APPENDICIES

Appendix 1 – Field Audit Notes

See attached CD

Appendix 2 – ASHRAE Audit Forms

See Attached CD

Appendix 3 – Cost Estimates

Project Name: **SUNY New Paltz**

Project No.: 4013032.01 | Sheet No: 1 of 1

Calculated by: | Date: 14-Dec-15

Checked by: | Date:

Measure: ECM **LNC2** Condenser Water Temperature Reset

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Implement Programing	6		$1,500.00	$0.00	$9,000.00	$0.00	$9,000.00	Prior experience
	Subtotal					$9,000.00	$0.00	$9,000.00	
	Contingency (10%)					$900.00	$0.00	$900.00	
	Total					$9,900.00	$0.00	$9,900.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$1,287.00	
	NYPA Project Management							$1,237.50	
	ECM Total (Roundoff)							$12,425	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM LNC3 Steam Traps

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Steam Traps (Thermostatic, 2 in.)	6	ea	$156.00	$485.00	$963.30	$2,994.88	$3,958.18	RSMeans 2014, Includes Removal of failed trap
	Subtotal					$963.30	$2,994.88	$3,958.18	
	Contingency (10%)					$96.33	$299.49	$395.82	
	Total					$1,059.63	$3,294.36	$4,353.99	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$566.02	
	NYPA Project Management							$544.25	
	ECM Total (Roundoff)							$5,464	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM LNC4 Window AC Timers

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Programmable Outlet Thermostat	56	ea	$8.55	$40.00	$478.98	$2,240.00	$2,718.98	RSMeans / Contractor Est.
	Subtotal					$478.98	$2,240.00	$2,718.98	
	Contingency (10%)					$47.90	$224.00	$271.90	
	Total					$526.88	$2,464.00	$2,990.88	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$388.81	
	NYPA Project Management							$373.86	
	ECM Total (Roundoff)							$3,754	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

Project Name: **SUNY New Paltz**
Project No.: 4013032
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM O&M1 **Weatherization**

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Door Weatherstripping	441	ea	$138.92	$49.71	$61,265	$21,921	$83,186	RS Means 08 71 25.10 2700
	Window Weatherstripping	220	ea	$90.74	$19.44	$19,962	$4,277	$24,239	RS Means 08 75 30.10 0500
	Subtotal					$81,226.73	$26,198.56	$107,425.29	
	Contingency (10%)					$8,122.67	$2,619.86	$10,742.53	
	Total					$89,349.40	$28,818.42	$118,167.82	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$15,361.82	
	NYPA Project Management							$14,770.98	
	ECM Total (Roundoff)							$148,301	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz Energy Master Plan**
Project No.: 4013032
Calculated by: S. Tully
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM O&M2 **Water Conservation**

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Lavatory Aerator	1,183	ea	$10.85	$0.99	$12,831.71	$1,171.17	$14,002.88	Contractor Est./RSMeans
	Showerhead Replacement	459	ea	$10.85	$10.00	$4,978.66	$4,590.00	$9,568.66	Contractor Est./RSMeans
	Subtotal					$17,810.37	$5,761.17	$23,571.54	
	Contingency (10%)					$1,781.04	$576.12	$2,357.15	
	Total					$19,591.40	$6,337.29	$25,928.69	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$3,370.73	
	NYPA Project Management							$3,241.09	
	ECM Total (Roundoff)							$32,541	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM O&M3 Building Schedules

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Control Changes	548	ea	$500.00	$750.00	$273,984.93	$410,977.40	$684,962.33	Previous Experience
	Subtotal					$273,984.93	$410,977.40	$684,962.33	
	Contingency (10%)					$27,398.49	$41,097.74	$68,496.23	
	Total					$301,383.42	$452,075.14	$753,458.56	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$97,949.61	
	NYPA Project Management							$94,182.32	
	ECM Total (Roundoff)							$945,590	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

Project Name: **SUNY New Paltz Energy Master Plan**

Project No.: 4013032 | Sheet No: 1 of 1

Calculated by: S. Tully | Date: 14-Dec-15

Checked by: | Date:

Measure: ECM O&M4 **Piping Insulation**

138.8 114.3

Div.	Description	Qty.	Unit	Unit each				Total	Ref.
	Heat Exhangers	1	lot	$7,158.25				$7,158.25	Contractor Est./RSMeans
	10" Fittings	1	ea	$198.04				$198.04	Contractor Est./RSMeans
	8" Fittings		ea						
	6" Fittings	4	ea	$232.40				$929.60	Contractor Est./RSMeans
	4" Fittings	27	ea	$191.88				$5,180.83	Contractor Est./RSMeans
	3" Fittings	38	ea	$228.85				$8,696.38	Contractor Est./RSMeans
	2-1/2" Fittings	10	ea	$174.87				$1,748.70	Contractor Est./RSMeans
	2" Fittings	42	ea	$217.89				$9,151.22	Contractor Est./RSMeans
	1-1/2" Fittings	5	ea	$180.10				$900.48	Contractor Est./RSMeans
	1" Fittings	4	ea	$155.96				$623.83	Contractor Est./RSMeans
	Subtotal					$0.00	$0.00	$34,587.33	
	Contingency (10%)					$0.00	$0.00	$3,458.73	
	Total					$0.00	$0.00	$38,046.06	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$4,945.99	
	NYPA Project Management							$4,755.76	
	ECM Total (Roundoff)							$47,748	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032
Calculated by: S Tully
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM O&M5 **Retro Commissioning**

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Retrocommissioning Raw Cost	1	Lot	-	-	-	-	$663,501.42	Contractor Est.
	Subtotal					$0.00	$0.00	$663,501.42	
	Contingency (10%)					$0.00	$0.00	$66,350.14	
	Total					$0.00	$0.00	$729,851.56	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$94,880.70	
	NYPA Project Management							$91,231.45	
	ECM Total (Roundoff)							$915,964	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

Project Name: **SUNY New Paltz Energy Master Plan**
Project No.: 4013032 Sheet No: 1 of 1
Calculated by: S. Tully Date: 14-Dec-15
Checked by:

Measure: ECM C1 **High Efficiency Lighting & Controls**

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Academic Stairwell Ceiling Occ Sensor	72	ea	$69.36	$88.07	$4,959.03	$6,296.65	$11,255.67	RSMeans 26 09 23.10 0100
	Dorm Stairwell Ceiling Occ Sensor	62	ea	$69.36	$88.07	$4,282.79	$5,438.01	$9,720.81	RSMeans 26 09 23.10 0100
	Dorm Corridors Ceiling Occ Sensor	168	ea	$69.36	$88.07	$11,628.86	$14,765.57	$26,394.42	RSMeans 26 09 23.10 0100
	Academic Misc Ceiling Occ Sensor	62	ea	$69.36	$88.07	$4,300.13	$5,460.03	$9,760.16	RSMeans 26 09 23.10 0100
	Academic Restroom Auto Wall Switches	8	ea	$20.24	$59.79	$168.66	$498.26	$666.92	RSMeans 26 09 23.10 0150
	F42LL T8 Retrofit (4' 2 lamp 32W T8)	12	ea	$60.83	$62.11	$729.95	$745.31	$1,475.26	RSMeans 26 51 13.50 2310
	Compact Florescent Lamp Retrofit	56	ea	$0.54	$0.40	$30.24	$22.17	$52.41	RSMeans 26 61 23.10 0560
	F46ILL T8 Retrofit (4' 6 lamp 32W T8)	20	ea	$113.70	$92.70	$2,274.00	$1,854.00	$4,128.00	RSMeans 26 51 13.50 2310
	200W Equivalent LED Retrofit.	63	ea	$148.95	$769.41	$9,383.66	$48,472.83	$57,856.49	RSMeans 26 51 13.55 6100
	Subtotal					$37,757.33	$83,552.82	$121,310.15	
	Contingency (10%)					$3,775.73	$8,355.28	$12,131.01	
	Total					$41,533.06	$91,908.11	$133,441.16	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00	$0.00	
	Audit, Design, and Construction Management							$17,347.35	
	NYPA Project Management							$16,680.15	
	ECM Total (Roundoff)							$167,469	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01 Sheet No: 1 of 1
Calculated by: Kalyan P. Date: 14-Dec-15
Checked by: Date:

Measure: ECM C2 **Site Lighting**

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Wall Pack mounted at High Level - LED	50	ea	$184.42	$494.35	$9,221.01	$24,717.51	$33,938.52	Contractor Est.
	Wall Pack mounted at Low Level - LED	70	ea	$184.42	$296.61	$12,909.41	$20,762.71	$33,672.13	Contractor Est.
	Pole Fixture - Acorn Type - LED	162	ea	$110.65	$271.89	$17,925.64	$44,046.61	$61,972.25	Contractor Est.
	Pole Fixture - Moon Type - LED	159	ea	$110.65	$271.89	$17,593.69	$43,230.93	$60,824.62	Contractor Est.
	Pole Fixture - Metal Halide Type - LED	58	ea	$221.30	$444.92	$12,835.65	$25,805.08	$38,640.73	Contractor Est.
	Pole Fixture - StandardType - LED	218	ea	$147.54	$593.22	$32,162.88	$129,322.03	$161,484.92	Contractor Est.
	Subtotal					$102,648.28	$287,884.89	$390,533.17	
	Contingency (10%)					$10,264.83	$28,788.49	$39,053.32	
	Total					$112,913.11	$316,673.38	$429,586.49	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$55,846.24	
	NYPA Project Management							$53,698.31	
	ECM Total (Roundoff)							$539,131	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM C3 VFDs

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Premium Efficiency Motor - 3HP	1	ea	$500.00	$190.00	$500.00	$190.00	$690.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 5HP	2	ea	$600.00	$190.00	$1,200.00	$380.00	$1,580.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 7.5HP	17	ea	$700.00	$204.00	$11,900.00	$3,468.00	$15,368.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 10HP	12	ea	$855.00	$214.00	$10,260.00	$2,568.00	$12,828.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 15HP	5	ea	$1,200.00	$266.00	$6,000.00	$1,330.00	$7,330.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 20HP	3	ea	$1,525.00	$328.00	$4,575.00	$984.00	$5,559.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 25HP	1	ea	$1,925.00	$342.00	$1,925.00	$342.00	$2,267.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	Premium Efficiency Motor - 30HP	2	ea	$2,200.00	$356.00	$4,400.00	$712.00	$5,112.00	RSMeans, Installation Cost Doubled to account of removal of existiing motor
	VFD - 3HP	1	ea	$535.00	$1,475.00	$535.00	$1,475.00	$2,010.00	RSMeans
	VFD - 5HP	2	ea	$535.00	$1,675.00	$1,070.00	$3,350.00	$4,420.00	RSMeans
	VFD - 7.5HP	17	ea	$635.00	$2,000.00	$10,795.00	$34,000.00	$44,795.00	RSMeans
	VFD - 10HP	12	ea	$635.00	$2,325.00	$7,620.00	$27,900.00	$35,520.00	RSMeans
	VFD - 15HP	5	ea	$960.00	$2,825.00	$4,800.00	$14,125.00	$18,925.00	RSMeans
	VFD - 20HP	3	ea	$960.00	$3,325.00	$2,880.00	$9,975.00	$12,855.00	RSMeans
	VFD - 25HP	1	ea	$1,275.00	$4,100.00	$1,275.00	$4,100.00	$5,375.00	RSMeans
	VFD - 30HP	2	ea	$1,275.00	$5,100.00	$2,550.00	$10,200.00	$12,750.00	RSMeans
	Controls Programming	43	ea	$1,800.00	$0.00	$77,400.00	$0.00	$77,400.00	Contractor Quote
	Subtotal					$149,685.00	$115,099.00	$264,784.00	
	Contingency (10%)					$14,968.50	$11,509.90	$26,478.40	
	Total					$164,653.50	$126,608.90	$291,262.40	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$37,864.11	
	NYPA Project Management							$36,407.80	
	ECM Total (Roundoff)							$365,534	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM C4 Chilled Water Temperature Reset

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Implement Programing	6		$1,500.00	$0.00	$9,000.00	$0.00	$9,000.00	Prior experience
	Subtotal					$9,000.00	$0.00	$9,000.00	
	Contingency (10%)					$900.00	$0.00	$900.00	
	Total					$9,900.00	$0.00	$9,900.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$1,287.00	
	NYPA Project Management							$1,237.50	
	ECM Total (Roundoff)							$12,425	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM C5 DCV

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Control Points - 2 per AHU	16	ea	$800.00	$2,000.00	$12,800.00	$32,000.00	$44,800.00	Previous Experience
	Field CO2 Sensor - 1 per AHU	16	ea	$200.00	$500.00	$3,200.00	$8,000.00	$11,200.00	Previous Experience
	Subtotal					$16,000.00	$40,000.00	$56,000.00	
	Contingency (10%)					$1,600.00	$4,000.00	$5,600.00	
	Total					$17,600.00	$44,000.00	$61,600.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$8,008.00	
	NYPA Project Management							$7,700.00	
	ECM Total (Roundoff)							$77,308	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**
Project No.: 4013032.01
Calculated by:
Checked by:

Sheet No: 1 of 1
Date: 14-Dec-15
Date:

Measure: ECM C6 Kitchen Hood Controls

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	VFD - 3HP	4	ea	$535.00	$1,475.00	$2,140.00	$5,900.00	$8,040.00	RSMeans
	Controls Programming	4	ea	$1,800.00	$0.00	$7,200.00	$0.00	$7,200.00	Contractor Quote
	Subtotal					$9,340.00	$5,900.00	$15,240.00	
	Contingency (10%)					$934.00	$590.00	$1,524.00	
	Total					$10,274.00	$6,490.00	$16,764.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$2,179.32	
	NYPA Project Management							$2,095.50	
	ECM Total (Roundoff)							$21,039	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP

Project Name: **SUNY New Paltz Energy Master Plan**
Project No.: 4013032.01 Sheet No: 1 of 1
Calculated by: S. Tully Date: 14-Dec-15
Checked by: Date:

Measure: ECM C7 Condensing Boilers

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Day Care Boiler (600MBH)	1	ea	$3,500	$35,000	$3,500	$35,000	$38,500	Aerco Rep / Means 23 52 23.20
	Student HC Boiler (800MBH)	1	ea	$3,900	$35,000	$3,900	$35,000	$38,900	for labor
	Lenape Boiler (2500MBH)	2	ea	$8,250	$35,000	$16,500	$70,000	$86,500	
	Esopus Boiler (3000MBH)	2	ea	$10,000	$35,000	$20,000	$70,000	$90,000	
	College Hall Boiler (800MBH)	1	ea	$3,900	$35,000	$3,900	$35,000	$38,900	
	Assume no replacement of pumps								
	Subtotal					$47,800.00	$245,000.00	$292,800.00	
	Contingency (10%)					$4,780.00	$24,500.00	$29,280.00	
	Total					$52,580.00	$269,500.00	$322,080.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$41,870.40	
	NYPA Project Management							$40,260.00	
	ECM Total (Roundoff)							$404,210	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

EYP/

Project Name: **SUNY New Paltz**

Project No.: 4013032.01 Sheet No: 1 of 1

Calculated by: Date: 14-Dec-15

Checked by: Date:

Measure: ECM C8 Upgrade Chiller

Div.	Description	Qty.	Unit	Unit Labor	Cost Material	Total Labor	Total Material	Total	Ref.
	Trane Chiller - RTHD w/VFD 250 Ton	2	ea	$14,500.00	$100,500.00	$29,000.00	$201,000.00	$230,000.00	RSMeans
	Mechanical Connections	2	ea	$10,000.00	$10,000.00	$20,000.00	$20,000.00	$40,000.00	Estimate
	Electrical	2	ea	$5,000.00	$5,000.00	$10,000.00	$10,000.00	$20,000.00	Estimate
	Controls Programming	2	ea	$5,000.00	$2,500.00	$10,000.00	$5,000.00	$15,000.00	Contractor Quote
	Subtotal					$69,000.00	$236,000.00	$305,000.00	
	Contingency (10%)					$6,900.00	$23,600.00	$30,500.00	
	Total					$75,900.00	$259,600.00	$335,500.00	
	Asbestos Abatement					$0.00	$0.00		
	Bonds IDIC Add					$0.00	$0.00		
	Audit, Design, and Construction Management							$43,615.00	
	NYPA Project Management							$41,937.50	
	ECM Total (Roundoff)							$421,053	

The costs noted above are estimates only and may be modified by changing conditions or the passage of time.

Appendix 4 – Savings Calculations

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC1	**Winter Domestic Hot Water**

Utility Costs		
Electricity:	0.107	$/kWh
Natural Gas:	0.858	$/therm

	Existing Water Usage			**Projected Water Usage**		**Hot Water Savings**			
Building	**Annual Water Use (kGal)**	**Energy (MMBTU)**	**Central Plant Efficiency**	**Distribution System Losses**	**Estimated Therm Consumption**	**Local Boiler Efficiency**	**Estimated Therm Consumption**	**Therm Savings**	**Cost Savings**
College Hall, Shango Hall	116.8	141	78%	5%	1,906	85%	1,661	244	$ 210
Capen Hall	90.4	109	78%	5%	1,475	90%	1,214	261	$ 224
LeFevre Hall	90.4	109	78%	5%	1,475	90%	1,214	261	$ 224
Dubois Hall	107.1	130	78%	5%	1,748	90%	1,439	309	$ 265
Deyo Hall	103.6	125	78%	5%	1,690	90%	1,392	299	$ 256
Scudder Hall	103.6	125	78%	5%	1,690	90%	1,392	299	$ 256
Bevier Hall	111.7	135	78%	5%	1,823	90%	1,501	322	$ 276
Bliss Hall	105.1	127	78%	5%	1,715	90%	1,412	303	$ 260
Gage Hall	163.5	198	78%	5%	2,668	90%	2,197	471	$ 404
Crispell Hall	105.1	127	78%	5%	1,715	90%	1,412	303	$ 260
Bouton Hall	148.8	180	78%	5%	2,428	90%	1,999	429	$ 368
Lenape Hall	118.8	144	78%	5%	1,939	78%	1,842	97	$ 83
Esopus Hall	118.8	144	78%	5%	1,939	78%	1,842	97	$ 83
Total Units		1,794			24,212		20,518	3,694	$ 3,169

Savings Summary	
Site Electricity Savings (kWh):	**0**
Site Gas Savings (Therms):	**3,694**
Energy Savings (MMBTU Source):	**387**
Cost Savings ($):	**$ 3,169**
Emissions Reduction (lb CO_2):	**45,011**

Assumptions:

- Annual Water Use based on assumtions from ECM-O&M2 - Water Conservation for 8 months.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset - Summary**

Summary	
Estimated Cost to Implement	$12,425
Site Electric Savings [kWh]	123,646
Site Heating Savings (therm)	-
Total Source Savings (MMBTU)	1,409
Cost Savings ($)	$ 11,071
Simple Payback [years]	1.12
Emissions Reduction (lb CO_2):	252,330

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

	Existing Case	**Proposed Case**	**Savings [unit]**	**Savings [$]**
Electrical Consumption [kwh / yr]	1,575,322.22	1,451,676.04	123,646.18	$ 11,071
Natural Gas Consumption [therms / yr]	-	-	-	-
Implementation Cost [$]		$12,425		
Totals				**$ 11,071**

Building	**Prior Existing Conditions**		**Revised Conditions**	
	Yearly Energy Consumption (kWh)	Yearly Energy Cost ($)	Yearly Energy Consumption (kWh)	Yearly Energy Cost ($)
Lecture Center	492,500	44,099	453,844	40,637
Old Main Building	185,072	16,571	170,546	15,271
Student Union	417,878	37,417	385,080	34,480
Esopus Residence Hall	213,628	19,128	196,861	17,627
Lenape Residence Hall	213,628	19,128	196,861	17,627
Health Services	52,616	4,711	48,484	4,341
Totals	**1,575,322**	**141,055**	**1,451,676**	**129,984**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset**
Building	**Lecture Center**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	38,655
Estimated recurring yearly savings [$]	$ 3,461.20
Simple Payback [years]	0.4

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	492,499.56	453,844.40	38,655.16	$ 3,461.20
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 3,461.20**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	140	50	10
95	700	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (°	45
Existing chilled water return temp. (°F)	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°F	55
Condenser Water Temp. High Limit (°	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.59
75%	0.43
50%	0.32
25%	0.45
IPLV	0.38

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	665	95%	0.56	7	80	4,478	80	0	0%	4,473	0.84	0.42	0	5
85 to 90	87.5	73.6	98	595	85%	0.50	7	81	28,898	81	0	0%	28,898	0.00	0.00	0	0
80 to 85	82.5	71.4	311	525	75%	0.43	7	80	70,208	79	1	2%	69,388	5.27	2.64	3	820
75 to 80	77.5	68.2	391	455	65%	0.39	8	80	68,956	76	4	8%	66,209	14.05	7.03	7	2,747
70 to 75	72.5	66.3	579	385	55%	0.35	8	80	76,950	74	6	11%	72,598	15.03	7.52	8	4,352
65 to 70	67.5	62.5	774	315	45%	0.35	9	80	84,992	71	9	18%	77,343	19.77	9.88	10	7,649
60 to 65	62.5	58.1	911	245	35%	0.40	9	80	88,787	67	13	26%	77,358	25.09	12.55	13	11,429
55 to 60	57.5	53.6	885	175	25%	0.45	10	80	69,229	63	17	34%	57,576	26.33	13.17	13	11,653
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									492,500				453,844				38,655

