr. Ercel F. Webb School (PS #22)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	1/28/22	3,078	$36,086	$11.72	0
1/29/22	2/15/22	106	$1,252	$11.81	0
2/16/22	2/16/21	378	$4,300	$11.38	0
2/17/21	3/15/21	253	$2,901	$11.47	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		3,815	$44,540	$11.675	0

Mahatma K. Gandhi School Baseline Energy Use

Mahatma K. Ghandi School (PS #23)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
48,588	113	$722	$3,889	$429	$371	$5,411	$3.79	$0.095	$0.111	$0.00	$0.00	165,782,256
46,238	111	$689	$3,751	$419	$371	$5,230	$3.79	$0.096	$0.113	$0.00	$0.00	157,764,056
49,786	225	$744	$4,094	$1,441	$371	$6,649	$6.42	$0.097	$0.134	$0.00	$0.00	169,869,832
44,862	231	$696	$3,964	$1,564	$371	$6,595	$6.76	$0.104	$0.147	$0.00	$0.00	153,069,144
39,250	80	$610	$3,594	$1,088	$371	$5,663	$13.55	$0.107	$0.144	$0.00	$0.00	133,921,000
46,179	244	$718	$3,670	$1,656	$371	$6,414	$6.77	$0.095	$0.139	$0.00	$0.00	157,562,748
49,127	247	$777	$3,318	$551	$371	$5,017	$2.23	$0.083	$0.102	$0.00	$0.00	167,621,324
46,770	117	$764	$3,205	$521	$371	$4,860	$4.47	$0.085	$0.104	$0.00	$0.00	159,579,240
52,278	113	$854	$3,797	$504	$371	$5,525	$4.47	$0.089	$0.106	$0.00	$0.00	178,372,536
49,206	232	$804	$4,132	$519	$371	$5,825	$2.23	$0.100	$0.118	$0.00	$0.00	167,890,872
48,280	350	$791	$4,038	$521	$371	$5,720	$1.49	$0.100	$0.118	$0.00	$0.00	164,731,360
52,842	115	$869	$4,421	$514	$371	$6,175	$4.47	$0.100	$0.117	$0.00	$0.00	180,296,904
573,406	350	$9,038	$45,872	$9,725	$4,450	$69,084	$5.04	$0.096	$0.120	$0.00	$0.00	1,956,461,272

Mahatma K. Ghandi School (PS #23)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
14,095	$2,344	$10,747	$164	$13,255	$1	1,409,512,000
1,415	$201	$1,270	$164	$1,636	$1	141,538,300
178	$189	$193	$166	$548	$2	17,806,100
21	$70	$23	$170	$264	$4	2,090,800
0	$392	$0	$170	$563	$0.00	0
73	$771	$88	$170	$1,029	$12	7,310,700
293	$9,587	$349	$170	$10,107	$34	29,271,100
681	$13,123	$648	$170	$13,942	$20	68,082,300
8,288	$3,557	$7,169	$172	$10,898	$1	828,809,800
11,060	-$2,748	$10,461	$176	$7,889	$1	1,106,029,000
10,086	-$7,443	$7,267	$176	$0	$0	1,008,591,600
7,745	-$4,711	$4,517	$194	$0	$0	774,489,700
53,935	$15,334	$42,733	$2,063	$60,130	$1.08	5,393,531,400

Mahatma K. Ghandi School (PS #23)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	127	$1,724	$13.57	0
10/13/21	11/13/20	104	$1,451	$13.95	0
11/14/20	10/15/20	164	$1,958	$11.94	0
10/16/20	1/10/22	255	$3,138	$12.31	0
1/11/22	12/8/21	241	$2,975	$12.34	0
12/9/21	2/11/21	134	$1,778	$13.27	0
2/12/21	3/11/21	43	$777	$18.06	0
3/12/21	1/13/21	256	$3,116	$12.17	0
1/14/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		1,324	$16,916	$12.776	0

MarcAnthony Dinardo School Baseline Energy Use

MarcAnthony Dinardo School (PS #23B)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
32,295	71	$718	$3,503	$281	$5	$4,507	$3.96	$0.131	$0.140	$0.00	$0.00	110,190,540
405	64	$9	$849	$253	$5	$1,115	$3.96	$2.117	$2.753	$0.00	$0.00	1,381,860
15,615	115	$270	$1,694	$799	$5	$2,767	$6.95	$0.126	$0.177	$0.00	$0.00	53,278,380
32,265	270	$580	$4,290	$2,359	$15	$7,243	$8.75	$0.151	$0.224	$0.00	$0.00	110,088,180
11,115	108	$258	$1,251	$251	$5	$1,766	$2.33	$0.136	$0.159	$0.00	$0.00	37,924,380
11,730	43	$280	$1,280	$201	$5	$1,766	$4.66	$0.133	$0.151	$0.00	$0.00	40,022,760
11,820	44	$282	$1,321	$206	$5	$1,815	$4.66	$0.136	$0.154	$0.00	$0.00	40,329,840
12,000	92	$286	$1,500	$215	$5	$2,007	$2.33	$0.149	$0.167	$0.00	$0.00	40,944,000
13,020	93	$311	$1,576	$217	$5	$2,108	$2.33	$0.145	$0.162	$0.00	$0.00	44,424,240
13,200	50	$317	$1,616	$233	$5	$2,171	$4.66	$0.146	$0.164	$0.00	$0.00	45,038,400
153,465	270	$3,311	$18,879	$5,016	$59	$27,265	$4.46	$0.145	$0.178	$0.00	$0.00	523,622,580

MarcAnthony Dinardo School (PS #23B)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
2,088	$343	$1,571	$164	$2,078	$0.92	208,825,800
925	$146	$778	$164	$1,089	$1.00	92,516,400
222	$16	$231	$166	$412	$1.11	22,222,300
0	$0	$0	$170	$170	$0.00	0
0	$0	$0	$170	$170	$0.00	0
0	$0	$0	$170	$170	$0.00	0
186	$27	$199	$170	$396	$1.21	18,648,300
717	$701	$708	$170	$1,579	$1.97	71,683,300
1,644	$869	$1,415	$171	$2,456	$1.39	164,370,200
2,543	$1,044	$2,475	$176	$3,695	$1.38	254,345,400
2,468	$815	$1,808	$176	$2,799	$1.06	246,784,100
1,974	$713	$1,164	$176	$2,053	$0.95	197,396,300
12,768	$4,675	$10,348	$2,045	$17,068	$1.18	1,276,792,100

MarcAnthony Dinardo School (PS #23B)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/8/21	54	$686	$12.71	0
10/9/21	10/13/20	6	$107	$17.85	0
10/14/20	2/10/22	94	$1,140	$12.12	0
2/11/22	1/10/22	83	$965	$11.62	0
1/11/22	12/6/21	86	$1,045	$12.15	0
12/7/21	2/11/21	6	$116	$19.40	0
2/12/21	3/11/21	10	$208	$20.75	0
3/12/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		339	$4,267	$12.586	0

Chaplain Charles Waters School Baseline Energy Use

Chaplain Charles Waters School (PS #24)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
41,026	144	$611	$3,589	$544	$371	$0	$3.78	$0.102	$0.000	$0.00	$0.00	139,980,712
35,697	108	$511	$3,123	$408	$371	$0	$3.78	$0.102	$0.000	$0.00	$0.00	121,798,164
41,737	410	$630	$3,805	$1,783	$371	$6,589	$4.35	$0.106	$0.158	$0.00	$0.00	142,406,644
46,364	122	$721	$4,125	$1,649	$371	$6,866	$13.55	$0.105	$0.148	$0.00	$0.00	158,193,968
55,140	96	$857	$4,628	$1,303	$371	$7,159	$13.55	$0.099	$0.130	$0.00	$0.00	188,137,680
42,174	311	$656	$3,269	$2,105	$371	$6,401	$6.77	$0.093	$0.152	$0.00	$0.00	143,897,688
37,726	293	$606	$2,874	$655	$371	$4,506	$2.23	$0.092	$0.119	$0.00	$0.00	128,721,112
36,570	133	$597	$2,815	$592	$371	$4,375	$4.47	$0.093	$0.120	$0.00	$0.00	124,776,840
43,835	135	$716	$3,648	$601	$371	$5,336	$4.47	$0.100	$0.122	$0.00	$0.00	149,565,020
41,834	274	$683	$3,864	$613	$371	$5,531	$2.23	$0.109	$0.132	$0.00	$0.00	142,737,608
39,953	263	$656	$3,833	$588	$371	$5,447	$2.23	$0.112	$0.136	$0.00	$0.00	136,319,636
38,496	130	$633	$3,865	$580	$371	$5,448	$4.47	$0.117	$0.142	$0.00	$0.00	131,348,352
500,552	410	$7,878	$43,438	$11,421	$4,450	$57,658	$5.49	$0.103	$0.115	$0.00	$0.00	1,707,883,424

Chaplain Charles Waters School (PS #24)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
15	$5	$11	$19	$35	$1.10	1,467,800
19	$6	$15	$19	$40	$1.14	1,887,200
23	$8	$18	$19	$45	$1.16	2,306,600
21	$7	$24	$19	$51	$1.51	2,092,800
20	$7	$20	$19	$46	$1.38	1,984,300
20	$7	$22	$19	$48	$1.48	1,984,300
19	$7	$23	$19	$49	$1.59	1,881,700
10	$3	$13	$19	$35	$1.56	1,045,400
45	$21	$40	$19	$81	$1.36	4,512,600
3	$1	$3	$20	$24	$1.40	314,200
16	$8	$13	$20	$40	$1.32	1,569,600
13	$6	$8	$20	$34	$1.12	1,259,300
223	$87	$212	$230	$529	$1.34	22,305,800

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Chaplain Charles Waters School (PS #24)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	219	$2,431	$11.10	0
10/13/21	11/13/20	33	$410	$12.43	0
11/14/20	1/10/22	234	$2,604	$11.13	0
1/11/22	12/8/21	215	$2,396	$11.14	0
12/9/21	3/12/21	109	$1,235	$11.33	0
3/13/21	1/13/21	148	$1,663	$11.24	0
1/14/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		958	$10,739	$11.210	0

Nicolaus Copernicus School Baseline Energy Use

Nicolaus Copernicus School (PS #25)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
115,941	331	$1,724	$7,597	$1,251	$371	$10,943	$3.79	$0.080	$0.094	$0.00	$0.00	395,590,692
74,535	289	$1,109	$5,361	$1,094	$371	$7,935	$3.78	$0.087	$0.106	$0.00	$0.00	254,313,420
60,615	345	$906	$4,709	$2,209	$371	$8,194	$6.41	$0.093	$0.135	$0.00	$0.00	206,818,380
55,702	341	$855	$4,748	$2,282	$371	$8,256	$6.69	$0.101	$0.148	$0.00	$0.00	190,055,224
42,928	94	$667	$3,876	$1,268	$371	$6,182	$13.55	$0.106	$0.144	$0.00	$0.00	146,470,336
42,551	201	$661	$3,793	$1,360	$371	$6,186	$6.77	$0.105	$0.145	$0.00	$0.00	145,184,012
62,068	174	$970	$3,963	$778	$371	$6,082	$4.47	$0.079	$0.098	$0.00	$0.00	211,776,016
59,741	231	$976	$3,853	$1,033	$371	$6,232	$4.47	$0.081	$0.104	$0.00	$0.00	203,836,292
108,784	297	$1,777	$6,369	$1,327	$371	$9,844	$4.47	$0.075	$0.090	$0.00	$0.00	371,171,008
135,548	83	$2,214	$9,535	$1,433	$371	$13,554	$17.29	$0.087	$0.100	$0.00	$0.00	462,489,776
125,979	941	$2,060	$8,873	$1,401	$371	$12,705	$1.49	$0.087	$0.101	$0.00	$0.00	429,840,348
135,398	295	$2,226	$9,544	$1,316	$371	$13,457	$4.47	$0.087	$0.099	$0.00	$0.00	461,977,976
1,019,790	941	$16,147	$72,222	$16,752	$4,450	$109,570	$6.47	$0.087	$0.107	$0.00	$0.00	3,479,523,480

Nicolaus Copernicus School (PS #25)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1	$0	$1	$19	$20	$1.15	104,800
6	$2	$5	$19	$26	$1.24	629,100
2	$1	$2	$19	$22	$1.46	209,500
2	$1	$2	$19	$22	$1.43	209,100
2	$1	$2	$19	$22	$1.42	208,700
0	$0	$0	$19	$19	$0.00	0
2	$1	$2	$19	$22	$1.58	209,100
2	$1	$2	$19	$22	$1.38	209,100
3	$2	$3	$19	$24	$1.35	315,400
10	$5	$10	$20	$35	$1.43	1,044,400
8	$4	$6	$20	$30	$1.24	837,900
16	$8	$9	$21	$38	$1.07	1,575,700
56	$25	$46	$232	$302	$1.27	5,552,800

Nicolaus Copernicus School (PS #25)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	1,371	$5,200	$3.79	188,349,286
4/1/22	4/30/22	849	$3,146	$3.71	116,636,429
5/1/22	5/31/22	0		$0.00	0
6/1/22	6/30/22	0		$0.00	0
7/1/22	7/31/22	0		$0.00	0
8/1/22	8/31/22	0		$0.00	0
9/1/22	9/30/22	0		$0.00	0
10/1/22	10/31/22	1,804	$6,635	$3.68	247,835,238
11/1/22	11/30/22	774	$3,115	$4.02	106,332,857
12/1/22	12/31/22	3,397	$11,582	$3.41	466,683,095
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	0	$0	$0.00	0
TOTALS		8,195	$29,678	$3.62	1,125,836,905

Nicolaus Copernicus School (PS #25)					
Provider		Domestic Water (CCF)			
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/11/21	13	$205	$15.76	0
9/12/21	11/5/21	379	$1,346	$3.55	0
11/6/21	8/6/21	200	$2,598	$12.99	0
8/7/21	7/8/21	180	$2,344	$13.02	0
7/9/21	10/9/21	438	$5,173	$11.81	0
10/10/21	4/12/21	219	$2,777	$12.68	0
4/13/21	11/13/20	192	$2,511	$13.08	0
11/14/20	10/15/20	169	$2,102	$12.44	0
10/16/20	2/15/22	504	$6,047	$12.00	0
2/16/22	1/10/22	21	$341	$16.25	0
1/11/22	2/12/21	234	$3,011	$12.87	0
2/13/21	1/12/21	174	$2,213	$12.72	0
TOTALS		2,723	$30,668	$11.263	0

Patricia Noonan School Baseline Energy Use

Patricia Noonan School (PS #26)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
72,834	223	$1,083	$7,828	$844	$371	$10,126	$3.79	$0.122	$0.139	$0.00	$0.00	248,509,608
79,007	287	$1,177	$8,177	$1,085	$371	$10,810	$3.79	$0.118	$0.137	$0.00	$0.00	269,571,884
105,572	746	$1,578	$9,993	$4,785	$371	$16,726	$6.42	$0.110	$0.158	$0.00	$0.00	360,211,664
102,758	743	$1,594	$10,211	$5,022	$371	$17,198	$6.76	$0.115	$0.167	$0.00	$0.00	350,610,296
118,623	379	$1,844	$11,280	$5,128	$371	$18,623	$13.55	$0.111	$0.157	$0.00	$0.00	404,741,676
100,525	612	$1,563	$9,351	$4,148	$371	$15,433	$6.77	$0.109	$0.154	$0.00	$0.00	342,991,300
85,456	612	$1,351	$7,363	$1,368	$371	$10,453	$2.23	$0.102	$0.122	$0.00	$0.00	291,575,872
82,488	289	$1,348	$7,181	$1,293	$371	$10,193	$4.47	$0.103	$0.124	$0.00	$0.00	281,449,056
83,354	225	$1,362	$7,743	$1,004	$371	$10,479	$4.47	$0.109	$0.126	$0.00	$0.00	284,403,848
78,806	448	$1,287	$8,947	$1,000	$371	$11,605	$2.23	$0.130	$0.147	$0.00	$0.00	268,886,072
74,733	533	$1,224	$9,691	$911	$371	$12,197	$1.71	$0.146	$0.163	$0.00	$0.00	254,988,996
80,833	233	$1,329	$10,299	$1,042	$371	$13,042	$4.47	$0.144	$0.161	$0.00	$0.00	275,802,196
1,064,989	746	$16,739	$108,066	$27,632	$4,450	$156,886	$5.05	$0.117	$0.147	$0.00	$0.00	3,633,742,468

Patricia Noonan School (PS #26)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
2,965	$465	$2,279	$164	$2,909	$0.93	296,472,900
2,072	$314	$1,815	$164	$2,292	$1.03	207,165,900
331	$23	$365	$167	$556	$1.18	33,057,100
303	$23	$334	$170	$527	$1.17	30,344,900
159	$12	$166	$170	$348	$1.12	15,858,900
179	$13	$216	$170	$400	$1.29	17,858,600
918	$139	$954	$170	$1,264	$1.19	91,807,100
1,594	$1,370	$1,518	$170	$3,058	$1.81	159,425,600
4,998	$2,002	$4,445	$172	$6,620	$1.29	499,804,800
5,996	$2,204	$5,606	$176	$7,986	$1.30	599,615,100
5,607	$1,895	$3,978	$176	$6,049	$1.05	560,742,200
5,156	$1,895	$2,959	$194	$5,048	$0.94	515,645,200
30,278	$10,355	$24,635	$2,065	$37,055	$1.16	3,027,798,300

Patricia Noonan School (PS #26)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	13	$501	$38.56	0
9/14/21	11/9/21	16	$479	$29.96	0
11/10/21	8/11/21	10	$392	$39.23	0
8/12/21	7/16/21	2	$371	$185.34	0
7/17/21	10/12/21	16	$490	$30.64	0
10/13/21	4/19/21	11	$436	$39.63	0
4/20/21	11/13/20	17	$501	$29.48	0
11/14/20	10/15/20	17	$474	$27.88	0
10/16/20	2/15/22	10	$502	$50.24	0
2/16/22	3/15/21	56	$947	$16.92	0
3/16/21	2/12/21	87	$1,327	$15.25	0
2/13/21	1/13/21	15	$490	$32.69	0
TOTALS		270	$6,912	$25.599	0

Alfred E. Zampella School Baseline Energy Use

Alfred E. Zampella School (PS #27)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
107,420	354	$663	$6,847	$1,453	$376	$9,316	$4.10	$0.070	$0.087	$23.25	54%	366,517,040
52,522	221	$199	$3,887	$1,005	$376	$5,467	$4.56	$0.078	$0.104	$0.00	$0.00	179,205,064
49,055	319	$596	$3,860	$2,193	$376	$6,567	$6.87	$0.091	$0.134	$458.05	1%	167,375,660
42,207	1460	$314	$3,549	$2,162	$376	$6,365	$1.48	$0.092	$0.151	$35.30	3%	144,010,284
35,101	80	$403	$3,062	$1,107	$376	$4,933	$13.86	$0.099	$0.141	$15.21	120%	119,764,612
32,032	301	$152	$2,615	$2,050	$376	$5,185	$6.81	$0.086	$0.162	$7.46	59%	109,293,184
54,702	435	$310	$3,347	$1,014	$376	$5,046	$2.33	$0.067	$0.092	$0.00	$0.00	186,643,224
65,364	246	$2,695	$3,836	$1,197	$376	$7,398	$4.87	$0.100	$0.113	$705.16	2%	223,021,968
117,932	370	$925	$6,866	$1,704	$376	$9,870	$4.61	$0.066	$0.084	$0.00	$0.00	402,383,984
147,532	365	$1,214	$8,570	$1,434	$376	$11,594	$3.93	$0.066	$0.079	$0.00	$0.00	503,379,184
198,702	411	$1,779	$11,407	$1,557	$371	$15,113	$3.79	$0.066	$0.076	$0.00	$0.00	677,971,224
162,707	386	$1,567	$11,304	$1,725	$371	$14,967	$4.47	$0.079	$0.092	$0.00	$0.00	555,156,284
1,065,276	1460	$10,816	$69,150	$18,600	$4,499	$101,822	$5.14	$0.075	$0.096	$1,244.43	2%	3,634,721,712

Alfred E. Zampella School (PS #27)

Provider		Domestic Water (CCF)		
Meter/Acct #				

Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	644	$7,134	$11.08	0
9/15/21	11/9/21	698	$7,693	$11.02	0
11/10/21	8/6/21	223	$2,529	$11.34	0
8/7/21	7/8/21	33	$458	$13.87	0
7/9/21	10/12/21	421	$4,690	$11.14	0
10/13/21	4/9/21	478	$5,303	$11.09	0
4/10/21	11/13/20	748	$8,244	$11.02	0
11/14/20	10/14/20	241	$2,517	$10.45	0
10/15/20	2/11/21	69	$967	$14.02	0
2/12/21	1/10/22	287	$3,235	$11.27	0
1/11/22	3/11/21	476	$5,260	$11.05	0
3/12/21	1/13/21	305	$3,438	$11.27	0
TOTALS		4,623	$51,468	$11.133	0

Christa Mcauliffe School Baseline Energy Use

Christa Mcauliffe School (PS #28)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
107,515	315	$1,853	$9,052	$750	$376	$12,030	$2.38	$0.101	$0.112	$0.00	$0.00	366,841,180
165,030	562	$2,821	$13,172	$1,115	$376	$17,483	$1.98	$0.097	$0.106	$0.00	$0.00	563,082,360
229,841	683	$3,863	$37,626	$1,565	$376	$43,430	$2.29	$0.181	$0.189	$0.00	$0.00	784,217,492
193,460	683	$3,279	$10,545	$1,559	$376	$15,759	$2.28	$0.071	$0.081	$0.00	$0.00	660,085,520
360	3	$6	$64	$46	$5	$121	$13.88	$0.194	$0.335	$0.00	$0.00	1,228,320
5,920	42	$107	$583	$305	$5	$999	$7.32	$0.116	$0.169	$0.00	$0.00	20,199,040
4,560	62	$107	$461	$145	$5	$719	$2.33	$0.125	$0.158	$0.00	$0.00	15,558,720
5,680	31	$136	$512	$145	$5	$798	$4.66	$0.114	$0.140	$0.00	$0.00	19,380,160
9,570	49	$213	$862	$195	$5	$1,275	$3.96	$0.112	$0.133	$0.00	$0.00	32,652,840
14,640	42	$338	$1,132	$198	$5	$1,672	$4.66	$0.100	$0.114	$0.00	$0.00	49,951,680
12,240	120	$293	$951	$186	$5	$1,436	$1.55	$0.102	$0.117	$0.00	$0.00	41,762,880
12,320	34	$295	$983	$160	$5	$1,443	$4.66	$0.104	$0.117	$0.00	$0.00	42,035,840
761,136	683	$13,310	$75,943	$6,368	$1,542	$97,164	$4.33	$0.117	$0.128	$0.00	$0.00	2,596,996,032

Christa Mcauliffe School (PS #28)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	38	$607	$15.96	0
9/14/21	11/9/21	83	$1,065	$12.83	0
11/10/21	8/11/21	88	$1,123	$12.76	0
8/12/21	7/8/21	46	$663	$14.41	0
7/9/21	10/12/21	75	$995	$13.27	0
10/13/21	4/13/21	102	$1,279	$12.54	0
4/14/21	1/13/21	188	$2,211	$11.76	0
1/14/21	2/11/21	126	$1,568	$12.45	0
2/12/21				$0.00	0
1/1/00	2/14/22	75	$896	$11.94	0
2/15/22	2/11/22	33	$372	$11.29	0
2/12/22	3/15/21	164	$1,933	$11.79	0
TOTALS		1,018	$12,712	$12.487	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Gladys Nunery School Baseline Energy Use

Gladys Nunery School (PS #29)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
9,280	34	$206	$1,052	$133	$5	$1,396	$3.96	$0.136	$0.150	$0.00	$0.00	31,663,360
3,680	42	$62	$417	$577	$5	$1,061	$13.88	$0.130	$0.288	$0.00	$0.00	12,556,160
22,640	182	$396	$1,895	$859	$5	$3,155	$4.71	$0.101	$0.139	$0.00	$0.00	77,247,680
18,400	42	$332	$1,665	$609	$5	$2,611	$14.64	$0.109	$0.142	$0.00	$0.00	62,780,800
8,960	20	$162	$1,060	$293	$5	$1,519	$14.64	$0.136	$0.170	$0.00	$0.00	30,571,520
9,600	112	$173	$970	$820	$5	$1,968	$7.32	$0.119	$0.205	$0.00	$0.00	32,755,200
13,200	107	$312	$1,077	$250	$5	$1,643	$2.33	$0.105	$0.124	$0.00	$0.00	45,038,400
12,160	54	$290	$1,030	$253	$5	$1,579	$4.66	$0.109	$0.130	$0.00	$0.00	41,489,920
17,520	62	$418	$1,464	$291	$5	$2,178	$4.66	$0.107	$0.124	$0.00	$0.00	59,778,240
16,960	118	$405	$1,612	$276	$5	$2,298	$2.33	$0.119	$0.136	$0.00	$0.00	57,867,520
15,760	109	$378	$1,582	$253	$5	$2,218	$2.33	$0.124	$0.141	$0.00	$0.00	53,773,120
12,240	51	$294	$1,403	$239	$5	$1,940	$4.66	$0.139	$0.158	$0.00	$0.00	41,762,880
160,400	182	$3,427	$15,227	$4,852	$59	$23,566	$6.68	$0.116	$0.147	$0.00	$0.00	547,284,800

Gladys Nunery School (PS #29)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1	$0	$1	$19	$20	$1.16	104,800
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
1	$0	$1	$19	$21	$1.56	104,600
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
1	$0	$1	$20	$21	$1.45	104,700
1	$0	$1	$20	$21	$1.24	104,600
1	$0	$1	$20	$21	$1.07	104,900
5	$2	$5	$230	$236	$1.30	523,600

Gladys Nunery School (PS #29)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	2,778	$11,393	$4.10	381,644,286
4/1/22	4/30/22	0	$0	$0.00	0
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	3,200	$11,190	$3.50	439,619,048
11/1/22	11/30/22	0	$0	$0.00	0
12/1/22	12/31/22	4,078	$13,998	$3.43	560,239,524
1/1/23	1/31/23	1,967	$5,665	$2.88	270,228,333
2/1/23	2/31/23	2,970	$8,697	$2.93	408,021,429
TOTALS		14,993	$50,943	$3.40	2,059,752,619

Gladys Nunery School (PS #29)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	49	$582	$11.89	0
10/13/21	10/15/20	47	$522	$11.11	0
10/16/20	11/12/20	333	$3,672	$11.03	0
11/13/20	12/8/21	73	$852	$11.68	0
12/9/21	1/10/22	137	$1,607	$11.73	0
1/11/22	12/8/21	77	$1,471	$19.11	0
12/9/21	2/12/21	98	$597	$6.09	0
2/13/21	3/11/21	25	$367	$14.69	0
3/12/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		839	$9,672	$11.528	0

Alexander D. Sullivan School Baseline Energy Use

Alexander D. Sullivan School (PS #30)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
34,123	98	$89	$2,779	$599	$380	$3,847	$6.13	$0.084	$0.113	$0.00	$0.00	116,427,676
31,290	87	$102	$2,590	$1,347	$380	$4,420	$15.52	$0.086	$0.141	$0.00	$0.00	106,761,480
32,789	366	$472	$2,851	$1,879	$380	$5,234	$5.14	$0.101	$0.160	$0.00	$0.00	111,876,068
65,968	378	$1,013	$5,418	$3,730	$1,122	$10,518	$9.86	$0.097	$0.159	$0.00	$0.00	225,082,816
33,224	234	$550	$2,201	$607	$380	$3,402	$2.59	$0.083	$0.102	$349.84	2%	113,360,288
31,549	101	$536	$2,109	$586	$380	$3,322	$5.80	$0.084	$0.105	$764.28	2%	107,645,188
39,199	100	$669	$2,895	$513	$380	$4,170	$5.13	$0.091	$0.106	$335.79	5%	133,746,988
35,114	206	$12,682	$2,817	$521	$381	$16,106	$2.53	$0.441	$0.459	$290.44	2%	119,808,968
36,816	205	$2,008	$1,542	$538	$381	$4,175	$2.62	$0.096	$0.113	$287.29	3%	125,616,192
35,122	115	$604	$2,918	$594	$381	$4,166	$5.16	$0.100	$0.119	$295.03	4%	119,836,264
0	4	$0	$89	$16	$5	$110	$3.94	$0.00	$0.00	$293.90	0%	0
0	4	$0	$84	$16	$5	$104	$3.94	$0.00	$0.00	$330.05	0%	0
375,194	378	$18,726	$28,294	$10,946	$4,556	$59,574	$5.70	$0.125	$0.159	$2,946.62	1%	1,280,161,928

Alexander D. Sullivan School (PS #30)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
709	$281	$594	$37	$911	$1.23	70,937,100
842	$341	$645	$37	$1,022	$1.17	84,248,100
1,044	$415	$828	$37	$1,279	$1.19	104,378,900
711	$284	$665	$38	$987	$1.33	71,147,600
512	$203	$462	$76	$741	$1.30	51,202,300
159	$61	$123	$38	$222	$1.16	15,936,200
137	$54	$125	$38	$217	$1.30	13,743,700
286	$102	$254	$38	$394	$1.25	28,590,300
280	$123	$239	$39	$401	$1.29	28,041,000
8	$3	$10	$19	$32	$1.57	835,500
14	$5	$15	$19	$40	$1.50	1,359,000
64	$69	$20	$20	$110	$1.40	6,395,400
4,768	$1,939	$3,981	$436	$6,357	$1.24	476,815,100

Alexander D. Sullivan School (PS #30)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	4,015	$18,019	$4.49	551,584,524
4/1/22	4/30/22	0	$0	$0.00	0
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	2,325	$8,128	$3.50	319,410,714
11/1/22	11/30/22	0	$0	$0.00	0
12/1/22	12/31/22	4,536	$23,533	$5.19	623,160,000
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	0	$0	$0.00	0
TOTALS		10,876	$49,680	$4.57	1,494,155,238

Alexander D. Sullivan School (PS #30)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	0	$11	$0.00	0
9/14/21	11/9/21	0	$9	$0.00	0
11/10/21	8/11/21	0	$130	$0.00	0
8/12/21	7/8/21	40	$527	$13.17	0
7/9/21	10/12/21	110	$1,310	$11.91	0
10/13/21	10/13/20	0	$9	$0.00	0
10/14/20	11/13/20	40	$541	$13.53	0
11/14/20	1/7/22	60	$759	$12.64	0
1/8/22	12/8/21	100	$1,204	$12.04	0
12/9/21	2/12/21	40	$541	$13.53	0
2/13/21	3/12/21	30	$425	$14.17	0
3/13/21				$0.00	0
TOTALS		420	$5,466	$13.013	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Anthony J. Infante School Baseline Energy Use

Anthony J. Infante School (PS #31)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
12,660	41	$282	$1,504	$164	$5	$1,954	$3.96	$0.141	$0.154	$0.00	$0.00	43,195,920
6,660	39	$148	$1,176	$155	$5	$1,485	$3.96	$0.199	$0.223	$0.00	$0.00	22,723,920
16,860	155	$292	$1,789	$1,081	$5	$3,166	$6.95	$0.123	$0.188	$0.00	$0.00	57,526,320
12,570	152	$225	$1,616	$1,105	$5	$2,952	$7.28	$0.147	$0.235	$0.00	$0.00	42,888,840
3,480	46	$63	$1,033	$668	$5	$1,768	$14.64	$0.315	$0.508	$0.00	$0.00	11,873,760
15,840	70	$286	$1,734	$1,028	$5	$3,052	$14.64	$0.127	$0.193	$0.00	$0.00	54,046,080
21,540	167	$503	$1,774	$389	$5	$2,671	$2.33	$0.106	$0.124	$0.00	$0.00	73,494,480
12,600	16	$301	$1,375	$75	$5	$1,756	$4.66	$0.133	$0.139	$0.00	$0.00	42,991,200
31,020	216	$729	$3,844	$696	$15	$5,284	$3.22	$0.147	$0.170	$0.00	$0.00	105,840,240
11,580	76	$9,195	$1,560	$178	$5	$10,938	$2.33	$0.929	$0.945	$0.00	$0.00	39,510,960
10,620	107	$254	$1,571	$166	$5	$1,996	$1.55	$0.172	$0.188	$0.00	$0.00	36,235,440
11,460	35	$275	$1,657	$164	$5	$2,101	$4.66	$0.169	$0.183	$0.00	$0.00	39,101,520
166,890	216	$12,552	$20,634	$5,868	$69	$39,123	$5.85	$0.199	$0.234	$0.00	$0.00	569,428,680

Anthony J. Infante School (PS #31)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1,706	$284	$1,300	$164	$1,748	$0.93	170,579,900
358	$59	$314	$164	$537	$1.04	35,751,500
357	$25	$391	$166	$583	$1.16	35,717,000
0	$0	$0	$170	$170	$0.00	0
41	$3	$42	$170	$216	$1.11	4,069,200
0	$0	$0	$170	$170	$0.00	0
186	$23	$196	$170	$390	$1.18	18,608,000
212	$623	$205	$170	$998	$3.91	21,157,900
1,604	$873	$1,398	$172	$2,443	$1.42	160,404,600
2,723	$1,087	$2,570	$176	$3,833	$1.34	272,325,700
2,455	$841	$1,749	$176	$2,765	$1.05	245,542,800
1,980	$759	$1,142	$188	$2,088	$0.96	198,030,100
11,622	$4,576	$9,306	$2,058	$15,940	$1.19	1,162,186,700

Anthony J. Infante School (PS #31)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	8/11/21	37	$463	$12.50	0
8/12/21	10/9/21	20	$322	$16.08	0
10/10/21	10/13/20	7	$164	$23.46	0
10/14/20	1/10/22	16	$292	$18.26	0
1/11/22	12/9/21	19	$314	$16.54	0
12/10/21	2/11/21	4	$96	$24.11	0
2/12/21	3/11/21	6	$164	$27.34	0
3/12/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		109	$1,815	$16.654	0

Paul Rafalides School Baseline Energy Use

Paul Rafalides School (PS #33)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
14,670	65	$300	$1,734	$667	$20	$2,641	$10.30	$0.139	$0.180	$80.64	12%	50,054,040
16,558	40	$281	$1,857	$523	$20	$2,681	$13.06	$0.129	$0.162	$0.00	$0.00	56,495,896
19,588	134	$280	$2,045	$997	$20	$3,342	$7.42	$0.119	$0.171	$0.00	$0.00	66,834,256
20,682	98	$521	$2,035	$1,753	$20	$4,250	$17.97	$0.124	$0.205	$78.91	11%	70,566,984
14,686	60	$298	$1,618	$717	$20	$2,494	$12.03	$0.130	$0.170	$159.28	6%	50,108,632
17,766	109	$131	$1,647	$1,118	$20	$2,770	$10.28	$0.100	$0.156	$146.94	5%	60,617,592
25,020	106	$445	$1,724	$556	$20	$2,744	$5.27	$0.087	$0.110	$0.00	$0.00	85,368,240
29,416	67	$702	$2,556	$600	$20	$3,709	$8.92	$0.111	$0.126	$167.89	11%	100,367,392
34,830	104	$745	$2,962	$436	$20	$4,163	$4.18	$0.106	$0.120	$0.00	$0.00	118,839,960
30,836	106	$360	$2,747	$593	$20	$3,719	$5.62	$0.101	$0.121	$0.00	$0.00	105,212,432
13,280	99	$318	$1,110	$231	$5	$1,664	$2.33	$0.108	$0.125	$0.00	$0.00	45,311,360
12,800	46	$307	$1,119	$216	$5	$1,647	$4.66	$0.111	$0.129	$0.00	$0.00	43,673,600
250,132	134	$4,688	$23,154	$8,408	$208	$35,825	$8.50	$0.111	$0.143	$633.66	12%	853,450,384

Paul Rafalides School (PS #33)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1,941	$879	$1,553	$164	$2,596	$1.25	194,064,800
903	$148	$706	$164	$1,019	$0.95	90,270,000
251	$38	$196	$164	$399	$0.94	25,057,500
9	$1	$11	$169	$180	$1.24	941,800
6	$0	$6	$170	$177	$1.07	626,600
0	$0	$0	$170	$170	$0.00	0
4	$0	$5	$170	$176	$1.32	418,200
239	$41	$242	$170	$453	$1.18	23,939,600
452	$645	$390	$170	$1,206	$2.29	45,231,000
2,295	$985	$2,146	$174	$3,305	$1.36	229,489,700
3,587	$1,228	$3,098	$176	$4,502	$1.21	358,708,700
2,210	$746	$1,431	$176	$2,353	$0.99	221,012,900
11,898	$4,712	$9,784	$2,039	$16,535	$1.22	1,189,760,800

Paul Rafalides School (PS #33)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	1	$19	$18.60	0
9/15/21	11/8/21	18	$202	$11.21	0
11/9/21	7/12/21	0	$6	$0.00	0
7/13/21	10/12/21	15	$268	$17.88	0
10/13/21	10/13/20	7	$78	$11.19	0
10/14/20	11/10/20	0	$6	$0.00	0
11/11/20	2/14/22	12	$140	$11.67	0
2/15/22	1/10/22	47	$637	$13.55	0
1/11/22	12/8/21	12	$242	$20.20	0
12/9/21	2/12/21	11	$225	$20.50	0
2/13/21	3/12/21	6	$164	$27.34	0
3/13/21	1/13/21	40	$541	$13.53	0
TOTALS		169	$2,528	$14.961	0

President Barack Obama School Baseline Energy Use

President Barack Obama School (PS #34)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
43,187	398	$653	$3,430	$1,732	$371	$6,186	$4.35	$0.095	$0.143	$0.00	$0.00	147,354,044
36,306	121	$564	$3,029	$1,641	$371	$5,605	$13.55	$0.099	$0.154	$0.00	$0.00	123,876,072
50,478	99	$785	$3,903	$1,341	$371	$6,400	$13.55	$0.093	$0.127	$0.00	$0.00	172,230,936
54,732	305	$851	$3,460	$2,067	$371	$6,749	$6.77	$0.079	$0.123	$0.00	$0.00	186,745,584
43,284	302	$695	$2,675	$676	$371	$4,417	$2.23	$0.078	$0.102	$0.00	$0.00	147,685,008
35,347	110	$577	$2,312	$490	$371	$3,750	$4.47	$0.082	$0.106	$0.00	$0.00	120,603,964
44,587	118	$728	$3,247	$526	$371	$4,872	$4.47	$0.089	$0.109	$0.00	$0.00	152,130,844
43,034	243	$703	$3,636	$542	$371	$5,252	$2.23	$0.101	$0.122	$0.00	$0.00	146,832,008
40,518	236	$665	$3,631	$527	$371	$5,194	$2.23	$0.106	$0.128	$0.00	$0.00	138,247,416
38,482	121	$633	$3,626	$540	$371	$5,169	$4.47	$0.111	$0.134	$0.00	$0.00	131,300,584
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
429,955	398	$6,854	$32,950	$10,081	$3,708	$53,593	$5.83	$0.093	$0.125	$0.00	$0.00	1,467,006,460

President Barack Obama School (PS #34)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
4,732	$1,641	$3,786	$164	$5,591	$1.15	473,205,800
3,503	$584	$2,740	$164	$3,488	$0.95	350,256,400
1,849	$238	$1,447	$164	$1,849	$0.91	184,922,100
44	$3	$51	$169	$223	$1.24	4,418,100
20	$1	$20	$170	$192	$1.09	1,984,300
20	$1	$22	$170	$194	$1.20	1,984,300
43	$3	$53	$170	$227	$1.31	4,303,500
610	$103	$618	$170	$891	$1.18	61,020,800
1,847	$1,193	$1,594	$170	$2,957	$1.51	184,657,500
5,798	$1,905	$5,421	$174	$7,500	$1.26	579,769,800
5,302	$1,821	$4,591	$176	$6,587	$1.21	530,169,000
4,656	$1,599	$3,034	$176	$4,809	$1.00	465,576,100
28,423	$9,092	$23,378	$2,039	$34,509	$1.14	2,842,267,700

President Barack Obama School (PS #34)					
Provider		Domestic Water (CCF)			
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	11/9/21	23	$349	$15.17	0
11/10/21	7/10/21	10	$208	$20.75	0
7/11/21	8/9/21	4	$96	$24.11	0
8/10/21	9/13/21	10	$171	$17.05	0
9/14/21	10/8/21	25	$373	$14.90	0
10/9/21	4/9/21	11	$167	$15.21	0
4/10/21	11/10/20	68	$839	$12.33	0
11/11/20	10/13/20	118	$1,227	$10.40	0
10/14/20	2/11/22	112	$1,395	$12.45	0
2/12/22	3/13/21	13	$194	$14.95	0
3/14/21	2/11/21	15	$214	$14.29	0
2/12/21	1/12/21	19	$265	$13.94	0
TOTALS		428	$5,497	$12.843	0

Rafael Cordero Y Molina School Baseline Energy Use

Rafael Cordero Y Molina School (PS #37)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
20,129	220	$315	$1,660	$1,281	$371	$3,310	$5.81	$0.098	$0.164	$316.27	1%	68,680,148
12,889	99	-$79	$924	$1,157	$371	$2,373	$11.64	$0.066	$0.184	$0.00	$0.00	43,977,268
18,993	71	$99	$1,691	$830	$371	$2,991	$11.64	$0.094	$0.157	$0.00	$0.00	64,804,116
30,587	178	$490	$2,792	$2,070	$371	$5,212	$11.64	$0.107	$0.170	$510.29	1%	104,362,844
24,353	2	$405	$1,664	$200	$371	$2,316	$86.77	$0.085	$0.095	$322.30	137%	83,092,436
30,172	118	$507	$1,893	$210	$371	$2,641	$1.78	$0.080	$0.088	$338.95	3%	102,946,864
36,012	151	$173	$3,294	$267	$371	$4,104	$1.78	$0.096	$0.114	$0.00	$0.00	122,872,944
38,732	125	$651	$3,658	$221	$371	$4,543	$1.78	$0.111	$0.117	$357.60	4%	132,153,584
36,821	124	$266	$1,436	$220	$371	$2,293	$1.78	$0.046	$0.062	$0.00	$0.00	125,633,252
34,164	122	$228	$959	$216	$371	$1,775	$1.78	$0.035	$0.052	$0.00	$0.00	116,567,568
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
282,852	220	$3,054	$19,970	$6,673	$3,708	$31,559	$13.64	$0.081	$0.112	$1,845.41	3%	965,091,024

Rafael Cordero Y Molina School (PS #37)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
3	$1	$2	$19	$22	$1.13	314,500
2	$1	$2	$19	$21	$1.19	209,700
28	$9	$23	$19	$50	$1.12	2,828,000
3	$1	$4	$19	$24	$1.55	313,900
0	$0	$0	$19	$19	$0.00	0
1	$0	$1	$19	$21	$1.54	104,400
1	$0	$1	$19	$21	$1.61	104,500
46	$22	$47	$19	$88	$1.49	4,599,700
2	$1	$2	$19	$22	$1.23	210,300
4	$2	$4	$20	$26	$1.44	418,200
3	$1	$2	$20	$24	$1.22	314,200
9	$4	$6	$20	$30	$1.10	945,400
104	$43	$95	$230	$367	$1.32	10,362,800

Rafael Cordero Y Molina School (PS #37)					
Provider	Varies	Fuel Oil #2 (Gal)			
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	4,993	$20,954	$4.20	685,943,095
4/1/22	4/30/22	0	$0	$0.00	0
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	4,000	$13,988	$3.50	549,551,286
11/1/22	11/30/22	0	$0	$0.00	0
12/1/22	12/31/22	7,096	$23,787	$3.35	974,855,238
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	0	$0	$0.00	0
TOTALS		16,089	$58,729	$3.65	2,210,349,619

Rafael Cordero Y Molina School (PS #37)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	369	$4,169	$11.30	0
10/13/21	11/12/20	200	$2,341	$11.71	0
11/13/20	2/14/22	456	$5,168	$11.33	0
2/15/22	1/28/22	681	$7,690	$11.29	0
1/29/22	12/8/21	440	$4,964	$11.28	0
12/9/21	1/10/22	97	$1,237	$12.75	0
1/11/22	2/16/21	53	$764	$14.42	0
2/17/21	3/15/21	180	$2,107	$11.71	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		2,476	$28,441	$11.487	0

James F. Murray School Baseline Energy Use

James F. Murray School (PS #38)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
24,792	273	$424	$2,058	$1,840	$10	$4,221	$6.73	$0.100	$0.170	$110.21	3%	84,590,304
54,226	285	$874	$4,093	$3,204	$20	$8,192	$11.25	$0.092	$0.151	$0.00	$0.00	185,019,112
3,600	13	$13	$471	$187	$20	$691	$14.64	$0.134	$0.192	$0.00	$0.00	12,283,200
23,905	182	$423	$1,626	$1,483	$10	$3,513	$8.16	$0.086	$0.147	$29.84	18%	81,563,860
23,164	175	$533	$1,556	$431	$10	$2,530	$2.46	$0.090	$0.109	$0.00	$0.00	79,035,568
24,593	89	$585	$1,624	$424	$10	$2,637	$4.79	$0.090	$0.107	$6.89	168%	83,911,316
37,030	90	$777	$4,667	$542	$10	$5,996	$6.03	$0.147	$0.162	$0.00	$0.00	126,346,360
23,701	191	$275	$1,945	$629	$10	$2,854	$3.29	$0.094	$0.120	$4.59	112%	80,867,812
27,029	90	$646	$1,957	$421	$5	$3,028	$4.66	$0.096	$0.112	$0.00	$0.00	92,222,948
24,820	90	$592	$1,889	$417	$5	$2,903	$4.66	$0.100	$0.117	$0.00	$0.00	84,685,840
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
266,860	285	$5,143	$21,886	$9,579	$109	$36,565	$6.67	$0.101	$0.137	$151.53	26%	910,526,320

James F. Murray School (PS #38)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
231	$87	$180	$19	$286	$1.16	23,065,500
234	$88	$187	$19	$293	$1.18	23,380,000
151	$55	$120	$19	$194	$1.16	15,097,400
152	$211	$17	$19	$247	$1.50	15,172,900
107	$37	$109	$19	$166	$1.38	10,652,700
93	$33	$104	$19	$156	$1.47	9,295,000
33	$12	$41	$19	$72	$1.59	3,345,300
168	$69	$180	$19	$269	$1.48	16,830,900
146	$60	$129	$19	$208	$1.30	14,587,300
170	$71	$158	$20	$248	$1.35	16,968,200
232	$101	$195	$20	$316	$1.28	23,230,300
175	$75	$114	$20	$209	$1.08	17,525,700
1,892	$900	$1,535	$230	$2,665	$1.29	189,151,200

James F. Murray School (PS #38)					
Provider	Varies	Fuel Oil #2 (Gal)			
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	4,908	$17,591	$3.58	674,265,714
4/1/22	4/30/22	1,769	$9,212	$5.21	243,026,905
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	0	$0	$0.00	0
11/1/22	11/30/22	1,441	$5,122	$3.55	198,007,167
12/1/22	12/31/22	4,542	$15,201	$3.35	623,984,286
1/1/23	1/31/23	5,382	$17,744	$3.30	739,384,286
2/1/23	2/31/23	5,049	$14,362	$2.84	693,636,429
TOTALS		23,091	$79,232	$3.43	3,172,304,786

James F. Murray School (PS #38)					
Provider		Domestic Water (CCF)			
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	14	$312	$22.30	0
10/13/21	11/12/20	41	$600	$14.64	0
11/13/20	2/15/22	21	$429	$20.43	0
2/16/22	1/10/22	15	$340	$22.64	0
1/11/22	12/9/21	13	$307	$23.60	0
12/10/21	2/16/21	477	$5,377	$11.27	0
2/17/21	3/15/21	160	$1,890	$11.81	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		741	$9,255	$12.489	0

Dr. Charles P. Defuccio School Baseline Energy Use

Dr. Charles P. Defuccio School (PS #39)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
28,546	100	$138	$2,109	$378	$371	$2,995	$3.79	$0.079	$0.105	$0.00	$0.00	97,398,952
24,441	92	$100	$1,877	$347	$371	$2,695	$3.79	$0.081	$0.110	$0.00	$0.00	83,392,692
28,360	183	$424	$2,144	$1,174	$371	$3,850	$6.41	$0.091	$0.136	$262.89	2%	96,764,320
22,358	205	$343	$1,933	$1,374	$371	$3,727	$6.70	$0.102	$0.167	$294.46	2%	76,285,496
12,919	45	$419	$1,288	$604	$371	$2,336	$13.55	$0.132	$0.181	$346.13	3%	44,079,628
19,455	217	$302	$1,617	$1,473	$371	$3,451	$6.77	$0.099	$0.177	$311.96	1%	66,380,460
26,409	241	$67	$1,705	$539	$371	$2,682	$2.23	$0.067	$0.102	$0.00	$0.00	90,107,508
23,639	99	$386	$1,552	$440	$371	$2,466	$4.47	$0.082	$0.104	$282.70	4%	80,656,268
27,244	101	$445	$1,809	$450	$371	$2,786	$4.47	$0.083	$0.102	$289.30	4%	92,956,528
30,094	111	$130	$1,999	$420	$371	$2,920	$3.79	$0.071	$0.097	$0.00	$0.00	102,680,728
38,835	125	$221	$2,579	$472	$371	$3,643	$3.79	$0.072	$0.094	$0.00	$0.00	132,505,020
28,890	98	$475	$2,201	$439	$371	$3,345	$4.47	$0.093	$0.116	$141.55	9%	98,572,680
311,190	241	$3,451	$22,813	$8,111	$4,450	$36,896	$5.35	$0.084	$0.119	$1,928.99	3%	1,061,780,280

Dr. Charles P. Defuccio School (PS #39)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
5	$2	$6	$19	$27	$1.41	522,700
5	$2	$6	$19	$27	$1.45	521,700
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
5	$3	$5	$19	$26	$1.37	524,200
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$20	$20	$0.00	0
0	$0	$0	$20	$20	$0.00	0
0	$0	$0	$20	$20	$0.00	0
16	$6	$16	$231	$253	$1.41	1,568,600

Dr. Charles P. Defuccio School (PS #39)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	10/12/21	14	$312	$22.30	0
10/13/21	11/12/20	41	$600	$14.64	0
11/13/20	2/15/22	21	$429	$20.43	0
2/16/22	1/10/22	15	$340	$22.64	0
1/11/22	12/9/21	13	$307	$23.60	0
12/10/21	2/16/21	422	$5,377	$12.74	0
2/17/21	3/15/21	160	$1,890	$11.81	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		686	$9,255	$13.491	0

Fred W. Martin Center of the Arts Baseline Energy Use

Fred W. Martin Center of the Arts (PS #41)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
89,037	214	$710	$7,037	$809	$371	$8,927	$3.79	$0.087	$0.100	$0.00	$0.00	303,794,244
60,414	163	$396	$4,775	$617	$371	$6,158	$3.77	$0.086	$0.102	$0.00	$0.00	206,132,568
80,291	659	$1,204	$7,010	$2,831	$371	$10,785	$4.30	$0.102	$0.134	$630.26	1%	273,952,892
95,831	231	$1,489	$8,228	$3,131	$371	$12,556	$13.55	$0.101	$0.131	$663.26	3%	326,975,372
86,161	219	$1,339	$7,634	$2,960	$371	$11,678	$13.55	$0.104	$0.136	$627.10	3%	293,981,332
87,010	235	$1,353	$6,812	$3,189	$371	$11,049	$13.55	$0.094	$0.127	$675.60	2%	296,878,120
85,463	464	$1,361	$5,988	$1,037	$371	$8,090	$2.23	$0.086	$0.095	$666.42	1%	291,599,756
86,144	211	$1,407	$5,983	$944	$371	$8,099	$4.47	$0.086	$0.094	$606.43	3%	293,923,328
93,511	211	$1,528	$7,142	$944	$371	$9,378	$4.47	$0.093	$0.100	$606.43	3%	319,059,532
96,086	441	$2,203	$8,248	$986	$371	$11,174	$2.23	$0.109	$0.116	$633.40	1%	327,845,432
8,315	426	$6,637	$2,381	$951	$371	$10,034	$2.23	$1.085	$1.207	$306.44	0%	28,370,780
89,749	227	$1,476	$8,275	$1,013	$371	$10,808	$4.47	$0.109	$0.120	$326.59	5%	306,223,588
958,012	659	$21,103	$79,512	$19,413	$4,450	$118,736	$6.05	$0.105	$0.124	$5,741.93	1%	3,268,736,944

Fred W. Martin Center of the Arts (PS #41)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
179	$13	$141	$164	$318	$0.86	17,928,200
3,953	$647	$3,526	$164	$4,338	$1.06	395,296,300
1,124	$80	$1,265	$167	$1,513	$1.20	112,384,200
226	$17	$239	$170	$426	$1.13	22,558,700
173	$13	$190	$170	$373	$1.17	17,336,800
939	$70	$1,146	$170	$1,387	$1.30	93,876,600
341	$202	$195	$170	$568	$1.17	34,079,900
373	$91	$342	$170	$603	$1.16	37,324,200
397	$93	$359	$173	$625	$1.14	39,735,600
461	$97	$410	$176	$683	$1.10	46,146,600
384	$92	$264	$176	$531	$0.93	38,409,700
405	$92	$229	$176	$496	$0.79	40,508,500
8,956	$1,508	$8,306	$2,048	$11,862	$1.10	895,585,300

Fred W. Martin Center of the Arts (PS #41)					
Provider	Varies		Fuel Oil #2 (Gal)		
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
3/1/22	3/31/22	5,593	$22,420	$4.01	768,371,667
4/1/22	4/30/22	1,269	$6,608	$5.21	174,336,429
5/1/22	5/31/22	0	$0	$0.00	0
6/1/22	6/30/22	0	$0	$0.00	0
7/1/22	7/31/22	0	$0	$0.00	0
8/1/22	8/31/22	0	$0	$0.00	0
9/1/22	9/30/22	0	$0	$0.00	0
10/1/22	10/31/22	992	$3,854	$3.89	136,281,905
11/1/22	11/30/22	2,863	$12,408	$4.33	393,321,667
12/1/22	12/31/22	3,169	$10,392	$3.28	435,360,238
1/1/23	1/31/23	0	$0	$0.00	0
2/1/23	2/31/23	0	$0	$0.00	0
TOTALS		13,886	$55,682	$4.01	1,907,671,905

Fred W. Martin Center of the Arts (PS #41)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	7/8/21	3,750	$41,851	$11.16	0
7/9/21	10/12/21	272	$3,114	$11.45	0
10/13/21	11/12/20	484	$5,431	$11.22	0
11/13/20	1/7/22	123	$1,504	$12.22	0
1/8/22	12/8/21	165	$1,977	$11.98	0
12/9/21	2/16/21	252	$2,929	$11.62	0
2/17/21	3/15/21	279	$3,184	$11.41	0
3/16/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		5,325	$59,990	$11.266	0

Annex Early Childhood Development Ctr Baseline Energy Use

Annex Early Childhood Development Center (PS #23A)

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
3,200	25	$0	$600	$98	$5	$703	$3.96	$0.188	$0.220	$0.01	53763%	10,918,400
3,840	25	$14	$635	$98	$5	$752	$3.96	$0.169	$0.196	$0.00	$0.00	13,102,080
3,200	64	$55	$594	$445	$5	$1,007	$6.95	$0.203	$0.315	$91.84	2%	10,918,400
18,800	165	$338	$2,315	$1,461	$15	$3,842	$8.86	$0.141	$0.204	$287.00	2%	64,145,600
13,520	75	$315	$979	$175	$5	$1,366	$2.33	$0.096	$0.101	$107.91	7%	46,130,240
5,280	28	$126	$611	$130	$5	$792	$4.66	$0.140	$0.150	$80.36	10%	18,015,360
4,800	27	$115	$611	$127	$5	$779	$4.66	$0.151	$0.162	$78.06	9%	16,377,600
5,520	54	$132	$741	$127	$5	$927	$2.33	$0.158	$0.168	$78.07	5%	18,834,240
5,440	58	$130	$797	$134	$5	$984	$2.33	$0.170	$0.181	$82.65	5%	18,561,280
5,440	29	$130	$814	$134	$5	$1,001	$4.66	$0.174	$0.184	$82.66	10%	18,561,280
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
69,040	165	$1,355	$8,697	$2,929	$59	$12,152	$4.47	$0.146	$0.176	$888.56	2%	235,564,480

Annex Early Childhood Development Center (PS #23A)

TOTAL NATURAL GAS

Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
0	$0	$0	$0	$0	$0.00	0
0	$0	$0	$0	$0	$0.00	0
1,203	$510	$902	$19	$1,431	$1.17	120,255,200
482	$204	$427	$19	$649	$1.31	48,227,900
553	$234	$418	$19	$670	$1.18	55,252,400
234	$98	$203	$19	$320	$1.29	23,380,000
85	$0	$92	$19	$111	$1.09	8,484,100
9	$0	$11	$58	$68	$1.13	940,100
34	$0	$41	$19	$60	$1.19	3,449,800
66	$0	$64	$19	$83	$0.96	6,598,700
570	$234	$550	$19	$803	$1.37	57,017,100
736	$0	$698	$20	$718	$0.95	73,595,900
3,972	$1,280	$3,406	$228	$4,913	$1.18	397,201,200

Annex Early Childhood Development Center (PS #23A)					
Provider		Domestic Water (CCF)			
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	4	$163	$40.86	0
9/15/21	11/6/21	2	$110	$54.97	0
11/7/21	8/11/21	1	$131	$130.80	0
8/12/21	7/8/21	4	$135	$33.81	0
7/9/21	10/12/21	3	$131	$43.80	0
10/13/21	10/13/20	19	$281	$14.80	0
10/14/20	2/14/22	1	$134	$134.43	0
2/15/22	2/12/21	1	$117	$116.69	0
2/13/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		35	$1,203	$34.373	0

Danforth Early Childhood Center Baseline Energy Use

Danforth Early Childhood Center (PS #16A)												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
17,800	60	$1,030	$3,589	$237	$10	$4,866	$3.96	$0.259	$0.273	$0.00	$0.00	60,733,600
14,800	46	$334	$2,984	$182	$5	$3,504	$3.95	$0.224	$0.237	$0.00	$0.00	50,497,600
15,600	198	$273	$1,740	$932	$5	$2,950	$4.71	$0.129	$0.189	$0.00	$0.00	53,227,200
12,400	62	$224	$1,554	$908	$5	$2,690	$14.64	$0.143	$0.217	$0.00	$0.00	42,308,800
10,400	40	$188	$1,425	$586	$5	$2,204	$14.64	$0.155	$0.212	$0.00	$0.00	35,484,800
13,600	128	$250	$1,441	$932	$5	$2,628	$7.28	$0.124	$0.193	$0.00	$0.00	46,403,200
15,600	124	$369	$1,457	$289	$5	$2,120	$2.33	$0.117	$0.136	$0.00	$0.00	53,227,200
14,600	56	$349	$1,413	$261	$5	$2,027	$4.66	$0.121	$0.139	$0.00	$0.00	49,815,200
18,800	56	$449	$1,811	$261	$5	$2,526	$4.66	$0.120	$0.134	$0.00	$0.00	64,145,600
18,600	108	$449	$1,956	$252	$5	$2,662	$2.33	$0.129	$0.143	$0.00	$0.00	63,463,200
18,000	108	$431	$1,936	$252	$5	$2,624	$2.33	$0.132	$0.146	$0.00	$0.00	61,416,000
18,000	52	$432	$1,995	$242	$5	$2,674	$4.66	$0.135	$0.149	$0.00	$0.00	61,416,000
188,200	198	$4,776	$23,301	$5,333	$64	$33,473	$5.85	$0.149	$0.178	$0.00	$0.00	642,138,400

Danforth Early Childhood Center (PS #16A)						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
1	$0	$1	$19	$20	$1.25	104,800
0	$0	$0	$19	$19	$0.00	0
15	$5	$17	$19	$41	$1.51	1,465,000
0	$0	$0	$19	$19	$0.00	0
0	$0	$0	$19	$19	$0.00	0
8	$3	$10	$19	$32	$1.59	836,300
448	$208	$482	$19	$709	$1.54	44,847,500
1,974	$940	$1,746	$19	$2,704	$1.36	197,400,400
0	$0	$0	$19	$19	$0.00	0
5,594	$1,196	$4,795	$176	$6,166	$1.07	559,409,700
5,579	$1,877	$3,643	$176	$5,697	$0.99	557,884,400
4,610	-$2,700	$2,530	$170	$0	$0	460,995,600
18,229	$1,530	$13,223	$693	$15,446	$0.81	1,822,943,700

Danforth Early Childhood Center (PS #16A)					
Provider	Varies	Fuel Oil #2 (Gal)			
Meter/Acct #	Varies				
Billing Period Start Date	Actual Reading	Fuel Oil #2 (Gal)	$$	Cost / Unit Checksum	BTU
				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00	1/8/21	2,709	$9,480	$3.50	372,110,048
1/9/21	1/25/21	2,912	$10,045	$3.45	399,998,381
1/26/21	2/10/21	2,260	$7,863	$3.48	310,412,262
2/11/21	2/19/21	846	$2,733	$3.23	116,238,024
2/20/21	2/25/21	1,198	$4,192	$3.50	164,541,167
2/26/21	3/2/21	2,699	$9,448	$3.50	370,846,143
3/3/21	4/26/21	1,396	$4,886	$3.50	191,797,548
TOTALS		14,019	$48,647	$3.47	1,925,943,571

Danforth Early Childhood Center (PS #16A)					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	16	$232	$14.52	0
9/14/21	11/5/21	44	$521	$11.84	0
11/6/21	8/11/21	14	$212	$15.16	0
8/12/21	7/8/21	15	$209	$13.94	0
7/9/21	10/12/21	87	$1,049	$12.06	0
10/13/21	11/13/20	31	$518	$16.70	0
11/14/20	10/14/20	12	$168	$13.98	0
10/15/20	2/15/22	17	$250	$14.72	0
2/16/22	2/12/21	14	$205	$14.66	0
2/13/21	3/11/21	9	$146	$16.17	0
3/12/21	1/13/21	9	$151	$16.76	0
1/14/21				$0.00	0
TOTALS		268	$3,661	$13.659	0

Glenn D. Cunningham Center Baseline Energy Use

Glenn D. Cunningham Center												
TOTAL ELECTRIC												
Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
11,360	101	$197	$1,324	$469	$5	$1,996	$4.66	$0.134	$0.176	$0.00	$0.00	38,760,320
14,360	45	$259	$1,532	$662	$5	$2,458	$14.64	$0.125	$0.171	$0.00	$0.00	48,996,320
28,120	40	$507	$3,026	$1,183	$10	$4,726	$29.28	$0.126	$0.168	$0.00	$0.00	95,945,440
16,760	48	$276	$1,804	$672	$10	$2,762	$13.88	$0.124	$0.165	$0.00	$0.00	57,185,120
11,000	81	$258	$1,104	$188	$5	$1,555	$2.33	$0.124	$0.141	$0.00	$0.00	37,532,000
11,040	30	$264	$1,106	$138	$5	$1,513	$4.66	$0.124	$0.137	$0.00	$0.00	37,668,480
11,480	30	$274	$1,225	$138	$5	$1,642	$4.66	$0.131	$0.143	$0.00	$0.00	39,169,760
12,360	55	$295	$1,363	$129	$5	$1,792	$2.33	$0.134	$0.145	$0.00	$0.00	42,172,320
9,480	27	$227	$1,180	$125	$5	$1,537	$4.66	$0.148	$0.162	$0.00	$0.00	32,345,760
10,320	28	$247	$1,261	$130	$5	$1,644	$4.66	$0.146	$0.159	$0.00	$0.00	35,211,840
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
136,280	101	$2,804	$14,927	$3,834	$59	$21,624	$8.58	$0.130	$0.159	$0.00	$0.00	464,987,360

Glenn D. Cunningham Center						
TOTAL NATURAL GAS						
Therms	Gas Delivery Charges	Gas Commodity Charges	Fixed Customer Charge	Gas Total Charges	Cost/Therm Checksum	BTU
799	$337	$619	$19	$974	$1.20	79,890,500
470	$181	$364	$19	$564	$1.16	47,047,600
5	$2	$6	$19	$27	$1.48	523,200
4	$1	$5	$19	$25	$1.43	418,200
3	$1	$3	$19	$24	$1.46	313,000
6	$2	$8	$19	$29	$1.57	626,600
241	$114	$248	$19	$381	$1.50	24,148,600
337	$160	$318	$19	$497	$1.42	33,654,700
1,405	$673	$1,264	$19	$1,956	$1.38	140,520,600
1,872	$903	$1,701	$20	$2,624	$1.39	187,202,400
1,601	$773	$1,098	$20	$1,890	$1.17	160,145,200
1,551	$748	$879	$20	$1,647	$1.05	155,107,800
8,296	$3,894	$6,512	$231	$10,637	$1.25	829,598,400

Glenn D. Cunningham Center					
Provider			Domestic Water (CCF)		
Meter/Acct #					
Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/14/21	2	$76	$38.21	0
9/15/21	11/8/21	13	$196	$15.08	0
11/9/21	7/8/21	3	$82	$27.34	0
7/9/21	10/8/21	17	$234	$13.78	0
10/9/21	11/12/20	14	$205	$14.66	0
11/13/20	10/13/20	2	$67	$33.54	0
10/14/20	2/11/22	15	$226	$15.07	0
2/12/22	1/13/21	1	$71	$70.83	0
1/14/21				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
1/1/00				$0.00	0
TOTALS		67	$1,158	$17.285	0

Administration Central Office Baseline Energy Use

Administration Central Office

TOTAL ELECTRIC

Usage kWh	Demand kW	Electric Delivery Charges	Electric Commodity Charges	Electric Demand Charges	Fixed Customer Charges	Total Electric Charges	Cost / kW Checksum	Cost / kWh Checksum	Total Cost / kWh Checksum	Area Development Credit	Load Factor	BTU
335,952	1115	$4,759	$38,071	$6,469	$371	$49,670	$5.80	$0.127	$0.148	$0.00	$0.00	1,146,268,224
372,152	612	$5,331	$36,164	$7,125	$371	$48,991	$11.64	$0.112	$0.132	$0.00	$0.00	1,269,782,624
365,648	601	$5,264	$49,367	$6,991	$371	$61,993	$11.64	$0.149	$0.170	$0.00	$0.00	1,247,590,976
414,225	632	$7,777	$49,970	$7,360	$371	$63,663	$11.64	$0.139	$0.154	$1,814.42	2%	1,413,335,700
340,166	612	$6,768	$33,831	$1,088	$371	$40,301	$1.78	$0.119	$0.118	$1,756.44	1%	1,160,646,392
282,764	659	$5,914	$28,025	$1,070	$371	$33,652	$1.62	$0.120	$0.119	$1,727.45	1%	964,790,768
385,116	685	$5,106	$40,371	$1,218	$371	$47,066	$1.78	$0.118	$0.122	$0.00	$0.00	1,314,015,792
457,859	720	$4,843	$45,906	$1,270	$371	$52,390	$1.76	$0.111	$0.114	$0.00	$0.00	1,562,214,908
408,281	743	$5,319	$40,897	$1,310	$371	$47,897	$1.76	$0.113	$0.117	$0.00	$0.00	1,393,054,772
374,232	649	$4,463	$21,464	$1,154	$371	$27,453	$1.78	$0.069	$0.073	$0.00	$0.00	1,276,879,584
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
0	0	$0	$0	$0	$0	$0	$0.00	$0.00	$0.00	$0.00	$0.00	0
3,736,395	1115	$55,546	$384,066	$35,053	$3,708	$473,075	$5.12	$0.118	$0.127	$5,298.31	3%	12,748,579,740

Administration Central Office

Provider		Domestic Water (CCF)		
Meter/Acct #				

Billing Period Start Date	Actual Reading	Domestic Water (CCF)	$$	Cost / Unit Checksum	BTU
	9/13/21	107	$1,357	$12.68	0
9/14/21	11/9/21	97	$1,210	$12.47	0
11/10/21	8/9/21	147	$1,754	$11.93	0
8/10/21				$0.00	0
1/1/00	7/12/21	241	$2,776	$11.52	0
7/13/21	10/12/21	461	$5,225	$11.33	0
10/13/21	4/14/21	94	$1,188	$12.64	0
4/15/21	2/16/21	38	$473	$12.46	0
2/17/21	12/8/21	117	$1,329	$11.36	0
12/9/21	1/10/22	22	$298	$13.53	0
1/11/22	3/15/21	170	$2,068	$12.16	0
3/16/21	4/13/21	80	$1,030	$12.88	0
TOTALS		1,574	$18,708	$11.886	0

Energy Savings Utility Rates

DCO Energy used the following marginal rates to calculate energy cost savings:

BUILDING/FACILITY	ELECTRIC			NATURAL GAS	OTHER ENERGY #1	OTHER ENERGY #2
	$$ / kW	$$ / kWh	Blended $$ / kWh	Therms	Fuel Oil #2 (Gal)	Domestic Water (CCF)
William L. Dickinson High School (PS #43)	$4.59	$0.11	$0.12	$1.30	$3.473	$11.92
James J. Ferris High School (PS #44)	$6.53	$0.09	$0.11	$1.33	$0.00	$11.37
Lincoln High School (PS #48)	$15.20	$0.08	$0.10	$1.19	$0.00	$14.13
Henry Snyder High School (PS #46)	$7.41	$0.10	$0.12	$1.19	$0.00	$13.40
Dr. Ronald E. McNair Academic High School (PS #47)	$6.36	$0.12	$0.14	$1.17	$0.00	$20.94
Liberty High School (PS #45)	$7.78	$0.15	$0.18	$1.29	$3.566	$15.17
Academy I Middle School (PS #1)	$4.47	$0.08	$0.09	$0.00	$0.00	$28.25
Franklin L. Williams Middle School (MS #7)	$5.85	$0.11	$0.13	$1.09	$0.00	$4.89
Ezra L. Nolan Middle School (MS #40)	$5.68	$0.09	$0.12	$1.16	$0.00	$13.93
Frank R. Conwell Middle School (MS #4)	$4.57	$0.12	$0.14	$1.15	$0.00	$8.30
Frank R. Conwell School (PS #3)	$6.28	$0.12	$0.14	$1.23	$0.00	$11.24
Dr. Michael Conti School (PS #5)	$6.28	$0.12	$0.14	$1.01	$0.00	$12.57
Jotham W. Wakeman School (PS #6)	$6.10	$0.08	$0.11	$1.25	$0.00	$12.13
Charles E. Trefurt School (PS #8)	$5.03	$0.09	$0.12	$1.29	$3.470	$14.07
Martin Luther King, Jr. School (PS #11)	$4.85	$0.09	$0.12	$1.08	$0.00	$19.13
Julia A. Barnes School (PS #12)	$5.36	$0.13	$0.15	$1.10	$0.00	$12.40
Ollie Culbreth Jr. School (PS #14)	$6.23	$0.10	$0.13	$1.16	$0.00	$12.51
Whitney M. Young Jr. School (PS #15)	$5.84	$0.09	$0.11	$1.11	$0.00	$11.68
Cornelia F. Bradford School (PS #16)	$9.68	$0.12	$0.15	$1.04	$0.00	$11.55
Joseph H. Brensinger School (PS #17)	$5.52	$0.12	$0.12	$1.22	$0.00	$11.14
Dr. Maya Angelou School (PS #20)	$7.09	$0.11	$0.14	$1.16	$0.00	$12.27
Reverend Dr. Ercel F. Webb School (PS #22)	$5.62	$0.09	$0.13	$1.18	$0.00	$11.67
Mahatma K. Ghandi School (PS #23)	$5.04	$0.10	$0.12	$1.07	$0.00	$12.78
MarcAnthony Dinardo School (PS #23B)	$4.46	$0.14	$0.18	$1.18	$0.00	$12.59
Chaplain Charles Waters School (PS #24)	$5.49	$0.10	$0.12	$1.34	$0.00	$11.21
Nicolaus Copernicus School (PS #25)	$6.47	$0.09	$0.11	$1.27	$3.62	$11.26
Patricia Noonan School (PS #26)	$5.05	$0.12	$0.15	$1.16	$0.00	$25.60
Alfred E. Zampella School (PS #27)	$5.14	$0.08	$0.10	$0.00	$0.00	$11.13
Christa Mcauliffe School (PS #28)	$4.33	$0.12	$0.13	$0.00	$0.00	$12.49
Gladys Nunery School (PS #29)	$6.68	$0.12	$0.15	$1.30	$3.40	$11.53
Alexander D. Sullivan School (PS #30)	$5.70	$0.13	$0.16	$1.24	$4.57	$13.01
Anthony J. Infante School (PS #31)	$5.85	$0.20	$0.23	$1.19	$0.00	$16.65
Paul Rafalides School (PS #33)	$8.50	$0.11	$0.14	$1.22	$0.00	$14.96
President Barack Obama School (PS #34)	$5.83	$0.09	$0.12	$1.14	$0.00	$12.84
Rafael Cordero Y Molina School (PS #37)	$13.64	$0.08	$0.11	$1.32	$3.65	$11.49
James F. Murray School (PS #38)	$6.67	$0.10	$0.14	$1.29	$3.43	$12.49
Dr. Charles P. Defuccio School (PS #39)	$5.35	$0.08	$0.12	$1.41	$0.00	$13.49
Fred W. Martin Center of the Arts (PS #41)	$6.05	$0.11	$0.12	$1.10	$4.01	$11.27
Annex Early Childhood Development Center (PS #23A)	$4.47	$0.15	$0.18	$1.18	$0.00	$34.37
Danforth Early Childhood Center (PS #16A)	$5.85	$0.15	$0.18	$0.81	$3.47	$13.66
A. Harry Moore School (PS #52)	$7.41	$0.10	$0.12	$1.19	$0.00	$17.94
Glenn D. Cunningham Center	$8.58	$0.13	$0.16	$1.25	$0.00	$17.28
Administration Central Office	$5.12	$0.12	$0.13	$0.00	$0.00	$11.89
PS #16 (New School)	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00

ENERGY SAVINGS PLAN

SECTION 3 – ENERGY CONSERVATION MEASURES

Energy Conservation Measure Breakdown

The matrix below details which ECMs were applied and evaluated by building.