Assumptions:
- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset**
Building	**Old Main Building**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	14,526
Estimated recurring yearly savings [$]	$ 1,300.65
Simple Payback [years]	1.2

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	185,072.29	170,546.39	14,525.90	$ 1,300.65
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 1,300.65**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	50	50	10
95	250	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (°	44
Existing chilled water return temp. (°F)	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°F	55
Condenser Water Temp. High Limit (°	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.63
75%	0.45
50%	0.34
25%	0.47
IPLV	0.40

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	238	95%	0.59	7	80	1,683	80	0	0%	1,681	0.31	0.16	0	2
85 to 90	87.5	73.6	98	213	85%	0.52	7	81	10,860	81	0	0%	10,860	0.00	0.00	0	0
80 to 85	82.5	71.4	311	188	75%	0.45	7	80	26,383	79	1	2%	26,075	1.98	0.99	1	308
75 to 80	77.5	68.2	391	163	65%	0.41	8	80	25,912	76	4	8%	24,880	5.28	2.64	3	1,032
70 to 75	72.5	66.3	579	138	55%	0.36	8	80	28,916	74	6	11%	27,281	5.65	2.82	3	1,636
65 to 70	67.5	62.5	774	113	45%	0.37	9	80	31,938	71	9	18%	29,064	7.43	3.71	4	2,874
60 to 65	62.5	58.1	911	88	35%	0.42	9	80	33,365	67	13	26%	29,070	9.43	4.71	5	4,295
55 to 60	57.5	53.6	885	63	25%	0.47	10	80	26,015	63	17	34%	21,636	9.90	4.95	5	4,379
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									185,072				170,546				14,526

- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset**
Building	**Student Union**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	32,798
Estimated recurring yearly savings [$]	$ 2,936.77
Simple Payback [years]	0.5

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	417,878.41	385,080.10	32,798.32	$ 2,936.77
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 2,936.77**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	120	50	10
95	600	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (°	44
Existing chilled water return temp. (°F)	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°F	55
Condenser Water Temp. High Limit (°	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.59
75%	0.43
50%	0.32
25%	0.44
IPLV	0.37

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	570	95%	0.56	7	80	3,800	80	0	0%	3,796	0.71	0.35	0	4
85 to 90	87.5	73.6	98	510	85%	0.49	7	81	24,520	81	0	0%	24,520	0.00	0.00	0	0
80 to 85	82.5	71.4	311	450	75%	0.43	7	80	59,571	79	1	2%	58,875	4.47	2.24	2	696
75 to 80	77.5	68.2	391	390	65%	0.38	8	80	58,508	76	4	8%	56,177	11.92	5.96	6	2,331
70 to 75	72.5	66.3	579	330	55%	0.34	8	80	65,291	74	6	11%	61,598	12.76	6.38	6	3,693
65 to 70	67.5	62.5	774	270	45%	0.35	9	80	72,115	71	9	18%	65,624	16.77	8.39	8	6,490
60 to 65	62.5	58.1	911	210	35%	0.39	9	80	75,334	67	13	26%	65,637	21.29	10.64	11	9,697
55 to 60	57.5	53.6	885	150	25%	0.44	10	80	58,740	63	17	34%	48,853	22.34	11.17	11	9,887
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									417,878				385,080				32,798

- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset**
Building	**Esopus Residence Hall**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	16,767
Estimated recurring yearly savings [$]	$ 1,501.34
Simple Payback [years]	1.0

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	213,627.89	196,860.73	16,767.16	$ 1,501.34
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 1,501.34**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	33	50	10
95	165	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (°	44
Existing chilled water return temp. (°F)	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°F	55
Condenser Water Temp. High Limit (°	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.09
75%	0.79
50%	0.60
25%	0.82
IPLV	0.69

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	157	95%	1.03	7	80	1,943	80	0	0%	1,940	0.36	0.18	0	2
85 to 90	87.5	73.6	98	140	85%	0.91	7	81	12,535	81	0	0%	12,535	0.00	0.00	0	0
80 to 85	82.5	71.4	311	124	75%	0.79	7	80	30,454	79	1	2%	30,098	2.29	1.14	1	356
75 to 80	77.5	68.2	391	107	65%	0.71	8	80	29,911	76	4	8%	28,719	6.10	3.05	3	1,192
70 to 75	72.5	66.3	579	91	55%	0.64	8	80	33,378	74	6	11%	31,490	6.52	3.26	3	1,888
65 to 70	67.5	62.5	774	74	45%	0.64	9	80	36,866	71	9	18%	33,548	8.57	4.29	4	3,318
60 to 65	62.5	58.1	911	58	35%	0.73	9	80	38,512	67	13	26%	33,555	10.88	5.44	5	4,957
55 to 60	57.5	53.6	885	41	25%	0.82	10	80	30,029	63	17	34%	24,975	11.42	5.71	6	5,054
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									213,628				196,861				16,767

- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC2	**Condenser Water Reset**
Building	**Lenape Residence Hall**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	16,767
Estimated recurring yearly savings [$]	$ 1,501.34
Simple Payback [years]	1.0

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	213,627.89	196,860.73	16,767.16	$ 1,501.34
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 1,501.34**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	33	50	10
95	165	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (°	44
Existing chilled water return temp. (°F)	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°F	55
Condenser Water Temp. High Limit (°	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.09
75%	0.79
50%	0.60
25%	0.82
IPLV	0.69

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	157	95%	1.03	7	80	1,943	80	0	0%	1,940	0.36	0.18	0	2
85 to 90	87.5	73.6	98	140	85%	0.91	7	81	12,535	81	0	0%	12,535	0.00	0.00	0	0
80 to 85	82.5	71.4	311	124	75%	0.79	7	80	30,454	79	1	2%	30,098	2.29	1.14	1	356
75 to 80	77.5	68.2	391	107	65%	0.71	8	80	29,911	76	4	8%	28,719	6.10	3.05	3	1,192
70 to 75	72.5	66.3	579	91	55%	0.64	8	80	33,378	74	6	11%	31,490	6.52	3.26	3	1,888
65 to 70	67.5	62.5	774	74	45%	0.64	9	80	36,866	71	9	18%	33,548	8.57	4.29	4	3,318
60 to 65	62.5	58.1	911	58	35%	0.73	9	80	38,512	67	13	26%	33,555	10.88	5.44	5	4,957
55 to 60	57.5	53.6	885	41	25%	0.82	10	80	30,029	63	17	34%	24,975	11.42	5.71	6	5,054
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									213,628				196,861				16,767

- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	SUNY New Paltz
Project Number:	4013032.01
ECM-LNC2	Condenser Water Reset
Building	Health Services

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated Annual consumption savings [kWh]	4,132
Estimated recurring yearly savings [$]	$ 370.02
Simple Payback [years]	4.1

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	52,616.18	48,483.70	4,132.48	$ 370.02
Natural Gas Consumption [therms / yr]	N/A	N/A	N/A	N/A
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 370.02**

Calculation Inputs

Cooling Load Profile		Cooling Tower Approach Temperature	
OAT (F)	**Cooling Load (Tons)**	**WBT (F)**	**Approach Temp (F)**
55	5	50	10
95	25	75	7

OAT lockout of chiller plant (°F)	55
Condenser Water Setpoint (°F)	80
Existing chilled water temp. setpoint (	44
Existing chilled water return temp. (°F	54
% decrease in energy consumption per 1Fdrop in condenser water temp	2.0%
Condenser Water Temp. Low Limit (°	55
Condenser Water Temp. High Limit (	85
%Cooling Tower Pentaly w.r.t chiller savings	50%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.18
75%	1.18
50%	1.18
25%	1.18
IPLV	1.18

Calculations

Weather Data				Performance Data			Existing Operating Parameter			Proposed Operation Strategy				Estimated Energy Savings			
Bin	**DBT**	**WBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Cooling Tower Approach Temperature (F)**	**Existing Condenser Water Temperature Setpoint**	**Existing Energy Consumption (kWh)**	**Recommended Condenser Water Temperature Setpoint (F)**	**Net Change in Temperature (F)**	**Reduction in Chiller Power Consumption (%)**	**Proposed Energy Consumption (kWh)**	**Change in Chiller Power Consumption (kW)**	**%Cooling Tower Penalty**	**Estimated Power Reduction (kW)**	**Estimated Energy Savings (kWh)**
90 to 95	92.5	72.6	12	24	95%	1.18	7	80	335	80	0	0%	335	0.06	0.03	0	0
85 to 90	87.5	73.6	98	21	85%	1.18	7	81	2,450	81	0	0%	2,450	0.00	0.00	0	0
80 to 85	82.5	71.4	311	19	75%	1.18	7	80	6,860	79	1	2%	6,780	0.52	0.26	0	80
75 to 80	77.5	68.2	391	16	65%	1.18	8	80	7,475	76	4	8%	7,177	1.52	0.76	1	298
70 to 75	72.5	66.3	579	14	55%	1.18	8	80	9,366	74	6	11%	8,836	1.83	0.91	1	530
65 to 70	67.5	62.5	774	11	45%	1.18	9	80	10,244	71	9	18%	9,322	2.38	1.19	1	922
60 to 65	62.5	58.1	911	9	35%	1.18	9	80	9,378	67	13	26%	8,171	2.65	1.33	1	1,207
55 to 60	57.5	53.6	885	6	25%	1.18	10	80	6,507	63	17	34%	5,412	2.48	1.24	1	1,095
50 to 55	52.5	48.4	837	0	0%	0.00	10	80	0	58	22	43%	0	0.00	0.00	0	0
45 to 50	47.5	43.6	604	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
40 to 45	42.5	39.2	756	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
35 to 40	37.5	34.6	747	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
30 to 35	32.5	30	553	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
25 to 30	27.5	25.3	374	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
20 to 25	22.5	20.4	337	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
15 to 20	17.5	15.6	214	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
10 to 15	12.5	10.4	127	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
5 to 10	7.5	5.9	110	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
0 to 5	2.5	1.4	77	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-5 to 0	-2.5	-3.1	33	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-10 to -5	-7.5	-8	20	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
-15 to -10	-12.5	-12.7	10	0	0%	0.00	10	80	0	55	25	50%	0	0.00	0.00	0	0
									52,616				48,484				4,132

- Existing condenser water setpoint is 80 deg. F
- Proposed condenser water setpoint is 55 deg. F
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Location:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC3	**Steam Trap Replacement**

Assumptions		
Total Building Area with Steam Traps:	308,750	ft^2
Hours of Operation:	4,368	Hours
Estimated Steam Trap Density:	1,500	ft^2 / Trap
Estimated Number of Traps:	206	Traps
Expected Failed Trap %:	15.0%	
Expected No. of Traps upstream of control valves	20.0%	
Estimated Trap Orifice:	0.250	in. dia
Low Pressure Traps, % of Total:	100%	

From DOE's Industrial Technologies Program

Utility Data		
Natural Gas Cost/MMBTU	$8.58	
Equivalent Cost / Mlb:	$8.11	$/1000 lb

Steam Trap Calculations

System Operating Pressure	Steam Loss Per Trap, lb/hr (From DOE)	Expected # of Failed Traps	# of Traps for Potential Savings	Potential Pounds of Lost Steam	Potential Savings
Low Pressure 15 PSI	54.7	6	6	1,475,390	**$11,961**

Equivalent Fuel Usage Calculation

Assumed Boiler Efficiency	BTUs /lb of Steam generated (@15psig)	Equivalent mmBTUs Lost	Equivalent Therms of NG
73.5%	945.4	1,395	18,977

Total Trap Replacement Cost	$5,464

Savings Summary	
Electricity Usage (kWh):	**0**
Gas Savings (Therms):	**18,977**
Energy Savings (MMBTU Source):	**1,987**
Cost Savings ($):	**$ 11,961**
Emissions Reduction (lb CO2):	**231,229**
Cost Estimate ($):	**$ 5,464**
Simple payback:	**0.5**

Assumptions:

- Number of traps based on national averages. Cost of steam based on New Paltz NG rates and steam pressure
- 15% failed trap rate is the most conservative value from the DOE for plants without ongoing maintenance of steam traps.
- For further information refer to Steam Tip Sheet #1 - Inspect and Repair Steam Traps, published by the Department of Energy
- Cost of trap based on price listed in 2014 RS Means for 2" Thermostatic Trap
- Steam loss based on 15 psi steam and 0.25 in. dia. Orifice. Source: Repair Steam leaks publication from the New York State Energy Office, 1988
- Number of traps assumed to be all low pressure.
- Operating hours assume shutdown from April 15th to October 15
- Boiler Efficiency is based upon actual tested combustion efficiency, derated 10% for skin, condensate, and piping losses.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-LNC4	**Window AC Timer**

Equipment		
Cooling System Capacity:	10,000	Btu/hr
Existing Cooling System Efficiency:	1.20	kW/ton
No. of Window AC Units	56	

Utility Costs		
Electricity:	$0.090	kWh

Weather Data			Total Savings	
Avg (°F)	Existing Hours	Proposed Hours	Cooling Energy Savings (kWh)	Electric Energy Savings ($)
92.5	12	8	202	$18
87.5	98	69	1,646	$147
82.5	311	218	5,225	$468
77.5	391	274	6,569	$588
72.5	579	405	9,727	$871
67.5	774	542	13,003	$1,164
Total			**36,170**	**$3,239**

Savings Summary	
Electricity Savings (kWh):	**36,170**
Gas Savings (Therms):	**-**
Energy Savings (MMBTU Source):	**412.20**
Cost Savings ($):	**$ 3,239**
Emissions Reduction (lb CO_2):	**73,814**
Cost Estimate ($):	**$ 3,754**
Simple payback:	**1.2**

Assumptions:

- Energy savings calculated based on unit shutting off during unoccupied periods. A 30% reduction in operation hours due to occupancy controls has been assumed.

- Bin Hours are for unoccupied hours based on 7AM-7PM Mon-Fri occupancy.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M1	**Weatherization Upgrades - Summary**

Savings Summary	
Estimated Cost to Implement	$148,301
Site Electric Savings [kWh]	56,163
Site Heating Savings (therm)	29,314
Total Source Savings (MMBTU)	3,709
Cost Savings ($)	$ 31,161
Simple Payback [years]	4.76
Emissions Reduction (lb CO_2):	471,810

Utility Costs		
Electricity:	$0.107	/kWh
Natural Gas:	$0.858	/Therm

	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	56,163	$ 6,023
Natural Gas Consumption [therms / yr]	29,314	$ 25,139
Totals		**$ 31,161**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M1	**Door Weatherization**

Equipment	
Heating System Efficiency	78%
Cooling System COP	2.5

Weather Data		
Heating Degree Days	6,391	
Cooling Degree Days	2,666	
Average Wind Velocity	602	ft/min

Utility Costs		
Electricity:	0.107	$/kWh
Natural Gas:	0.858	$/therm

		Infiltration Openings (sq. in.)				Adjustment Factors			Energy Savings Calculations: Heating			Energy Savings Calculations: Cooling			Annual Cost Savings		
Building	Exterior Door Count	Threshold	Head	Jambs	Total Per.	Effectivness Opening	Fraction Infil. Avoidable	Fraction of Year Infil. Occurs	Typical Heat Loss Coeff (Btu/yr/in^2)	Typical Heating Energy Savings (MBtu/yr/Door)	Total Heating Energy Savings (Therms/yr)	Typical Infiltration Cooling Loss Constant (Btu/yr/in^2)	Typical Cooling Energy Savings (MBtu/yr/Door)	Total Cooling Energy Savings (kWh/yr)	Typical Heating Savings ($)	Typical Cooling Savings ($)	Total Savings ($)
Maintenance Warehouse	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Sojourner Truth Library	8	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	355	285,036	577	1,353.34	$304	$145	$450
College Hall, Shango Hall	32	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	1,419	285,036	577		$1,218	$0	$1,218
Van den berg Hall	18	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	798	285,036	577	3,045.01	$685	$327	$1,011
Capen Hall	3	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	133	285,036	577		$114	$0	$114
LeFevre Hall	5	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	222	285,036	577		$190	$0	$190
Dubois Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Deyo Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Scudder Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Bevier Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Bliss Hall	7	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	310	285,036	577		$266	$0	$266
Fine Arts Building	25	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	1,109	285,036	577	4,229	$951	$454	$1,405
Elting Gym	23	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	1,020	285,036	577	3,891	$875	$417	$1,292
Gage Hall	8	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	355	285,036	577		$304	$0	$304
Old Main	26	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	1,153	285,036	577	4,398	$989	$472	$1,461
Crispell Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577		$228	$0	$228
Bouton Hall	8	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	355	285,036	577	1,353	$304	$145	$450
South Classroom Building	8	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	355	285,036	577	1,353	$304	$145	$450
Old Library	4	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	177	285,036	577	677	$152	$73	$225
Child Care Center	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577	1,015	$228	$109	$337
Service Building	18	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	798	285,036	577		$685	$0	$685
Student Health Center	5	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	222	285,036	577	846	$190	$91	$281
Hopfer Alumni Center	9	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	399	285,036	577	1,523	$342	$163	$506
Faculty Office Building	8	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	355	285,036	577	1,353	$304	$145	$450
Smiley Arts Building	25	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	1,109	285,036	577	4,229	$951	$454	$1,405
Dorsky Museum	2	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	89	285,036	577	338	$76	$36	$112
McKenna Theatre	5	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	222	285,036	577	846	$190	$91	$281
Humanities	12	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	532	285,036	577	2,030	$457	$218	$674
Jacobson Faculty Tower	10	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	443	285,036	577	1,692	$381	$181	$562
Lenape Hall	6	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	266	285,036	577	1,015	$228	$109	$337
Esopus Hall	9	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	399	285,036	577	1,523	$342	$163	$506
Lecture Center	18	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	798	285,036	577	3,045	$685	$327	$1,011
Athletic Center	17	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	754	285,036	577	2,876	$647	$308	$955
Parker Theatre	10	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	443	285,036	577	1,692	$381	$181	$562
Student Union Building	20	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	887	285,036	577	3,383	$761	$363	$1,124
Coykendall Science Building	15	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	665	285,036	577	2,538	$571	$272	$843
Haggerty Admin Building	10	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	443	285,036	577	1,692	$381	$181	$562
Hasbrouck Dining Hall	20	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	887	285,036	577	3,383	$761	$363	$1,124
Resnick Engineering Hall	5	2.25	2.25	10.5	15	0.375	90%	100%	683,295	4,435	222	285,036	577	846	$190	$91	$281
Total Units	441										19,558			56,163			$22,803

Total Savings Summary	
Site Electricity Savings (kWh):	**56,163**
Site Gas Savings (Therms):	**19,558**
Source Energy Savings (MMBTU):	**2,688**
Cost Savings ($):	**$ 22,803**

Assumptions.

Typical Cooling Loss Coeff = specific heat of air (0.24 but/lb) x density of air (0.074,1 lb/ft3), avg. velocity of wind x degree cooling hours x 24 (hr/day) x 60 (min/hr) / 144 (in2/ft2)

Typical Heat Loss Coeff = specific heat of air (0.24 but/lb) x density of air (0.074,1 lb/ft3) x avg. velocity of wind x degree heating hours x 24 (hr/day) x 60 (min/hr) / 144 (in2/ft2)

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M1	**Window Weatherization**

Equipment	
Heating System Efficiency	78%
Cooling System COP	2.5

Weather Data		
Heating Degree Days	6,391	
Cooling Degree Days	2,666	
Average Wind Velocity	602	ft/min

Utility Costs		
Electricity:	0.107	$/kWh
Natural Gas:	0.858	$/therm

		Infiltration Openings (sq. in.)				Adjustment Factors			Energy Savings Calculations: Heating			Energy Savings Calculations: Cooling			Annual Cost Savings		
Building	Exterior Window Count	Threshold	Head	Jambs	Total Per.	Effectivness Opening	Fraction Infil. Avoidable	Fraction of Year Infil. Occurs	Typical Heat Loss Coeff (Btu/yr/in^2)	Typical Heating Energy Savings (MBtu/yr/ Window)	Total Heating Energy Savings (Therms/yr)	Typical Infiltration Cooling Loss Constant (Btu/yr/in^2)	Typical Cooling Energy Savings (MBtu/yr/ Window)	Total Cooling Energy Savings (kWh/yr)	Typical Heating Savings ($)	Typical Cooling Savings ($)	Total Savings ($)
College Hall, Shango Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Capen Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
LeFevre Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Dubois Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Deyo Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Scudder Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Bevier Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Bliss Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Gage Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Crispell Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Bouton Hall	20	0	0	0	15	0.375	90%	100%	683,295	4,435	887	285,036	577		$761	$0	$761
Total Units	220										9,757			-		$0	$8,371

Total Savings Summary	
Site Electricity Savings (kWh):	0
Site Gas Savings (Therms):	9,757
Source Energy Savings (MMBTU):	1,022
Cost Savings ($):	$ 8,371

Assumptions.

Typical Cooling Loss Coeff = specific heat of air (0.24 but/lb) x density of air (0.074,1 lb/ft3), avg. velocity of wind x degree cooling hours x 24 (hr/day) x 60 (min/hr) / 144 (in2/ft2)

Typical Heat Loss Coeff = specific heat of air (0.24 but/lb) x density of air (0.074,1 lb/ft3) x avg. velocity of wind x degree heating hours x 24 (hr/day) x 60 (min/hr) / 144 (in2/ft2)

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M2	**Water Conservation**

Utility Costs		
Electricity:	0.107	$/kWh
Natural Gas:	0.858	$/therm

Building	Annual Occupied Days	Full Time Occupants	Male Toilet Uses / Day	Male Urinal Uses / Day	Female Uses / Day	Lavatory Use (Min / use)	Existing Water Usage		Projected Water Usage		Hot Water Savings	
							Water Use, Gal	Annual (kGal)	Water Use, Gal	Annual (kGal)	Water Savings (kGal)	Energy Savings (MMBTU)
Maintenance Warehouse	251		4	0	4	0.25	4.7	0.0	2.0	0.0	0.0	0.0
Sojourner Truth Library	238		4	0	4	0.25	2.2	0.0	0.5	0.0	0.0	0.0
College Hall, Shango Hall	238	230	4	0	4	0.25	4.7	175	2.0	60	66.2	44.8
Van den berg Hall	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Capen Hall	238	178	4	0	4	0.25	4.7	136	2.0	47	51.3	34.0
LeFevre Hall	238	178	4	0	4	0.25	4.7	136	2.0	47	51.3	34.0
Dubois Hall	238	211	4	0	4	0.25	4.7	161	2.0	55	60.8	40.4
Deyo Hall	238	204	4	0	4	0.25	4.7	155	2.0	53	58.7	39.0
Scudder Hall	238	204	4	0	4	0.25	4.7	155	2.0	53	58.7	39.0
Bevier Hall	238	220	4	0	4	0.25	4.7	168	2.0	58	63.4	42.1
Bliss Hall	238	207	4	0	4	0.25	4.7	158	2.0	54	59.6	39.6
Fine Arts Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Elting Gym / Athletic Center	365	200	4	0	4	0.25	4.7	234	2.0	80	88.3	61.4
Gage Hall	238	322	4	0	4	0.25	4.7	245	2.0	84	92.7	61.6
Old Main	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Crispell Hall	238	207	4	0	4	0.25	4.7	158	2.0	54	59.6	39.6
Bouton Hall	238	293	4	0	4	0.25	4.7	223	2.0	77	84.4	56.0
South Classroom Building	238		4	4	4	0.25	4.7	0	2.0	0	0.0	0.0
Old Library	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Child Care Center	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Service Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Student Health Center	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Hopfer Alumni Center	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Faculty Office Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Smiley Arts Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Dorsky Museum	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
McKenna Theatre	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Humanities	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Jacobson Faculty Tower	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Lenape Hall	238	234	4	0	4	0.25	4.7	178	2.0	61	67.4	44.8
Esopus Hall	238	234	4	0	4	0.25	4.7	178	2.0	61	67.4	44.8
Lecture Center	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Athletic Center	238		4	0	4	0.25	4.7	0	2.0	0	0.0	0.0
Parker Theatre	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Student Union Building	238		0.25	0	0.25	0.25	2.2	0	0.5	0	0.0	0.0
Coykendall Science Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Haggerty Admin Building	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Hasbrouck Dining Hall	238		0.25	0	0.25	0.25	2.2	0	0.5	0	0.0	0.0
Resnick Engineering Hall	238		4	0	4	0.25	2.2	0	0.5	0	0.0	0.0
Faculty	238	423	4	0	4	0.25	2.2	221	0.5	50	85.5	59.4
Commuter Students	238	2,368	4	0	4	0.25	2.2	1,240	0.5	282	479.0	332.9
Total Units		**2,922**									**1,494.3**	**1,013.3**

Savings Summary	
Site Electricity Savings (kWh):	**0**
Site Gas Savings (Therms):	**10,133**
Energy Savings (MMBTU Source):	**1,061**
Cost Savings ($):	**$ 8,695**
Emissions Reduction (lb CO_2):	**123,476**
Cost Estimate ($):	**$ 32,541**
Simple payback:	**3.7**

Assumptions:

- Site water use based on floor plans, double occupancy
- Site Fixture count based on estimate from floor plan
- Residence Hall occupancy based on check-in and check-out dates for 2013-2014 Academic Calendar.
- Faculty savings calculated on 347 Full-time faculty and 302 part-time (transient) faculty. (Common Data Set 2013-2014 Instructional Faculty and Class Size)
- Commuter Students based on enrollment minus dormatory occupancy (Common Data Set 2013-2014 Instructional Faculty and Class Size)

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Reduced Campus Building AHU schedules**

Building	Prior Existing Conditions			Revised Conditions			Savings Summary		
	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Building Area (SF)	Heating Energy Savings (Therm/SF)	Electric Energy Savings (kWh/SF)
Coykendall Hall	138,510	101,079	241,877	126,968	88,863	234,665	21,057	0.58	0.89
Fine Arts Building	198,243	132,032	284,122	187,229	123,079	275,064	67,616	0.13	0.30
Service Building	13,917	10,408	22,349	12,061	9,125	19,030	8,674	0.15	0.60
Vandenberg Hall	145,494	32,017	70,736	136,400	29,155	69,352	88,441	0.03	0.12
Humanities Bldg	100,391	71,606	122,449	64,806	39,561	52,235	69,634	0.46	1.52
Parker Theatre	83,968	31,739	60,389	62,181	21,473	51,046	103,813	0.10	0.30
Student Union Bldg	215,590	58,837	45,417	154,461	44,215	38,997	15,755	0.93	4.29
Hasbrouck Dining Hall	87,296	26,852	45,918	71,760	21,091	41,127	70,778	0.08	0.29
Haggerty Admin Bldg	261,889	80,557	137,755	215,281	63,272	123,382	83,597	0.21	0.73
Totals	**1,245,297**	**545,128**	**1,031,011**	**1,031,148**	**439,834**	**904,898**	**529,365**	0.20	0.64

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

Building	Potential Energy Savings		
	Building Area (SF)	Heating Energy Savings (Therm)	Electric Energy Savings (kWh)
Resnick Engineering Building	30,015	5,970	19,293
Athletic Center	60366	12,007	38,802
Lecture Center	61,262	12,185	39,378
Smiley/Dorsky	68,035	13,533	43,731
Faculty Office Building	33,180	6,600	21,327
Student Health Center	11,787	2,345	7,576
Child Care Center	14,103	2,805	9,065
Old Library	67,500	13,426	43,387
South Classroom Building	5,906	1,175	3,796
Elting Gym	18,216	3,623	11,709
Sojourner Truth Library	110,983	22,075	71,337
Totals	**481,353**	**95,744**	**309,401**

Savings Summary	
Site Electricity Savings (kWh):	**649,663**
Site Gas Savings (Therms):	**201,038**
Energy Savings (MMBTU Source):	**28,452**
Cost Savings ($):	**$ 230,573**
Emissions Reduction (lb CO_2):	**3,775,433**
Cost Estimate ($):	**$ 945,590**
Simple payback:	**4.1**

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

- For new buildings, the same level of average savings per building area can be assumed in all other buildings.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Coykendall Science Building AHU schedule**

AHU details						
Unit:	AHU-1	AHU-2	AHU-3	AHU-5	AHU-7	Totals
Motor Nameplate Size	15	60	15	7.5	7.5	105
Calculated Air Flow: (cfm)	9,000	42,000	13,000	15,200	16,000	95,200
% Outdoor Air Flow:	100.0%	100.0%	100.0%	100.0%	100.0%	
Fan Static Efficiency: (%)	53%	53%	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	4.0	18.7	5.8	6.8	7.1	42
Calculated Fan Power: (kW)	2.99	13.95	4.32	5.05	5.31	32
Calculated OA Flow: (cfm)	9,000	42,000	13,000	15,200	16,000	95,200

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours				
Existing (AHUs):	6am	to	6pm	Sun-Sat
Proposed (all):	7am	to	6pm	Sun-Sat

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	379	-	4,026	12	36.3	379	-	4,026
85 to 90	87.5	95	37.3	3,004	-	34,776	95	37.3	3,004	-	34,776
80 to 85	82.5	256	35	8,096	-	75,699	256	35	8,096	-	75,699
75 to 80	77.5	286	32.3	9,044	-	60,945	284	32.3	8,981	-	60,519
70 to 75	72.5	337	30.1	10,657	-	49,129	327	30	10,341	-	46,671
65 to 70	67.5	386	26.8	12,207	-	17,301	364	26.5	11,511	-	12,974
60 to 65	62.5	449	24.3	14,199	-	-	401	23.9	12,681	-	-
55 to 60	57.5	400	21.6	12,649	6,591	-	364	21.4	11,511	5,998	-
50 to 55	52.5	381	18.4	12,048	8,789	-	343	18.2	10,847	7,912	-
45 to 50	47.5	295	16.4	9,329	8,749	-	271	16.3	8,570	8,037	-
40 to 45	42.5	381	14.5	12,048	13,811	-	347	14.4	10,973	12,578	-
35 to 40	37.5	298	12.7	9,424	12,766	-	256	12.6	8,096	10,967	-
30 to 35	32.5	231	10.8	7,305	11,419	-	206	10.8	6,514	10,183	-
25 to 30	27.5	163	8.8	5,155	9,132	-	140	8.7	4,427	7,843	-
20 to 25	22.5	153	7.2	4,838	9,580	-	126	7.1	3,985	7,889	-
15 to 20	17.5	92	5.5	2,909	6,367	-	80	5.5	2,530	5,536	-
10 to 15	12.5	61	3.8	1,929	4,623	-	58	3.8	1,834	4,396	-
5 to 10	7.5	46	2.6	1,455	3,790	-	41	2.6	1,297	3,378	-
0 to 5	2.5	32	1.3	1,012	2,847	-	24	1.3	759	2,135	-
-5 to 0	-2.5	13	0	411	1,242	-	11	0	348	1,051	-
-10 to -5	-7.5	6	-1.4	190	613		3	-1.3	95	306	
-15 to -10	-12.5	7	-2.6	221	761	-	6	-2.6	190	652	-
Totals		**4,380**	-	**138,510**	**101,079**	**241,877**	**4,015**	-	**126,968**	**88,863**	**234,665**

Savings Summary		
Fan Energy Savings (kWh, $):	**11,543**	**$1,039**
Heating Energy Savings (therm, $):	**12,216**	**$10,506**
Cooling Energy Savings (kWh, $):	**7,212**	**$649**
Total Cost Savings ($):	**$12,194**	
Estimated BAS Cost	**$43,750**	
Simple Payback	**3.6**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Fine Arts Building AHU schedule**

AHU details						
Unit:	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	Totals
Motor Nameplate Size	15	15	15	15	5	65
Calculated Air Flow: (cfm)	18,100	22,500	19,000	15,850	4,700	80,150
% Outdoor Air Flow:	100.0%	100.0%	100.0%	100.0%	100.0%	
Fan Static Efficiency: (%)	53%	53%	53%	53%	53%	
Total Static Pressure: (in)	1.70	1.70	1.70	1.70	1.70	
Calculated Fan Power: (BHP)	9.1	11.4	9.6	8.0	2.4	40
Calculated Fan Power: (kW)	6.81	8.47	7.15	5.97	1.77	30
Calculated OA Flow: (cfm)	18,100	22,500	19,000	15,850	4,700	80,150

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs		
Natural Gas:	$0.86	/ Therm
Electricity:	$0.09	/ kWh

Operational Hours				
Existing (AHUs):	6am	to	12am	Mon - Fri
Proposed (all):	6am	to	11pm	Mon - Fri

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	362	-	3,389	12	36.3	362	-	3,389
85 to 90	87.5	98	37.2	2,957	-	29,951	98	37.2	2,957	-	29,951
80 to 85	82.5	311	35.2	9,384	-	79,027	311	35.2	9,384	-	79,027
75 to 80	77.5	383	32.5	11,557	-	70,686	379	32.4	11,436	-	68,971
70 to 75	72.5	501	30.6	15,117	-	67,944	481	30.5	14,514	-	63,993
65 to 70	67.5	594	27.5	17,923	-	33,125	559	27.4	16,867	-	29,734
60 to 65	62.5	686	24.6	20,699	-	-	645	24.5	19,462	-	-
55 to 60	57.5	638	21.9	19,251	8,850	-	597	21.8	18,014	8,282	-
50 to 55	52.5	583	18.9	17,591	11,322	-	544	18.8	16,415	10,565	-
45 to 50	47.5	465	16.7	14,031	11,611	-	434	16.6	13,095	10,837	-
40 to 45	42.5	555	14.6	16,747	16,938	-	528	14.5	15,932	16,114	-
35 to 40	37.5	499	12.6	15,057	17,998	-	464	12.6	14,001	16,735	-
30 to 35	32.5	382	10.9	11,526	15,897	-	347	10.8	10,470	14,441	-
25 to 30	27.5	231	8.8	6,970	10,895	-	217	8.8	6,548	10,235	-
20 to 25	22.5	233	7.2	7,031	12,282	-	217	7.1	6,548	11,439	-
15 to 20	17.5	151	5.5	4,556	8,798	-	142	5.5	4,285	8,273	-
10 to 15	12.5	93	3.8	2,806	5,934	-	87	3.8	2,625	5,552	-
5 to 10	7.5	75	2.5	2,263	5,202	-	70	2.5	2,112	4,855	-
0 to 5	2.5	46	1.2	1,388	3,446	-	43	1.2	1,297	3,221	-
-5 to 0	-2.5	19	0	573	1,529	-	16	0	483	1,287	-
-10 to -5	-7.5	8	-1.4	241	688		7	-1.4	211	602	
-15 to -10	-12.5	7	-2.6	211	641	-	7	-2.6	211	641	-
Totals		**6,570**	-	**198,243**	**132,032**	**284,122**	**6,205**	-	**187,229**	**123,079**	**275,064**

Savings Summary		
Fan Energy Savings (kWh, $):	**11,013**	**$991**
Heating Energy Savings (therm, $):	**8,953**	**$7,700**
Cooling Energy Savings (kWh, $):	**9,057**	**$815**
Total Cost Savings ($):	**$9,506**	
Estimated BAS Cost	**$43,750**	
Simple Payback	**4.6**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Service Building AHU schedule**

AHU details				
Unit:	HV-1	AC-1	AC-2	Totals
Motor Nameplate Size	3	2	2	7
Calculated Air Flow: (cfm)	4,500	3,000	3,000	10,500
% Outdoor Air Flow:	100.0%	100.0%	100.0%	
Fan Static Efficiency: (%)	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	2.0	1.3	1.3	5
Calculated Fan Power: (kW)	1.49	1.00	1.00	3
Calculated OA Flow: (cfm)	4,500	3,000	3,000	10,500

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs		
Natural Gas:	$0.86	/ Therm
Electricity:	$0.09	/ kWh

Operational Hours				
Existing (AHUs):	5am	to	8pm	Mon - Fri
Proposed (all):	5am	to	6pm	Mon - Fri

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	4	36.3	14	-	148	4	36.3	14	-	148
85 to 90	87.5	60	37.5	209	-	2,463	59	37.6	206	-	2,442
80 to 85	82.5	213	35.2	743	-	7,091	181	34.9	631	-	5,842
75 to 80	77.5	258	32.3	900	-	6,064	212	32.2	739	-	4,911
70 to 75	72.5	273	30.2	952	-	4,482	230	30.1	802	-	3,698
65 to 70	67.5	353	27.1	1,231	-	2,102	316	27.2	1,102	-	1,989
60 to 65	62.5	421	24.3	1,468	-	-	357	24.4	1,245	-	-
55 to 60	57.5	379	21.9	1,322	689	-	327	21.9	1,141	594	-
50 to 55	52.5	368	18.8	1,284	936	-	327	18.7	1,141	832	-
45 to 50	47.5	281	16.5	980	919	-	230	16.5	802	752	-
40 to 45	42.5	361	14.5	1,259	1,443	-	316	14.6	1,102	1,263	-
35 to 40	37.5	282	12.8	984	1,332	-	247	12.8	862	1,167	-
30 to 35	32.5	215	10.8	750	1,172	-	187	10.8	652	1,020	-
25 to 30	27.5	143	9	499	884	-	129	9.1	450	797	-
20 to 25	22.5	145	7.2	506	1,001	-	131	7.3	457	905	-
15 to 20	17.5	88	5.6	307	672	-	72	5.6	251	550	-
10 to 15	12.5	46	3.7	160	385	-	41	3.7	143	343	-
5 to 10	7.5	50	2.5	174	454	-	42	2.6	146	382	-
0 to 5	2.5	30	1.3	105	294	-	30	1.3	105	294	-
-5 to 0	-2.5	7	0.1	24	74	-	7	0.1	24	74	-
-10 to -5	-7.5	5	-1.4	17	56		5	-1.4	17	56	
-15 to -10	-12.5	8	-2.6	28	96	-	8	-2.6	28	96	-
Totals		**3,990**	**-**	**13,917**	**10,408**	**22,349**	**3,458**	**-**	**12,061**	**9,125**	**19,030**

Savings Summary		
Fan Energy Savings (kWh, $):	**1,856**	**$167**
Heating Energy Savings (therm, $):	**1,283**	**$1,104**
Cooling Energy Savings (kWh, $):	**3,320**	**$299**
Total Cost Savings ($):	**$1,569**	
Estimated BAS Cost	**$26,250**	
Simple Payback	**16.7**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Vandenberg Hall**

AHU details						
Unit:	AHU-2	AHU-3	AHU-4	AHU-5	AHU-6	Totals
Motor Nameplate Size	15	15	15	15	15	75
Calculated Air Flow: (cfm)	15,000	15,000	15,000	15,000	15,000	75,000
% Outdoor Air Flow:	29.3%	29.3%	29.3%	29.3%	29.3%	n/a
Fan Static Efficiency: (%)	53%	53%	53%	53%	53%	n/a
Total Static Pressure: (in)	1.5	1.5	1.5	1.5	1.5	n/a
Calculated Fan Power: (BHP)	6.7	6.7	6.7	6.7	6.7	33
Calculated Fan Power: (kW)	4.98	4.98	4.98	4.98	4.98	25
Calculated OA Flow: (cfm)	4,395	4,395	4,395	4,395	4,395	21,975

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours				
Existing:	5am	to	9pm	Sun-Sat
Proposed:	6am	to	9pm	Sun-Sat

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	299	-	929	12	36.3	299	-	929
85 to 90	87.5	98	37.2	2,442	-	8,212	98	37.2	2,442	-	8,212
80 to 85	82.5	307	35.2	7,648	-	21,388	307	35.2	7,648	-	21,388
75 to 80	77.5	368	32.3	9,168	-	18,101	368	32.3	9,168	-	18,101
70 to 75	72.5	442	30.4	11,012	-	15,810	430	30.3	10,713	-	15,077
65 to 70	67.5	505	27.1	12,581	-	6,295	480	27	11,958	-	5,644
60 to 65	62.5	595	24.4	14,823	-	-	562	24.3	14,001	-	-
55 to 60	57.5	560	21.8	13,951	2,130	-	516	21.7	12,855	1,963	-
50 to 55	52.5	509	18.8	12,681	2,710	-	468	18.6	11,659	2,492	-
45 to 50	47.5	403	16.6	10,040	2,759	-	383	16.5	9,542	2,622	-
40 to 45	42.5	505	14.6	12,581	4,226	-	468	14.5	11,659	3,916	-
35 to 40	37.5	437	12.6	10,887	4,321	-	394	12.6	9,816	3,896	-
30 to 35	32.5	319	10.9	7,947	3,640	-	287	10.8	7,150	3,275	-
25 to 30	27.5	216	8.8	5,381	2,793	-	195	8.8	4,858	2,522	-
20 to 25	22.5	212	7.2	5,282	3,064	-	187	7.1	4,659	2,703	-
15 to 20	17.5	131	5.5	3,264	2,093	-	122	5.5	3,039	1,949	-
10 to 15	12.5	78	3.8	1,943	1,365	-	73	3.8	1,819	1,277	-
5 to 10	7.5	69	2.5	1,719	1,312	-	63	2.5	1,570	1,198	-
0 to 5	2.5	43	1.3	1,071	883	-	36	1.2	897	739	-
-5 to 0	-2.5	14	0	349	309	-	13	0	324	287	-
-10 to -5	-7.5	9	-1.4	224	212		6	-1.4	149	141	-
-15 to -10	-12.5	8	-2.6	199	201	-	7	-2.6	174	176	-
Totals		**5,840**	-	**145,494**	**32,017**	**70,736**	**5,475**	-	**136,400**	**29,155**	**69,352**

Savings Summary		
Fan Energy Savings (kWh, $):	**9,093**	**$818**
Heating Energy Savings (therm, $):	**2,862**	**$2,462**
Cooling Energy Savings (kWh, $):	**1,384**	**$125**
Total Cost Savings ($):	**$3,405**	
Estimated BAS Cost	**$43,750**	
Simple Payback	**12.9**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Humanities Building AHU schedule**

AHU details				
Unit:	HS-1	HS-3	HS-4	Totals
Motor Nameplate Size	10	1	10	21
Calculated Air Flow: (cfm)	14,000	1,500	13,000	28,500
% Outdoor Air Flow:	100.0%	100.0%	100.0%	
Fan Static Efficiency: (%)	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	6.2	0.7	5.8	13
Calculated Fan Power: (kW)	4.65	0.50	4.32	9
Calculated OA Flow: (cfm)	14,000	1,500	13,000	28,500