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
1	LED Lighting Replacement	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔		✔	✔	✔
2	Lighting Controls	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)		(✔)	(✔)		(✔)	(✔)	(✔)
3	District-Wide Energy Management System - Tier 1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
4	District-Wide Energy Management System - Tier 2	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)			(✔)			(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)		(✔)
5	Boiler Replacement		✔	✔									✔	✔		✔			✔	✔	(✔)		
6	Boiler Replacement w/ Fuel Conversion	✔					✔								✔								
7	Chiller Replacement					(✔)				(✔)	(✔)	(✔)			(✔)						(✔)		(✔)
8	Solar PPA	✔	✔		✔		✔		✔	✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
9	Roof Renovations	✔	✔		✔		✔		✔	✔				✔		✔	✔		✔	✔	✔	✔	
10	Indoor Air Quality & HVAC Enhancements	(✔)		(✔)			(✔)						✔							✔			(✔)
11	Unit Ventilator Replacement		(✔)					(✔)		(✔)				(✔)	(✔)	(✔)	(✔)	(✔)	(✔)				
12	Rooftop Unit Replacement	(✔)			(✔)					(✔)			(✔)	(✔)							(✔)		
13	Plug Load Controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
14	Building Envelope Improvements	✔	✔	✔	✔	✔	✔	✔		✔			✔	✔	✔	✔	✔	✔	✔	✔	✔		✔
15	Kitchen Hood Control		✔									✔									✔		
16	Refrigeration Controls	✔	✔	✔		✔				✔	✔	✔				✔			✔		✔	✔	✔
17	Water Conservation	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
18	Pipe Insulation	✔	✔	✔	✔	✔	✔			✔			✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔
19	Destratification Fans			✔		✔			✔	✔	✔	✔		✔					✔		✔	✔	✔
20	Combined Heating & Power		✔																				
21	Retro-Commissioning		✔			✔		✔		✔				✔	✔	✔	✔	✔	✔				
22	Steam Trap Replacement													✔	✔		✔	✔					
23	Student Education Program	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

✔	ECM included in the project
(✔)	Potential ECM Evaluated but not included
	ECM does not apply to the School

DCO Energy Efficiency Division
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Lawrenceville, NJ 08648

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
1	LED Lighting Replacement	✔	✔	✔	✔	✔	✔			✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	
2	Lighting Controls	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)				(✔)	(✔)	(✔)		(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	
3	District-Wide Energy Management System - Tier 1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	
4	District-Wide Energy Management System - Tier 2	(✔)	(✔)	(✔)	(✔)				(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)	(✔)		
5	Boiler Replacement										(✔)	(✔)	(✔)										
6	Boiler Replacement w/ Fuel Conversion				✔				✔	✔				✔	✔		✔		✔				
7	Chiller Replacement												(✔)				(✔)						
8	Solar PPA	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔			✔	✔		✔		✔	✔	
9	Roof Renovations			✔	✔	✔	✔				✔	✔	✔			✔	✔		✔		✔	✔	
10	Indoor Air Quality & HVAC Enhancements		✔	(✔)					✔		✔	✔	(✔)	✔					✔				
11	Unit Ventilator Replacement	(✔)			(✔)		(✔)			(✔)					(✔)	(✔)	(✔)			(✔)			
12	Rooftop Unit Replacement	(✔)								(✔)				(✔)									
13	Plug Load Controls	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
14	Building Envelope Improvements	✔	✔	✔	✔		✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
15	Kitchen Hood Control																						
16	Refrigeration Controls	✔				✔	✔	✔								✔	✔						
17	Water Conservation	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		
18	Pipe Insulation	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔		✔	✔	✔	✔			
19	Destratification Fans					✔								✔			✔						
20	Combined Heating & Power																						
21	Retro-Commissioning	✔			✔		✔			✔					✔	✔	✔			✔			
22	Steam Trap Replacement	✔			✔					✔					✔	✔				✔			
23	Student Education Program	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

✔	ECM included in the project
(✔)	Potential ECM Evaluated but not included
	ECM does not apply to the School

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ECM Breakdown by Cost & Savings

ECM #	JERSEY CITY PUBLIC SCHOOLS — ENERGY CONSERVATION MEASURE	INSTALLED COST ($)	ANNUAL ELECTRIC COST SAVINGS ($)	ANNUAL NATURAL GAS COST SAVINGS ($)	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS ($)	ANNUAL WATER SAVINGS (kGal) ($)	ANNUAL ENERGY COST SAVINGS ($)
1	LED Lighting Replacement	$12,372,529	$796,965	($16,314)	$0	$0	$780,651
2	Lighting Controls	$0	$0	$0	$0	$0	$0
3	District-Wide Energy Management System - Tier 1	$2,904,533	$14,412	$265,712	$0	$0	$280,124
4	District-Wide Energy Management System - Tier 2	$0	$0	$0	$0	$0	$0
5	Boiler Replacement	$4,982,800	$3,140	$74,028	$0	$0	$77,168
6	Boiler Replacement w/ Fuel Conversion	$3,954,400	$8,153	($327,527)	$722,938	$0	$403,564
7	Chiller Replacement	$0	$0	$0	$0	$0	$0
8	Solar PPA	$0	$840,852	$0	$0	$0	$840,852
9	Roof Renovations	$14,393,000	$0	$1,347	$0	$0	$1,347
10	Indoor Air Quality & HVAC Enhancements	$43,931,740	$2,003	$0	$0	$0	$2,003
11	Unit Ventilator Replacement	$0	$0	$0	$0	$0	$0
12	Rooftop Unit Replacement	$0	$0	$0	$0	$0	$0
13	Plug Load Controls	$476,500	$178,481	$0	$0	$0	$178,481
14	Building Envelope Improvements	$921,368	$26,450	$85,324	$0	$0	$111,774
15	Kitchen Hood Control	$100,065	$1,030	$7,520	$0	$0	$8,551
16	Refrigeration Controls	$254,276	$30,753	$0	$0	$0	$30,753
17	Water Conservation	$2,248,635	$3,747	$0	$0	$414,514	$418,261
18	Pipe Insulation	$938,568	$0	$100,844	$0	$0	$100,844
19	Destratification Fans	$281,875	($1,827)	$30,064	$0	$0	$28,237
20	Combined Heating & Power	$135,500	$1,524	($1,468)	$0	$0	$56
21	Retro-Commissioning	$0	$3,023	$9,087	$0	$0	$12,110
22	Steam Trap Replacement	$361,875	$0	$27,010	$0	$0	$27,010
23	Student Education Program	$0	$0	$0	$0	$0	$0
	TOTALS	$88,257,663	$1,908,708	$255,626	$722,938	$414,514	$3,301,786

ECM #	JERSEY CITY PUBLIC SCHOOLS — ENERGY CONSERVATION MEASURE	ELECTRIC CONSUMPTION SAVINGS (kWh)	ELECTRIC DEMAND SAVINGS (kW)	NATURAL GAS SAVINGS (THERMS)	Fuel Oil #2 (Gal) SAVINGS (Fuel Oil #2 (Gal))	Domestic Water (CCF) SAVINGS (Domestic Water (CCF))
1	LED Lighting Replacement	7,046,014	1,791	(13,811)	0	0
2	Lighting Controls	0	0	0	0	0
3	District-Wide Energy Management System - Tier 1	140,235	0	301,385	0	0
4	District-Wide Energy Management System - Tier 2	0	0	0	0	0
5	Boiler Replacement	37,754	0	63,551	0	0
6	Boiler Replacement w/ Fuel Conversion	73,937	0	(262,767)	201,895	0
7	Chiller Replacement	0	0	0	0	0
8	Solar PPA	0	0	0	0	0
9	Roof Renovations	0	0	1,124	0	0
10	Indoor Air Quality & HVAC Enhancements	15,961	0	0	0	0
11	Unit Ventilator Replacement	0	0	0	0	0
12	Rooftop Unit Replacement	0	0	0	0	0
13	Plug Load Controls	1,727,176	0	0	0	0
14	Building Envelope Improvements	243,426	0	73,477	0	0
15	Kitchen Hood Control	9,505	0	5,931	0	0
16	Refrigeration Controls	304,671	0	0	0	0
17	Water Conservation	37,791	0	0	0	36,805
18	Pipe Insulation	0	0	86,010	0	0
19	Destratification Fans	(17,936)	0	25,606	0	0
20	Combined Heating & Power	13,348	4	(1,102)	0	0
21	Retro-Commissioning	39,158	0	7,697	0	0
22	Steam Trap Replacement	0	0	21,846	0	0
23	Student Education Program	0	0	0	0	0
	TOTALS	9,671,040	1,795	308,947	201,895	36,805

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ECM Breakdown by Greenhouse Gas Reduction

JERSEY CITY PUBLIC SCHOOLS		Reduction of CO_2	Reduction of No_x	Reduction of SO_2	Reduction of Hg
ECM #	ENERGY CONSERVATION MEASURE	LBS	LBS	LBS	LBS
1	LED Lighting Replacement	8,941,859	58,355	47,208	1.7
2	Lighting Controls	0	0	0	0.0
3	District-Wide Energy Management System - Tier 1	3,707,391	3,937	940	0.0
4	District-Wide Energy Management System - Tier 2	0	0	0	0.0
5	Boiler Replacement	792,329	898	253	0.0
6	Boiler Replacement w/ Fuel Conversion	266,325	-1,804	495	0.0
7	Chiller Replacement	0	0	0	0.0
8	Solar PPA	0	0	0	0.0
9	Roof Renovations	13,147	10	0	0.0
10	Indoor Air Quality & HVAC Enhancements	20,621	132	107	0.0
11	Unit Ventilator Replacement	0	0	0	0.0
12	Rooftop Unit Replacement	0	0	0	0.0
13	Plug Load Controls	2,231,511	14,336	11,572	0.4
14	Building Envelope Improvements	1,174,187	2,696	1,631	0.1
15	Kitchen Hood Control	81,673	133	64	0.0
16	Refrigeration Controls	393,635	2,529	2,041	0.1
17	Water Conservation	48,826	314	253	0.0
18	Pipe Insulation	1,006,317	791	0	0.0
19	Destratification Fans	276,417	87	-120	0.0
20	Combined Heating & Power	4,353	101	89	0.0
21	Retro-Commissioning	140,645	396	262	0.0
22	Steam Trap Replacement	255,602	201	0	0.0
23	Student Education Program	0	0	0	0.0
	TOTALS	19,354,838.3	83,112.0	64,796.0	2.4

Note: Factors used to calculate Greenhouse Gas Reductions are as follows.

- *CO2 = (1.292*kWh Savings) + (11.7*Therm Savings)*
- *NOx = (0.0083*kWh Savings) + (0.0092*Therm Savings)*
- *SO2 = (0.0067*kWh Savings)*
- *Hg = (0.0000000243* kWh Savings)*

ECM Breakdown by Building

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	William L. Dickinson High School (PS #43)	LED Lighting Replacement	Y	$818,750	$55,724	($1,253)	$0	$0	$54,471
2	William L. Dickinson High School (PS #43)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	William L. Dickinson High School (PS #43)	District-Wide Energy Management System - Tier 1	Y	$94,009	$0	$22,409	$0	$0	$22,409
4	William L. Dickinson High School (PS #43)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	William L. Dickinson High School (PS #43)	Boiler Replacement w/ Fuel Conversion	Y	$1,342,400	$2,400	($128,633)	$264,233	$0	$138,000
8	William L. Dickinson High School (PS #43)	Solar PPA	Y	$0	$45,033	$0	$0	$0	$45,033
9	William L. Dickinson High School (PS #43)	Roof Renovations	Y	$1,150,000	$0	$111	$0	$0	$111
10	William L. Dickinson High School (PS #43)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
12	William L. Dickinson High School (PS #43)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	William L. Dickinson High School (PS #43)	Plug Load Controls	Y	$27,625	$10,267	$0	$0	$0	$10,267
14	William L. Dickinson High School (PS #43)	Building Envelope Improvements	Y	$16,984	$268	$1,849	$0	$0	$2,116
16	William L. Dickinson High School (PS #43)	Refrigeration Controls	Y	$13,812	$965	$0	$0	$0	$965
17	William L. Dickinson High School (PS #43)	Water Conservation	Y	$121,163	$0	$0	$0	$20,834	$20,834
18	William L. Dickinson High School (PS #43)	Pipe Insulation	Y	$23,968	$0	$2,910	$0	$0	$2,910
23	William L. Dickinson High School (PS #43)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	James J. Ferris High School (PS #44)	LED Lighting Replacement	Y	$825,279	$73,005	($1,879)	$0	$0	$71,127
2	James J. Ferris High School (PS #44)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	James J. Ferris High School (PS #44)	District-Wide Energy Management System - Tier 1	Y	$81,956	$0	$17,923	$0	$0	$17,923
4	James J. Ferris High School (PS #44)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	James J. Ferris High School (PS #44)	Boiler Replacement	Y	$1,565,800	$633	$19,123	$0	$0	$19,756
8	James J. Ferris High School (PS #44)	Solar PPA	Y	$0	$78,345	$0	$0	$0	$78,345
9	James J. Ferris High School (PS #44)	Roof Renovations	Y	$970,000	$0	$230	$0	$0	$230
11	James J. Ferris High School (PS #44)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	James J. Ferris High School (PS #44)	Plug Load Controls	Y	$24,750	$8,778	$0	$0	$0	$8,778
14	James J. Ferris High School (PS #44)	Building Envelope Improvements	Y	$151,244	$1,971	$16,865	$0	$0	$18,836
15	James J. Ferris High School (PS #44)	Kitchen Hood Control	Y	$39,086	$307	$2,890	$0	$0	$3,197
16	James J. Ferris High School (PS #44)	Refrigeration Controls	Y	$24,828	$5,253	$0	$0	$0	$5,253
17	James J. Ferris High School (PS #44)	Water Conservation	Y	$145,486	$0	$0	$0	$28,728	$28,728
18	James J. Ferris High School (PS #44)	Pipe Insulation	Y	$10,270	$0	$1,479	$0	$0	$1,479
20	James J. Ferris High School (PS #44)	Combined Heating & Power	Y	$135,500	$1,524	($1,468)	$0	$0	$56
21	James J. Ferris High School (PS #44)	Retro-Commissioning	Y	$0	$0	$2,430	$0	$0	$2,430
23	James J. Ferris High School (PS #44)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Lincoln High School (PS #48)	LED Lighting Replacement	Y	$868,750	$60,678	($1,203)	$0	$0	$59,476
2	Lincoln High School (PS #48)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Lincoln High School (PS #48)	District-Wide Energy Management System - Tier 1	Y	$99,188	$0	$15,678	$0	$0	$15,678
4	Lincoln High School (PS #48)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Lincoln High School (PS #48)	Boiler Replacement	Y	$942,400	$1,201	$19,650	$0	$0	$20,851
10	Lincoln High School (PS #48)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
13	Lincoln High School (PS #48)	Plug Load Controls	Y	$22,750	$7,745	$0	$0	$0	$7,745
14	Lincoln High School (PS #48)	Building Envelope Improvements	Y	$22,704	$273	$2,337	$0	$0	$2,610
16	Lincoln High School (PS #48)	Refrigeration Controls	Y	$14,708	$859	$0	$0	$0	$859
17	Lincoln High School (PS #48)	Water Conservation	Y	$66,699	$0	$0	$0	$13,262	$13,262
18	Lincoln High School (PS #48)	Pipe Insulation	Y	$52,915	$0	$7,528	$0	$0	$7,528
19	Lincoln High School (PS #48)	Destratification Fans	Y	$22,725	($120)	$2,109	$0	$0	$1,989
23	Lincoln High School (PS #48)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	William L. Dickinson High School (PS #43)	LED Lighting Replacement	Y	461,273	117	(964)	0	0
2	William L. Dickinson High School (PS #43)	Lighting Controls	N	0	0	0	0	0
3	William L. Dickinson High School (PS #43)	District-Wide Energy Management System - Tier 1	Y	0	0	17,250	0	0
4	William L. Dickinson High School (PS #43)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	William L. Dickinson High School (PS #43)	Boiler Replacement w/ Fuel Conversion	Y	22,473	0	(99,021)	76,082	0
8	William L. Dickinson High School (PS #43)	Solar PPA	Y	0	0	0	0	0
9	William L. Dickinson High School (PS #43)	Roof Renovations	Y	0	0	86	0	0
10	William L. Dickinson High School (PS #43)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
12	William L. Dickinson High School (PS #43)	Rooftop Unit Replacement	N	0	0	0	0	0
13	William L. Dickinson High School (PS #43)	Plug Load Controls	Y	96,138	0	0	0	0
14	William L. Dickinson High School (PS #43)	Building Envelope Improvements	Y	2,508	0	1,423	0	0
16	William L. Dickinson High School (PS #43)	Refrigeration Controls	Y	9,032	0	0	0	0
17	William L. Dickinson High School (PS #43)	Water Conservation	Y	0	0	0	0	1,747
18	William L. Dickinson High School (PS #43)	Pipe Insulation	Y	0	0	2,240	0	0
23	William L. Dickinson High School (PS #43)	Student Education Program	Y	0	0	0	0	0
1	James J. Ferris High School (PS #44)	LED Lighting Replacement	Y	674,362	171	(1,410)	0	0
2	James J. Ferris High School (PS #44)	Lighting Controls	N	0	0	0	0	0
3	James J. Ferris High School (PS #44)	District-Wide Energy Management System - Tier 1	Y	0	0	13,453	0	0
4	James J. Ferris High School (PS #44)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	James J. Ferris High School (PS #44)	Boiler Replacement	Y	7,168	0	14,354	0	0
8	James J. Ferris High School (PS #44)	Solar PPA	Y	0	0	0	0	0
9	James J. Ferris High School (PS #44)	Roof Renovations	Y	0	0	173	0	0
11	James J. Ferris High School (PS #44)	Unit Ventilator Replacement	N	0	0	0	0	0
13	James J. Ferris High School (PS #44)	Plug Load Controls	Y	99,352	0	0	0	0
14	James J. Ferris High School (PS #44)	Building Envelope Improvements	Y	22,305	0	12,659	0	0
15	James J. Ferris High School (PS #44)	Kitchen Hood Control	Y	3,476	0	2,169	0	0
16	James J. Ferris High School (PS #44)	Refrigeration Controls	Y	59,450	0	0	0	0
17	James J. Ferris High School (PS #44)	Water Conservation	Y	0	0	0	0	2,527
18	James J. Ferris High School (PS #44)	Pipe Insulation	Y	0	0	1,110	0	0
20	James J. Ferris High School (PS #44)	Combined Heating & Power	Y	13,348	4	(1,102)	0	0
21	James J. Ferris High School (PS #44)	Retro-Commissioning	Y	0	0	1,824	0	0
23	James J. Ferris High School (PS #44)	Student Education Program	Y	0	0	0	0	0
1	Lincoln High School (PS #48)	LED Lighting Replacement	Y	485,179	123	(1,014)	0	0
2	Lincoln High School (PS #48)	Lighting Controls	N	0	0	0	0	0
3	Lincoln High School (PS #48)	District-Wide Energy Management System - Tier 1	Y	0	0	13,225	0	0
4	Lincoln High School (PS #48)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Lincoln High School (PS #48)	Boiler Replacement	Y	15,263	0	16,576	0	0
10	Lincoln High School (PS #48)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
13	Lincoln High School (PS #48)	Plug Load Controls	Y	98,417	0	0	0	0
14	Lincoln High School (PS #48)	Building Envelope Improvements	Y	3,473	0	1,971	0	0
16	Lincoln High School (PS #48)	Refrigeration Controls	Y	10,921	0	0	0	0
17	Lincoln High School (PS #48)	Water Conservation	Y	0	0	0	0	938
18	Lincoln High School (PS #48)	Pipe Insulation	Y	0	0	6,350	0	0
19	Lincoln High School (PS #48)	Destratification Fans	Y	(1,520)	0	1,779	0	0
23	Lincoln High School (PS #48)	Student Education Program	Y	0	0	0	0	0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Henry Snyder High School (PS #46)	LED Lighting Replacement	Y	$833,750	$41,845	($865)	$0	$0	$40,979
2	Henry Snyder High School (PS #46)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Henry Snyder High School (PS #46)	District-Wide Energy Management System - Tier 1	Y	$83,054	$0	$11,369	$0	$0	$11,369
4	Henry Snyder High School (PS #46)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Henry Snyder High School (PS #46)	Solar PPA	Y	$0	$23,726	$0	$0	$0	$23,726
9	Henry Snyder High School (PS #46)	Roof Renovations	Y	$1,165,000	$0	$76	$0	$0	$76
12	Henry Snyder High School (PS #46)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Henry Snyder High School (PS #46)	Plug Load Controls	Y	$22,625	$7,702	$0	$0	$0	$7,702
14	Henry Snyder High School (PS #46)	Building Envelope Improvements	Y	$71,368	$1,006	$6,957	$0	$0	$7,963
17	Henry Snyder High School (PS #46)	Water Conservation	Y	$41,740	$0	$0	$0	$12,761	$12,761
18	Henry Snyder High School (PS #46)	Pipe Insulation	Y	$68,544	$0	$7,931	$0	$0	$7,931
23	Henry Snyder High School (PS #46)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Dr. Ronald E. McNair Academic High School (PS #47)	LED Lighting Replacement	Y	$509,025	$32,066	($578)	$0	$0	$31,488
2	Dr. Ronald E. McNair Academic High School (PS #47)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Dr. Ronald E. McNair Academic High School (PS #47)	District-Wide Energy Management System - Tier 1	Y	$81,269	$0	$7,797	$0	$0	$7,797
4	Dr. Ronald E. McNair Academic High School (PS #47)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
7	Dr. Ronald E. McNair Academic High School (PS #47)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
13	Dr. Ronald E. McNair Academic High School (PS #47)	Plug Load Controls	Y	$11,500	$2,031	$0	$0	$0	$2,031
14	Dr. Ronald E. McNair Academic High School (PS #47)	Building Envelope Improvements	Y	$56,277	$957	$5,464	$0	$0	$6,421
16	Dr. Ronald E. McNair Academic High School (PS #47)	Refrigeration Controls	Y	$12,128	$1,872	$0	$0	$0	$1,872
17	Dr. Ronald E. McNair Academic High School (PS #47)	Water Conservation	Y	$27,089	$0	$0	$0	$1,196	$1,196
18	Dr. Ronald E. McNair Academic High School (PS #47)	Pipe Insulation	Y	$18,132	$0	$2,752	$0	$0	$2,752
19	Dr. Ronald E. McNair Academic High School (PS #47)	Destratification Fans	Y	$13,925	($106)	$2,203	$0	$0	$2,097
21	Dr. Ronald E. McNair Academic High School (PS #47)	Retro-Commissioning	Y	$0	$0	$969	$0	$0	$969
23	Dr. Ronald E. McNair Academic High School (PS #47)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Liberty High School (PS #45)	LED Lighting Replacement	Y	$28,136	$4,998	($79)	$0	$0	$4,919
2	Liberty High School (PS #45)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Liberty High School (PS #45)	District-Wide Energy Management System - Tier 1	Y	$31,705	$0	$2,085	$0	$0	$2,085
4	Liberty High School (PS #45)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Liberty High School (PS #45)	Boiler Replacement w/ Fuel Conversion	Y	$0	$1,400	($9,287)	$19,705	$0	$11,818
8	Liberty High School (PS #45)	Solar PPA	Y	$0	$6,039	$0	$0	$0	$6,039
9	Liberty High School (PS #45)	Roof Renovations	Y	$85,000	$0	$8	$0	$0	$8
10	Liberty High School (PS #45)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
13	Liberty High School (PS #45)	Plug Load Controls	Y	$5,125	$3,302	$0	$0	$0	$3,302
14	Liberty High School (PS #45)	Building Envelope Improvements	Y	$18,178	$393	$1,956	$0	$0	$2,349
17	Liberty High School (PS #45)	Water Conservation	Y	$9,151	$0	$0	$0	$160	$160
18	Liberty High School (PS #45)	Pipe Insulation	Y	$10,346	$0	$1,227	$0	$0	$1,227
23	Liberty High School (PS #45)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Academy I Middle School (PS #1)	LED Lighting Replacement	Y	$218,750	$0	$0	$0	$0	$0
2	Academy I Middle School (PS #1)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Academy I Middle School (PS #1)	District-Wide Energy Management System - Tier 1	Y	$226,475	$2,141	$0	$0	$0	$2,141
11	Academy I Middle School (PS #1)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Academy I Middle School (PS #1)	Plug Load Controls	Y	$13,375	$6,695	$0	$0	$0	$6,695
14	Academy I Middle School (PS #1)	Building Envelope Improvements	Y	$32,193	$382	$0	$0	$0	$382
17	Academy I Middle School (PS #1)	Water Conservation	Y	$52,918	$0	$0	$0	$368	$368
21	Academy I Middle School (PS #1)	Retro-Commissioning	Y	$0	$1,424	$0	$0	$0	$1,424
23	Academy I Middle School (PS #1)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Franklin L. Williams Middle School (MS #7)	LED Lighting Replacement	Y	$645,340	$47,290	($842)	$0	$0	$46,448
2	Franklin L. Williams Middle School (MS #7)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Franklin L. Williams Middle School (MS #7)	District-Wide Energy Management System - Tier 1	Y	$33,111	$0	$8,398	$0	$0	$8,398
8	Franklin L. Williams Middle School (MS #7)	Solar PPA	Y	$0	$66,012	$0	$0	$0	$66,012
9	Franklin L. Williams Middle School (MS #7)	Roof Renovations	Y	$1,500,000	$0	$85	$0	$0	$85
13	Franklin L. Williams Middle School (MS #7)	Plug Load Controls	Y	$15,750	$3,188	$0	$0	$0	$3,188
17	Franklin L. Williams Middle School (MS #7)	Water Conservation	Y	$34,206	$0	$0	$0	$6,212	$6,212
19	Franklin L. Williams Middle School (MS #7)	Destratification Fans	Y	$27,625	($201)	$3,347	$0	$0	$3,146
23	Franklin L. Williams Middle School (MS #7)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Henry Snyder High School (PS #46)	LED Lighting Replacement	Y	349,134	89	(730)	0	0
2	Henry Snyder High School (PS #46)	Lighting Controls	N	0	0	0	0	0
3	Henry Snyder High School (PS #46)	District-Wide Energy Management System - Tier 1	Y	0	0	9,590	0	0
4	Henry Snyder High School (PS #46)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Henry Snyder High School (PS #46)	Solar PPA	Y	0	0	0	0	0
9	Henry Snyder High School (PS #46)	Roof Renovations	Y	0	0	64	0	0
12	Henry Snyder High School (PS #46)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Henry Snyder High School (PS #46)	Plug Load Controls	Y	79,198	0	0	0	0
14	Henry Snyder High School (PS #46)	Building Envelope Improvements	Y	10,341	0	5,869	0	0
17	Henry Snyder High School (PS #46)	Water Conservation	Y	0	0	0	0	952
18	Henry Snyder High School (PS #46)	Pipe Insulation	Y	0	0	6,690	0	0
23	Henry Snyder High School (PS #46)	Student Education Program	Y	0	0	0	0	0
1	Dr. Ronald E. McNair Academic High School (PS #47)	LED Lighting Replacement	Y	236,995	60	(496)	0	0
2	Dr. Ronald E. McNair Academic High School (PS #47)	Lighting Controls	N	0	0	0	0	0
3	Dr. Ronald E. McNair Academic High School (PS #47)	District-Wide Energy Management System - Tier 1	Y	0	0	6,685	0	0
4	Dr. Ronald E. McNair Academic High School (PS #47)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
7	Dr. Ronald E. McNair Academic High School (PS #47)	Chiller Replacement	N	0	0	0	0	0
13	Dr. Ronald E. McNair Academic High School (PS #47)	Plug Load Controls	Y	17,523	0	0	0	0
14	Dr. Ronald E. McNair Academic High School (PS #47)	Building Envelope Improvements	Y	8,254	0	4,685	0	0
16	Dr. Ronald E. McNair Academic High School (PS #47)	Refrigeration Controls	Y	16,154	0	0	0	0
17	Dr. Ronald E. McNair Academic High School (PS #47)	Water Conservation	Y	0	0	0	0	57
18	Dr. Ronald E. McNair Academic High School (PS #47)	Pipe Insulation	Y	0	0	2,360	0	0
19	Dr. Ronald E. McNair Academic High School (PS #47)	Destratification Fans	Y	(912)	0	1,889	0	0
21	Dr. Ronald E. McNair Academic High School (PS #47)	Retro-Commissioning	Y	0	0	831	0	0
23	Dr. Ronald E. McNair Academic High School (PS #47)	Student Education Program	Y	0	0	0	0	0
1	Liberty High School (PS #45)	LED Lighting Replacement	Y	29,231	7	(61)	0	0
2	Liberty High School (PS #45)	Lighting Controls	N	0	0	0	0	0
3	Liberty High School (PS #45)	District-Wide Energy Management System - Tier 1	Y	0	0	1,614	0	0
4	Liberty High School (PS #45)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Liberty High School (PS #45)	Boiler Replacement w/ Fuel Conversion	Y	9,510	0	(7,192)	5,526	0
8	Liberty High School (PS #45)	Solar PPA	Y	0	0	0	0	0
9	Liberty High School (PS #45)	Roof Renovations	Y	0	0	6	0	0
10	Liberty High School (PS #45)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
13	Liberty High School (PS #45)	Plug Load Controls	Y	22,427	0	0	0	0
14	Liberty High School (PS #45)	Building Envelope Improvements	Y	2,670	0	1,515	0	0
17	Liberty High School (PS #45)	Water Conservation	Y	0	0	0	0	11
18	Liberty High School (PS #45)	Pipe Insulation	Y	0	0	950	0	0
23	Liberty High School (PS #45)	Student Education Program	Y	0	0	0	0	0
1	Academy I Middle School (PS #1)	LED Lighting Replacement	Y	92,340	23	(193)	0	0
2	Academy I Middle School (PS #1)	Lighting Controls	N	0	0	0	0	0
3	Academy I Middle School (PS #1)	District-Wide Energy Management System - Tier 1	Y	26,840	0	0	0	0
11	Academy I Middle School (PS #1)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Academy I Middle School (PS #1)	Plug Load Controls	Y	83,933	0	0	0	0
14	Academy I Middle School (PS #1)	Building Envelope Improvements	Y	4,789	0	2,718	0	0
17	Academy I Middle School (PS #1)	Water Conservation	Y	0	0	0	0	13
21	Academy I Middle School (PS #1)	Retro-Commissioning	Y	17,852	0	0	0	0
23	Academy I Middle School (PS #1)	Student Education Program	Y	0	0	0	0	0
1	Franklin L. Williams Middle School (MS #7)	LED Lighting Replacement	Y	370,066	94	(774)	0	0
2	Franklin L. Williams Middle School (MS #7)	Lighting Controls	N	0	0	0	0	0
3	Franklin L. Williams Middle School (MS #7)	District-Wide Energy Management System - Tier 1	Y	0	0	7,718	0	0
8	Franklin L. Williams Middle School (MS #7)	Solar PPA	Y	0	0	0	0	0
9	Franklin L. Williams Middle School (MS #7)	Roof Renovations	Y	0	0	78	0	0
13	Franklin L. Williams Middle School (MS #7)	Plug Load Controls	Y	28,998	0	0	0	0
17	Franklin L. Williams Middle School (MS #7)	Water Conservation	Y	0	0	0	0	1,271
19	Franklin L. Williams Middle School (MS #7)	Destratification Fans	Y	(1,824)	0	3,076	0	0
23	Franklin L. Williams Middle School (MS #7)	Student Education Program	Y	0	0	0	0	0

ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	INCLUDED IN PROJECT "Y" OR "N"	INSTALLED COST $	ANNUAL ELECTRIC COST SAVINGS $	ANNUAL NATURAL GAS COST SAVINGS $	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS $	ANNUAL Domestic Water (CCF) COST SAVINGS $	ANNUAL ENERGY COST SAVINGS $
	JERSEY CITY PUBLIC SCHOOLS								
1	Ezra L. Nolan Middle School (MS #40)	LED Lighting Replacement	Y	$368,750	$13,036	($286)	$0	$0	$12,750
2	Ezra L. Nolan Middle School (MS #40)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Ezra L. Nolan Middle School (MS #40)	District-Wide Energy Management System - Tier 1	Y	$73,648	$0	$7,236	$0	$0	$7,236
4	Ezra L. Nolan Middle School (MS #40)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
7	Ezra L. Nolan Middle School (MS #40)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	Ezra L. Nolan Middle School (MS #40)	Solar PPA	Y	$0	$20,009	$0	$0	$0	$20,009
9	Ezra L. Nolan Middle School (MS #40)	Roof Renovations	Y	$0	$0	$90	$0	$0	$90
11	Ezra L. Nolan Middle School (MS #40)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
12	Ezra L. Nolan Middle School (MS #40)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Ezra L. Nolan Middle School (MS #40)	Plug Load Controls	Y	$11,250	$1,613	$0	$0	$0	$1,613
14	Ezra L. Nolan Middle School (MS #40)	Building Envelope Improvements	Y	$51,571	$736	$5,191	$0	$0	$5,927
16	Ezra L. Nolan Middle School (MS #40)	Refrigeration Controls	Y	$11,340	$753	$0	$0	$0	$753
17	Ezra L. Nolan Middle School (MS #40)	Water Conservation	Y	$67,530	$0	$0	$0	$6,487	$6,487
18	Ezra L. Nolan Middle School (MS #40)	Pipe Insulation	Y	$48,848	$0	$5,229	$0	$0	$5,229
19	Ezra L. Nolan Middle School (MS #40)	Destratification Fans	Y	$18,450	($113)	$1,856	$0	$0	$1,743
21	Ezra L. Nolan Middle School (MS #40)	Retro-Commissioning	Y	$0	$0	$920	$0	$0	$920
23	Ezra L. Nolan Middle School (MS #40)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Frank R. Conwell Middle School (MS #4)	LED Lighting Replacement	Y	$703,750	$38,756	($697)	$0	$0	$38,059
2	Frank R. Conwell Middle School (MS #4)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Frank R. Conwell Middle School (MS #4)	District-Wide Energy Management System - Tier 1	Y	$34,107	$0	$9,218	$0	$0	$9,218
7	Frank R. Conwell Middle School (MS #4)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
13	Frank R. Conwell Middle School (MS #4)	Plug Load Controls	Y	$11,125	$2,059	$0	$0	$0	$2,059
16	Frank R. Conwell Middle School (MS #4)	Refrigeration Controls	Y	$15,404	$2,396	$0	$0	$0	$2,396
17	Frank R. Conwell Middle School (MS #4)	Water Conservation	Y	$45,087	$0	$0	$0	$25,917	$25,917
19	Frank R. Conwell Middle School (MS #4)	Destratification Fans	Y	$31,625	($146)	$3,369	$0	$0	$3,223
23	Frank R. Conwell Middle School (MS #4)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Frank R. Conwell School (PS #3)	LED Lighting Replacement	Y	$475,000	$32,560	($595)	$0	$0	$31,965
2	Frank R. Conwell School (PS #3)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Frank R. Conwell School (PS #3)	District-Wide Energy Management System - Tier 1	Y	$25,262	$0	$6,858	$0	$0	$6,858
7	Frank R. Conwell School (PS #3)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
13	Frank R. Conwell School (PS #3)	Plug Load Controls	Y	$12,625	$2,458	$0	$0	$0	$2,458
15	Frank R. Conwell School (PS #3)	Kitchen Hood Control	Y	$39,086	$490	$3,096	$0	$0	$3,586
16	Frank R. Conwell School (PS #3)	Refrigeration Controls	Y	$14,616	$1,768	$0	$0	$0	$1,768
17	Frank R. Conwell School (PS #3)	Water Conservation	Y	$31,127	$0	$0	$0	$35,103	$35,103
19	Frank R. Conwell School (PS #3)	Destratification Fans	Y	$17,975	($148)	$2,001	$0	$0	$1,853
23	Frank R. Conwell School (PS #3)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Dr. Michael Conti School (PS #5)	LED Lighting Replacement	Y	$156,946	$22,940	($343)	$0	$0	$22,597
2	Dr. Michael Conti School (PS #5)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Dr. Michael Conti School (PS #5)	District-Wide Energy Management System - Tier 1	Y	$51,319	$0	$6,743	$0	$0	$6,743
4	Dr. Michael Conti School (PS #5)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Dr. Michael Conti School (PS #5)	Boiler Replacement	Y	$828,300	$0	$14,290	$0	$0	$14,290
8	Dr. Michael Conti School (PS #5)	Solar PPA	Y	$0	$30,811	$0	$0	$0	$30,811
10	Dr. Michael Conti School (PS #5)	Indoor Air Quality & HVAC Enhancements	Y	$10,305,200	$428	$0	$0	$0	$428
12	Dr. Michael Conti School (PS #5)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Dr. Michael Conti School (PS #5)	Plug Load Controls	Y	$10,375	$11,990	$0	$0	$0	$11,990
14	Dr. Michael Conti School (PS #5)	Building Envelope Improvements	Y	$4,957	$117	$550	$0	$0	$668
17	Dr. Michael Conti School (PS #5)	Water Conservation	Y	$60,344	$0	$0	$0	$4,175	$4,175
18	Dr. Michael Conti School (PS #5)	Pipe Insulation	Y	$50,470	$0	$4,305	$0	$0	$4,305
23	Dr. Michael Conti School (PS #5)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Ezra L. Nolan Middle School (MS #40)	LED Lighting Replacement	Y	117,860	30	(246)	0	0
2	Ezra L. Nolan Middle School (MS #40)	Lighting Controls	N	0	0	0	0	0
3	Ezra L. Nolan Middle School (MS #40)	District-Wide Energy Management System - Tier 1	Y	0	0	6,240	0	0
4	Ezra L. Nolan Middle School (MS #40)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
7	Ezra L. Nolan Middle School (MS #40)	Chiller Replacement	N	0	0	0	0	0
8	Ezra L. Nolan Middle School (MS #40)	Solar PPA	Y	0	0	0	0	0
9	Ezra L. Nolan Middle School (MS #40)	Roof Renovations	Y	0	0	78	0	0
11	Ezra L. Nolan Middle School (MS #40)	Unit Ventilator Replacement	N	0	0	0	0	0
12	Ezra L. Nolan Middle School (MS #40)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Ezra L. Nolan Middle School (MS #40)	Plug Load Controls	Y	17,287	0	0	0	0
14	Ezra L. Nolan Middle School (MS #40)	Building Envelope Improvements	Y	7,889	0	4,477	0	0
16	Ezra L. Nolan Middle School (MS #40)	Refrigeration Controls	Y	8,077	0	0	0	0
17	Ezra L. Nolan Middle School (MS #40)	Water Conservation	Y	0	0	0	0	466
18	Ezra L. Nolan Middle School (MS #40)	Pipe Insulation	Y	0	0	4,510	0	0
19	Ezra L. Nolan Middle School (MS #40)	Destratification Fans	Y	(1,216)	0	1,601	0	0
21	Ezra L. Nolan Middle School (MS #40)	Retro-Commissioning	Y	0	0	794	0	0
23	Ezra L. Nolan Middle School (MS #40)	Student Education Program	Y	0	0	0	0	0
1	Frank R. Conwell Middle School (MS #4)	LED Lighting Replacement	Y	289,113	73	(605)	0	0
2	Frank R. Conwell Middle School (MS #4)	Lighting Controls	N	0	0	0	0	0
3	Frank R. Conwell Middle School (MS #4)	District-Wide Energy Management System - Tier 1	Y	0	0	7,992	0	0
7	Frank R. Conwell Middle School (MS #4)	Chiller Replacement	N	0	0	0	0	0
13	Frank R. Conwell Middle School (MS #4)	Plug Load Controls	Y	17,140	0	0	0	0
16	Frank R. Conwell Middle School (MS #4)	Refrigeration Controls	Y	19,953	0	0	0	0
17	Frank R. Conwell Middle School (MS #4)	Water Conservation	Y	0	0	0	0	3,122
19	Frank R. Conwell Middle School (MS #4)	Destratification Fans	Y	(1,216)	0	2,921	0	0
23	Frank R. Conwell Middle School (MS #4)	Student Education Program	Y	0	0	0	0	0
1	Frank R. Conwell School (PS #3)	LED Lighting Replacement	Y	230,650	59	(482)	0	0
2	Frank R. Conwell School (PS #3)	Lighting Controls	N	0	0	0	0	0
3	Frank R. Conwell School (PS #3)	District-Wide Energy Management System - Tier 1	Y	0	0	5,555	0	0
7	Frank R. Conwell School (PS #3)	Chiller Replacement	N	0	0	0	0	0
13	Frank R. Conwell School (PS #3)	Plug Load Controls	Y	20,149	0	0	0	0
15	Frank R. Conwell School (PS #3)	Kitchen Hood Control	Y	4,019	0	2,508	0	0
16	Frank R. Conwell School (PS #3)	Refrigeration Controls	Y	14,493	0	0	0	0
17	Frank R. Conwell School (PS #3)	Water Conservation	Y	0	0	0	0	3,122
19	Frank R. Conwell School (PS #3)	Destratification Fans	Y	(1,216)	0	1,621	0	0
23	Frank R. Conwell School (PS #3)	Student Education Program	Y	0	0	0	0	0
1	Dr. Michael Conti School (PS #5)	LED Lighting Replacement	Y	162,501	41	(340)	0	0
2	Dr. Michael Conti School (PS #5)	Lighting Controls	N	0	0	0	0	0
3	Dr. Michael Conti School (PS #5)	District-Wide Energy Management System - Tier 1	Y	0	0	6,688	0	0
4	Dr. Michael Conti School (PS #5)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Dr. Michael Conti School (PS #5)	Boiler Replacement	Y	0	0	14,174	0	0
8	Dr. Michael Conti School (PS #5)	Solar PPA	Y	0	0	0	0	0
10	Dr. Michael Conti School (PS #5)	Indoor Air Quality & HVAC Enhancements	Y	3,508	0	0	0	0
12	Dr. Michael Conti School (PS #5)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Dr. Michael Conti School (PS #5)	Plug Load Controls	Y	98,268	0	0	0	0
14	Dr. Michael Conti School (PS #5)	Building Envelope Improvements	Y	962	0	546	0	0
17	Dr. Michael Conti School (PS #5)	Water Conservation	Y	0	0	0	0	332
18	Dr. Michael Conti School (PS #5)	Pipe Insulation	Y	0	0	4,270	0	0
23	Dr. Michael Conti School (PS #5)	Student Education Program	Y	0	0	0	0	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Jotham W. Wakeman School (PS #6)	LED Lighting Replacement	Y	$167,711	$20,261	($523)	$0	$0	$19,739
2	Jotham W. Wakeman School (PS #6)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Jotham W. Wakeman School (PS #6)	District-Wide Energy Management System - Tier 1	Y	$77,982	$0	$0	$0	$0	$0
4	Jotham W. Wakeman School (PS #6)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Jotham W. Wakeman School (PS #6)	Boiler Replacement	Y	$329,600	$845	$7,640	$0	$0	$8,484
8	Jotham W. Wakeman School (PS #6)	Solar PPA	Y	$0	$18,495	$0	$0	$0	$18,495
9	Jotham W. Wakeman School (PS #6)	Roof Renovations	Y	$0	$0	$57	$0	$0	$57
11	Jotham W. Wakeman School (PS #6)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
12	Jotham W. Wakeman School (PS #6)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Jotham W. Wakeman School (PS #6)	Plug Load Controls	Y	$11,375	$2,566	$0	$0	$0	$2,566
14	Jotham W. Wakeman School (PS #6)	Building Envelope Improvements	Y	$4,055	$61	$526	$0	$0	$587
17	Jotham W. Wakeman School (PS #6)	Water Conservation	Y	$98,933	$0	$0	$0	$12,009	$12,009
18	Jotham W. Wakeman School (PS #6)	Pipe Insulation	Y	$19,628	$0	$2,511	$0	$0	$2,511
19	Jotham W. Wakeman School (PS #6)	Destratification Fans	Y	$22,600	($126)	$1,968	$0	$0	$1,842
21	Jotham W. Wakeman School (PS #6)	Retro-Commissioning	Y	$0	$0	$274	$0	$0	$274
22	Jotham W. Wakeman School (PS #6)	Steam Trap Replacement	Y	$34,375	$0	$2,593	$0	$0	$2,593
23	Jotham W. Wakeman School (PS #6)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Charles E. Trefurt School (PS #8)	LED Lighting Replacement	Y	$402,479	$16,997	($439)	$0	$0	$16,558
2	Charles E. Trefurt School (PS #8)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Charles E. Trefurt School (PS #8)	District-Wide Energy Management System - Tier 1	Y	$94,205	$0	$10,292	$0	$0	$10,292
4	Charles E. Trefurt School (PS #8)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Charles E. Trefurt School (PS #8)	Boiler Replacement w/ Fuel Conversion	Y	$0	$223	($32,164)	$66,410	$0	$34,470
7	Charles E. Trefurt School (PS #8)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	Charles E. Trefurt School (PS #8)	Solar PPA	Y	$0	$20,904	$0	$0	$0	$20,904
11	Charles E. Trefurt School (PS #8)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Charles E. Trefurt School (PS #8)	Plug Load Controls	Y	$14,125	$3,263	$0	$0	$0	$3,263
14	Charles E. Trefurt School (PS #8)	Building Envelope Improvements	Y	$8,303	$124	$1,019	$0	$0	$1,143
17	Charles E. Trefurt School (PS #8)	Water Conservation	Y	$97,727	$0	$0	$0	$6,979	$6,979
18	Charles E. Trefurt School (PS #8)	Pipe Insulation	Y	$49,072	$0	$4,868	$0	$0	$4,868
21	Charles E. Trefurt School (PS #8)	Retro-Commissioning	Y	$0	$0	$35	$0	$0	$35
22	Charles E. Trefurt School (PS #8)	Steam Trap Replacement	Y	$84,375	$0	$6,578	$0	$0	$6,578
23	Charles E. Trefurt School (PS #8)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Martin Luther King, Jr. School (PS #11)	LED Lighting Replacement	Y	$300,000	$14,567	($348)	$0	$0	$14,219
2	Martin Luther King, Jr. School (PS #11)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Martin Luther King, Jr. School (PS #11)	District-Wide Energy Management System - Tier 1	Y	$76,516	$0	$5,028	$0	$0	$5,028
4	Martin Luther King, Jr. School (PS #11)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Martin Luther King, Jr. School (PS #11)	Boiler Replacement	Y	$488,400	$40	$3,730	$0	$0	$3,770
8	Martin Luther King, Jr. School (PS #11)	Solar PPA	Y	$0	$27,533	$0	$0	$0	$27,533
9	Martin Luther King, Jr. School (PS #11)	Roof Renovations	Y	$900,000	$0	$51	$0	$0	$51
11	Martin Luther King, Jr. School (PS #11)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Martin Luther King, Jr. School (PS #11)	Plug Load Controls	Y	$9,500	$2,236	$0	$0	$0	$2,236
14	Martin Luther King, Jr. School (PS #11)	Building Envelope Improvements	Y	$9,339	$139	$901	$0	$0	$1,039
16	Martin Luther King, Jr. School (PS #11)	Refrigeration Controls	Y	$15,404	$2,050	$0	$0	$0	$2,050
17	Martin Luther King, Jr. School (PS #11)	Water Conservation	Y	$36,159	$2,050	$0	$0	$0	$2,050
18	Martin Luther King, Jr. School (PS #11)	Pipe Insulation	Y	$10,558	$0	$1,170	$0	$0	$1,170
21	Martin Luther King, Jr. School (PS #11)	Retro-Commissioning	Y	$0	$0	$858	$0	$0	$858
23	Martin Luther King, Jr. School (PS #11)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
3	Julia A Barnes School (PS #12)	District-Wide Energy Management System - Tier 1	Y	$40,776	$0	$4,463	$0	$0	$4,463
4	Julia A Barnes School (PS #12)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Julia A Barnes School (PS #12)	Solar PPA	Y	$0	$14,527	$0	$0	$0	$14,527
9	Julia A Barnes School (PS #12)	Roof Renovations	Y	$455,000	$0	$0	$0	$0	$0
11	Julia A Barnes School (PS #12)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Julia A Barnes School (PS #12)	Plug Load Controls	Y	$9,875	$4,921	$0	$0	$0	$4,921
14	Julia A Barnes School (PS #12)	Building Envelope Improvements	Y	$7,865	$163	$794	$0	$0	$957
17	Julia A Barnes School (PS #12)	Water Conservation	Y	$42,368	$0	$0	$0	$12,419	$12,419
18	Julia A Barnes School (PS #12)	Pipe Insulation	Y	$21,790	$0	$2,293	$0	$0	$2,293
21	Julia A Barnes School (PS #12)	Retro-Commissioning	Y	$0	$0	$768	$0	$0	$768
22	Julia A Barnes School (PS #12)	Steam Trap Replacement	Y	$20,000	$0	$1,324	$0	$0	$1,324
23	Julia A Barnes School (PS #12)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Jotham W. Wakeman School (PS #6)	LED Lighting Replacement	Y	200,031	51	(418)	0	0
2	Jotham W. Wakeman School (PS #6)	Lighting Controls	N	0	0	0	0	0
3	Jotham W. Wakeman School (PS #6)	District-Wide Energy Management System - Tier 1	Y	0	0	0	0	0
4	Jotham W. Wakeman School (PS #6)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Jotham W. Wakeman School (PS #6)	Boiler Replacement	Y	10,214	0	6,114	0	0
8	Jotham W. Wakeman School (PS #6)	Solar PPA	Y	0	0	0	0	0
9	Jotham W. Wakeman School (PS #6)	Roof Renovations	Y	0	0	46	0	0
11	Jotham W. Wakeman School (PS #6)	Unit Ventilator Replacement	N	0	0	0	0	0
12	Jotham W. Wakeman School (PS #6)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Jotham W. Wakeman School (PS #6)	Plug Load Controls	Y	31,031	0	0	0	0
14	Jotham W. Wakeman School (PS #6)	Building Envelope Improvements	Y	743	0	421	0	0
17	Jotham W. Wakeman School (PS #6)	Water Conservation	Y	0	0	0	0	990
18	Jotham W. Wakeman School (PS #6)	Pipe Insulation	Y	0	0	2,010	0	0
19	Jotham W. Wakeman School (PS #6)	Destratification Fans	Y	(1,520)	0	1,575	0	0
21	Jotham W. Wakeman School (PS #6)	Retro-Commissioning	Y	0	0	219	0	0
22	Jotham W. Wakeman School (PS #6)	Steam Trap Replacement	Y	0	0	2,075	0	0
23	Jotham W. Wakeman School (PS #6)	Student Education Program	Y	0	0	0	0	0
1	Charles E. Trefurt School (PS #8)	LED Lighting Replacement	Y	162,586	41	(340)	0	0
2	Charles E. Trefurt School (PS #8)	Lighting Controls	N	0	0	0	0	0
3	Charles E. Trefurt School (PS #8)	District-Wide Energy Management System - Tier 1	Y	0	0	7,970	0	0
4	Charles E. Trefurt School (PS #8)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Charles E. Trefurt School (PS #8)	Boiler Replacement w/ Fuel Conversion	Y	2,506	0	(24,907)	19,137	0
7	Charles E. Trefurt School (PS #8)	Chiller Replacement	N	0	0	0	0	0
8	Charles E. Trefurt School (PS #8)	Solar PPA	Y	0	0	0	0	0
11	Charles E. Trefurt School (PS #8)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Charles E. Trefurt School (PS #8)	Plug Load Controls	Y	36,587	0	0	0	0
14	Charles E. Trefurt School (PS #8)	Building Envelope Improvements	Y	1,391	0	789	0	0
17	Charles E. Trefurt School (PS #8)	Water Conservation	Y	0	0	0	0	496
18	Charles E. Trefurt School (PS #8)	Pipe Insulation	Y	0	0	3,770	0	0
21	Charles E. Trefurt School (PS #8)	Retro-Commissioning	Y	0	0	27	0	0
22	Charles E. Trefurt School (PS #8)	Steam Trap Replacement	Y	0	0	5,094	0	0
23	Charles E. Trefurt School (PS #8)	Student Education Program	Y	0	0	0	0	0
1	Martin Luther King, Jr. School (PS #11)	LED Lighting Replacement	Y	153,720	39	(321)	0	0
2	Martin Luther King, Jr. School (PS #11)	Lighting Controls	N	0	0	0	0	0
3	Martin Luther King, Jr. School (PS #11)	District-Wide Energy Management System - Tier 1	Y	0	0	4,640	0	0
4	Martin Luther King, Jr. School (PS #11)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Martin Luther King, Jr. School (PS #11)	Boiler Replacement	Y	426	0	3,442	0	0
8	Martin Luther King, Jr. School (PS #11)	Solar PPA	Y	0	0	0	0	0
9	Martin Luther King, Jr. School (PS #11)	Roof Renovations	Y	0	0	47	0	0
11	Martin Luther King, Jr. School (PS #11)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Martin Luther King, Jr. School (PS #11)	Plug Load Controls	Y	23,598	0	0	0	0
14	Martin Luther King, Jr. School (PS #11)	Building Envelope Improvements	Y	1,465	0	831	0	0
16	Martin Luther King, Jr. School (PS #11)	Refrigeration Controls	Y	21,637	0	0	0	0
17	Martin Luther King, Jr. School (PS #11)	Water Conservation	Y	21,637	0	0	0	443
18	Martin Luther King, Jr. School (PS #11)	Pipe Insulation	Y	0	0	1,080	0	0
21	Martin Luther King, Jr. School (PS #11)	Retro-Commissioning	Y	0	0	792	0	0
23	Martin Luther King, Jr. School (PS #11)	Student Education Program	Y	0	0	0	0	0
3	Julia A. Barnes School (PS #12)	District-Wide Energy Management System - Tier 1	Y	0	0	4,069	0	0
4	Julia A. Barnes School (PS #12)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Julia A. Barnes School (PS #12)	Solar PPA	Y	0	0	0	0	0
9	Julia A. Barnes School (PS #12)	Roof Renovations	Y	0	0	0	0	0
11	Julia A. Barnes School (PS #12)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Julia A. Barnes School (PS #12)	Plug Load Controls	Y	38,473	0	0	0	0
14	Julia A. Barnes School (PS #12)	Building Envelope Improvements	Y	1,276	0	724	0	0
17	Julia A. Barnes School (PS #12)	Water Conservation	Y	0	0	0	0	1,001
18	Julia A. Barnes School (PS #12)	Pipe Insulation	Y	0	0	2,090	0	0
21	Julia A. Barnes School (PS #12)	Retro-Commissioning	Y	0	0	700	0	0
22	Julia A. Barnes School (PS #12)	Steam Trap Replacement	Y	0	0	1,207	0	0
23	Julia A. Barnes School (PS #12)	Student Education Program	Y	0	0	0	0	0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Ollie Culbreth Jr. School (PS #14)	LED Lighting Replacement	Y	$175,000	$4,765	($117)	$0	$0	$4,647
2	Ollie Culbreth Jr. School (PS #14)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Ollie Culbreth Jr. School (PS #14)	District-Wide Energy Management System - Tier 1	Y	$69,290	$0	$5,361	$0	$0	$5,361
4	Ollie Culbreth Jr. School (PS #14)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Ollie Culbreth Jr. School (PS #14)	Solar PPA	Y	$0	$8,953	$0	$0	$0	$8,953
11	Ollie Culbreth Jr. School (PS #14)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Ollie Culbreth Jr. School (PS #14)	Plug Load Controls	Y	$10,875	$2,334	$0	$0	$0	$2,334
14	Ollie Culbreth Jr. School (PS #14)	Building Envelope Improvements	Y	$7,800	$127	$863	$0	$0	$989
17	Ollie Culbreth Jr. School (PS #14)	Water Conservation	Y	$70,040	$0	$0	$0	$4,775	$4,775
18	Ollie Culbreth Jr. School (PS #14)	Pipe Insulation	Y	$27,375	$0	$3,007	$0	$0	$3,007
21	Ollie Culbreth Jr. School (PS #14)	Retro-Commissioning	Y	$0	$0	$863	$0	$0	$863
22	Ollie Culbreth Jr. School (PS #14)	Steam Trap Replacement	Y	$37,500	$0	$2,628	$0	$0	$2,628
23	Ollie Culbreth Jr. School (PS #14)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Whitney M. Young Jr. School (PS #15)	LED Lighting Replacement	Y	$750,000	$26,031	($660)	$0	$0	$25,372
2	Whitney M. Young Jr. School (PS #15)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Whitney M. Young Jr. School (PS #15)	District-Wide Energy Management System - Tier 1	Y	$64,361	$0	$8,823	$0	$0	$8,823
4	Whitney M. Young Jr. School (PS #15)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Whitney M. Young Jr. School (PS #15)	Boiler Replacement	Y	$828,300	$421	$6,072	$0	$0	$6,492
8	Whitney M. Young Jr. School (PS #15)	Solar PPA	Y	$0	$44,148	$0	$0	$0	$44,148
9	Whitney M. Young Jr. School (PS #15)	Roof Renovations	Y	$1,050,000	$0	$97	$0	$0	$97
11	Whitney M. Young Jr. School (PS #15)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Whitney M. Young Jr. School (PS #15)	Plug Load Controls	Y	$13,875	$4,401	$0	$0	$0	$4,401
14	Whitney M. Young Jr. School (PS #15)	Building Envelope Improvements	Y	$47,256	$623	$4,359	$0	$0	$4,982
16	Whitney M. Young Jr. School (PS #15)	Refrigeration Controls	Y	$12,128	$1,451	$0	$0	$0	$1,451
17	Whitney M. Young Jr. School (PS #15)	Water Conservation	Y	$85,646	$0	$0	$0	$15,803	$15,803
18	Whitney M. Young Jr. School (PS #15)	Pipe Insulation	Y	$18,660	$0	$2,501	$0	$0	$2,501
19	Whitney M. Young Jr. School (PS #15)	Destratification Fans	Y	$13,750	($82)	$1,572	$0	$0	$1,491
21	Whitney M. Young Jr. School (PS #15)	Retro-Commissioning	Y	$0	$0	$443	$0	$0	$443
23	Whitney M. Young Jr. School (PS #15)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
3	Cornelia F. Bradford School (PS #16)	District-Wide Energy Management System - Tier 1	Y	$36,555	$0	$2,884	$0	$0	$2,884
4	Cornelia F. Bradford School (PS #16)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Cornelia F. Bradford School (PS #16)	Boiler Replacement	Y	$0	$0	$3,524	$0	$0	$3,524
8	Cornelia F. Bradford School (PS #16)	Solar PPA	Y	$0	$16,063	$0	$0	$0	$16,063
9	Cornelia F. Bradford School (PS #16)	Roof Renovations	Y	$265,000	$0	$18	$0	$0	$18
10	Cornelia F. Bradford School (PS #16)	Indoor Air Quality & HVAC Enhancements	Y	$4,309,490	$202	$0	$0	$0	$202
13	Cornelia F. Bradford School (PS #16)	Plug Load Controls	Y	$5,375	$8,207	$0	$0	$0	$8,207
14	Cornelia F. Bradford School (PS #16)	Building Envelope Improvements	Y	$4,368	$88	$422	$0	$0	$510
17	Cornelia F. Bradford School (PS #16)	Water Conservation	Y	$20,498	$0	$0	$0	$9,921	$9,921
18	Cornelia F. Bradford School (PS #16)	Pipe Insulation	Y	$16,295	$0	$1,439	$0	$0	$1,439
23	Cornelia F. Bradford School (PS #16)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Joseph H. Brensinger School (PS #17)	LED Lighting Replacement	Y	$390,483	$31,383	($684)	$0	$0	$30,699
2	Joseph H. Brensinger School (PS #17)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Joseph H. Brensinger School (PS #17)	District-Wide Energy Management System - Tier 1	Y	$84,953	$0	$8,358	$0	$0	$8,358
4	Joseph H. Brensinger School (PS #17)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Joseph H. Brensinger School (PS #17)	Boiler Replacement	N	$0	$0	$0	$0	$0	$0
7	Joseph H. Brensinger School (PS #17)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	Joseph H. Brensinger School (PS #17)	Solar PPA	Y	$0	$66,367	$0	$0	$0	$66,367
9	Joseph H. Brensinger School (PS #17)	Roof Renovations	Y	$1,150,000	$0	$97	$0	$0	$97
12	Joseph H. Brensinger School (PS #17)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Joseph H. Brensinger School (PS #17)	Plug Load Controls	Y	$14,750	$2,688	$0	$0	$0	$2,688
14	Joseph H. Brensinger School (PS #17)	Building Envelope Improvements	Y	$20,247	$406	$2,434	$0	$0	$2,840
15	Joseph H. Brensinger School (PS #17)	Kitchen Hood Control	Y	$21,893	$233	$1,534	$0	$0	$1,767
16	Joseph H. Brensinger School (PS #17)	Refrigeration Controls	Y	$14,214	$1,266	$0	$0	$0	$1,266
17	Joseph H. Brensinger School (PS #17)	Water Conservation	Y	$45,274	$0	$0	$0	$15,005	$15,005
18	Joseph H. Brensinger School (PS #17)	Pipe Insulation	Y	$13,167	$0	$1,505	$0	$0	$1,505
19	Joseph H. Brensinger School (PS #17)	Destratification Fans	Y	$22,825	($176)	$2,687	$0	$0	$2,511
23	Joseph H. Brensinger School (PS #17)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Dr. Maya Angelou School (PS #20)	LED Lighting Replacement	Y	$298,000	$18,221	($381)	$0	$0	$17,841
2	Dr. Maya Angelou School (PS #20)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Dr. Maya Angelou School (PS #20)	District-Wide Energy Management System - Tier 1	Y	$23,700	$0	$5,941	$0	$0	$5,941
8	Dr. Maya Angelou School (PS #20)	Solar PPA	Y	$0	$38,540	$0	$0	$0	$38,540
9	Dr. Maya Angelou School (PS #20)	Roof Renovations	Y	$340,000	$0	$68	$0	$0	$68
13	Dr. Maya Angelou School (PS #20)	Plug Load Controls	Y	$7,750	$1,321	$0	$0	$0	$1,321
16	Dr. Maya Angelou School (PS #20)	Refrigeration Controls	Y	$15,805	$2,880	$0	$0	$0	$2,880
17	Dr. Maya Angelou School (PS #20)	Water Conservation	Y	$27,508	$0	$0	$0	$4,210	$4,210
18	Dr. Maya Angelou School (PS #20)	Pipe Insulation	Y	$2,263	$0	$313	$0	$0	$313
19	Dr. Maya Angelou School (PS #20)	Destratification Fans	Y	$13,500	($104)	$1,412	$0	$0	$1,308
23	Dr. Maya Angelou School (PS #20)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Ollie Culbreth Jr. School (PS #14)	LED Lighting Replacement	Y	48,379	12	(101)	0	0
2	Ollie Culbreth Jr. School (PS #14)	Lighting Controls	N	0	0	0	0	0
3	Ollie Culbreth Jr. School (PS #14)	District-Wide Energy Management System - Tier 1	Y	0	0	4,618	0	0
4	Ollie Culbreth Jr. School (PS #14)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Ollie Culbreth Jr. School (PS #14)	Solar PPA	Y	0	0	0	0	0
11	Ollie Culbreth Jr. School (PS #14)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Ollie Culbreth Jr. School (PS #14)	Plug Load Controls	Y	24,090	0	0	0	0
14	Ollie Culbreth Jr. School (PS #14)	Building Envelope Improvements	Y	1,310	0	743	0	0
17	Ollie Culbreth Jr. School (PS #14)	Water Conservation	Y	0	0	0	0	382
18	Ollie Culbreth Jr. School (PS #14)	Pipe Insulation	Y	0	0	2,590	0	0
21	Ollie Culbreth Jr. School (PS #14)	Retro-Commissioning	Y	0	0	744	0	0
22	Ollie Culbreth Jr. School (PS #14)	Steam Trap Replacement	Y	0	0	2,264	0	0
23	Ollie Culbreth Jr. School (PS #14)	Student Education Program	Y	0	0	0	0	0
1	Whitney M. Young Jr. School (PS #15)	LED Lighting Replacement	Y	285,148	72	(596)	0	0
2	Whitney M. Young Jr. School (PS #15)	Lighting Controls	N	0	0	0	0	0
3	Whitney M. Young Jr. School (PS #15)	District-Wide Energy Management System - Tier 1	Y	0	0	7,973	0	0
4	Whitney M. Young Jr. School (PS #15)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Whitney M. Young Jr. School (PS #15)	Boiler Replacement	Y	4,683	0	5,487	0	0
8	Whitney M. Young Jr. School (PS #15)	Solar PPA	Y	0	0	0	0	0
9	Whitney M. Young Jr. School (PS #15)	Roof Renovations	Y	0	0	88	0	0
11	Whitney M. Young Jr. School (PS #15)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Whitney M. Young Jr. School (PS #15)	Plug Load Controls	Y	49,003	0	0	0	0
14	Whitney M. Young Jr. School (PS #15)	Building Envelope Improvements	Y	6,941	0	3,939	0	0
16	Whitney M. Young Jr. School (PS #15)	Refrigeration Controls	Y	16,154	0	0	0	0
17	Whitney M. Young Jr. School (PS #15)	Water Conservation	Y	0	0	0	0	1,353
18	Whitney M. Young Jr. School (PS #15)	Pipe Insulation	Y	0	0	2,260	0	0
19	Whitney M. Young Jr. School (PS #15)	Destratification Fans	Y	(912)	0	1,421	0	0
21	Whitney M. Young Jr. School (PS #15)	Retro-Commissioning	Y	0	0	401	0	0
23	Whitney M. Young Jr. School (PS #15)	Student Education Program	Y	0	0	0	0	0
3	Cornelia F. Bradford School (PS #16)	District-Wide Energy Management System - Tier 1	Y	0	0	2,787	0	0
4	Cornelia F. Bradford School (PS #16)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Cornelia F. Bradford School (PS #16)	Boiler Replacement	Y	0	0	3,405	0	0
8	Cornelia F. Bradford School (PS #16)	Solar PPA	Y	0	0	0	0	0
9	Cornelia F. Bradford School (PS #16)	Roof Renovations	Y	0	0	17	0	0
10	Cornelia F. Bradford School (PS #16)	Indoor Air Quality & HVAC Enhancements	Y	1,652	0	0	0	0
13	Cornelia F. Bradford School (PS #16)	Plug Load Controls	Y	67,042	0	0	0	0
14	Cornelia F. Bradford School (PS #16)	Building Envelope Improvements	Y	719	0	408	0	0
17	Cornelia F. Bradford School (PS #16)	Water Conservation	Y	0	0	0	0	859
18	Cornelia F. Bradford School (PS #16)	Pipe Insulation	Y	0	0	1,390	0	0
23	Cornelia F. Bradford School (PS #16)	Student Education Program	Y	0	0	0	0	0
1	Joseph H. Brensinger School (PS #17)	LED Lighting Replacement	Y	267,501	68	(559)	0	0
2	Joseph H. Brensinger School (PS #17)	Lighting Controls	N	0	0	0	0	0
3	Joseph H. Brensinger School (PS #17)	District-Wide Energy Management System - Tier 1	Y	0	0	6,831	0	0
4	Joseph H. Brensinger School (PS #17)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Joseph H. Brensinger School (PS #17)	Boiler Replacement	N	0	0	0	0	0
7	Joseph H. Brensinger School (PS #17)	Chiller Replacement	N	0	0	0	0	0
8	Joseph H. Brensinger School (PS #17)	Solar PPA	Y	0	0	0	0	0
9	Joseph H. Brensinger School (PS #17)	Roof Renovations	Y	0	0	79	0	0
12	Joseph H. Brensinger School (PS #17)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Joseph H. Brensinger School (PS #17)	Plug Load Controls	Y	23,187	0	0	0	0
14	Joseph H. Brensinger School (PS #17)	Building Envelope Improvements	Y	3,505	0	1,989	0	0
15	Joseph H. Brensinger School (PS #17)	Kitchen Hood Control	Y	2,010	0	1,254	0	0
16	Joseph H. Brensinger School (PS #17)	Refrigeration Controls	Y	10,921	0	0	0	0
17	Joseph H. Brensinger School (PS #17)	Water Conservation	Y	0	0	0	0	1,347
18	Joseph H. Brensinger School (PS #17)	Pipe Insulation	Y	0	0	1,230	0	0
19	Joseph H. Brensinger School (PS #17)	Destratification Fans	Y	(1,520)	0	2,196	0	0
23	Joseph H. Brensinger School (PS #17)	Student Education Program	Y	0	0	0	0	0
1	Dr. Maya Angelou School (PS #20)	LED Lighting Replacement	Y	157,034	40	(328)	0	0
2	Dr. Maya Angelou School (PS #20)	Lighting Controls	N	0	0	0	0	0
3	Dr. Maya Angelou School (PS #20)	District-Wide Energy Management System - Tier 1	Y	0	0	5,125	0	0
8	Dr. Maya Angelou School (PS #20)	Solar PPA	Y	0	0	0	0	0
9	Dr. Maya Angelou School (PS #20)	Roof Renovations	Y	0	0	59	0	0
13	Dr. Maya Angelou School (PS #20)	Plug Load Controls	Y	11,564	0	0	0	0
16	Dr. Maya Angelou School (PS #20)	Refrigeration Controls	Y	25,209	0	0	0	0
17	Dr. Maya Angelou School (PS #20)	Water Conservation	Y	0	0	0	0	343
18	Dr. Maya Angelou School (PS #20)	Pipe Insulation	Y	0	0	270	0	0
19	Dr. Maya Angelou School (PS #20)	Destratification Fans	Y	(912)	0	1,218	0	0
23	Dr. Maya Angelou School (PS #20)	Student Education Program	Y	0	0	0	0	0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Reverend Dr. Ercel F. Webb School (PS #22)	LED Lighting Replacement	Y	$290,000	$17,142	($443)	$0	$0	$16,698
2	Reverend Dr. Ercel F. Webb School (PS #22)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Reverend Dr. Ercel F. Webb School (PS #22)	District-Wide Energy Management System - Tier 1	Y	$77,862	$0	$8,742	$0	$0	$8,742
4	Reverend Dr. Ercel F. Webb School (PS #22)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
7	Reverend Dr. Ercel F. Webb School (PS #22)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	Reverend Dr. Ercel F. Webb School (PS #22)	Solar PPA	Y	$0	$23,125	$0	$0	$0	$23,125
10	Reverend Dr. Ercel F. Webb School (PS #22)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
13	Reverend Dr. Ercel F. Webb School (PS #22)	Plug Load Controls	Y	$14,000	$3,147	$0	$0	$0	$3,147
14	Reverend Dr. Ercel F. Webb School (PS #22)	Building Envelope Improvements	Y	$7,292	$113	$808	$0	$0	$921
16	Reverend Dr. Ercel F. Webb School (PS #22)	Refrigeration Controls	Y	$11,340	$759	$0	$0	$0	$759
17	Reverend Dr. Ercel F. Webb School (PS #22)	Water Conservation	Y	$68,061	$0	$0	$0	$23,945	$23,945
18	Reverend Dr. Ercel F. Webb School (PS #22)	Pipe Insulation	Y	$42,372	$0	$4,441	$0	$0	$4,441
19	Reverend Dr. Ercel F. Webb School (PS #22)	Destratification Fans	Y	$26,850	($172)	$1,965	$0	$0	$1,794
23	Reverend Dr. Ercel F. Webb School (PS #22)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Mahatma K. Ghandi School (PS #23)	LED Lighting Replacement	Y	$140,322	$12,658	($292)	$0	$0	$12,366
2	Mahatma K. Ghandi School (PS #23)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Mahatma K. Ghandi School (PS #23)	District-Wide Energy Management System - Tier 1	Y	$54,158	$0	$8,296	$0	$0	$8,296
4	Mahatma K. Ghandi School (PS #23)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Mahatma K. Ghandi School (PS #23)	Solar PPA	Y	$0	$23,928	$0	$0	$0	$23,928
11	Mahatma K. Ghandi School (PS #23)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
12	Mahatma K. Ghandi School (PS #23)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Mahatma K. Ghandi School (PS #23)	Plug Load Controls	Y	$10,750	$4,369	$0	$0	$0	$4,369
14	Mahatma K. Ghandi School (PS #23)	Building Envelope Improvements	Y	$8,450	$131	$830	$0	$0	$961
16	Mahatma K. Ghandi School (PS #23)	Refrigeration Controls	Y	$12,530	$1,934	$0	$0	$0	$1,934
17	Mahatma K. Ghandi School (PS #23)	Water Conservation	Y	$67,855	$0	$0	$0	$8,765	$8,765
18	Mahatma K. Ghandi School (PS #23)	Pipe Insulation	Y	$16,829	$0	$1,626	$0	$0	$1,626
21	Mahatma K. Ghandi School (PS #23)	Retro-Commissioning	Y	$0	$0	$1,154	$0	$0	$1,154
22	Mahatma K. Ghandi School (PS #23)	Steam Trap Replacement	Y	$42,500	$0	$2,744	$0	$0	$2,744
23	Mahatma K. Ghandi School (PS #23)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	MarcAnthony Dinardo School (PS #23B)	LED Lighting Replacement	Y	$81,824	$6,695	($113)	$0	$0	$6,582
2	MarcAnthony Dinardo School (PS #23B)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	MarcAnthony Dinardo School (PS #23B)	District-Wide Energy Management System - Tier 1	Y	$36,007	$0	$3,241	$0	$0	$3,241
4	MarcAnthony Dinardo School (PS #23B)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	MarcAnthony Dinardo School (PS #23B)	Solar PPA	Y	$0	$10,801	$0	$0	$0	$10,801
10	MarcAnthony Dinardo School (PS #23B)	Indoor Air Quality & HVAC Enhancements	Y	$5,957,630	$315	$0	$0	$0	$315
13	MarcAnthony Dinardo School (PS #23B)	Plug Load Controls	Y	$4,375	$1,946	$0	$0	$0	$1,946
14	MarcAnthony Dinardo School (PS #23B)	Building Envelope Improvements	Y	$4,718	$118	$544	$0	$0	$661
17	MarcAnthony Dinardo School (PS #23B)	Water Conservation	Y	$32,874	$0	$0	$0	$2,161	$2,161
18	MarcAnthony Dinardo School (PS #23B)	Pipe Insulation	Y	$15,955	$0	$1,718	$0	$0	$1,718
23	MarcAnthony Dinardo School (PS #23B)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Chaplain Charles Waters School (PS #24)	LED Lighting Replacement	Y	$400,000	$13,248	($357)	$0	$0	$12,890
2	Chaplain Charles Waters School (PS #24)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Chaplain Charles Waters School (PS #24)	District-Wide Energy Management System - Tier 1	Y	$46,223	$0	$7,469	$0	$0	$7,469
4	Chaplain Charles Waters School (PS #24)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Chaplain Charles Waters School (PS #24)	Solar PPA	Y	$0	$22,629	$0	$0	$0	$22,629
9	Chaplain Charles Waters School (PS #24)	Roof Renovations	Y	$0	$0	$48	$0	$0	$48
10	Chaplain Charles Waters School (PS #24)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
13	Chaplain Charles Waters School (PS #24)	Plug Load Controls	Y	$15,875	$7,847	$0	$0	$0	$7,847
14	Chaplain Charles Waters School (PS #24)	Building Envelope Improvements	Y	$8,303	$80	$594	$0	$0	$674
17	Chaplain Charles Waters School (PS #24)	Water Conservation	Y	$62,015	$0	$0	$0	$5,811	$5,811
18	Chaplain Charles Waters School (PS #24)	Pipe Insulation	Y	$60,353	$0	$5,056	$0	$0	$5,056
23	Chaplain Charles Waters School (PS #24)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Nicolaus Copernicus School (PS #25)	LED Lighting Replacement	Y	$229,495	$19,758	($596)	$0	$0	$19,162
2	Nicolaus Copernicus School (PS #25)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Nicolaus Copernicus School (PS #25)	District-Wide Energy Management System - Tier 1	Y	$48,723	$0	$7,973	$0	$0	$7,973
4	Nicolaus Copernicus School (PS #25)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Nicolaus Copernicus School (PS #25)	Boiler Replacement w/ Fuel Conversion	Y	$828,300	$278	($13,588)	$29,678	$0	$16,368
8	Nicolaus Copernicus School (PS #25)	Solar PPA	Y	$0	$15,988	$0	$0	$0	$15,988
9	Nicolaus Copernicus School (PS #25)	Roof Renovations	Y	$220,000	$0	$45	$0	$0	$45
11	Nicolaus Copernicus School (PS #25)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Nicolaus Copernicus School (PS #25)	Plug Load Controls	Y	$12,500	$4,718	$0	$0	$0	$4,718
14	Nicolaus Copernicus School (PS #25)	Building Envelope Improvements	Y	$51,934	$660	$5,507	$0	$0	$6,167
17	Nicolaus Copernicus School (PS #25)	Water Conservation	Y	$105,458	$0	$0	$0	$17,383	$17,383
18	Nicolaus Copernicus School (PS #25)	Pipe Insulation	Y	$17,127	$0	$2,637	$0	$0	$2,637
21	Nicolaus Copernicus School (PS #25)	Retro-Commissioning	Y	$0	$0	$1	$0	$0	$1
22	Nicolaus Copernicus School (PS #25)	Steam Trap Replacement	Y	$20,625	$0	$1,586	$0	$0	$1,586
23	Nicolaus Copernicus School (PS #25)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Patricia Noonan School (PS #26)	LED Lighting Replacement	Y	$232,943	$22,484	($459)	$0	$0	$22,025
2	Patricia Noonan School (PS #26)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Patricia Noonan School (PS #26)	District-Wide Energy Management System - Tier 1	Y	$26,127	$0	$6,695	$0	$0	$6,695
8	Patricia Noonan School (PS #26)	Solar PPA	Y	$0	$39,229	$0	$0	$0	$39,229
9	Patricia Noonan School (PS #26)	Roof Renovations	Y	$998,000	$0	$81	$0	$0	$81
13	Patricia Noonan School (PS #26)	Plug Load Controls	Y	$7,375	$1,310	$0	$0	$0	$1,310
16	Patricia Noonan School (PS #26)	Refrigeration Controls	Y	$14,616	$1,698	$0	$0	$0	$1,698
17	Patricia Noonan School (PS #26)	Water Conservation	Y	$3,695	$0	$0	$0	$0	$0
18	Patricia Noonan School (PS #26)	Pipe Insulation	Y	$7,681	$0	$1,029	$0	$0	$1,029
19	Patricia Noonan School (PS #26)	Destratification Fans	Y	$13,625	($107)	$1,436	$0	$0	$1,330
23	Patricia Noonan School (PS #26)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Reverend Dr. Ercel F. Webb School (PS #22)	LED Lighting Replacement	Y	179,581	46	(375)	0	0
2	Reverend Dr. Ercel F. Webb School (PS #22)	Lighting Controls	N	0	0	0	0	0
3	Reverend Dr. Ercel F. Webb School (PS #22)	District-Wide Energy Management System - Tier 1	Y	0	0	7,402	0	0
4	Reverend Dr. Ercel F. Webb School (PS #22)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
7	Reverend Dr. Ercel F. Webb School (PS #22)	Chiller Replacement	N	0	0	0	0	0
8	Reverend Dr. Ercel F. Webb School (PS #22)	Solar PPA	Y	0	0	0	0	0
10	Reverend Dr. Ercel F. Webb School (PS #22)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
13	Reverend Dr. Ercel F. Webb School (PS #22)	Plug Load Controls	Y	33,470	0	0	0	0
14	Reverend Dr. Ercel F. Webb School (PS #22)	Building Envelope Improvements	Y	1,205	0	684	0	0
16	Reverend Dr. Ercel F. Webb School (PS #22)	Refrigeration Controls	Y	8,077	0	0	0	0
17	Reverend Dr. Ercel F. Webb School (PS #22)	Water Conservation	Y	0	0	0	0	2,051
18	Reverend Dr. Ercel F. Webb School (PS #22)	Pipe Insulation	Y	0	0	3,760	0	0
19	Reverend Dr. Ercel F. Webb School (PS #22)	Destratification Fans	Y	(1,824)	0	1,664	0	0
23	Reverend Dr. Ercel F. Webb School (PS #22)	Student Education Program	Y	0	0	0	0	0
1	Mahatma K. Ghandi School (PS #23)	LED Lighting Replacement	Y	130,437	33	(273)	0	0
2	Mahatma K. Ghandi School (PS #23)	Lighting Controls	N	0	0	0	0	0
3	Mahatma K. Ghandi School (PS #23)	District-Wide Energy Management System - Tier 1	Y	0	0	7,756	0	0
4	Mahatma K. Ghandi School (PS #23)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Mahatma K. Ghandi School (PS #23)	Solar PPA	Y	0	0	0	0	0
11	Mahatma K. Ghandi School (PS #23)	Unit Ventilator Replacement	N	0	0	0	0	0
12	Mahatma K. Ghandi School (PS #23)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Mahatma K. Ghandi School (PS #23)	Plug Load Controls	Y	45,620	0	0	0	0
14	Mahatma K. Ghandi School (PS #23)	Building Envelope Improvements	Y	1,367	0	776	0	0
16	Mahatma K. Ghandi School (PS #23)	Refrigeration Controls	Y	20,193	0	0	0	0
17	Mahatma K. Ghandi School (PS #23)	Water Conservation	Y	0	0	0	0	686
18	Mahatma K. Ghandi School (PS #23)	Pipe Insulation	Y	0	0	1,520	0	0
21	Mahatma K. Ghandi School (PS #23)	Retro-Commissioning	Y	0	0	1,079	0	0
22	Mahatma K. Ghandi School (PS #23)	Steam Trap Replacement	Y	0	0	2,566	0	0
23	Mahatma K. Ghandi School (PS #23)	Student Education Program	Y	0	0	0	0	0
1	MarcAnthony Dinardo School (PS #23B)	LED Lighting Replacement	Y	45,943	12	(96)	0	0
2	MarcAnthony Dinardo School (PS #23B)	Lighting Controls	N	0	0	0	0	0
3	MarcAnthony Dinardo School (PS #23B)	District-Wide Energy Management System - Tier 1	Y	0	0	2,755	0	0
4	MarcAnthony Dinardo School (PS #23B)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	MarcAnthony Dinardo School (PS #23B)	Solar PPA	Y	0	0	0	0	0
10	MarcAnthony Dinardo School (PS #23B)	Indoor Air Quality & HVAC Enhancements	Y	2,177	0	0	0	0
13	MarcAnthony Dinardo School (PS #23B)	Plug Load Controls	Y	13,461	0	0	0	0
14	MarcAnthony Dinardo School (PS #23B)	Building Envelope Improvements	Y	813	0	462	0	0
17	MarcAnthony Dinardo School (PS #23B)	Water Conservation	Y	0	0	0	0	172
18	MarcAnthony Dinardo School (PS #23B)	Pipe Insulation	Y	0	0	1,460	0	0
23	MarcAnthony Dinardo School (PS #23B)	Student Education Program	Y	0	0	0	0	0
1	Chaplain Charles Waters School (PS #24)	LED Lighting Replacement	Y	127,491	32	(267)	0	0
2	Chaplain Charles Waters School (PS #24)	Lighting Controls	N	0	0	0	0	0
3	Chaplain Charles Waters School (PS #24)	District-Wide Energy Management System - Tier 1	Y	0	0	5,570	0	0
4	Chaplain Charles Waters School (PS #24)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Chaplain Charles Waters School (PS #24)	Solar PPA	Y	0	0	0	0	0
9	Chaplain Charles Waters School (PS #24)	Roof Renovations	Y	0	0	35	0	0
10	Chaplain Charles Waters School (PS #24)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
13	Chaplain Charles Waters School (PS #24)	Plug Load Controls	Y	76,541	0	0	0	0
14	Chaplain Charles Waters School (PS #24)	Building Envelope Improvements	Y	780	0	443	0	0
17	Chaplain Charles Waters School (PS #24)	Water Conservation	Y	0	0	0	0	518
18	Chaplain Charles Waters School (PS #24)	Pipe Insulation	Y	0	0	3,770	0	0
23	Chaplain Charles Waters School (PS #24)	Student Education Program	Y	0	0	0	0	0
1	Nicolaus Copernicus School (PS #25)	LED Lighting Replacement	Y	223,768	57	(468)	0	0
2	Nicolaus Copernicus School (PS #25)	Lighting Controls	N	0	0	0	0	0
3	Nicolaus Copernicus School (PS #25)	District-Wide Energy Management System - Tier 1	Y	0	0	6,258	0	0
4	Nicolaus Copernicus School (PS #25)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Nicolaus Copernicus School (PS #25)	Boiler Replacement w/ Fuel Conversion	Y	3,209	0	(10,666)	8195	0
8	Nicolaus Copernicus School (PS #25)	Solar PPA	Y	0	0	0	0	0
9	Nicolaus Copernicus School (PS #25)	Roof Renovations	Y	0	0	35	0	0
11	Nicolaus Copernicus School (PS #25)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Nicolaus Copernicus School (PS #25)	Plug Load Controls	Y	54,449	0	0	0	0
14	Nicolaus Copernicus School (PS #25)	Building Envelope Improvements	Y	7,618	0	4,323	0	0
17	Nicolaus Copernicus School (PS #25)	Water Conservation	Y	0	0	0	0	1,543
18	Nicolaus Copernicus School (PS #25)	Pipe Insulation	Y	0	0	2,070	0	0
21	Nicolaus Copernicus School (PS #25)	Retro-Commissioning	Y	0	0	1	0	0
22	Nicolaus Copernicus School (PS #25)	Steam Trap Replacement	Y	0	0	1,245	0	0
23	Nicolaus Copernicus School (PS #25)	Student Education Program	Y	0	0	0	0	0
1	Patricia Noonan School (PS #26)	LED Lighting Replacement	Y	189,778	48	(397)	0	0
2	Patricia Noonan School (PS #26)	Lighting Controls	N	0	0	0	0	0
3	Patricia Noonan School (PS #26)	District-Wide Energy Management System - Tier 1	Y	0	0	5,794	0	0
8	Patricia Noonan School (PS #26)	Solar PPA	Y	0	0	0	0	0
9	Patricia Noonan School (PS #26)	Roof Renovations	Y	0	0	70	0	0
13	Patricia Noonan School (PS #26)	Plug Load Controls	Y	11,181	0	0	0	0
16	Patricia Noonan School (PS #26)	Refrigeration Controls	Y	14,493	0	0	0	0
17	Patricia Noonan School (PS #26)	Water Conservation	Y	0	0	0	0	0
18	Patricia Noonan School (PS #26)	Pipe Insulation	Y	0	0	890	0	0
19	Patricia Noonan School (PS #26)	Destratification Fans	Y	(912)	0	1,243	0	0
23	Patricia Noonan School (PS #26)	Student Education Program	Y	0	0	0	0	0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Alfred E. Zampella School (PS #27)	LED Lighting Replacement	Y	$137,409	$12,225	$0	$0	$0	$12,225
2	Alfred E. Zampella School (PS #27)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Alfred E. Zampella School (PS #27)	District-Wide Energy Management System - Tier 1	Y	$438,923	$1,832	$0	$0	$0	$1,832
8	Alfred E. Zampella School (PS #27)	Solar PPA	Y	$0	$15,947	$0	$0	$0	$15,947
9	Alfred E. Zampella School (PS #27)	Roof Renovations	Y	$635,000	$0	$0	$0	$0	$0
11	Alfred E. Zampella School (PS #27)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Alfred E. Zampella School (PS #27)	Plug Load Controls	Y	$11,625	$4,300	$0	$0	$0	$4,300
14	Alfred E. Zampella School (PS #27)	Building Envelope Improvements	Y	$11,554	$132	$0	$0	$0	$132
16	Alfred E. Zampella School (PS #27)	Refrigeration Controls	Y	$11,340	$606	$0	$0	$0	$606
17	Alfred E. Zampella School (PS #27)	Water Conservation	Y	$67,371	$0	$0	$0	$29,462	$29,462
18	Alfred E. Zampella School (PS #27)	Pipe Insulation	N	$0	$0	$0	$0	$0	$0
21	Alfred E. Zampella School (PS #27)	Retro-Commissioning	Y	$0	$1,599	$0	$0	$0	$1,599
23	Alfred E. Zampella School (PS #27)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
3	Christa Mcauliffe School (PS #28)	District-Wide Energy Management System - Tier 1	Y	$26,770	$9,299	$0	$0	$0	$9,299
8	Christa Mcauliffe School (PS #28)	Solar PPA	Y	$0	$40,478	$0	$0	$0	$40,478
13	Christa Mcauliffe School (PS #28)	Plug Load Controls	Y	$17,250	$12,251	$0	$0	$0	$12,251
14	Christa Mcauliffe School (PS #28)	Building Envelope Improvements	Y	$42,601	$13,157	$0	$0	$0	$13,157
16	Christa Mcauliffe School (PS #28)	Refrigeration Controls	Y	$15,404	$2,537	$0	$0	$0	$2,537
17	Christa Mcauliffe School (PS #28)	Water Conservation	Y	$58,847	$0	$0	$0	$7,293	$7,293
18	Christa Mcauliffe School (PS #28)	Pipe Insulation	N	$0	$0	$0	$0	$0	$0
23	Christa Mcauliffe School (PS #28)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
3	Gladys Nunery School (PS #29)	District-Wide Energy Management System - Tier 1	Y	$37,324	$0	$3,877	$0	$0	$3,877
4	Gladys Nunery School (PS #29)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Gladys Nunery School (PS #29)	Boiler Replacement w/ Fuel Conversion	Y	$0	$496	($25,305)	$50,943	$0	$26,134
10	Gladys Nunery School (PS #29)	Indoor Air Quality & HVAC Enhancements	Y	$3,548,810	$164	$0	$0	$0	$164
13	Gladys Nunery School (PS #29)	Plug Load Controls	Y	$4,125	$2,460	$0	$0	$0	$2,460
14	Gladys Nunery School (PS #29)	Building Envelope Improvements	Y	$30,113	$517	$3,269	$0	$0	$3,786
17	Gladys Nunery School (PS #29)	Water Conservation	Y	$22,673	$0	$0	$0	$5,146	$5,146
18	Gladys Nunery School (PS #29)	Pipe Insulation	Y	$20,866	$0	$2,464	$0	$0	$2,464
23	Gladys Nunery School (PS #29)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Alexander D. Sullivan School (PS #30)	LED Lighting Replacement	Y	$49,869	$3,160	($65)	$0	$0	$3,095
3	Alexander D. Sullivan School (PS #30)	District-Wide Energy Management System - Tier 1	Y	$41,931	$0	$5,224	$0	$0	$5,224
4	Alexander D. Sullivan School (PS #30)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Alexander D. Sullivan School (PS #30)	Boiler Replacement w/ Fuel Conversion	Y	$0	$619	($17,577)	$49,680	$0	$32,722
8	Alexander D. Sullivan School (PS #30)	Solar PPA	Y	$0	$22,834	$0	$0	$0	$22,834
11	Alexander D. Sullivan School (PS #30)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
12	Alexander D. Sullivan School (PS #30)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Alexander D. Sullivan School (PS #30)	Plug Load Controls	Y	$11,375	$5,303	$0	$0	$0	$5,303
14	Alexander D. Sullivan School (PS #30)	Building Envelope Improvements	Y	$47,111	$857	$4,819	$0	$0	$5,676
17	Alexander D. Sullivan School (PS #30)	Water Conservation	Y	$59,125	$0	$0	$0	$2,859	$2,859
18	Alexander D. Sullivan School (PS #30)	Pipe Insulation	Y	$23,148	$0	$2,248	$0	$0	$2,248
21	Alexander D. Sullivan School (PS #30)	Retro-Commissioning	Y	$0	$0	$118	$0	$0	$118
22	Alexander D. Sullivan School (PS #30)	Steam Trap Replacement	Y	$30,625	$0	$2,296	$0	$0	$2,296
23	Alexander D. Sullivan School (PS #30)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Anthony J. Infante School (PS #31)	LED Lighting Replacement	Y	$76,118	$9,193	($115)	$0	$0	$9,078
2	Anthony J. Infante School (PS #31)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Anthony J. Infante School (PS #31)	District-Wide Energy Management System - Tier 1	Y	$32,331	$0	$1,995	$0	$0	$1,995
4	Anthony J. Infante School (PS #31)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Anthony J. Infante School (PS #31)	Boiler Replacement	N	$0	$0	$0	$0	$0	$0
8	Anthony J. Infante School (PS #31)	Solar PPA	Y	$0	$11,740	$0	$0	$0	$11,740
9	Anthony J. Infante School (PS #31)	Roof Renovations	Y	$340,000	$0	$15	$0	$0	$15
10	Anthony J. Infante School (PS #31)	Indoor Air Quality & HVAC Enhancements	Y	$3,929,150	$304	$0	$0	$0	$304
13	Anthony J. Infante School (PS #31)	Plug Load Controls	Y	$4,125	$3,592	$0	$0	$0	$3,592
14	Anthony J. Infante School (PS #31)	Building Envelope Improvements	Y	$5,350	$111	$380	$0	$0	$491
17	Anthony J. Infante School (PS #31)	Water Conservation	Y	$22,393	$0	$0	$0	$886	$886
18	Anthony J. Infante School (PS #31)	Pipe Insulation	Y	$27,036	$0	$2,102	$0	$0	$2,102
23	Anthony J. Infante School (PS #31)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Alfred E. Zampella School (PS #27)	LED Lighting Replacement	Y	160,065	41	0	0	0
2	Alfred E. Zampella School (PS #27)	Lighting Controls	N	0	0	0	0	0
3	Alfred E. Zampella School (PS #27)	District-Wide Energy Management System - Tier 1	Y	24,400	0	0	0	0
8	Alfred E. Zampella School (PS #27)	Solar PPA	Y	0	0	0	0	0
9	Alfred E. Zampella School (PS #27)	Roof Renovations	Y	0	0	0	0	0
11	Alfred E. Zampella School (PS #27)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Alfred E. Zampella School (PS #27)	Plug Load Controls	Y	57,280	0	0	0	0
14	Alfred E. Zampella School (PS #27)	Building Envelope Improvements	Y	1,760	0	0	0	0
16	Alfred E. Zampella School (PS #27)	Refrigeration Controls	Y	8,077	0	0	0	0
17	Alfred E. Zampella School (PS #27)	Water Conservation	Y	0	0	0	0	2,646
18	Alfred E. Zampella School (PS #27)	Pipe Insulation	N	0	0	0	0	0
21	Alfred E. Zampella School (PS #27)	Retro-Commissioning	Y	21,306	0	0	0	0
23	Alfred E. Zampella School (PS #27)	Student Education Program	Y	0	0	0	0	0
3	Christa Mcauliffe School (PS #28)	District-Wide Energy Management System - Tier 1	Y	79,300	0	79,300	0	0
8	Christa Mcauliffe School (PS #28)	Solar PPA	Y	0	0	0	0	0
13	Christa Mcauliffe School (PS #28)	Plug Load Controls	Y	104,471	0	0	0	0
14	Christa Mcauliffe School (PS #28)	Building Envelope Improvements	Y	112,197	0	0	0	0
16	Christa Mcauliffe School (PS #28)	Refrigeration Controls	Y	21,637	0	0	0	0
17	Christa Mcauliffe School (PS #28)	Water Conservation	Y	0	0	0	0	584
18	Christa Mcauliffe School (PS #28)	Pipe Insulation	N	0	0	0	0	0
23	Christa Mcauliffe School (PS #28)	Student Education Program	Y	0	0	0	0	0
3	Gladys Nunery School (PS #29)	District-Wide Energy Management System - Tier 1	Y	0	0	2,990	0	0
4	Gladys Nunery School (PS #29)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Gladys Nunery School (PS #29)	Boiler Replacement w/ Fuel Conversion	Y	4,265	0	(19,513)	14993	0
10	Gladys Nunery School (PS #29)	Indoor Air Quality & HVAC Enhancements	Y	1,409	0	0	0	0
13	Gladys Nunery School (PS #29)	Plug Load Controls	Y	21,149	0	0	0	0
14	Gladys Nunery School (PS #29)	Building Envelope Improvements	Y	4,443	0	2,521	0	0
17	Gladys Nunery School (PS #29)	Water Conservation	Y	0	0	0	0	446
18	Gladys Nunery School (PS #29)	Pipe Insulation	Y	0	0	1,900	0	0
23	Gladys Nunery School (PS #29)	Student Education Program	Y	0	0	0	0	0
1	Alexander D. Sullivan School (PS #30)	LED Lighting Replacement	Y	24,926	6	(52)	0	0
3	Alexander D. Sullivan School (PS #30)	District-Wide Energy Management System - Tier 1	Y	0	0	4,207	0	0
4	Alexander D. Sullivan School (PS #30)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Alexander D. Sullivan School (PS #30)	Boiler Replacement w/ Fuel Conversion	Y	4,938	0	(14,155)	10876	0
8	Alexander D. Sullivan School (PS #30)	Solar PPA	Y	0	0	0	0	0
11	Alexander D. Sullivan School (PS #30)	Unit Ventilator Replacement	N	0	0	0	0	0
12	Alexander D. Sullivan School (PS #30)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Alexander D. Sullivan School (PS #30)	Plug Load Controls	Y	42,317	0	0	0	0
14	Alexander D. Sullivan School (PS #30)	Building Envelope Improvements	Y	6,838	0	3,881	0	0
17	Alexander D. Sullivan School (PS #30)	Water Conservation	Y	0	0	0	0	220
18	Alexander D. Sullivan School (PS #30)	Pipe Insulation	Y	0	0	1,810	0	0
21	Alexander D. Sullivan School (PS #30)	Retro-Commissioning	Y	0	0	95	0	0
22	Alexander D. Sullivan School (PS #30)	Steam Trap Replacement	Y	0	0	1,849	0	0
23	Alexander D. Sullivan School (PS #30)	Student Education Program	Y	0	0	0	0	0
1	Anthony J. Infante School (PS #31)	LED Lighting Replacement	Y	45,887	12	(96)	0	0
2	Anthony J. Infante School (PS #31)	Lighting Controls	N	0	0	0	0	0
3	Anthony J. Infante School (PS #31)	District-Wide Energy Management System - Tier 1	Y	0	0	1,670	0	0
4	Anthony J. Infante School (PS #31)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Anthony J. Infante School (PS #31)	Boiler Replacement	N	0	0	0	0	0
8	Anthony J. Infante School (PS #31)	Solar PPA	Y	0	0	0	0	0
9	Anthony J. Infante School (PS #31)	Roof Renovations	Y	0	0	12	0	0
10	Anthony J. Infante School (PS #31)	Indoor Air Quality & HVAC Enhancements	Y	1,531	0	0	0	0
13	Anthony J. Infante School (PS #31)	Plug Load Controls	Y	18,062	0	0	0	0
14	Anthony J. Infante School (PS #31)	Building Envelope Improvements	Y	560	0	318	0	0
17	Anthony J. Infante School (PS #31)	Water Conservation	Y	0	0	0	0	53
18	Anthony J. Infante School (PS #31)	Pipe Insulation	Y	0	0	1,760	0	0
23	Anthony J. Infante School (PS #31)	Student Education Program	Y	0	0	0	0	0

ECM #	JERSEY CITY PUBLIC SCHOOLS BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	INCLUDED IN PROJECT "Y" OR "N"	INSTALLED COST $	ANNUAL ELECTRIC COST SAVINGS $	ANNUAL NATURAL GAS COST SAVINGS $	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS $	ANNUAL Domestic Water (CCF) COST SAVINGS $	ANNUAL ENERGY COST SAVINGS $
1	Paul Rafalides School (PS #33)	LED Lighting Replacement	Y	$94,111	$8,257	($185)	$0	$0	$8,072
2	Paul Rafalides School (PS #33)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Paul Rafalides School (PS #33)	District-Wide Energy Management System - Tier 1	Y	$31,242	$0	$1,685	$0	$0	$1,685
4	Paul Rafalides School (PS #33)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	Paul Rafalides School (PS #33)	Boiler Replacement	N	$0	$0	$0	$0	$0	$0
8	Paul Rafalides School (PS #33)	Solar PPA	Y	$0	$5,160	$0	$0	$0	$5,160
9	Paul Rafalides School (PS #33)	Roof Renovations	Y	$195,000	$0	$4	$0	$0	$4
10	Paul Rafalides School (PS #33)	Indoor Air Quality & HVAC Enhancements	Y	$2,661,350	$125	$0	$0	$0	$125
13	Paul Rafalides School (PS #33)	Plug Load Controls	Y	$3,250	$2,556	$0	$0	$0	$2,556
14	Paul Rafalides School (PS #33)	Building Envelope Improvements	Y	$5,350	$198	$1,228	$0	$0	$1,426
17	Paul Rafalides School (PS #33)	Water Conservation	Y	$16,084	$0	$0	$0	$1,420	$1,420
18	Paul Rafalides School (PS #33)	Pipe Insulation	Y	$11,731	$0	$1,340	$0	$0	$1,340
23	Paul Rafalides School (PS #33)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	President Barack Obama School (PS #34)	LED Lighting Replacement	Y	$200,511	$11,270	($286)	$0	$0	$10,984
2	President Barack Obama School (PS #34)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	President Barack Obama School (PS #34)	District-Wide Energy Management System - Tier 1	Y	$82,964	$0	$5,247	$0	$0	$5,247
4	President Barack Obama School (PS #34)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
5	President Barack Obama School (PS #34)	Boiler Replacement	N	$0	$0	$0	$0	$0	$0
7	President Barack Obama School (PS #34)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	President Barack Obama School (PS #34)	Solar PPA	Y	$0	$13,728	$0	$0	$0	$13,728
9	President Barack Obama School (PS #34)	Roof Renovations	Y	$465,000	$0	$26	$0	$0	$26
10	President Barack Obama School (PS #34)	Indoor Air Quality & HVAC Enhancements	N	$0	$0	$0	$0	$0	$0
13	President Barack Obama School (PS #34)	Plug Load Controls	Y	$10,625	$4,078	$0	$0	$0	$4,078
14	President Barack Obama School (PS #34)	Building Envelope Improvements	Y	$40,551	$513	$3,591	$0	$0	$4,103
17	President Barack Obama School (PS #34)	Water Conservation	Y	$64,909	$0	$0	$0	$3,076	$3,076
18	President Barack Obama School (PS #34)	Pipe Insulation	Y	$39,612	$0	$4,627	$0	$0	$4,627
23	President Barack Obama School (PS #34)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
3	Rafael Cordero Y Molina School (PS #37)	District-Wide Energy Management System - Tier 1	Y	$49,180	$0	$8,102	$0	$0	$8,102
4	Rafael Cordero Y Molina School (PS #37)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Rafael Cordero Y Molina School (PS #37)	Boiler Replacement w/ Fuel Conversion	Y	$184,400	$908	($27,709)	$58,729	$0	$31,927
10	Rafael Cordero Y Molina School (PS #37)	Indoor Air Quality & HVAC Enhancements	Y	$9,798,080	$259	$0	$0	$0	$259
12	Rafael Cordero Y Molina School (PS #37)	Rooftop Unit Replacement	N	$0	$0	$0	$0	$0	$0
13	Rafael Cordero Y Molina School (PS #37)	Plug Load Controls	Y	$10,750	$0	$0	$0	$0	$0
14	Rafael Cordero Y Molina School (PS #37)	Building Envelope Improvements	Y	$3,211	$42	$385	$0	$0	$427
17	Rafael Cordero Y Molina School (PS #37)	Water Conservation	Y	$72,786	$0	$0	$0	$15,794	$15,794
18	Rafael Cordero Y Molina School (PS #37)	Pipe Insulation	Y	$41,923	$0	$5,465	$0	$0	$5,465
19	Rafael Cordero Y Molina School (PS #37)	Destratification Fans	Y	$18,325	($99)	$2,383	$0	$0	$2,284
23	Rafael Cordero Y Molina School (PS #37)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	James F. Murray School (PS #38)	LED Lighting Replacement	Y	$259,353	$7,908	($207)	$0	$0	$7,701
2	James F. Murray School (PS #38)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	James F. Murray School (PS #38)	District-Wide Energy Management System - Tier 1	Y	$46,685	$0	$7,035	$0	$0	$7,035
4	James F. Murray School (PS #38)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	James F. Murray School (PS #38)	Boiler Replacement w/ Fuel Conversion	Y	$168,500	$1,078	($38,695)	$79,232	$0	$41,614
11	James F. Murray School (PS #38)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	James F. Murray School (PS #38)	Plug Load Controls	Y	$9,250	$2,775	$0	$0	$0	$2,775
14	James F. Murray School (PS #38)	Building Envelope Improvements	Y	$7,193	$113	$816	$0	$0	$929
17	James F. Murray School (PS #38)	Water Conservation	Y	$48,201	$0	$0	$0	$5,145	$5,145
18	James F. Murray School (PS #38)	Pipe Insulation	Y	$10,270	$0	$1,532	$0	$0	$1,532
21	James F. Murray School (PS #38)	Retro-Commissioning	Y	$0	$0	$49	$0	$0	$49
22	James F. Murray School (PS #38)	Steam Trap Replacement	Y	$39,375	$0	$3,061	$0	$0	$3,061
23	James F. Murray School (PS #38)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Dr. Charles P. Defuccio School (PS #39)	LED Lighting Replacement	Y	$165,000	$7,467	($256)	$0	$0	$7,211
2	Dr. Charles P. Defuccio School (PS #39)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Dr. Charles P. Defuccio School (PS #39)	District-Wide Energy Management System - Tier 1	Y	$47,623	$0	$8,379	$0	$0	$8,379
4	Dr. Charles P. Defuccio School (PS #39)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Dr. Charles P. Defuccio School (PS #39)	Solar PPA	Y	$0	$10,697	$0	$0	$0	$10,697
9	Dr. Charles P. Defuccio School (PS #39)	Roof Renovations	Y	$840,000	$0	$38	$0	$0	$38
11	Dr. Charles P. Defuccio School (PS #39)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Dr. Charles P. Defuccio School (PS #39)	Plug Load Controls	Y	$8,500	$1,627	$0	$0	$0	$1,627
14	Dr. Charles P. Defuccio School (PS #39)	Building Envelope Improvements	Y	$9,309	$125	$1,180	$0	$0	$1,305
16	Dr. Charles P. Defuccio School (PS #39)	Refrigeration Controls	Y	$12,530	$1,704	$0	$0	$0	$1,704
17	Dr. Charles P. Defuccio School (PS #39)	Water Conservation	Y	$55,817	$0	$0	$0	$6,656	$6,656
21	Dr. Charles P. Defuccio School (PS #39)	Retro-Commissioning	Y	$0	$0	$142	$0	$0	$142
22	Dr. Charles P. Defuccio School (PS #39)	Steam Trap Replacement	Y	$33,125	$0	$2,814	$0	$0	$2,814
23	Dr. Charles P. Defuccio School (PS #39)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Paul Rafalides School (PS #33)	LED Lighting Replacement	Y	72,767	18	(152)	0	0
2	Paul Rafalides School (PS #33)	Lighting Controls	N	0	0	0	0	0
3	Paul Rafalides School (PS #33)	District-Wide Energy Management System - Tier 1	Y	0	0	1,383	0	0
4	Paul Rafalides School (PS #33)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	Paul Rafalides School (PS #33)	Boiler Replacement	N	0	0	0	0	0
8	Paul Rafalides School (PS #33)	Solar PPA	Y	0	0	0	0	0
9	Paul Rafalides School (PS #33)	Roof Renovations	Y	0	0	3	0	0
10	Paul Rafalides School (PS #33)	Indoor Air Quality & HVAC Enhancements	Y	1,127	0	0	0	0
13	Paul Rafalides School (PS #33)	Plug Load Controls	Y	22,967	0	0	0	0
14	Paul Rafalides School (PS #33)	Building Envelope Improvements	Y	1,775	0	1,008	0	0
17	Paul Rafalides School (PS #33)	Water Conservation	Y	0	0	0	0	95
18	Paul Rafalides School (PS #33)	Pipe Insulation	Y	0	0	1,100	0	0
23	Paul Rafalides School (PS #33)	Student Education Program	Y	0	0	0	0	0
1	President Barack Obama School (PS #34)	LED Lighting Replacement	Y	119,815	30	(251)	0	0
2	President Barack Obama School (PS #34)	Lighting Controls	N	0	0	0	0	0
3	President Barack Obama School (PS #34)	District-Wide Energy Management System - Tier 1	Y	0	0	4,593	0	0
4	President Barack Obama School (PS #34)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
5	President Barack Obama School (PS #34)	Boiler Replacement	N	0	0	0	0	0
7	President Barack Obama School (PS #34)	Chiller Replacement	N	0	0	0	0	0
8	President Barack Obama School (PS #34)	Solar PPA	Y	0	0	0	0	0
9	President Barack Obama School (PS #34)	Roof Renovations	Y	0	0	22	0	0
10	President Barack Obama School (PS #34)	Indoor Air Quality & HVAC Enhancements	N	0	0	0	0	0
13	President Barack Obama School (PS #34)	Plug Load Controls	Y	44,047	0	0	0	0
14	President Barack Obama School (PS #34)	Building Envelope Improvements	Y	5,537	0	3,143	0	0
17	President Barack Obama School (PS #34)	Water Conservation	Y	0	0	0	0	240
18	President Barack Obama School (PS #34)	Pipe Insulation	Y	0	0	4,050	0	0
23	President Barack Obama School (PS #34)	Student Education Program	Y	0	0	0	0	0
3	Rafael Cordero Y Molina School (PS #37)	District-Wide Energy Management System - Tier 1	Y	0	0	6,123	0	0
4	Rafael Cordero Y Molina School (PS #37)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Rafael Cordero Y Molina School (PS #37)	Boiler Replacement w/ Fuel Conversion	Y	11,150	0	(20,940)	16089.2	0
10	Rafael Cordero Y Molina School (PS #37)	Indoor Air Quality & HVAC Enhancements	Y	3,188	0	0	0	0
12	Rafael Cordero Y Molina School (PS #37)	Rooftop Unit Replacement	N	0	0	0	0	0
13	Rafael Cordero Y Molina School (PS #37)	Plug Load Controls	Y	0	0	0	0	0
14	Rafael Cordero Y Molina School (PS #37)	Building Envelope Improvements	Y	513	0	291	0	0
17	Rafael Cordero Y Molina School (PS #37)	Water Conservation	Y	0	0	0	0	1,375
18	Rafael Cordero Y Molina School (PS #37)	Pipe Insulation	Y	0	0	4,130	0	0
19	Rafael Cordero Y Molina School (PS #37)	Destratification Fans	Y	(1,216)	0	1,801	0	0
23	Rafael Cordero Y Molina School (PS #37)	Student Education Program	Y	0	0	0	0	0
1	James F. Murray School (PS #38)	LED Lighting Replacement	Y	76,789	20	(161)	0	0
2	James F. Murray School (PS #38)	Lighting Controls	N	0	0	0	0	0
3	James F. Murray School (PS #38)	District-Wide Energy Management System - Tier 1	Y	0	0	5,464	0	0
4	James F. Murray School (PS #38)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	James F. Murray School (PS #38)	Boiler Replacement w/ Fuel Conversion	Y	10,639	0	(30,053)	23091.3	0
11	James F. Murray School (PS #38)	Unit Ventilator Replacement	N	0	0	0	0	0
13	James F. Murray School (PS #38)	Plug Load Controls	Y	27,403	0	0	0	0
14	James F. Murray School (PS #38)	Building Envelope Improvements	Y	1,117	0	634	0	0
17	James F. Murray School (PS #38)	Water Conservation	Y	0	0	0	0	412
18	James F. Murray School (PS #38)	Pipe Insulation	Y	0	0	1,190	0	0
21	James F. Murray School (PS #38)	Retro-Commissioning	Y	0	0	38	0	0
22	James F. Murray School (PS #38)	Steam Trap Replacement	Y	0	0	2,377	0	0
23	James F. Murray School (PS #38)	Student Education Program	Y	0	0	0	0	0
1	Dr. Charles P. Defuccio School (PS #39)	LED Lighting Replacement	Y	87,071	22	(182)	0	0
2	Dr. Charles P. Defuccio School (PS #39)	Lighting Controls	N	0	0	0	0	0
3	Dr. Charles P. Defuccio School (PS #39)	District-Wide Energy Management System - Tier 1	Y	0	0	5,955	0	0
4	Dr. Charles P. Defuccio School (PS #39)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Dr. Charles P. Defuccio School (PS #39)	Solar PPA	Y	0	0	0	0	0
9	Dr. Charles P. Defuccio School (PS #39)	Roof Renovations	Y	0	0	27	0	0
11	Dr. Charles P. Defuccio School (PS #39)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Dr. Charles P. Defuccio School (PS #39)	Plug Load Controls	Y	19,272	0	0	0	0
14	Dr. Charles P. Defuccio School (PS #39)	Building Envelope Improvements	Y	1,478	0	839	0	0
16	Dr. Charles P. Defuccio School (PS #39)	Refrigeration Controls	Y	20,193	0	0	0	0
17	Dr. Charles P. Defuccio School (PS #39)	Water Conservation	Y	0	0	0	0	493
21	Dr. Charles P. Defuccio School (PS #39)	Retro-Commissioning	Y	0	0	101	0	0
22	Dr. Charles P. Defuccio School (PS #39)	Steam Trap Replacement	Y	0	0	2,000	0	0
23	Dr. Charles P. Defuccio School (PS #39)	Student Education Program	Y	0	0	0	0	0

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	INCLUDED IN PROJECT "Y" OR "N"	INSTALLED COST $	ANNUAL ELECTRIC COST SAVINGS $	ANNUAL NATURAL GAS COST SAVINGS $	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS $	ANNUAL Domestic Water (CCF) COST SAVINGS $	ANNUAL ENERGY COST SAVINGS $
	JERSEY CITY PUBLIC SCHOOLS								
1	Fred W. Martin Center of the Arts (PS #41)	LED Lighting Replacement	Y	$388,448	$35,653	($767)	$0	$0	$34,887
2	Fred W. Martin Center of the Arts (PS #41)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Fred W. Martin Center of the Arts (PS #41)	District-Wide Energy Management System - Tier 1	Y	$109,183	$0	$6,953	$0	$0	$6,953
4	Fred W. Martin Center of the Arts (PS #41)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Fred W. Martin Center of the Arts (PS #41)	Boiler Replacement w/ Fuel Conversion	Y	$942,400	$75	($19,804)	$55,682	$0	$35,953
7	Fred W. Martin Center of the Arts (PS #41)	Chiller Replacement	N	$0	$0	$0	$0	$0	$0
8	Fred W. Martin Center of the Arts (PS #41)	Solar PPA	Y	$0	$27,145	$0	$0	$0	$27,145
9	Fred W. Martin Center of the Arts (PS #41)	Roof Renovations	Y	$0	$0	$66	$0	$0	$66
11	Fred W. Martin Center of the Arts (PS #41)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	Fred W. Martin Center of the Arts (PS #41)	Plug Load Controls	Y	$11,750	$2,657	$0	$0	$0	$2,657
14	Fred W. Martin Center of the Arts (PS #41)	Building Envelope Improvements	Y	$20,167	$380	$2,251	$0	$0	$2,631
16	Fred W. Martin Center of the Arts (PS #41)	Refrigeration Controls	Y	$12,128	$0	$0	$0	$0	$0
17	Fred W. Martin Center of the Arts (PS #41)	Water Conservation	Y	$134,884	$1,697	$0	$0	$33,867	$35,564
18	Fred W. Martin Center of the Arts (PS #41)	Pipe Insulation	Y	$44,827	$0	$5,413	$0	$0	$5,413
19	Fred W. Martin Center of the Arts (PS #41)	Destratification Fans	Y	$18,075	($128)	$1,754	$0	$0	$1,627
21	Fred W. Martin Center of the Arts (PS #41)	Retro-Commissioning	Y	$0	$0	$0	$0	$0	$0
23	Fred W. Martin Center of the Arts (PS #41)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Annex Early Childhood Development Center (PS #23A)	LED Lighting Replacement	Y	$23,803	$3,757	($63)	$0	$0	$3,694
2	Annex Early Childhood Development Center (PS #23A)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Annex Early Childhood Development Center (PS #23A)	District-Wide Energy Management System - Tier 1	Y	$35,776	$0	$688	$0	$0	$688
4	Annex Early Childhood Development Center (PS #23A)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
13	Annex Early Childhood Development Center (PS #23A)	Plug Load Controls	Y	$2,250	$490	$0	$0	$0	$490
14	Annex Early Childhood Development Center (PS #23A)	Building Envelope Improvements	Y	$5,193	$0	$0	$0	$0	$0
17	Annex Early Childhood Development Center (PS #23A)	Water Conservation	Y	$4,057	$0	$0	$0	$435	$435
18	Annex Early Childhood Development Center (PS #23A)	Pipe Insulation	Y	$3,038	$0	$436	$0	$0	$436
23	Annex Early Childhood Development Center (PS #23A)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Danforth Early Childhood Center (PS #16A)	LED Lighting Replacement	Y	$68,449	$5,915	($66)	$0	$0	$5,849
2	Danforth Early Childhood Center (PS #16A)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Danforth Early Childhood Center (PS #16A)	District-Wide Energy Management System - Tier 1	Y	$39,515	$0	$2,888	$0	$0	$2,888
4	Danforth Early Childhood Center (PS #16A)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
6	Danforth Early Childhood Center (PS #16A)	Boiler Replacement w/ Fuel Conversion	Y	$488,400	$677	($14,766)	$48,647	$0	$34,558
8	Danforth Early Childhood Center (PS #16A)	Solar PPA	Y	$0	$14,222	$0	$0	$0	$14,222
9	Danforth Early Childhood Center (PS #16A)	Roof Renovations	Y	$910,000	$0	$19	$0	$0	$19
10	Danforth Early Childhood Center (PS #16A)	Indoor Air Quality & HVAC Enhancements	Y	$3,422,030	$204	$0	$0	$0	$204
13	Danforth Early Childhood Center (PS #16A)	Plug Load Controls	Y	$3,250	$3,426	$0	$0	$0	$3,426
14	Danforth Early Childhood Center (PS #16A)	Building Envelope Improvements	Y	$31,468	$688	$2,120	$0	$0	$2,808
17	Danforth Early Childhood Center (PS #16A)	Water Conservation	Y	$32,941	$0	$0	$0	$1,683	$1,683
18	Danforth Early Childhood Center (PS #16A)	Pipe Insulation	Y	$69,263	$0	$3,253	$0	$0	$3,253
23	Danforth Early Childhood Center (PS #16A)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	A. Harry Moore School (PS #52)	LED Lighting Replacement	Y	$200,000	$8,045	($201)	$0	$0	$7,844
2	A. Harry Moore School (PS #52)	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	A. Harry Moore School (PS #52)	District-Wide Energy Management System - Tier 1	Y	$37,173	$0	$3,646	$0	$0	$3,646
4	A. Harry Moore School (PS #52)	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
11	A. Harry Moore School (PS #52)	Unit Ventilator Replacement	N	$0	$0	$0	$0	$0	$0
13	A. Harry Moore School (PS #52)	Plug Load Controls	Y	$15,250	$9,486	$0	$0	$0	$9,486
14	A. Harry Moore School (PS #52)	Building Envelope Improvements	Y	$39,745	$543	$3,757	$0	$0	$4,300
17	A. Harry Moore School (PS #52)	Water Conservation	Y	$18,396	$0	$0	$0	$5,990	$5,990
18	A. Harry Moore School (PS #52)	Pipe Insulation	Y	$24,236	$0	$2,489	$0	$0	$2,489
21	A. Harry Moore School (PS #52)	Retro-Commissioning	Y	$0	$0	$62	$0	$0	$62
22	A. Harry Moore School (PS #52)	Steam Trap Replacement	Y	$19,375	$0	$1,387	$0	$0	$1,387
23	A. Harry Moore School (PS #52)	Student Education Program	Y	$0	$0	$0	$0	$0	$0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Fred W. Martin Center of the Arts (PS #41)	LED Lighting Replacement	Y	334,575	85	(700)	0	0
2	Fred W. Martin Center of the Arts (PS #41)	Lighting Controls	N	0	0	0	0	0
3	Fred W. Martin Center of the Arts (PS #41)	District-Wide Energy Management System - Tier 1	Y	0	0	6,346	0	0
4	Fred W. Martin Center of the Arts (PS #41)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Fred W. Martin Center of the Arts (PS #41)	Boiler Replacement w/ Fuel Conversion	Y	710	0	(18,073)	13886	0
7	Fred W. Martin Center of the Arts (PS #41)	Chiller Replacement	N	0	0	0	0	0
8	Fred W. Martin Center of the Arts (PS #41)	Solar PPA	Y	0	0	0	0	0
9	Fred W. Martin Center of the Arts (PS #41)	Roof Renovations	Y	0	0	61	0	0
11	Fred W. Martin Center of the Arts (PS #41)	Unit Ventilator Replacement	N	0	0	0	0	0
13	Fred W. Martin Center of the Arts (PS #41)	Plug Load Controls	Y	25,300	0	0	0	0
14	Fred W. Martin Center of the Arts (PS #41)	Building Envelope Improvements	Y	3,618	0	2,054	0	0
16	Fred W. Martin Center of the Arts (PS #41)	Refrigeration Controls	Y	0	0	0	0	0
17	Fred W. Martin Center of the Arts (PS #41)	Water Conservation	Y	16,154	0	0	0	3,006
18	Fred W. Martin Center of the Arts (PS #41)	Pipe Insulation	Y	0	0	4,940	0	0
19	Fred W. Martin Center of the Arts (PS #41)	Destratification Fans	Y	(1,216)	0	1,601	0	0
21	Fred W. Martin Center of the Arts (PS #41)	Retro-Commissioning	Y	0	0	0	0	0
23	Fred W. Martin Center of the Arts (PS #41)	Student Education Program	Y	0	0	0	0	0
1	Annex Early Childhood Development Center (PS #23A)	LED Lighting Replacement	Y	25,606	7	(54)	0	0
2	Annex Early Childhood Development Center (PS #23A)	Lighting Controls	N	0	0	0	0	0
3	Annex Early Childhood Development Center (PS #23A)	District-Wide Energy Management System - Tier 1	Y	0	0	583	0	0
4	Annex Early Childhood Development Center (PS #23A)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
13	Annex Early Childhood Development Center (PS #23A)	Plug Load Controls	Y	3,363	0	0	0	0
14	Annex Early Childhood Development Center (PS #23A)	Building Envelope Improvements	Y	0	0	0	0	0
17	Annex Early Childhood Development Center (PS #23A)	Water Conservation	Y	0	0	0	0	13
18	Annex Early Childhood Development Center (PS #23A)	Pipe Insulation	Y	0	0	370	0	0
23	Annex Early Childhood Development Center (PS #23A)	Student Education Program	Y	0	0	0	0	0
1	Danforth Early Childhood Center (PS #16A)	LED Lighting Replacement	Y	39,258	10	(82)	0	0
2	Danforth Early Childhood Center (PS #16A)	Lighting Controls	N	0	0	0	0	0
3	Danforth Early Childhood Center (PS #16A)	District-Wide Energy Management System - Tier 1	Y	0	0	3,569	0	0
4	Danforth Early Childhood Center (PS #16A)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
6	Danforth Early Childhood Center (PS #16A)	Boiler Replacement w/ Fuel Conversion	Y	4,537	0	(18,246)	14019	0
8	Danforth Early Childhood Center (PS #16A)	Solar PPA	Y	0	0	0	0	0
9	Danforth Early Childhood Center (PS #16A)	Roof Renovations	Y	0	0	23	0	0
10	Danforth Early Childhood Center (PS #16A)	Indoor Air Quality & HVAC Enhancements	Y	1,369	0	0	0	0
13	Danforth Early Childhood Center (PS #16A)	Plug Load Controls	Y	22,967	0	0	0	0
14	Danforth Early Childhood Center (PS #16A)	Building Envelope Improvements	Y	4,615	0	2,619	0	0
17	Danforth Early Childhood Center (PS #16A)	Water Conservation	Y	0	0	0	0	123
18	Danforth Early Childhood Center (PS #16A)	Pipe Insulation	Y	0	0	4,020	0	0
23	Danforth Early Childhood Center (PS #16A)	Student Education Program	Y	0	0	0	0	0
1	A. Harry Moore School (PS #52)	LED Lighting Replacement	Y	81,151	21	(170)	0	0
2	A. Harry Moore School (PS #52)	Lighting Controls	N	0	0	0	0	0
3	A. Harry Moore School (PS #52)	District-Wide Energy Management System - Tier 1	Y	0	0	3,076	0	0
4	A. Harry Moore School (PS #52)	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
11	A. Harry Moore School (PS #52)	Unit Ventilator Replacement	N	0	0	0	0	0
13	A. Harry Moore School (PS #52)	Plug Load Controls	Y	97,540	0	0	0	0
14	A. Harry Moore School (PS #52)	Building Envelope Improvements	Y	5,584	0	3,169	0	0
17	A. Harry Moore School (PS #52)	Water Conservation	Y	0	0	0	0	334
18	A. Harry Moore School (PS #52)	Pipe Insulation	Y	0	0	2,100	0	0
21	A. Harry Moore School (PS #52)	Retro-Commissioning	Y	0	0	52	0	0
22	A. Harry Moore School (PS #52)	Steam Trap Replacement	Y	0	0	1,170	0	0
23	A. Harry Moore School (PS #52)	Student Education Program	Y	0	0	0	0	0

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	INSTALLED COST	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	ANNUAL ENERGY COST SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	$	$	$	$	$	$
1	Glenn D. Cunningham Center	LED Lighting Replacement	Y	$48,975	$3,627	($72)	$0	$0	$3,555
2	Glenn D. Cunningham Center	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Glenn D. Cunningham Center	District-Wide Energy Management System - Tier 1	Y	$28,079	$0	$715	$0	$0	$715
4	Glenn D. Cunningham Center	District-Wide Energy Management System - Tier 2	N	$0	$0	$0	$0	$0	$0
8	Glenn D. Cunningham Center	Solar PPA	Y	$0	$8,671	$0	$0	$0	$8,671
9	Glenn D. Cunningham Center	Roof Renovations	Y	$295,000	$0	$18	$0	$0	$18
13	Glenn D. Cunningham Center	Plug Load Controls	Y	$1,875	$380	$0	$0	$0	$380
14	Glenn D. Cunningham Center	Building Envelope Improvements	Y	$7,046	$139	$759	$0	$0	$898
17	Glenn D. Cunningham Center	Water Conservation	Y	$3,504	$0	$0	$0	$415	$415
23	Glenn D. Cunningham Center	Student Education Program	Y	$0	$0	$0	$0	$0	$0
1	Administration Central Office	LED Lighting Replacement	Y	$350,000	$33,378	$0	$0	$0	$33,378
2	Administration Central Office	Lighting Controls	N	$0	$0	$0	$0	$0	$0
3	Administration Central Office	District-Wide Energy Management System - Tier 1	Y	$47,291	$1,141	$0	$0	$0	$1,141
8	Administration Central Office	Solar PPA	Y	$0	$9,025	$0	$0	$0	$9,025
9	Administration Central Office	Roof Renovations	Y	$465,000	$0	$0	$0	$0	$0
23	Administration Central Office	Student Education Program	Y	$0	$0	$0	$0	$0	$0
23	PS #16 (New School)	Student Education Program	Y	$0	$0	$0	$0	$0	$0
		TOTALS		$88,257,663	$1,908,708	$255,626	$722,938	$414,514	$3,301,786

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT	ELECTRIC CONSUMPTION SAVINGS	ELECTRIC DEMAND SAVINGS	NATURAL GAS SAVINGS	Fuel Oil #2 (Gal) SAVINGS	Domestic Water (CCF) SAVINGS
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"	kWh	kW	THERMS	GAL	CCF
1	Glenn D. Cunningham Center	LED Lighting Replacement	Y	27,419	7	(57)	0	0
2	Glenn D. Cunningham Center	Lighting Controls	N	0	0	0	0	0
3	Glenn D. Cunningham Center	District-Wide Energy Management System - Tier 1	Y	0	0	570	0	0
4	Glenn D. Cunningham Center	District-Wide Energy Management System - Tier 2	N	0	0	0	0	0
8	Glenn D. Cunningham Center	Solar PPA	Y	0	0	0	0	0
9	Glenn D. Cunningham Center	Roof Renovations	Y	0	0	14	0	0
13	Glenn D. Cunningham Center	Plug Load Controls	Y	2,921	0	0	0	0
14	Glenn D. Cunningham Center	Building Envelope Improvements	Y	1,067	0	605	0	0
17	Glenn D. Cunningham Center	Water Conservation	Y	0	0	0	0	24
23	Glenn D. Cunningham Center	Student Education Program	Y	0	0	0	0	0
1	Administration Central Office	LED Lighting Replacement	Y	280,587	71	0	0	0
2	Administration Central Office	Lighting Controls	N	0	0	0	0	0
3	Administration Central Office	District-Wide Energy Management System - Tier 1	Y	9,695	0	0	0	0
8	Administration Central Office	Solar PPA	Y	0	0	0	0	0
9	Administration Central Office	Roof Renovations	Y	0	0	0	0	0
23	Administration Central Office	Student Education Program	Y	0	0	0	0	0
23	PS #16 (New School)	Student Education Program	Y	0	0	0	0	0
		TOTALS		9,671,040	171.4	308,947	201,895	36,805

ECM Budgeting Narrative

The budgetary costs carried in the project are based on good faith estimates, contractor supplied budgets for similar ECMs on other recent projects and a database of actual installed costs for various ECMs.