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours				
Existing (AHUs):	12am	to	12am	Sun-Sat
Proposed (all):	6am	to	10pm	M-F
Proposed (all):	7am	to	10pm	Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	114	-	1,205	12	36.3	114	-	613
85 to 90	87.5	98	37.2	928	-	10,650	98	37.2	928	-	5,418
80 to 85	82.5	311	35.2	2,944	-	28,101	310	35.2	2,935	-	14,251
75 to 80	77.5	391	32.6	3,702	-	26,018	374	32.4	3,541	-	12,313
70 to 75	72.5	579	31	5,481	-	30,042	452	30.4	4,279	-	10,668
65 to 70	67.5	774	28.2	7,328	-	20,311	517	27.2	4,894	-	4,493
60 to 65	62.5	911	25.2	8,624	-	-	588	24.3	5,567	-	-
55 to 60	57.5	885	22.3	8,378	4,365	-	550	21.7	5,207	2,570	-
50 to 55	52.5	837	19.4	7,924	5,780	-	496	18.6	4,696	3,245	-
45 to 50	47.5	604	17	5,718	5,363	-	398	16.5	3,768	3,348	-
40 to 45	42.5	756	14.9	7,157	8,204	-	486	14.5	4,601	4,996	-
35 to 40	37.5	747	12.8	7,072	9,580	-	423	12.6	4,005	5,139	-
30 to 35	32.5	553	10.9	5,235	8,183	-	306	10.8	2,897	4,290	-
25 to 30	27.5	374	9	3,541	6,272	-	203	8.7	1,922	3,225	-
20 to 25	22.5	337	7.3	3,190	6,317	-	193	7.1	1,827	3,427	-
15 to 20	17.5	214	5.6	2,026	4,434	-	128	5.5	1,212	2,512	-
10 to 15	12.5	127	3.9	1,202	2,882	-	76	3.8	719	1,634	-
5 to 10	7.5	110	2.6	1,041	2,713	-	67	2.5	634	1,565	-
0 to 5	2.5	77	1.2	729	2,051	-	38	1.2	360	959	-
-5 to 0	-2.5	33	0	312	944	-	14	0	133	379	-
-10 to -5	-7.5	20	-1.4	189	612		5	-1.4	47	145	
-15 to -10	-12.5	10	-2.6	95	326	-	7	-2.6	66	216	-
Totals		**8,760**	**-**	**82,931**	**68,026**	**116,326**	**5,741**	**-**	**54,350**	**37,652**	**47,757**

Savings Summary		
Fan Energy Savings (kWh, $):	**28,581**	**$2,572**
Heating Energy Savings (therm, $):	**30,374**	**$26,122**
Cooling Energy Savings (kWh, $):	**68,570**	**$6,171**
Total Cost Savings ($):	**$34,865**	
Estimated BAS Cost	**$26,250**	
Simple Payback	**0.8**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Humanities Building AHU schedule**

AHU details			
Unit:	HS-5	HS-6	Totals
Motor Nameplate Size	2	2	4
Calculated Air Flow: (cfm)	3,000	3,000	6,000
% Outdoor Air Flow:	50.0%	50.0%	
Fan Static Efficiency: (%)	53%	53%	
Total Static Pressure: (in)	1.50	1.50	
Calculated Fan Power: (BHP)	1.3	1.3	3
Calculated Fan Power: (kW)	1.00	1.00	2
Calculated OA Flow: (cfm)	1,500	1,500	3,000

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours				
Existing (AHUs):	12am	to	12am	Sun-Sat
Proposed (all):	6am	to	10pm	M-F
Proposed (all):	7am	to	5pm	Sat-Sun

Weather Data		Existing Conditions					Proposed Conditions				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	24	-	63	11	36.2	22	-	58
85 to 90	87.5	98	37.2	195	-	561	92	37.3	183	-	531
80 to 85	82.5	311	35.2	620	-	1,479	286	35.3	570	-	1,374
75 to 80	77.5	391	32.6	779	-	1,369	342	32.4	682	-	1,165
70 to 75	72.5	579	31	1,154	-	1,581	398	30.3	793	-	953
65 to 70	67.5	774	28.2	1,543	-	1,069	468	27.1	933	-	398
60 to 65	62.5	911	25.2	1,816	-	-	549	24.3	1,094	-	-
55 to 60	57.5	885	22.3	1,764	230	-	504	21.7	1,005	131	-
50 to 55	52.5	837	19.4	1,668	304	-	457	18.7	911	166	-
45 to 50	47.5	604	17	1,204	282	-	371	16.5	739	173	-
40 to 45	42.5	756	14.9	1,507	432	-	453	14.5	903	259	-
35 to 40	37.5	747	12.8	1,489	504	-	371	12.6	739	250	-
30 to 35	32.5	553	10.9	1,102	431	-	277	10.8	552	216	-
25 to 30	27.5	374	9	745	330	-	186	8.8	371	164	-
20 to 25	22.5	337	7.3	672	332	-	172	7.2	343	170	-
15 to 20	17.5	214	5.6	427	233	-	120	5.5	239	131	-
10 to 15	12.5	127	3.9	253	152	-	69	3.8	138	82	-
5 to 10	7.5	110	2.6	219	143	-	59	2.5	118	77	-
0 to 5	2.5	77	1.2	153	108	-	36	1.2	72	50	-
-5 to 0	-2.5	33	0	66	50	-	13	0	26	20	-
-10 to -5	-7.5	20	-1.4	40	32		5	-1.4	10	8	
-15 to -10	-12.5	10	-2.6	20	17	-	7	-2.6	14	12	-
Totals		**8,760**	**-**	**17,459**	**3,580**	**6,122**	**5,246**	**-**	**10,456**	**1,909**	**4,478**

Savings Summary		
Fan Energy Savings (kWh, $):	**7,004**	**$630**
Heating Energy Savings (therm, $):	**1,671**	**$1,437**
Cooling Energy Savings (kWh, $):	**1,645**	**$148**
Total Cost Savings ($):	**$2,216**	
Estimated BAS Cost	**$17,500**	
Simple Payback	**7.9**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Parker Theater AHU schedule**

AHU details					
Unit:	AC-1	AC-2	AC-4	AC-5	Totals
Motor Nameplate Size	1	1	8	2	11
Calculated Air Flow: (cfm)	1,050	1,500	11,250	3,000	16,800
% Outdoor Air Flow:	50.0%	50.0%	50.0%	50.0%	
Fan Static Efficiency: (%)	53%	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.75	1.4	
Calculated Fan Power: (BHP)	0.5	0.7	5.8	1.2	8
Calculated Fan Power: (kW)	0.35	0.50	4.36	0.93	6
Calculated OA Flow: (cfm)	525	750	5,625	1,500	8,400

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours				
Existing (AHUs):	6am	to	12am	Sun-Sat
Proposed (all):	7am	to	11pm	Sun-Sat

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	74	-	355	12	36.3	74	-	355
85 to 90	87.5	98	37.2	601	-	3,139	98	37.2	601	-	3,139
80 to 85	82.5	311	35.2	1,909	-	8,282	310	35.2	1,902	-	8,256
75 to 80	77.5	383	32.5	2,350	-	7,408	368	32.3	2,258	-	6,919
70 to 75	72.5	501	30.6	3,075	-	7,121	440	30.3	2,700	-	5,897
65 to 70	67.5	594	27.5	3,645	-	3,472	504	27.1	3,093	-	2,401
60 to 65	62.5	686	24.6	4,210	-	-	573	24.3	3,516	-	-
55 to 60	57.5	638	21.9	3,915	928	-	531	21.7	3,259	772	-
50 to 55	52.5	583	18.9	3,578	1,187	-	482	18.6	2,958	981	-
45 to 50	47.5	465	16.7	2,854	1,217	-	390	16.5	2,393	1,021	-
40 to 45	42.5	555	14.6	3,406	1,775	-	476	14.5	2,921	1,522	-
35 to 40	37.5	499	12.6	3,062	1,886	-	410	12.6	2,516	1,550	-
30 to 35	32.5	382	10.9	2,344	1,666	-	295	10.8	1,810	1,287	-
25 to 30	27.5	231	8.8	1,418	1,142	-	193	8.7	1,184	954	-
20 to 25	22.5	233	7.2	1,430	1,287	-	187	7.1	1,148	1,033	-
15 to 20	17.5	151	5.5	927	922	-	122	5.5	749	745	-
10 to 15	12.5	93	3.8	571	622	-	74	3.8	454	495	-
5 to 10	7.5	75	2.5	460	545	-	65	2.5	399	473	-
0 to 5	2.5	46	1.2	282	361	-	37	1.2	227	290	-
-5 to 0	-2.5	19	0	117	160	-	13	0	80	110	-
-10 to -5	-7.5	8	-1.4	49	72		5	-1.4	31	45	
-15 to -10	-12.5	7	-2.6	43	67	-	7	-2.6	43	67	-
Totals		**6,570**	-	**40,320**	**13,837**	**29,777**	**5,592**	-	**34,318**	**11,344**	**26,968**

Savings Summary		
Fan Energy Savings (kWh, $):	**6,002**	**$540**
Heating Energy Savings (therm, $):	**2,493**	**$2,144**
Cooling Energy Savings (kWh, $):	**2,809**	**$253**
Total Cost Savings ($):	**$2,937**	
Estimated BAS Cost	**$35,000**	
Simple Payback	**11.9**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Parker Theater AHU schedule**

AHU details		
Unit:	AC-3	Totals
Motor Nameplate Size	10	
Calculated Air Flow: (cfm)	15,000	15,000
% Outdoor Air Flow:	50.0%	50%
Fan Static Efficiency: (%)	53%	53%
Total Static Pressure: (in)	1.5	1.5
Calculated Fan Power: (BHP)	6.7	7
Calculated Fan Power: (kW)	4.98	5
Calculated OA Flow: (cfm)	7500	7,500

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours	
Existing:	5am-11pm M-F / 5am-12am Sat-Sun
Proposed:	6am-9pm M-F / 7am-10pm Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	60	-	317	12	36.3	60	-	317
85 to 90	87.5	98	37.2	488	-	2,803	98	37.2	488	-	2,803
80 to 85	82.5	311	35.2	1,550	-	7,395	310	35.2	1,545	-	7,371
75 to 80	77.5	391	32.6	1,948	-	6,847	368	32.3	1,834	-	6,178
70 to 75	72.5	579	31	2,885	-	7,906	440	30.3	2,192	-	5,266
65 to 70	67.5	774	28.2	3,857	-	5,345	504	27.1	2,511	-	2,144
60 to 65	62.5	911	25.2	4,539	-	-	573	24.3	2,855	-	-
55 to 60	57.5	885	22.3	4,410	1,149	-	531	21.7	2,646	689	-
50 to 55	52.5	837	19.4	4,170	1,521	-	482	18.6	2,402	876	-
45 to 50	47.5	604	17	3,010	1,411	-	390	16.5	1,943	911	-
40 to 45	42.5	756	14.9	3,767	2,159	-	476	14.5	2,372	1,359	-
35 to 40	37.5	747	12.8	3,722	2,521	-	410	12.6	2,043	1,384	-
30 to 35	32.5	553	10.9	2,755	2,154	-	295	10.8	1,470	1,149	-
25 to 30	27.5	374	9	1,864	1,651	-	193	8.7	962	852	-
20 to 25	22.5	337	7.3	1,679	1,662	-	187	7.1	932	922	-
15 to 20	17.5	214	5.6	1,066	1,167	-	122	5.5	608	665	-
10 to 15	12.5	127	3.9	633	758	-	74	3.8	369	442	-
5 to 10	7.5	110	2.6	548	714	-	65	2.5	324	422	-
0 to 5	2.5	77	1.2	384	540	-	37	1.2	184	259	-
-5 to 0	-2.5	33	0	164	248	-	13	0	65	98	-
-10 to -5	-7.5	20	-1.4	100	161	-	5	-1.4	25	40	-
-15 to -10	-12.5	10	-2.6	50	86	-	7	-2.6	35	60	-
Totals		**8,760**	-	**43,648**	**17,902**	**30,612**	**5,592**	-	**27,863**	**10,129**	**24,078**

Savings Summary		
Fan Energy Savings (kWh, $):	**15,785**	**$1,421**
Heating Energy Savings (therm, $):	**7,773**	**$6,684**
Cooling Energy Savings (kWh, $):	**6,534**	**$588**
Total Cost Savings ($):	**$8,693**	
Estimated BAS Cost	**$8,750**	
Simple Payback	**1.0**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Student Union, AC-1**

AHU details		
Unit:	AC-1	Totals
Motor Nameplate Size	30	
Calculated Air Flow: (cfm)	30,000	30,000
% Outdoor Air Flow:	12.0%	12%
Fan Static Efficiency: (%)	53%	53%
Total Static Pressure: (in)	1.5	1.5
Calculated Fan Power: (BHP)	13.4	13
Calculated Fan Power: (kW)	9.97	10
Calculated OA Flow: (cfm)	3600	3,600

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.373	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours	
Existing:	5am-11pm M-F / 5am-12am Sat-Sun
Proposed:	6am-9pm M-F / 7am-10pm Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	120	-	66	12	36.3	120	-	66
85 to 90	87.5	98	37.2	977	-	586	98	37.2	977	-	586
80 to 85	82.5	311	35.2	3,099	-	1,547	307	35.2	3,059	-	1,527
75 to 80	77.5	380	32.4	3,787	-	1,353	371	32.4	3,697	-	1,321
70 to 75	72.5	502	30.7	5,003	-	1,358	433	30.3	4,315	-	1,084
65 to 70	67.5	591	27.5	5,890	-	645	487	27	4,853	-	409
60 to 65	62.5	689	24.6	6,866	-	-	560	24.2	5,581	-	-
55 to 60	57.5	652	21.9	6,497	406	-	518	21.7	5,162	323	-
50 to 55	52.5	598	18.9	5,959	522	-	467	18.6	4,654	407	-
45 to 50	47.5	461	16.7	4,594	517	-	381	16.5	3,797	427	-
40 to 45	42.5	571	14.6	5,690	783	-	462	14.4	4,604	633	-
35 to 40	37.5	517	12.7	5,152	838	-	396	12.6	3,946	642	-
30 to 35	32.5	385	10.9	3,837	720	-	286	10.8	2,850	535	-
25 to 30	27.5	242	8.8	2,412	513	-	196	8.7	1,953	415	-
20 to 25	22.5	248	7.2	2,471	587	-	185	7.1	1,844	438	-
15 to 20	17.5	154	5.5	1,535	403	-	120	5.5	1,196	314	-
10 to 15	12.5	93	3.9	927	267	-	71	3.8	708	203	-
5 to 10	7.5	78	2.5	777	243	-	65	2.5	648	203	-
0 to 5	2.5	51	1.2	508	172	-	35	1.2	349	118	-
-5 to 0	-2.5	18	0	179	65	-	13	0	130	47	-
-10 to -5	-7.5	10	-1.4	100	39	-	5	-1.4	50	19	-
-15 to -10	-12.5	8	-2.6	80	33	-	7	-2.6	70	29	-
Totals		**6,669**	-	**66,459**	**6,105**	**5,555**	**5,475**	-	**54,560**	**4,753**	**4,993**

Savings Summary		
Fan Energy Savings (kWh, $):	**11,899**	**$1,071**
Heating Energy Savings (therm, $):	**1,352**	**$1,163**
Cooling Energy Savings (kWh, $):	**562**	**$51**
Total Cost Savings ($):	**$2,285**	
Estimated BAS Cost	**$8,750**	
Simple Payback	**3.8**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Student Union, AC-2**

AHU details		
Unit:	AC-2	Totals
Motor Nameplate Size	10	
Calculated Air Flow: (cfm)	10,000	10,000
% Outdoor Air Flow:	12.0%	12%
Fan Static Efficiency: (%)	53%	53%
Total Static Pressure: (in)	1.5	1.5
Calculated Fan Power: (BHP)	4.5	4.5
Calculated Fan Power: (kW)	3.32	3.3
Calculated OA Flow: (cfm)	1200	1,200

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.373	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours	
Existing:	24 hours, 7 days/week
Proposed:	7am-7pm M-F / Off Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	40	-	22	4	36.3	13	-	7
85 to 90	87.5	98	37.2	326	-	195	60	37.5	199	-	123
80 to 85	82.5	311	35.2	1,033	-	516	199	35.1	661	-	327
75 to 80	77.5	391	32.6	1,299	-	477	239	32.2	794	-	276
70 to 75	72.5	579	31	1,923	-	551	242	29.9	804	-	186
65 to 70	67.5	774	28.2	2,571	-	373	294	26.6	977	-	62
60 to 65	62.5	911	25.2	3,026	-	-	330	23.8	1,096	-	-
55 to 60	57.5	885	22.3	2,940	184	-	291	21.6	967	60	-
50 to 55	52.5	837	19.4	2,780	243	-	288	18.3	957	84	-
45 to 50	47.5	604	17	2,006	226	-	227	16.3	754	85	-
40 to 45	42.5	756	14.9	2,511	345	-	293	14.4	973	134	-
35 to 40	37.5	747	12.8	2,481	403	-	191	12.6	634	103	-
30 to 35	32.5	553	10.9	1,837	345	-	164	10.8	545	102	-
25 to 30	27.5	374	9	1,242	264	-	98	8.8	326	69	-
20 to 25	22.5	337	7.3	1,119	266	-	99	7	329	78	-
15 to 20	17.5	214	5.6	711	187	-	67	5.5	223	58	-
10 to 15	12.5	127	3.9	422	121	-	42	3.7	140	40	-
5 to 10	7.5	110	2.6	365	114	-	34	2.5	113	35	-
0 to 5	2.5	77	1.2	256	86	-	17	1.2	56	19	-
-5 to 0	-2.5	33	0	110	40	-	6	0.1	20	7	-
-10 to -5	-7.5	20	-1.4	66	26	-	1	-1.2	3	1	-
-15 to -10	-12.5	10	-2.6	33	14	-	6	-2.6	20	8	-
Totals		**8,760**	-	**29,099**	**2,864**	**2,134**	**3,192**	-	**10,603**	**885**	**980**

Savings Summary		
Fan Energy Savings (kWh, $):	**18,496**	**$1,665**
Heating Energy Savings (therm, $):	**1,979**	**$1,702**
Cooling Energy Savings (kWh, $):	**1,154**	**$104**
Total Cost Savings ($):	**$3,470**	
Estimated BAS Cost	**$8,750**	
Simple Payback	**2.5**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Student Union, AC-3**

AHU details		
Unit:	AC-3	Totals
Motor Nameplate Size	15	
Calculated Air Flow: (cfm)	15,000	15,000
% Outdoor Air Flow:	12.0%	12%
Fan Static Efficiency: (%)	53%	53%
Total Static Pressure: (in)	2.0	2
Calculated Fan Power: (BHP)	8.9	9
Calculated Fan Power: (kW)	6.64	7
Calculated OA Flow: (cfm)	1800	1,800

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.373	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours	
Existing:	6am-12am, 7 days/week
Proposed:	6am-9pm M-F / Off Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	80	-	33	4	36.3	27	-	11
85 to 90	87.5	98	37.2	651	-	293	60	37.5	399	-	184
80 to 85	82.5	311	35.2	2,066	-	773	217	35.2	1,442	-	540
75 to 80	77.5	383	32.5	2,544	-	692	271	32.3	1,800	-	476
70 to 75	72.5	501	30.6	3,328	-	665	288	30.2	1,913	-	353
65 to 70	67.5	594	27.5	3,946	-	324	357	27.1	2,372	-	159
60 to 65	62.5	686	24.6	4,557	-	-	424	24.2	2,817	-	-
55 to 60	57.5	638	21.9	4,239	199	-	383	21.8	2,544	119	-
50 to 55	52.5	583	18.9	3,873	254	-	361	18.7	2,398	157	-
45 to 50	47.5	465	16.7	3,089	261	-	290	16.5	1,927	163	-
40 to 45	42.5	555	14.6	3,687	380	-	357	14.5	2,372	245	-
35 to 40	37.5	499	12.6	3,315	404	-	275	12.6	1,827	223	-
30 to 35	32.5	382	10.9	2,538	357	-	206	10.8	1,369	193	-
25 to 30	27.5	231	8.8	1,535	245	-	133	8.9	884	141	-
20 to 25	22.5	233	7.2	1,548	276	-	133	7.2	884	157	-
15 to 20	17.5	151	5.5	1,003	198	-	94	5.5	624	123	-
10 to 15	12.5	93	3.8	618	133	-	46	3.7	306	66	-
5 to 10	7.5	75	2.5	498	117	-	47	2.5	312	73	-
0 to 5	2.5	46	1.2	306	77	-	27	1.2	179	45	-
-5 to 0	-2.5	19	0	126	34	-	7	0.1	47	13	-
-10 to -5	-7.5	8	-1.4	53	15	-	3	-1.4	20	6	-
-15 to -10	-12.5	7	-2.6	47	14	-	7	-2.6	47	14	-
Totals		**6,570**	-	**43,648**	**2,965**	**2,780**	**3,990**	-	**26,508**	**1,738**	**1,722**

Savings Summary		
Fan Energy Savings (kWh, $):	**17,140**	**$1,543**
Heating Energy Savings (therm, $):	**1,227**	**$1,055**
Cooling Energy Savings (kWh, $):	**1,058**	**$95**
Total Cost Savings ($):	**$2,693**	
Estimated BAS Cost	**$8,750**	
Simple Payback	**3.2**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Student Union, AC-4, HV-1,2**