JERSEY CITY PUBLIC SCHOOLS		INSTALLED COST
ECM #	ENERGY CONSERVATION MEASURE	$
1	LED Lighting Replacement	$12,372,529
2	Lighting Controls	$0
3	District-Wide Energy Management System - Tier 1	$2,904,533
4	District-Wide Energy Management System - Tier 2	$0
5	Boiler Replacement	$4,982,800
6	Boiler Replacement w/ Fuel Conversion	$3,954,400
7	Chiller Replacement	$0
8	Solar PPA	$0
9	Roof Renovations	$14,393,000
10	Indoor Air Quality & HVAC Enhancements	$43,931,740
11	Unit Ventilator Replacement	$0
12	Rooftop Unit Replacement	$0
13	Plug Load Controls	$476,500
14	Building Envelope Improvements	$921,368
15	Kitchen Hood Control	$100,065
16	Refrigeration Controls	$254,276
17	Water Conservation	$2,248,635
18	Pipe Insulation	$938,568
19	Destratification Fans	$281,875
20	Combined Heating & Power	$135,500
21	Retro-Commissioning	$0
22	Steam Trap Replacement	$361,875
23	Student Education Program	$0
	TOTALS	$88,257,663

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

ECM 1 – LED Lighting Replacement

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
1	LED Lighting Replacement	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
1	LED Lighting Replacement	✓	✓	✓	✓	✓	✓			✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	

Background

Lighting retrofits and fixture replacements can greatly reduce energy consumption and lower energy bills, while maintaining lighting levels and quality by upgrading lighting components to more efficient and advanced technologies. Upgrading technologies can also offer employees greater control over lighting, allowing for additional energy savings

Improvements in lighting technologies have led to increased lifetimes for components that will result in fewer failures and lengthen the time between maintenance activities. The implementation of a routine maintenance program in addition to the lighting retrofit will greatly simplify the maintenance practices and reduce the operational costs.

Retrofitting is typically the least expensive way to transform and upgrade the lighting in a facility. Many offices, government and school facilities utilize 2-to-4-foot tubes as primary lighting type. In these situations, specifying Type B LED Tubes may be most optimal because they have an internal LED driver which allows them to bypass the existing fluorescent ballast in a fixture and wire directly to line voltage. This results in added energy savings as LED T8 tubes that run on a ballast are less efficient. Initial installation takes more time as the ballast wiring needs to be cut out, but long-term, this will also result in maintenance savings as there is no need to replace ballasts.

Fixture Replacements are often the most expensive option, but are also typically the most efficient choice, making them the most cost-effective choice over the lifespan of all products. From simple dimming installations, all the way to sophisticated sensing that can provide real-time feedback on energy usage, occupancy rates, and even operational status, LED fixtures may be able to provide the solution. Fixture Replacements allow for variety and increased customization of specific light color, output, and other features.

Existing Conditions

Scope of Work

Replace a majority of existing interior and exterior fixtures with new LED fixtures as proposed in the line-by-lines in Appendix F. Retrofitting is specified in spaces shown on the line-by-line. The new LED tubes do not require the existing fluorescent ballasts to operate (Type B retrofit).

ECM Savings Calculations

BPU Protocols were used to calculate LED lighting savings. A coincidence factor is applied to estimate peak demand savings. The impact on the HVAC systems is captured as well. See Appendix G for Lighting Line-by-Lines.

LED Lighting Replacement Savings

BUILDING	SQFT	SPACE	QUANTITY	W_b	LPD_b	W_q	LPD_q	ΔkW	CF	Hours per Year	$HVAC_d$	$HVAC_e$	$HVAC_g$	Peak Demand Savings (kW)	Replacement Energy Savings (kWh)	Replacement Fuel Savings (Therms)
William L. Dickinson High School (PS #43)	356,000	INTERIOR	4057	277.57	3.16	114.72	1.31	163	0.5	2575	0.44	0.1	-0.00023	117.25	461,272.63	(964.48)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
James J. Ferris High School (PS #44)	282,511	INTERIOR	5086	372.72	6.71	134.64	2.42	238	0.5	2575	0.44	0.1	-0.00023	171.42	674,361.60	(1,410.03)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Lincoln High School (PS #48)	272,932	INTERIOR	2833	261.49	2.71	90.2	0.94	171	0.5	2575	0.44	0.1	-0.00023	123.33	485,178.93	(1,014.47)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Henry Snyder High School (PS #46)	187,500	INTERIOR	3055	221.67	3.61	98.41	1.60	123	0.5	2575	0.44	0.1	-0.00023	88.75	349,133.95	(730.01)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	INTERIOR	1512	139.18	1.59	55.51	0.63	84	0.5	2575	0.44	0.1	-0.00023	60.24	236,995.28	(495.54)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Liberty High School (PS #45)	33,316	INTERIOR	209	16.17	0.10	5.85	0.04	10	0.5	2575	0.44	0.1	-0.00023	7.43	29,231.40	(61.12)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Academy I Middle School (PS #1)	64,884	INTERIOR	693	57.6	0.62	25	0.27	33	0.5	2575	0.44	0.1	-0.00023	23.47	92,339.50	(193.07)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Franklin L. Williams Middle School (MS #7)	163,855	INTERIOR	3479	209.68	4.45	79.03	1.68	131	0.5	2575	0.44	0.1	-0.00023	94.07	370,066.13	(773.77)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Ezra L. Nolan Middle School (MS #40)	132,483	INTERIOR	1239	90	0.84	48.39	0.45	42	0.5	2575	0.44	0.1	-0.00023	29.96	117,860.33	(246.44)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Frank R. Conwell Middle School (MS #4)	169,678	INTERIOR	2451	195.22	2.82	93.15	1.35	102	0.5	2575	0.44	0.1	-0.00023	73.49	289,113.28	(604.51)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Frank R. Conwell School (PS #3)	117,939	INTERIOR	1697	147.31	2.12	65.88	0.95	81	0.5	2575	0.44	0.1	-0.00023	58.63	230,650.48	(482.27)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Dr. Michael Conti School (PS #5)	148,049	INTERIOR	1282	123.37	1.07	66	0.57	57	0.5	2575	0.44	0.1	-0.00023	41.31	162,500.53	(339.77)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Jotham W. Wakeman School (PS #6)	148,882	INTERIOR	1258	107.28	0.91	36.66	0.31	71	0.5	2575	0.44	0.1	-0.00023	50.85	200,031.15	(418.25)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Charles E. Trefurt School (PS #8)	169,196	INTERIOR	1327	123.4	0.97	66	0.52	57	0.5	2575	0.44	0.1	-0.00023	41.33	162,585.50	(339.95)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Martin Luther King, Jr. School (PS #11)	104,509	INTERIOR	1706	99.41	1.62	45.14	0.74	54	0.5	2575	0.44	0.1	-0.00023	39.07	153,719.78	(321.41)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Julia A. Barnes School (PS #12)	86,375	INTERIOR			0.00		0.00	0	0.5	2575	0.44	0.1	-0.00023	0.00	0.00	0.00
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Ollie Culbreth Jr. School (PS #14)	98,036	INTERIOR	910	75.08	0.70	58	0.54	17	0.5	2575	0.44	0.1	-0.00023	12.30	48,379.10	(101.16)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Whitney M. Young Jr. School (PS #15)	179,590	INTERIOR	1628	181.49	1.65	80.82	0.73	101	0.5	2575	0.44	0.1	-0.00023	72.48	285,147.78	(596.22)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Cornelia F. Bradford School (PS #16)	61,684	INTERIOR			0.00		0.00	0	0.5	2575	0.44	0.1	-0.00023	0.00	0.00	0.00
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Joseph H. Brensinger School (PS #17)	153,864	INTERIOR	2054	144.44	1.93	50	0.67	94	0.5	2575	0.44	0.1	-0.00023	68.00	267,501.30	(559.32)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Dr. Maya Angelou School (PS #20)	108,800	INTERIOR	990	96.08	0.87	40.64	0.37	55	0.5	2575	0.44	0.1	-0.00023	39.92	157,033.80	(328.34)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	INTERIOR	1518	139.4	1.35	76	0.73	63	0.5	2575	0.44	0.1	-0.00023	45.65	179,580.50	(375.49)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00

LED Lighting Replacement Savings

BUILDING	SQFT	SPACE	QUANTITY	W_b	LPD_b	W_q	LPD_q	ΔkW	CF	Hours per Year	$HVAC_d$	$HVAC_e$	$HVAC_g$	Peak Demand Savings (kW)	Replacement Energy Savings (kWh)	Replacement Fuel Savings (Therms)
Mahatma K. Ghandi School (PS #23)	164,653	INTERIOR	906	76.37	0.42	30.32	0.17	46	0.5	2575	0.44	0.1	-0.00023	33.16	130,436.63	(272.73)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
MarcAnthony Dinardo School (PS #23B)	58,480	INTERIOR	638	62.22	0.68	46	0.50	16	0.5	2575	0.44	0.1	-0.00023	11.68	45,943.15	(96.06)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Chaplain Charles Waters School (PS #24)	118,240	INTERIOR	1358	96.01	1.10	51	0.59	45	0.5	2575	0.44	0.1	-0.00023	32.41	127,490.83	(266.57)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Nicolaus Copernicus School (PS #25)	132,860	INTERIOR	1618	125	1.52	46	0.56	79	0.5	2575	0.44	0.1	-0.00023	56.88	223,767.50	(467.88)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Patricia Noonan School (PS #26)	123,000	INTERIOR	1695	113	1.56	46	0.63	67	0.5	2575	0.44	0.1	-0.00023	48.24	189,777.50	(396.81)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Alfred E. Zampella School (PS #27)	94,611	INTERIOR	947	90.87	0.91	34.36	0.34	57	0.5	2575	0.44	0.1	-0.00023	40.69	160,064.58	(334.68)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Christa Mcauliffe School (PS #28)	126,761	INTERIOR			0.00		0.00	0	0.5	2575	0.44	0.1	-0.00023	0.00	0.00	0.00
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Gladys Nunery School (PS #29)	66,180	INTERIOR			0.00		0.00	0	0.5	2575	0.44	0.1	-0.00023	0.00	0.00	0.00
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Alexander D. Sullivan School (PS #30)	93,129	INTERIOR	20	10	0.00	1.2	0.00	9	0.5	2575	0.44	0.1	-0.00023	6.34	24,926.00	(52.12)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Anthony J. Infante School (PS #31)	36,973	INTERIOR	403	31.2	0.34	15	0.16	16	0.5	2575	0.44	0.1	-0.00023	11.66	45,886.50	(95.94)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Paul Rafalides School (PS #33)	30,607	INTERIOR	432	39.14	0.55	13.45	0.19	26	0.5	2575	0.44	0.1	-0.00023	18.50	72,766.93	(152.15)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
President Barack Obama School (PS #34)	103,444	INTERIOR	995	90.3	0.87	48	0.46	42	0.5	2575	0.44	0.1	-0.00023	30.46	119,814.75	(250.52)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Rafael Cordero Y Molina School (PS #37)	135,534	INTERIOR			0.00		0.00	0	0.5	2575	0.44	0.1	-0.00023	0.00	0.00	0.00
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
James F. Murray School (PS #38)	120,940	INTERIOR	857	89.11	0.63	62	0.44	27	0.5	2575	0.44	0.1	-0.00023	19.52	76,789.08	(160.56)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Dr. Charles P. Defuccio School (PS #39)	126,429	INTERIOR	1223	78.74	0.76	48	0.46	31	0.5	2575	0.44	0.1	-0.00023	22.13	87,071.05	(182.06)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Fred W. Martin Center of the Arts (PS #41)	140,467	INTERIOR	1585	188.38	2.13	70.26	0.79	118	0.5	2575	0.44	0.1	-0.00023	85.05	334,574.90	(699.57)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Annex Early Childhood Development Center (PS #23A)	12,375	INTERIOR	176	14.79	0.21	5.75	0.08	9	0.5	2575	0.44	0.1	-0.00023	6.51	25,605.80	(53.54)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Danforth Early Childhood Center (PS #16A)	78,996	INTERIOR	272	22.84	0.08	8.98	0.03	14	0.5	2575	0.44	0.1	-0.00023	9.98	39,258.45	(82.09)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
A. Harry Moore School (PS #52)	65,300	INTERIOR	858	51.16	0.67	22.51	0.30	29	0.5	2575	0.44	0.1	-0.00023	20.63	81,151.13	(169.68)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Glenn D. Cunningham Center	12,100	INTERIOR	181	15.97	0.24	6.29	0.09	10	0.5	2575	0.44	0.1	-0.00023	6.97	27,418.60	(57.33)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00
Administration Central Office	246,800	INTERIOR	1876	170.81	1.30	71.75	0.55	99	0.5	2575	0.44	0.1	-0.00023	71.32	280,587.45	(586.68)
		EXTERIOR												0.00	0.00	0.00
		SPECIAL												0.00	0.00	0.00

Algorithms

$$\text{DkW} = (\#\ of\ replaced\ fixtures) * (Watts_b) - (\#\ of\ fixtures\ installed) * (Watts_q) = (LPD_b - LPD_q) * (\text{SF})$$

$$\text{Energy Savings}\left(\frac{\text{kWh}}{\text{yr}}\right) = (\Delta\text{kW}) * (\text{Hrs}) * (1 + HVAC_e)$$

$$\text{Peak Demand Savings (kW)} = (\Delta\text{kW}) * (\text{CF}) * (1 + HVAC_d)$$

$$\text{Fuel Savings}\left(\frac{\text{MMBtu}}{\text{yr}}\right) = (\Delta\text{kW}) * (\text{Hrs}) * (\text{HVAC}_\text{g})$$

Definition of Variables

ΔkW = Change in connected load from baseline to efficient lighting
$Watts_{b,q}$ = Wattage of existing baseline and qualifying equipment
LPD_b = Baseline lighting power density in Watt per square foot of space floor area
LPD_q = Lighting power density of qualified fixtures, equal to the sum of installed fixture wattage divided by floor area of the space where the fixtures are installed.
SF = Space floor area, in square feet
CF = Coincidence factor
Hrs = Annual operating hours
$HVAC_d$ = HVAC Interactive Factor for peak demand savings
$HVAC_e$ = HVAC Interactive Factor for annual energy savings
$HVAC_g$ = HVAC Interactive Factor for annual energy savings

Lighting Verification Performance Lighting

Component	Type	Value	Source
$Watts_{b,q}$	Variable	See NGrid Fixture Wattage Table Fixture counts and types, space type, floor area from customer application.	1
SF	Variable	From Customer Application	Application
CF	Fixed	See Table by Building Type	4
Hrs	Fixed	See Table by Building Type	4
$HVAC_d$	Fixed	See Table by Building Type	3, 5
$HVAC_e$	Fixed	See Table by Building Type	3, 5
$HVAC_g$	Fixed	See Table by Building Type	6
LPD_b	Variable	Lighting Power Density for, W/SF	2
LPD_q	Variable	Lighting Power Density, W/SF	Application

Hours of Operation and Coincidence Factor by Building Type

Building Type	Sector	CF	Hours
Grocery	Large Commercial/Industrial & Small Commercial	0.96	7,134
Medical - Clinic	Large Commercial/Industrial & Small Commercial	0.8	3,909
Medical - Hospital	Large Commercial/Industrial & Small Commercial	0.8	8,760[54]
Office	Large Commercial/Industrial	0.7	2,969
	Small Commercial	0.67	2,950
Other	Large Commercial/Industrial & Small Commercial	0.66	4,573
Retail	Large Commercial/Industrial	0.96	4,920
	Small Commercial	0.86	4,926
School	Large Commercial/Industrial & Small Commercial	0.50	2,575
Warehouse/ Industrial	Large Commercial/Industrial	0.7	4,116
	Small Commercial	0.68	3,799

HVAC Interactive Effects

Building Type	Demand Waste Heat Factor ($HVAC_d$)		Annual Energy Waste Heat Factor by Cooling/Heating Type ($HVAC_e$)			
	AC (Utility)	AC (PJM)	AC/ NonElec	AC/ ElecRes	Heat Pump	NoAC/ ElecRes
Office	0.35	0.32	0.10	-0.15	-0.06	-0.25
Retail	0.27	0.26	0.06	-0.17	-0.05	-0.23
Education	0.44	0.44	0.10	-0.19	-0.04	-0.29
Warehouse	0.22	0.23	0.02	-0.25	-0.11	-0.27
Other[56]	0.34	0.32	0.08	-0.18	-0.07	-0.26

Interactive Factor (HVACg) for Annual Fuel Savings

Project Type	**Fuel Type**	**Impact (MMBtu/ΔkWh)**
Large Retrofit (> 200 kW)	C&I Gas Heat	-0.00023
Large Retrofit (> 200 kW)	Oil	-0.00046
Small Retrofit (≤ 200 kW)	Gas Heat	-0.001075
Small Retrofit (> 200 kW)	Oil Heat	-0.000120

Sources

1. Device Codes and Rated Lighting System Wattage Table Retrofit Program, National Grid, January 13, 2015. https://www1.nationalgridus.com/files/AddedPDF/POA/RILightingRetrofit1.pdf

ECM 3 – District-Wide Energy Management System – Tier 1

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
3	District-Wide Energy Management System - Tier 1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
3	District-Wide Energy Management System - Tier 1	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	

Background

Energy Management Systems (EMS) are systems comprised of sensors, operators, processors, and a front-end user interface that controls and monitors electrical and mechanical building systems. Such systems provide automated control and monitoring of the heating, cooling, ventilation, lighting and performance of a building or group of buildings. The energy management system will provide Jersey City BOE with continuous monitoring & reporting of the Electric and Gas Meters.

Having building systems monitored from a central location enables the operator to receive alerts and predict future problems or troublesome conditions. The data obtained from this can be used to produce a trend analysis and annual consumption forecasts. Advanced control strategies implemented using these systems such as time scheduling, optimum start and stop, night set-back, demand-controlled ventilation, and peak demand limiting. The auditor will be able to use the EMS to diagnose current building system problems as well as tailor specific energy savings strategies that utilize the full capability of the given EMS.

DCO Energy uses a tiered approach to scoping the Energy Management System. Tier 1 covers the material and labor necessary to get each of the schools connected to the District-Wide System and takes control of the plant-level system, such as boiler or chillers. Tier 2 is a building specific scope that would retrofits and or integrate zone-level HVAC systems. In the scope of work detailed below, the Tier 1 and Tier 2 are detailed by building.

Scope of Work

WILLIAM L DICKINSON HIGH SCHOOL (PS #43)

- Steam Boiler Plant
    - New boiler plant to be installed in the ESIP Project by Mechanical Contractor
    - New Open Protocol Controller
    - Integration of new Boiler Control Panel
    - Water & OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- Steam to Hot Water Heat Exchanger
    - New HX to be installed in the ESIP Project by Mechanical Contractor
    - New Open Protocol Controller
    - 1/3-2/3 Steam Control Valves
    - (2) Water Temperature Sensors
    - Constant Volume Pump Control

        - Pump Start/Stop
        - Pump Status
- (204) Existing Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (14) Self-Contained Vertical Unit Ventilators
    - Existing Aerdale units are controlled standalone via unit mounted ALC Controls
    - Remove existing ALC Controls
    - Re-Use existing end devices
    - Provide/install new space temperature/humidity sensor
- (4) Packaged Rooftop Units
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Wall Mounted Temperature, Humidity and CO2 Sensor
    - RTU Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Units to turn off during unoccupied mode
        - OA Damper to operate based on CO2 Setpoint
- (146) Classroom Monitoring
    - Radiators and window air conditioners will operate standalone
    - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
    - Show classroom temp and humidity on floorplan graphics
- (4) Heating Only Hot Water Air Handling Units
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Hot Water Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, price to control boilers & heat exchanger.
2. All other scope items

JAMES J. FERRIS HIGH SCHOOL (PS #44)

- Hot Water Boiler Plant
  - New boiler plant to be installed in the ESIP Project by Mechanical Contractor
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (112) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Pipe, 2-Way Control Valve
  - New OA Damper Actuator
  - New Face & Bypass Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (14) Cabinet Unit Heaters
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new line voltage thermostat
- (10) Heating Only Hot Water Air Handling Units
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Fan Start/Stop & Status
  - Wall Mounted Temperature& Humidity Sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, price to control boilers.
2. All other scope items

ABRAHAM LINCOLN HIGH SCHOOL (PS #48)

- Steam Boiler Plant
    - New boiler plant to be installed in the ESIP Project by Mechanical Contractor
    - New Open Protocol Controller
    - Integration of new Boiler Control Panel
    - Water & OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- Hot Water Boiler Plant
    - New boiler plant to be installed in the ESIP Project by Mechanical Contractor
    - New Open Protocol Controller
    - Integration of new Boiler Control Panel
    - Water & OA Temperature Sensors
    - Constant Volume Pump Control including:
        - Pump Start/Stop
        - Pump Status
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (217) Existing Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (76) Classroom Monitoring (Old School)
    - Radiators and window air conditioners will operate standalone
    - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
    - Show classroom temp and humidity on floorplan graphics
- (3) Heating Only Hot Water Air Handling Units (Addition)
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Hot Water Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor

  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (50) Classroom Unit Ventilators (Addition)
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (8) Packaged Rooftop Units (Freshman Academy)
  - Install new Open Protocol Controller
- (39) Duct Mounted HW Reheat Coils (Freshman Academy)
  - Install new Open Protocol Controller
  - Re-Use existing coil control valve if possible
  - Discharge air temperature sensor
  - Wall Mounted Temperature& Humidity Sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, price to control boilers.
2. All other scope items

Liberty HIGH SCHOOL (PS #48)

- Steam Boiler Plant
  - New boiler plant to be installed in the ESIP Project by Mechanical Contractor
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (50) Existing Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (26) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
  - Show classroom temp and humidity on floorplan graphics

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, price to control boilers.
2. All other scope items

HENRY SNYDER HIGH SCHOOL (PS #46)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Air-Cooled Chiller Plant
  - New Open Protocol Controller
  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors

    - Constant volume pump control of (2) existing pumps
        - Pump Start/Stop
        - Pump Status
- (232) Existing Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (135) Classroom Monitoring
    - Radiators and window air conditioners will operate standalone
    - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
    - Show classroom temp and humidity on floorplan graphics
- (6) Heating Only Hot Water Air Handling Units
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor
- (10) Chilled Water Only Air Handling Units (Auditorium)
    - Install new Open Protocol Controller
    - New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor
- (3) Chilled Water/Steam Air Handling Units (Serves 4th Floor Studio)
    - Remove existing ALC Controls
    - Install new Open Protocol Controller
    - New 2-Way Chilled Water Coil Control Valve
    - New Steam Coil Control Valve

- New Modulating OA Damper Actuator
- Discharge Air Temperature Sensor
- Freezestat
- Fan Start/Stop Relay
- Fan Status Current Sensor
- Wall Mounted Temperature & Humidity sensor

- (8) Classroom Unit Ventilators
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (1) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. All other scope items

MCNAIR HIGH SCHOOL (PS #47)

- Hot Water Boiler Plant
    - New Open Protocol Controller
    - Integration of new Boiler Control Panel
    - Water & OA Temperature Sensors
    - Constant Volume Pump Control including:
        - Pump Start/Stop
        - Pump Status
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
        - Dual Temperature Changeover Control
- Air-Cooled Chiller Plant
    - New Open Protocol Controller

  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors
  - Constant volume pump control of (2) existing pumps
    - Pump Start/Stop
    - Pump Status
- (75) Dual Temp Air Handling Units
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. Price for all other scope items

ACADEMY I MIDDLE SCHOOL (PS #47)

- (44) Classroom Unit Ventilators
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Electric Heat Enable/Disable
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control UVs.
2. None

EZRA NOLAN MIDDLE SCHOOL (MS #40)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Air-Cooled Chiller Plant
  - New Open Protocol Controller
  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors
  - Constant volume pump control of (2) existing pumps
    - Pump Start/Stop
    - Pump Status
- (12) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (57) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (7) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor

  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Chilled Water/Steam Air Handling Units (Serves Auditorium)
  - Remove existing ALC Controls
  - Install new Open Protocol Controller
  - New 2-Way Chilled Water Coil Control Valve
  - New Steam Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (1) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, control boilers & chillers.
2. All other scope items

FRANKLIN L WILLIAMS MIDDLE SCHOOL (MS #7)

- Integrate the existing, building-wide ALC Control System

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

FRANK CONWELL MIDDLE SCHOOL (MS #4)

- Integrate the existing, building-wide ALC Control System

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

FRANK CONWELL ELEMENTARY SCHOOL (PS #3)

- Integrate the existing, building-wide ALC Control System

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

DR MICHAEL CONTI SCHOOL (PS #5)

- Steam Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (281) Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (8) Fan Coil Units
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - Supply Fan Start/Stop & Status
    - Wall Mounted Temperature, Humidity

- (2) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (1) Split System
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

JOTHAM W WAKEMAN SCHOOL (PS #6)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Hot Water Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - Constant Volume Pump Control including:
    - Pump Start/Stop
    - Pump Status
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode

        - OA Supply Water Temperature setpoint Reset Schedule
        - Dual Temperature Changeover Control
- (55) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (7) Self-Contained Classroom Unit Ventilators
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Connect to existing DDC End Devices
    - Wall Mounted Temperature, Humidity
- (4) Heating Only Air Handling Units
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

CHARLES E TREFURT SCHOOL (PS #8)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (2) Steam to HW Heat Exchangers
  - New Open Protocol Controller
  - Water & OA Temperature Sensors
  - (2) new Steam Control Valves
  - Constant Volume Pump Control of (2) existing pumps including:
    - Pump Start/Stop
    - Pump Status
- Existing Air-Cooled Chiller Plant
  - New Open Protocol Controller
  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors
  - Constant volume pump control of (2) existing pumps
    - Pump Start/Stop
    - Pump Status
- (126) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (9) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place

  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Pipe, 2-Way Control Valve
  - New OA Damper Actuator
  - New Face & Bypass Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (3) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. All other scope items

MARTIN LUTHER KING SCHOOL (PS #8)

- Hot Water Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - Constant Volume Pump Control including:
    - Pump Start/Stop
    - Pump Status
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule

        - Dual Temperature Changeover Control
- Air-Cooled Chiller Plant
    - New Open Protocol Controller
    - Integration of Chiller Control Panel
    - Water & OA Temperature Sensors
    - Constant volume pump control of (2) existing pumps
        - Pump Start/Stop
        - Pump Status
- (60) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (3) HW/DX Air Handling Units
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Coil Control Valve
    - Condensing Unit enable/disable
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. All other scope items

JULIA A BARNES SCHOOL (PS #12)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (32) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (29 Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (1) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

OLLIE CULBRETH SCHOOL (PS #14)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Hot Water Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - Constant Volume Pump Control including:
    - Pump Start/Stop
    - Pump Status
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
    - Dual Temperature Changeover Control
- (60) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (110) Steam Radiators
  - New Thermostatic Radiation Valve

  - Radiators to operate standalone
- (4) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

WHITNEY M YOUNG JR SCHOOL (PS #15)

- Hot Water Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - Constant Volume Pump Control including:
    - Pump Start/Stop
    - Pump Status
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
    - Dual Temperature Changeover Control
- (75) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points

  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (20) Fan Coil Units
  - Existing FCUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - Supply Fan Start/Stop & Status
  - Wall Mounted Temperature, Humidity
- (128) Hot Water Baseboard Zones
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (4) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Provide the following pricing:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

CORNELIA F BRADFORD SCHOOL (PS #16)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (110) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (33) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
  - Show classroom temp and humidity on floorplan graphics
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

JOSEPH S BRINSINGER SCHOOL (PS #17)

- Hot Water Boiler Plant
  - New Open Protocol Controller
  - Integration of new Boiler Control Panel
  - Water & OA Temperature Sensors
  - Constant Volume Pump Control including:
    - Pump Start/Stop
    - Pump Status
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
    - Dual Temperature Changeover Control

- Air-Cooled Chiller Plant
    - New Open Protocol Controller
    - Integration of Chiller Control Panel
    - Water & OA Temperature Sensors
    - Constant volume pump control of (2) existing pumps
        - Pump Start/Stop
        - Pump Status
- (47) Classroom Unit Ventilators
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (18) CHW/HW Air Handling Units
    - Install new Open Protocol Controller
    - (2) New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor
- (4) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. Price for all other scope items

DR MAYA ANGELOU SCHOOL (PS #20)

- Integrate the existing, building-wide ALC Control System

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

REV DR ERCEL WEBB SCHOOL (PS #22)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Air-Cooled Chiller Plant
  - New Open Protocol Controller
  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors
  - Constant volume pump control of (2) existing pumps
    - Pump Start/Stop
    - Pump Status
- (130) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (86) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
- (4) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve

- New Modulating OA Damper Actuator
- Discharge Air Temperature Sensor
- Freezestat
- Fan Start/Stop Relay
- Fan Status Current Sensor
- Wall Mounted Temperature & Humidity sensor

- (2) CHW/HW Air Handling Units (Auditorium)
    - Install new Open Protocol Controller
    - (2) New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Freezestat
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor
- (2) Split Systems
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers & chillers.
2. Price for all other scope items

MAHATMA GHANDI SCHOOL (PS #23)

- Steam Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (68) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place

- Install new Open Protocol Controller as required to include additional hardwired points
- Install new 2-Way Control Valve
- New OA Damper Actuator
- Supply Fan Start/Stop & Status
- UV Discharge Air Temperature Sensor
- Wall Mounted Temperature, Humidity

- (2) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Pricing:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

MARCANTHONY DINARDO SCHOOL (PS #23)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (110) Steam Radiators
  - New Thermostatic Radiation Valve

- Radiators to operate standalone
- (33) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. Price for all other scope items

CHAPLIN CHARLIE WATERS SCHOOL (PS #24)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (56) Classroom Fan Coil Units
  - Existing FCUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - Supply Fan Start/Stop & Status
  - Wall Mounted Temperature, Humidity
- (110) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (2) Heating Only Air Handling Units (Cafeteria)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor

- Freezestat
- Fan Start/Stop Relay
- Fan Status Current Sensor
- Wall Mounted Temperature & Humidity sensor

- (1) HW/DX Air Handling Units (Library)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - Condensing Unit enable/disable
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

NICOLAS COPERNICUS SCHOOL (PS #25)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (33) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (114) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (2) Heating Only Air Handling Units (Cafeteria)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (1) HW/DX Air Handling Units (Library)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place

  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - Condensing Unit enable/disable
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

PATRICIA NOONAN SCHOOL (PS #26)

- Integrate the existing, building-wide ALC Control System

Tier scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

ALFRED E ZAMPELLA SCHOOL (PS #27)

- (79) Classroom Unit Ventilators
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Electric Heat Enable/Disable
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (2) Heating Only Air Handling Units
  - Install new Open Protocol Controller
  - Electric Heat Enable/Disable

  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control UVs.
2. None

CHRISTA MCAULIFFE SCHOOL (PS #28)

- Integrate the existing, building-wide ALC Control System

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to integrate existing system.
2. None

GLADYS NUNNERY SCHOOL (PS #29)

- New Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (94) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (33) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.

- (2) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

ALEXANDER SULLIVAN SCHOOL (PS #30)

- Steam Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (49) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (50) Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (3) Heating Only Air Handling Units
    - Existing AHUs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor

- Freezestat
- Fan Start/Stop Relay
- Fan Status Current Sensor
- Wall Mounted Temperature & Humidity sensor

- (1) HW/DX Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - Condensing Unit enable/disable
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

INFANTE SCHOOL (PS #31)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (64) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone

- (30) Classroom Monitoring
    - Radiators and window air conditioners will operate standalone
    - Provide and install new space temperature and humidity sensors in each classroom for monitoring.

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

PAUL RAFILIDES SCHOOL (PS #33)

- Steam Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (54) Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (20) Classroom Monitoring
    - Radiators and window air conditioners will operate standalone
    - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
- (2) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity

Tier Scopes

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

BARACK OBAMA SCHOOL (PS #34)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- Air-Cooled Chiller Plant
  - New Open Protocol Controller
  - Integration of Chiller Control Panel
  - Water & OA Temperature Sensors
  - Constant volume pump control of (2) existing pumps
    - Pump Start/Stop
    - Pump Status
- (2) Steam to HW Heat Exchangers
  - New Open Protocol Controller
  - Water & OA Temperature Sensors
  - (2) new Steam Control Valves
  - Constant Volume Pump Control of (2) existing pumps including:
    - Pump Start/Stop
    - Pump Status
- (102) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (56) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
- (17) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator

- Supply Fan Start/Stop & Status
- UV Discharge Air Temperature Sensor
- Wall Mounted Temperature, Humidity

- (1) Heating Only Air Handling Units (Gymnasium)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor
- (1) HW/CHW Air Handling Units (Cafeteria)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - (2) New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor

Tier Scopes

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

RAFAEL CORDEO Y MOLINA SCHOOL (PS #37)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (168) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (56) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
- (2) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (2) Heating Only Air Handling Units (Gymnasium)
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor

- (2) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

JAMES F MURRAY SCHOOL (PS #38)

- Steam Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (88) Steam Radiators
    - New Thermostatic Radiation Valve
    - Radiators to operate standalone
- (63) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (2) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

DEFUCCIO SCHOOL (PS #39)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (78) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (53) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve
  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (2) Heating Only Air Handling Units
  - Existing AHUs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller
  - New 2-Way Coil Control Valve
  - New Modulating OA Damper Actuator
  - Discharge Air Temperature Sensor
  - Freezestat
  - Fan Start/Stop Relay
  - Fan Status Current Sensor
  - Wall Mounted Temperature & Humidity sensor

Tier Scopes

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

FRED W MARTIN CTR FOR THE ARTS (PS #41)

- (2) Hot Water Boiler Plant
    - New Open Protocol Controller
    - Integration of new Boiler Control Panel
    - Water & OA Temperature Sensors
    - Constant Volume Pump Control including:
        - Pump Start/Stop
        - Pump Status
- Air-Cooled Chiller Plant
    - New Open Protocol Controller
    - Integration of Chiller Control Panel
    - Water & OA Temperature Sensors
    - Constant volume pump control of (2) existing pumps
        - Pump Start/Stop
        - Pump Status
- (76) Classroom Unit Ventilators
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (4) CHWHW Air Handling Units (Auditorium)
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller
    - (2) New 2-Way Coil Control Valve
    - New Modulating OA Damper Actuator
    - Discharge Air Temperature Sensor
    - Fan Start/Stop Relay
    - Fan Status Current Sensor
    - Wall Mounted Temperature & Humidity sensor

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

ANNEX EARLY CHILDHOOD CENTER (PS #23A)

- Hot Water Boiler Plant
    - New Open Protocol Controller
    - Integration of existing Boiler Control Panel
    - OA Temperature Sensors
    - System Pressure Sensors
    - Boiler Sequence of Operations to include, but not limited to:
        - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
        - OA Supply Water Temperature setpoint Reset Schedule
- (12) Classroom Unit Ventilators
    - Existing UVs are pneumatically controlled
    - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
    - Install new Open Protocol Controller as required to include additional hardwired points
    - Install new 2-Way Control Valve
    - New OA Damper Actuator
    - Supply Fan Start/Stop & Status
    - UV Discharge Air Temperature Sensor
    - Wall Mounted Temperature, Humidity
- (3) Packaged Rooftop Units
    - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

DANFORTH EARLY CHILDHOOD CENTER (PS #16A)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (48) Steam Radiators
  - New Thermostatic Radiation Valve
  - Radiators to operate standalone
- (20) Classroom Monitoring
  - Radiators and window air conditioners will operate standalone
  - Provide and install new space temperature and humidity sensors in each classroom for monitoring.
- (2) Packaged Rooftop Units
  - Install new Communicating Thermostat

Tier Scopes:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

A HARRY MOORE SCHOOL (PS #52)

- Steam Boiler Plant
  - New Open Protocol Controller
  - Integration of existing Boiler Control Panel
  - OA Temperature Sensors
  - System Pressure Sensors
  - Boiler Sequence of Operations to include, but not limited to:
    - Occupied/Unoccupied control – Boilers to turn off during unoccupied mode
    - OA Supply Water Temperature setpoint Reset Schedule
- (31) Classroom Unit Ventilators
  - Existing UVs are pneumatically controlled
  - Remove existing pneumatic end devices. Cut & cap pneumatic tubing in place
  - Install new Open Protocol Controller as required to include additional hardwired points
  - Install new 2-Way Control Valve

  - New OA Damper Actuator
  - Supply Fan Start/Stop & Status
  - UV Discharge Air Temperature Sensor
  - Wall Mounted Temperature, Humidity
- (3) Packaged Rooftop Units
  - Install new Communicating Thermostat

Provide the following pricing:

1. Front End Graphics, Connection to District-Wide Network, Building Network Control Panel, Price to control boilers.
2. All other scope items

ECM Savings Calculations

Most of the existing boiler plants across the district are enabled & disabled manually. Because manual operation is difficult to quantity, DCO took a very conservative approach to calculating the Tier 1 controls scope. Energy savings from the Tier 1 district Energy Management System were calculated using the BPU protocols. The upgraded system will have improved and precise occupied/unoccupied scheduling capabilities programed through user interface at a central computer dashboard. The proposed controls would maintain the heating setpoint of 70F during occupied hours and 65F setpoint during unoccupied hours. Where new boilers are being installed in ECM 5 & 6, the new efficiency of those boilers was used. Where existing boilers are remaining, the BPU protocols for existing efficiencies using the ASHRAE 90.1 tables provided in the protocol.

<u>Algorithms</u>

Cooling Energy Savings (kWh/yr) = $(((T_c * (H+5) + S_c * (168 - (H+5)))/168) - T_c) * (P_c * Cap_{hp} * 12 * EFLH_c/EER_{hp})$

Heating Energy Savings (kWh/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168)) * (P_h * Cap_{hp} * 12 * EFLH_h/EER_{hp})$

Heating Energy Savings (Therms/yr) = $(T_h - ((T_h * (H+5) + S_h * (168 - (H+5)))/168) * (P_h * Cap_h * EFLH_h/AFUE_h/100{,}000)$

<u>Definition of Variables</u>

T_h = Heating Season Facility Temp. (°F)
T_c = Cooling Season Facility Temp. (°F)
S_h = Heating Season Setback Temp. (°F)
S_c = Cooling Season Setup Temp. (°F)
H = Weekly Occupied Hours
Cap_{hp} = Connected load capacity of heat pump/AC (Tons) – Provided on Application.
Cap_h = Connected heating load capacity (Btu/hr) – Provided on Application.
$EFLH_c$ = Equivalent full load cooling hours
$EFLH_h$ = Equivalent full load heating hours
P_h = Heating season percent savings per degree setback
P_c = Cooling season percent savings per degree setup
$AFUE_h$ = Heating equipment efficiency – Provided on Application.
EER_{hp} = Heat pump/AC equipment efficiency – Provided on Application

12 = Conversion factor from Tons to kBtu/hr to acquire consumption in kWh.
168 = Hours per week.
7 = Assumed weekly hours for setback/setup adjustment period (based on 1 setback/setup per day, 7 days per week).

Summary of Inputs

Occupancy Controlled Thermostats

Component	Type	Value	Source
T_h	Variable		Application
T_c	Variable		Application
S_h	Fixed	T_h-5°	
S_c	Fixed	T_c+5°	
H	Variable		Application; Default of 84 hrs/week
Cap_{hp}	Variable		Application
Cap_h	Variable		Application
$EFLH_{c,h}$	Variable	See Table Below	1
P_h	Fixed	3%	2
P_c	Fixed	6%	2
$AFUE_h$	Variable		Application
EER_{hp}	Variable		Application

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Retail – big box	191	1279
Retail – Grocery	191	1279
Retail – small	545	882
Retail – large	2101	1068
School – Community college	1431	846
School – postsecondary	1191	1208
School – primary	840	394
School – secondary	901	466
Warehouse	452	400

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Cooling	507	550	562
Low-rise, Heating	757	723	503
High-rise, Cooling	793	843	954
High-rise, Heating	526	395	219

CALCULATED SAVINGS

EMS Tier 1 Savings

BUILDING	SQFT	Unit Type	Existing Weekly Occupied Heat Hours [H]	Proposed Weekly Occupied Heat Hours [H]	Boiler Heating (kBtu/hr) [CAPboiler]	Boiler Heating Efficiency (%)	ELFHc	ELFHh	Th (F)	Sh (F)	Ph (%)	Boiler Heating Energy Savings (Therms)
William L. Dickinson High School (PS #43)	356,000	Boiler	121	60	17,800	85.5%	466	901	70	65	3%	17,250
James J. Ferris High School (PS #44)	282,511	Boiler	121	60	14,126	87.0%	466	901	70	65	3%	13,453
Lincoln High School (PS #48)	272,932	Boiler	121	60	13,647	85.5%	466	901	70	65	3%	13,225
Henry Snyder High School (PS #46)	187,500	Boiler	121	60	9,375	81.0%	466	901	70	65	3%	9,590
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	Boiler	121	60	6,616	82.0%	466	901	70	65	3%	6,685
Liberty High School (PS #45)	33,316	Boiler	121	60	1,666	85.5%	466	901	70	65	3%	1,614
Academy I Middle School (PS #1)	64,884	Boiler	121	60		-	394	840	70	65	3%	0
Franklin L. Williams Middle School (MS #7)	163,855	Boiler	121	60	8,193	82.0%	394	840	70	65	3%	7,718
Ezra L. Nolan Middle School (MS #40)	132,483	Boiler	121	60	6,624	82.0%	394	840	70	65	3%	6,240
Frank R. Conwell Middle School (MS #4)	169,678	Boiler	121	60	8,484	82.0%	394	840	70	65	3%	7,992
Frank R. Conwell School (PS #3)	117,939	Boiler	121	60	5,897	82.0%	394	840	70	65	3%	5,555
Dr. Michael Conti School (PS #5)	148,049	Boiler	121	60	7,402	85.5%	394	840	70	65	3%	6,688
Jotham W. Wakeman School (PS #6)	148,882	Boiler	121	60		-	394	840	70	65	3%	0
Charles E. Trefurt School (PS #8)	169,196	Boiler	121	60	8,460	82.0%	394	840	70	65	3%	7,970
Martin Luther King, Jr. School (PS #11)	104,509	Boiler	121	60	5,225	87.0%	394	840	70	65	3%	4,640
Julia A. Barnes School (PS #12)	86,375	Boiler	121	60	4,319	82.0%	394	840	70	65	3%	4,069
Ollie Culbreth Jr. School (PS #14)	98,036	Boiler	121	60	4,902	82.0%	394	840	70	65	3%	4,618
Whitney M. Young Jr. School (PS #15)	179,590	Boiler	121	60	8,980	87.0%	394	840	70	65	3%	7,973
Cornelia F. Bradford School (PS #16)	61,684	Boiler	121	60	3,084	85.5%	394	840	70	65	3%	2,787
Joseph H. Brensinger School (PS #17)	153,864	Boiler	121	60	7,693	87.0%	394	840	70	65	3%	6,831
Dr. Maya Angelou School (PS #20)	108,800	Boiler	121	60	5,440	82.0%	394	840	70	65	3%	5,125
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	Boiler	121	60	7,857	82.0%	394	840	70	65	3%	7,402
Mahatma K. Ghandi School (PS #23)	164,653	Boiler	121	60	8,233	82.0%	394	840	70	65	3%	7,756
MarcAnthony Dinardo School (PS #23B)	58,480	Boiler	121	60	2,924	82.0%	394	840	70	65	3%	2,755
Chaplain Charles Waters School (PS #24)	118,240	Boiler	121	60	5,912	82.0%	394	840	70	65	3%	5,570
Nicolaus Copernicus School (PS #25)	132,860	Boiler	121	60	6,643	82.0%	394	840	70	65	3%	6,258
Patricia Noonan School (PS #26)	123,000	Boiler	121	60	6,150	82.0%	394	840	70	65	3%	5,794
Alfred E. Zampella School (PS #27)	94,611	Boiler	121	60		-	394	840	70	65	3%	0
Christa Mcauliffe School (PS #28)	126,761	Boiler	121	60		-	394	840	70	65	3%	0
Gladys Nunery School (PS #29)	66,180	Boiler	121	60	3,309	85.5%	394	840	70	65	3%	2,990
Alexander D. Sullivan School (PS #30)	93,129	Boiler	121	60	4,656	85.5%	394	840	70	65	3%	4,207
Anthony J. Infante School (PS #31)	36,973	Boiler	121	60	1,849	85.5%	394	840	70	65	3%	1,670
Paul Rafalides School (PS #33)	30,607	Boiler	121	60	1,530	85.5%	394	840	70	65	3%	1,383
President Barack Obama School (PS #34)	103,444	Boiler	121	60	5,172	87.0%	394	840	70	65	3%	4,593
Rafael Cordero Y Molina School (PS #37)	135,534	Boiler	121	60	6,777	85.5%	394	840	70	65	3%	6,123
James F. Murray School (PS #38)	120,940	Boiler	121	60	6,047	85.5%	394	840	70	65	3%	5,464
Dr. Charles P. Defuccio School (PS #39)	126,429	Boiler	121	60	6,321	82.0%	394	840	70	65	3%	5,955
Fred W. Martin Center of the Arts (PS #41)	140,467	Boiler	121	60	7,023	85.5%	394	840	70	65	3%	6,346
Annex Early Childhood Development Center (PS #23A)	12,375	Boiler	121	60	619	82.0%	394	840	70	65	3%	583
Danforth Early Childhood Center (PS #16A)	78,996	Boiler	121	60	3,950	85.5%	394	840	70	65	3%	3,569
A. Harry Moore School (PS #52)	65,300	Boiler	121	60	3,265	82.0%	394	840	70	65	3%	3,076
Glenn D. Cunningham Center	12,100	Boiler	121	60	605	82.0%	394	840	70	65	3%	570

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

ECM 5 & 6 – Boiler Replacements & Fuel Conversions

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
5	Boiler Replacement		✔	✔									✔	✔		✔			✔	✓	✓		
6	Boiler Replacement w/ Fuel Conversion	✔					✔								✔								

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

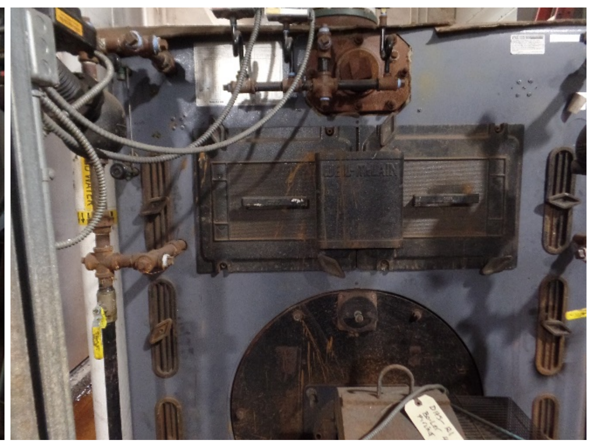
ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
5	Boiler Replacement										✓	✓	✓										
6	Boiler Replacement w/ Fuel Conversion				✔				✔	✔				✔	✔		✔		✔				

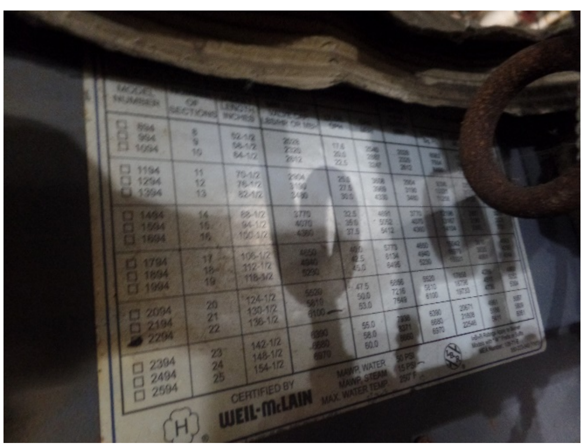
✔	ECM included in the project
✓	Potential ECM Evaluated but not included

Note:
JCPS is using current capital to fund the replacement of the existing boilers at Liberty High School (PS #45), Charles E Trefurt School (PS #8), Cornelia F Bradford School (PS #16), Gladys Nunery School (PS #29), & Alexander D Sullivan School (PS #30). No costs for these replacements are being carried in the ESIP. However, the savings associated with these projects are carried in the ESIP.

WILLIAM L DICKINSON HIGH SCHOOL (PS #43) – EXISTING CONDITIONS

Installed in 2006, the existing steam system consists of our Weil McLain 4,736 MBh oil fired steam boilers. Each boiler has a 5 hp combustion air fan. There are two 0.3 hp and two 5 hp condensate pumps and five 1 hp boiler feed boiler pumps. There are also two 0.5 hp, three 0.8 hp, and four 1.5 hp fuel oil pumps.





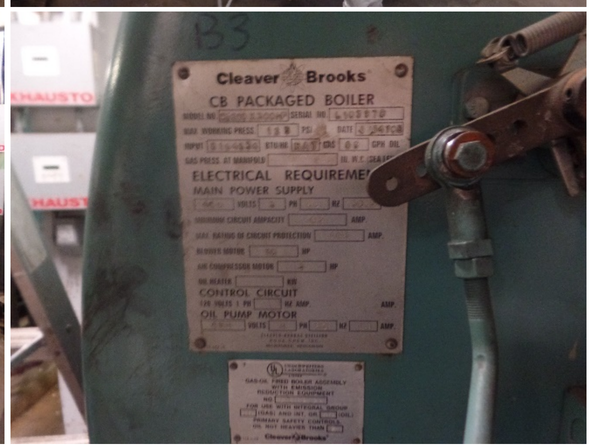
WILLIAM L DICKINSON HIGH SCHOOL (PS #43) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
    - Existing steam boilers
    - Boiler breeching & flue (as required)
    - Existing combustion air fans
    - All existing steam piping to the header
    - All condensate piping in the mechanical room utility building
    - Condensate receiver and condensate pumps
    - Boiler feed water pumps & piping
    - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
    - Existing deaerator tank
    - Existing power wiring
    - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
    - (4) new Steam Boilers to match the capacity of the existing boilers
    - New Breeching and flue (as required)
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - New condensate receiver and condensate pumps
    - New feed water piping & pumps
    - New combustion air fans
    - Connect new steam piping to existing steam header.
    - Re-insulate steam header
    - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
    - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

JAMES FERRIS HIGH SCHOOL (PS #44) – EXISTING CONDITIONS

The existing boiler plant consist of four Cleaver Brooks hot water boilers with output capacities of 6,000 MBh each. The boilers are configured in a constant flow primary distribution with two 75 hp constant speed hot water pumps dedicated to James J. Ferris High School and two 15 hp constant speed hot water pumps dedicated to Ferris Junior Academy. The boilers also are part of a broader 2-Pipe System. However, the chilled water portion of the 2-Pipe system has not be operable for many years.



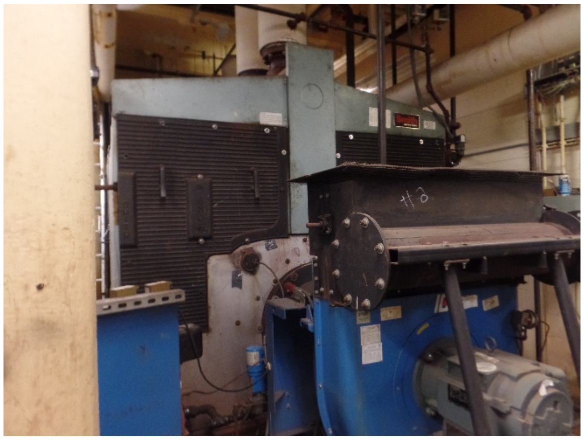
JAMES FERRIS HIGH SCHOOL (PS #44) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (4) new condensing 6,000 MBH Hot Water Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads (as required)
  - (2) new 75 HP System Pumps w/ Integral VFDs
  - (2) new 40 HP System Pumps w/ Integral VFDs (Jr. Academy)
  - (2) new 15 HP System Pumps w/ Integral VFDs
  - New combustion air fans
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

LINCOLN HIGH SCHOOL (PS #48) – EXISTING CONDITIONS

Lincoln High School heating system consists of two 11,000 MBH HB Smith gas-fired steam boilers. The boilers provide steam to radiators throughout the main building and supply hot water via two heat exchangers. The heat exchangers provide hot water to the unit ventilators and air handling units throughout the annex, and to the hot water reheat coils serving the Freshman Academy. There are three 2 hp boiler feed water pumps and nine condensate pumps ranging from 0.5 to 5 hp. Two constant speed 10 hp heating hot water pumps distribute hot water to the annex and two 10 hp pumps with variable speed motors serve the Freshman Academy.



LINCOLN HIGH SCHOOL (PS #48) – SCOPE OF WORK

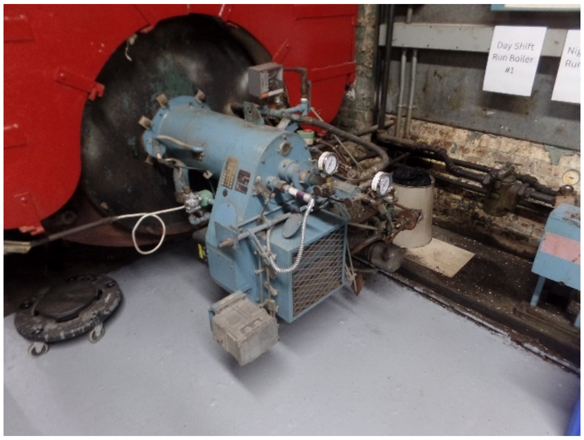
General Scope of Work to include:

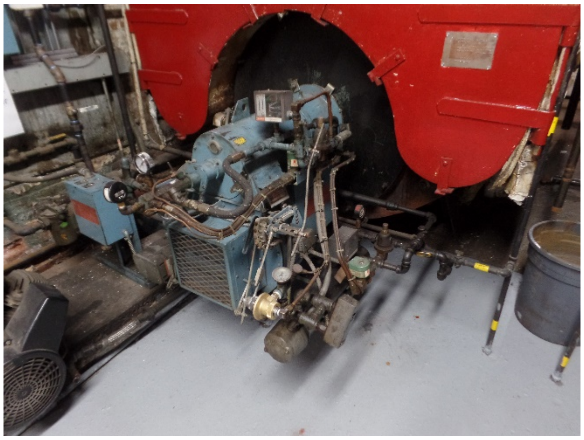
- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
    - Existing steam boilers (as required)
    - Boiler breeching & flue
    - Existing combustion air fans
    - All existing steam piping to the header
    - All condensate piping in the mechanical room utility building
    - Condensate receiver and condensate pumps
    - Boiler feed water pumps & piping
    - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
    - Existing deaerator tank
    - Existing power wiring
    - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
    - (2) new Steam Boilers
        - New Breeching and flue (as required)
        - New gas piping to the new boilers
        - New concrete pads (as required)
        - New condensate receiver and condensate pumps
        - New feed water piping & pumps
        - New combustion air fans
        - Connect new steam piping to existing steam header.
        - Re-insulate steam header
    - (2) new condensing Hot Water Boilers to replace the Steam-to-Hot Water Heat Exchangers
        - New Breeching and flue (as required)
        - New gas piping to the new boilers
        - New concrete pads (as required)
        - (2) new 10 HP Hot Water System Pumps w/ Integral VFDs for the Annex System
        - (2) new 10 HP Hot Water System Pumps w/ Integral VFDs For the Freshman Academy system
        - New combustion air fans
        - Connect new Hot Water Piping to the existing Hot Water distribution.
    - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
    - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.

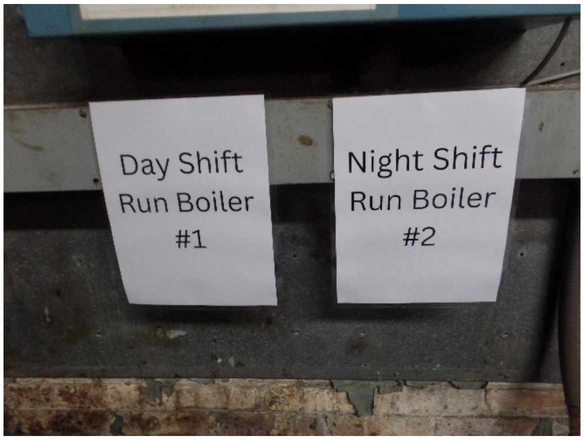
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

LIBERTY HIGH SCHOOL (PS #45) – EXISTING CONDITIONS

Liberty High School heating system consists of two Titusville 3,892 MBh oil fired steam boilers. The boilers are equipped with two 3.0 hp combustion air fans, two 1.5 hp condensate pumps, and small process pumps the supply fuel oil to the boiler. The boiler supplies steam through radiators to heat the entire building.







LIBERTY HIGH SCHOOL (PS #43) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) 4,000 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads (as required)
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

DR. MICHAEL CONTI SCHOOL (PS #5) – EXISTING CONDITIONS

The heating system consists of three Superior gas-fired steam boilers, each with an output capacity of 6,836 MBh. A 2-pipe steam distribution system serves the building heating terminals. There are three 2 hp boiler feed pumps and six condensate pumps ranging from 1/3 to 5 hp in the boiler room.

DR. MICHAEL CONTI SCHOOL (PS #5) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (3) new 6,500 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Repair existing steam header leaks.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

JOTHAM W WAKEMAN SCHOOL (PS #6) – EXISTING CONDITIONS

Two HB Smith 3,594 MBh steam boilers serve the old wing's heating load and one Hot Water Boiler. It was noted that steam boiler #2 and hot water boiler #4 are leaking and in need of replacement.




JOTHAM W WAKEMAN SCHOOL (PS #6) – SCOPE OF WORK

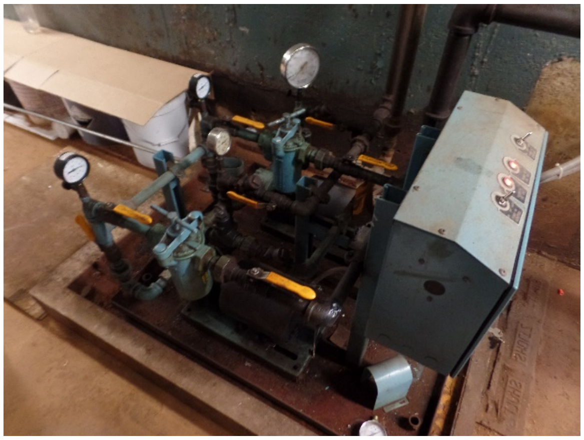
General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following:
  - Existing oil fired steam boiler burner
  - (1) new Steam Boilers. Boiler capacity to match existing.
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - Connect new steam piping to existing steam header.
  - (1) new high efficiency, non-condensing Hot Water Boiler. Boiler capacity to match existing.
    - New Breeching and flue
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - Connect new Hot Water Piping to the existing Hot Water distribution.
- Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
- provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

CHARLES E TREFURT SCHOOL (PS #8) – EXISTING CONDITIONS

Installed in 1958, the existing steam system consists of (2) fuel oil Kewanee 2,160 MBh steam boilers, fuel oil pumps, (2) boiler feed water pumps, and (2) combustion air fans. Additionally, there are (2) vacuum pumps and (2) condensate pumps. One of the steam boilers is inoperable.






CHARLES E TREFURT SCHOOL (PS #8) – SCOPE OF WORK

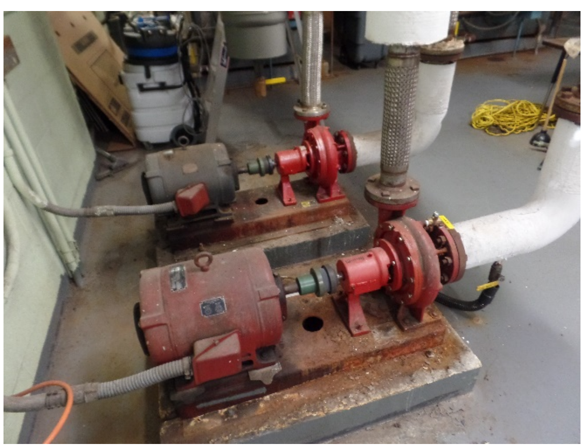
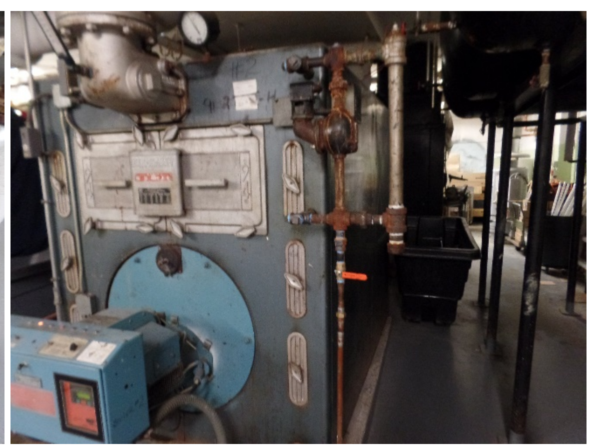
General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 7,250 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

MARTIN LUTHER KING JR. SCHOOL (PS #11) – EXISTING CONDITIONS

Two Weil McLain 3,360 MBh hot water boilers serve the building heating load. The boilers are configured in a constant flow primary distribution with two 10.0 hp constant speed hot water pumps operating in a manual control scheme. Each boiler has a 3.0 hp combustion air fan.



MARTIN LUTHER KING JR. SCHOOL (PS #11) – SCOPE OF WORK

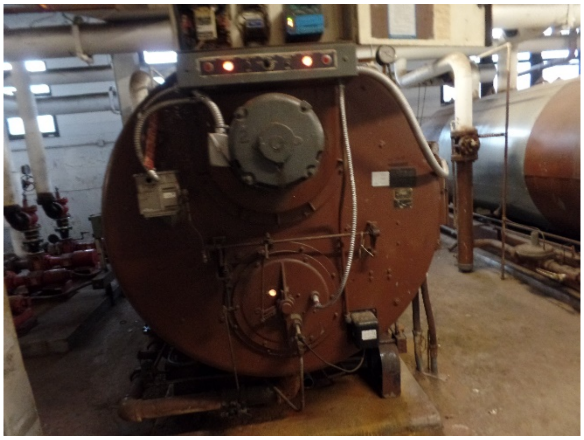
General Scope of Work to include:

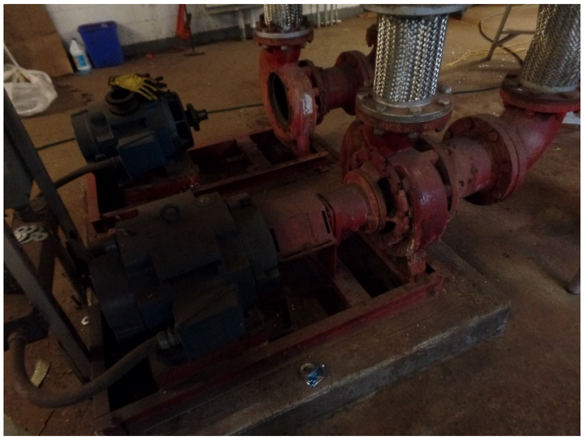
- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (2) new condensing 3,000 MBH Hot Water Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads (as required)
  - (2) new 10 HP Hot Water System Pumps w/ Integral VFDs
  - New combustion air fans
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

WHITNEY M YOUNG JR. SCHOOL (PS #15) – EXISTING CONDITIONS

Two Cleaver Brooks 5,356 MBh hot water boilers serve the building heating load. The burners are modulating with a nominal efficiency of 76%. The boilers are configured in a lead-lag control scheme. Both boilers are required under high load conditions. Installed in 1970, they are nearing the end of their useful life. The hydronic distribution system is a two-pipe heating only system. The system consists of two primary loop pumps and several secondary heating hot water pumps, including two pumps dedicated to pool heating. Small booster pumps serve the unit ventilators.





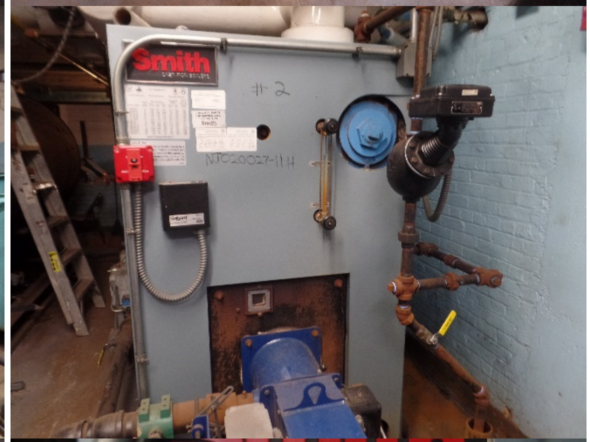

WHITNEY M YOUNG JR. SCHOOL (PS #15) – SCOPE OF WORK

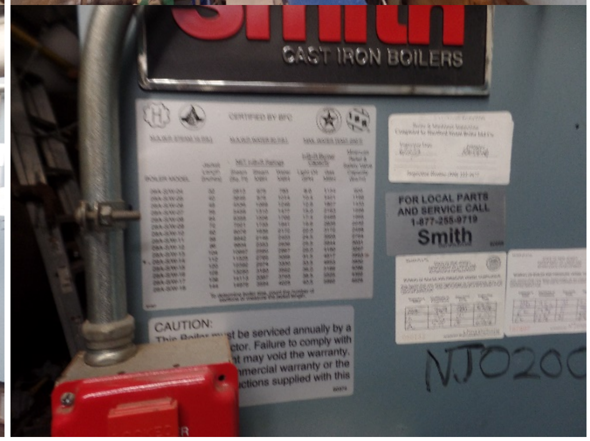
General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (2) new condensing 6,000 MBH Hot Water Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads (as required)
  - (2) new 25 HP Hot Water System Pumps w/ Integral VFDs
  - (2) new 2 HP Hot Water System Pumps w/ Integral VFDs
  - New combustion air fans
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

CORNELIA F BRADFORD SCHOOL (PS #16) – EXISTING CONDITIONS

The building heating system consists of one Kewanee steam boiler with an output capacity of 2,160 MBh, and one Smith steam boiler with an output capacity of 2,766 MBh. The Kewanee boiler is no longer functional. The HB Smith boiler was installed in 2010 and is in good condition. There are two 3/4 hp and two 2 hp condensate pumps and two 3/4 hp boiler feed water pumps in the storage room behind the boilers.





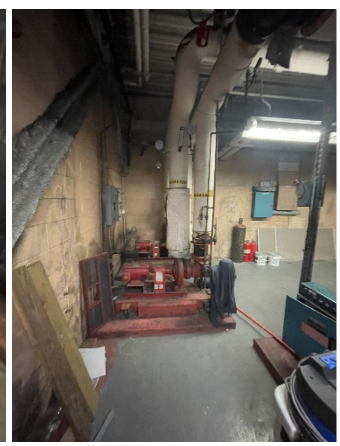
CORNELIA F BRADFORD SCHOOL (PS #16) – SCOPE OF WORK

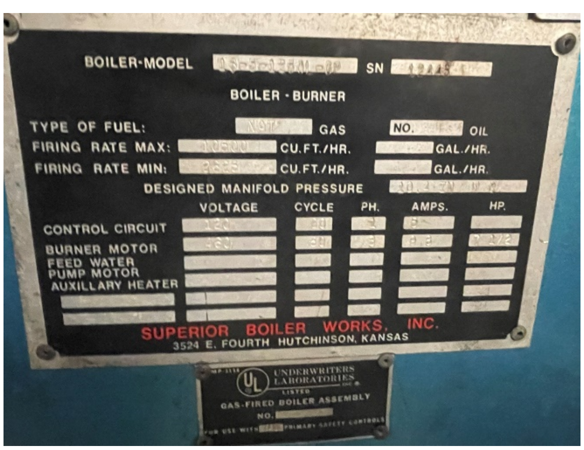
General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (1) new 2,200 MBH HB Smith Steam Boiler to replace the existing, non-functional Kewanee boiler
  - Connect to existing Breeching and flue (as required)
  - New gas piping to the new boiler
  - New concrete pad as required
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

JOSEPH P BRENSINGER SCHOOL (PS #17) – EXISTING CONDITIONS

Two Seneca 6,694 MBh hot water boilers serve the building heating requirements. Each boiler is equipped with a 7.5 hp combustion air fan. The boilers have two constant speed 10 hp heating hot water pumps operating in lead/lag fashion that are supplying heating hot water to the air handlers and unit ventilators.





JOSEPH P BRENSINGER SCHOOL (PS #17) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (2) new condensing 6,000 MBH Hot Water Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads (as required)
  - (2) new 10 HP Hot Water System Pumps w/ Integral VFDs
  - New combustion air fans
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

NICOLAS COPERNICUS SCHOOL (PS #25) – EXISTING CONDITIONS

Two Cleaver Brooks 3,263.52 MBh oil-fired steam boilers serve the old wing's building heating load. The boilers are equipped with combustion air fans at 3.0 hp each. There are also two 0.5 hp fuel oil pumps.

NICOLAS COPERNICUS SCHOOL (PS #25) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 3,200 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

GLADYS NUNERY SCHOOL (PS #29) – EXISTING CONDITIONS

One, 8,576 MBh (Boiler #1) and one, 7,944 MBh (Boiler #2) oil-fired steam boilers serve the building heating load. Each boiler has a 5 hp combustion air fan. Two, 1 hp condensate pumps return the condensate to the feedwater, and two, 0.8 hp oil pumps supply fuel to the burner.

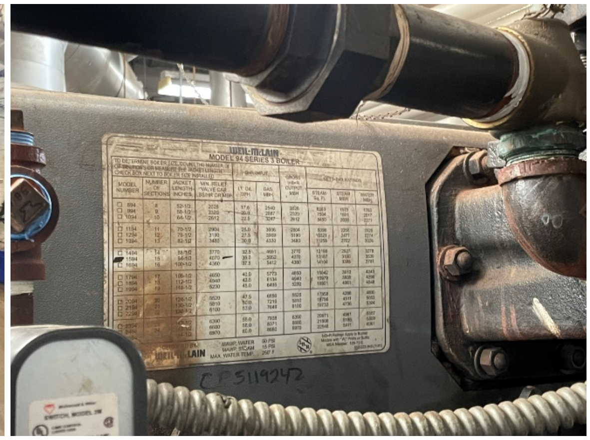
GLADYS NUNERY SCHOOL (PS #29) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 4,000 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

ALEXANDER D SULLIVAN SCHOOL (PS #30) – EXISTING CONDITIONS

Two Weil McLain 4,062 MBh output steam boilers comprise the building heating plant. There are three, 1.0 hp boiler feed pumps in the boiler room.

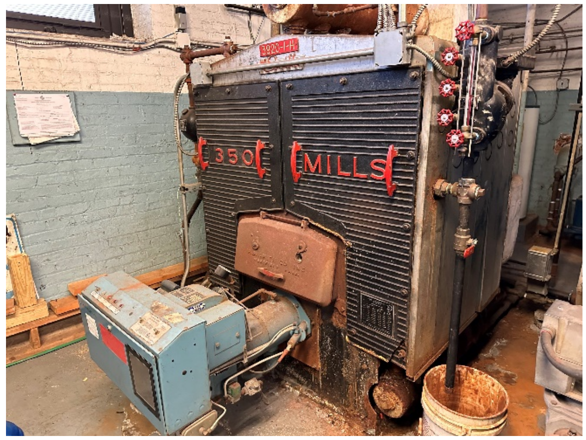

ALEXANDER D SULLIVAN SCHOOL (PS #30) – SCOPE OF WORK

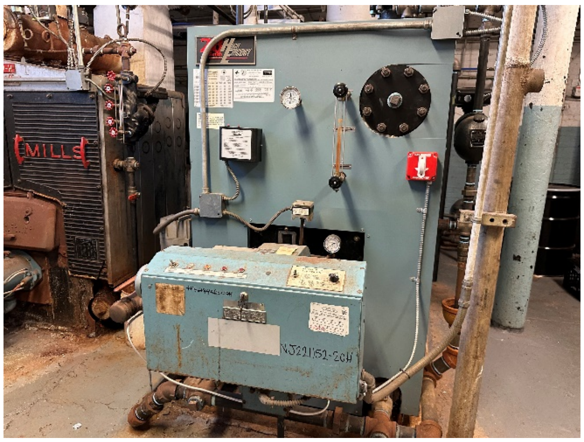
General Scope of Work to include:

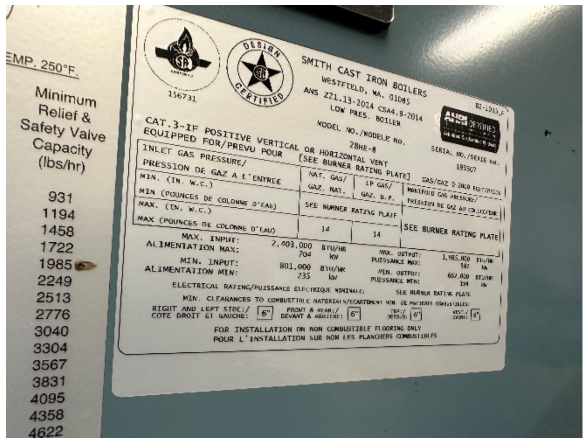
- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 4,000 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

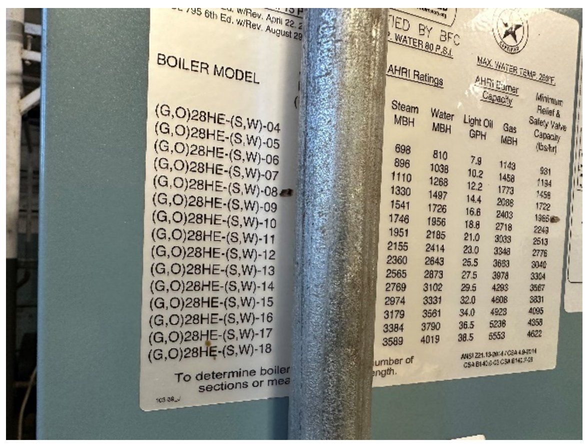
ANTHONY J INFANTE (PS #31) – EXISTING CONDITIONS

Two HB Smith natural gas fired steam boilers with respective output capacities of 1776 MBh (Boiler #1) and 1985 MBh (Boiler #2) serve the building heating load. The boilers are 29 and one years old with nominal efficiencies of 78% and 82.6% respectively. There are two combustion air fans and two 0.3 hp boiler feedwater pumps.









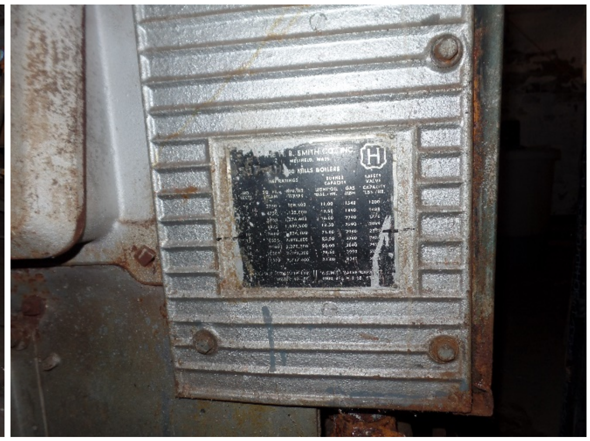
ANTHONY J INFANTE (PS #31) – EXISTING CONDITIONS

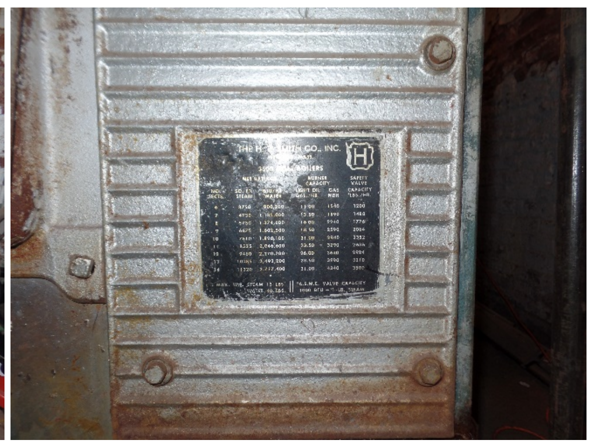
General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing steam piping from old boiler to the header
  - All condensate piping in the mechanical room utility building
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing power wiring for Old Boiler
- Provide and install the following:
  - (1) new 2,000 MBH Steam Boiler to replace the existing, 29 year old boiler.
  - New Breeching and flue (as required)
  - New gas piping to the new boiler
  - Connect new steam piping to existing steam header.
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer’s requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

PAUL RAFALIDES SCHOOL (PS #33) – EXISTING CONDITIONS

Two HB Smith 3,038 MBh gas-fired steam boilers serve the building heating load.





PAUL RAFALIDES SCHOOL (PS #33) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
- Provide and install the following:
  - (2) new 3,000 MBH Steam Boilers
  - New Breeching and flue (as required)
  - New gas piping to the new boilers
  - New concrete pads
  - New condensate receiver and condensate pumps
  - New feed water piping & pumps
  - New combustion air fans
  - Connect new steam piping to existing steam header.
  - Re-insulate steam header
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

PRESIDENT BARACK OBAMA SCHOOL (PS #34) – EXISTING CONDITIONS

Two Smith 3,594 MBh steam boilers serve the building heating load. A single-pipe steam distribution system serves some of the building's radiant heaters and the air handling unit. Most of the building's heating requirement is fulfilled by a heat exchanger located in the boiler room is used to exchange heat between the steam generated from the boilers and the hot water loops. The hot water in the unit ventilator loop is circulated using two, 5-hp pumps. The hot water in the perimeter radiator loop is circulated using two constant speed 3-hp pumps.






PRESIDENT BARACK OBAMA SCHOOL (PS #34) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - All existing steam piping to the header
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 1,000 MBH Steam Boilers
    - New Breeching and flue (as required)
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - New condensate receiver and condensate pumps
    - New feed water piping & pumps
    - New combustion air fans
    - Connect new steam piping to existing steam header.
    - Re-insulate steam header
  - (2) new 2,000 MBH Condensing Hot Water Boilers to replace the Steam-to-Hot Water Heat Exchanger
    - New Breeching and flue (as required)
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - (2) new 5 HP Hot Water System Pumps w/ Integral VFDs for the Annex System
    - (2) new 3 HP Hot Water System Pumps w/ Integral VFDs For the Freshman Academy system
    - New combustion air fans
    - Connect new Hot Water Piping to the existing Hot Water distribution.
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer’s requirements.

- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

RAFAEL CORDERO Y MOLINA SCHOOL (PS #37)– EXISTING CONDITIONS

The heating system consists of 2 Burnham oil-fired steam boilers, each with an output capacity of 3,533 MBh. There are two, 1 hp boiler feed pumps and seven condensate pumps ranging from 1/2 hp to 2 hp in the boiler room.

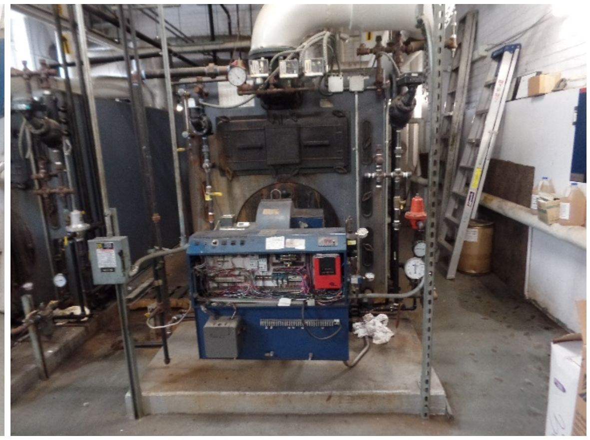
RAFAEL CORDERO Y MOLINA SCHOOL (PS #37)– SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing oil fired steam boiler burners
- Provide and install the following:
  - (2) new gas fired burner to replace the existing oil fired burner
  - Burner to be fully modulating
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

JAMES F MURRAY SCHOOL (PS #38) – EXISTING CONDITIONS

Two Weil-McClain 5,520 MBh steam boilers serve the building heating load. There are three 1.0 hp boiler feed water pumps. Two of these pumps run automatically while the third is on standby.



JAMES F MURRAY SCHOOL (PS #38) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing oil fired steam boiler burners
- Provide and install the following:
  - (2) new gas fired burners to replace the existing oil fired burner
  - Burner to be fully modulating
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

FRED W MARTIN SCHOOL (PS #41) – EXISTING CONDITIONS

Two Continental 11,550 MBh oil-fired steam boilers serve the building heating load. The steam generated by the boilers is used to heat the heating hot water loop using a heat exchanger located in the boiler room. The hydronic distribution system is mostly a two-pipe heating only system. The hot water is circulated in the loop by three constant speed HHW pumps. One of the pumps is rated at 7.5 hp and other two are rated at 10-hp.

FRED W MARTIN SCHOOL (PS #41) – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the following
  - Existing steam boilers
  - Boiler breeching & flue (as required)
  - Existing combustion air fans
  - Existing heat exchanger and associated piping.
  - All existing steam piping to the header and the header.
  - All condensate piping in the mechanical room utility building
  - Condensate receiver and condensate pumps
  - Boiler feed water pumps & piping
  - Disconnect and remove all existing pneumatic valves, sensors and control panel. Remove existing pneumatic tubing back to source and cap.
  - Existing deaerator tank
  - Existing power wiring
  - Existing fuel oil piping back to the fuel oil tank (fuel oil tank to remain abandoned in place)
- Provide and install the following:
  - (2) new 6,000 MBH Condensing Hot Water Boilers to replace the Steam-to-Hot Water Heat Exchanger
    - New Breeching and flue (as required)
    - New gas piping to the new boilers
    - New concrete pads (as required)
    - (1) new 7.5 HP Hot Water System Pumps w/ Integral VFDs.
    - (2) new 10 HP Hot Water System Pumps w/ Integral VFDs.
    - New combustion air fans.
    - Connect new Hot Water Piping to the existing Hot Water distribution.
  - (1) new 1,500 MBH Condensing Hot Water Boilers to replace the Steam-to-Hot Water Heat Exchanger that serves the pool AHUs
  - Install new power wiring (incl. new conduit, wiring and circuit breakers) for new boilers and pumps from existing power panel(s). If adequate spare capacity is not available, provide new sub-panel for electrical service to new equipment.
  - provide all valves, fittings, temperature/pressure sensors, meters and gauges required to complete the installation in accordance with the manufacturer's requirements.
- Existing Fuel Oil Tank(s) and Fuel Oil Pumps to be abandoned in place.
- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide report on the installation and testing results.

ECM Savings Calculations

BPU Protocols were used to calculate the boiler replacement savings. For the Boiler Replacement w/ Fuel Switch, the baseline Fuel Oil Consumption was used, converted the Therms of Natural Gas and then incorporated the improved efficiency for the savings. Condensing boiler efficiencies based on 180 degree supply and 160 degree return water temperatures.

Boiler Replacement Savings								
BUILDING	Baseline Plant Rated Input per Boiler MBH (CAPYbi)	Estimated Existing Efficiency (EFFb)	Qualifying Boiler Plant Capacity (CAPYqi)	Qualifying Boiler Efficiency (EFFq)	Quantity	Total Capacity (MBH aka kBTU/hr)	ELFHh	Calculated Annual Fuel Savings (Th/yr)
James J. Ferris High School (PS #44)	6,532	82%	6,532	87.0%	4	26,127	901	14,354
Lincoln High School (PS #48)	11,180	79%	11,180	85.5%	2	22,360	901	16,576
Dr. Michael Conti School (PS #5)	6,836	79%	6,836	85.5%	3	20,508	840	14,174
Jotham W. Wakeman School (PS #6)	3,594	79%	3,594	87.0%	2	7,188	840	6,114
Martin Luther King, Jr. School (PS #11)	3,360	82%	3,360	87.0%	2	6,720	840	3,442
Whitney M. Young Jr. School (PS #15)	5,356	82%	5,356	87.0%	2	10,712	840	5,487
Cornelia F. Bradford School (PS #16)	2,463	79%	2,463	85.5%	2	4,926	840	3,405
Joseph H. Brensinger School (PS #17)	6,694	82%	6,694	87.0%	2	13,388	840	6,857
Anthony J. Infante School (PS #31)	1,881	79%	1,881	85.5%	2	3,761	840	2,599
Paul Rafalides School (PS #33)	3,038	79%	3,038	85.5%	2	6,076	840	4,199
President Barack Obama School (PS #34)	3,594	79%	3,594	87.0%	4	14,376	840	12,229

Algorithms

Fuel Savings (MMBtu/yr) = Cap_{in} * $EFLH_h$ * ((Eff_q/Eff_b)-1) / 1000 kBtu/MMBtu

Definition of Variables

Cap_{in} = Input capacity of qualifying unit in kBtu/hr

$EFLH_h$ = The Equivalent Full Load Hours of operation for the average unit during the heating season in hours

Eff_b = Boiler Baseline Efficiency

Eff_q = Boiler Proposed Efficiency

1000 = Conversion from kBtu to MMBtu

Summary of Inputs

Prescriptive Boilers

Component	Type	Value	Source
Cap_{in}	Variable		Application
$EFLH_h$	Fixed	See Table Below	1
Eff_b	Variable	See Table Below	2
Eff_q	Variable		Application

$EFLH_h$ Table

Facility Type	Heating EFLH
Assembly	603
Auto repair	1910
Dormitory	465
Hospital	3366
Light industrial	714
Lodging – Hotel	1077
Lodging – Motel	619
Office – large	2034
Office – small	431
Other	681
Religious worship	722

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Heating	757	723	503
High-rise, Heating	526	395	219

Facility Type	Heating EFLH
Restaurant – fast food	813
Restaurant – full service	821
Retail – big box	191
Retail – Grocery	191
Retail – small	545
Retail – large	2101
School – Community college	1431
School – postsecondary	1191
School – primary	840
School – secondary	901
Warehouse	452

Baseline Boiler Efficiencies (Eff_b)

Boiler Type	Size Category (kBtu input)	Standard 90.1-2016
Hot Water – Gas fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	82% AFUE 80% Et 82% Ec
Hot Water – Oil fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	84% AFUE 82% Et 84% Ec
Steam – Gas fired	< 300	80% AFUE
Steam – Gas fired, all except natural draft	≥ 300 and ≤ 2,500	79% Et
Steam – Gas fired, all except	> 2,500	79% Ec

Boiler Type	Size Category (kBtu input)	Standard 90.1-2016
Steam – Gas fired, natural draft	≥ 300 and ≤ 2,500	79% Et
Steam – Gas fired, natural draft	> 2,500	79% Ec
Steam – Oil fired	< 300 ≥ 300 and ≤ 2,500 > 2,500	82% AFUE 81% Et 81% Ec

Sources

1. New York State Joint Utilities, *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs*, V7, April 2019. Appendix G – Equivalent Full-Load Hours (EFLH), For Heating and Cooling. P. 675-680. EFLH values for NYC due to proximity to NJ.
2. ASHRAE Standards 90.1-2016. *Energy Standard for Buildings Except Low Rise Residential Buildings*; available at: https://www.ashrae.org/standards-research--technology/standards--guidelines. Table 6.8.1-6

Boiler Replacement w/ Fuel Switch Savings

BUILDING	Annual Fuel Oil (Gal)	Fuel Oil No. 2 (15 PPM Sulfur max) (MMBTU/barrel)	Fuel Oil No. 2 (BTU/gallon)	Fuel Oil (BTU)	Existing Boiler Efficiency	Thermal Energy Provided (BTU)	Proposed Natural Gas Boiler Efficiency	Proposed Natural Gas Consumption (BTU)	Proposed Natural Gas Consumption (Therms)
William L. Dickinson High School (PS #43)	76,082	5.770	137,381	10,452,246,469	81%	8,466,319,640	85.5%	9,902,128,234	99,021
Liberty High School (PS #45)	5,526	5.770	137,381	759,167,143	81%	614,925,386	85.5%	719,210,977	7,192
Charles E. Trefurt School (PS #8)	19,137	5.770	137,381	2,629,059,286	81%	2,129,538,021	85.5%	2,490,687,744	24,907
Nicolaus Copernicus School (PS #25)	8,195	5.770	137,381	1,125,836,905	81%	911,927,893	85.5%	1,066,582,331	10,666
Gladys Nunery School (PS #29)	14,993	5.770	137,381	2,059,752,619	81%	1,668,399,621	85.5%	1,951,344,586	19,513
Alexander D. Sullivan School (PS #30)	10,876	5.770	137,381	1,494,155,238	81%	1,210,265,743	85.5%	1,415,515,489	14,155
Rafael Cordero Y Molina School (PS #37)	16,089	5.770	137,381	2,210,349,619	81%	1,790,383,191	85.5%	2,094,015,429	20,940
James F. Murray School (PS #38)	23,091	5.770	137,381	3,172,304,786	81%	2,569,566,876	85.5%	3,005,341,376	30,053
Fred W. Martin Center of the Arts (PS #41)	13,886	5.770	137,381	1,907,671,905	81%	1,545,214,243	85.5%	1,807,268,120	18,073
Danforth Early Childhood Center (PS #16A)	14,019	5.770	137,381	1,925,943,571	81%	1,560,014,293	85.5%	1,824,578,120	18,246

ECM 8 - Solar PPA

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
8	Solar PPA	✓	✓		✓		✓		✓	✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
8	Solar PPA	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			✓	✓		✓		✓	✓	

Background

The renewable energy industry is one of the fastest growing and evolving components to modern building system design. The ability to capture solar energy will provide long term economic and environmental benefits. Technology improvements are rapidly evolving as well, and the market is flooded with new products with new features that have only been available within the last few years, with promising new technologies and updates on the verge of becoming available to the market.

Clients can purchase power through a Power Purchase Agreement, predetermining fixed low rates for the duration of the agreement, without having to manage any part of the process. This allows the solar provider to manage compliance reporting, filings, and maintenance of the equipment for the entire length of the contract.

A solar PPA makes going green easy. Work takes place around the client's schedule, and a safe and functional environment is maintained throughout installation of the system.

Scope of Work by Building

For detailed school-by-school Helioscope analysis, please see Appendix G – Solar Helioscopes. New solar panels have a 20 year warranty.

ECM Savings Calculations

Solar PPA Savings are calculated by building and are a function of the difference between buying the kWh generated by the solar panels for the PPA rate versus the PSEG Utility Rate. System downtime may affect future savings. Since these downtimes aren't know at this time, they are not included in the savings calculations.

PPA Rate	ESCALATION RATE	ANNUAL PANEL DERATING	CONTRACT TERM (YRS)
$0.0260	2.00%	0.15%	15

YEAR	15 YEAR SOLAR PPA kWh GENERATION	15 YEAR SOLAR PPA COST SAVINGS
1	10,884,945	$890,747
2	10,868,618	$909,543
3	10,852,315	$928,735
4	10,836,036	$948,329
5	10,819,782	$968,336
6	10,803,553	$988,763
7	10,787,347	$1,009,619
8	10,771,166	$1,030,914
9	10,755,009	$1,052,656
10	10,738,877	$1,074,855
11	10,722,769	$1,097,520
12	10,706,684	$1,120,662
13	10,690,624	$1,144,290
14	10,674,588	$1,168,414
15	10,658,577	$1,193,045
TOTAL	161,570,890	$15,526,428

Solar Landscape Solar PPA Rates & Savings

BUILDING	MOUNTING CATEGORY	PROPOSED ANNUAL GENERATION (KWh)	POST-ESIP ESTIMATE CONSUMPTION (kWh)	$$/kWh RATES		SAVINGS	TOTAL SAVINGS
				UTILITY	SOLAR PPA		
William L. Dickinson High School (PS #43)	Roof	557,400	836,850	$0.107	$0.026	$45,033	$45,033
	Ground			$0.107	$0.026	$0	
	Canopy			$0.107	$0.026	$0	
James J. Ferris High School (PS #44)	Roof	1,316,000	1,256,479	$0.088	$0.026	$78,345	$78,345
	Ground			$0.088	$0.026	$0	
	Canopy			$0.088	$0.026	$0	
Lincoln High School (PS #48)	Roof			$0.079	$0.026	$0	$0
	Ground			$0.079	$0.026	$0	
	Canopy			$0.079	$0.026	$0	
Henry Snyder High School (PS #46)	Roof	333,000	676,431	$0.097	$0.026	$23,726	$23,726
	Ground			$0.097	$0.026	$0	
	Canopy			$0.097	$0.026	$0	
Dr. Ronald E. McNair Academic High School (PS #47)	Roof			$0.116	$0.026	$0	$0
	Ground			$0.116	$0.026	$0	
	Canopy			$0.116	$0.026	$0	
Liberty High School (PS #45)	Roof	49,810	108,923	$0.147	$0.026	$6,039	$6,039
	Ground			$0.147	$0.026	$0	
	Canopy			$0.147	$0.026	$0	
Academy I Middle School (PS #1)	Roof			$0.080	$0.026	$0	$0
	Ground			$0.080	$0.026	$0	
	Canopy			$0.080	$0.026	$0	
Franklin L. Williams Middle School (MS #7)	Roof	786,300	1,259,336	$0.110	$0.026	$66,012	$66,012
	Ground			$0.110	$0.026	$0	
	Canopy			$0.110	$0.026	$0	
Ezra L. Nolan Middle School (MS #40)	Roof	297,400	333,240	$0.093	$0.026	$20,009	$20,009
	Ground			$0.093	$0.026	$0	
	Canopy			$0.093	$0.026	$0	
Frank R. Conwell Middle School (MS #4)	Roof			$0.120	$0.026	$0	$0
	Ground			$0.120	$0.080	$0	
	Canopy			$0.120	$0.026	$0	
Frank R. Conwell School (PS #3)	Roof			$0.122	$0.026	$0	$0
	Ground			$0.122	$0.026	$0	
	Canopy			$0.122	$0.026	$0	
Dr. Michael Conti School (PS #5)	Roof	320,900	416,909	$0.122	$0.026	$30,811	$30,811
	Ground			$0.122	$0.026	$0	
	Canopy			$0.122	$0.026	$0	
Jotham W. Wakeman School (PS #6)	Roof	339,626	326,217	$0.083	$0.026	$18,495	$18,495
	Ground			$0.083	$0.026	$0	
	Canopy			$0.083	$0.026	$0	
Charles E. Trefurt School (PS #8)	Roof	332,700	330,809	$0.089	$0.026	$20,904	$20,904
	Ground			$0.089	$0.026	$0	
	Canopy			$0.089	$0.026	$0	
Martin Luther King, Jr. School (PS #11)	Roof	400,400	498,828	$0.095	$0.026	$27,533	$27,533
	Ground			$0.095	$0.026	$0	
	Canopy			$0.095	$0.026	$0	
Julia A. Barnes School (PS #12)	Roof	142,545	183,902	$0.128	$0.026	$14,527	$14,527
	Ground			$0.128	$0.026	$0	
	Canopy			$0.128	$0.026	$0	
Ollie Culbreth Jr. School (PS #14)	Roof	153,500	126,278	$0.097	$0.026	$8,953	$8,953
	Ground			$0.097	$0.026	$0	
	Canopy			$0.097	$0.026	$0	
Whitney M. Young Jr. School (PS #15)	Roof	691,900	712,727	$0.090	$0.026	$44,148	$44,148
	Ground			$0.090	$0.026	$0	
	Canopy			$0.090	$0.026	$0	

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Solar Landscape Solar PPA Rates & Savings

BUILDING	MOUNTING CATEGORY	PROPOSED ANNUAL GENERATION (KWh)	POST-ESIP ESTIMATE CONSUMPTION (kWh)	$$/kWh RATES		SAVINGS	TOTAL SAVINGS
				UTILITY	SOLAR PPA		
Cornelia F. Bradford School (PS #16)	Roof	166,600	634,651	$0.122	$0.026	$16,063	$16,063
	Ground			$0.122	$0.026	$0	
	Canopy			$0.122	$0.026	$0	
Joseph H. Brensinger School (PS #17)	Roof	738,100	999,156	$0.116	$0.026	$66,367	$66,367
	Ground			$0.116	$0.026	$0	
	Canopy			$0.116	$0.026	$0	
Dr. Maya Angelou School (PS #20)	Roof	436,800	922,857	$0.114	$0.026	$38,540	$38,540
	Ground			$0.114	$0.026	$0	
	Canopy			$0.114	$0.026	$0	
Reverend Dr. Ercel F. Webb School (PS #22)	Canopy	354,400	339,939	$0.094	$0.026	$23,125	$23,125
	Ground			$0.094	$0.026	$0	
	Roof			$0.094	$0.026	$0	
Mahatma K. Ghandi School (PS #23)	Roof	343,000	375,789	$0.096	$0.026	$23,928	$23,928
	Ground			$0.096	$0.026	$0	
	Canopy			$0.096	$0.026	$0	
MarcAnthony Dinardo School (PS #23B)	Roof	120,100	93,248	$0.145	$0.026	$11,059	$11,059
	Ground			$0.145	$0.026	$0	
	Canopy			$0.145	$0.026	$0	
Chaplain Charles Waters School (PS #24)	Roof	315,300	295,741	$0.103	$0.026	$22,629	$22,629
	Ground			$0.103	$0.080	$0	
	Canopy			$0.103	$0.026	$0	
Nicolaus Copernicus School (PS #25)	Roof	263,600	730,746	$0.087	$0.026	$15,988	$15,988
	Ground			$0.087	$0.026	$0	
	Canopy			$0.087	$0.026	$0	
Patricia Noonan School (PS #26)	Roof	430,200	850,450	$0.117	$0.026	$39,229	$39,229
	Ground			$0.117	$0.026	$0	
	Canopy			$0.117	$0.026	$0	
Alfred E. Zampella School (PS #27)	Roof	325,000	792,389	$0.075	$0.026	$15,947	$15,947
	Ground			$0.075	$0.026	$0	
	Canopy			$0.075	$0.026	$0	
Christa Mcauliffe School (PS #28)	Roof	748,900	443,531	$0.117	$0.026	$40,478	$40,478
	Ground			$0.117	$0.026	$0	
	Canopy			$0.117	$0.026	$0	
Gladys Nunery School (PS #29)	Roof			$0.116	$0.026	$0	$0
	Ground			$0.116	$0.026	$0	
	Canopy			$0.116	$0.026	$0	
Alexander D. Sullivan School (PS #30)	Roof	229,900	296,175	$0.125	$0.026	$22,834	$22,834
	Ground			$0.125	$0.026	$0	
	Canopy			$0.125	$0.026	$0	
Anthony J. Infante School (PS #31)	Roof	67,920	102,382	$0.199	$0.026	$11,740	$11,740
	Ground			$0.199	$0.026	$0	
	Canopy			$0.199	$0.026	$0	
Paul Rafalides School (PS #33)	Roof	60,480	152,623	$0.111	$0.026	$5,160	$5,160
	Ground			$0.111	$0.026	$0	
	Canopy			$0.111	$0.026	$0	
President Barack Obama School (PS #34)	Roof	206,200	260,556	$0.093	$0.026	$13,728	$13,728
	Ground			$0.093	$0.026	$0	
	Canopy			$0.093	$0.026	$0	

Solar Landscape Solar PPA Rates & Savings

BUILDING	MOUNTING CATEGORY	PROPOSED ANNUAL GENERATION (KWh)	POST-ESIP ESTIMATE CONSUMPTION (kWh)	$$/kWh RATES		SAVINGS	TOTAL SAVINGS
				UTILITY	SOLAR PPA		
Rafael Cordero Y Molina School (PS #37)	Roof			$0.081	$0.026	$0	$0
	Ground			$0.081	$0.026	$0	
	Canopy			$0.081	$0.026	$0	
James F. Murray School (PS #38)	Roof			$0.101	$0.026	$0	$0
	Ground			$0.101	$0.026	$0	
	Canopy			$0.101	$0.026	$0	
Dr. Charles P. Defuccio School (PS #39)	Roof	205,400	183,176	$0.084	$0.026	$10,697	$10,697
	Ground			$0.084	$0.026	$0	
	Canopy			$0.084	$0.026	$0	
Fred W. Martin Center of the Arts (PS #41)	Roof	343,500	578,872	$0.105	$0.026	$27,145	$27,145
	Ground			$0.105	$0.026	$0	
	Canopy			$0.105	$0.026	$0	
Annex Early Childhood Development Center (PS #23A)	Roof			$0.146	$0.026	$0	$0
	Ground			$0.146	$0.026	$0	
	Canopy			$0.146	$0.026	$0	
Danforth Early Childhood Center (PS #16A)	Roof	117,000	116,823	$0.149	$0.026	$14,391	$14,391
	Ground			$0.149	$0.080	$0	
	Canopy			$0.149	$0.026	$0	
A. Harry Moore School (PS #52)	Roof			$0.097	$0.026	$0	$0
	Ground			$0.097	$0.026	$0	
	Canopy			$0.097	$0.026	$0	
Glenn D. Cunningham Center	Roof	83,290	104,874	$0.130	$0.026	$8,671	$8,671
	Ground			$0.130	$0.026	$0	
	Canopy			$0.130	$0.026	$0	
Administration Central Office	Roof	98,460	3,446,112	$0.118	$0.026	$9,025	$9,025
	Ground			$0.118	$0.026	$0	
	Canopy			$0.118	$0.026	$0	

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ECM 9 – Roof Renovations

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
9	Roof Renovations	✓	✓		✓		✓		✓	✓				✓		✓	✓		✓	✓	✓	✓	

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
9	Roof Renovations			✓	✓	✓	✓				✓	✓	✓			✓	✓		✓		✓	✓	

Background

Roof refurbishment or replacement can help aid in energy savings. Infrared (IR) scans conducted by the subcontractor will determine the existing damage to each roof in the project. Full roof replacements will be done to eliminate water damage and insufficient insulation. Roof refurbishments will consist of the optimal roofing types for low-slope roofing: EPDM Membrane, Built-Up Roofing (BUR) System with gravel, and Modified Bitumen Membrane.

The Roofing Renovations are included where Solar Panels are going to be installed to assure that the roofing under the panels has at least 15 year warranty.

Scope of Work

BUILDING	INCLUDE IN PROJECT (Y/N)	ROOF AREA	ROOFING SYSTEM TYPE	APPROX. SQUARE FOOTAGE	ESTIMATED ROOF AGE
William L. Dickinson High School (PS #43)	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	52,000	> 10 yrs. (2011)
	Y	SOLAR PANEL SECTIONS	Asphalt Shingle	15,000	> 20 yrs.
	N	NON SOLAR PANEL	Modified Bitumen Membrane	9,000	> 20 yrs.
James J. Ferris High School (PS #44)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	135,000	< 10 yrs. (2014)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		
Lincoln High School (PS #48)	N				
	N				
	N				
Henry Snyder High School (PS #46)	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	35,700	> 10 yrs. (2012)
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	14,500	> 20 yrs.
	N	SOLAR PANEL SECTIONS	EPDM Membrane	14,500	> 20 yrs.
	N	NON SOLAR PANEL	EPDM Membrane	5,000	> 20 yrs.
Dr. Ronald E. McNair Academic High School (PS #47)	N				
	N				
	N				
Liberty High School (PS #45)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen w/ Coating	5,000	> 20 yrs.
	N	SOLAR PANEL SECTIONS	Modified Bitumen w/ Coating	5,000	> 20 yrs.
Academy I Middle School (PS #1)	N				
	N				
	N				
Franklin L. Williams Middle School (MS #7)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	61,000	> 15 yrs. (2007)
	N	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	61,000	> 15 yrs. (2007)
	N	NON SOLAR PANEL	Standing Seam Metal	24,000	> 15 yrs. (2007)
Ezra L. Nolan Middle School (MS #40)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	48,000	> 20 yrs.
	N				2023 PROJECT!!
Frank R. Conwell Middle School (MS #4)	N				
	N				
	N				
Frank R. Conwell School (PS #3)	N				
	N				
	N				
Dr. Michael Conti School (PS #5)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane/EPDM Membrane	35,500	Under Warranty (2023)
	N	NON SOLAR PANEL	EPDM Membrane	4,500	Under Warranty (2023)
Jotham W. Wakeman School (PS #6)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	36,000	> 20 yrs.
	N	NON SOLAR PANEL	EPDM Membrane		2023 PROJECT!!
Charles E. Trefurt School (PS #8)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	40,000	Under Warranty (2021)
	N	NON SOLAR PANEL	EPDM Membrane		Under Warranty (2021)
Martin Luther King, Jr. School (PS #11)	N				
	Y	SOLAR PANEL SECTIONS	BUR W/ Gravel	36,500	> 20 yrs.
	N	SOLAR PANEL SECTIONS	BUR W/ Gravel	36,500	> 20 yrs.
	N	NON SOLAR PANEL			
Julia A. Barnes School (PS #12)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen w/ Coating	15,000	> 20 yrs.
	N	SOLAR PANEL SECTIONS	Modified Bitumen w/ Coating	15,000	> 20 yrs.
	N	NON SOLAR PANEL	Modified Bitumen w/ Coating	800	> 20 yrs.
Ollie Culbreth Jr. School (PS #14)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	33,000	Under Warranty (2022)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		Under Warranty (2022)
Whitney M. Young Jr. School (PS #15)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	68,500	> 10 yrs. (2013)
	N	NON SOLAR PANEL			
Cornelia F. Bradford School (PS #16)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	13,500	> 20 yrs.
	N	SOLAR PANEL SECTIONS	EPDM Membrane	13,500	> 20 yrs.
	N	NON SOLAR PANEL			
Joseph H. Brensinger School (PS #17)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	62,000	> 15 yrs.
	N	SOLAR PANEL SECTIONS	EPDM Membrane	62,000	> 15 yrs.
	N	NON SOLAR PANEL	EPDM Membrane	3,000	> 15 yrs.

BUILDING	INCLUDE IN PROJECT (Y/N)	ROOF AREA	ROOFING SYSTEM TYPE	APPROX. SQUARE FOOTAGE	ESTIMATED ROOF AGE
Dr. Maya Angelou School (PS #20)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	46,000	< 10 yrs. (2015)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		
Reverend Dr. Ercel F. Webb School (PS #22)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	41,000	< 1 yr. old (2023)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		< 1 yr. old (2023)
Mahatma K. Ghandi School (PS #23)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	33,000	< 1 yr. old (2023)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		< 1 yr. old (2023)
MarcAnthony Dinardo School (PS #23B)	N				
	N				
	N				
Chaplain Charles Waters School (PS #24)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	29,000	> 20 yrs.
	N	NON SOLAR PANEL			2023 PROJECT!!
Nicolaus Copernicus School (PS #25)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	27,750	< 10 yrs. (2014)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		
Patricia Noonan School (PS #26)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	55,000	< 10 yrs. (2016)
	N	NON SOLAR PANEL	Modified Bitumen Membrane		
Alfred E. Zampella School (PS #27)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane w/ Coating	15,000	> 10 yrs.
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	14,000	> 20 yrs.
	N	SOLAR PANEL SECTIONS	EPDM Membrane	14,000	> 20 yrs.
Christa Mcauliffe School (PS #28)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	60,000	Under Warranty (2021)
	N	NON SOLAR PANEL	EPDM Membrane		Under Warranty (2021)
Gladys Nunery School (PS #29)	N				
	N				
	N				
Alexander D. Sullivan School (PS #30)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	21,500	Under Warranty (2020)
	Y	NON SOLAR PANEL	Modified Bitumen Membrane		Under Warranty (2020)
Anthony J. Infante School (PS #31)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	9,500	> 20 yrs.
	N	NON SOLAR PANEL			
Paul Rafalides School (PS #33)	N				
	Y	SOLAR PANEL SECTIONS	BUR w/ Gravel & EPDM	2,700	> 20 yrs
	Y	SOLAR PANEL SECTIONS	BUR w/ Gravel & EPDM	7,500	> 20 yrs
President Barack Obama School (PS #34)	N				
	Y	SOLAR PANEL SECTIONS	BUR w/ Gravel & Aluminized Modified Bitumen	17,500	> 20 yrs
	N				
Rafael Cordero Y Molina School (PS #37)	N				
	N				
	N				
James F. Murray School (PS #38)	N				
	N				
	N				
Dr. Charles P. Defuccio School (PS #39)	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	21,000	> 20 yrs
	N				
Fred W. Martin Center of the Arts (PS #41)	N				2023 PROJECT!!
	Y	SOLAR PANEL SECTIONS	BUR w/ Gravel & EPDM Membrane	47,350	> 20 yrs
	N	NON SOLAR PANEL	BUR w/ Gravel & EPDM Membrane	10,000	> 20 yrs
Annex Early Childhood Development Center (PS #23A)	N				
	N				
	N				
Danforth Early Childhood Center (PS #16A)	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane	18,000	> 20 yrs.
	N				
A. Harry Moore School (PS #52)	N				
	N	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	17,000	> 10 yrs. (2011)
	N	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	17,000	> 10 yrs. (2011)
	N	NON SOLAR PANEL	Modified Bitumen Membrane	4,000	> 10 yrs. (2011)
Glenn D. Cunningham Center	N				
	Y	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	11,000	> 15 yrs. (2005)
	N	SOLAR PANEL SECTIONS	Modified Bitumen Membrane	11,000	> 15 yrs. (2005)
	N	NON SOLAR PANEL			
Administration Central Office	N				
	Y	SOLAR PANEL SECTIONS	EPDM Membrane/BUR w/ Gravel	19,000	> 20 yrs.
	N	SOLAR PANEL SECTIONS	EPDM Membrane/BUR w/ Gravel	19,000	> 20 yrs.
	N	NON SOLAR PANEL	BUR W. Gravel	17,500	> 20 yrs.

ECM Savings Calculations

Roof Replacement Savings										
BUILDING	ROOF SQFT	HEATING EFFICIENCY (%)	HEATING DEGREE DAYS (°F-days)	EXISTING R-VALUE (ft2-°F-h/BTU)	EXISTING U-VALUE (BTU/ft2-°F-h)	PROPOSED R-VALUE (ft2-°F-h/BTU)	PROPOSED U-VALUE (BTU/ft2-°F-h)	EXISTING HEAT LOSS (THERM)	POST-RETRO FIT HEAT LOSS (THERM)	ROOF SAVINGS (THERM)
William L. Dickinson High School (PS #43)	67,000	80.00	4,615	20	0.050	26	0.038	371.0	285.4	86
James J. Ferris High School (PS #44)	135,000	80.00	4,615	20	0.050	26	0.038	747.6	575	173
Henry Snyder High School (PS #46)	50,200	80.00	4,615	20	0.050	26	0.038	278.0	214	64
Liberty High School (PS #45)	5,000	80.00	4,615	20	0.050	26	0.038	27.7	21	6
Franklin L. Williams Middle School (MS #7)	61,000	80.00	4,615	20	0.050	26	0.038	337.8	260	78
Jotham W. Wakeman School (PS #6)	36,000	80.00	4,615	20	0.050	26	0.038	199.4	153	46
Martin Luther King, Jr. School (PS #11)	36,500	80.00	4,615	20	0.050	26	0.038	202.1	155	47
Julia A. Barnes School (PS #12)	15,000	80.00	4,615	20	0.050	26	0.038	83.1	64	19
Whitney M. Young Jr. School (PS #15)	68,500	80.00	4,615	20	0.050	26	0.038	379.4	292	88
Cornelia F. Bradford School (PS #16)	13,500	80.00	4,615	20	0.050	26	0.038	74.8	58	17
Joseph H. Brensinger School (PS #17)	62,000	80.00	4,615	20	0.050	26	0.038	343.4	264	79
Dr. Maya Angelou School (PS #20)	46,000	80.00	4,615	20	0.050	26	0.038	254.7	196	59
Chaplain Charles Waters School (PS #24)	29,000	80.00	4,615	20	0.050	26	0.038	160.6	124	37
Nicolaus Copernicus School (PS #25)	27,750	80.00	4,615	20	0.050	26	0.038	153.7	118	35
Patricia Noonan School (PS #26)	55,000	80.00	4,615	20	0.050	26	0.038	304.6	234	70
Alfred E. Zampella School (PS #27)	15,000	80.00	4,615	20	0.050	26	0.038	83.1	64	19
Anthony J. Infante School (PS #31)	9,500	80.00	4,615	20	0.050	26	0.038	53	40	12
Paul Rafalides School (PS #33)	2,700	80.00	4,615	20	0.050	26	0.038	15	12	3
President Barack Obama School (PS #34)	17,500	80.00	4,615	20	0.050	26	0.038	97	75	22
Dr. Charles P. Defuccio School (PS #39)	21,000	80.00	4,615	20	0.050	26	0.038	116	89	27
Fred W. Martin Center of the Arts (PS #41)	47,350	80.00	4,615	20	0.050	26	0.038	262	202	61
Danforth Early Childhood Center (PS #16A)	18,000	80.00	4,615	20	0.050	26	0.038	100	77	23
A. Harry Moore School (PS #52)	17,000	80.00	4,615	20	0.050	26	0.038	94	72	22
Glenn D. Cunningham Center	11,000	80.00	4,615	20	0.050	26	0.038	61	47	14
Administration Central Office	19,000	80.00	4,615	20	0.050	26	0.038	105	81	24

$$q_{bd} = U \times A \times \Delta t_{bd} \text{ (Btu/h)}$$

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

ECM 10 – Indoor Air Quality & HVAC Improvements

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)
10	Indoor Air Quality & HVAC Enhancements	✔		✔			✔					

ECM #	ECM DESCRIPTION	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
10	Indoor Air Quality & HVAC Enhancements	✔							✔			✔

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)
10	Indoor Air Quality & HVAC Enhancements		✔	✔					✔		✔	✔

ECM #	ECM DESCRIPTION	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
10	Indoor Air Quality & HVAC Enhancements	✔	✔					✔				

✔	ECM included in the project
✔	Potential ECM Evaluated but not included

Background

JCPS has several Schools/Classrooms that have no ventilation. In most cases, the classrooms are heating via Cast Iron Radiators and have Window Air Conditioners to provide cooling. The radiators are not controlled, and the window air conditioners are controlled locally. When space temperatures get too high during heating season, the temperature in the classrooms is reduced by either opening the windows or the custodian turns off the boilers.


Math
trucks
red
yellow
orange


FAMILY TREE

The goal of ECM #10 is to develop a strategy to deliver Indoor air quality and HVAC enhancements to 8 schools (2 per Quadrant) such that all classrooms, offices, auditoriums, gymnasiums and cafeterias have ventilation and air conditioning. The following is a list of schools and classrooms that were evaluated for ECM-10.

SCHOOL	# OF CLASSROOMS
William L. Dickinson High School (PS #43)	146
Lincoln High School (PS #48)	106
Liberty High School (PS #45)	26
Dr. Michael Conti School (PS #5)	75
Cornelia F. Bradford School (PS #16)	33
Reverend Dr. Ercel F. Webb School (PS #22)	86
MarcAnthony Dinardo School (PS #23B)	46
Chaplain Charles Waters School (PS #24)	74
Gladys Nunery School (PS #29)	27
Anthony J. Infante School (PS #31)	30
Paul Rafalides School (PS #33)	20
President Barack Obama School (PS #34)	56
Rafael Cordero Y Molina School (PS #37)	71
Danforth Early Childhood Center (PS #16A)	26
TOTAL	822

In general, a new Changeair Vertical Self-Contained Classroom Air Conditioning Unit will be installed in each classroom in front of an existing window. New Changeair Vertical Self-Contained Classroom Air Conditioning Unit will be a heat pump with hot gas reheat to provide some dehumidification capability. New units wall also have energy recovery wheels. New steam baseboard radiation will be installed under the remaining windows and will be the primary source of heat in the classrooms with the Changeair Vertical Self-Contained Classroom Air Conditioning Unit providing the secondary source of heating.

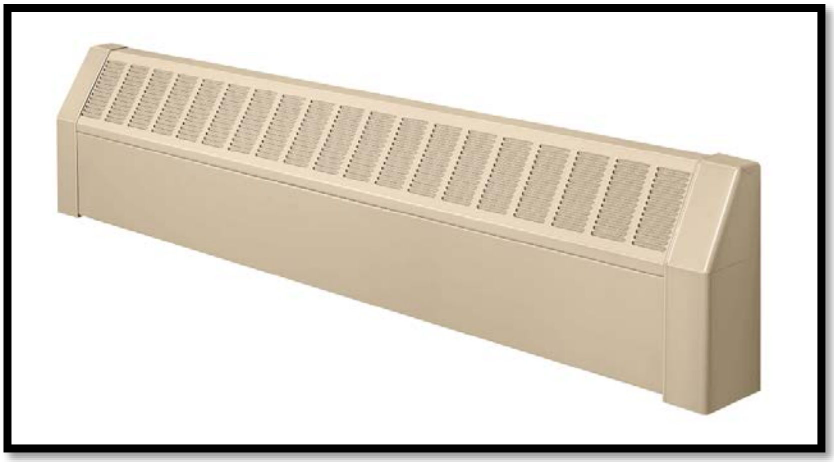
CLASSROOM – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the existing Steam Radiators
- Remove the existing window air conditioning units and return them to Jersey City Public Schools:
- Provide and install new Changeair Vertical Self-Contained Classroom Air Conditioning Unit
    - New unit will be installed in front of an existing window. Window to be removed and replaced with new OA Intake louver similar to the renovation performed at Dickinson HS Science Classrooms (See picture below)

    - New Changeair Vertical Self-Contained Classroom Air Conditioning Unit to be installed per manufacturers recommendations. Use manufacturer provided filler pieces to install unit flush against the wall, covering the window.
    - Units installed in classrooms with existing drop ceilings to have new ductwork installed above the drop ceiling to (4) new supply air louvers.
    - Units installed in classrooms without existing drop ceilings will be provided with a unit mounted supply air plenum with (3) supply grilles from the Changeair factory.
    - Provide power wiring back to the new breaker panels.
    - Changeair cut sheets provided in Appendix A.

- Provide and install new Steam Baseboard Radiation to include
    - Use one of the steam supply pipes and condensate return pipes in each classroom. Any other steam supply or condensate piping in each classroom shall be capped.
    - Install a single zone of steam baseboard radiation with sloped top architectural cover under the full length of the windows in the classroom.
    - In circumstances where a classroom has 2 window exposures, install a second steam radiation zone under the 2nd set of windows.
    - Baseboard will be controlled via a new 2-position steam control valve. Control valve to wired to the factory mounted controller being provided with the Changeair unit.



- Perform system start-up and testing
- Remove all debris and old equipment from the site.
- Start up the new pumps and check for any leaks or abnormal noises.
- Verify that the new pumps meet the performance requirements of the steam heating system.
- Provide start-up report on the installation and testing results.

AUDITORIUM, GYMNASIUM, & CAFETERIA – SCOPE OF WORK

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- Demolish, remove and responsibly dispose of the existing Steam Radiators
- Remove the existing window air conditioning units and return them to Jersey City Public Schools:
- Provide and install new Changeair Vertical Self-Contained Classroom Air Conditioning Unit, Packaged Rooftop Unit or Split System as appropriate for each school/space.

SCHOOL ELECTRICAL UPGRADES – SCOPE OF WORK

The addition of Air Conditioning will add the following estimated tonnage to each of the schools. To accommodate the increased electrical load, each school will need electrical upgrades.

SCHOOL	Added Tonnage of Cooling
William L. Dickinson High School (PS #43)	438
Lincoln High School (PS #48)	318
Liberty High School (PS #45)	78
Dr. Michael Conti School (PS #5)	225
Cornelia F. Bradford School (PS #16)	99
Reverend Dr. Ercel F. Webb School (PS #22)	258
MarcAnthony Dinardo School (PS #23B)	138
Chaplain Charles Waters School (PS #24)	222
Gladys Nunery School (PS #29)	81
Anthony J. Infante School (PS #31)	90
Paul Rafalides School (PS #33)	60
President Barack Obama School (PS #34)	168
Rafael Cordero Y Molina School (PS #37)	213
Danforth Early Childhood Center (PS #16A)	78
TOTAL	2,466

General Scope of Work to include:

- Coordinate sequence of installation with DCO Construction Manager and Owner
- The electrical service and switchgear will be upgraded according to the following steps:
- Shutdown power to the existing electrical service and lockout the electrical panel.
- Remove the existing electrical service and switchgear and dispose of them in an environmentally responsible manner.
- Install a new electrical service with increased capacity, including a new service entrance, meter, and service disconnect switch.
- Install a new main switchgear with increased capacity and proper coordination with the new electrical service.
- Install new feeders and branch circuits from the new switchgear to the new cooling equipment.
- Perform all necessary grounding and bonding as required by local electrical codes and safety standards.
- Perform a visual inspection to ensure that all wiring and connections are secure and meet the manufacturer's specifications.
- Verify proper operation of all electrical equipment, including the new electrical service, switchgear, and cooling equipment.
- Perform a power quality test to verify that the electrical service is operating within acceptable limits.
- For additional information, see Appendix L for school layouts.

ECM Savings Calculations

JCPS has made this ECM a top priority. DCO has worked with the district to approve a baseline adjustment necessary to carry some savings associated with the IAQ and HVAC Enhancements. The ECM will include the following 8 Schools (2 Per Quadrant). Please note the quadrant color coding key below:

Q1
Q2
Q3
Q4

JERSEY CITY PUBLIC SCHOOLS			INCLUDED IN PROJECT
ECM #	BUILDING/FACILITY	ENERGY CONSERVATION MEASURE	"Y" OR "N"
10	William L. Dickinson High School (PS #43)	Indoor Air Quality & HVAC Enhancements	N
10	Lincoln High School (PS #48)	Indoor Air Quality & HVAC Enhancements	N
10	Liberty High School (PS #45)	Indoor Air Quality & HVAC Enhancements	N
10	Dr. Michael Conti School (PS #5)	Indoor Air Quality & HVAC Enhancements	Y
10	Cornelia F. Bradford School (PS #16)	Indoor Air Quality & HVAC Enhancements	Y
10	Reverend Dr. Ercel F. Webb School (PS #22)	Indoor Air Quality & HVAC Enhancements	N
10	MarcAnthony Dinardo School (PS #23B)	Indoor Air Quality & HVAC Enhancements	Y
10	Chaplain Charles Waters School (PS #24)	Indoor Air Quality & HVAC Enhancements	N
10	Gladys Nunery School (PS #29)	Indoor Air Quality & HVAC Enhancements	Y
10	Anthony J. Infante School (PS #31)	Indoor Air Quality & HVAC Enhancements	Y
10	Paul Rafalides School (PS #33)	Indoor Air Quality & HVAC Enhancements	Y
10	President Barack Obama School (PS #34)	Indoor Air Quality & HVAC Enhancements	N
10	Rafael Cordero Y Molina School (PS #37)	Indoor Air Quality & HVAC Enhancements	Y
10	Danforth Early Childhood Center (PS #16A)	Indoor Air Quality & HVAC Enhancements	Y

The Baseline Adjustment adds in the estimated electrical usage for the new systems to the baseline period. At this time the current baseline data in section 1 of this ESP does not contain these values. The adjustment assumes 3-Tons per classroom and 20 tons per Cafeteria, Gym, Auditorium. DCO and JCPS have agreed to reflect these adjustment in our M&V Plan as well as future Energy Cost Budgeting to be performed by the district so that future costs of electricity will be accounted for.

IAQ & HVAC Enhancements - Annual Consumption Baseline Adjustment

BUILDING	SQFT	SPACE TYPE	SPACES TO GET COOLING (QUANTITY)	CAPACITY EACH (MBH)	EFFICIENCY (EER)	RUN HOURS	ANNUAL USAGE (kWh)	TOTAL BASELINE ADJUSTMENT
Dr. Michael Conti School (PS #5)	148,049	Gym/Auditorium	2	240	10.8	960	42,667	263,385
		Classroom	75	36	13.0	960	199,385	
		Cafeteria	1	240	10.8	960	21,333	
Cornelia F. Bradford School (PS #16)	61,684	Gym/Auditorium	1	240	10.8	960	21,333	130,396
		Classroom	33	36	13.0	960	87,729	
		Cafeteria	1	240	10.8	960	21,333	
MarcAnthony Dinardo School (PS #23B)	58,480	Gym/Auditorium	1	240	10.8	960	21,333	164,956
		Classroom	46	36	13.0	960	122,289	
		Cafeteria	1	240	10.8	960	21,333	
Gladys Nunery School (PS #29)	66,180	Gym/Auditorium	1	240	10.8	960	21,333	114,445
		Classroom	27	36	13.0	960	71,778	
		Cafeteria	1	240	10.8	960	21,333	
Anthony J. Infante School (PS #31)	36,973	Gym/Auditorium	1	240	10.8	960	21,333	122,421
		Classroom	30	36	13.0	960	79,754	
		Cafeteria	1	240	10.8	960	21,333	
Paul Rafalides School (PS #33)	30,607	Gym/Auditorium	1	240	10.8	960	21,333	95,836
		Classroom	20	36	13.0	960	53,169	
		Cafeteria	1	240	10.8	960	21,333	
Rafael Cordero Y Molina School (PS #37)	135,534	Gym/Auditorium	1	240	10.8	960	21,333	231,417
		Classroom	71	36	13.0	960	188,751	
		Cafeteria	1	240	10.8	960	21,333	
Danforth Early Childhood Center (PS #16A)	78,996	Gym/Auditorium	1	240	10.8	960	21,333	111,787
		Classroom	26	36	13.0	960	69,120	
		Cafeteria	1	240	10.8	960	21,333	

Savings calculations shown below and carried in the ESIP represent an efficiency improvement over the baseline adjustment calculation.