AHU details				
Unit:	AC-4	HV-1	HV-2	Totals
Motor Nameplate Size	5	7.5	5	
Calculated Air Flow: (cfm)	7,500	11,250	7,500	26,250
% Outdoor Air Flow:	12.0%	100.0%	100.0%	75%
Fan Static Efficiency: (%)	53%	53%	53%	53%
Total Static Pressure: (in)	1.5	1.5	1.5	5
Calculated Fan Power: (BHP)	3.3	5.0	3.3	12
Calculated Fan Power: (kW)	2.49	3.74	2.49	9
Calculated OA Flow: (cfm)	900	11,250	7,500	19,650

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.373	kW/ton
Heating System Efficiency:	78%	

Utility Costs	
Natural Gas:	$0.86 / Therm
Electricity:	$0.09 / kWh

Operational Hours	
Existing:	24 hours, 7 days/week
Proposed:	4am-12am M-F / 4am-11pm Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	105	-	362	12	36.3	105	-	362
85 to 90	87.5	98	37.2	855	-	3,199	98	37.2	855	-	3,199
80 to 85	82.5	311	35.2	2,712	-	8,442	311	35.2	2,712	-	8,442
75 to 80	77.5	391	32.6	3,409	-	7,816	383	32.5	3,340	-	7,551
70 to 75	72.5	579	31	5,049	-	9,025	514	30.7	4,482	-	7,588
65 to 70	67.5	774	28.2	6,749	-	6,102	639	27.7	5,572	-	4,158
60 to 65	62.5	911	25.2	7,944	-	-	745	24.8	6,496	-	-
55 to 60	57.5	885	22.3	7,717	3,010	-	713	22.1	6,217	2,425	-
50 to 55	52.5	837	19.4	7,298	3,985	-	653	19.1	5,694	3,109	-
45 to 50	47.5	604	17	5,267	3,698	-	500	16.8	4,360	3,061	-
40 to 45	42.5	756	14.9	6,592	5,656	-	623	14.7	5,432	4,661	-
35 to 40	37.5	747	12.8	6,514	6,605	-	574	12.7	5,005	5,076	-
30 to 35	32.5	553	10.9	4,822	5,642	-	437	10.9	3,810	4,459	-
25 to 30	27.5	374	9	3,261	4,325	-	271	8.9	2,363	3,134	-
20 to 25	22.5	337	7.3	2,939	4,355	-	271	7.2	2,363	3,502	-
15 to 20	17.5	214	5.6	1,866	3,057	-	170	5.6	1,482	2,428	-
10 to 15	12.5	127	3.9	1,107	1,987	-	101	3.9	881	1,580	-
5 to 10	7.5	110	2.6	959	1,871	-	84	2.5	732	1,428	-
0 to 5	2.5	77	1.2	671	1,414	-	59	1.2	514	1,084	-
-5 to 0	-2.5	33	0	288	651	-	20	0	174	395	-
-10 to -5	-7.5	20	-1.4	174	422	-	14	-1.4	122	295	-
-15 to -10	-12.5	10	-2.6	87	224	-	9	-2.6	78	202	-
Totals		**8,760**	-	**76,384**	**46,902**	**34,947**	**7,201**	-	**62,790**	**36,839**	**31,301**

Savings Summary		
Fan Energy Savings (kWh, $):	**13,594**	**$1,223**
Heating Energy Savings (therm, $):	**10,063**	**$8,655**
Cooling Energy Savings (kWh, $):	**3,646**	**$328**
Total Cost Savings ($):	**$10,206**	
Estimated BAS Cost	**$26,250**	
Simple Payback	**2.6**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Hasbrouck Dining Hall AHU Schedule**

AHU details			
Unit:	MZ-1	AC-1	Totals
Motor Nameplate Size	5	10	
Calculated Air Flow: (cfm)	7,500	15,000	22,500
% Outdoor Air Flow:	50.0%	50.0%	50%
Fan Static Efficiency: (%)	53%	53%	53%
Total Static Pressure: (in)	2.0	2.0	4
Calculated Fan Power: (BHP)	4.5	8.9	13
Calculated Fan Power: (kW)	3.32	6.64	10
Calculated OA Flow: (cfm)	3750	7500	11,250

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs		
Natural Gas:	$0.86	/ Therm
Electricity:	$0.09	/ kWh

Operational Hours	
Existing:	6am-12am, 7 days/week
Proposed:	6am-9pm M-F / Off Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	120	-	476	12	36.3	120	-	476
85 to 90	87.5	98	37.2	977	-	4,204	98	37.2	977	-	4,204
80 to 85	82.5	311	35.2	3,099	-	11,092	311	35.2	3,099	-	11,092
75 to 80	77.5	391	32.6	3,896	-	10,270	383	32.5	3,817	-	9,922
70 to 75	72.5	579	31	5,770	-	11,859	514	30.7	5,122	-	9,970
65 to 70	67.5	774	28.2	7,713	-	8,017	639	27.7	6,368	-	5,464
60 to 65	62.5	911	25.2	9,078	-	-	745	24.8	7,424	-	-
55 to 60	57.5	885	22.3	8,819	1,723	-	713	22.1	7,105	1,388	-
50 to 55	52.5	837	19.4	8,341	2,282	-	653	19.1	6,507	1,780	-
45 to 50	47.5	604	17	6,019	2,117	-	500	16.8	4,983	1,752	-
40 to 45	42.5	756	14.9	7,534	3,238	-	623	14.7	6,208	2,669	-
35 to 40	37.5	747	12.8	7,444	3,782	-	574	12.7	5,720	2,906	-
30 to 35	32.5	553	10.9	5,511	3,230	-	437	10.9	4,355	2,553	-
25 to 30	27.5	374	9	3,727	2,476	-	271	8.9	2,701	1,794	-
20 to 25	22.5	337	7.3	3,358	2,493	-	271	7.2	2,701	2,005	-
15 to 20	17.5	214	5.6	2,133	1,750	-	170	5.6	1,694	1,390	-
10 to 15	12.5	127	3.9	1,266	1,138	-	101	3.9	1,006	905	-
5 to 10	7.5	110	2.6	1,096	1,071	-	84	2.5	837	818	-
0 to 5	2.5	77	1.2	767	810	-	59	1.2	588	620	-
-5 to 0	-2.5	33	0	329	373	-	20	0	199	226	-
-10 to -5	-7.5	20	-1.4	199	241	-	14	-1.4	140	169	-
-15 to -10	-12.5	10	-2.6	100	129	-	9	-2.6	90	116	-
Totals		**8,760**	-	**87,296**	**26,852**	**45,918**	**7,201**	-	**71,760**	**21,091**	**41,127**

Savings Summary		
Fan Energy Savings (kWh, $):	**15,536**	**$1,398**
Heating Energy Savings (therm, $):	**5,762**	**$4,955**
Cooling Energy Savings (kWh, $):	**4,791**	**$431**
Total Cost Savings ($):	**$6,784**	
Estimated BAS Cost	**$17,500**	
Simple Payback	**2.6**	

Assumptions:

- Assume that 7 control points are needed per AHU, plus a controller and Networking

- Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M3	**Haggerty Admin Building AHU Schedule**

AHU details			
Unit:	AC-5	AC-6	Totals
Motor Nameplate Size	20	25	
Calculated Air Flow: (cfm)	30,000	37,500	67,500
% Outdoor Air Flow:	50.0%	50.0%	50%
Fan Static Efficiency: (%)	53%	53%	53%
Total Static Pressure: (in)	2.0	2.0	4
Calculated Fan Power: (BHP)	17.8	22.3	40
Calculated Fan Power: (kW)	13.29	16.61	30
Calculated OA Flow: (cfm)	15000	18750	33,750

Heating/Cooling		
Cooling Supply Enthalpy:	25.3	Btu/lb
Heating Supply Temp:	70	°F
Cooling System Efficiency:	0.857	kW/ton
Heating System Efficiency:	78%	

Utility Costs		
Natural Gas:	$0.86	/ Therm
Electricity:	$0.09	/ kWh

Operational Hours	
Existing:	6am-12am, 7 days/week
Proposed:	6am-9pm M-F / Off Sat-Sun

Weather Data		**Existing Conditions**					**Proposed Conditions**				
ΔT (°F)	Mid-pts (°F)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Total Run Hours	h (Btu/lb)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)
90 to 95	92.5	12	36.3	359	-	1,427	12	36.3	359	-	1,427
85 to 90	87.5	98	37.2	2,930	-	12,612	98	37.2	2,930	-	12,612
80 to 85	82.5	311	35.2	9,298	-	33,277	311	35.2	9,298	-	33,277
75 to 80	77.5	391	32.6	11,689	-	30,810	383	32.5	11,450	-	29,765
70 to 75	72.5	579	31	17,310	-	35,577	514	30.7	15,367	-	29,910
65 to 70	67.5	774	28.2	23,139	-	24,052	639	27.7	19,104	-	16,391
60 to 65	62.5	911	25.2	27,235	-	-	745	24.8	22,273	-	-
55 to 60	57.5	885	22.3	26,458	5,170	-	713	22.1	21,316	4,165	-
50 to 55	52.5	837	19.4	25,023	6,845	-	653	19.1	19,522	5,340	-
45 to 50	47.5	604	17	18,057	6,351	-	500	16.8	14,948	5,257	-
40 to 45	42.5	756	14.9	22,601	9,715	-	623	14.7	18,625	8,006	-
35 to 40	37.5	747	12.8	22,332	11,345	-	574	12.7	17,160	8,718	-
30 to 35	32.5	553	10.9	16,532	9,691	-	437	10.9	13,065	7,658	-
25 to 30	27.5	374	9	11,181	7,428	-	271	8.9	8,102	5,382	-
20 to 25	22.5	337	7.3	10,075	7,480	-	271	7.2	8,102	6,015	-
15 to 20	17.5	214	5.6	6,398	5,250	-	170	5.6	5,082	4,171	-
10 to 15	12.5	127	3.9	3,797	3,413	-	101	3.9	3,019	2,714	-
5 to 10	7.5	110	2.6	3,289	3,213	-	84	2.5	2,511	2,453	-
0 to 5	2.5	77	1.2	2,302	2,429	-	59	1.2	1,764	1,861	-
-5 to 0	-2.5	33	0	987	1,118	-	20	0	598	678	-
-10 to -5	-7.5	20	-1.4	598	724	-	14	-1.4	419	507	-
-15 to -10	-12.5	10	-2.6	299	386	-	9	-2.6	269	347	-
Totals		**8,760**	-	**261,889**	**80,557**	**137,755**	**7,201**	-	**215,281**	**63,272**	**123,382**

Savings Summary		
Fan Energy Savings (kWh, $):	**46,608**	**$4,195**
Heating Energy Savings (therm, $):	**17,285**	**$14,865**
Cooling Energy Savings (kWh, $):	**14,373**	**$1,294**
Total Cost Savings ($):	**$20,353**	
Estimated BAS Cost	**$17,500**	
Simple Payback	**0.9**	

Assumptions:

- *Assume that 7 control points are needed per AHU, plus a controller and Networking*
- *Industry standard of $1000 per point used for controls costs, plus 25% overage to cover existing conditions*

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M4	**Pipe Insulation - Summary**

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Heating System Operating (Hours/yr)	8,760
Heating System Efficiency	78%

Pipework Properties				Savings			
Type	**Diameter (in.)**	**Equiv. Pipe Length (ft.)**	**Fluid Temperature (°F)**	**Heat Loss Uninsulated (Btu/h)**	**Heat Loss Insulated (Btu/h)**	**Heating Energy Savings (Therms)**	**Annual Energy Cost Savings ($)**
Campuswide 10" Fittings	10	1.83	260	2,434	96	263	$ 225
Campuswide 8" Fittings	8	0.00	260	0	0	0	$ -
Campuswide 6" Fittings	6	13.49	260	11,503	534	1,232	$ 1,056
Campuswide 4" Fittings	4	65.82	260	39,310	96	4,404	$ 3,777
Campuswide 3" Fittings	3	99.63	260	47,246	96	5,295	$ 4,541
Campuswide 2.5" Fittings	2.5	27.24	260	10,789	749	1,128	$ 967
Campuswide 2.0" Fittings	2	127.93	260	42,579	3,313	4,410	$ 3,782
Campuswide 1.5" Fittings	1.5	60.27	260	16,369	1,392	1,682	$ 1,442
Campuswide 1.0" Fittings	1	17.51	260	3,405	384	339	$ 291
Heat Exchangers	Various	28.78	260	80,719	2,650	8,768	$ 7,519
						27,520	$ 23,600

Savings Summary	
Electricity Usage (kWh):	**0**
Gas Savings (Therms):	**27,520**
Energy Savings (MMBTU Source):	**2,881**
Cost Savings ($):	**$ 23,600**
Emissions Reduction (lb CO_2):	**335,332**
Cost Estimate ($):	**$ 47,748**
Simple payback:	**2.02**

Assumptions:

- Insulation quantities based on previous survey provided by SUNY New Paltz, field verified.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M4	**Pipe Insulation Calculations**

Utility Costs		
Natural Gas:	$0.86	therm
Electricity:	$0.09	kWh

Building	Type of Pipe	Description	Pipe Size (Inches)	Pipe Length (Feet)	Pipe Inside Temperature (°F)	Heating System Operating (Hours/yr)	Bare Pipe Heat Loss (Btu/hr)	Existing Heating Energy MMBtu	Required Pipe Insulation (Inches)	Insulated Pipe Heat Loss (Btu/hr)	Proposed Heating Energy MMBtu	Heat Loss Savings (Btu/hr)	Saved Heating Energy MMBtu
Campus	High Temp HW	Campuswide 10" Fittings	10.00	1.83	260°F	8,760	2434	21	3.5	96	0.84	2338	20
Campus	High Temp HW	Campuswide 8" Fittings	8.00		260°F	8,760	0	0	3.5	0	0	0	0
Campus	High Temp HW	Campuswide 6" Fittings	6.00	13.49	260°F	8,760	11503	101	3	534	5	10968	96
Campus	High Temp HW	Campuswide 4" Fittings	4.00	65.82	260°F	8,760	39310	344	3	2086	11	37224	190
Campus	High Temp HW	Campuswide 3" Fittings	3.00	99.63	260°F	8,760	47246	414	2.5	2829	14	44417	227
Campus	High Temp HW	Campuswide 2.5" Fittings	2.50	27.24	260°F	8,760	10789	95	2	749	7	10040	88
Campus	High Temp HW	Campuswide 2.0" Fittings	2.00	127.93	260°F	8,760	42579	373	2	3313	29	39266	344
Campus	High Temp HW	Campuswide 1.5" Fittings	1.50	60.27	260°F	8,760	16369	143	2	1392	12	14977	131
Campus	High Temp HW	Campuswide 1.0" Fittings	1.00	17.51	260°F	8,760	3405	30	1.5	384	3	3021	26
Campus	High Temp HW	Heat Exchangers	24.00	28.78	260°F	8,760	80719	707	4	2650	23	78069	684
TOTALS				**443**			**254,354**	**2,228**		**14,034**	**0**	**240,320**	**0**

Assumptions:

- Insulation quantities based on previous survey provided by SUNY New Paltz, field verified.

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-O&M5	**Retrocommissioning**

Assumptions	
Annual Savings due to RCx	10.0%
RCx Average Cost ($/SF)	$ 0.30

		Existing				Energy Savings Calculations					
Building	**Building Square Footage**	**Building Type**	**Building Annual Electrcity Usage (kWh)**	**Building Annual Heating Usage (therms)**	**Building Utility Cost ($)**	**Area Covered by RCx (SF)**	**RCx Cost Factor ($/SF)**	**Estimated Building Heating Energy Saved (kWh)**	**Estimated Building Heating Energy Saved (Therms)**	**Estimated Building Utility Cost Savings**	**RCx cost**
Athletic Center	61,262	Gym	1,184,803	17,862	$ 176,038	61,262	$ 0.50	118,480	1,786	$ 12,141	$ 30,631
Bevier Hall	56,394	Dormitory	266,875	45,670	$ 75,186	56,394	$ 0.30	26,687	4,567	$ 6,306	$ 16,918
Child Care Center	5,906	Day Care	40,110	5,145	$ 8,758	5,906	$ 0.30	4,011	515	$ 800	$ 1,772
College Hall	106,362	Dormitory	490,083	60,770	$ 105,210	106,362	$ 0.30	49,008	6,077	$ 9,600	$ 31,909
Coykendall Science Building	83,597	Academic	1,413,204	138,078	$ 271,518	83,597	$ 0.50	141,320	13,808	$ 24,495	$ 41,799
Deyo Hall	56,394	Dormitory	261,067	45,670	$ 74,556	56,394	$ 0.30	26,107	4,567	$ 6,254	$ 16,918
Elting Gym	82,730	Gym	462,669	73,749	$ 113,371	82,730	$ 0.30	46,267	7,375	$ 10,467	$ 24,819
Esopus Hall	69,634	Dormitory	675,772	69,778	$ 133,053	69,634	$ 0.30	67,577	6,978	$ 12,035	$ 20,890
Haggerty Admin Building	70,778	Offices	1,343,248	115,518	$ 119,446	70,778	$ 0.30	134,325	11,552	$ 21,934	$ 21,233
Hasbrouck Dining Hall	30,015	Dining	863,901	38,215	$ 15,307	30,015	$ 0.30	86,390	3,822	$ 11,013	$ 9,005
Humanities/Jacobson Faculty Tower	104,435	Academic	1,062,672	135,365	$ 231,215	104,435	$ 0.50	106,267	13,537	$ 21,124	$ 52,218
Lecture Center	60,366	Academic	537,693	102,615	$ 162,684	60,366	$ 0.30	53,769	10,262	$ 13,614	$ 18,110
Lenape Hall	68,035	Dormitory	645,392	68,176	$ 128,387	68,035	$ 0.30	64,539	6,818	$ 11,625	$ 20,411
Old Main	77,257	Academic	648,092	46,316	$ 109,934	77,257	$ 0.30	64,809	4,632	$ 9,775	$ 23,177
Parker Theatre	21,057	Academic	221,290	39,269	$ 60,752	21,057	$ 0.30	22,129	3,927	$ 5,349	$ 6,317
Resnick Engineering Hall	15,755	Academic	306,831	14,363	$ 94,530	15,755	$ 0.50	30,683	1,436	$ 3,979	$ 7,878
Scudder Hall	47,404	Dormitory	213,548	31,423	$ 57,066	47,404	$ 0.30	21,355	3,142	$ 4,607	$ 14,221
Smiley Arts Building/Dorsky Museum	96,706	Academic	1,085,596	97,331	$ 201,082	96,706	$ 0.30	108,560	9,733	$ 18,067	$ 29,012
Sojourner Truth Library	110,983	Library	327,074	77,629	$ 101,720	110,983	$ 0.30	32,707	7,763	$ 9,586	$ 33,295
Student Health Center	14,103	Healthcare	177,916	4,250	$ 22,920	14,103	$ 0.30	17,792	425	$ 1,958	$ 4,231
Student Union Building	103,813	Dining	2,153,042	65,127	$ 290,025	103,813	$ 0.50	215,304	6,513	$ 24,863	$ 51,907
Vandenberg Hall	88,441	Academic	342,902	71,185	$ 92,837	88,441	$ 0.30	34,290	7,118	$ 9,175	$ 26,532
Totals	1,987,777							1,762,931	136,350	$ 274,783	$ 663,501

Savings Summary	
Site Electricity Savings (kWh):	**1,762,931**
Site Gas Savings (Therms):	**136,350**
Energy Savings (MMBTU Source):	**34,366**
Cost Savings ($):	**$ 274,783**
Emissions Reduction (lb CO_2):	**5,259,112**
Cost Estimate ($):	**$ 915,964**
Simple payback:	**3.3**

Assumptions:

- Savings values and costs are based on:
  Existing Building Commissioning, published in the ASHRAE Journal, September 2007
  Building Commissioning, published by Evan Mills, Ph.D, Lawrence Berkeley National Laboratory, July 2009
- Not all buildings are not sub-metered so utility consumption is estimated on a square foot basis
- RCx cost does not include the costs to make capital improvements, equipment repairs or equipment replacement
- Scope of RCx would cover all systems, reviewing BAS schedules, sequences, etc. - whole bldg SF
- The cost estimate in the summary box includes markups for contingency, design, and NYPA project management

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C1	**High Efficiency Lighting & Controls - Summary**

Utility Costs		
Electricity:	$0.09	/kWh

Savings Summary		
Site Electricity Savings (kWh):		**344,267**
Site Gas Savings (Therms):		**0**
Energy Savings (MMBTU Source):		**3,923**
Cost Savings ($):	**$**	**30,826**
Emissions Reduction (lb CO2):		**702,559**
Cost Estimate ($):	**$**	**167,469**
Simple payback:		**5.4**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C1	**High Efficiency Lighting & Controls**

Assumptions - Occ Sensor Savings	
Corridor Savings	25%
Stairwell Savings	95%
Restroom Savings	50%
Work room / Classroom Savings	55%