IAQ & HVAC Enhancement Savings

BUILDING	QUANTITY	TONS	TOTAL TONS	EERb	EERq	CF	ELFHc	EFLHh	Cooling Energy Savings (kWh/yr)	Heating Energy Savings (kWh/yr)	Total Energy Savings (kWh/yr)
Dr. Michael Conti School (PS #5)	2	20	40	10.8	11	50%	394	840	318	0	3,508
	75	3	225	13.0	13.5	50%	394	840	3,031	0	
	1	20	20	10.8	11	50%	394	840	159	0	
Cornelia F. Bradford School (PS #16)	1	20	20	10.8	11	50%	394	840	159	0	1,652
	33	3	99	13.0	13.5	50%	394	840	1,334	0	
	1	20	20	10.8	11	50%	394	840	159	0	
MarcAnthony Dinardo School (PS #23B)	1	20	20	10.8	11	50%	394	840	1,859	0	2,018
	46	3	138	13.0	13.5	50%	394	840	159	0	
	1	20	20	10.8	11	50%	394	840	0	0	
Gladys Nunery School (PS #29)	1	20	20	10.8	11	50%	394	840	159	0	1,409
	27	3	81	13.0	13.5	50%	394	840	1,091	0	
	1	20	20	10.8	11	50%	394	840	159	0	
Anthony J. Infante School (PS #31)	1	20	20	10.8	11	50%	394	840	159	0	1,531
	30	3	90	13.0	13.5	50%	394	840	1,212	0	
	1	20	20	10.8	11	50%	394	840	159	0	
Paul Rafalides School (PS #33)	1	20	20	10.8	11	50%	394	840	159	0	1,127
	20	3	60	13.0	13.5	50%	394	840	808	0	
	1	20	20	10.8	11	50%	394	840	159	0	
Rafael Cordero Y Molina School (PS #37)	1	20	20	10.8	11	50%	394	840	159	0	3,188
	71	3	213	13.0	13.5	50%	394	840	2,869	0	
	1	20	20	10.8	11	50%	394	840	159	0	
Danforth Early Childhood Center (PS #16A)	1	20	20	10.8	11	50%	394	840	159	0	1,369
	26	3	78	13.0	13.5	50%	394	840	1,051	0	
	1	20	20	10.8	11	50%	394	840	159	0	

Algorithms

Air Conditioning Algorithms:

Energy Savings (kWh/yr) = N * Tons * 12 kBtuh/Ton * ($1/EER_b$-$1/EER_q$) * $EFLH_c$

Peak Demand Savings (kW) = N * Tons * 12 kBtuh/Ton * ($1/EER_b$-$1/EER_q$) * CF

Heat Pump Algorithms:

Cooling Energy Savings (kWh/yr) = N * Tons * 12 kBtuh/Ton * ($1/EER_b$-$1/EER_q$) * $EFLH_c$

Heating Energy Savings (Btu/yr) = N * Tons * 12 kBtuh/Ton * ((1/ (COP_b * 3.412))-(1/ (COP_q * 3.412)) * $EFLH_h$

Where $_c$ is for cooling and $_h$ is for heating.

Summary of Inputs

HVAC and Heat Pumps

Component	Type	Value	Source
Tons	Variable	Rated Capacity, Tons	Application
EER_b	Variable	See Table below	1
EER_q	Variable	ARI/AHRI or AHAM Values	Application
CF	Fixed	50%	2
$EFLH_{(c\ or\ h)}$	Variable	See Tables below	3

Definition of Variables

N = Number of units

Tons = Rated cooling capacity of unit.This value comes from ARI/AHRI or AHAM rating or manufacturer data.

EER_b = Energy Efficiency Ratio of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER should be used in place of EER.

COP_b = Coefficient of Performance of the baseline unit. This data is found in the HVAC and Heat Pumps table below. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

EER_q = Energy Efficiency Ratio of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 (5.4 tons) BtuH, SEER should be used in place of EER.

COP_q = Coefficient of Performance of the high efficiency unit. This value comes from the ARI/AHRI or AHAM directories or manufacturer data. For units < 65,000 BtuH (5.4 tons), SEER and HSPF/3.412 should be used in place of COP * 3.412 for cooling and heating savings, respectively.

CF = Coincidence Factor – This value represents the percentage of the total load which is on during electric system's Peak Window. This value is based on existing measured usage and determined as the average number of operating hours during the peak window period.

$EFLH_{c\ or\ h}$ = Equivalent Full Load Hours – This represents a measure of energy use by season during the on-peak and off-peak periods.

EFLH Table

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Assembly	603	669
Auto repair	1910	426
Dormitory	465	800
Hospital	3366	1424
Light industrial	714	549
Lodging – Hotel	1077	2918
Lodging – Motel	619	1233
Office – large	2034	720
Office – small	431	955

HVAC Baseline Efficiencies Table – New Construction/EUL/RoF

Equipment Type	Baseline = ASHRAE Std. 90.1 – 2016
Unitary HVAC/Split Systems and Single Package, Air Cooled <=5.4 tons, split <=5.4 tons, single >5.4 to 11.25 tons >11.25 to 20 tons > 21 to 63 tons >63 Tons	 14 SEER 14 SEER 11.0 EER, 12.7 IEER 10.8 EER, 12.2 IEER 9.8 EER, 11.4 IEER 9.5 EER, 11.0 IEER
Air Cooled Heat Pump Systems, Split System and Single Package <=5.4 tons, split <=5.4 tons, single >5.4 to 11.25 tons >11.25 to 20 tons >= 21	 14 SEER, 8.2 HSPF 14 SEER, 8.0 HSPF 10.8 EER, 12 IEER, 3.3 heating COP 10.4 EER, 11.4 IEER, 3.2 heating COP 9.3 EER, 10.4 IEER, 3.2 heating COP
Water Source Heat Pumps (water to air, water loop) <=1.4 tons >1.4 to 5.4 tons >5.4 to 11.25 tons	 12.2 EER, 4.3 heating COP 13.0 EER, 4.3 heating COP 13.0 EER, 4.3 heating COP
Ground Water Source Heat Pumps <=11.25 tons	18.0 EER, 3.7 heating COP
Ground Source Heat Pumps (brine to air, ground loop) <=11.25 tons	14.1 EER, 3.2 heating COP
Package Terminal Air Conditioners[57]	14.0 – (0.300 * Cap/1,000), EER
Package Terminal Heat Pumps	14.0 – (0.300 * Cap/1,000), EER 3.7 – (0.052 * Cap/1,000), heating COP
Single Package Vertical Air Conditioners <=5.4 tons >5.4 to 11.25 tons >11.25 to 20 tons	10.0 EER 10.0 EER 10.0 EER
Single Package Vertical Heat Pumps <=5.4 tons >5.4 to 11.25 tons >11.25 to 20 tons	 10.0 EER, 3.0 heating COP 10.0 EER, 3.0 heating COP 10.0 EER, 3.0 heating COP

Facility Type	Heating $EFLH_h$	Cooling $EFLH_c$
Other	681	736
Religious worship	722	279
Restaurant – fast food	813	645
Restaurant – full service	821	574
Retail – big box	191	1279
Retail – Grocery	191	1279
Retail – small	545	882
Retail – large	2101	1068
School – Community college	1431	846
School – postsecondary	1191	1208
School – primary	840	394
School – secondary	901	466
Warehouse	452	400

Multi-family EFLH by Vintage

Facility Type	Prior to 1979	From 1979 to 2006	From 2007 through Present
Low-rise, Cooling	507	550	562
Low-rise, Heating	757	723	503
High-rise, Cooling	793	843	954
High-rise, Heating	526	395	219

Sources

1. ASHRAE Standards 90.1-2016, *Energy Standard for Buildings Except Low Rise Residential Buildings*; available at: https://www.ashrae.org/standards-research--technology/standards--guidelines.
2. C&I Unitary HVAC Load Shape Project Final Report. August 2011, v.1.1, p. 12, Table O-5. The CF reported here is a center point for NJ chosen between the CF for urban NY and for the Mid-Atlantic region in the PJM peak periods. Available at: http://www.neep.org/sites/default/files/resources/NEEP_HVAC_Load_Shape_Report_Final_August2_0.pdf.
3. New York State Joint Utilities, *New York Standard Approach for Estimating Energy Savings from Energy Efficiency Programs*, V7, April 2019. Appendix G – Equivalent

DCO Energy Efficiency Division
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ECM 13 – Plug Load Controls

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
13	Plug Load Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
13	Plug Load Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Background

Plug loads in a building typically refer to the electrical devices that are plugged into wall outlets, such as computers, printers, chargers, and televisions. However, when a device is turned off or in standby mode, it may still draw a small amount of power, known as standby power or vampire power.

This occurs because many electronic devices have power supplies or transformers that are designed to convert the incoming electrical power to a lower voltage suitable for the device's use. These power supplies typically consume a small amount of power even when the device is not in use, to maintain the circuitry needed for the device to turn on quickly when the user wants to use it.

For example, when a television is turned off, it may still consume power to maintain the settings and to power the remote control sensor. Some televisions may also consume power to download updates or to maintain a network connection.

Similarly, chargers for devices like phones and laptops may continue to consume power even when the device is fully charged.

According to the U.S. Department of Energy, standby power can account for up to 10% of a building's total electricity use. To reduce standby power consumption, it is important to use energy-efficient devices, unplug devices when they are not in use, or use power strips that can be turned off when not in use.

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ECM Scope & Savings Calculations

Hours per year scheduled “On” is the available hours of operation that the Bert Plugs will be programmed to enable the plugged in equipment to operate. Hours per year scheduled “OFF” is the amount of parasitic load that will be saved. The table below indicates the estimated parasitic load of each piece of equipment.

Plug Load Savings

BUILDING	SQFT	DEVICE TYPE	QUANTITY	WATTS PER UNIT (PARASITIC LOAD)	HOURS PER YEAR PLUGGED IN	HOUR PER DAY SCHEDULED "ON"	HOUR PER DAY SCHEDULED "OFF"	ELECTRIC SAVINGS (kWh)	TOTAL ELECTRIC SAVINGS (kWh)
William L. Dickinson High School (PS #43)	356,000	Printer/Copier	38	25	8,760	2,860	5,900	5,605	96,138
		SmartBoard	146	35	8,760	2,860	5,900	30,149	
		Window A/C	37	1,200	3,360	2,000	1,360	60,384	
James J. Ferris High School (PS #44)	282,511	Printer/Copier	48	25	8,760	2,860	5,900	7,080	99,352
		SmartBoard	107	35	8,760	2,860	5,900	22,096	
		Window A/C	43	1,200	3,360	2,000	1,360	70,176	
Lincoln High School (PS #48)	272,932	Printer/Copier	32	25	8,760	2,860	5,900	4,720	98,417
		SmartBoard	106	35	8,760	2,860	5,900	21,889	
		Window A/C	44	1,200	3,360	2,000	1,360	71,808	
Henry Snyder High School (PS #46)	187,500	Printer/Copier	16	25	8,760	2,860	5,900	2,360	79,198
		SmartBoard	135	35	8,760	2,860	5,900	27,878	
		Window A/C	30	1,200	3,360	2,000	1,360	48,960	
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	Printer/Copier	25	25	8,760	2,860	5,900	3,688	17,523
		SmartBoard	67	35	8,760	2,860	5,900	13,836	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Liberty High School (PS #45)	33,316	Printer/Copier	5	25	8,760	2,860	5,900	738	22,427
		SmartBoard	26	35	8,760	2,860	5,900	5,369	
		Window A/C	10	1,200	3,360	2,000	1,360	16,320	
Academy I Middle School (PS #1)	64,884	Printer/Copier	15	25	8,760	2,860	5,900	2,213	83,933
		SmartBoard	48	35	8,760	2,860	5,900	9,912	
		Window A/C	44	1,200	3,360	2,000	1,360	71,808	
Franklin L. Williams Middle School (MS #7)	163,855	Printer/Copier	22	25	8,760	2,860	5,900	3,245	28,998
		SmartBoard	101	35	8,760	2,860	5,900	20,857	
		Window A/C	3	1,200	3,360	2,000	1,360	4,896	
Ezra L. Nolan Middle School (MS #40)	132,483	Printer/Copier	22	25	8,760	2,860	5,900	3,245	17,287
		SmartBoard	68	35	8,760	2,860	5,900	14,042	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Frank R. Conwell Middle School (MS #4)	169,678	Printer/Copier	21	25	8,760	2,860	5,900	3,098	17,140
		SmartBoard	68	35	8,760	2,860	5,900	14,042	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Frank R. Conwell School (PS #3)	117,939	Printer/Copier	12	25	8,760	2,860	5,900	1,770	20,149
		SmartBoard	89	35	8,760	2,860	5,900	18,379	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Dr. Michael Conti School (PS #5)	148,049	Printer/Copier	8	25	8,760	2,860	5,900	1,180	98,268
		SmartBoard	75	35	8,760	2,860	5,900	15,488	
		Window A/C	50	1,200	3,360	2,000	1,360	81,600	
Jotham W. Wakeman School (PS #6)	148,882	Printer/Copier	10	25	8,760	2,860	5,900	1,475	31,031
		SmartBoard	72	35	8,760	2,860	5,900	14,868	
		Window A/C	9	1,200	3,360	2,000	1,360	14,688	
Charles E. Trefurt School (PS #8)	169,196	Printer/Copier	17	25	8,760	2,860	5,900	2,508	36,587
		SmartBoard	86	35	8,760	2,860	5,900	17,759	
		Window A/C	10	1,200	3,360	2,000	1,360	16,320	
Martin Luther King, Jr. School (PS #11)	104,509	Printer/Copier	11	25	8,760	2,860	5,900	1,623	23,598
		SmartBoard	59	35	8,760	2,860	5,900	12,184	
		Window A/C	6	1,200	3,360	2,000	1,360	9,792	
Julia A. Barnes School (PS #12)	86,375	Printer/Copier	11	25	8,760	2,860	5,900	1,623	38,473
		SmartBoard	52	35	8,760	2,860	5,900	10,738	
		Window A/C	16	1,200	3,360	2,000	1,360	26,112	
Ollie Culbreth Jr. School (PS #14)	98,036	Printer/Copier	17	25	8,760	2,860	5,900	2,508	24,090
		SmartBoard	65	35	8,760	2,860	5,900	13,423	
		Window A/C	5	1,200	3,360	2,000	1,360	8,160	
Whitney M. Young Jr. School (PS #15)	179,590	Printer/Copier	17	25	8,760	2,860	5,900	2,508	49,003
		SmartBoard	75	35	8,760	2,860	5,900	15,488	
		Window A/C	19	1,200	3,360	2,000	1,360	31,008	
Cornelia F. Bradford School (PS #16)	61,684	Printer/Copier	10	25	8,760	2,860	5,900	1,475	67,042
		SmartBoard	33	35	8,760	2,860	5,900	6,815	
		Window A/C	36	1,200	3,360	2,000	1,360	58,752	
Joseph H. Brensinger School (PS #17)	153,864	Printer/Copier	20	25	8,760	2,860	5,900	2,950	23,187
		SmartBoard	98	35	8,760	2,860	5,900	20,237	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Dr. Maya Angelou School (PS #20)	108,800	Printer/Copier	21	25	8,760	2,860	5,900	3,098	11,564
		SmartBoard	41	35	8,760	2,860	5,900	8,467	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	Printer/Copier	18	25	8,760	2,860	5,900	2,655	33,470
		SmartBoard	86	35	8,760	2,860	5,900	17,759	
		Window A/C	8	1,200	3,360	2,000	1,360	13,056	

Plug Load Savings

BUILDING	SQFT	DEVICE TYPE	QUANTITY	WATTS PER UNIT (PARASITIC LOAD)	HOURS PER YEAR PLUGGED IN	HOUR PER DAY SCHEDULED "ON"	HOUR PER DAY SCHEDULED "OFF"	ELECTRIC SAVINGS (kWh)	TOTAL ELECTRIC SAVINGS (kWh)
Mahatma K. Ghandi School (PS #23)	164,653	Printer/Copier	11	25	8,760	2,860	5,900	1,623	45,620
		SmartBoard	55	35	8,760	2,860	5,900	11,358	
		Window A/C	20	1,200	3,360	2,000	1,360	32,640	
MarcAnthony Dinardo School (PS #23B)	58,480	Printer/Copier	5	25	8,760	2,860	5,900	738	13,461
		SmartBoard	30	35	8,760	2,860	5,900	6,195	
		Window A/C	4	1,200	3,360	2,000	1,360	6,528	
Chaplain Charles Waters School (PS #24)	118,240	Printer/Copier	17	25	8,760	2,860	5,900	2,508	76,541
		SmartBoard	74	35	8,760	2,860	5,900	15,281	
		Window A/C	36	1,200	3,360	2,000	1,360	58,752	
Nicolaus Copernicus School (PS #25)	132,860	Printer/Copier	7	25	8,760	2,860	5,900	1,033	54,449
		SmartBoard	69	35	8,760	2,860	5,900	14,249	
		Window A/C	24	1,200	3,360	2,000	1,360	39,168	
Patricia Noonan School (PS #26)	123,000	Printer/Copier	17	25	8,760	2,860	5,900	2,508	11,181
		SmartBoard	42	35	8,760	2,860	5,900	8,673	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Alfred E. Zampella School (PS #27)	94,611	Printer/Copier	7	25	8,760	2,860	5,900	1,033	57,280
		SmartBoard	59	35	8,760	2,860	5,900	12,184	
		Window A/C	27	1,200	3,360	2,000	1,360	44,064	
Christa Mcauliffe School (PS #28)	126,761	Printer/Copier	17	25	8,760	2,860	5,900	2,508	104,471
		SmartBoard	67	35	8,760	2,860	5,900	13,836	
		Window A/C	54	1,200	3,360	2,000	1,360	88,128	
Gladys Nunery School (PS #29)	66,180	Printer/Copier	6	25	8,760	2,860	5,900	885	21,149
		SmartBoard	27	35	8,760	2,860	5,900	5,576	
		Window A/C	9	1,200	3,360	2,000	1,360	14,688	
Alexander D. Sullivan School (PS #30)	93,129	Printer/Copier	12	25	8,760	2,860	5,900	1,770	42,317
		SmartBoard	62	35	8,760	2,860	5,900	12,803	
		Window A/C	17	1,200	3,360	2,000	1,360	27,744	
Anthony J. Infante School (PS #31)	36,973	Printer/Copier	3	25	8,760	2,860	5,900	443	18,062
		SmartBoard	30	35	8,760	2,860	5,900	6,195	
		Window A/C	7	1,200	3,360	2,000	1,360	11,424	
Paul Rafalides School (PS #33)	30,607	Printer/Copier	6	25	8,760	2,860	5,900	885	22,967
		SmartBoard	20	35	8,760	2,860	5,900	4,130	
		Window A/C	11	1,200	3,360	2,000	1,360	17,952	
President Barack Obama School (PS #34)	103,444	Printer/Copier	10	25	8,760	2,860	5,900	1,475	44,047
		SmartBoard	56	35	8,760	2,860	5,900	11,564	
		Window A/C	19	1,200	3,360	2,000	1,360	31,008	
Rafael Cordero Y Molina School (PS #37)	135,534	Printer/Copier	15	25	8,760	2,860	5,900	2,213	98,474
		SmartBoard	71	35	8,760	2,860	5,900	14,662	
		Window A/C	50	1,200	3,360	2,000	1,360	81,600	
James F. Murray School (PS #38)	120,940	Printer/Copier	12	25	8,760	2,860	5,900	1,770	27,403
		SmartBoard	53	35	8,760	2,860	5,900	10,945	
		Window A/C	9	1,200	3,360	2,000	1,360	14,688	
Dr. Charles P. Defuccio School (PS #39)	126,429	Printer/Copier	8	25	8,760	2,860	5,900	1,180	19,272
		SmartBoard	56	35	8,760	2,860	5,900	11,564	
		Window A/C	4	1,200	3,360	2,000	1,360	6,528	
Fred W. Martin Center of the Arts (PS #41)	140,467	Printer/Copier	21	25	8,760	2,860	5,900	3,098	25,300
		SmartBoard	68	35	8,760	2,860	5,900	14,042	
		Window A/C	5	1,200	3,360	2,000	1,360	8,160	
Annex Early Childhood Development Center (PS #23A)	12,375	Printer/Copier	6	25	8,760	2,860	5,900	885	3,363
		SmartBoard	12	35	8,760	2,860	5,900	2,478	
		Window A/C	0	1,200	3,360	2,000	1,360	0	
Danforth Early Childhood Center (PS #16A)	78,996	Printer/Copier	6	25	8,760	2,860	5,900	885	22,967
		SmartBoard	20	35	8,760	2,860	5,900	4,130	
		Window A/C	11	1,200	3,360	2,000	1,360	17,952	
A. Harry Moore School (PS #52)	65,300	Printer/Copier	6	25	8,760	2,860	5,900	885	97,540
		SmartBoard	65	35	8,760	2,860	5,900	13,423	
		Window A/C	51	1,200	3,360	2,000	1,360	83,232	
Glenn D. Cunningham Center	12,100	Printer/Copier	3	25	8,760	2,860	5,900	443	2,921
		SmartBoard	12	35	8,760	2,860	5,900	2,478	
		Window A/C	0	1,200	3,360	2,000	1,360	0	

EQUIPMENT PARASITIC LOADS

DEVICE TYPE	WATTS PER UNIT (PARASITIC LOAD)
Printer/Copier	25
SmartBoard	35
Window A/C	1,200

ECM 14 – Building Envelope Improvements

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
14	Building Envelope Improvements	✓	✓	✓	✓	✓	✓	✓		✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
14	Building Envelope Improvements	✓	✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Background

Caulking – gaps at door assembly are allowing unwanted air leakage as seen by clear daylight between trim (Alexander D Sullivan School).

Caulking – dirty fiberglass is a clear sign of air leakage behind the snap trim of the window, caulk needs to be applied to the window assembly to reduce air leakage (Alexander D Sullivan School).

Caulking – gaps between the window frame and block wall are a direct pathway between interior and exterior of the building resulting in air leakage (Danforth ECC).

Caulking – gaps between the window snap trim is partially caulked, sealants should be applied at all trim intersections to reduce air leakage (Ezra L Nolan School).

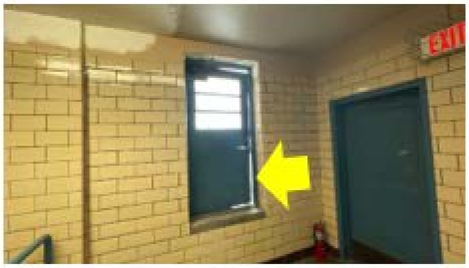
Caulking – gaps between the window trim pieces are building up with dust/debris as air leaks into and out of the building (Glenn D Cunningham Center).

Caulking – dirty fiberglass is a clear sign of air leakage behind the snap trim of the window, caulk needs to be applied to the window assembly to reduce air leakage (MarcAnthony Dinardo School).

Door Weather Stripping – daylight at the center and bottom of the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Academy 1 MS).

Door Weather Stripping – damaged/missing weather stripping needs to be replaced to reduce drafts ad air leakage at the door assembly (Alfred Zampella).

Door Weather Stripping – daylight at the sides of the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Anthony J Infante School).

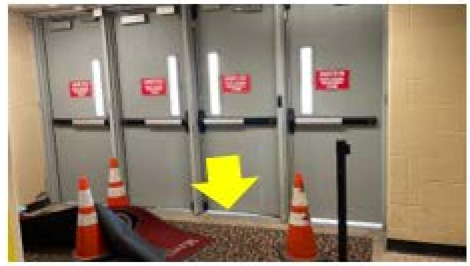


Door Weather Stripping – daylight at the side and bottom of the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Charles Trefurt School)

Door Weather Stripping – damaged/missing weather stripping needs to be replaced to reduce drafts and air leakage at the door assembly (Christa Mcauliffe).

Door Weather Stripping – daylight at the center and bottom of the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Danforth ECC).

Door Weather Stripping – daylight at the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Ezra Nolan School).



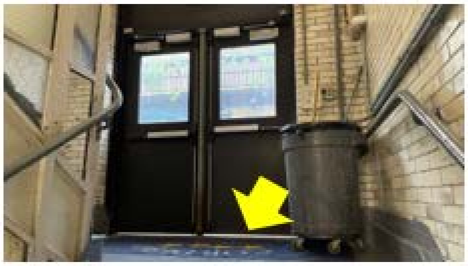
Door Weather Stripping – daylight at the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (Fred Martin School).

Door Weather Stripping – daylight at the door shows clear envelope weaknesses that need to be addressed with improved weather stripping (James J Ferris School).

Door Weather Stripping – damaged/missing weather stripping needs to be replaced to reduce drafts and air leakage at the door assembly (James J Ferris School).

Door Weather Stripping – damaged/missing weather stripping needs to be replaced to reduce drafts and air leakage at the door assembly (Mahatma Gandi School).

Door Weather Stripping – damaged/missing weather stripping needs to be replaced to reduce drafts and air leakage at the door assembly (Michael Conti School).



Door Weather Stripping – daylight at the bottom of the double door assembly is a clear sign or air leakage that can be eliminated by installing proper weather stripping (Rafael Cordero School).

Door Weather Stripping – daylight at the bottom of the double door assembly is a clear sign or air leakage that can be eliminated by installing proper weather stripping (William Dickinson School).

Roof-Wall Intersection Air Sealing – air permeable fiberglass installed in the roof-wall intersection is allowing air infiltration and exfiltration (Alfred Zampella School).

Roof-Wall Intersection Air Sealing – air permeable fiberglass installed in the roof-wall intersection is allowing air infiltration and exfiltration (Christa McAuliffe School).

Roof-Wall Intersection Air Sealing – gaps in fireproofing spray are building up with dust/debris; a clear sign of air leakage through the roof-wall intersection of the building (President Barack Obama School).

Wall Air Sealing – the air barrier is not continuous at the exterior wall; a louver over the door is stuck open resulting in excessive air leakage into the building (Joseph Brensinger School).

Scope of Work

- Caulking – there are unsealed perimeter joints and holes found at the window systems throughout the Jersey City Public School District. These gaps allow air to find its way into the wall and window frame cavities or directly from outside to inside resulting in unwanted energy losses.
- Door Weather Stripping – deteriorated weather stripping materials, ineffective weather stripping installation and daylight showing at the perimeter of door systems create direct pathways for unwanted infiltration/ exfiltration throughout the school district.
- Overhang Air Sealing – overhangs are roofs, floor systems or areas above entryways that extend beyond the plane of the exterior wall system. These areas of construction at the Schools were misunderstood by builders and the cavity that extends beyond the plane of the exterior wall system was incorrectly "connected" to the interior heated spaces of the building in many locations. Overhangs that are not properly sealed at the plane of the surface that should separate the conditioned space from the outdoors lead to excessive air leakage and heat loss at these vulnerable areas in the building envelope.
- Overhead Door Weather Stripping/ Roll-up Door Weather Stripping – remove existing weather stripping and replace with new commercial grade weather stripping to create a full air seal around the door. With low grade, none, or deteriorating materials in place overhead and roll-up doors are a major air leakage sources.
- Roof-Wall Intersection Air Sealing – the roof-wall intersection is regularly an area that allows unwanted air leakage through the building shell. Exterior flashing and finish details at this area are not constructed to stop air leakage (exterior flashings are for water control, not air control); unsealed exterior flashing details combine with interior gaps in the framing between the roof and wall assembly to allow infiltration/ exfiltration.
- Wall Air Sealing – a wall assembly that does not have an effective air barrier in place allows unnecessary air leakage losses. Areas of poorly insulated and sealed wall assemblies create bypasses for air leakage and heat loss that force the heating and cooling systems to work harder than necessary.

School	Caulking (LF)	Door - Install Jamb Spacer (Units)	Door Weather Striping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Overhang Air Sealing (LF)	Overhead Door Weather Stripping (Units)	Roll-Up Door Weather Stripping (Units)	Roof-Wall Intersection Air Sealing (LF)	Wall Air Sealing (LF)	Wall Air Sealing (SF)	Wall Air Sealing (Units)	Total Quantity
A. Harry Moore School (PS #52)	9,420	10	9	9								9,448
Academy I Middle School (PS #1)	7,798		12	6								7,816
Alexander D. Sullivan School (PS #30)	14,423		7	2								14,432
Alfred E. Zampella School (PS #27)	96		10	2	7			202				317
Annex Early Childhood Development Center (PS #23A)			2		10			276				288
Anthony J. Infante School (PS #31)		3	2	5								10
Chaplain Charles Waters School (PS #24)			7									7
Charles E. Trefurt School (PS #8)			10	8								18
Christa Mcauliffe School (PS #28)	8,778		16	2	13			428				9,237
Cornelia F. Bradford School (PS #16)			6	3								9
Danforth Early Childhood Center (PS #16A)	9,611		3	5								9,619
Dr. Charles P. Defuccio School (PS #39)			14	3								17
Dr. Michael Conti School (PS #5)			1	15								16
Dr. Ronald E. McNair Academic High School (PS #47)	16,700		8	8								16,716
Ezra L. Nolan Middle School (MS #40)	13,359		8	26					20			13,413
Fred W. Martin Center of the Arts (PS #41)			3	48			1					52
Gladys Nunery School (PS #29)	8,554		6	5								8,565
Glenn D. Cunningham Center	1,904		1	3								1,908
Henry Snyder High School (PS #46)	22,383		8	3								22,394
James F. Murray School (PS #38)			7	5								12
James J. Ferris High School (PS #44)	42,034		35	23								42,092
Joseph H. Brensinger School (PS #17)			16	25	21	1	1				1	65
Jotham W. Wakeman School (PS #6)				11								11
Julia A. Barnes School (PS #12)			9	6			1					16
Liberty High School (PS #45)	4,928		5	2								4,935
Lincoln High School (PS #48)		1	17	18			4					40
Mahatma K. Ghandi School (PS #23)			10	6			1					17
Marc Anthony Dinardo School (PS #23B)			3	8								11
Martin Luther King, Jr. School (PS #11)		2	8	10								20
Nicolaus Copernicus School (PS #25)	13,653		14	9		1						13,677
Ollie Culbreth Jr. School (PS #14)			9	8								17
Paul Rafalides School (PS #33)			2	23								25
President Barack Obama School (PS #34)	8,778		8	7				308				9,101
PS #16 (New School)			3	5								8
Rafael Cordero Y Molina School (PS #37)			5	1								6
Reverend Dr. Ercel F. Webb School (PS #22)			5	10						2		17
Whitney M. Young Jr. School (PS #15)	12,812		11	7								12,830
William L. Dickinson High School (PS #43)			18	7		2						27

ECM Savings Calculations

Building Envelope Savings Summary			
BUILDING	SQFT	kWh SAVINGS	THERMS SAVINGS
William L. Dickinson High School (PS #43)	356,000	2,508	1,423
James J. Ferris High School (PS #44)	282,511	22,305	12,659
Lincoln High School (PS #48)	272,932	3,473	1,971
Henry Snyder High School (PS #46)	187,500	10,341	5,869
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	8,254	4,685
Liberty High School (PS #45)	33,316	2,670	1,515
Academy I Middle School (PS #1)	64,884	4,789	2,718
Ezra L. Nolan Middle School (MS #40)	132,483	7,889	4,477
Dr. Michael Conti School (PS #5)	148,049	962	546
Jotham W. Wakeman School (PS #6)	148,882	743	421
Charles E. Trefurt School (PS #8)	169,196	1,391	789
Martin Luther King, Jr. School (PS #11)	104,509	1,465	831
Julia A. Barnes School (PS #12)	86,375	1,276	724
Ollie Culbreth Jr. School (PS #14)	98,036	1,310	743
Whitney M. Young Jr. School (PS #15)	179,590	6,941	3,939
Cornelia F. Bradford School (PS #16)	61,684	719	408
Joseph H. Brensinger School (PS #17)	153,864	3,505	1,989
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	1,205	684
Mahatma K. Ghandi School (PS #23)	164,653	1,367	776
MarcAnthony Dinardo School (PS #23B)	58,480	813	462
Chaplain Charles Waters School (PS #24)	118,240	780	443
Nicolaus Copernicus School (PS #25)	132,860	7,618	4,323
Alfred E. Zampella School (PS #27)	94,611	1,760	999
Christa Mcauliffe School (PS #28)	126,761	112,197	
Gladys Nunery School (PS #29)	66,180	4,443	2,521
Alexander D. Sullivan School (PS #30)	93,129	6,838	3,881
Anthony J. Infante School (PS #31)	36,973	560	318
Paul Rafalides School (PS #33)	30,607	1,775	1,008
President Barack Obama School (PS #34)	103,444	5,537	3,143
Rafael Cordero Y Molina School (PS #37)	135,534	513	291
James F. Murray School (PS #38)	120,940	1,117	634
Dr. Charles P. Defuccio School (PS #39)	126,429	1,478	839
Fred W. Martin Center of the Arts (PS #41)	140,467	3,618	2,054
Annex Early Childhood Development Center (PS #23A)	12,375	837	475
Danforth Early Childhood Center (PS #16A)	78,996	4,615	2,619
A. Harry Moore School (PS #52)	65,300	5,584	3,169
Glenn D. Cunningham Center	12,100	1,067	605

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
A. Harry Moore School (PS #52)												
Caulking												
Interior Seal (LF)	1/64 in.	9,420 LF	12.3 SF	1,378 CFM	therms	kWh	9,420	$2.94	$27,721	$3,031	2,256	3,974
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	297 LF	3.1 SF	348 CFM	therms	kWh	9	$764.23	$6,878	$765	569	1,002
Install Door Jamb Spacer (UT)		—	—	—	therms	kWh	10	$182.86	$1,829	—	—	—
Single Door - Sides, Top, Sweep (UT)	1/8 in.	180 LF	1.9 SF	211 CFM	therms	kWh	9	$368.59	$3,317	$463	345	608
A. Harry Moore School (PS #52) Total		9,897 LF	17.2 SF	1,937 CFM					$39,745	$4,259	3,169	5,584
Academy I Middle School (PS #1)												
Caulking												
Interior Seal (LF)	1/64 in.	7,798 LF	10.2 SF	1,141 CFM	therms	kWh	7,798	$2.94	$22,948	$2,509	1,867	3,290
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	297 LF	3.1 SF	348 CFM	therms	kWh	11	$584.98	$6,435	$765	569	1,002
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 in.	34 LF	0.4 SF	40 CFM	therms	kWh	2	$285.94	$572	$88	65	115
Single Door - Sides, Top, Sweep (UT)	1/8 in.	80 LF	0.8 SF	94 CFM	therms	kWh	4	$368.59	$1,474	$206	153	270
Academy I Middle School (PS #1) Total		8,242 LF	14.8 SF	1,661 CFM					$32,193	$3,652	2,718	4,789
Alexander D. Sullivan School (PS #30)												
Caulking												
Interior Seal (LF)	1/64 in.	14,423 LF	18.8 SF	2,110 CFM	therms	kWh	14,423	$2.94	$42,444	$4,641	3,454	6,085
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	189 LF	2.0 SF	221 CFM	therms	kWh	7	$584.98	$4,095	$487	362	638
Single Door - Sides, Sweep (UT)	1/8 in.	34 LF	0.4 SF	40 CFM	therms	kWh	2	$285.94	$572	$88	65	115
Alexander D. Sullivan School (PS #30) Total		14,646 LF	21.1 SF	2,371 CFM					$47,110	$5,215	3,881	6,838
Alfred E. Zampella School (PS #27)												
Caulking												
Interior Seal (LF)	1/64 in.	96 LF	0.1 SF	14 CFM	therms	kWh	96	$2.94	$283	$31	23	41
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	330 LF	3.4 SF	386 CFM	therms	kWh	10	$764.23	$7,642	$849	632	1,114
Single Door - Sides, Top, Sweep (UT)	1/8 in.	40 LF	0.4 SF	47 CFM	therms	kWh	2	$368.59	$737	$103	77	135
Overhang Air Sealing												
Seal (LF)	1/12 in.	7 LF	0.0 SF	5 CFM	therms	kWh	7	$13.83	$97	$12	9	16
Roof-Wall Intersection Air Sealing												
Seal (LF)	1/12 in.	202 LF	1.4 SF	158 CFM	therms	kWh	202	$13.83	$2,794	$347	258	455
Alfred E. Zampella School (PS #27) Total		675 LF	5.4 SF	610 CFM					$11,553	$1,342	999	1,760
Annex Early Childhood Development Center (PS #23A)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	54 LF	0.6 SF	63 CFM	therms	kWh	2	$584.98	$1,170	$139	103	182
Overhang Air Sealing												
Block, Seal (LF)	1/8 in.	10 LF	0.1 SF	12 CFM	therms	kWh	10	$21.10	$211	$26	19	34
Roof-Wall Intersection Air Sealing												
Seal (LF)	1/12 in.	263 LF	1.8 SF	205 CFM	therms	kWh	263	$13.83	$3,638	$451	336	592
Seal Exposed (LF)	1/12 in.	13 LF	0.1 SF	10 CFM	therms	kWh	13	$13.39	$174	$22	17	29
Annex Early Childhood Development Center (PS #23A) Total		340 LF	2.6 SF	290 CFM					$5,193	$638	475	837

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
Anthony J. Infante School (PS #31)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	66 LF	0.7 SF	77 CFM	therms	kWh	2	$764.23	$1,528	$170	126	223
Install Door Jamb Spacer (UT)		—	—	—	therms	kWh	3	$174.96	$525	—	—	—
Single Door - Sides, Top, Sweep (UT)	1/8 In.	100 LF	1.0 SF	117 CFM	therms	kWh	5	$368.59	$1,843	$257	192	338
Anthony J. Infante School (PS #31) Total		166 LF	1.7 SF	194 CFM					$3,896	$427	318	560
Chaplain Charles Waters School (PS #24)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	231 LF	2.4 SF	270 CFM	therms	kWh	7	$764.23	$5,350	$595	443	780
Chaplain Charles Waters School (PS #24) Total		231 LF	2.4 SF	270 CFM					$5,350	$595	443	780
Charles E. Trefurt School (PS #8)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	270 LF	2.8 SF	316 CFM	therms	kWh	10	$584.98	$5,850	$695	517	911
Single Door - Sides, Sweep (UT)	1/8 In.	102 LF	1.1 SF	119 CFM	therms	kWh	6	$285.94	$1,716	$263	195	344
Single Door - Sides, Top, Sweep (UT)	1/8 In.	40 LF	0.4 SF	47 CFM	therms	kWh	2	$368.59	$737	$103	77	135
Charles E. Trefurt School (PS #8) Total		412 LF	4.3 SF	482 CFM					$8,303	$1,061	789	1,391
Christa Mcauliffe School (PS #28)												
Caulking												
Interior Seal (LF)	1/64 In.	8,778 LF	11.4 SF	1,284 CFM	therms	kWh	8,778	$2.94	$25,832	$2,825	2,102	3,704
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	216 LF	2.3 SF	253 CFM	therms	kWh	8	$584.98	$4,680	$556	414	729
Double Door - Sides, Top, Sweep (UT)	1/8 In.	104 LF	1.1 SF	122 CFM	therms	kWh	4	$548.66	$2,195	$268	199	351
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	132 LF	1.4 SF	155 CFM	therms	kWh	4	$764.23	$3,057	$340	253	446
Single Door - Sides, Top, Sweep (UT)	1/8 In.	40 LF	0.4 SF	47 CFM	therms	kWh	2	$368.59	$737	$103	77	135
Overhang Air Sealing												
Seal (LF)	1/12 In.	13 LF	0.1 SF	10 CFM	therms	kWh	13	$13.83	$180	$22	17	29
Roof-Wall Intersection Air Sealing												
Seal (LF)	1/12 In.	428 LF	3.0 SF	334 CFM	therms	kWh	428	$13.83	$5,920	$735	547	963
Christa Mcauliffe School (PS #28) Total		9,711 LF	19.6 SF	2,204 CFM					$42,600	$4,848	3,608	6,357
Cornelia F. Bradford School (PS #16)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	162 LF	1.7 SF	190 CFM	therms	kWh	6	$584.98	$3,510	$417	310	547
Single Door - Sides, Sweep (UT)	1/8 In.	51 LF	0.5 SF	60 CFM	therms	kWh	3	$285.94	$858	$131	98	172
Cornelia F. Bradford School (PS #16) Total		213 LF	2.2 SF	249 CFM					$4,368	$548	408	719
Danforth Early Childhood Center (PS #16A)												
Caulking												
Interior Seal (LF)	1/64 In.	9,611 LF	12.5 SF	1,406 CFM	therms	kWh	9,611	$2.94	$28,283	$3,093	2,301	4,055
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	81 LF	0.8 SF	95 CFM	therms	kWh	3	$584.98	$1,755	$209	155	273
Single Door - Sides, Sweep (UT)	1/8 In.	85 LF	0.9 SF	99 CFM	therms	kWh	5	$285.94	$1,430	$219	163	287
Danforth Early Childhood Center (PS #16A) Total		9,777 LF	14.2 SF	1,600 CFM					$31,468	$3,520	2,619	4,615
Dr. Charles P. Defuccio School (PS #39)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	351 LF	3.7 SF	411 CFM	therms	kWh	13	$584.98	$7,605	$904	672	1,185
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 In.	34 LF	0.4 SF	40 CFM	therms	kWh	2	$285.94	$572	$88	65	115
Single Door - Sides, Top, Sweep (UT)	1/8 In.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Dr. Charles P. Defuccio School (PS #39) Total		438 LF	4.6 SF	513 CFM					$9,309	$1,128	839	1,478
Dr. Michael Conti School (PS #5)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	27 LF	0.3 SF	32 CFM	therms	kWh	1	$584.98	$585	$70	52	91
Single Door - Sides, Sweep (UT)	1/8 In.	238 LF	2.5 SF	279 CFM	therms	kWh	14	$285.94	$4,003	$613	456	803
Single Door - Sides, Top, Sweep (UT)	1/8 In.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Dr. Michael Conti School (PS #5) Total		285 LF	3.0 SF	334 CFM					$4,957	$734	546	962

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
Dr. Ronald E. McNair Academic High School (PS #47)												
Caulking												
Interior Seal (LF)	1/64 In.	16,700 LF	21.7 SF	2,443 CFM	therms	kWh	16,700	$2.94	$49,144	$5,374	3,999	7,046
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	216 LF	2.3 SF	253 CFM	therms	kWh	8	$584.98	$4,680	$556	414	729
Single Door - Sides, Sweep (UT)	1/8 In.	102 LF	1.1 SF	119 CFM	therms	kWh	6	$285.94	$1,716	$263	195	344
Single Door - Sides, Top, Sweep (UT)	1/8 In.	40 LF	0.4 SF	47 CFM	therms	kWh	2	$368.59	$737	$103	77	135
Dr. Ronald E. McNair Academic High School (PS #47) Total		17,058 LF	25.5 SF	2,862 CFM					$56,277	$6,295	4,685	8,254
Ezra L. Nolan Middle School (MS #40)												
Caulking												
Interior Seal (LF)	1/64 In.	13,359 LF	17.4 SF	1,955 CFM	therms	kWh	13,359	$2.94	$39,313	$4,299	3,199	5,636
Door Weather Stripping												
Double Door - Sides, Sweep (UT)	1/8 In.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$369.41	$369	$51	38	68
Double Door - Sides, Sweep, Center (UT)	1/8 In.	189 LF	2.0 SF	221 CFM	therms	kWh	7	$584.98	$4,095	$487	362	638
Single Door - Sides, Sweep (UT)	1/8 In.	425 LF	4.4 SF	497 CFM	therms	kWh	25	$285.94	$7,148	$1,094	814	1,435
Single Door - Sides, Top, Sweep (UT)	1/8 In.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Wall Air Sealing												
Seal (LF)	1/12 In.	20 LF	0.1 SF	16 CFM	therms	kWh	20	$13.83	$277	$34	26	45
Ezra L. Nolan Middle School (MS #40) Total		14,033 LF	24.3 SF	2,736 CFM					$51,570	$6,017	4,477	7,889
Fred W. Martin Center of the Arts (PS #41)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	54 LF	0.6 SF	63 CFM	therms	kWh	2	$584.98	$1,170	$139	103	182
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 In.	17 LF	0.2 SF	20 CFM	therms	kWh	1	$285.94	$286	$44	33	57
Single Door - Sides, Top, Sweep (UT)	1/8 In.	940 LF	9.8 SF	1,100 CFM	therms	kWh	47	$368.59	$17,324	$2,420	1,801	3,173
Garage Door Weather Stripping												
Roll-Up Door Weather Strip - Sides, Top	1/8 In.	28 LF	0.3 SF	33 CFM	therms	kWh	1	$622.51	$623	$72	54	95
Fred W. Martin Center of the Arts (PS #41) Total		1,072 LF	11.2 SF	1,255 CFM					$20,167	$2,760	2,054	3,618
Gladys Nunery School (PS #29)												
Caulking												
Interior Seal (LF)	1/64 In.	8,554 LF	11.1 SF	1,252 CFM	therms	kWh	8,554	$2.94	$25,173	$2,753	2,048	3,609
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	162 LF	1.7 SF	190 CFM	therms	kWh	6	$584.98	$3,510	$417	310	547
Single Door - Sides, Sweep (UT)	1/8 In.	85 LF	0.9 SF	99 CFM	therms	kWh	5	$285.94	$1,430	$219	163	287
Gladys Nunery School (PS #29) Total		8,801 LF	13.7 SF	1,541 CFM					$30,112	$3,388	2,521	4,443
Glenn D. Cunningham Center												
Caulking												
Interior Seal (LF)	1/64 In.	1,904 LF	2.5 SF	279 CFM	therms	kWh	1,904	$2.94	$5,603	$613	456	803
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	27 LF	0.3 SF	32 CFM	therms	kWh	1	$584.98	$585	$70	52	91
Single Door - Sides, Sweep (UT)	1/8 In.	51 LF	0.5 SF	60 CFM	therms	kWh	3	$285.94	$858	$131	98	172
Glenn D. Cunningham Center Total		1,982 LF	3.3 SF	370 CFM					$7,046	$813	605	1,067
Henry Snyder High School (PS #46)												
Caulking												
Interior Seal (LF)	1/64 In.	22,383 LF	29.1 SF	3,275 CFM	therms	kWh	22,383	$2.94	$65,867	$7,202	5,360	9,444
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	189 LF	2.0 SF	221 CFM	therms	kWh	7	$584.98	$4,095	$487	362	638
Double Door - Sides, Top, Sweep (UT)	1/8 In.	26 LF	0.3 SF	30 CFM	therms	kWh	1	$548.66	$549	$67	50	88
Single Door - Sides, Sweep (UT)	1/8 In.	51 LF	0.5 SF	60 CFM	therms	kWh	3	$285.94	$858	$131	98	172
Henry Snyder High School (PS #46) Total		22,649 LF	31.9 SF	3,586 CFM					$71,368	$7,887	5,869	10,341
James F. Murray School (PS #38)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	231 LF	2.4 SF	270 CFM	therms	kWh	7	$764.23	$5,350	$595	443	780
Single Door - Sides, Top, Sweep (UT)	1/8 In.	100 LF	1.0 SF	117 CFM	therms	kWh	5	$368.59	$1,843	$257	192	338
James F. Murray School (PS #38) Total		331 LF	3.4 SF	387 CFM					$7,193	$852	634	1,117

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
James J. Ferris High School (PS #44)												
Caulking												
Interior Seal (LF)	1/64 In.	42,034 LF	54.7 SF	6,150 CFM	therms	kWh	42,034	$2.94	$123,697	$13,526	10,065	17,735
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	945 LF	9.8 SF	1,106 CFM	therms	kWh	35	$584.98	$20,474	$2,433	1,810	3,190
Single Door - Sides, Sweep (UT)	1/8 In.	289 LF	3.0 SF	338 CFM	therms	kWh	17	$285.94	$4,861	$744	554	975
Single Door - Sides, Top, Sweep (UT)	1/8 In.	120 LF	1.3 SF	140 CFM	therms	kWh	6	$368.59	$2,212	$309	230	405
James J. Ferris High School (PS #44) Total		43,388 LF	68.8 SF	7,735 CFM					$151,244	$17,011	12,659	22,305
Joseph H. Brensinger School (PS #17)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	432 LF	4.5 SF	506 CFM	therms	kWh	16	$584.98	$9,360	$1,112	828	1,458
Single Door - Sides, Sweep (UT)	1/8 In.	51 LF	0.5 SF	60 CFM	therms	kWh	3	$285.94	$858	$131	98	172
Single Door - Sides, Top, Sweep (UT)	1/8 In.	440 LF	4.6 SF	515 CFM	therms	kWh	22	$368.59	$8,109	$1,133	843	1,485
Garage Door Weather Stripping												
Overhead Door Weather Strip - Sides, Top	1/8 In.	24 LF	0.3 SF	28 CFM	therms	kWh	1	$622.51	$623	$62	46	81
Roll-Up Door Weather Strip - Top	1/8 In.	6 LF	0.1 SF	6 CFM	therms	kWh	1	$240.85	$241	$14	11	19
Overhang Air Sealing												
Seal Firestop (LF)	1/12 In.	21 LF	0.1 SF	16 CFM	therms	kWh	21	$25.83	$542	$36	27	47
Wall Air Sealing												
Block, Seal (UT)	1/2 In.	18 LF	0.8 SF	84 CFM	therms	kWh	1	$514.14	$514	$185	138	243
Joseph H. Brensinger School (PS #17) Total		992 LF	10.8 SF	1,216 CFM					$20,246	$2,673	1,989	3,505
Jotham W. Wakeman School (PS #6)												
Door Weather Stripping												
Single Door - Sides, Top, Sweep (UT)	1/8 In.	220 LF	2.3 SF	258 CFM	therms	kWh	11	$368.59	$4,055	$566	421	743
Jotham W. Wakeman School (PS #6) Total		220 LF	2.3 SF	258 CFM					$4,055	$566	421	743
Julia A. Barnes School (PS #12)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	216 LF	2.3 SF	253 CFM	therms	kWh	8	$584.98	$4,680	$556	414	729
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 In.	85 LF	0.9 SF	99 CFM	therms	kWh	5	$285.94	$1,430	$219	163	287
Single Door - Sides, Top, Sweep (UT)	1/8 In.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Garage Door Weather Stripping												
Roll-Up Door Weather Strip - Sides, Top	1/8 In.	24 LF	0.3 SF	28 CFM	therms	kWh	1	$622.51	$623	$62	46	81
Julia A. Barnes School (PS #12) Total		378 LF	3.9 SF	442 CFM					$7,865	$973	724	1,276
Liberty High School (PS #45)												
Caulking												
Interior Seal (LF)	1/64 In.	4,928 LF	6.4 SF	721 CFM	therms	kWh	4,928	$2.94	$14,502	$1,586	1,180	2,079
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	108 LF	1.1 SF	126 CFM	therms	kWh	4	$584.98	$2,340	$278	207	365
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 In.	34 LF	0.4 SF	40 CFM	therms	kWh	2	$285.94	$572	$88	65	115
Liberty High School (PS #45) Total		5,103 LF	8.2 SF	926 CFM					$18,178	$2,036	1,515	2,670
Lincoln High School (PS #48)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	54 LF	0.6 SF	63 CFM	therms	kWh	2	$584.98	$1,170	$139	103	182
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	495 LF	5.2 SF	579 CFM	therms	kWh	15	$764.23	$11,463	$1,274	948	1,671
Install Door Jamb Spacer (UT)		—	—	—	therms	kWh	1	$182.86	$183	—	—	—
Single Door - Sides, Top, Sweep (UT)	1/8 In.	360 LF	3.8 SF	421 CFM	therms	kWh	18	$368.59	$6,635	$927	690	1,215
Garage Door Weather Stripping												
Roll-Up Door Weather Strip - Sides, Top, Bottom	1/8 In.	120 LF	1.3 SF	140 CFM	therms	kWh	4	$813.33	$3,253	$309	230	405
Lincoln High School (PS #48) Total		1,029 LF	10.7 SF	1,204 CFM					$22,704	$2,649	1,971	3,473

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
Mahatma K. Ghandi School (PS #23)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	243 LF	2.5 SF	284 CFM	therms	kWh	9	$584.98	$5,265	$626	465	820
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 in.	85 LF	0.9 SF	99 CFM	therms	kWh	5	$285.94	$1,430	$219	163	287
Single Door - Sides, Top, Sweep (UT)	1/8 in.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Garage Door Weather Stripping												
Roll-Up Door Weather Strip - Sides, Top	1/8 in.	24 LF	0.3 SF	28 CFM	therms	kWh	1	$622.51	$623	$62	46	81
Mahatma K. Ghandi School (PS #23) Total		405 LF	4.2 SF	474 CFM					$8,450	$1,043	776	1,367
MarcAnthony Dinardo School (PS #23B)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	54 LF	0.6 SF	63 CFM	therms	kWh	2	$584.98	$1,170	$139	103	182
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 in.	34 LF	0.4 SF	40 CFM	therms	kWh	2	$285.94	$572	$88	65	115
Single Door - Sides, Top, Sweep (UT)	1/8 in.	120 LF	1.3 SF	140 CFM	therms	kWh	6	$368.59	$2,212	$309	230	405
MarcAnthony Dinardo School (PS #23B) Total		241 LF	2.5 SF	282 CFM					$4,718	$620	462	813
Martin Luther King, Jr. School (PS #11)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	264 LF	2.8 SF	309 CFM	therms	kWh	8	$764.23	$6,114	$680	506	891
Install Door Jamb Spacer (UT)		—	—	—	therms	kWh	2	$182.86	$366	—	—	—
Single Door - Sides, Sweep (UT)	1/8 in.	170 LF	1.8 SF	199 CFM	therms	kWh	10	$285.94	$2,859	$438	326	574
Martin Luther King, Jr. School (PS #11) Total		434 LF	4.5 SF	508 CFM					$9,339	$1,117	831	1,465
Nicolaus Copernicus School (PS #25)												
Caulking												
Interior Seal (LF)	1/64 in.	13,653 LF	17.8 SF	1,998 CFM	therms	kWh	13,653	$2.94	$40,178	$4,393	3,269	5,760
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	351 LF	3.7 SF	411 CFM	therms	kWh	13	$584.98	$7,605	$904	672	1,185
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Single Door - Sides, Sweep (UT)	1/8 in.	153 LF	1.6 SF	179 CFM	therms	kWh	9	$285.94	$2,573	$394	293	516
Garage Door Weather Stripping												
Overhead Door Weather Strip - Sides, Top, Bottom	1/12 in.	20 LF	0.1 SF	16 CFM	therms	kWh	1	$813.33	$813	$34	26	45
Nicolaus Copernicus School (PS #25) Total		14,210 LF	23.5 SF	2,642 CFM					$51,934	$5,810	4,323	7,618
Ollie Culbreth Jr. School (PS #14)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	243 LF	2.5 SF	284 CFM	therms	kWh	9	$584.98	$5,265	$626	465	820
Single Door - Sides, Sweep (UT)	1/8 in.	85 LF	0.9 SF	99 CFM	therms	kWh	5	$285.94	$1,430	$219	163	287
Single Door - Sides, Top, Sweep (UT)	1/8 in.	60 LF	0.6 SF	70 CFM	therms	kWh	3	$368.59	$1,106	$154	115	203
Ollie Culbreth Jr. School (PS #14) Total		388 LF	4.0 SF	454 CFM					$7,800	$999	743	1,310
Paul Rafalides School (PS #33)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 in.	66 LF	0.7 SF	77 CFM	therms	kWh	2	$764.23	$1,528	$170	126	223
Single Door - Sides, Top, Sweep (UT)	1/8 in.	460 LF	4.8 SF	538 CFM	therms	kWh	23	$368.59	$8,478	$1,184	881	1,553
Paul Rafalides School (PS #33) Total		526 LF	5.5 SF	616 CFM					$10,006	$1,354	1,008	1,775
President Barack Obama School (PS #34)												
Caulking												
Interior Seal (LF)	1/64 in.	8,778 LF	11.4 SF	1,284 CFM	therms	kWh	8,778	$2.94	$25,832	$2,825	2,102	3,704
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 in.	216 LF	2.3 SF	253 CFM	therms	kWh	8	$584.98	$4,680	$556	414	729
Single Door - Sides, Sweep (UT)	1/8 in.	102 LF	1.1 SF	119 CFM	therms	kWh	6	$285.94	$1,716	$263	195	344
Single Door - Sides, Top, Sweep (UT)	1/8 in.	20 LF	0.2 SF	23 CFM	therms	kWh	1	$368.59	$369	$51	38	68
Roof-Wall Intersection Air Sealing												
Seal Firestop (LF)	1/12 in.	308 LF	2.1 SF	240 CFM	therms	kWh	308	$25.83	$7,955	$529	393	693
President Barack Obama School (PS #34) Total		9,424 LF	17.1 SF	1,920 CFM					$40,551	$4,223	3,143	5,537

Building/ Measure	Sum of Crack Size	Sum of Crack Length (LF)	Sum of Leakage Area (SF)	Sum of Savings (CFM)	Heating Fuel Units	Cooling Fuel Units	Units, LF or SF	Unit Price ($)	Investment ($)	Heating + Cooling Savings ($)	Heating Savings (Fuel Units)	Cooling Savings (Fuel Units)
PS #16 (New School)												
Door Weather Stripping												
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	33 LF	0.3 SF	39 CFM	therms	kWh	1	$764.23	$764	$85	63	111
Double Door - Sweep (UT)	1/8 In.	12 LF	0.1 SF	14 CFM	therms	kWh	2	$166.95	$334	$31	23	41
Single Door - Sweep (UT)	1/8 In.	15 LF	0.2 SF	18 CFM	therms	kWh	5	$83.47	$417	$39	29	51
PS #16 (New School) Total		60 LF	0.6 SF	70 CFM					$1,515	$154	115	203
Rafael Cordero Y Molina School (PS #37)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	135 LF	1.4 SF	158 CFM	therms	kWh	5	$584.98	$2,925	$348	259	456
Single Door - Sides, Sweep (UT)	1/8 In.	17 LF	0.2 SF	20 CFM	therms	kWh	1	$285.94	$286	$44	33	57
Rafael Cordero Y Molina School (PS #37) Total		152 LF	1.6 SF	178 CFM					$3,211	$391	291	513
Reverend Dr. Ercel F. Webb School (PS #22)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	135 LF	1.4 SF	158 CFM	therms	kWh	5	$584.98	$2,925	$348	259	456
Single Door - Sides, Sweep (UT)	1/8 In.	17 LF	0.2 SF	20 CFM	therms	kWh	1	$285.94	$286	$44	33	57
Single Door - Sides, Top, Sweep (UT)	1/8 In.	180 LF	1.9 SF	211 CFM	therms	kWh	9	$368.59	$3,317	$463	345	608
Wall Air Sealing												
Block, Seal Paint (SF)	1/2 In.	6 LF	0.3 SF	29 CFM	therms	kWh	2	$381.76	$764	$65	48	85
Reverend Dr. Ercel F. Webb School (PS #22) Total		338 LF	3.7 SF	418 CFM					$7,292	$919	684	1,205
Whitney M. Young Jr. School (PS #15)												
Caulking												
Interior Seal (LF)	1/64 In.	12,812 LF	16.7 SF	1,875 CFM	therms	kWh	12,812	$2.94	$37,703	$4,123	3,068	5,406
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	216 LF	2.3 SF	253 CFM	therms	kWh	8	$584.98	$4,680	$556	414	729
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	99 LF	1.0 SF	116 CFM	therms	kWh	3	$764.23	$2,293	$255	190	334
Single Door - Sides, Top, Sweep (UT)	1/8 In.	140 LF	1.5 SF	164 CFM	therms	kWh	7	$368.59	$2,580	$360	268	473
Whitney M. Young Jr. School (PS #15) Total		13,267 LF	21.4 SF	2,407 CFM					$47,256	$5,294	3,939	6,941
William L. Dickinson High School (PS #43)												
Door Weather Stripping												
Double Door - Sides, Sweep, Center (UT)	1/8 In.	135 LF	1.4 SF	158 CFM	therms	kWh	5	$584.98	$2,925	$348	259	456
Double Door - Sides, Top, Sweep, Center (UT)	1/8 In.	429 LF	4.5 SF	502 CFM	therms	kWh	13	$764.23	$9,935	$1,104	822	1,448
Single Door - Sides, Sweep (UT)	1/8 In.	17 LF	0.2 SF	20 CFM	therms	kWh	1	$285.94	$286	$44	33	57
Single Door - Sides, Top, Sweep (UT)	1/8 In.	120 LF	1.3 SF	140 CFM	therms	kWh	6	$368.59	$2,212	$309	230	405
Garage Door Weather Stripping												
Overhead Door Weather Strip - Sides, Top, Bottom	1/12 In.	63 LF	0.4 SF	49 CFM	therms	kWh	2	$813.33	$1,627	$108	80	142
William L. Dickinson High School (PS #43) Total		764 LF	7.7 SF	870 CFM					$16,984	$1,913	1,423	2,508

INFILTRATION/ EXFILTRATION SAVINGS CALCULATION METHODOLOGY

Heating Savings

		Flow Factor		$(\Delta P)^{\wedge n}$		A		CFM Reduction
1) Q	=	Flow Factor	x	Wind Pressure	x	Aggregate Air Leakage Pathway Hole	=	Cubic Feet / Minute (CFM)

		Q		HDD		Fuel $/MMBTU		
2) Savings	=	CFM	x	HDD for Location	x	Fuel Cost in $	=	Savings in Dollars
				Fuel / Mechanical Efficiency Factor				
				Efficiency Factor				

INFILTRATION/ EXFILTRATION SAVINGS CALCULATION METHODOLOGY

Cooling Savings

		Flow Factor		$(\Delta P)^{\wedge n}$		A		CFM Reduction
1) Q	=	Flow Factor	x	Wind Pressure	x	Aggregate Air Leakage Pathway Hole	=	Cubic Feet / Minute (CFM)

		Total Heat Constant		CFM Reduction		Enthalpy		Tons
2) Tons	=	4.5	x	CFM Reduction	x	Enthalpy Value	=	Tons
				12,000				
				BTU Hour per Ton				

3) kWh Savings	=	Tons		kW per Ton		Cooling Hours		kWh
		Tons	x	1.0	x	Cooling Hours for Location	=	kWh

4) Savings	=	kWh		Fuel Cost/kWh		
		kWh Savings	x	Fuel Cost in $	=	Savings in Dollars

THERMAL INSULATION SAVINGS CALCULATION METHODOLOGY

Heating and Cooling Savings

1) Pre-retrofit Heat Loss

		U-Value		ΔT		A		
Heat Loss	=	Existing U	x	HDD (or CDD) *24 hrs/day * 0.75	x	Surface Area	=	Pre-retrofit Heat Loss in MMBtu
				1,000,000				
				Convert MMBtu				

$$\text{Heat Loss} = \frac{\text{Existing U} \times \text{HDD (or CDD)} * 24\ \text{hrs/day} * 0.75 \times \text{Surface Area}}{1{,}000{,}000} = \text{Pre-retrofit Heat Loss in MMBtu}$$

		MMBtu		$ / Unit		
Heat Loss	=	Pre-Retrofit Heat Loss in MMBtu	x	Cost / MMBtu	=	Pre-retrofit Heat Loss in $

2) Post-retrofit Heat Loss - Same Calculations as Above = Post-retrofit Heat Loss in $

#1 Result	#2 Result

ECM 15 – Kitchen Hood Control

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
15	Kitchen Hood Control		✓									✓									✓		

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
15	Kitchen Hood Control																						

Background

Demand control ventilation for commercial kitchen hoods optimizes energy efficiency by reducing the exhaust and make-up air fan speed. This is accomplished by leveraging sensors to determine the minimum amount of exhaust air required to capture and contain effluent from the cook line. With demand control ventilation for commercial kitchen hoods, overall building air must be maintained. Savings are due to a reduction in blower energy, but also potential savings from reduced heating and cooling.

Scope of Work

This measure includes converting the existing Constant Air Volume (CAV) kitchen hood systems to Variable Air Volume (VAV) systems. This will be accomplished through the installation of TEL microprocessor based kitchen control system whose sensors automatically regulate fan speed based on cooking load, time of day and hood temperature. The system includes a control panel with door mounted display, temperature sensor installed in the hood exhaust collar, room temperature sensor, a series of Infra-Red (IR) sensors installed in the hoods that detect the presence of smoke or cooking effluent and VFDs installed on the corresponding exhaust fans and make-up air units. BACnet interfaces are included for connection to BMS however the integration is not included in this proposal.

Even relatively small decreases in speed can reduce the kitchen noise level. When the fans run at 80% speed, the air noise generated at the grease filters decreases more than 20%, when the fans run at 50% speed, the air noise is virtually eliminated. The result: a more pleasant environment for employees and guests (when the hoods are located near customers).

Soft-starting the hood fans with a VFD extends belt life, and reducing the outside air load on the kitchen air conditioning units reduces compressor run time and extends life as well (this can also apply to refrigeration units inside the kitchen). In addition, reducing the makeup air decreases the rate at which the filters become dirty and need to be cleaned or replaced.

Excessive fan speeds send grease up the duct, into the fan and out to the building roof, and sometimes, into the atmosphere. Slowing down the exhaust fans and reducing the air duct velocity allows the grease to drain back into the hood and into grease cups, where it can be easily disposed if, which reduces the frequency that the hoods and ducts need to be cleaned.

ECM Savings Calculations

See Appendix M for calculation details.

BUILDING	Location	Hood Name	HOOD SIZE (L")	HOOD SIZE (W")	OP. DAYS PER WEEK	OP. HOURS PER DAY	Exhaust Air (assumed)
James J. Ferris High School (PS #44)	Kitchen	1	218	122	5 Days	8	4542
Frank R. Conwell School (PS #3)	Kitchen	1	144	58	5 Days	8	3000
Frank R. Conwell School (PS #3)	Kitchen	2	144	58	5 Days	8	3000
Frank R. Conwell Middle School (MS #4)	Kitchen	1	216	80	5 Days	8	4500
Joseph H. Brensinger School (PS #17)	Kitchen	1	252	80	5 Days	8	5250

Kitchen Hood Savings			
BUILDING	**SQFT**	**kWh SAVINGS**	**THERMS SAVINGS**
James J. Ferris High School (PS #44)	282,511	3,476	2,169
Frank R. Conwell School (PS #3)	117,939	4,019	2,508
Joseph H. Brensinger School (PS #17)	153,864	2,010	1,254

ECM 16 – Refrigeration Controls

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
16	Refrigeration Controls	✓	✓	✓		✓				✓	✓	✓				✓			✓		✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
16	Refrigeration Controls	✓				✓	✓	✓								✓	✓						

Background

ECM 16 will install motor controls on JCPS Walk-In Freezers. Existing walk-in freezers have basic control systems that simply measure and maintain a single temperature. These systems can cause excessive cycling, frost, and degrade the system reliability.

Scope of Work

ArtikControl™ WIC & WIF is a state of the art Intelligent Energy Saving Refrigeration Controller for the retro-fit of Walk-In Coolers & Freezers. A configurable energy saving Refrigeration Controller for the retrofit of walk-in cooler and freezers with: web-based scheduling and set-point optimization; integrated evaporator controls; adaptive defrost controls; failure alarming; predictive diagnostics and ready for demand-side-management (DSM) program integration and, all while offering remote monitoring and control from anywhere via a SmartPhone, Tablet or Laptop.

- Controls Evaporator Fans; Room Temperature; Compressor/Liquid Line Solenoid; Defrost Heaters while providing Multiple Alarms.
- Energy Savings Verified by Third Party Administrators & Engineers
- Quantifiable System Savings between 50-75% over antiquated Motors and Mechanical Controls.
- Maximizes energy efficiency with less compressor run times resulting from shorter defrost cycles.
- Eliminates ice formation on floors and ceilings associated with defrost times and cycles.
- Reduction in excessive temperature that occur with mechanical defrost units.
- Use of Latent Energy in the box reducing compressor run times.

ECM Savings Calculations

Walk-In Cooler/Freezer Refrigeration Controls Savings		
BUILDING	**SQFT**	**kWh SAVINGS**
William L. Dickinson High School (PS #43)	356,000	9,032
James J. Ferris High School (PS #44)	282,511	59,450
Lincoln High School (PS #48)	272,932	10,921
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	16,154
Franklin L. Williams Middle School (MS #7)	163,855	21,637
Ezra L. Nolan Middle School (MS #40)	132,483	8,077
Frank R. Conwell Middle School (MS #4)	169,678	19,953
Frank R. Conwell School (PS #3)	117,939	14,493
Martin Luther King, Jr. School (PS #11)	104,509	21,637
Whitney M. Young Jr. School (PS #15)	179,590	16,154
Joseph H. Brensinger School (PS #17)	153,864	10,921
Dr. Maya Angelou School (PS #20)	108,800	25,209
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	8,077
Mahatma K. Ghandi School (PS #23)	164,653	20,193
Patricia Noonan School (PS #26)	123,000	14,493
Alfred E. Zampella School (PS #27)	94,611	8,077
Christa Mcauliffe School (PS #28)	126,761	21,637
Dr. Charles P. Defuccio School (PS #39)	126,429	20,193
Fred W. Martin Center of the Arts (PS #41)	140,467	16,154

Location	Motors (Quantity)	ArtikControl C= Cooler F= Freezer	Fan Save (kWh)	Cooling Save (kWh)	Compressor Save (kWh)	Defrost Save (kWh)	Total Save (kWh)
William L Dickinson HS (PS#43)	1	c	4,842.15	2,227.22	222.72	1,740.28	9,032.38
	2	f					
James J. Ferris HS (PS#44)	5	c	31,751.30	14,105.74	1,410.57	12,181.99	59,449.60
	14	f					
Lincoln HS (PS#48)	2	c	5,914.02	2,969.63	296.96	1,740.28	10,920.90
	2	f					
Dr. Maya Angelou School (PS#20)	2	c	13,454.57	5,939.26	593.93	5,220.85	25,208.61
	6	f					
Frank R. Conwell School (PS#3)	2	c	7,799.16	3,712.04	371.20	2,610.43	14,492.83
	3	f					
Frank R. Conwell Middle School (MS#4)	3	c	10,756.17	5,196.85	519.69	3,480.57	19,953.28
	4	f					
Joseph H Brensigner School (PS#17)	2	c	5,914.02	2,969.63	296.96	1,740.28	10,920.90
	2	f					
Martin Luther King Jr. School (PS#11)	2	c	11,569.44	5,196.85	519.69	4,350.71	21,636.68
	5	f					
Franklin L. Williams Middle School (MS#7)	2	c	11,569.44	5,196.85	519.69	4,350.71	21,636.68
	5	f					
Christa Mcauliffe School (PS#28)	2	c	11,569.44	5,196.85	519.69	4,350.71	21,636.68
	5	f					
Patricia Noonan School (PS#26)	2	c	7,799.16	3,712.04	371.20	2,610.43	14,492.83
	3	f					
Alfred E. Zampella School (PS#27)	0	c	3,770.28	2,333.28	233.33	1,740.28	8,077.17
	2	f					
Mahatma K. Ghandi School (PS#23)	0	c	9,425.69	5,833.20	583.32	4,350.71	20,192.92
	5	f					
Dr. Charles P. Defuccia School (PS#39)	0	c	9,425.69	5,833.20	583.32	4,350.71	20,192.92
	5	f					
Reverend Dr Ercel F. Webb School (PS#22)	0	c	3,770.28	2,333.28	233.33	1,740.28	8,077.17
	2	f					
Fred W. Martin Center of Arts (PS#41)	0	c	7,540.55	4,666.56	466.66	3,480.57	16,154.34
	4	f					
Ezra L. Nolan Middle School (MS#40)	0	c	3,770.28	2,333.28	233.33	1,740.28	8,077.17
	2	f					
Whitney M. Young Jr. School (PS#15)	0	c	7,540.55	4,666.56	466.66	3,480.57	16,154.34
	4	f					
Dr. Ronald E. McNair Academic HS (PS#47)	0	c	7,540.55	4,666.56	466.66	3,480.57	16,154.34
	4	f					

Fan Replacement Energy Savings Calculations:

Assumptions:

- Shaded Pole Motor (1/15th HP, 115V): 154W
- EC Motor (High Speed) 1/15th HP, 115V: 50W
- EC Motor (Low Speed) 1/15th HP, 115V: 9W
- Shaded Pole Motor (1/15th HP, 230V): 242W
- EC Motor (High Speed) 1/15th HP, 230V: 18W
- EC Motor (Low Speed) 1/15th HP, 230V: 3W
- Shaded Pole Motor (1/47th HP, 115V): 72W
- EC Motor (High Speed) 1/47th HP, 115V: 47W
- EC Motor (Low Speed) 1/47th HP, 115V: 5W
- Shaded Pole Motor (1/47th HP, 230V): 64W
- EC Motor (High Speed) 1/47th HP, 230V: 42W
- EC Motor (Low Speed) 1/47th HP, 230V: 4.4W
- EC Motor at High Speed (Cooler): 55% of the Time
- EC Motor at Low Speed (Cooler): 45% of the Time
- EC Motor at High Speed (Freezer): 51% of the Time
- EC Motor at Low Speed (Freezer): 42% of the Time

- Shaded Pole Motor Energy Usage (kWh) 115V
  - (# of motors) x ((154W x 24hrs x 365 days)/1,000)
  - 6 x (1,349,040/1,000)
  - 8,094.24 kWh
- EC Motor Energy Usage (kWh) 115V
  - (# of motors) x (((50W x 0.55) + (9W x 0.45)) x 24 x 365)/1,000
  - 6 x ((27.5 + 4.05) x 8,760)/1,000
  - 6 x (31.55 x 8,760)/1,000
  - 6 x 276,378/1,000
  - 1,658.27 kWh
- Fan Motor Replacement Energy Savings
  - Shaded Pole Motor Usage – EC Motor Energy Usage
  - 8,094.24 – 1,658.27 = 6,435.97 kWh

Defrost Controls Energy Savings Calculations:

Assumptions:

- Defrost Controls Energy Reduction: 45%
- Defrost Average Power Consumed: 1,100W per fan
- Daily Defrost Time (per Time Clock): 3 hrs. per day (4 times a Day for 45 minutes each time)
- (# of Fans) x (((1,100W x 3hr/day x 365) x 0.45)/1,000)
- 6 x ((1,204,500 x 0.45)/1,000)
- 6 x (542,025/1,000)
- 6 x 542.025 = 3,252.15 kWh

Heat (Load) Reduction:

Assumptions:

- 1W = 3.412 BTU/hr
- 6.2 EER Compressor Efficiency
- 10:1 Compressor: Condenser Ratio
- Average Power Consumed during Defrost: 1,100W per fan
- Daily Defrost Time, per Time Clock: 3 hours
- Defrost controls Energy Reduction: 45%

Fan Heat Load Reduction:

- (# of fans) x ((((Shaded pole Watts – Average ECM Watts) x 3.412)/6.2) x 24 x 365)/1,000
- 6 x ((((154 – 29.5) x 3.412) / 6.2) x 24 x 365) / 1,000
- 6 x (124.5 x 3.412 / 6.2 x 24 x 365 / 1,000)
- 3,601.16 kWh

Compressor Load Reduction:

- (Fan Heat Load Reduction) / (Compressor:Condenser Ratio)
- 3,601.16 / 10
- 360.116 kWh

Defrost Heat Load Reduction:

- (# of Motors) x (((1,100W x 3.412) / 6.2) + (((1,100W x 3.412) / 6.2) / 10))
- 6 x ((3,753.2 / 6.2) + ((3,753.2 / 6.2) / 10))
- 6 x (605.35 + 60.54)
- 6 x ((665.89 x 3 hr/day x 365 x 0.45) / 1,000)
- 6 x 328.12
- 1,968.70 kWh

<u>Total Energy Save</u> = **Fan Replacement Energy Reduction +**

Defrost Controls Energy Reduction +

Heat (Load) Reduction

ECM 17 – Water Conservation

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
17	Water Conservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
17	Water Conservation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

Background

Water Conservation is not typical to ESIP projects due to the relatively low cost of water in the state of New Jersey. However, water costs in Jersey City are higher that typical districts and can enable a water conservation opportunity. Jersey has many high-flow fixtures, toilet, & urinals throughout the district that would deliver good savings if replaced with new fixtures.

Scope of Work

Water Closets:

Tank Style Water Closets: Tank style water closets utilize a tank fill valve on top of the bowl which uses gravity to drain large volumes of water into the bowl during evacuation. Pressure assisted tank valves use domestic water pressure to pressurize the tank water allowing for more forceful evacuations with less water volume.

- (9) 1.1 GPF Pressure Assist Tank Style Toilet
- (3) 1.1 GPF Pressure Assist ADA Tank Style Toilet
- (5) 1.1 GPF Pressure Assist Child Size Tank Style Toilet

Flush Valve Water Closets: Most commercial facilities utilize flush valve water closets. Flush valves are designed to release precise volumes of water when activated. High efficiency flush valve and china combinations can enable a facility to greatly reduce its water consumption by reducing flush valve flow rates and the amount of water required for evacuation.

- Water Closet China
  - (333) High Efficiency Floor Mount Top Spud Toilet (1.28 GPF)
  - (154) High Efficiency Floor Mount ADA Top Spud Toilet (1.28 GPF)
  - (21) High Efficiency Floor Mount Child Size Top Spud Toilet (1.28 GPF)
  - (55) High Efficiency Wall Mount Rear Spud Toilet (1.28 GPF)
  - (545) High Efficiency Wall Mount Top Spud Toilet (1.28 GPF)
  - (29) High Efficiency Wall Mount Rear Spud Toilet 3 Bolt (1.6 GPF)
  - (314) High Efficiency Wall Mount Top Spud Toilet 3 Bolt (1.6 GPF)
- Water Valve
  - (343) High Efficiency 1.6 GPF Synthetic Diaphragm Valve
  - (1092) High Efficiency 1.28 GPF Synthetic Diaphragm Valve
  - (930) High Efficiency 1.6 GPF Synthetic Diaphragm Valve Kit
- Water Closet Seat
  - (1439) Elongated, standard white, open front toilet seat less cover with stainless steel check hinge

Urinals:

- Existing Urinals consist of 1.5 GPF, 1.0 GPF and 0.125 GPF models.
- These diaphragms and components deteriorate over time due to the flexing of the rubber and chloramines in the water treatment process. Urinal valves over 5 years in age have partially degraded diaphragms creating an average of 10% to 15%additional water per flush for those fixtures. The fixtures should be retrofit to low flow using newer chloramine resistant synthetic diaphragm valves and all fixtures should be change to ultra-low flow standards
- All angle stops will be placed in the standard operating position
- Existing 1/8 GPF urinal china will not be changed
- Urinal Valve
  - (766) High Efficiency 0.5 GPF Synthetic Diaphragm Valve

Bathroom & Kitchen Faucets / Aerators:

Bathroom & Kitchen Faucet Aerators: Most faucets utilize aerators to restrict the volume of water at the mouth of a faucet and to generate a more comfortable flow. High efficiency aerators can greatly reduce flow rates from faucets and create a comfortable flow for handwashing and cleaning. Restricting faucet flow rates enables a facility to conserve water and reduce energy usage associated with heating water.

- Aerators
  - (1342) Neoperl 0.5 GPM Vandal proof aerator for bathroom faucet
- Retrofit existing high flow kitchen and dish sprayers with water efficient 0.6 GPM pressure compensating sprayers.
  - (1) Low Consumption 0.6 GPM Kitchen Pre-Rinse Sprayer
- Retrofit existing high flow prep sink faucets with new 1.5 GPM kitchen sink aerators and install foot pedal flow controls. Foot pedal flow controls prevent unattended flow of water from a faucet during food preparation.
  - (13) 1.5 GPM Aerators and Foot Flow control device
- Retrofit existing high flow kitchen hand washing faucets with water efficient 1.5 GPM vandal proof aerators.
  - (17) Vandal Proof Aerator 1.5 GPM

ECM Savings Calculations

Please see Appendix H For detailed water conservation calculations and fixtures. Summary results of water conservation calculations are shown below.

Water Conservation Savings									
BUILDING	SQFT	CONSERVATION MEASURE	USAGE BEFORE (GAL)	USAGE AFTER (GAL)	WATER SAVINGS (GAL)	WATER SAVINGS (kGAL)	kGAL TO CCF MULTIPLIER	WATER SAVINGS (CCF)	TOTAL WATER SAVINGS (CCF)
William L. Dickinson High School (PS #43)	356,000	Plumbing Fixtures	2,307,130	1,003,193	1,303,937	1,304	1.34	1,747	1,747
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
James J. Ferris High School (PS #44)	282,511	Plumbing Fixtures	2,962,380	1,076,797	1,885,583	1,886	1.34	2,527	2,527
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Lincoln High School (PS #48)	272,932	Plumbing Fixtures	1,681,319	981,020	700,299	700	1.34	938	938
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Henry Snyder High School (PS #46)	187,500	Plumbing Fixtures	1,218,656	508,204	710,452	710	1.34	952	952
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	Plumbing Fixtures	111,033	68,393	42,640	43	1.34	57	57
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Liberty High School (PS #45)	33,316	Plumbing Fixtures	15,495	7,650	7,845	8	1.34	11	11
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Academy I Middle School (PS #1)	64,884	Plumbing Fixtures	15,520	5,785	9,735	10	1.34	13	13
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Franklin L. Williams Middle School (MS #7)	163,855	Plumbing Fixtures	2,277,471	1,328,969	948,502	949	1.34	1,271	1,271
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Ezra L. Nolan Middle School (MS #40)	132,483	Plumbing Fixtures	549,193	201,730	347,463	347	1.34	466	466
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Frank R. Conwell Middle School (MS #4)	169,678	Plumbing Fixtures	3,100,470	1,967,389	1,133,081	1,133	1.34	1,518	1,518
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Frank R. Conwell School (PS #3)	117,939	Plumbing Fixtures	6,382,008	4,052,227	2,329,781	2,330	1.34	3,122	3,122
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Dr. Michael Conti School (PS #5)	148,049	Plumbing Fixtures	508,818	260,972	247,846	248	1.34	332	332
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Jotham W. Wakeman School (PS #6)	148,882	Plumbing Fixtures	1,319,669	581,112	738,557	739	1.34	990	990
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Charles E. Trefurt School (PS #8)	169,196	Plumbing Fixtures	590,125	219,977	370,148	370	1.34	496	496
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Martin Luther King, Jr. School (PS #11)	104,509	Plumbing Fixtures	666,285	335,986	330,299	330	1.34	443	443
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Julia A. Barnes School (PS #12)	86,375	Plumbing Fixtures	1,227,028	479,794	747,234	747	1.34	1,001	1,001
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Ollie Culbreth Jr. School (PS #14)	98,036	Plumbing Fixtures	458,148	173,325	284,823	285	1.34	382	382
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Whitney M. Young Jr. School (PS #15)	179,590	Plumbing Fixtures	1,592,023	582,648	1,009,375	1,009	1.34	1,353	1,353
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Cornelia F. Bradford School (PS #16)	61,684	Plumbing Fixtures	1,104,418	463,219	641,199	641	1.34	859	859
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Joseph H. Brensinger School (PS #17)	153,864	Plumbing Fixtures	2,364,824	1,359,724	1,005,100	1,005	1.34	1,347	1,347
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Dr. Maya Angelou School (PS #20)	108,800	Plumbing Fixtures	652,063	396,007	256,056	256	1.34	343	343
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	Plumbing Fixtures	2,589,127	1,058,579	1,530,548	1,531	1.34	2,051	2,051
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	

Water Conservation Savings

BUILDING	SQFT	CONSERVATION MEASURE	USAGE BEFORE (GAL)	USAGE AFTER (GAL)	WATER SAVINGS (GAL)	WATER SAVINGS (kGAL)	kGAL TO CCF MULTIPLIER	WATER SAVINGS (CCF)	TOTAL WATER SAVINGS (CCF)
Mahatma K. Ghandi School (PS #23)	164,653	Plumbing Fixtures	893,084	381,085	511,999	512	1.34	686	686
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
MarcAnthony Dinardo School (PS #23B)	58,480	Plumbing Fixtures	229,504	101,343	128,161	128	1.34	172	172
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Chaplain Charles Waters School (PS #24)	118,240	Plumbing Fixtures	650,078	263,265	386,813	387	1.34	518	518
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Nicolaus Copernicus School (PS #25)	132,860	Plumbing Fixtures	1,853,145	701,372	1,151,773	1,152	1.34	1,543	1,543
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Patricia Noonan School (PS #26)	123,000	Plumbing Fixtures	183,072	183,072	0	0	1.34	0	0
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Alfred E. Zampella School (PS #27)	94,611	Plumbing Fixtures	3,141,239	1,166,325	1,974,914	1,975	1.34	2,646	2,646
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Christa Mcauliffe School (PS #28)	126,761	Plumbing Fixtures	686,840	250,975	435,865	436	1.34	584	584
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Gladys Nunery School (PS #29)	66,180	Plumbing Fixtures	570,820	237,695	333,125	333	1.34	446	446
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Alexander D. Sullivan School (PS #30)	93,129	Plumbing Fixtures	282,384	118,435	163,949	164	1.34	220	220
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Anthony J. Infante School (PS #31)	36,973	Plumbing Fixtures	72,894	33,211	39,683	40	1.34	53	53
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Paul Rafalides School (PS #33)	30,607	Plumbing Fixtures	115,008	44,196	70,812	71	1.34	95	95
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
President Barack Obama School (PS #34)	103,444	Plumbing Fixtures	291,376	112,610	178,766	179	1.34	240	240
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Rafael Cordero Y Molina School (PS #37)	135,534	Plumbing Fixtures	1,676,575	650,450	1,026,125	1,026	1.34	1,375	1,375
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
James F. Murray School (PS #38)	120,940	Plumbing Fixtures	504,499	197,077	307,422	307	1.34	412	412
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Dr. Charles P. Defuccio School (PS #39)	126,429	Plumbing Fixtures	651,715	283,537	368,178	368	1.34	493	493
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Fred W. Martin Center of the Arts (PS #41)	140,467	Plumbing Fixtures	3,610,747	1,367,305	2,243,442	2,243	1.34	3,006	3,006
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Annex Early Childhood Development Center (PS #23A)	12,375	Plumbing Fixtures	22,354	12,911	9,443	9	1.34	13	13
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Danforth Early Childhood Center (PS #16A)	78,996	Plumbing Fixtures	175,453	83,522	91,931	92	1.34	123	123
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
A. Harry Moore School (PS #52)	65,300	Plumbing Fixtures	554,525	305,428	249,097	249	1.34	334	334
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	
Glenn D. Cunningham Center	12,100	Plumbing Fixtures	45,172	27,268	17,904	18	1.34	24	24
		Air Cooled Condenser			0	0	1.34	0	
		Kitchen Fixtures			0	0	1.34	0	

ECM 18 – Pipe Insulation

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
18	Pipe Insulation	✓	✓	✓	✓	✓	✓			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
18	Pipe Insulation	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓			

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Background

Valve & Fitting Insulation – condensate pumps and pipe attached to the condensate tank should be insulated to reduce heating distribution losses (Alexander Sullivan School).

Valve & Fitting Insulation – bonnets should be insulated with removable blankets to limit heat loss at otherwise well insulated steam gate valves (Charles Trefurt School)

Valve & Fitting Insulation – the steam trap and surrounding pipes are not insulated which is leading to unnecessary distribution losses (Danforth ECC).

Valve & Fitting Insulation – pipes are not insulated which is leading to unnecessary distribution losses (Danforth ECC).

Tank Insulation – the condensate tank and surrounding pipes represents a large surface area in the heating distribution system that needs to be insulated to improve efficiency (Danforth ECC).

Valve & Fitting Insulation – the valves are not insulated which is leading to unnecessary distribution losses (Danforth ECC).

Tank Insulation – the un-insulated air separator tank needs to be insulated to reduce heating distribution losses (Dr Maya Angelou School).

Valve & Fitting Insulation – components at the pump station need to be insulated to reduce unnecessary distribution losses (Dr Maya Angelou School).

Valve & Fitting Insulation – condensate pumps and pipe attached to the condensate tank should be insulated to reduce heating distribution losses (Jotham Wakeman School).

Tank Insulation – the un-insulated heat exchanger needs to be insulated to reduce heating distribution losses (Lincoln HS).

Tank Insulation – damaged insulation should be removed and replaced to reduce unnecessary heating distribution losses (Lincoln HS).

Tank Insulation – the condensate tank represents a large surface area in the heating distribution system that needs to be insulated to improve efficiency (Mahatma Gandi School).

Valve & Fitting Insulation – components at the pump station need to be insulated to reduce unnecessary distribution losses (Ronald McNair School).

Valve & Fitting Insulation – components at the pump station need to be insulated to reduce unnecessary distribution losses (MLK School).

Valve & Fitting Insulation – the strainer and pump are not insulated which is leading to unnecessary distribution losses (Patricia Noonan School).

Tank Insulation – the un-insulated heat exchanger needs to be insulated to reduce heating distribution losses (Rafael Cordero).

Valve & Fitting Insulation – bonnets should be insulated with removable blankets to limit heat loss at otherwise well insulated steam gate valves (William Dickinson School).

Tank Insulation – the un-insulated air separator tank needs to be insulated to reduce heating distribution losses (Fred Martin School).

Scope of Work

- Pipe Insulation – un-insulated pipes in the steam, condensate, and heating hot water systems are leading to unnecessary distribution losses and wasted energy.
- Valve & Fitting Insulation – valves and fittings are difficult components of a mechanical system to insulate and as a result are frequently left un-insulated. These un-insulated or poorly insulated components have the same temperature fluids passing through them as the pipes that are more likely to be insulated; un-insulated components of the distribution system lead to unnecessary distribution losses and wasted energy.
- Tank Insulation – tanks are difficult components of a mechanical system to insulate and as a result are frequently left un-insulated. Un-insulated or poorly insulated tanks or equipment have the same temperature fluids passing through them as the pipes that are more likely to be insulated; un-insulated components of the distribution system lead to unnecessary distribution losses and wasted energy.

ECM Savings Calculations

Please see Appendix I for detailed Pipe Insulation Line-By-Line and Savings.

Pipe Insulation Savings

BUILDING	SQFT	THERMS SAVINGS
William L. Dickinson High School (PS #43)	356,000	2,240
James J. Ferris High School (PS #44)	282,511	1,110
Lincoln High School (PS #48)	272,932	6,350
Henry Snyder High School (PS #46)	187,500	6,690
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	2,360
Liberty High School (PS #45)	33,316	950
Ezra L. Nolan Middle School (MS #40)	132,483	4,510
Dr. Michael Conti School (PS #5)	148,049	4,270
Jotham W. Wakeman School (PS #6)	148,882	2,010
Charles E. Trefurt School (PS #8)	169,196	3,770
Martin Luther King, Jr. School (PS #11)	104,509	1,080
Julia A. Barnes School (PS #12)	86,375	2,090
Ollie Culbreth Jr. School (PS #14)	98,036	2,590
Whitney M. Young Jr. School (PS #15)	179,590	2,260
Cornelia F. Bradford School (PS #16)	61,684	1,390
Joseph H. Brensinger School (PS #17)	153,864	1,230
Dr. Maya Angelou School (PS #20)	108,800	270
Reverend Dr. Ercel F. Webb School (PS #22)	157,134	3,760
Mahatma K. Ghandi School (PS #23)	164,653	1,520
MarcAnthony Dinardo School (PS #23B)	58,480	1,460
Chaplain Charles Waters School (PS #24)	118,240	3,770
Nicolaus Copernicus School (PS #25)	132,860	2,070
Patricia Noonan School (PS #26)	123,000	890
Alfred E. Zampella School (PS #27)	94,611	230
Christa Mcauliffe School (PS #28)	126,761	540
Gladys Nunery School (PS #29)	66,180	1,900
Alexander D. Sullivan School (PS #30)	93,129	1,810
Anthony J. Infante School (PS #31)	36,973	1,760
Paul Rafalides School (PS #33)	30,607	1,100
President Barack Obama School (PS #34)	103,444	4,050
Rafael Cordero Y Molina School (PS #37)	135,534	4,130
James F. Murray School (PS #38)	120,940	1,190
Fred W. Martin Center of the Arts (PS #41)	140,467	4,940
Annex Early Childhood Development Center (PS #23A)	12,375	370
Danforth Early Childhood Center (PS #16A)	78,996	4,020
A. Harry Moore School (PS #52)	65,300	2,100

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ECM 19 – Destratification Fans

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
19	Destratification Fans			✓		✓			✓	✓	✓	✓		✓					✓		✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
19	Destratification Fans					✓								✓			✓						

Background

In high ceiling areas, this produces layers of stratified air. Thermal Destratification is the process of mixing the internal air to eliminate stratified layers and achieve temperature equalization throughout the building envelope.

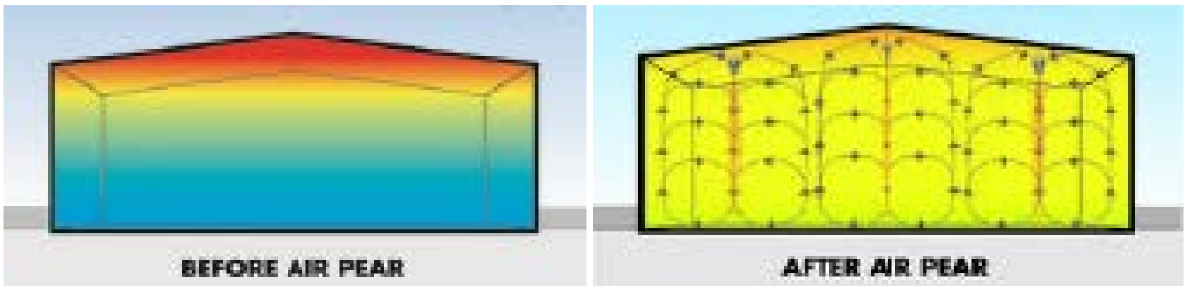
The design of the Air Pear will address the issue of temperature differences in high ceiling areas by efficiently moving hot air to the ground and homogenizing the air throughout the space.

When air has little opportunity to move, dramatic temperature differences occur. Hot air rises pushing cooler air near the floor. This temperature difference can be as much as one degree per foot of height. Items such as lighting and ventilation ducts can increase this effect. Since people and thermostats are located near the floor it is imperative to even out this temperature difference.

Air Pear fans get air moving. Their energy efficient motors operate quietly to eliminate hot and cold spots throughout a space. After installation, there is significant energy reduction. The result is a more comfortable space with reduced utility and maintenance costs.

Scope of Work

Install Air Pear in select gymnasiums in the district. List of gymnasiums is below.



ECM Savings Calculations

Savings Table

Temp Differential (°F)

Celling Height (ft.)	5.4	7.2	9	10.8	18	19.8
20	12.7	14.7	16.2	17.5	22	23
26	15.8	17.6	19	20.8	26	27
33	18	20	21.8	23.2	28.8	30.5
40	20	22	23.6	25.6	31.8	33.2

% savings

Source: Building Scientific Research Information Association, UK, 1997. Computational Fluid Dynamics for a 100' x 165' x 26' building with a 100kW gas heater at 3,600cfm. Insulation and lighting remain constant.

Building	Area in Building	Ceiling Height (ft.)	Area (sq.ft.)	Gas Usage Assumed (therms)	Temp Differential (°F)	Savings in therms	Cost per therm
Dr. Ronald E. McNair Academic High School (PS #47)	Gym	36	5,984	7,181	15	1,889	1.170
Lincoln High School (PS #48)	Gym	24	8,470	10,164	11	1,779	1.190
Rafael Cordero Y Molina School (PS #37)	Gym	26	7,215	8,658	12	1,801	1.320
Jotham W. Wakeman School (PS #6)	Gym	21	8,100	9,720	10	1,575	1.420
Reverend Dr. Ercel F. Webb School (PS #22)	Gym	20	4,280	5,136	10	832	1.180
Reverend Dr. Ercel F. Webb School (PS #22)	Gym	20	4,280	5,136	10	832	1.180
Fred W. Martin Center of the Arts (PS #41)	Gym	21	6,384	7,661	10	1,241	1.100
Ezra L. Nolan Middle School (MS #40)	Gym	22.5	7,623	9,148	11	1,601	1.160
Whitney M. Young Jr. School (PS #15)	Gym	30	5,360	6,432	13	1,421	1.110
Dr. Maya Angelou School (PS #20)	Gym	29.5	4,592	5,510	13	1,218	1.160
Frank R. Conwell School (PS #3)	Gym	30	6,111	7,333	13	1,621	1.230
Frank R. Conwell Middle School (MS #4)	Gym	30	2,166	2,599	13	574	1.150
Frank R. Conwell Middle School (MS #4)	Small Gym	31	8,964	10,757	13	2,377	1.150
Joseph H. Brensinger School (PS #17)	Gym	27.5	8,800	10,560	12	2,196	1.220
Franklin L. Williams Middle School (MS #7)	Atrium	36	1,764	2,117	15	557	1.090
Franklin L. Williams Middle School (MS #7)	Gym	30	9,500	11,400	13	2,519	1.090
Patricia Noonan School (PS #26)	Gym	27	4,980	5,976	12	1,243	1.160

Yearly Fan Operating Hours	Price of Power	Fan Type	QTY	Power Draw	kWh Increase
4000	$0.10	YX-P4-STD-	3	0.076	912
4000	$0.11	YX-P4-STD-	5	0.076	1,520
4000	$0.07	YX-P4-STD-	4	0.076	1,216
4000	$0.08	YX-P4-STD-	5	0.076	1,520
4000	$0.09	YX-P4-STD-	3	0.076	912
4000	$0.09	YX-P4-STD-	3	0.076	912
4000	$0.10	YX-P4-STD-	4	0.076	1,216
4000	$0.09	YX-P4-STD-	4	0.076	1,216
4000	$0.09	YX-P4-STD-	3	0.076	912
4000	$0.10	YX-P4-STD-	3	0.076	912
4000	$0.12	YX-P4-STD-	4	0.076	1,216
4000	$0.12	YX-P4-STD-	2	0.076	608
4000	$0.12	YX-P4-STD-	5	0.076	1,520
4000	$0.11	YX-P4-STD-	5	0.076	1,520
4000	$0.11	YX-P4-STD-	1	0.076	304
4000	$0.11	YX-P4-STD-	5	0.076	1,520
4000	$0.12	YX-P4-STD-	3	0.076	912

ECM 20 – Combined Heating & Power

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
20	Combined Heating & Power		✔																				

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
20	Combined Heating & Power																						

Background

CHP offers energy and environmental benefits over electric-only and thermal-only systems in both central and distributed power generation applications. CHP systems have the potential for a wide range of applications and the higher efficiencies result in lower emissions than separate heat and power generation.

The simultaneous production of useful thermal and electrical energy in CHP systems leads to increased fuel efficiency. CHP units can be strategically located at the point of energy use. Such onsite generation avoids the transmission and distribution losses associated with electricity purchased via the grid from central stations. CHP is versatile and can be coupled with existing and planned technologies for many different applications in the industrial, commercial, and residential sectors.

Scope of Work

- Provide engineered and stamped drawings including shop drawings, submittals and as-builts.
- Apply for the Interconnection application.
- Furnish and install new equipment housekeeping pad for CHP inside THS boiler room
- Furnish new 4.4 KW CHP and secure on the new pad.
- Furnish and install new thermal load module to interface with buildings space heating.
- Furnish and install all piping for the CHP, load module, tie in to heating loop, and make up water piping.
- Furnish and install gas piping to the new CHP.
- Insulate all newly installed piping.
- Furnish and install all electrical power and control wiring.
- Furnish and install exhaust for the CHP (To the roof)
- Provide startup of the CHP
- Provide certified balancing report.

The following will be installed at James Ferris High School

- One (1) 4.4kW micro CHP Including:
    - 4.4kW, 208 V, 60 Hz, Single Phase
    - Industrial Natural Gas Engine, EPA Certified
    - Open Protocol Interface

TECHNICAL DATA

Fuel	natural gas: minimum methane number 59 propane: minimum octane number MOZ 92 (EN 589)
Electrical Power	natural gas: 1.2 - 4.4 kW modulating propane: 1.2 - 4.4 kW modulating
Thermal Output	natural gas: 4.0 - 12.5 kW modulating propane: 4.5 - 13.8 kW modulating
Total Input Power	natural gas: 5.9 - 19.0 kW propane: 6.5 - 20.0 kW
Fuel Consumption	natural gas: .21 - .65 therms/hr propane: 0.26 - 0.78 gal/hr
Overall Efficiency	93%
Exhaust Gas Emissions	on-site settings: <250 ppm CO, <30 ppm NOx
Noise Pressure Level	approx. 55 dB (A), in 3.3 ft distance

EXHAUST DATA

Exhaust Gas Temperature	operation: < 180°F (82°C)
Exhaust Gas Pipe	unit can be vented with 3 in. CPVC (schedule 80) pipe max. length: 65 ft. with max. of six 90 degree bends inner diam. 2.76 in (70 mm) outer diam. 2.85 in (75 mm) total drag 0.2 wci (0.5 mbar) max. high pressure (back pressure) 1.2 w.c.i. (3.0 mbar) with wind impact

ELECTRICAL DATA

Voltage/Frequency/Power	230V nominal / 60 Hz / 0.98 - 1.00 power factor ecopower® adapts to the grid phase sequence
Phase Sequence	corresponds to the grid phase sequence

GENERATOR AND INVERTER

Generator	brushless, permanent magnet generator directly flanged to the engine, with water cooling system
Inverter	three-phase inverter with integrated safety monitoring, microcontroller control (singe phase output for North America)

HEATING SYSTEM DATA

Heating Return Temperature	min. 95°F (35°C), max. 140°F (60°C)
Heating Supply Temp. Max.	167°F (75°C)
Pressure Drop at the Plate Heat Exchanger	1.0 psi (0.07 bar) at a flow rate of 211 gal/hour (800 L/h)
Temperature Sensor	standard NTC sensor outdoor, room, supply, return, and storage temperature, depending on the operating mode
Hot Water	adjustable: 41 - 158°F (5 - 70°C) (the factory setting of 140°F (60°C) is recommended

ENGINE DATA

Engine	water-cooled, single cylinder, four stroke piston gas combustion engine, designed for long running time; displacement 16.6 in³ (272cm³)
Speed Range	1,200 - 3,600 RPM (factory max. setting: 3,400 RPM)
Coolant Temperature	operation: 167 - 176°F (75 - 80°C) short-term: 194°F (90°C)
Engine Electronics	control of the gas - air ratio (λ = 1 - control) and monitoring the engine operation, accomplished by microcontroller

ECM Calculations

The CHP will act as the first stage of heating for the hot water heating loop. The CHP is estimated to run at full load for over 2,000 hours per year. Non-displaceable gas use is estimated to be 8% (kitchen appliances, gas-fired RTUs, etc.) during the heating season. The remaining load is available for the CHP. For a more conservative energy savings calculation, the CHP is allowed to run during the heating season only (October through April). The installed CHP will be available year-round and will operate when adequate heating load exists. If necessary, heat can be rejected through a radiator when the full heating load is not required.

CHP Input Data		
Number of units	1	
Electrical output	4.4	kW
Thermal output	42,000	BTU/hr
Gas input (HHV)	65,000	Btu/hr
Overall efficiency	87.7%	

Runtime Analysis	
Run hours	2,002
% Boiler load displaced by CHP	1.4%

		Fuel Usage Without CHP				
Month	Days	Total Gas - Post ECMs (Baseline reduced by 10%)	Proposed Boiler Efficiency	Non-Displaceable Gas Therms, Boilers OFF June-Oct	Displaceable Gas Therms	Displaceable Heat Therms
Jan	31	15,029	85.5%	367	14,662	12,535
Feb	28	20,631	85.5%	503	20,128	17,207
Mar	31	13,406	85.5%	327	13,079	11,181
Apr	30	8,527	85.5%	208	8,319	7,112
May	31	1,984	85.5%	1,984	0	0
Jun	30	162	85.5%	162	0	0
Jul	31	10	85.5%	10	0	0
Aug	31	12	85.5%	12	0	0
Sep	30	39	85.5%	39	0	0
Oct	31	2,277	85.5%	2,277	0	0
Nov	30	676	85.5%	16	659	563
Dec	31	12,759	85.5%	311	12,448	10,642
Total:	365	75,512		6,217	69,295	59,239

		4.4 kW Cogen Plant Thermal Operation								
Month	Days	Combined Cogen Run Hours	% Heat Load Displaced by CHP		Total Cogen Hours	Utilized Cogen Heat Therms	Max Cogen Heat Therms	Avoided Boiler Gas Therms	Full Load Run Hours	System Operating Efficiency
Jan	31	494	2%		494	207	207	243	494	87.7%
Feb	28	421	1%		421	177	177	207	421	87.7%
Mar	31	350	1%		350	147	147	172	350	87.7%
Apr	30	216	1%		216	91	91	106	216	87.7%
May	31	0	0%		0	0	0	0	0	-
Jun	30	0	0%		0	0	0	0	0	-
Jul	31	0	0%		0	0	0	0	0	-
Aug	31	0	0%		0	0	0	0	0	-
Sep	30	0	0%		0	0	0	0	0	-
Oct	31	0	0%		0	0	0	0	0	-
Nov	30	86	6%		86	36	36	42	86	87.7%
Dec	31	435	2%		435	183	183	214	435	87.7%
Total:	365	2,002	1.4%		2,002	841	841	984	2,002	88%

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

		Fuel Usage With CHP			Electric Savings With CHP			
Month	Days	Supplemental Boiler Gas Therms	Cogen Gas Therms	Total Gas	Run Hours	Avg Cogen Plant kW Output	kW Demand Savings	Cogen Electric Generation kWh
Jan	31	14,420	321	15,107	494	4.4	4.4	2,173
Feb	28	19,921	274	20,698	421	4.4	4.4	1,854
Mar	31	12,906	228	13,461	350	4.4	4.4	1,542
Apr	30	8,213	140	8,561	216	4.4	4.4	950
May	31	0	0	1,984	0	0.0	0.0	0
Jun	30	0	0	162	0	0.0	0.0	0
Jul	31	0	0	10	0	0.0	0.0	0
Aug	31	0	0	12	0	0.0	0.0	0
Sep	30	0	0	39	0	0.0	0.0	0
Oct	31	0	0	2,277	0	0.0	0.0	0
Nov	30	617	56	689	86	4.4	4.4	376
Dec	31	12,234	283	12,828	435	4.4	4.4	1,915
Total:	365	68,311	1,302	75,830	2,002		4.4	8,810

The NJ Protocol is to follow the National Renewable Energy Laboratory's Combined Heat and Power, The Uniform Methods Project: Methods for Determining Energy-Efficiency Savings for Specific Measures [1]. The product should be all of the below outputs, as applicable:

a. Annual energy input to the generator, HHV basis (MMBtu/yr)
b. Annual electricity generated, net of all parasitic loads (kWh/yr)
c. Annual fossil fuel energy savings from heat recovery (MMBtu/yr)
d. Annual electric energy savings from heat recovery, including absorption chiller sourced savings if chiller installation is included as part of the system installation (kWh/yr)
e. Annual overall CHP fuel conversion efficiency, HHV basis (%)
f. Annual electric conversion efficiency, net of parasitics, HHV basis (%)

ECM 21 – Retro-Commissioning

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
21	Retro-Commissioning		✔			✔		✔		✔				✔	✔	✔	✔	✔	✔				

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
21	Retro-Commissioning	✔			✔		✔			✔					✔	✔	✔			✔			

Background

Due to the complexity of today's HVAC systems and controls, it is likely for systems to be operating incorrectly or not as efficiently as they could be. Retro-commissioning studies reveal hidden deficiencies and highlight operational & maintenance (O&M) issues that could have been avoided as well as expose hidden control system problems. There are valuable benefits to retro-commissioning in existing buildings. It is a detailed and specialized process that reviews how an HVAC system is controlled and designed to operate. Applying retro-commissioning to existing facilities includes planning, discovering root causes of inefficiencies, development of cost-effective project delivery and a focus on optimizing value to the building owner. The study includes functional system testing under various modes, such as heating or cooling loads, occupied and unoccupied modes, varying outside air temperature and space temperatures.

This is a systematic process to ensure that the building energy systems perform interactively according to the original design intent and the current operational needs of the facility. Retro-commissioning is a common practice recommended by the American Society of Heating Refrigeration and Energy (ASHRAE) to be revisited every couple of years.

Scope of Work

In 2023, JCPS had all of the Unit Ventilators in the district Retro-Commissioned and cleaned. Valves and OA dampers were repaired and available pneumatic lines were cleaned and inspected for leaks. Units were vacuumed and coils were brushed clean. Filters were replaced. The costs associated with RCx of the unit ventilators is not included in the project but the savings have been carried in the ESIP.

Energy Savings Calculations

According to a Lawrence Berkeley National Laboratory study, *The Cost-Effectiveness of Commercial Buildings Commissioning*, "For existing buildings, we found median commissioning costs of $0.27/ft2, whole-building energy savings of 15 percent, and payback times of 0.7 years." Savings are conservatively estimated to be 2% of the existing natural gas use across the district for those schools that retro-commissioned the UVs.

Retro-Commissioning Savings		
BUILDING	SQFT	THERMS SAVINGS
James J. Ferris High School (PS #44)	282,511	1,824
Dr. Ronald E. McNair Academic High School (PS #47)	132,311	831
Academy I Middle School (PS #1)	64,884	0
Ezra L. Nolan Middle School (MS #40)	132,483	794
Jotham W. Wakeman School (PS #6)	148,882	219
Charles E. Trefurt School (PS #8)	169,196	27
Martin Luther King, Jr. School (PS #11)	104,509	792
Julia A. Barnes School (PS #12)	86,375	700
Ollie Culbreth Jr. School (PS #14)	98,036	744
Whitney M. Young Jr. School (PS #15)	179,590	1,304
Mahatma K. Ghandi School (PS #23)	164,653	1,079
Nicolaus Copernicus School (PS #25)	132,860	1
Alfred E. Zampella School (PS #27)	94,611	0
Alexander D. Sullivan School (PS #30)	93,129	95
James F. Murray School (PS #38)	120,940	38
Dr. Charles P. Defuccio School (PS #39)	126,429	101
Fred W. Martin Center of the Arts (PS #41)	140,467	179
A. Harry Moore School (PS #52)	65,300	52

ECM 22 – Steam Trap Replacement

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
22	Steam Trap Replacement													✓	✓		✓	✓					

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
22	Steam Trap Replacement	✓			✓					✓					✓	✓				✓			

Background

Steam traps are automatic valves that are used to remove condensate and other non-condensable gases from steam heating systems. They work by using temperature, pressure, or mechanical means to sense the presence of condensate and then open to discharge it. Steam traps are crucial components of steam heating systems because they prevent the buildup of condensate, which can cause corrosion and reduce the efficiency of the system. By removing condensate, steam traps also help to maintain the desired steam pressure and temperature, ensuring that the heating system operates at maximum efficiency.

There are several potential problems that can arise when steam traps fail in a steam heating system:

- **Reduced efficiency:** When steam traps fail to discharge condensate, it can accumulate in the system, reducing the overall efficiency of the heating system. This can lead to decreased heat transfer and reduced system performance.

- **Increased energy costs:** When the system becomes less efficient due to failed steam traps, it requires more energy to maintain the desired steam pressure and temperature, leading to higher energy costs.

- **Corrosion:** Condensate that accumulates in the system can cause corrosion, which can lead to damage to pipes, valves, and other components. Over time, this can cause leaks, which can be expensive to repair.

- **Water hammer:** When condensate accumulates in the system, it can cause water hammer, a condition where water and steam are forced to change direction suddenly, leading to stress on pipes and components. This can result in damage to the system, reducing its efficiency and increasing the risk of leaks.

- **Poor heating:** When steam traps fail, it can result in poor heating performance, reducing the overall comfort of the building. This can lead to complaints from occupants and can also result in increased energy costs as the heating system struggles to maintain the desired temperature.

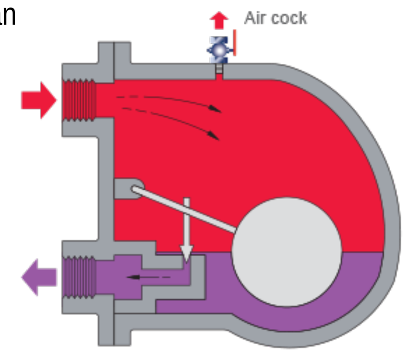


Fig. 11.3.1 Float trap with air cock

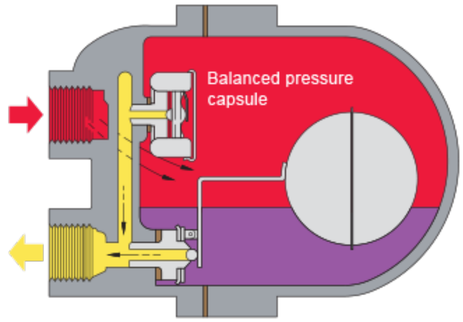


Fig. 11.3.2 Float trap with thermostatic air vent

Scope of Work
Steam Traps in steam schools with Unit Ventilators will be repaired or replaced.

- **Steam Trap Repairs:** Disassemble existing traps, inspect & replace damaged parts. Reassemble and install the repaired trap.
- **Steam Trap Replacement:** Remove and properly dispose of existing steam trap. Provide and install new stream trap that is properly sized for the system.

ECM Savings

Steam Traps savings are calculated using the following formulas and tables.

Steam Trap Savings					
BUILDING	**Trap Pipe Size (Inches)**	**Trap Orifice Diameter (Inches)**	**% of orifice passing steam**	**Leakage Diameter**	**Leakage Area**
Jotham W. Wakeman School (PS #6)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Charles E. Trefurt School (PS #8)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Julia A. Barnes School (PS #12)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Ollie Culbreth Jr. School (PS #14)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Mahatma K. Ghandi School (PS #23)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Nicolaus Copernicus School (PS #25)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Alexander D. Sullivan School (PS #30)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
James F. Murray School (PS #38)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
Dr. Charles P. Defuccio School (PS #39)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941
A. Harry Moore School (PS #52)	0.75	0.2180	0.3000	0.0936	0.2055
	1.00	0.2180	0.3000	0.0654	0.2055
	1.25	0.3120	0.3000	0.0936	0.2941

Steam Trap Savings

BUILDING	Number of Traps	Steam Pressure (lbs)	Steam Loss(lbs/hr)	Operating Hours	Total Steam Loss (lbs)	Total BTU	Total Therms
Jotham W. Wakeman School (PS #6)	55	10	4	901	180,453	207,521,380	2,075
		10	2	901	0	0	0
		10	4	901	0	0	0
Charles E. Trefurt School (PS #8)	135	10	4	901	442,931	509,370,660	5,094
		10	2	901	0	0	0
		10	4	901	0	0	0
Julia A. Barnes School (PS #12)	32	10	4	901	104,991	120,739,712	1,207
		10	2	901	0	0	0
		10	4	901	0	0	0
Ollie Culbreth Jr. School (PS #14)	60	10	4	901	196,858	226,386,960	2,264
		10	2	901	0	0	0
		10	4	901	0	0	0
Mahatma K. Ghandi School (PS #23)	68	10	4	901	223,106	256,571,888	2,566
		10	2	901	0	0	0
		10	4	901	0	0	0
Nicolaus Copernicus School (PS #25)	33	10	4	901	108,272	124,512,828	1,245
		10	2	901	0	0	0
		10	4	901	0	0	0
Alexander D. Sullivan School (PS #30)	49	10	4	901	160,768	184,882,684	1,849
		10	2	901	0	0	0
		10	4	901	0	0	0
James F. Murray School (PS #38)	63	10	4	901	206,701	237,706,308	2,377
		10	2	901	0	0	0
		10	4	901	0	0	0
Dr. Charles P. Defuccio School (PS #39)	53	10	4	901	173,891	199,975,148	2,000
		10	2	901	0	0	0
		10	4	901	0	0	0
A. Harry Moore School (PS #52)	31	10	4	901	101,710	116,966,596	1,170
		10	2	901	0	0	0
		10	4	901	0	0	0

Steam loss (lb/hr) = 24.24 * (PSIG+PSIA) * D^2
Where D=Diameter of trap orifice

ECM 23 – Student Education Program

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
23	Student Education Program	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
23	Student Education Program	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔	✔

Overview

At DCO Energy, LLC (DCO), we take pride in building a team of both internal and external professional resources dedicated to engaging students and the local community. We have created a JCBOE ESIP Project Website that will allow sharing of updates and progress of the ESIP Project and Educational Component. DCO and our Competitive Edge team will include local, educational outreach resources to help align with the Jersey City Board of Education academic objectives for students. We will customize an online platform with interactive multimedia to help promote STEM/STEAM Education, promote the innovative energy solutions in the ESIP, and show our community engagement. From solar animations and renderings to videos and a customized project website, we look forward to developing a platform that advances academic excellence and student achievement.

Our Student Education Program will be implemented by our Competitive Edge team with a partnership with JCBOE Administration and teachers of the JCBOE school system. The Student Education Program was created to respond to the need for an early introduction and enhancement of student awareness and interest in STEM/STEAM fields, energy efficiency, and construction by providing innovative educational programs for K-12 students.

The program goals are for participants to be exposed to and acquire knowledge and skills for 21st-century careers in STEAM. The goal is to provide educational and career advancing opportunities to the students of JCBOE. The programs that we are proposing include but are not limited to Live Classroom, Train-to-Hire, Women in Engineering, NEED Energy Education, and ESIP Exploration.

Our target audience is students in K-12 as each program we implement will address a need or goal and tie directly into the District’s curriculum. While we have a foundation and structure to our educational programs we ensure that all material and information provided is grade specific.

DCO and Competitive Edge will serve as the manager and administrator of the program, curriculum, and staff. Educators/teachers will be hired to assist in administering the program and serve as mentors, guides, and encouragers. Also, we will have guest speakers currently working in the STEAM fields present various topics to students throughout the schools in Jersey City. In conjunction with the Jersey City School District, we will provide students hands-on educational experiences, career opportunities and trips to see what STEAM opportunities are available to them.

Student Education Programs – Competitive Edge

1 – Live Classroom – is an educational program designed for boys and girls of all grade levels to introduce them to STEM/STEAM, energy efficiency, and the construction industries. As part of our project, we will work with the JCBOE Administration, staff, and professionals to develop an educational program that ties into the existing curriculum. Our team has planned to implement a STEM/STEAM After School Program in the Fall and Spring, two-week summer programs, and online access to materials and presentations. Each program will be grade and age specific. Our goal is to help the students of Jersey City with educational development but also provide exciting life experiences. We plan to reach **every student** in the District with this program alone.

2 – Women in Engineering - In an effort to increase the number of women in STEM/STEAM, engineering, and construction, we have designed a program that will allow girls/women interested in learning more about those fields to obtain real-life experiences. As we do for all our programs, we will work directly with the JCBOE Administration and staff to design a custom hands-on educational program for women students in Jersey City. The program will help girls/women of all ages learn about the STEM/STEAM fields to increase their exposure for future academic and career opportunities. For those women who are preparing to work or go to college we will work to help them find careers and/or internship opportunities.

3- Train-to-Hire/Workforce Development Provides job training and apprenticeships to local students and potentially residents interested in pursuing construction industry careers. We will recruit current and former Jersey City students to take part in the program. The progam will be tailored to develop the skills of each individual to increase their opportunity for employment. Also, as part of our Workforce Development piece, we will partner with local minority-owned and women-owned businesses and subcontractors to facilitate their involvement in your ESIP project. By engaging the local MBE/WBE firms during the IGA, we will be able to work with them and guide them through the process. This portion of our program will ensure local JC students and MBE/WBE subcontractors are provided an opportunity to be involved in the project. We have identified companies local to Jersey City that we will work with in lighting, Solar and project specific areas to help train and employ interested students and residents.

4 – ESIP Exploration – We will work with the Administration and building principals to educate and include students in the ESIP Project. Our team will develop grade specific and curriculum tasks for students to complete so they will be involved. This will include but not be limited to taking part in site visits, a mini-IGA, and in-person or virtual presentations. We want the students of JCBOE to not only see the energy efficient improvements but also understand the improvements.

5 – Bright Stars Program - DCO will work closely with the JCBOE Administration and the Board of Education to hold a "Flip the Switch" ceremony with attendance by major local leaders and news outlets to highlight the accomplishments of the JCBOE associated with the ESIP Project**.** At that time, we will also highlight the achievements of the project and the educational and career advancement of those individuals who took part in the Competitive Edge Programs.

6 - NEED Energy Curriculum

The NEED curriculum is developed by a national Teacher Advisory Board (TAB) that is dedicated to developing and promoting standards-based energy curriculum and training. The curriculum employs a number of strategies for teaching students about energy. Most NEED modules are inquiry-based, using a Kids-Teaching-Kids approach. Activities that are not inquiry-based are highly engaging and interactive, helping students to develop and access critical thinking skills. NEED strongly believes in integrating energy education across all subject areas including science, technology, engineering, mathematics, language arts, social studies, and creative arts. NEED also believes in providing the most recently reported energy data available to our teachers and students. Most statistics and data are derived from the most recent, complete annual data made available by the U.S. Energy Information Administration (EIA) at the time of publishing. Working in partnership with the EIA, NEED includes easy to understand data in our curriculum materials.

(The National Energy Education Development Project, Resource Catalog & Planning Guide 2019-2020)

Community Outreach – Competitive Edge

Through our community involvement, the money allocated for our projects consistently filters into the local community. Our subcontractors are required to utilize the available local workforce, suppliers, and contractors. JJS community enrichment plan allows the community's potential for economic improvement to be significantly bolstered as a result of project dollars remaining in the community.

We utilize many different resources to obtain information about potential contractors/suppliers for our project. These resources consist of state programs, local organizations, community gatherings, local unions, project owners, etc. that help provide us with information about local, small, minority and women owned businesses. By incorporating and taking advantage of these resources, we can generate a large and diversified base of contractors and suppliers to provide the services required for the project.

We have established a division within our company whose sole purpose is to ensure that our Outreach Program is successful. Without close attention, many times programs such as this end up being neglected or dissolved. By providing our program with its own supervisor, we can ensure a much higher level of community outreach success.

Our subcontractors are supplied with a list of available graduating union classes of local apprentices and are required to utilize that list. By using the local apprentices on our projects, we create an opportunity for members of the local community to gain working experience while keeping the allocated dollars in the community.

We will assist SBE/MBE/WBE businesses in the areas of jobsite safety, project document controls, cost estimating, project scheduling, and manpower utilization. We will also provide guidance to obtaining construction insurance, financial assistance and bonding support to help promote their company's success.

We are committed to obtaining contracts for local, small, minority, and women owned businesses and distribute large sections of work into smaller component parts in order to give local businesses an opportunity to participate in the project. We will help build relationships with the local unions and help navigate their business toward local unions' training programs.

We assign employees to monitor the outreach program. These employees will be tasked to gather, track and report on the local workforce and the SBE/MBE/WBE contractor's participation and progress. Our subcontractors will also be required to report on a monthly basis the amount of local resident hires, contract value for local small, minority and women owned contractors and purchases made through local, small, minority, and women owned suppliers. By collecting and compiling this information, we can monitor the success of the program and provide appropriate consultation for those subcontractors whose goals are not being met. With the help of community and district leaders we will identify local residents that are willing to train with a mentor to gain construction work experience while collecting a competitive salary for themselves and their families. These potential residents will be working on the jobsite and in the office. The mentor will concentrate on the residents' passion and strong suit that will benefit their future career endeavors while working with us in the construction industry.

ECMs Evaluated but Not Included

The energy conservation measures highlighted in this section were each evaluated during the investment grade audit. Due to high capital costs compared to annual energy savings and district priorities, these measures have not been included in the Energy Savings Plan.

ECM 2 – Lighting Controls

Due to poor payback and JCPS priorities, this ECM is not included in the ESIP Project

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
2	Lighting Controls	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓		✓	✓	✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
2	Lighting Controls	✓	✓	✓	✓	✓	✓				✓	✓	✓		✓	✓	✓	✓	✓	✓	✓	✓	

Background, Scope of Work, and ECM Calculations not provided. Cost and savings can be reviewed on Form II in Section 4 of the Energy Savings Plan.

✓	ECM included in the project
✓	Potential ECM Evaluated but not included

ECM 4 – District-Wide Energy Management System – Tier 2

Due to poor payback and JCPS priorities, this ECM is not included in the ESIP Project

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
4	District-Wide Energy Management System - Tier 2	✓	✓	✓	✓	✓	✓			✓			✓	✓	✓	✓	✓	✓	✓	✓	✓		✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
4	District-Wide Energy Management System - Tier 2	✓	✓	✓	✓				✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		

✓ (green)	ECM included in the project
✓	Potential ECM Evaluated but not included

Background, Scope of Work, and ECM Calculations not provided. Cost and savings can be reviewed on Form II in Section 4 of the Energy Savings Plan.

ECM 7 – Chiller Replacement

Due to poor payback and JCPS priorities, this ECM is not included in the ESIP Project

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
7	Chiller Replacement					✓				✓	✓	✓			✓						✓		✓

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
7	Chiller Replacement												✓				✓						

✓	ECM included in the project
✓	Potential ECM Evaluated but not included

Background, Scope of Work, and ECM Calculations not provided. Cost and savings can be reviewed on Form II in Section 4 of the Energy Savings Plan.

ECM 11 – Unit Ventilator Replacement

Due to poor payback and JCPS priorities, this ECM is not included in the ESIP Project

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
11	Unit Ventilator Replacement		✓					✓		✓				✓	✓	✓	✓	✓	✓				

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
11	Unit Ventilator Replacement	✓			✓		✓			✓					✓	✓	✓			✓			

✓ (green)	ECM included in the project
✓	Potential ECM Evaluated but not included

Background, Scope of Work, and ECM Calculations not provided. Cost and savings can be reviewed on Form II in Section 4 of the Energy Savings Plan.

ECM 12 – Rooftop Unit Replacement

Due to poor payback and JCPS priorities, this ECM is not included in the ESIP Project

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	William L. Dickinson High School (PS #43)	James J. Ferris High School (PS #44)	Lincoln High School (PS #48)	Henry Snyder High School (PS #46)	Dr. Ronald E. McNair Academic High School (PS #47	Liberty High School (PS #45)	Academy I Middle School (PS #1)	Franklin L. Williams Middle School (MS #7)	Ezra L. Nolan Middle School (MS #40)	Frank R. Conwell Middle School (MS #4)	Frank R. Conwell School (PS #3)	Dr. Michael Conti School (PS #5)	Jotham W. Wakeman School (PS #6)	Charles E. Trefurt School (PS #8)	Martin Luther King, Jr. School (PS #11)	Julia A. Barnes School (PS #12)	Ollie Culbreth Jr. School (PS #14)	Whitney M. Young Jr. School (PS #15)	Cornelia F. Bradford School (PS #16)	Joseph H. Brensinger School (PS #17)	Dr. Maya Angelou School (PS #20)	Reverend Dr. Ercel F. Webb School (PS #22
12	Rooftop Unit Replacement	✔			✔					✔			✔	✔							✔		

JERSEY CITY PUBLIC SCHOOLS ECM MATRIX

ECM #	ECM DESCRIPTION	Mahatma K. Ghandi School (PS #23)	MarcAnthony Dinardo School (PS #23B)	Chaplain Charles Waters School (PS #24)	Nicolaus Copernicus School (PS #25)	Patricia Noonan School (PS #26)	Alfred E. Zampella School (PS #27)	Christa Mcauliffe School (PS #28)	Gladys Nunery School (PS #29)	Alexander D. Sullivan School (PS #30)	Anthony J. Infante School (PS #31)	Paul Rafalides School (PS #33)	President Barack Obama School (PS #34)	Rafael Cordero Y Molina School (PS #37)	James F. Murray School (PS #38)	Dr. Charles P. Defuccio School (PS #39)	Fred W. Martin Center of the Arts (PS #41)	Annex Early Childhood Development Center (PS #23A)	Danforth Early Childhood Center (PS #16A)	A. Harry Moore School (PS #52)	Glenn D. Cunningham Center	Administration Central Office	PS #16 (New School)
12	Rooftop Unit Replacement	✔								✔				✔									

✔	ECM included in the project
✔	Potential ECM Evaluated but not included

Background, Scope of Work, and ECM Calculations not provided. Cost and savings can be reviewed on Form II in Section 4 of the Energy Savings Plan.

JERSEY CITY PUBLIC SCHOOLS

ENERGY SAVINGS PLAN

SECTION 4 – FINANCIAL ANALYSIS

Form V – ESCO Construction and Service Fees

FORM V

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCOs PROPOSED FINAL PROJECT COST FORM FOR BASE CASE PROJECT
JERSEY CITY PUBLIC SCHOOLS
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

PROPOSED CONSTRUCTION FEES:

Fee Category	Fees [1] Dollar ($) Value	Percentage of Hard Costs
Estimated Value of Hard Costs [2]	$ 88,257,663	N/A
Contingency	$ 2,232,919	
Estimated Value of Hard Costs [2]	$ 90,490,582	
Project Service Fees		
Investment Grade Energy Audit	$ 1,809,812	2.00%
Design Engineering Fees	$ 904,906	1.00%
Construction Management & Project Administration	$ 7,691,699	8.50%
System Commissioning	$ 1,583,585	1.75%
Equipment Initial Training Fees	$ 904,906	1.00%
ESCO Overhead	$ 3,167,170	3.50%
ESCO Profit	$ 4,072,076	4.50%
Project Service Fees Sub Total	$ 12,894,908	14.25%
CHA Design Fee [3]	$ 6,334,341	7.00%
JCBOE Construction Administration [3]	$ 2,714,717	3.00%
3rd Party Review [3]	$ 452,453	0.50%
TOTAL FINANCED PROJECT COSTS:	$ 120,126,248	32.75%

PROPOSED ANNUAL SERVICE FEES

First Year Annual Service Fees	Fees [1] Dollar ($) Value	Percentage of Hard Costs
SAVINGS GUARANTEE *(OPTION)*	$0	0.00%
Measurement & Verification *(Associated w/ Savings Guarantee Option)*	$661,932	0.75%
ENERGY STAR Services *(optional)*	$0	0.00%
Post Construction Services *(if applicable)*	$0	0.00%
Performance Monitoring	w/ M&V	0.00%
On-going Training Services	w/ M&V	0.00%
Verification Reports	w/ M&V	0.00%
TOTAL FIRST YEAR ANNUAL SERVICES	$0	0..75%

NOTES:

(1) Fees should include all mark-ups, overhead, and profit. Figures stated as a range will NOT be accepted.