Utility Costs		
Electricity:	$0.09	/kWh

				PRE-INSTALLATION					POST-INSTALLATION								
Line Item	Building	Floor	Area Description	Pre Fixt. No.	Pre Fixt Code	Pre Watts / Fixt	Pre kW / Space	Existing Control	Post Fixt No.	Post Fixt Code	Post Watts/ Fixt	Post kW / Space	Proposed Control	kW Saved	Baseline Annual Hours	Proposed Annual Hours	Annual kWh Saved
1	Hasbrouck		Summer Boiler Room	9	F42SE	86	0.77	Light Switch	9	F42LL	60	0.54	Light Switch	0.23	800	800	187
2	Sojourner Truth Library		Restrooms	13	F41LL	32	0.42	Light Switch	13	F41LL	32	0.42	Motion Sensor	0.00	4,992	2,496	1,038
3	Old Library		The Cage	48	CFQ13/1-L	15	0.72	Light Switch	48	CFQ13/1-L	15	0.72	Motion Sensor	0.00	4,992	2,246	1,977
4	Old Library		Stairwells	8	CFT13/2	31	0.25	Light Switch	8	CFT13/2	31	0.25	Motion Sensor	0.00	8,760	438	2,064
5	Old Main		Auditorium	4	I150/1	150	0.60	Light Switch	4	CFT24/1	32	0.13	Motion Sensor	0.47	4,992	2,246	2,708
6	Old Main		Auditorium	17	I300/1	300	5.10	Light Switch	17	CFT55/1-BX	56	0.95	Motion Sensor	4.15	4,992	2,246	23,321
7	Old Main		Auditorium	6	CFQ18/1	26	0.16	Light Switch	6	CFQ18/1	26	0.16	Motion Sensor	0.00	4,992	2,246	428
8	Old Main		Stairwells	51	CFQ18/1	26	1.33	Light Switch	51	CFQ18/1	26	1.33	Motion Sensor	0.00	8,760	438	11,035
9	Coykendal		Lecture Hall	35	I60/1	60	2.10	Light Switch	35	CFS15/1	15	0.53	Motion Sensor	1.58	4,992	2,246	9,304
10	Coykendal	All	Stairwells	51	F42LL	60	3.06	Light Switch	51	F42LL	60	3.06	Motion Sensor	0.00	8,760	438	25,465
11	Coykendal	All	Stairwells	2	CFQ25/2	66	0.13	Light Switch	2	CFQ25/2	66	0.13	Motion Sensor	0.00	8,760	438	1,099
12	Faculty Office Building		Conference Room	5	F42LL	60	0.30	Light Switch	5	F42LL	60	0.30	Motion Sensor	0.00	4,992	2,246	824
13	Lecture Center	All	Stairwells	4	CFT13/1	17	0.07	Light Switch	4	CFT13/1	17	0.07	Motion Sensor	0.00	8,760	438	566
14	Lecture Center		Classroom 100	15	F46GHL	351	5.27	Light Switch	15	F46GHL	351	5.27	Motion Sensor	0.00	4,992	2,246	14,456
15	Lecture Center		Classroom 100	68	CFS15/1	15	1.02	Light Switch	68	CFS15/1	15	1.02	Motion Sensor	0.00	4,992	2,246	2,801
16	Lecture Center		Classroom 102	48	F43LL-H	98	4.70	Light Switch	48	F43LL-H	98	4.70	Motion Sensor	0.00	4,992	2,246	12,915
17	Lecture Center		Classroom 102	8	CFS15/1	15	0.12	Light Switch	8	CFS15/1	15	0.12	Motion Sensor	0.00	4,992	2,246	329
18	Lecture Center		Classroom 104	25	F43LL-H	98	2.45	Light Switch	25	F43LL-H	98	2.45	Motion Sensor	0.00	4,992	2,246	6,727
19	Lecture Center		Classroom 104	3	CFS15/1	15	0.05	Light Switch	3	CFS15/1	15	0.05	Motion Sensor	0.00	4,992	2,246	124
20	Van dan burg		Stairwells	5	F42LL	60	0.30	Light Switch	5	F42LL	60	0.30	Motion Sensor	0.00	8,760	438	2,497
21	Van dan burg		Stairwells	2	CF26/4-L	108	0.22	Light Switch	2	CF26/4-L	108	0.22	Motion Sensor	0.00	8,760	438	1,798
22	Van dan burg		Annex Rm 251	3	F44SE	172	0.52	Light Switch	3	F42LL	60	0.18	Motion Sensor	0.34	4,992	2,246	2,172
23	Haggerty Administration	all	Stairwells	20	F41LL	32	0.64	Light Switch	20	F41LL	32	0.64	Motion Sensor	0.00	8,760	438	5,326
24	Haggerty Administration		Restrooms	20	F41LL	32	0.64	Light Switch	20	F41LL	32	0.64	Motion Sensor	0.00	8,760	4,380	2,803
25	Haggerty Administration	2 thru 9	Corridors	88	F41LL	32	2.82	Light Switch	88	F41LL	32	2.82	Motion Sensor	0.00	8,760	6,570	6,167
26	Child Care Center		Gender Neutral Bathroom	1	F42LL	60	0.06	Light Switch	1	F42LL	60	0.06	Motion Sensor	0.00	4,992	2,496	150
27	Student Union		Multi Purpose Room	63	MH200/1	232	14.62	Light Switch	63	200W LED Eq.	75	4.73	Motion Sensor	9.89	936	421	11,690
28	Student Union	All	Stairwells	40	F41LL	32	1.28	Light Switch	40	F41LL	32	1.28	Motion Sensor	0.00	8,760	438	10,652
29	South Classroom	1	Restrooms	6	F42LL	60	0.36	Light Switch	6	F42LL	60	0.36	Motion Sensor	0.00	4,992	2,496	899
30	Smiley Arts	1, 2	Restrooms	10	F41LL	32	0.32	Light Switch	10	F41LL	32	0.32	Motion Sensor	0.00	4,992	2,496	799
31	Smiley Arts	All	Stairwells	24	CFS9/1	9	0.22		24	CFS9/1	9	0.22	Motion Sensor	0.00	8,760	438	1,798
32	Humanities	All	Stairwells	1	CFQ13/1-L	15	0.02	Light Switch	1	CFQ13/1-L	15	0.02	Motion Sensor	0.00	8,760	438	125
33	Humanities	All	Stairwells	15	F44LL	118	1.77		15	F44LL	118	1.77	Motion Sensor	0.00	8,760	438	14,730
34	Humanities	All	Stairwells	1	F41LL	32	0.03		1	F41LL	32	0.03	Motion Sensor	0.00	8,760	438	266
35	Faculty Tower	All	Stairwells	44	CFT13/2	31	1.36		44	CFT13/2	31	1.36	Motion Sensor	0.00	8,760	438	11,351
36	Resnick	All	Stairwells	18	CFQ18/2-L	38	0.68		18	CFQ18/2-L	38	0.68	Motion Sensor	0.00	8,760	438	5,692
37	Maintenance WH	1	Bay Lighting	20	F44SS	188	3.76		20	F46ILL-R	156	3.12	Motion Sensor	0.64	2,080	936	4,900
			Total Pre Fixt.	**801**		**Total Pre kW**	**58**	**Total Post Fixt.**	**801**		**Total Post kW**	**41**	**Total kW Saved**	**17.30**	**Total Annual kWh Saved**		**201,180**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C1	**High Efficiency Lighting & Controls**

Assumptions - Occ Sensor Savings	
Corridor	25%
Stairwell	95%

Utility Costs		
Electricity:	$0.09	/kWh

				PRE-INSTALLATION					POST-INSTALLATION								
Line Item	Building	Floor	Area Description	Pre Fixt. No.	Pre Fixt Code	Pre Watts / Fixt	Pre kW / Space	Existing Control	Post Fixt No.	Post Fixt Code	Post Watts/ Fixt	Post kW / Space	Proposed Control	kW Saved	Baseline Annual Hours	Proposed Annual Hours	Annual kWh Saved
1	Bevier Hall	B - 3	Corridors	64	CFS9/1	9	0.58	Light Switch	64	CFS9/1	9	0.58	Motion Sensor	0.00	8,760	6,570	1,261
2	Bevier Hall	B - 3	Corridors	14	CFQ13/1-L	15	0.21	Light Switch	14	CFQ13/1-L	15	0.21	Motion Sensor	0.00	8,760	6,570	460
3	Bevier Hall	all	Stairwells	26	F41LL	32	0.83	Light Switch	26	F41LL	32	0.83	Motion Sensor	0.00	8,760	438	6,924
4	Bevier Hall	all	Stairwells	1	CFT13/1	17	0.02	Light Switch	1	CFT13/1	17	0.02	Motion Sensor	0.00	8,760	438	141
5	Deyo Hall	B - 3	Corridors	64	CFS9/1	9	0.58	Light Switch	64	CFS9/1	9	0.58	Motion Sensor	0.00	8,760	6,570	1,261
6	Deyo Hall	B - 3	Corridors	14	CFQ13/1-L	15	0.21	Light Switch	14	CFQ13/1-L	15	0.21	Motion Sensor	0.00	8,760	6,570	460
7	Deyo Hall	all	Stairwells	26	F41LL	32	0.83	Light Switch	26	F41LL	32	0.83	Motion Sensor	0.00	8,760	438	6,924
8	Deyo Hall	all	Stairwells	1	CFT13/1	17	0.02	Light Switch	1	CFT13/1	17	0.02	Motion Sensor	0.00	8,760	438	141
9	Doubios Hall	B - 3	Corridors	64	CFS9/1	9	0.58	Light Switch	64	CFS9/1	9	0.58	Motion Sensor	0.00	8,760	6,570	1,261
10	Doubios Hall	B - 3	Corridors	14	CFQ13/1-L	15	0.21	Light Switch	14	CFQ13/1-L	15	0.21	Motion Sensor	0.00	8,760	6,570	460
11	Doubios Hall	all	Stairwells	26	F41LL	32	0.83	Light Switch	26	F41LL	32	0.83	Motion Sensor	0.00	8,760	438	6,924
12	Doubios Hall	all	Stairwells	1	CFT13/1	17	0.02	Light Switch	1	CFT13/1	17	0.02	Motion Sensor	0.00	8,760	438	141
13	Capen Hall	B - 3	Corridors	128	CFS9/1	9	1.15	Light Switch	128	CFS9/1	9	1.15	Motion Sensor	0.00	8,760	6,570	2,523
14	Capen Hall	B - 3	Corridors	6	CFQ13/1-L	15	0.09	Light Switch	6	CFQ13/1-L	15	0.09	Motion Sensor	0.00	8,760	6,570	197
15	Capen Hall	all	Stairwells	21	F41LL	32	0.67	Light Switch	21	F41LL	32	0.67	Motion Sensor	0.00	8,760	438	5,592
16	Scudder Hall	B - 3	Corridors	128	CFS9/1	9	1.15	Light Switch	128	CFS9/1	9	1.15	Motion Sensor	0.00	8,760	6,570	2,523
17	Scudder Hall	B - 3	Corridors	6	CFQ13/1-L	15	0.09	Light Switch	6	CFQ13/1-L	15	0.09	Motion Sensor	0.00	8,760	6,570	197
18	Scudder Hall	all	Stairwells	21	F41LL	32	0.67	Light Switch	21	F41LL	32	0.67	Motion Sensor	0.00	8,760	438	5,592
19	Bliss Hall	B - 3	Corridors	128	CFS9/1	9	1.15	Light Switch	128	CFS9/1	9	1.15	Motion Sensor	0.00	8,760	6,570	2,523
20	Bliss Hall	B - 3	Corridors	6	CFQ13/1-L	15	0.09	Light Switch	6	CFQ13/1-L	15	0.09	Motion Sensor	0.00	8,760	6,570	197
21	Bliss Hall	all	Stairwells	21	F41LL	32	0.67	Light Switch	21	F41LL	32	0.67	Motion Sensor	0.00	8,760	438	5,592
22	Bouton Hall	B - 3	Corridors	114	CFS9/1	9	1.03	Light Switch	114	CFS9/1	9	1.03	Motion Sensor	0.00	8,760	6,570	2,247
23	Bouton Hall	B - 3	Corridors	1	CFQ13/1-L	15	0.02	Light Switch	1	CFQ13/1-L	15	0.02	Motion Sensor	0.00	8,760	6,570	33
24	Bouton Hall	all	Stairwells	20	F41LL	32	0.64	Light Switch	20	F41LL	32	0.64	Motion Sensor	0.00	8,760	438	5,326
25	Gage Hall	B - 3	Corridors	114	CFS9/1	9	1.03	Light Switch	114	CFS9/1	9	1.03	Motion Sensor	0.00	8,760	6,570	2,247
26	Gage Hall	B - 3	Corridors	1	CFQ13/1-L	15	0.02	Light Switch	1	CFQ13/1-L	15	0.02	Motion Sensor	0.00	8,760	6,570	33
27	Gage Hall	all	Stairwells	20	F41LL	32	0.64	Light Switch	20	F41LL	32	0.64	Motion Sensor	0.00	8,760	438	5,326
28	Lenape	1, 2, 3	Corridors	93	F23LL	52	4.84	Light Switch	93	F23LL	52	4.84	Motion Sensor	0.00	8,760	6,570	10,591
29	Lenape	all	Stairwells	54	F41LL	32	1.73	Light Switch	54	F41LL	32	1.73	Motion Sensor	0.00	8,760	438	14,380
30	Esopus	1, 2, 3	Corridors	183	F23LL	52	9.52	Light Switch	183	F23LL	52	9.52	Motion Sensor	0.00	8,760	6,570	20,840
31	Esopus	all	Stairwells	33	F41LL	32	1.06	Light Switch	33	F41LL	32	1.06	Motion Sensor	0.00	8,760	438	8,788
32	College Hall / Shango	1, 2, 3	Corridors	6	CFQ13/1-L	15	0.09	Light Switch	6	CFQ13/1-L	15	0.09	Motion Sensor	0.00	8,760	6,570	197
33	College Hall / Shango	1, 2, 3	Corridors	98	F41LL	32	3.14	Light Switch	98	F41LL	32	3.14	Motion Sensor	0.00	8,760	6,570	6,868
34	College Hall / Shango	all	Stairwells	56	F41LL	32	1.79	Light Switch	56	F41LL	32	1.79	Motion Sensor	0.00	8,760	438	14,913
			Total Pre Fixt.	**1,573**		**Total Pre kW**	**36**	**Total Post Fixt.**	**1,573**		**Total Post kW**	**36**	**Total kW Saved**		**Total Annual kWh Saved**		**143,086**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C2	**Sitewide Exterior Lighting**

Site Data		
Annual Hours of Darkness	4,284	hours

Utility Costs		
Electricity:	$0.107	/kWh
Natural Gas:	$0.858	/Therm

	Existing Exterior Lighting					Proposed Exterior Lighting				
Lighting Fixture Type	**Wattage**	**Quantity**	**Total Watts**	**Annual kWh**	**Total Cost ($)**	**Wattage**	**Quantity**	**Total Watts**	**Annual kWh**	**Total Cost ($)**
Wall Pack mounted at High Level	295	50	14,750	63,189	$6,776	92	50	4,600	19,706	$2,113
Wall Pack mounted at Low Level	138	70	9,660	41,383	$4,438	46	70	3,220	13,794	$1,479
Pole Fixture - Acorn Type	188	162	30,456	130,474	$13,991	35	162	5,670	24,290	$2,605
Pole Fixture - Moon Type	188	159	29,892	128,057	$13,732	35	159	5,565	23,840	$2,556
Pole Fixture - Metal Halide Type	295	58	17,110	73,299	$7,860	79	58	4,582	19,629	$2,105
Pole Fixture - StandardType	465	218	101,370	434,269	$46,568	155	218	33,790	144,756	$15,523
Pole Fixture - LED	93	146	13,578	58,168	$6,238	93	146	13,578	58,168	$6,238
Totals		**863**	**216,816**	**928,840**	**$99,602**			**71,005**	**304,185**	**$32,619**

Savings Summary	
Site Electricity Savings (kWh):	**624,654**
Site Gas Savings (Therms):	**0**
Energy Savings (MMBTU Source):	**7,119**
Cost Savings ($):	**$ 66,983**
Emissions Reduction (lb CO_2):	**1,274,757**
Cost Estimate ($):	**$ 539,131**
Simple payback:	**8.0**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C3	**Premium Efficiency Motors/VFD Controls**

Utility Costs		
Annual Runtime	3,192	hours
Typical VFD Energy Reduction	68%	
Supply Air	1500	cfm/HP
Outdoor Air	20%	
Heating Space Temp	70	°F
Average Heating Outdoor Air Temp	40	°F
Heating Efficiency	78%	
Annual Heating Season Hours	5,684	hours
Cooling Space Temp	72	°F
Cooling Space Enthalpy	23.2	Btu/lb-da
Average Cooling Outdoor Air Temp	79	°F
Average Cooling Outdoor Air Enthalpy	33.4	Btu/lb-da
Average Cooling Efficiency	1.0	kW/ton
Annual Cooling Season Hours	3,076	hours

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

Equipment Details					Baseline			Proposed			Energy Savings		HVAC OA Savings		
Building	Type	Unit Name	Motor hp	RPM	Motor Efficiency	Motor Energy Usage (kW)	Motor Energy Usage (kWh)	Motor Efficiency	Motor Energy Usage (kW)	Motor Energy Usage (kWh)	Motor Energy Usage (kW)	Motor Energy Usage (kWh)	Reduction in OA cfm	Heating Savings (Therm)	Cooling Savings (kWh)
Sojourner Truth Library	HVAC	LS-1	5	1,800	84.3%	4.4	14,124	90.3%	4.1	13,185	0.3	938	474	1,135	5,603
Sojourner Truth Library	HVAC	LS-2	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Sojourner Truth Library	HVAC	LS-3	15	1,800	88.8%	12.6	40,224	93.4%	12.0	38,242	0.6	1,981	1,422	3,404	16,810
Sojourner Truth Library	HVAC	LS-4	15	1,800	88.8%	12.6	40,224	93.4%	12.0	38,242	0.6	1,981	1,422	3,404	16,810
Sojourner Truth Library	HVAC	LS-5	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Sojourner Truth Library	HVAC	LS-6	3	1,800	83.2%	2.7	8,586	89.8%	2.5	7,955	0.2	631	284	681	3,362
Sojourner Truth Library	PUMP	HW-1	7.5	1,800	86.0%	6.5	36,979	91.8%	6.1	34,643	0.4	2,336	0	0	0
Sojourner Truth Library	PUMP	HW-2	7.5	1,800	86.0%	6.5	36,979	91.8%	6.1	34,643	0.4	2,336	0	0	0
Sojourner Truth Library	PUMP	HW-3	7.5	1,800			-			-			0	0	0
Elting Gym	HVAC	AHU-4	20	1,800	89.4%	16.7	53,271	93.4%	16.0	50,990	0.7	2,281	1,896	4,538	22,413
Smiley Arts	HVAC	HV-5	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Smiley Arts	HVAC	HV-6	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Smiley Arts	HVAC	HV-7	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
McKenna	HVAC	HV-1	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
McKenna	HVAC	HV-2	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
McKenna	HVAC	HV-4	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Dorsky	HVAC	SA-1	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Dorsky	HVAC	AHU-1	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Dorsky	HVAC	AHU-2	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Parker Theatre	HVAC	AHU	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Student Union	HVAC	AC-3	15	1,800	88.8%	12.6	40,224	93.4%	12.0	38,242	0.6	1,981	1,422	3,404	16,810
Student Union	HVAC	AC-4	10	1,800	87.4%	8.5	27,245	92.4%	8.1	25,771	0.5	1,474	948	2,269	11,207
Student Union	HVAC	AC-1	20	1,800	89.4%	16.7	53,271	93.4%	16.0	50,990	0.7	2,281	1,896	4,538	22,413
Coykendall	HVAC	AHU-6	5	1,800	84.3%	4.4	14,124	90.3%	4.1	13,185	0.3	938	474	1,135	5,603
Coykendall	HVAC	AHU-4	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Haggerty Admin	HVAC	AC-5 RF	20	1,800	89.4%	16.7	53,271	93.4%	16.0	50,990	0.7	2,281	1,896	4,538	22,413
Haggerty Admin	HVAC	AC-5 SF	7.5	1,800	86.0%	6.5	20,767	91.8%	6.1	19,455	0.4	1,312	711	1,702	8,405
Haggerty Admin	PUMP	HW-1	10	1,800	87.4%	8.5	48,516	92.4%	8.1	45,890	0.5	2,625	0	0	0
Haggerty Admin	PUMP	HW-2	10	1,800			-			-			0	0	0
Vandenberg Hall	PUMP	HWP-1	7.5	1,800	86.0%	6.5	36,979	91.8%	6.1	34,643	0.4	2,336	0	0	0
Vandenberg Hall	PUMP	HWP-3	7.5	1,800			-			-			0	0	0
Service Building	PUMP	HW-1	15	1,800	88.8%	12.6	71,626	93.4%	12.0	68,098	0.6	3,528	0	0	0
Service Building	PUMP	HW-2	15	1,800			-			-			0	0	0
Lenape	PUMP	HW-1	7.5	1,800	86.0%	6.5	36,979	91.8%	6.1	34,643	0.4	2,336	0	0	0
Lenape	PUMP	HW-2	7.5	1,800	86.0%	6.5	36,979	91.8%	6.1	34,643	0.4	2,336	0	0	0
Lenape	PUMP	HW-3	7.5	1,800			-			-			0	0	0
Lecture Center	PUMP	HW-1	10	1,800	87.4%	8.5	48,516	92.4%	8.1	45,890	0.5	2,625	0	0	0
Lecture Center	PUMP	HW-2	10	1,800			-			-			0	0	0
Athletic Center	PUMP	HW-1	30	1,800	89.4%	25.0	142,291	93.4%	24.0	136,197	1.1	6,094	0	0	0
Athletic Center	PUMP	HW-2	30	1,800			-			-			0	0	0
Coykendall Science	PUMP	P-3	10	1,800	87.4%	8.5	48,516	92.4%	8.1	45,890	0.5	2,625	0	0	0
Coykendall Science	PUMP	P-4	10	1,800			-			-			0	0	0
Resnick	HVAC	VAV unit	25	1,800	89.4%	20.9	66,589	93.4%	20.0	63,737	0.9	2,852	2,370	5,673	28,016
	Totals					325.8	1,278,637		308.5	1,210,656	17.3	67,981	25,644	61,382	303,137

Savings Summary	
Site Electricity Savings (kWh):	**371,118**
Site Gas Savings (Therms):	**61,382**
Energy Savings (MMBTU Source):	**10,656**
Cost Savings ($):	**$ 85,869**
Emissions Reduction (lb CO_2):	**1,505,287**
Cost Estimate ($):	**$ 365,534**
Simple payback:	**4.3**

Assumptions

(1) VFD Reductions from "Control your energy costs with variable-frequency drives" - Wisconsin Focus on Energy https://focusonenergy.com/sites/default/files/controlingcostsvfd_factsheet.pdf
(2) Heating Savings based on the following assumptions: 1500 cfm supply air/HP, 20% outdoor air
(3) Cooling Savings based on the following assumptions: 1500 cfm supply air/HP, 20% outdoor air
(4) Motor Efficiency Values have been obtained from US DOE's Motormaster international program

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C4	**Chilled Water Temperature Reset - Summary**

Savings Summary	
Estimated Cost to Implement	$12,425
Site Electric Savings [kWh]	24,231
Site Heating Savings (therm)	-
Total Source Savings (MMBTU)	276
Cost Savings ($)	$2,170
Simple Payback [years]	5.73
Emissions Reduction (lb CO_2):	49,449

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

	Existing Case	**Proposed Case**	**Savings [unit]**	**Savings [$]**
Electrical Consumption [kwh / yr]	1,575,322.22	1,551,091.23	24,230.99	$ 2,169.65
Natural Gas Consumption [therms / yr]	-	-		
Implementation Cost [$]		$12,425		
Totals				**$ 2,169.65**

Building	**Prior Existing Conditions**		**Revised Conditions**	
	Yearly Energy Consumption (kWh)	Yearly Energy Cost ($)	Yearly Energy Consumption (kWh)	Yearly Energy Cost ($)
Lecture Center	492,500	44,099	487,535	43,654
Old Main Building	185,072	16,571	178,451	15,979
Student Union	417,878	37,417	412,926	36,974
Esopus Residence Hall	213,628	19,128	210,249	18,826
Lenape Residence Hall	213,628	19,128	210,249	18,826
Health Services	52,616	4,711	51,681	4,627
Totals	**1,575,322**	**141,055**	**1,551,091**	**138,885**

EYP/energy

Project Name:	SUNY New Paltz
Project Number:	4013032.01
ECM-C4	**Chilled Water Temperature Reset**
Building	**Lecture Center**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated recurring yearly consumption savings [kWh]	4,964.42
Estimated recurring yearly savings	$ 444.52
Simple Payback [years]	3.37

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	492,499.56	487,535.14	4,964.42	$ 444.52
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 444.52**

Calculations Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	140	50	48	45	55
95	700	95	45	48	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	35
Plant DP Setpoint (ft)	80.5
Existing chilled water temp. setpoint	45
Existing chilled water return temp. (	55
% decrease in energy consumption per 1F rise in temp	2.5%
Pump efficiency	68%
Motor Efficiency	90%

http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.594
75%	0.43
50%	0.32
25%	0.45
IPLV	0.377

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy					Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	665	95%	0.56	45	55	1,596	4,478	45.2	55.0	1,623	0	0.4%	4,468	1.55	0.67	1	11
85 to 90	87.5	98	595	85%	0.50	45	55	1,428	28,898	45.5	55.0	1,503	1	1%	28,720	3.69	1.86	2	179
80 to 85	82.5	311	525	75%	0.43	45	55	1,260	70,208	45.8	55.0	1,375	1	2%	69,628	4.70	2.84	2	580
75 to 80	77.5	391	455	65%	0.39	45	55	1,092	68,956	46.2	55.0	1,236	1	3%	68,342	5.14	3.57	2	614
70 to 75	72.5	579	385	55%	0.35	45	55	924	76,950	46.5	55.0	1,087	2	4%	76,404	4.98	4.04	1	546
65 to 70	67.5	774	315	45%	0.35	45	55	756	84,992	46.8	55.0	926	2	5%	84,352	5.03	4.21	1	641
60 to 65	62.5	911	245	35%	0.40	45	55	588	88,787	47.2	55.0	751	2	5%	87,649	5.28	4.03	1	1,138
55 to 60	57.5	885	175	25%	0.45	45	55	420	69,229	47.5	55.0	560	3	6%	67,972	4.89	3.47	1	1,257
50 to 55	52.5	837	0	0%	0.00	45	55	0	0	47.8	55.0	0	3	7%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	45	55	0	0	48.0	55.0	0	3	8%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	45	55	0	0	48.00	55.0	0	3	8%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	45	55	0	0	48.00	55.0	0	3	8%	0	0.00	-	0	0
									492,500						487,535				4,964

Assumptions:

- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name	SUNY New Paltz
Project Number	4013032.01
ECM-C4	Chilled Water Temperature Reset
Building	Old Main Building

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated recurring yearly consumption savings [kWh]	6,620.91
Estimated recurring yearly savings	$ 592.84
Simple Payback [years]	2.53

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	185,072.29	178,451.38	6,620.91	$ 592.84
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 592.84**

Calculation Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	50	50	48	43	53
95	250	85	43	48	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	25
Plant DP Setpoint (ft)	57.5
Existing chilled water temp. setpoint	43
Existing chilled water return temp. (F	53
% decrease in energy consumption per 1F rise in temp	2.5%
Pump efficiency	68%
Motor Efficiency	90%

http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.63
75%	0.45
50%	0.34
25%	0.47
IPLV	0.40

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy						Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	238	95%	0.59	43	53	570	1,683	43.0	53.0	570	0	0%	1,683	0.00	-	0	0
85 to 90	87.5	98	213	85%	0.52	43	53	510	10,860	43.0	53.0	510	0	0%	10,860	0.00	-	0	0
80 to 85	82.5	311	188	75%	0.45	43	53	450	26,383	43.4	53.1	460	0	1%	26,202	0.76	0.17	1	181
75 to 80	77.5	391	163	65%	0.41	43	53	390	25,912	44.1	53.4	417	1	3%	25,404	1.78	0.47	1	509
70 to 75	72.5	579	138	55%	0.36	43	53	330	28,916	44.8	53.7	370	2	4%	28,031	2.23	0.70	2	885
65 to 70	67.5	774	113	45%	0.37	43	53	270	31,938	45.5	54.0	318	3	6%	30,595	2.58	0.84	2	1,343
60 to 65	62.5	911	88	35%	0.42	43	53	210	33,365	46.2	54.3	260	3	8%	31,492	2.94	0.89	2	1,872
55 to 60	57.5	885	63	25%	0.47	43	53	150	26,015	46.9	54.6	196	4	10%	24,185	2.89	0.82	2	1,830
50 to 55	52.5	837	0	0%	0.00	43	53	0	0	47.6	54.9	0	5	12%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	43	53	0	0	48.0	55.0	0	5	13%	0	0.00	-	0	0
									185,072						178,451				6,621

Assumptions:

- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name	SUNY New Paltz
Project Number	4013032.01
ECM-C4	Chilled Water Temperature Reset
Building	Student Union

Summary		
Estimated Cost to Implement	$	1,500.00
Estimated recurring yearly consumption savings [kWh]		4,952.61
Estimated recurring yearly savings	$	443.46
Simple Payback [years]		3.38

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	417,878.41	412,925.81	4,952.61	$ 443.46
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 443.46**

Calculation Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	120	50	46	44	54
95	600	85	44	46	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	45
Plant DP Setpoint (ft)	103.5
Existing chilled water temp. setpoint (F)	44
Existing chilled water return temp. (F)	54
% decrease in energy consumption per 1F rise in temp	2.5% http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf
Pump efficiency	68%
Motor Efficiency	90%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	0.59
75%	0.43
50%	0.32
25%	0.44
IPLV	0.37

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy						Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	570	95%	0.56	44	54	1,368	3,800	44.0	54.0	1,368	0	0%	3,800	0.00	-	0	0
85 to 90	87.5	98	510	85%	0.49	44	54	1,224	24,520	44.0	54.0	1,224	0	0%	24,520	0.00	-	0	0
80 to 85	82.5	311	450	75%	0.43	44	54	1,080	59,571	44.1	54.1	1,088	0	0%	59,435	0.68	0.25	0	136
75 to 80	77.5	391	390	65%	0.38	44	54	936	58,508	44.4	54.2	956	0	1%	58,137	1.60	0.65	1	372
70 to 75	72.5	579	330	55%	0.34	44	54	792	65,291	44.7	54.4	821	1	2%	64,666	2.01	0.93	1	625
65 to 70	67.5	774	270	45%	0.35	44	54	648	72,115	45.0	54.5	682	1	3%	71,153	2.33	1.09	1	962
60 to 65	62.5	911	210	35%	0.39	44	54	504	75,334	45.3	54.6	539	1	3%	73,918	2.66	1.10	2	1,416
55 to 60	57.5	885	150	25%	0.44	44	54	360	58,740	45.6	54.8	391	2	4%	57,298	2.61	0.98	2	1,442
50 to 55	52.5	837	0	0%	0.00	44	54	0	0	45.9	54.9	0	2	5%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
									417,878						412,926				4,953

Assumptions:

- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name	**SUNY New Paltz**
Project Number	**4013032.01**
ECM-C4	**Chilled Water Temperature Reset**
Building	**Esopus Residence Hall**

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated recurring yearly consumption savings [kWh]	3,378.70
Estimated recurring yearly savings	$ 302.53
Simple Payback [years]	4.96

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	213,627.89	210,249.19	3,378.70	$ 302.53
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 302.53**

Calculation Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	33	50	46	44	54
95	165	85	44	46	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	45
Plant DP Setpoint (ft)	103.5
Existing chilled water temp. setpoint	44
Existing chilled water return temp. (F	54
% decrease in energy consumption per 1F rise in temp	2.5%
Pump efficiency	68%
Motor Efficiency	90%

http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.09
75%	0.79
50%	0.60
25%	0.82
IPLV	0.69

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy						Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	157	95%	1.03	44	54	376	1,943	44.0	54.0	376	0	0%	1,943	0.00	-	0	0
85 to 90	87.5	98	140	85%	0.91	44	54	337	12,535	44.0	54.0	337	0	0%	12,535	0.00	-	0	0
80 to 85	82.5	311	124	75%	0.79	44	54	297	30,454	44.1	54.1	299	0	0%	30,366	0.35	0.07	0	88
75 to 80	77.5	391	107	65%	0.71	44	54	257	29,911	44.4	54.2	263	0	1%	29,660	0.82	0.18	1	250
70 to 75	72.5	579	91	55%	0.64	44	54	218	33,378	44.7	54.4	226	1	2%	32,931	1.03	0.26	1	447
65 to 70	67.5	774	74	45%	0.64	44	54	178	36,866	45.0	54.5	188	1	3%	36,176	1.19	0.30	1	690
60 to 65	62.5	911	58	35%	0.73	44	54	139	38,512	45.3	54.6	148	1	3%	37,551	1.36	0.30	1	962
55 to 60	57.5	885	41	25%	0.82	44	54	99	30,029	45.6	54.8	107	2	4%	29,087	1.33	0.27	1	942
50 to 55	52.5	837	0	0%	0.00	44	54	0	0	45.9	54.9	0	2	5%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
									213,628						210,249				3,379

Assumptions:
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name	SUNY New Paltz
Project Number	4013032.01
ECM-C4	Chilled Water Temperature Reset
Building	Lenape Residence Hall

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated recurring yearly consumption savings [kWh]	3,378.70
Estimated recurring yearly savings	$ 302.53
Simple Payback [years]	4.96

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	213,627.89	210,249.19	3,378.70	$ 302.53
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 302.53**

Calculation Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	33	50	46	44	54
95	165	85	44	46	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	45
Plant DP Setpoint (ft)	103.5
Existing chilled water temp. setpoint	44
Existing chilled water return temp. (F	54
% decrease in energy consumption per 1F rise in temp	2.5% http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf
Pump efficiency	68%
Motor Efficiency	90%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.09
75%	0.79
50%	0.60
25%	0.82
IPLV	0.69

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy						Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	157	95%	1.03	44	54	376	1,943	44.0	54.0	376	0	0%	1,943	0.00	-	0	0
85 to 90	87.5	98	140	85%	0.91	44	54	337	12,535	44.0	54.0	337	0	0%	12,535	0.00	-	0	0
80 to 85	82.5	311	124	75%	0.79	44	54	297	30,454	44.1	54.1	299	0	0%	30,366	0.35	0.07	0	88
75 to 80	77.5	391	107	65%	0.71	44	54	257	29,911	44.4	54.2	263	0	1%	29,660	0.82	0.18	1	250
70 to 75	72.5	579	91	55%	0.64	44	54	218	33,378	44.7	54.4	226	1	2%	32,931	1.03	0.26	1	447
65 to 70	67.5	774	74	45%	0.64	44	54	178	36,866	45.0	54.5	188	1	3%	36,176	1.19	0.30	1	690
60 to 65	62.5	911	58	35%	0.73	44	54	139	38,512	45.3	54.6	148	1	3%	37,551	1.36	0.30	1	962
55 to 60	57.5	885	41	25%	0.82	44	54	99	30,029	45.6	54.8	107	2	4%	29,087	1.33	0.27	1	942
50 to 55	52.5	837	0	0%	0.00	44	54	0	0	45.9	54.9	0	2	5%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
									213,628						210,249				3,379

Assumptions:
- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name	SUNY New Paltz
Project Number	4013032.01
ECM-C4	Chilled Water Temperature Reset
Building	Health Services

Summary	
Estimated Cost to Implement	$ 1,500.00
Estimated recurring yearly consumption savings [kWh]	935.66
Estimated recurring yearly savings	$ 83.78
Simple Payback [years]	17.90

	Existing Case	Proposed Case	Savings [unit]	Savings [$]
Electrical Consumption [kwh / yr]	52,616.18	51,680.52	935.66	$ 83.78
Natural Gas Consumption [therms / yr]	n/a	n/a		
Implementation Cost [$]		$ 1,500.00		
Totals				**$ 83.78**

Calculation Inputs

Cooling Load Profile		Chilled Water Reset Schedule		Return Water Temperature Schedule	
OAT	**Cooling Load**	**OAT**	**Cooling Load**	**CHWST**	**CHWT**
55	5	50	46	44	54
95	25	85	44	46	55

OAT lockout of chiller plant	55
Plant DP Setpoint (psi)	45
Plant DP Setpoint (ft)	103.5
Existing chilled water temp. setpoint	44
Existing chilled water return temp. (F	54
% decrease in energy consumption per 1F rise in temp	2.5% http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf
Pump efficiency	68%
Motor Efficiency	90%

Chiller Part Load Performance	
% Load	**kW/Ton**
100%	1.18
75%	1.18
50%	1.18
25%	1.18
IPLV	1.18

Calculations

Weather Data			Performance Data			Existing Condition				Recommended Operating Strategy						Estimated Savings			
Bin	**DBT**	**Hours**	**Estimated Cooling Load (ton)**	**% Load**	**Estimated kW/Ton**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Yearly Energy Consumption (kWh)**	**Chilled Water Supply Temp (F)**	**Chilled Water Return Temp (F)**	**Chilled Water flow (gpm)**	**Chilled Water Supply Temp. Increase (F)**	**Net decrease in chiller power consumption (%)**	**Yearly Energy Consumption (kWh)**	**Reduction in chiller power consumption (kW)**	**Pumping Penalty (kW)**	**Overall reduction in power consumption (kW)**	**Overall Energy Consumption Reduction (kWh)**
90 to 95	92.5	12	24	95%	1.18	44	54	57	335	44.0	54.0	57	0	0%	335	0.00	-	0	0
85 to 90	87.5	98	21	85%	1.18	44	54	51	2,450	44.0	54.0	51	0	0%	2,450	0.00	-	0	0
80 to 85	82.5	311	19	75%	1.18	44	54	45	6,860	44.1	54.1	45	0	0%	6,839	0.08	0.01	0	21
75 to 80	77.5	391	16	65%	1.18	44	54	39	7,475	44.4	54.2	40	0	1%	7,406	0.20	0.03	0	69
70 to 75	72.5	579	14	55%	1.18	44	54	33	9,366	44.7	54.4	34	1	2%	9,221	0.29	0.04	0	145
65 to 70	67.5	774	11	45%	1.18	44	54	27	10,244	45.0	54.5	28	1	3%	10,023	0.33	0.05	0	221
60 to 65	62.5	911	9	35%	1.18	44	54	21	9,378	45.3	54.6	22	1	3%	9,118	0.33	0.05	0	260
55 to 60	57.5	885	6	25%	1.18	44	54	15	6,507	45.6	54.8	16	2	4%	6,288	0.29	0.04	0	220
50 to 55	52.5	837	0	0%	0.00	44	54	0	0	45.9	54.9	0	2	5%	0	0.00	-	0	0
45 to 50	47.5	604	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
40 to 45	42.5	756	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
35 to 40	37.5	747	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
30 to 35	32.5	553	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
25 to 30	27.5	374	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
20 to 25	22.5	337	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
15 to 20	17.5	214	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
10 to 15	12.5	127	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
5 to 10	7.5	110	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
0 to 5	2.5	77	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-5 to 0	-2.5	33	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-10 to -5	-7.5	20	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
-15 to -10	-12.5	10	0	0%	0.00	44	54	0	0	46.0	55.0	0	2	5%	0	0.00	-	0	0
									52,616						51,681				936

Assumptions:

- 2.5% decrease in energy consumption per degree fahrenheit rise in temperature from http://apps1.eere.energy.gov/buildings/publications/pdfs/alliances/hea_chillers.fs.pdf

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation**

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

Building	**Existing Conditions**			**Proposed Conditions**			**Energy Savings**	
	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Heating Energy Savings (Therm)	Electric Energy Savings (kWh)
Elting Gym	32,446	4,515	0	32,446	3,104	0	1,411	0
Parker Theater	11,928	4,150	10,547	11,928	2,853	7,251	1,297	3,296
Old Library	117,695	16,377	48,571	117,695	11,259	33,393	5,118	15,178
Lecture Center	23,857	4,980	5,571	23,857	3,104	0	1,876	5,571
Student Union	83,499	6,971	7,721	83,499	4,793	5,308	2,179	2,413
McKenna Theater	15,905	2,213	6,564	15,905	1,522	4,513	692	2,051
Totals	**285,330**	**39,206**	**78,973**	**285,330**	**26,635**	**50,464**	**12,571**	**28,509**

Savings Summary	
Site Electricity Savings (kWh):	**28,509**
Site Gas Savings (Therms):	**12,571**
Energy Savings (MMBTU Source):	**1,641**
Cost Savings ($):	**$ 13,334**
Emissions Reduction (lb CO_2):	**17,419**
Cost Estimate ($):	**$ 77,308**
Simple payback:	**5.8**

Assumptions:

- Assume that 7 control points and 3 CO2 sensors are needed per AHU, plus a controller and Networking

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Elting Gym**

AHU details			
Unit:	HV-1	HV-2	Totals
Motor Nameplate Size	5	5	10
Calculated Air Flow: (cfm)	15,300	15,300	30,600
% Outdoor Air Flow:	20%	20%	20%
Fan Static Efficiency: (%)	53%	53%	
Total Static Pressure: (in)	1.50	1.50	
Calculated Fan Power: (BHP)	6.8	6.8	13.6
Calculated Fan Power: (kW)	5.08	5.08	10
Calculated OA Flow: (cfm)	3,060	3,060	6,120
Proposed Average % OA:			14%
Average Heating Efficiency			78%
Average Cooling Efficiency (kW/ton)			0