(2) The total value of Hard Costs is defined in accordance with standard AIA definitions that include: Labor Costs, Subcontractor Costs, Cost of Materials and Equipment, Temporary Facilities and Related Items, and Miscellaneous Costs such as Permits, Bonds Taxes, Insurance, Mark-ups, Overhead and Profit, etc.

(3) Fees for CHA Design Cost (7%), Construction Administration (3%) and 3rd Party Review (.5%) have been added to Form V per the instructions described in the answer to RFI Question 1

(4) DCO's total fee for the JCBOE ESIP Project is 22.25%

ESCO's proposed interest rate at the time of submission: 5% TO BE USED BY ALL RESPONDING ESCOs FOR PROPOSAL PURPOSES

Form VI – Project Cash Flow Analysis

FORM VI

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
JERSEY CITY PUBLIC SCHOOLS - ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

Note: Respondents must use the following assumptions in all financial calculations:
(a) The cost of all types of energy should be assumed to inflate at **2.4% gas, 2.2%** electric per year and

1. Term of Agreement: 20 years
2. Construction Period [(2)] (months): 30 Months
3. Cash Flow Analysis Format:

Miscellaneous Costs Financed:	
Cost of Issuance	$550,000
Total	$550,000

Project Cost[(1)]:	**$120,126,248**
ESSER II Grant	**-$64,217,216**
Misc Costs Financed:	**$0**
Financed Amount:	**$55,909,031**

Interest Rate: **3.75%**

Year	Annual Energy Savings	Solar PPA Savings	Annual Operational Savings	Energy Rebates / Incentives	Total Annual Savings	Annual Project Costs	Annual Service Costs[(3)]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation (6 Months)	$ 44,195				$ 44,195			$ 44,195	
Installation (Year 1)	$ 1,768,990				$ 1,768,990			$ 1,768,990	
Installation (Year 2)	$ 3,090,733				$ 3,090,733			$ 3,090,733	
Year 1	$ 2,517,594	$ 890,298	$ 1,151,890	$ 1,733,773	$ 6,293,554	$ (5,589,168)	$ (661,932)	$ 42,454	$ 42,454
Year 2	$ 2,549,160	$ 909,084	$ 1,151,890		$ 4,610,134	$ (4,567,680)		$ 42,454	$ 84,908
Year 3	$ 2,598,221	$ 928,266	$ 357,224		$ 3,883,710	$ (3,841,256)		$ 42,454	$ 127,362
Year 4	$ 2,648,410	$ 947,851	$ 357,224		$ 3,953,485	$ (3,911,031)		$ 42,454	$ 169,816
Year 5	$ 2,699,756	$ 967,847	$ 357,224		$ 4,024,827	$ (3,982,373)		$ 42,454	$ 212,270
Year 6	$ 2,752,284	$ 988,264			$ 3,740,548	$ (3,698,094)		$ 42,454	$ 254,724
Year 7	$ 2,806,022	$ 1,009,110			$ 3,815,132	$ (3,772,678)		$ 42,454	$ 297,178
Year 8	$ 2,860,997	$ 1,030,394			$ 3,891,391	$ (3,848,937)		$ 42,454	$ 339,632
Year 9	$ 2,917,239	$ 1,052,125			$ 3,969,364	$ (3,926,910)		$ 42,454	$ 382,086
Year 10	$ 2,974,776	$ 1,074,313			$ 4,049,089	$ (4,006,635)		$ 42,454	$ 424,540
Year 11	$ 3,033,638	$ 1,096,967			$ 4,130,605	$ (4,088,151)		$ 42,454	$ 466,994
Year 12	$ 3,093,856	$ 1,120,098			$ 4,213,953	$ (4,171,499)		$ 42,454	$ 509,448
Year 13	$ 3,155,461	$ 1,143,714			$ 4,299,174	$ (4,256,720)		$ 42,454	$ 551,901
Year 14	$ 3,218,485	$ 1,167,826			$ 4,386,311	$ (4,343,857)		$ 42,454	$ 594,355
Year 15	$ 3,282,961	$ 1,192,444			$ 4,475,405	$ (4,432,952)		$ 42,454	$ 636,809
Year 16	$ 3,348,923				$ 3,348,923	$ (3,306,469)		$ 42,454	$ 679,263
Year 17	$ 3,416,404				$ 3,416,404	$ (3,373,950)		$ 42,454	$ 721,717
Year 18	$ 3,485,440				$ 3,485,440	$ (3,442,986)		$ 42,454	$ 764,171
Year 19	$ 3,556,067				$ 3,556,067	$ (3,513,613)		$ 42,454	$ 806,625
Year 20	$ 3,628,321				$ 3,628,321	$ (3,585,867)		$ 42,454	$ 849,079
Totals	**$ 63,634,746**	**$ 15,518,602**	**$ 3,375,450**	**$ 1,733,773**	**$ 84,262,571**	**$ (79,660,826)**	**$ (661,932)**	**$ 5,752,997**	

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by Jersey City Board of Education during the construction period.
(3) This figure should equal the value indicated on the ESCO's PROPOSED "FORM V". DO NOT include in the Financed Project Cost.

DCO Energy Efficiency Division
100 Lenox Drive
Lawrenceville, NJ 08648

Utility Inflation Details

Utility Inflation Worksheet					
Year	ANNUAL ELECTRIC COST SAVINGS	ANNUAL NATURAL GAS COST SAVINGS	ANNUAL Fuel Oil #2 (Gal) COST SAVINGS	ANNUAL Domestic Water (CCF) COST SAVINGS	Total
2	$1,085,625.06	$274,030.70	$774,990.01	$414,514	$2,549,160.26
3	$1,109,508.81	$280,607.44	$793,589.77	$414,514	$2,598,220.51
4	$1,133,918.01	$287,342.02	$812,635.92	$414,514	$2,648,410.44
5	$1,158,864.20	$294,238.22	$832,139.19	$414,514	$2,699,756.10
6	$1,184,359.21	$301,299.94	$852,110.53	$414,514	$2,752,284.17
7	$1,210,415.12	$308,531.14	$872,561.18	$414,514	$2,806,021.93
8	$1,237,044.25	$315,935.89	$893,502.65	$414,514	$2,860,997.28
9	$1,264,259.22	$323,518.35	$914,946.71	$414,514	$2,917,238.77
10	$1,292,072.93	$331,282.79	$936,905.43	$414,514	$2,974,775.64
11	$1,320,498.53	$339,233.58	$959,391.16	$414,514	$3,033,637.76
12	$1,349,549.50	$347,375.18	$982,416.55	$414,514	$3,093,855.72
13	$1,379,239.59	$355,712.19	$1,005,994.55	$414,514	$3,155,460.81
14	$1,409,582.86	$364,249.28	$1,030,138.42	$414,514	$3,218,485.04
15	$1,440,593.68	$372,991.26	$1,054,861.74	$414,514	$3,282,961.17
16	$1,472,286.74	$381,943.05	$1,080,178.42	$414,514	$3,348,922.71
17	$1,504,677.05	$391,109.69	$1,106,102.70	$414,514	$3,416,403.93
18	$1,537,779.94	$400,496.32	$1,132,649.17	$414,514	$3,485,439.92
19	$1,571,611.10	$410,108.23	$1,159,832.75	$414,514	$3,556,066.57
20	$1,606,186.55	$419,950.83	$1,187,668.73	$414,514	$3,628,320.60

YEAR	15 YEAR SOLAR PPA kWh GENERATION	15 YEAR SOLAR PPA COST SAVINGS
1	10,881,399	$890,298
2	10,865,077	$909,084
3	10,848,779	$928,266
4	10,832,506	$947,851
5	10,816,257	$967,847
6	10,800,033	$988,264
7	10,783,833	$1,009,110
8	10,767,657	$1,030,394
9	10,751,505	$1,052,125
10	10,735,378	$1,074,313
11	10,719,275	$1,096,967
12	10,703,196	$1,120,098
13	10,687,141	$1,143,714
14	10,671,111	$1,167,826
15	10,655,104	$1,192,444

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FORM II

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ENERGY CONSERVATION MEASURES (ECMs) SUMMARY FORM
JERSEY CITY PUBLIC SCHOOLS
ENERGY SAVINGS IMPROVEMENT PROGRAM

ESCO Name: DCO Energy

Proposed Preliminary Energy Savings Plan (Base Project)		Estimated Installed Hard Costs(1) $	Estimated Annual Savings $	Est. Simple Payback (Years)
ECM Numbe	Energy Conservation Measure			
1	LED Lighting Replacement	$12,372,529	$780,651	16
3	District-Wide Energy Management System - Tier 1	$2,904,533	$280,124	10
5	Boiler Replacement	$4,982,800	$77,168	65
6	Boiler Replacement w/ Fuel Conversion	$3,954,400	$403,564	10
9	Roof Renovations	$14,393,000	$1,347	10,685
10	Indoor Air Quality & HVAC Enhancements	$43,931,740	$2,003	21,938
13	Plug Load Controls	$476,500	$178,481	3
14	Building Envelope Improvements	$921,368	$111,774	8
15	Kitchen Hood Control	$100,065	$8,551	12
16	Refrigeration Controls	$254,276	$30,753	8
17	Water Conservation	$2,248,635	$418,261	5
18	Pipe Insulation	$938,568	$100,844	9
19	Destratification Fans	$281,875	$28,237	10
20	Combined Heating & Power	$135,500	$56	2,429
22	Steam Trap Replacement	$361,875	$27,010	13
*Add additional lines as needed**	**Project Summary:**	**$88,257,663**	**$3,301,786**	**27**

Optional ECMs *Considered, but not included with base project at this time*		Estimated Installed Hard Costs(1) $	Estimated Annual Savings $	Est. Simple Payback (Years)
ECM Number	Energy Conservation Measure			
2	Lighting Controls	$1,946,915	$75,532	26
4	District-Wide Energy Management System - Tier 2	$16,305,169	$0	-
5	Boiler Replacement	$2,760,800	$31,044	89
7	Chiller Replacement	$5,262,848	$11,178	471
10	Indoor Air Quality & HVAC Enhancements	$66,738,570	$2,091	31,918
11	Unit Ventilator Replacement	$22,798,870	$24,306	938
12	Rooftop Unit Replacement	$721,600	$2,704	267
18	Pipe Insulation	$11,506	$0	-
*Add additional lines as needed**	**Optional ECMs Summary:**	**$116,546,278**	**$146,854**	**794**

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ENERGY SAVINGS PLAN

SECTION 5 – RISK, DESIGN, & COMPLIANCE

Assessment of Risks, Design & Compliance Issues

Moving from a conceptual design to engineered documents DCO has identified areas of the project that could change during the detailed design. The table below represents potential conceptual areas of concern that will need to be investigated further with a corresponding party responsible for the compliance of each item.

Issue	Category	Responsible Party
Alteration of expected Maintenance and Operational Savings	Risk	JCPS
Disposition of Abandoned Equipment (Steam Piping, Condensate Piping, Oil Tanks, etc.)	Risk	JCPS
New Natural Gas Distribution	Risk	DCO
Integrity of re-used Infrastructure	Risk	JCPS
Life Safety System Coordination	Risk	JCPS
Coordination with JCPS Information Technology Department	Risk	JCPS
Ventilation Compliance with Code	Compliance	CHA
Temperature, Humidity and Air Change Compliance with Code	Compliance	CHA
Boiler Capacity and Turndown	Design	CHA
Natural Gas Regulator Compliance with Code	Compliance	CHA
Undocumented Underground Utilities	Risk	CHA
Code Compliance of Existing Electrical Infrastructure	Compliance	CHA
Lighting Levels	Compliance	CHA
Design Light Consortium rating for bulbs	Compliance	CHA
Underwriters Laboratory Testing for retrofitted LED Lighting Systems	Compliance	CHA

Lighting Retrofits within hard ceilings for fixtures and occupancy sensors	Risk	CHA
Unrealized Energy Savings 1. Energy Modeling 2. Performance Monitoring 3. Capacity of Equipment 4. Efficiency of Equipment 5. Run Hours of Equipment	Risk	DCO/ CHA 1. DCO 2. DCO 3. CHA / Basis of Design Vendor 4. CHA / Basis of Design Vendor 5. JCPS
Transformer Loading	Risk	CHA
Site Work for Equipment	Design	CHA
Condition of Roof Under Units	Risk	CHA
Adequate Crane Lifts & Clearances	Design	CHA / Rigger
Physical Space Constraints and Clearance for Equipment Replacement	Design	CHA
Refrigerant Reclaim / Refrigerant Disposal	Compliance	Contractor
Existing Tie in Locations	Design	CHA
Schedule Oversight	Risk	DCO Energy
Impact of Boiler Flue	Design	CHA
Impact of Space Usage During Construction	Risk	CHA & JCPS
Scope changes relating to requests by Authorities Having Jurisdiction.	Risk	JCPS (via contingency)
Department of Environmental Protection Permitting	Risk	CHA
Modifications of Energy Saving Control Sequences and Setpoints impacting Energy Savings and Incentives	Risk	JCPS

Post Construction Calibration of Sensors, Meters, & Safety Devices	Risk	JCPS
Adequate time and access for bidding contractor site surveys	Risk	JCPS
Utility Interconnection approval for the CHP Unit	Risk	DCO

Measurement & Verification (M&V) Plan

Our approach to M&V of energy savings aligns with the International Performance Measurement & Verification Protocol. More detailed information may be found below. It's most cost-effective to perform M&V using the least costly option that still adequately documents system performance and permits analysis of savings. This approach lowers the total cost of the program leaving more dollars available to perform more facility improvements. Depending upon which ECMs are implemented by JCPS, the M&V plan proposed by DCO would incorporate one or more of the following options which outlines the four most common approaches for M&V:

Option A – Retrofit Isolation with Key Parameter Measurement	This option is based on a combination of measured and estimated factors when variations in factors are not expected. Measurements are spot or short-term and are taken at the component or system level, both in the baseline and post-installation cases. Measurements should include the key performance parameter(s) which define the energy use of the ECM. Estimated factors are supported by historical or manufacturer's data. Savings are determined by means of engineering calculations of baseline and post-installation energy use based on measured and estimated values.	Direct measurements and estimated values, engineering calculations and/or component or system models often developed through regression analysis. Adjustments to models are not typically required.
Option B – Retrofit Isolation with Parameter Measurement	This option is based on periodic or continuous measurements of energy use taken at the component or system level when variations in factors are expected. Energy or proxies of energy use are measured continuously. Periodic spot or short-term measurements may suffice when variations in factors are not expected. Savings are determined form analysis of baseline and reporting period energy use of proxies of energy use.	Direct measurements, engineering calculations, and/or component or system models often developed through regression analysis. Adjustments to models may be required.
Option C – Utility Data Analysis	This option is based on long-term, continuous, whole-building utility meter, facility level, or sub-meter energy (or water) data. Savings are determined from analysis of baseline and reporting period energy data. Typically, regression analysis is conducted to correlate with and adjust energy use to independent variables such as weather, but simple comparisons may also be used.	Based on regression analysis of utility meter data to account for factors that drive energy use. Adjustments to models are typically required.
Option D – Calibrated Computer Simulation	Computer simulation software is used to model energy performance of a whole-facility (or sub-facility). Models must be calibrated with actual hourly or monthly billing data from the facility. Implementation of simulation modeling requires engineering expertise. Inputs to the model include facility characteristics; performance specifications of new and existing equipment or systems; engineering estimates, spot-, short-term, or long-term measurements of system components; and long-term whole-building utility meter data. After the model has been calibrated, savings are determined by comparing a simulation of the baseline with either a simulation of the performance period or actual utility data	Based on computer simulation model calibrated with whole-building or end-use metered data or both. Adjustments to models are required.

Each of the options can be used for a wide array of energy efficiency upgrades and each has different costs and complexities associated with it. When selecting an M&V approach, the following general rule of thumb can be applied:

OPTION A

- When magnitude of savings is low for the entire project or a portion of the project
- The risk for not achieving savings is low

OPTION B

- For simple equipment replacement projects
- When energy savings values per individual measure are desired
- When interactive effects are to be ignored or are estimated using estimating methods that do not involve long term measurements
- When sub-meters already exist that record the energy use of subsystems under consideration

OPTION C

- For complex equipment replacement and controls projects
- When predicted energy savings are in excess of 10 to 20 percent as compared with the record energy use
- When energy savings per individual measure are not desired
- When interactive effects are to be included
- When the independent variables that affect energy, use are complex and excessively difficult or expensive

OPTION D

- When new construction projects are involved
- When energy savings values per measure are desired
- When Option C tools cannot cost effectively evaluate particular measures or their interactions with the building when complex baseline adjustments are anticipated

DCO will perform measurement and verification of the energy units savings during the first year of the energy savings guarantee. JCPS will work with DCO to provide necessary information and provide access to any buildings to allow DCO to properly verify and measure energy savings. DCO's energy guarantee will be based on units of energy saved as determined from the baseline provided in the ESP, or adjusted baseline if original baseline is determined by both parties to be inaccurate.

Adjustments to the baseline and associated savings will be taken for weather, hours of operation, building usage, utility rate increases, code or statute changes, and any other actions that adversely affect the savings beyond the control of DCO. Any savings discrepancies will be resolved to the satisfaction of both JCPS and DCO in a timely manner.

As part of the optional energy guarantee, DCO uses weather normalization procedures to correct for the effect of weather variance on energy savings in subsequent years. Baseline energy and weather data are used to establish an algorithm to predict how the baseline building uses energy as a function of weather. The algorithm is then applied to subsequent years to correct for the impact weather may have on future building energy use. The weather normalization procedure and algorithms will be covered in detail as part of the optional energy guarantee contract provided to JCPS.

Maintenance Plan

Owner Tasks and Responsibilities:

As a general statement, JCPS or its 3rd party service providers shall be responsible for providing ongoing maintenance through the duration of the M&V period. DCO will review operational procedures and schedules associated with such things as the building automation/control upgrades as well as the manufacturers' published requirements for all installed equipment be it: quarterly, semi-annually or annually. In most cases, JCPS is already aware of or self-implementing similar maintenance practices on campus or has contracted a 3rd party for such services. Failure to properly maintain the equipment may cause energy savings goals to fall short.

Specific Areas of Consideration:

In order to sustain energy savings JCPS Staff will be required to implement new maintenance tasks and even modify existing policies and practices. Outlined are two examples of specific instances.

Example 1. Advanced Building Operations Programming:

JCPS will be given specific training on the changes and advancements in the environmental operations and energy savings strategies. JCPS will be responsible for following the agreed upon guidelines associated with programmed schedules and any use of override functions.

Example 2. Verification of Proper Operations: Mechanical Equipment

JCPS will be required to assure that proper mechanical maintenance continues to be implemented on its mechanical equipment. Example: outside air dampers will require proper operation with the appropriate seals in order to maintain ECM(s) such as demand ventilation. DCO will periodically spot check system operations to verify the Owner or its 3rd party representative is implementing proper maintenance. Any deficiencies that may be identified will be brought to JCPS's attention for correction.

JERSEY CITY PUBLIC SCHOOLS

ENERGY SAVINGS PLAN

SECTION 6 – OPERATION & MAINTENANCE

It is critical to the success of achieving continued energy savings that JCPS develop and implement an Operation and Maintenance Plan. In this section are some recommendations for JCPS and/or 3rd party maintenance contractors.

Air Handling Units

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect the unit for cleanliness.
   b) Inspect the fan wheel and shaft for wear and clearance.
   c) Check the sheaves and pulleys for wear and alignment.
   d) Check the belts for tension, wear, cracks, and glazing.
   e) Verify tight bolts, set screws, and locking collars.
   f) Check dampers for wear, security and linkage adjustment.
   g) Verify clean condensate pan.
   h) Verify proper operation of the condensate drain.
   i) Verify clean air filters.
   j) Verify clean coils.
   k) Verify proper operation of the spray pump, if applicable.
   l) Verify smooth fan operation.
   m) Log operating conditions after system has stabilized.
   n) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate the fan shaft bearings, if applicable.
   b) Lubricate the motor bearings, if applicable.
5. Controls and Safeties
   a) Test the operation of the low temperature safety device, if applicable.
   b) Test the operation of the high static pressure safety device, if applicable.
   c) Test the operation of the low static pressure safety device, if applicable.
   d) Check the thermal cutout on electric heaters, if applicable.
   e) Check the step controller, if applicable.

f) Check and record supply air and control air pressure, if applicable.
g) Verify the operation of the control system and dampers while the fan is operating.

6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration. This includes wiring to the electric heat, if applicable.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.

Heating Inspection

1. Gas Heat Option
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.
   e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.
   f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
   g) Verify the operation of the flame detection device.
   h) Test the operation of the high temperature limit switch.
   i) Verify the integrity of the flue system.
   j) Verify the operation of the operating controls.
   k) Verify the burner sequence of operation.
   l) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
   m) Perform combustion test. Make adjustments as necessary.
2. Electric Heat Option
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable.
   c) Verify the operation of the heating elements.
   d) Check voltage and amperage and compare readings with the watt rating on the heater.
3. Hot Water / Steam Heat Option
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.
   d) Verify the operation of the unit low temperature safety device.

Scheduled Running Inspection

1. Check the general condition of the fan.

2. Verify smooth fan operation.
3. Check and record supply and control air pressure, if applicable.
4. Verify the operation of the control system.
5. Log the operating conditions after the system has stabilized.
6. Review operating procedures with operating personnel.
7. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Oil Sample/Spectrographic Analysis

1. Pull oil sample for spectrographic analysis

Refrigerant Sample/Analysis

1. Pull refrigerant sample for spectrographic analysis for contaminants (oil, water, and acid), using approved containers

Boilers

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
    a) Secure and drain the boiler.
    b) Open the fire and water side for cleaning and inspection.
    c) Check heating surfaces and water side for corrosion, pitting, scale, blisters, bulges, and soot.
    d) Inspect refractory.
    e) Clean fire inspection glass.
    f) Check blow-down valve packing, and lubricate.
    g) Check and test boiler blow-down valve.
    h) Perform hydrostatic test, if required.
    i) Verify proper operation of the level float.
    j) Gas Train Burner Assembly
        1. Check the gas train isolation valves for leaks.
        2. Check the gas supply piping for leaks.

3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot igniter assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating and discoloration.

k) Clean burner fan wheel and air dampers. Check fan for vibration.
l) Verify tightness on linkage set screws.
m) Check gas valves for leakage (where test cocks are provided).
n) Verify proper operation of the feed water pump.
o) Verify proper operation of the feed water treating equipment.

4. Controls and Safeties
   a) Disassemble and inspect low water cutoff safety device.
   b) Reassemble boiler low water cutoff safety device with new gaskets.
   c) Clean contacts in program timer, if applicable.
   d) Check the operation of the low water cutoff safety device and feed controls.
   e) Verify the setting and test the operation of the operating and limit controls.
   f) Verify the operation of the water level control.

Startup/Checkout Procedure

1. Verify proper water level in the boiler
2. Test the safety/relief valve after startup (full pressure test).
3. Clean or replace fuel filters.
4. Clean fuel nozzles.
5. Inspect clean, and functionally test the flame scanner and flame safeguard relay.
6. Clean and adjust the ignition electrode.
7. Replace the vacuum tube in the flame safeguard control, if applicable.
8. Perform pilot turn down test.
9. Verify proper steam pressure.

10. Perform combustion test and adjust the burner for maximum efficiency.
11. Test the following items:
    a) Firing rate
    b) Fuel/air ratio
    c) CO2
    d) CO
    e) NOX
    f) Perform smoke test.
12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Mid-Season Running Inspection

1. Check the general condition of the unit.
2. Inspect the burner.
3. Adjust the burner controls to obtain proper combustion.
4. Check the operation of the pressure relief valve.
5. Check the operation of the low water cutoff and feed controls.
6. Check the setting and test the operation of the operating and limit controls.
7. Check the operation of the modulating motor.
8. Lift the safety/relief valves with at least 70% of rated pressure.
9. Blow down and try gauge cocks to confirm glass water level.
10. Check and test boiler blow down valve.
11. Log operating conditions after the system has stabilized.
12. Review operating procedures
13. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Seasonal Shut-down Procedure

1. Shut down boiler at boiler controls.
2. Shut off fuel lines at main valves.
3. Review operating procedures
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Burners

Gas Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided

Oil Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.

12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided).

Dual Fuel Train

1. Check the gas train isolation valves for leaks.
2. Check the gas supply piping for leaks.
3. Check the gas pilot solenoid valve for wear and leaks.
4. Check the main gas and the pilot gas regulators for wear and leaks.
5. Test the low gas pressure switch. Calibrate and record setting.
6. Test the high gas pressure switch. Calibrate and record setting.
7. Verify the operation of the burner fan air flow switch.
8. Inspect and clean the burner assembly.
9. Inspect and clean the pilot ignitor assembly.
10. Inspect and clean the burner fan.
11. Run the fan and check for vibration.
12. Inspect the flue and flue damper.
13. Burner Control Panel:
    a) Inspect the panel for cleanliness.
    b) Inspect wiring and connections for tightness and signs of overheating.
14. Clean burner fan wheel and air dampers. Check the fan for vibration.
15. Verify tightness of the linkage set screws.
16. Check the gas valves against leakage (where test cocks are provided)

Cooling Towers

Startup/Checkout Procedure

1. Fill the basin and verify the float level.
2. Verify the operation of the basin heaters

3. Verify the operation, setpoint, and sensitivity of the basin heater temperature control device.
4. Start the condenser water pumps.
5. Verify the balance of the return water through the distribution boxes.
6. Verify proper operation of the bypass valve(s), if applicable.
7. Operate fan and verify smooth operation.
8. Log operation after system has stabilized.
9. Review operating procedures
10. Provide a written report of completed work, operating log, and indicate uncorrected deficiencies detected.

Comprehensive Bi-Annual Inspection

1. Perform following inspection and cleaning before starting the tower for the cooling season and during shutdown at end of season.
2. Record and report abnormal conditions, measurements taken, etc.
3. Review logs for operational problems and trends.
4. General Assembly
   a) Structure
      1. Disassemble all screens and access panels for inspection.
      2. Inspect the conditions of the slats, if applicable.
      3. Inspect the condition of the tower fill.
      4. Inspect the condition of the support structure.
      5. Inspect the condition of the basins (upper and lower) and/or spray nozzles.
      6. Verify clean basins and strainer(s).
      7. Verify the condition and operation of the basin fill valve system.
   b) Mechanical
      1. Inspect belts for wear, cracks, and glazing.
      2. Verify correct belt tension. Adjust the tension as necessary.
      3. Inspect sheaves and pulleys for wear, condition, and alignment.
      4. Inspect fan shaft and bearings for condition.
      5. Inspect fan assembly for condition, security, and clearances. (e.g. blade tip clearance).
4. Lubrication System
   a) Lubricate motor bearings.
   b) Lubricate fan shaft bearings.
5. Motor And Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.

d) Check the contactor(s) for free and smooth operation.
e) Meg the motor(s) and record readings.
f) Check disconnect terminal block for wear, tightness and signs of overheating and discoloration.
g) Check the condition and operation of the basin heater contactor(s).

Shut-Down Procedure

1. Check the general condition of the tower.
2. Turn off electrical power to basin heaters, tower fans, and pipe heaters as necessary.
3. Drain tower and condenser water piping.
4. Review operating procedures
5. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Energy Management System

Maintenance Inspection

1. Review reports for operational problems and trends.
2. Make a back-up copy of the BAS program.
3. Check for loose or damaged parts or wiring.
4. Check for any accumulation of dirt or moisture. Clean if required.
5. Verify proper electrical grounding.
6. Verify control panel power supplies for proper output voltages.
7. Inspect interconnecting cables and electrical connections.
8. Verify that manual override switches are in the desired positions.
9. Check the operation of all binary and analog outputs, if applicable.
10. Calibrate control devices, if applicable.
11. Verify the correct time and date.
12. Check and update the holiday schedules and daylight savings time.
13. Via terminal mode, view the event log and input/output points for any unusual status or override conditions.
14. Clean the external surfaces of the panel enclosure.
15. Review operating program and parameters.
16. Check cable connections for security.
17. Review operating procedures

18. Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

Maintenance Inspection (Control Panels)

1. Control Panel
    a) Verify secure connections on all internal wiring, LAN, and communication links.
    b) Check for loose or damaged parts or wiring.
    c) Check for any accumulation of dirt or moisture. Clean if required.
    d) Remove excessive dust from heat sink surfaces
    e) Verify proper system electrical grounding.
    f) Verify proper output voltages on control panel power supplies.
    g) Check LED Indications to verify proper operation
    h) Verify LAN communications
    i) Verify that cards are seated and secured.
    j) Check wiring trunks and check for possible Error Code Indications
    k) Check voltage level of
    l) Verify the proper operation of critical control processes and points associated with this unit an make adjustments if necessary.
    m) Check Volatile memory available
    n) Cheek Non volatile memory available
    o) Check Processor idle time
    p) Clean external surfaces of the panel enclosure.
    q) Check modem operation, if applicable.
    r) View the event log and input/output points for any unusual status or override conditions.
    s) Verify correct time and date.
    t) Check and update holiday schedules, if applicable, and daylight savings time.
    u) Review operating procedures with operating personnel.
    v) Provide a written report of completed work, and indicate any uncorrected deficiencies detected.

Maintenance Inspection (EMS - Sequence of Operations)

Central Plant

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for the chiller plant. An initial survey of current equipment operating parameters will be conducted within the first 60 days of the contract term during cooling season. This survey will include:

1. Chiller(s) operation
2. Cooling tower(s) operation
3. Pump(s) operation
4. Economizer operation (where applicable)
5. Environmental safety

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

Building Systems

In order to assure effective environmental conditioning while minimizing the cost to operate the equipment, technicians will review operating sequences and practices for covered airside systems. An initial survey of current systems operating parameters will be conducted within the first 60 days of the contract term, except seasonally operated systems, which will be surveyed during the appropriate operating season. This survey will include:

1. Time schedule(s)
2. Reset schedule(s)
3. Economizer changeover (where applicable)
4. Setpoints
5. Energy Management routines

A detailed report of findings and recommendations for changes, if any, will be made. Agreed upon operational changes which require only adjustment of controls or programming will be made during regularly scheduled maintenance visits as part of this agreement at no additional cost. Any recommended alterations that require addition of devices or equipment will be accompanied by a guaranteed cost proposal reflecting the applicable discounts determined by this agreement.

Fans

Maintenance Procedure

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Check the general condition of the unit.
   b) Verify tightness of the fan, fan guards, louvers, etc.
   c) Verify clean burner assembly.
   d) Check sheaves and pulleys for wear and alignment, if applicable.
   e) Check belts for tension, wear, cracks, and/or glazing.
4. Lubrication
   a) Lubricate the fan motor, if applicable.
   b) Lubricate the fan bearings as necessary.
5. Controls and Safeties
   a) Verify proper operation of the temperature control device.
   b) Verify proper operation of the high temperature control device.
   c) Verify proper operation of the fan switch.
   d) Verify proper operation of the pilot safety device, if applicable.
6. Electrical
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
7. Startup and Checkout
   a) Start the unit.
   b) Verify proper combustion air to the burner.
   c) Verify proper gas pressure to the burner.
   d) Check the flame for proper combustion.

Comprehensive Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Disassemble all screens and panels necessary to gain access to the fan mechanism.
   b) Disassemble the control mechanism (AVPB only).
   c) Clean all accessible rotor components to include control pitch mechanism (AVPB only).
   d) Inspect blades for wear.
   e) Inspect blade arms for wear (AVPB only).
   f) Check blade tip clearance.
   g) Check for oil leak on the blade bearing housing (AVPB only).
   h) Clean motor and fan housing.

   i) Reassemble all removed screens and plates.
4. Lubrication
   a) Lubricate the motor bearings.
   b) Lubricate the shaft bearings (AVPA only).
5. Controls and Safeties
   a) Test the operation of the high static safety device. Calibrate and record setting.
   b) Test the operation of the low static safety device. Calibrate and record setting.
   c) Test the operation of the vibration safety device. Calibrate and record setting.
   d) Verify the operation of the phase monitor, if applicable.
   e) Inspect pneumatic and electrical controls for condition and calibration.
   f) Verify proper operation.
6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Clean the disconnect switch and cabinet at the fan, if applicable.
   c) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   d) Check the condition of the contacts for wear and pitting.
   e) Check the contactors for free and smooth operation.
   f) Meg the motor and record readings.
7. Startup / Checkout Procedure
   a) Start the fan.
   b) Verify the operation of the starter.
   c) Check and record supply and control air pressure.
   d) Verify the operation of the control system while the fan is operating.
   e) Log the operating conditions after the system has stabilized.
   f) Review operating procedures with operating personnel.
   g) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Scheduled Running Inspection (fans)

1. Check the general operation of the fan.
2. Check and record supply and control air pressure.
3. Verify the operation of the control system.
4. Log the operating conditions after the system has stabilized.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Comprehensive Annual Inspection (fans)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Verify tight bolts, set screws, and locking collars.
   b) Inspect sheaves and pulleys for wear and alignment.
   c) Inspect belts for tension, wear, cracks, and glazing.
   d) Inspect dampers for wear, security, and clearances, if applicable.
   e) Verify clean air filters.
   f) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate fan bearings.
   b) Lubricate motor bearings, if applicable.
5. Controls and Safeties
   a) Verify the operation of the control system while the fan is operating.
   b) Verify the setting of the low temperature safety device, if applicable.
   c) Verify the operation of the pre-heat control device, if applicable.
   d) Verify the operation of the cooling control device, if applicable.
   e) Verify the operation of the re-heat control device, if applicable.
   f) Verify the operation of the humidity control device, if applicable.
6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect the wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Meg the motor and record readings.
   f) Check volts and amps of the motor.

Lubricate/Grease Bearings

1. Lubricate and/or grease bearings according to manufacturer's specifications

MEG Motor

1. Check the integrity of the insulation on the motor windings and the motor leads, using a megohm meter.

Coils

Maintenance Procedure

1. Record and report abnormal conditions.
2. Visually inspect the coil for leaks.
3. Inspect the coil for cleanliness.

Pumps

Annual Inspection

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Check motor shaft and pump shaft for alignment, if applicable.
   b) Inspect the coupling for wear.
   c) Verify that the shaft guard is in place and tight, if applicable.
   d) Verify water flow through the pump.

   e) Check for leaks on the mechanical pump seals, if applicable.
   f) Verify proper drip rate on the pump seal packing, if applicable.
   g) Verify smooth operation of the pump.
   h) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.
4. Lubrication
   a) Lubricate the motor bearings as necessary.
   b) Lubricate the pump bearings as necessary.
5. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Meg the motor.
   d) Verify tight connections on the motor terminals.

e) Check the condition of the contacts for wear and pitting, if applicable.
f) Check the contactors for free and smooth operation.
g) Verify proper volts and amps.

Pump Run Inspection

1. Verify smooth operation of the pump.
2. Check for leaks on the mechanical pump seals, if applicable.
3. Verify proper drip rate on the pump seal packing, if applicable.
4. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Mechanical Starters with Electronic Controls

Comprehensive Annual Maintenance

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check condition of the contacts for wear and pitting.
4. Check contactors for free and smooth operation.
5. Check the mechanical linkages for wear, security, and clearances.
6. Verify the overload settings.

VFD Starters

Comprehensive Annual Maintenance

1. Clean the starter and cabinet.
2. Inspect wiring and connections for tightness and signs of overheating and discoloration.
3. Check the tightness of the motor terminal connections.
4. Verify the operation of the cooling loop.
5. Verify proper operation of the frequency drive.

Rooftop Units

Comprehensive Annual Maintenance

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect for leaks and report results.
   b) Calculate refrigerant loss rate and report to the customer.
   c) Repair minor leaks as required (e.g. valve packing, flare nuts).
   d) Visually inspect condenser tubes for cleanliness.
4. Controls and Safeties
   a) Inspect the control panel for cleanliness.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Verify the working condition of all indicator/alarm lights, if applicable.
   d) Test the low water temperature control device. Calibrate and record setting.
   e) Test the low evaporator pressure safety device. Calibrate and record setting.
   f) Test the oil pressure safety device. Calibrate and record setting, if applicable.
   g) Check programmed parameters of RCM control, if applicable.
5. Lubrication System
   a) Check oil level in the compressor.
   b) Test oil for acid content and discoloration. Make recommendations to the customer based on the results of the test.
   c) Verify the operation of the oil heater. Measure amps and compare reading with the watt rating of the heater.

6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
   e) Check the tightness of the motor terminal connections.
   f) Meg the motor and record readings.
   g) Verify the operation of the electrical interlocks.
   h) Measure voltage and record. Voltage should be nominal voltage ± 10%.

Comprehensive Maintenance Inspection (RTU Heating Cycle)

1. Perform heating inspection/maintenance applicable to the unit (steam/hot water, gas, electric).
2. Verify smooth operation of the fans.
3. Check the belts for tension, wear, cracks, and glazing.
4. Verify clean air filters.
5. Gas Heat Option
   a) Visually inspect the heat exchanger.
   b) Inspect the combustion air blower fan, and clean, if required.
   c) Lubricate the combustion air blower fan motor, if applicable.
   d) Verify the operation of the combustion air flow-proving device.
   e) Test the operation of the high gas pressure safety device, if applicable. Calibrate, if necessary.
   f) Test the operation of the low gas pressure safety device, if applicable. Calibrate, if necessary.
   g) Verify the operation of the flame detection device.
   h) Test the operation of the high temperature limit switch. i.. Verify the integrity of the flue system.
   i) Verify the operation of the operating controls.
   j) Verify the burner sequence of operation.
   k) Verify proper gas pressure to the unit and/or at the manifold, if applicable.
   l) Perform combustion test. Make adjustments as necessary.
6. Electric Heat Option
   a) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   b) Check and calibrate operating and safety controls, if applicable.
   c) Verify the operation of the heating elements.
   d) Check voltage and amperage and compare readings with the watt rating on the heater.

7. Hot Water / Steam Heat Option
   a) Inspect control valves and traps.
   b) Check and calibrate all operating and safety controls.
   c) Verify the operation of the heating coils.
   d) Verify the operation of the unit low temperature safety device.

Mid-Season Cooling Inspection (RTU)

1. Check the general condition of the unit.
2. Log the operating condition after system has stabilized.
3. Verify the operation of the control circuits.
4. Analyze the recorded data. Compare the data to the original design conditions.
5. Review operating procedures with operating personnel.
6. Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

Comprehensive Maintenance Inspection (RTU - Cooling Cycle)

1. Record and report abnormal conditions, measurements taken, etc.
2. Review logs for operational problems and trends.
3. General Assembly
   a) Inspect for leaks and report results.
   b) Calculate refrigerant loss rate and report to the customer.
   c) Repair minor leaks as required (e.g. valve packing, flare nuts).
   d) Check pulleys and sheaves for wear and alignment.
   e) Check belts for tension, wear, cracks, and glazing.
   f) Verify clean evaporator coil, blower wheel, and condensate pan.
   g) Verify clean air filters.
   h) Verify proper operation of the condensate drain.
   i) Verify proper operation of the dampers and/or inlet guide vanes, if applicable.
4. Controls and Safeties
   a) Inspect the control panel for cleanliness.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Verify the working condition of all indicator/alarm lights, if applicable.
   d) Test the low evaporator pressure safety device. Calibrate and record setting, if applicable.
   e) Test the high condenser pressure safety device. Calibrate and record setting, applicable.
   f) Test the oil pressure safety device, if applicable. Calibrate and record setting.
   g) Test the high static pressure safety device, if applicable. Calibrate and record setting.
   h) Verify the operation of the static pressure control device, if applicable.
5. Lubrication
   a) Verify the operation of the oil heater, if applicable.
   b) Lubricate the fan bearings as required.
   c) Lubricate the fan motor bearings as required.
   d) Lubricate the damper bearings, if applicable.
6. Motor and Starter
   a) Clean the starter and cabinet.
   b) Inspect wiring and connections for tightness and signs of overheating and discoloration.
   c) Check the condition of the contacts for wear and pitting.
   d) Check the contactors for free and smooth operation.
7. Startup /Checkout Procedure
   a) Verify the operation of the oil heater.
   b) Verify full water system, including the cooling tower and the condenser.
   c) Verify clean cooling tower and strainers.
   d) Test all flow-proving devices on the condenser water circuit.

e) Start the condenser water pump and the cooling tower fan(s).
f) Verify flow rate through the condenser.
g) Start the unit.
h) Verify smooth operation of the compressor(s) and fan(s).
i) Check the setpoint and sensitivity of the temperature control device.
j) Verify the operation of the condenser water temperature control device.
k) Verify clean condenser using pressure and temperature.
l) Check operation and setup of the Unit Control Module.
m) Check the superheat and subcooling on the refrigeration circuit(s).
n) Log the operating conditions after the system has stabilized.
o) Review operating procedures with operating personnel.
p) Provide a written report of completed work, operating log, and indicate any uncorrected deficiencies detected.

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ENERGY SAVINGS PLAN

SECTION 7 – OPTIONAL ENERGY GUARANTEE

OPTIONAL ENERGY GUARANTEE OVERVIEW

NOTE: The following is meant only to serve as a description of an optional energy guarantee and does not constitute any contractual obligations between the JCPS and DCO. If JCPS chooses to implement an energy guarantee contract, a separate document will be used based on mutual agreement and acceptance of all parties of its terms and conditions.

A successful energy project consists of a partnership between an ESCO and Owner. Both parties have defined roles and accept their individual responsibilities as well as support any joint initiatives of the program as defined in this document. Both DCO and the JCPS will have a role in ongoing maintenance and operations as defined in the agreed-upon energy guarantee contractual documents. Both parties will be required to meet their obligations for the guaranteed energy units savings (referred to as "guarantee or savings") to be achieved and to ensure the guarantee stays intact.

DCO will guarantee JCPS will achieve 100% of the total energy units savings per the provisions of the agreed-upon energy guarantee contractual documents based on the final selection of ECMs and their associated energy savings as measured and verified by the Owner's third-party, independent firm. The energy savings will be in energy units, not dollars as DCO has no control over the costs of utilities. The energy units guarantee contract shall commence thirty (30) days after the start-up and commissioning of the last Energy Conservation Measure (ECM) and be enforced for a period of one (1) year or until terminated by JCPS.

SAVINGS VERIFICATION

There are events that cause energy savings to change. JCPS and DCO will agree to baseline energy consumption that represents the facility's energy use and cost prior to the date of any Agreement (the "Base Year") and parameters, which affect the energy usage and cost of the facility, including but not limited to, utility rates, local weather profile, facility square footage, environmental conditions, schedules (e.g., lighting, HVAC) and an inventory of equipment in the facility. Energy savings are determined by comparing measured energy use or demand before and after implementation of an energy savings program.

ECM ENERGY SAVINGS = BASELINE ENERGY USE – POST INSTALLATION ENERGY USE +/- ADJUSTMENTS

Changes in estimated energy savings fall into two categories. These categories are Routine Adjustments and Non-Routine Adjustments. Routine Adjustments are expected changes during the savings reporting period to energy governing factors (e.g. weather). DCO uses IPMVP approved mathematical techniques to determine adjustments. Non-Routine Adjustments include energy-governing factors which are not usually expected to change, such as the facility size, the design and operation of installed equipment, occupancy and the type of occupants or any physical changes to the building or equipment that impact the facilities' utility use. These factors will be monitored for change throughout the reporting period.

DCO will perform monthly utility bill analysis and audit reports which compare the current year with base year energy consumption and costs. DCO will perform periodic on-site analysis to determine whether mechanical and electrical systems are operating at optimal efficiency and to assess the occupancy and operational schedules of the buildings.

As part of the optional energy guarantee, DCO uses weather normalization procedures to correct for the effect of weather variance on energy savings in subsequent years. Baseline energy and weather data are used to establish an algorithm to predict how the baseline building uses energy as a function of weather. The algorithm is then applied to subsequent years to correct for the impact weather may have on future building energy use. The weather normalization procedure and algorithms will be covered in detail as part of the optional energy guarantee contract provided to JCPS.

ENERGY SAVINGS PLAN

APPENDICIES

APPENDIX LIST	
APPENDIX A	Construction Contingency Allowance
APPENDIX B	Design Bid Build Procedures
APPENDIX C	Operations & Maintenance Savings
APPENDIX D	Project Changes in Financing
APPENDIX E	Project Incentives
APPENDIX F	Lighting Line-by-Line
APPENDIX G	Solar Helioscopes
APPENDIX H	Domestic Water Conservation Line-By-Line & Savings
APPENDIX I	Pine Insulation Line-By-Line & Savings
APPENDIX J	Local Government Energy Audits
APPENDIX K	Solar PPA Bid Information
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ENERGY SAVINGS PLAN

APPENDIX A – CONSTRUCTION CONTINGENCY ALLOWANCE

Appendix A – Construction Contingency Allowance

Experience shows that during the construction phase there are four major categories of potential change of scope issues that benefit from having an appropriate Construction Contingency Allowance (CCA).

- Unknown conditions
- Building inspector's modifications
- Project owner requested changes.
- Design clarifications or modifications

Unknown Conditions

Renovations to older facilities have greater potential for revealing the unknown. Missing or inaccurate Blueprints, deviations from the original blueprints by the original builder and unknown or undocumented modifications during the life of the facility.

Areas such as behind a wall/roof/equipment or under the slab can bring unforeseen conditions which can delay the new construction and change the anticipated scope of the work. Therefore, it is advisable to dedicate a CCA that is higher than that for new construction.

Building Inspection Modifications

A plan review for the local building jurisdiction reviews the construction documents prior to issuing a building permit. However, there remains the likelihood that the building inspector will request modifications to the plans based upon experience and their interpretation of the applicable building code.

While we can ask for code review and documentation, if you hope to get a Certificate of Occupancy under a tight schedule from this same inspector requested modifications will need to be implemented as successfully appeals take time.

Whether it is adding an extra exit sign, smoke detector or fire extinguisher, or whether it is something more significant, it may require more work from the contractor, thus added expense. The CCA is intended to be the source of funds necessary for these requested modifications.

Project Owner Requested Changes

It is nearly impossible to express your every desire during the design phase. You will always see something during construction that you would like to change.

There is nothing necessarily wrong with that.

The CCA is intended to be the source of funds necessary for these requested changes.

Design Clarifications or Modifications

No designer has ever developed the perfect set of construction documents.

There are always items that can be detailed better or more clearly. The design intent should be adequately reflected in the drawings and specifications so that the contractor can bid and build the ECM to meet the design intent.

However, there will be times during construction when the builder will not be readily able to identify the exact intent of particular details or systems. At that time the builder will submit a Request for Information (RFI) to the designer for clarification or more information. The designer will issue clarifications or directives so that the builder can continue to meet the design intent.

On occasion, the RFI will reveal that something more than was shown in the construction documents is necessary to fulfill the design intent. The clarification or modification may impact the scope of the work to a degree that additional construction costs become necessary.

As long as the design omission is not negligent, the CCA is intended to be the source of funds necessary for these design clarifications or modifications.

Allowance Method

JCPS ESIP Project is carrying $2,232,919 of construction contingency. The use of Contingency by JCPS or DCO Energy will be defined in the Implementation Contract.

ENERGY SAVINGS PLAN

APPENDIX B – DESIGN BID BUILD

Appendix B – Design Bid Build Procedures

Design–bid–build (or design/bid/build, and abbreviated D–B–B or D/B/B accordingly), also known as Design–tender (or "design/tender") traditional method or hard bid is the method of delivery for this project.

Design–bid–build is the traditional method for project delivery and differs in several substantial aspects from design–build.

There are three main sequential phases to the design–bid–build delivery method:

- The design phase
- The bidding (or tender) phase
- The construction phase

Design Phase

In this phase DCO will design and produce bid documents, including construction drawings and technical specifications, on which various contractors will in turn bid to construct the project.

The Energy Savings Plan (ESP) is intended to document owner's project requirements and provide a conceptual and/or schematic design and good faith estimates.

With the ESP, DCO will bring in design professionals including mechanical, electrical, and plumbing engineers (MEP specifications engineers), a fire protection engineer, structural engineer, sometimes a civil engineer and a landscape architect to help complete the construction drawings and technical.

The design document should reflect the intent of the energy savings plan for scope, price, savings, operations & maintenance savings, incentive and schedule.

The finished bid documents are coordinated by the DCO and owner for issuance to contractors during the bid phase.

Bid (or tender) phase

Bidding is according to NJ Public Bid Law and is "open", in which any qualified bidder may participate.

The various contractors bidding obtain bid documents, and then put them out to multiple subcontractors for bids on sub-components of the project.

Questions may arise during the bid period, and DCO will issue clarifications or corrections to the bid documents in the form of addenda.

From these elements, the contractor compiles a complete bid for submission by the established closing date and time bid date.

Bids are to be based on a base bid lump sum plus alternates, bid requirements and alternates are elucidated within the bid documents.

Once bids are received, DCO reviews the bids, seeks any clarifications required of the bidders, investigates contractor qualifications, ensures all documentation is in order (including bonding if required), and advises the owner as to the ranking of the bids.

If the bids fall in a range acceptable to the owner, the project is awarded to the contractor with the lowest reasonable bid.

In the event that all of the bids do not satisfy the needs of the owner the following options become available to DCO:

- Re-bid the construction of the project on a future when monies become available and/or construction costs go down.
- Revise the design of that ECM (at no cost to the client) so as to make the project smaller or reduce features or elements of the project to bring the cost down. The revised bid documents can then be issued again for bid.
    - DCO will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.
- Revise the design of future ECM(s) (at no cost to the client) so as to make the project smaller or reduce features or elements of the project to bring the cost down. The current bid package can then be contracted
    - DCO will provide guidance on energy savings, operation and maintenance savings and incentives to ensure the project is self-funding.

Construction phase

Once the construction of the project has been awarded to the contractor, the bid documents (e.g., approved construction drawings and technical specifications) may not be altered.

The necessary permits (for example, a building permit) must be achieved from all jurisdictional authorities in order for the construction process to begin.

Should design changes be necessary during construction, whether initiated by the contractor, owner, or as discovered by the architect, DCO will issue sketches or written clarifications and handle the project through contingency (See Appendix A).

The contractor may be required to document "as built" conditions to the owner.

ENERGY SAVINGS PLAN

APPENDIX C – OPERATIONS AND MAINTENANCE SAVINGS

Appendix C – Operation & Maintenance Savings

Operations and Maintenance and other non-energy-related cost savings are allowable in NJ ESIPs, and are defined as reduction in expenses (other than energy cost savings) related to energy and water consuming equipment:

Energy-related cost savings can result from avoided expenditures for operations, maintenance, equipment repair, or equipment replacement due to the ESIP project.

Sources of O&M savings include:

- Lower maintenance service contract costs
- Decrease in repair costs
  - Avoided repair and replacement costs as a result of replacing old and unreliable equipment
  - Material savings due to new equipment warranties
  - Material savings due to the longer life items not needing replacement
    - In particular, reduction in florescent bulbs due to LED

Lower maintenance service contract costs

Prior to the implementation of the ESIP mechanical and electrical equipment was maintained by a third party under a maintenance contract. The ESIP replaces the aging equipment with newer, more efficient equipment, which can reduce the service costs to the client.

Decrease in repair costs

The client is responsible for maintenance both before and after the equipment installation. Although there is no reduction in staff for which to claim labor savings, there will be cost savings on replacement materials.

Material-related savings frequently result from lighting and lighting controls projects.

For this project, lighting maintenance savings will result from the following:

1. Reduced material requirements (e.g., lamps)
2. Reduced operating time — Control measures increase equipment life by reducing the burn time of lamps and ballasts
3. Warranty-related savings — newly installed lamps, and fixtures come with a manufacturer warranty of 10 years.

Year 1 O&M Savings

O&M Savings is being carried in the ESIP each year for the first 5 years of the financing term. This amount is related only to the LED Lighting and mechanical maintenance that JCPS no longer has to purchase upon completion of the ESIP project. Per ESIP rules, the mechanical Operational Savings is carried for the first 2 years and the Lighting Operational Savings is carried for 5 years.

Incentive Totals

BUILDING	MAINTENANCE TYPE	CONTRACTOR/COMPANY	COST	TOTAL
JERSEY CITY PUBLIC SCHOOLS	LIGHTING	NATIONAL BULB RECYCLING, INC.	$10,000	$357,224
		SAL ELECTRIC COMPANY	$90,397	
		MTB Electric	$256,827	
	MECHANICAL MAINTENANCE			$794,666
		PENNETTA	$794,666	

Year	Annual Operational Savings
Year 1	$ 1,151,890
Year 2	$ 1,151,890
Year 3	$ 357,224
Year 4	$ 357,224
Year 5	$ 357,224

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PUBLIC SCHOOLS

ENERGY SAVINGS PLAN

APPENDIX D – PROJECT CHANGES IN FINANCING

Appendix D – Project Changes in Financing

The Energy savings plan has been approved using:

Interest rate of:..3.75 %
Term:...20 Years
Construction Term..30 Months
Construction Interest Only Payment of ....TBD by JCPS financial advisor
Annual Surplus of no less than....................................$2,539

During financing DCO will provide assistance but does not guarantee the timing of savings or incentives.

While beneficial to the client financing changes are the responsibility of the client, bond counsel and/or financial advisor. DCO represents in no way advice on these financial items

Financial items may include but are not limited to:

- Timing of payments
- Splitting payments into bi-annual, tri-annual, etc.
- Coordination with the client's fiscal year
- Local finance board material, forms and presentations
- Multiple tiered interest rates

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ENERGY SAVINGS PLAN

APPENDIX E – PROJECT INCENTIVES

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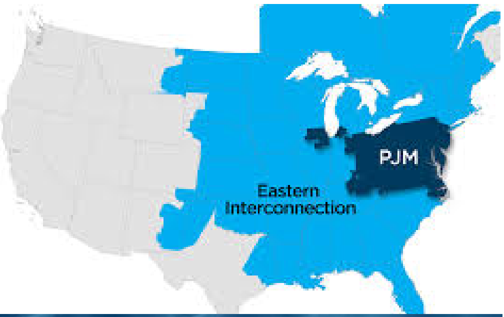
Demand Response & Project Incentives Analysis

Demand Response

Demand Response (DR) is a voluntary Pennsylvania-Jersey-Maryland (PJM) Interconnection program that allows end use customers to reduce their electricity usage during periods of higher power prices. In exchange, end-use customers are compensated through PJM members known as Curtailment Service Providers (CSPs) for decreasing their electricity use when requested by PJM.



Common reduction strategies used in Demand Response include:

- Manual or automatic load drop
- Energy management systems
- Load shedding strategies
- Lighting control strategies
- Backup generation
- Ice storage systems

Benefits of the program include:

- Significant source of new revenue
- Helps to ensure local grid reliability
- Reduces the need for new environmentally taxing energy generation

In the base product, customers commit to reducing their load at the direction of PJM during emergency conditions during the summer months. In the Capacity Performance product, the customer will need to be able to reduce load when directed during the entire year.

Commercial & Industrial Prescriptive Rebate Program

Commercial and industrial facilities with a peak electric demand exceeding 200 kW, the Commercial & Industrial Prescriptive Rebate Program is the best option for maximum rebates and incentives. This program is offered through public utilities and provides the technical and financial means to help improve the energy efficiency of your buildings. The program is designed to take a comprehensive approach to energy savings while allowing you to earn incentives that are directly linked to equipment type and size. This Prescriptive rebate program is your best option for lighting and controls, heating, cooling and ventilation (HVAC), refrigeration, kitchen equipment, Electronically Commutated Motors (ECM), electric water heaters, plug load controls, or variable speed drive (VSD) upgrades and installations.

Prescriptive rebates are designed to cover up to 50 percent of the incremental measure cost for installing high-efficiency equipment. Applications for this rebate are filed through your electric and natural gas provider.

Commercial & Industrial Custom Rebate Program

Commercial and industrial facilities with a peak electric demand exceeding 200 kW which have energy conservation measures that are not covered by the Prescriptive Rebate Program, the Custom Rebate Program is the best option to maximize rebates and incentives. This program is offered through public utilities and is designed to cover energy conservation measures or projects which are more unique in nature. All custom projects required for pre-approval, engineering analyses demonstrating savings, and a pre-inspection to determine eligibility.

The Custom Rebate Program Incentive structure breaks down as:

Electric – $.16/kwh saved for the first year
Natural Gas – $1.60/therm saved for the first year, and buydown to 1 year payback

Direct Install

Created specifically for existing small to mid-sized facilities, Direct Install is a turnkey project solution that makes it easy and affordable to upgrade to high-efficiency equipment. The program provides a free energy assessment, and a participating contractor will work with you to cut your facility's energy costs by replacing lighting, HVAC and other outdated operational equipment with energy efficient alternatives.

The DI Program is open to all eligible commercial and industrial customers whose *average* demand did not exceed 200 kW in any of the preceding twelve months, have their gas or electricity provided by one of New Jersey's Investor-Owned Utilities (IOUs), and pay into the Societal Benefits Charge (SBC).

To dramatically improve your payback on the project, the program pays up to 80% of retrofit costs to facilities within an Urban Enterprise Zone, Opportunity Zone, owned or operated by a local government, K-12 public school, or designated as affordable housing. Other types of facilities receive an incentive up to 70% of retrofit costs.

In 2019 the Direct Install program surpassed $200 million in incentives provided since its inception.

Systems and Equipment Addressed by the Program:

- Lighting & Lighting Controls
- Heating, Cooling & Ventilation (HVAC) and HVAC Controls
- Refrigeration
- Motors
- Variable Frequency Drives
- Hot Water Conservation Measures

* As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance regarding the procurement of all subcontractors.

Combined Heat & Power

One of the goals of the State of New Jersey is to enhance energy efficiency through on-site power generation with recovery and productive use of waste heat, and to reduce existing and new demands to the electric power grid. The Board of Public Utilities seeks to accomplish this goal by providing generous financial incentives for Combined Heat & Power (CHP) and Fuel Cell (FC) installations.

Eligible CHP or Waste Heat to Power (WHP) projects must achieve an annual system efficiency of at least 60% (Higher Heating Value - HHV), based on total energy input and total utilized energy output. Mechanical energy may be included in the efficiency evaluation.

In order to qualify for incentives, systems must operate a minimum of 5,000 full-load equivalent hours per year (i.e. run at least 5,000 hours per year at full rated kW output). The Office of Clean Energy (OCE) may grant exceptions to these minimum operating hours requirement for Critical Facilities, provided the proposed system operates a minimum of 3,500 full-load equivalent hours per year and is equipped with blackstart and islanding capability. For this program, a Critical Facility is defined as any:

(a) public facility, including any federal, state, county, or municipal facility,

(b) non-profit and/or private facility, including any hospital, police station, fire station, water/wastewater treatment facility, school, multifamily building, or similar facility that:

(A) is determined to be either Tier 1 or critical infrastructure by the New Jersey Office of Emergency Management or the State Office of Homeland Security and Preparedness or

(B) could serve as a Shelter during a power outage. A Shelter is a facility able to provide food, sleeping arrangements, and other amenities to its residents and the community.

The CHP, FC, or WHP system must have a ten (10) year all-inclusive warranty. The warranty must cover the major components of the system eligible for the incentive, to protect against breakdown or degradation in electrical output of more than ten percent from the originally rated electrical output. The warranty shall cover the full cost of repair or replacement of defective components or systems, including coverage for labor costs to remove and reinstall defective components or systems. In the event the system warranty does not meet program requirements, customer must purchase an extended warranty or a ten (10) year maintenance/service contract. The cost of the ten (10) year warranty or service contract may be considered as part of the cost of the project. Notwithstanding the foregoing, public entities that are prohibited from entering into agreements for the full ten (10) years may comply with the 10-year requirement by:

(a) providing an agreement for the longest lawful term,
(b) committing the entity to purchase an agreement for the remaining years, and
(c) either:
(i) providing the vendor’s commitment for specific pricing for those remaining years, or
(ii) assuming the pricing for the remaining years will increase by 2.5% each year

<u>Incentive Structure:</u>

Eligible Technologies	Size (Installed Rated Capacity)	Incentive ($/kW)	% of Total Cost Cap per project[3]	$ Cap per project[3]
Powered by non-renewable or renewable fuel source, or combination[4]: Gas Internal Combustion Engine; Gas Combustion Turbine; Microturbine; Fuel Cells with Heat Recovery (FCHR)	≤500 kW	$2,000	30-40%[2]	$2 million
	>500 kW - 1 MW	$1,000		
	> 1 MW - 3 MW	$550	30%	$3 million
	>3 MW	$350		
Fuel Cell without Heat Recover (FCwoHR)	Same as above(1)	Applicable amount above	30%	$1 million
Waste Heat to Power	≤ 1MW	$1,000	30%	$2 million
	> 1MW	$500		$3 million

Footnotes:

(1) Incentives are tiered, which means the incentive levels vary based upon the installed rated capacity, as listed in the chart above. For example, a 4 MW CHP system would receive $2.00/watt for the first 500 kW, $1.00/watt for the second 500 kW, $0.55/watt for the next 2 MW and $0.35/watt for the last 1 MW (up to the caps listed).

(2) The maximum incentive will be limited to 30% of total project. For CHP-FC projects up to 1 MW, this cap will be increased to 40% where a cooling application is used or included with the CHP system (e.g., absorption chiller).

(3) Projects will be eligible for incentives shown above, not to exceed the lesser of % of total project cost per project cap or maximum $ per project cap. Projects installing CHP or FC with WHP will be eligible for incentive shown above, not to exceed the lesser caps of the CHP or FC incentive. Minimum efficiency will be calculated based on annual total electricity generated, utilized waste heat at the host site (i.e. not lost/rejected), and energy input.

(4) Systems fueled by a Class 1 Renewable Fuel Source, as defined by N.J.A.C. 14:8-2.5, are eligible for a 30% incentive bonus. If the fuel is mixed, the bonus will be prorated accordingly. For example, if the mix is 60/40 (60% being a Class 1 renewable), the bonus will be 18%. This bonus will be included in the final performance incentive payment, based on system performance and fuel mix consumption data. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

(5) CHP or FC systems located at Critical Facility and incorporating blackstart and islanding technology are eligible for a 25% incentive bonus. This bonus incentive will be paid with the second/Installation incentive payment. Total incentive, inclusive of bonus, shall not exceed above stipulated caps.

Incentive Payment Schedule

The total incentive is divided into three partial payments. Each stage of payment requires additional documentation and/or has conditions that must be met. At approval, the maximum incentive partial payment amounts are calculated by multiplying the total incentive by the ratios listed in the following table.

Purchase	Installation	Acceptance of 12 months post-installation performance data
30%	50%	20%

(e.g., for the purpose of calculating a payback period)

Large Energy Users Program

The Large Energy Users Program (LEUP) is an incentive offered as part of the New Jersey Clean Energy Program (NJCEP). Designed to encourage energy efficiency and sustainability among large energy-consuming facilities, LEUP provides financial incentives and technical support to help these entities implement energy-saving measures and reduce their environmental impact.

- To qualify, eligible entities must have incurred at least $5,000,000 in total annual energy costs (on a pre-sales tax basis, aggregate of all buildings/sites) between July 1, 2021 and June 30, 2022 as billed by NJ Utilities and any applicable third-party suppliers associated with those accounts.
  - NJ Utilities refer to the regulated electric and/or gas utilities in the State of New Jersey. They are: Atlantic City Electric, Jersey Central Power & Light, Rockland Electric Company, New Jersey Natural Gas, Elizabethtown Gas, PSE&G, and South Jersey Gas.
  - Applicant's accounts must be commercially-billed and pay the Societal Benefits Charge (SBC).
  - Eligible annual costs include standard costs associated with electric and/or gas delivery and supply (e.g., generation, transmission, distribution, SBC, etc.) and not those that are unique to the customer (e.g., energy management charges).
- In order to be considered for incentives, the billed peak demand of each facility submitted in the Draft Energy Efficiency Plan (DEEP) or Final Energy Efficiency Plan (FEEP) must meet or exceed 400 kW and/or 4,000 DTh.
  - For campus facilities, the 400 kW or 4000 DTh threshold shall be met on a campus-wide level (i.e. total demand of campus). Any number of buildings may be included in the Energy Efficiency Plan.
- Once qualified, entities will be approved to submit their Draft Energy Efficiency Plan (DEEP) for fund reservation or the Final Energy Efficiency Plan (FEEP) for incentive commitment.
- Annual project savings at $0.33/kWh plus $3.75/therm for non-lighting measures and $0.16/kWh for lighting measures
- 75% of total project cost
- not to exceed the NJCEP entity cap of $4,000,000 per entity per fiscal year

Incentive Calculations

Estimated incentive values were calculated in accordance with the Large Energy Users Program, which is the most lucrative Incentive option available to JCPS. The total incentive amount was calculated to be $1,733,773 in rebates and incentives. Incentives are carried within Form VI of the JCPS Energy Savings Plan.

No implied and/or written guarantee is being made with respective to the receipt of incentives. All incentives estimates carry inherent risks that may jeopardize the receipt of them. Therefore, JCPS acknowledges and accepts that any project proposed should not rely on the receipt of incentives as a reason to implement it.

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ENERGY SAVINGS PLAN

APPENDIX F – LIGHTING LINE BY LINE

ENERGY SAVINGS PLAN

APPENDIX G – SOLAR HELIOSCOPES

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ENERGY SAVINGS PLAN

APPENDIX H – WATER CONSERVATION LINE-BY-LINE

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ENERGY SAVINGS PLAN

APPENDIX I – PIPE INSULATION LINE-BY-LINE & SAVINGS

ENERGY SAVINGS PLAN

APPENDIX J – LOCAL GOVERNMENT ENERGY AUDITS

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APPENDIX K – SOLAR PPA BID INFORMATION

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APPENDIX L – IAQ & HVAC ENHANCEMENTS SCHOO LAYOUTS

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APPENDIX M – KITCHEN HOOD SAVINGS CALCULATIONS