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				**Baseline**					**Proposed**					**Savings**	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	10.16	6,120	41	-	0	10.16	4,208	41	-	0	-	
85 to 90	87.5	37.5	60	10.16	6,120	610	-	0	10.16	4,208	610	-	0	-	
80 to 85	82.5	35.1	199	10.16	6,120	2,023	-	0	10.16	4,208	2,023	-	0	-	
75 to 80	77.5	32.2	239	10.16	6,120	2,429	-	0	10.16	4,208	2,429	-	0	-	
70 to 75	72.5	29.9	242	10.16	6,120	2,460	-	0	10.16	4,208	2,460	-	0	-	
65 to 70	67.5	26.6	294	10.16	6,120	2,988	-	0	10.16	4,208	2,988	-	0	-	
60 to 65	62.5	23.8	330	10.16	6,120	3,354	-		10.16	4,208	3,354	-		-	
55 to 60	57.5	21.6	291	10.16	6,120	2,958	308		10.16	4,208	2,958	212		-	96
50 to 55	52.5	18.3	288	10.16	6,120	2,927	427		10.16	4,208	2,927	294		-	133
45 to 50	47.5	16.3	227	10.16	6,120	2,307	433		10.16	4,208	2,307	298		-	135
40 to 45	42.5	14.4	293	10.16	6,120	2,978	683		10.16	4,208	2,978	469		-	213
35 to 40	37.5	12.6	191	10.16	6,120	1,941	526		10.16	4,208	1,941	362		-	164
30 to 35	32.5	10.8	164	10.16	6,120	1,667	521		10.16	4,208	1,667	358		-	163
25 to 30	27.5	8.8	98	10.16	6,120	996	353		10.16	4,208	996	243		-	110
20 to 25	22.5	7	99	10.16	6,120	1,006	398		10.16	4,208	1,006	274		-	125
15 to 20	17.5	5.5	67	10.16	6,120	681	298		10.16	4,208	681	205		-	93
10 to 15	12.5	3.7	42	10.16	6,120	427	205		10.16	4,208	427	141		-	64
5 to 10	7.5	2.5	34	10.16	6,120	346	180		10.16	4,208	346	124		-	56
0 to 5	2.5	1.2	17	10.16	6,120	173	97		10.16	4,208	173	67		-	30
-5 to 0	-2.5	0.1	6	10.16	6,120	61	37		10.16	4,208	61	25		-	12
-10 to -5	-7.5	-1.2	1	10.16	6,120	10	7		10.16	4,208	10	5		-	2
-15 to -10	-12.5	-2.6	6	10.16	6,120	61	42		10.16	4,208	61	29		-	13
Totals			**3,192**	-	-	**32,446**	**4,515**	**0**	-	-	**32,446**	**3,104**	**0**	**0**	**1,411**

Savings Summary		
Site Electricity Savings (kWh, $):	**0**	**$0**
Site Gas Savings (Therm, $):	**1,411**	**$1,210**
Total Cost Savings ($):	**$1,210**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Savings based on the following assumptions: 1500 cfm supply air/HP, 20% outdoor air
- Fan speeds can be adjusted in the following manner during occupied hours:

OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Parker Theater**

AHU details		
Unit:	AC-4	Totals
Motor Nameplate Size	8	8
Calculated Air Flow: (cfm)	11,250	11,250
% Outdoor Air Flow:	50%	50%
Fan Static Efficiency: (%)	53%	
Total Static Pressure: (in)	1.50	
Calculated Fan Power: (BHP)	5.0	5.0
Calculated Fan Power: (kW)	3.74	4
Calculated OA Flow: (cfm)	5,625	5,625
Proposed Average % OA:		34%
Average Heating Efficiency		78%
Average Cooling Efficiency (kW/ton)		0.857

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				**Baseline**					**Proposed**					**Savings**	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	3.74	5,625	15	-	79	3.74	3,867	15	-	55	25	
85 to 90	87.5	37.5	60	3.74	5,625	224	-	1,319	3.74	3,867	224	-	907	412	
80 to 85	82.5	35.1	199	3.74	5,625	744	-	3,513	3.74	3,867	744	-	2,415	1,098	
75 to 80	77.5	32.2	239	3.74	5,625	893	-	2,966	3.74	3,867	893	-	2,039	927	
70 to 75	72.5	29.9	242	3.74	5,625	904	-	1,997	3.74	3,867	904	-	1,373	624	
65 to 70	67.5	26.6	294	3.74	5,625	1,099	-	672	3.74	3,867	1,099	-	462	210	
60 to 65	62.5	23.8	330	3.74	5,625	1,233	-		3.74	3,867	1,233	-		-	
55 to 60	57.5	21.6	291	3.74	5,625	1,087	283		3.74	3,867	1,087	195		-	89
50 to 55	52.5	18.3	288	3.74	5,625	1,076	393		3.74	3,867	1,076	270		-	123
45 to 50	47.5	16.3	227	3.74	5,625	848	398		3.74	3,867	848	273		-	124
40 to 45	42.5	14.4	293	3.74	5,625	1,095	628		3.74	3,867	1,095	431		-	196
35 to 40	37.5	12.6	191	3.74	5,625	714	483		3.74	3,867	714	332		-	151
30 to 35	32.5	10.8	164	3.74	5,625	613	479		3.74	3,867	613	329		-	150
25 to 30	27.5	8.8	98	3.74	5,625	366	324		3.74	3,867	366	223		-	101
20 to 25	22.5	7	99	3.74	5,625	370	366		3.74	3,867	370	252		-	114
15 to 20	17.5	5.5	67	3.74	5,625	250	274		3.74	3,867	250	188		-	86
10 to 15	12.5	3.7	42	3.74	5,625	157	188		3.74	3,867	157	129		-	59
5 to 10	7.5	2.5	34	3.74	5,625	127	166		3.74	3,867	127	114		-	52
0 to 5	2.5	1.2	17	3.74	5,625	64	89		3.74	3,867	64	61		-	28
-5 to 0	-2.5	0.1	6	3.74	5,625	22	34		3.74	3,867	22	23		-	11
-10 to -5	-7.5	-1.2	1	3.74	5,625	4	6		3.74	3,867	4	4		-	2
-15 to -10	-12.5	-2.6	6	3.74	5,625	22	39		3.74	3,867	22	27		-	12
Totals			**3,192**	-	-	**11,928**	**4,150**	**10,547**	-	-	**11,928**	**2,853**	**7,251**	**3,296**	**1,297**

Savings Summary		
Site Electricity Savings (kWh, $):	**3,296**	**$295**
Site Gas Savings (Therm, $):	**1,297**	**$1,112**
Total Cost Savings ($):	**$1,407**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Fan speeds can be adjusted in the following manner during occupied hours:

OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Old Library**

AHU details						
Unit:	LS-1	LS-2	LS-3	LS-4	LS-5	Totals
Motor Nameplate Size	15	10	15	15	19	74
Calculated Air Flow: (cfm)	22,500	15,000	22,500	22,500	28,500	111,000
% Outdoor Air Flow:	20.0%	20.0%	20.0%	20.0%	20.0%	20%
Fan Static Efficiency: (%)	53%	53%	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	10.0	6.7	10.0	10.0	12.7	49
Calculated Fan Power: (kW)	7.47	4.98	7.47	7.47	9.47	37
Calculated OA Flow: (cfm)	4,500	3,000	4,500	4,500	5,700	22,200
Proposed Average % OA:						14%
Average Heating Efficiency						78%
Average Cooling Efficiency (kW/ton)						1

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				Baseline					Proposed					Savings	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	36.87	22,200	147	-	365	36.87	15,263	147	-	251	114	
85 to 90	87.5	37.5	60	36.87	22,200	2,212	-	6,076	36.87	15,263	2,212	-	4,178	1,899	
80 to 85	82.5	35.1	199	36.87	22,200	7,337	-	16,177	36.87	15,263	7,337	-	11,122	5,055	
75 to 80	77.5	32.2	239	36.87	22,200	8,812	-	13,659	36.87	15,263	8,812	-	9,391	4,268	
70 to 75	72.5	29.9	242	36.87	22,200	8,923	-	9,197	36.87	15,263	8,923	-	6,323	2,874	
65 to 70	67.5	26.6	294	36.87	22,200	10,840	-	3,096	36.87	15,263	10,840	-	2,129	968	
60 to 65	62.5	23.8	330	36.87	22,200	12,168	-		36.87	15,263	12,168	-		-	
55 to 60	57.5	21.6	291	36.87	22,200	10,730	1,118		36.87	15,263	10,730	769		-	349
50 to 55	52.5	18.3	288	36.87	22,200	10,619	1,549		36.87	15,263	10,619	1,065		-	484
45 to 50	47.5	16.3	227	36.87	22,200	8,370	1,570		36.87	15,263	8,370	1,079		-	491
40 to 45	42.5	14.4	293	36.87	22,200	10,803	2,477		36.87	15,263	10,803	1,703		-	774
35 to 40	37.5	12.6	191	36.87	22,200	7,042	1,908		36.87	15,263	7,042	1,312		-	596
30 to 35	32.5	10.8	164	36.87	22,200	6,047	1,890		36.87	15,263	6,047	1,300		-	591
25 to 30	27.5	8.8	98	36.87	22,200	3,613	1,280		36.87	15,263	3,613	880		-	400
20 to 25	22.5	7	99	36.87	22,200	3,650	1,445		36.87	15,263	3,650	994		-	452
15 to 20	17.5	5.5	67	36.87	22,200	2,470	1,081		36.87	15,263	2,470	743		-	338
10 to 15	12.5	3.7	42	36.87	22,200	1,549	742		36.87	15,263	1,549	510		-	232
5 to 10	7.5	2.5	34	36.87	22,200	1,254	653		36.87	15,263	1,254	449		-	204
0 to 5	2.5	1.2	17	36.87	22,200	627	353		36.87	15,263	627	242		-	110
-5 to 0	-2.5	0.1	6	36.87	22,200	221	134		36.87	15,263	221	92		-	42
-10 to -5	-7.5	-1.2	1	36.87	22,200	37	24		36.87	15,263	37	16		-	7
-15 to -10	-12.5	-2.6	6	36.87	22,200	221	152		36.87	15,263	221	105		-	48
Totals			**3,192**	**-**	**-**	**117,695**	**16,377**	**48,571**	**-**	**-**	**117,695**	**11,259**	**33,393**	**15,178**	**5,118**

Savings Summary		
Site Electricity Savings (kWh, $):	**15,178**	**$1,359**
Site Gas Savings (Therm, $):	**5,118**	**$4,389**
Total Cost Savings ($):	**$5,748**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Fan speeds can be adjusted in the following manner during occupied hours:

OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Lecture Center**

AHU details				
Unit:	LC-1	LC-2	LC-3	Totals
Motor Nameplate Size	7.5	7.5	7.5	23
Calculated Air Flow: (cfm)	11,250	11,250	11,250	33,750
% Outdoor Air Flow:	20.0%	20.0%	20.0%	20%
Fan Static Efficiency: (%)	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	5.0	5.0	5.0	10.0
Calculated Fan Power: (kW)	3.74	3.74	3.74	7.5
Calculated OA Flow: (cfm)	2250	2250	2250	6,750
Proposed Average % OA:				14%
Average Heating Efficiency				78%
Average Cooling Efficiency (kW/ton)				0.38

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				**Baseline**					**Proposed**					**Savings**	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	7.47	6,750	30	-	42	7.47	4,641	30	-	29	13	
85 to 90	87.5	37.5	60	7.47	6,750	448	-	697	7.47	4,641	448	-	479	218	
80 to 85	82.5	35.1	199	7.47	6,750	1,487	-	1,856	7.47	4,641	1,487	-	1,276	580	
75 to 80	77.5	32.2	239	7.47	6,750	1,786	-	1,567	7.47	4,641	1,786	-	1,077	490	
70 to 75	72.5	29.9	242	7.47	6,750	1,809	-	1,055	7.47	4,641	1,809	-	725	330	
65 to 70	67.5	26.6	294	7.47	6,750	2,197	-	355	7.47	4,641	2,197	-	244	111	
60 to 65	62.5	23.8	330	7.47	6,750	2,466	-		7.47	4,641	2,466	-		-	
55 to 60	57.5	21.6	291	7.47	6,750	2,175	340		7.47	4,641	2,175	234		-	106
50 to 55	52.5	18.3	288	7.47	6,750	2,153	471		7.47	4,641	2,153	324		-	147
45 to 50	47.5	16.3	227	7.47	6,750	1,697	477		7.47	4,641	1,697	328		-	149
40 to 45	42.5	14.4	293	7.47	6,750	2,190	753		7.47	4,641	2,190	518		-	235
35 to 40	37.5	12.6	191	7.47	6,750	1,428	580		7.47	4,641	1,428	399		-	181
30 to 35	32.5	10.8	164	7.47	6,750	1,226	575		7.47	4,641	1,226	395		-	180
25 to 30	27.5	8.8	98	7.47	6,750	732	389		7.47	4,641	732	268		-	122
20 to 25	22.5	7	99	7.47	6,750	740	440		7.47	4,641	740	302		-	137
15 to 20	17.5	5.5	67	7.47	6,750	501	329		7.47	4,641	501	226		-	103
10 to 15	12.5	3.7	42	7.47	6,750	314	226		7.47	4,641	314	155		-	71
5 to 10	7.5	2.5	34	7.47	6,750	254	199		7.47	4,641	254	137		-	62
0 to 5	2.5	1.2	17	7.47	6,750	127	107		7.47	4,641	127	74		-	34
-5 to 0	-2.5	0.1	6	7.47	6,750	45	41		7.47	4,641	45	28		-	13
-10 to -5	-7.5	-1.2	1	7.47	6,750	7	7		7.47	4,641	7	5		-	2
-15 to -10	-12.5	-2.6	6	7.47	6,750	45	46		7.47	4,641	45	32		-	14
Totals			**3,192**	**-**	**-**	**23,857**	**4,980**	**5,571**	**-**	**-**	**23,857**	**3,423**	**3,830**	**1,741**	**1,556**

Savings Summary		
Site Electricity Savings (kWh, $):	**1,741**	**$156**
Site Gas Savings (Therm, $):	**1,556**	**$1,334**
Total Cost Savings ($):	**$1,490**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Fan speeds can be adjusted in the following manner during occupied hours:

OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Student Union**

AHU details					
Unit:	AC-3	AC-4	AC-9	AC-10	Totals
Motor Nameplate Size	15	5	7.5	30	58
Calculated Air Flow: (cfm)	15,000	7,500	11,250	45,000	78,750
% Outdoor Air Flow:	12.0%	12.0%	12.0%	12.0%	12%
Fan Static Efficiency: (%)	53%	53%	53%	53%	
Total Static Pressure: (in)	1.50	1.50	1.50	1.50	
Calculated Fan Power: (BHP)	6.7	3.3	5.0	20.0	35
Calculated Fan Power: (kW)	4.98	2.49	3.74	14.95	26
Calculated OA Flow: (cfm)	1800	900	1350	5400	9,450
Proposed Average % OA:					8%
Average Heating Efficiency					78%
Average Cooling Efficiency (kW/ton)					0.37

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				**Baseline**					**Proposed**					**Savings**	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	26.16	9,450	105	-	58	26.16	6,497	105	-	40	18	
85 to 90	87.5	37.5	60	26.16	9,450	1,570	-	966	26.16	6,497	1,570	-	664	302	
80 to 85	82.5	35.1	199	26.16	9,450	5,206	-	2,571	26.16	6,497	5,206	-	1,768	804	
75 to 80	77.5	32.2	239	26.16	9,450	6,252	-	2,171	26.16	6,497	6,252	-	1,493	678	
70 to 75	72.5	29.9	242	26.16	9,450	6,330	-	1,462	26.16	6,497	6,330	-	1,005	457	
65 to 70	67.5	26.6	294	26.16	9,450	7,691	-	492	26.16	6,497	7,691	-	338	154	
60 to 65	62.5	23.8	330	26.16	9,450	8,632	-		26.16	6,497	8,632	-		-	
55 to 60	57.5	21.6	291	26.16	9,450	7,612	476		26.16	6,497	7,612	327		-	149
50 to 55	52.5	18.3	288	26.16	9,450	7,534	659		26.16	6,497	7,534	453		-	206
45 to 50	47.5	16.3	227	26.16	9,450	5,938	668		26.16	6,497	5,938	459		-	209
40 to 45	42.5	14.4	293	26.16	9,450	7,665	1,054		26.16	6,497	7,665	725		-	329
35 to 40	37.5	12.6	191	26.16	9,450	4,996	812		26.16	6,497	4,996	558		-	254
30 to 35	32.5	10.8	164	26.16	9,450	4,290	805		26.16	6,497	4,290	553		-	251
25 to 30	27.5	8.8	98	26.16	9,450	2,564	545		26.16	6,497	2,564	375		-	170
20 to 25	22.5	7	99	26.16	9,450	2,590	615		26.16	6,497	2,590	423		-	192
15 to 20	17.5	5.5	67	26.16	9,450	1,753	460		26.16	6,497	1,753	316		-	144
10 to 15	12.5	3.7	42	26.16	9,450	1,099	316		26.16	6,497	1,099	217		-	99
5 to 10	7.5	2.5	34	26.16	9,450	889	278		26.16	6,497	889	191		-	87
0 to 5	2.5	1.2	17	26.16	9,450	445	150		26.16	6,497	445	103		-	47
-5 to 0	-2.5	0.1	6	26.16	9,450	157	57		26.16	6,497	157	39		-	18
-10 to -5	-7.5	-1.2	1	26.16	9,450	26	10		26.16	6,497	26	7		-	3
-15 to -10	-12.5	-2.6	6	26.16	9,450	157	65		26.16	6,497	157	45		-	20
Totals			**3,192**	**-**	**-**	**83,499**	**6,971**	**7,721**	**-**	**-**	**83,499**	**4,793**	**5,308**	**2,413**	**2,179**

Savings Summary		
Site Electricity Savings (kWh, $):	**2,413**	**$216**
Site Gas Savings (Therm, $):	**2,179**	**$1,868**
Total Cost Savings ($):	**$2,084**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Fan speeds can be adjusted in the following manner during occupied hours:

OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Elting Gym**

AHU details		
Unit:	HV-1	Totals
Motor Nameplate Size	10	10
Calculated Air Flow: (cfm)	15,000	15,000
% Outdoor Air Flow:	20.0%	20%
Fan Static Efficiency: (%)	53%	
Total Static Pressure: (in)	1.50	
Calculated Fan Power: (BHP)	6.7	6.7
Calculated Fan Power: (kW)	4.98	5
Calculated OA Flow: (cfm)	3000	3,000
Proposed Average % OA:		14%
Average Heating Efficiency		78%
Average Cooling Efficiency (kW/ton)		1

Heating/Cooling		
Cooling Space Enthalpy:	25.3	Btu/lb
Heating Space Temp:	70	°F

Utility Costs		
Natural Gas:	$0.858	therm
Electricity:	$0.090	kWh

Weather Data				**Baseline**					**Proposed**					**Savings**	
ΔT (°F)	Mid-pts (°F)	h (Btu/lb)	Total Run Hours	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Fan Power (kW)	OA Flow (CFM)	Fan Energy (kWh)	Heating Energy (therm)	Cooling Energy (kWh)	Electric Energy Savings (kWh)	Heating Energy Savings (therm)
90 to 95	92.5	36.3	4	4.98	3,000	20	-	49	4.98	2,063	20	-	34	15	
85 to 90	87.5	37.5	60	4.98	3,000	299	-	821	4.98	2,063	299	-	565	257	
80 to 85	82.5	35.1	199	4.98	3,000	992	-	2,186	4.98	2,063	992	-	1,503	683	
75 to 80	77.5	32.2	239	4.98	3,000	1,191	-	1,846	4.98	2,063	1,191	-	1,269	577	
70 to 75	72.5	29.9	242	4.98	3,000	1,206	-	1,243	4.98	2,063	1,206	-	854	388	
65 to 70	67.5	26.6	294	4.98	3,000	1,465	-	418	4.98	2,063	1,465	-	288	131	
60 to 65	62.5	23.8	330	4.98	3,000	1,644	-		4.98	2,063	1,644	-		-	
55 to 60	57.5	21.6	291	4.98	3,000	1,450	151		4.98	2,063	1,450	104		-	47
50 to 55	52.5	18.3	288	4.98	3,000	1,435	209		4.98	2,063	1,435	144		-	65
45 to 50	47.5	16.3	227	4.98	3,000	1,131	212		4.98	2,063	1,131	146		-	66
40 to 45	42.5	14.4	293	4.98	3,000	1,460	335		4.98	2,063	1,460	230		-	105
35 to 40	37.5	12.6	191	4.98	3,000	952	258		4.98	2,063	952	177		-	81
30 to 35	32.5	10.8	164	4.98	3,000	817	255		4.98	2,063	817	176		-	80
25 to 30	27.5	8.8	98	4.98	3,000	488	173		4.98	2,063	488	119		-	54
20 to 25	22.5	7	99	4.98	3,000	493	195		4.98	2,063	493	134		-	61
15 to 20	17.5	5.5	67	4.98	3,000	334	146		4.98	2,063	334	100		-	46
10 to 15	12.5	3.7	42	4.98	3,000	209	100		4.98	2,063	209	69		-	31
5 to 10	7.5	2.5	34	4.98	3,000	169	88		4.98	2,063	169	61		-	28
0 to 5	2.5	1.2	17	4.98	3,000	85	48		4.98	2,063	85	33		-	15
-5 to 0	-2.5	0.1	6	4.98	3,000	30	18		4.98	2,063	30	12		-	6
-10 to -5	-7.5	-1.2	1	4.98	3,000	5	3		4.98	2,063	5	2		-	1
-15 to -10	-12.5	-2.6	6	4.98	3,000	30	21		4.98	2,063	30	14		-	6
Totals			**3,192**	-	-	**15,905**	**2,213**	**6,564**	-	-	**15,905**	**1,522**	**4,513**	**2,051**	**692**

Savings Summary		
Site Electricity Savings (kWh, $):	**2,051**	**$184**
Site Gas Savings (Therm, $):	**692**	**$593**
Total Cost Savings ($):	**$777**	

Assumptions:

- Proposed outdoor airflow based on assumed schedule: On 7am-7pm M-F, Off Sat-Sun
- Fan speeds can be adjusted in the following manner during occupied hours:

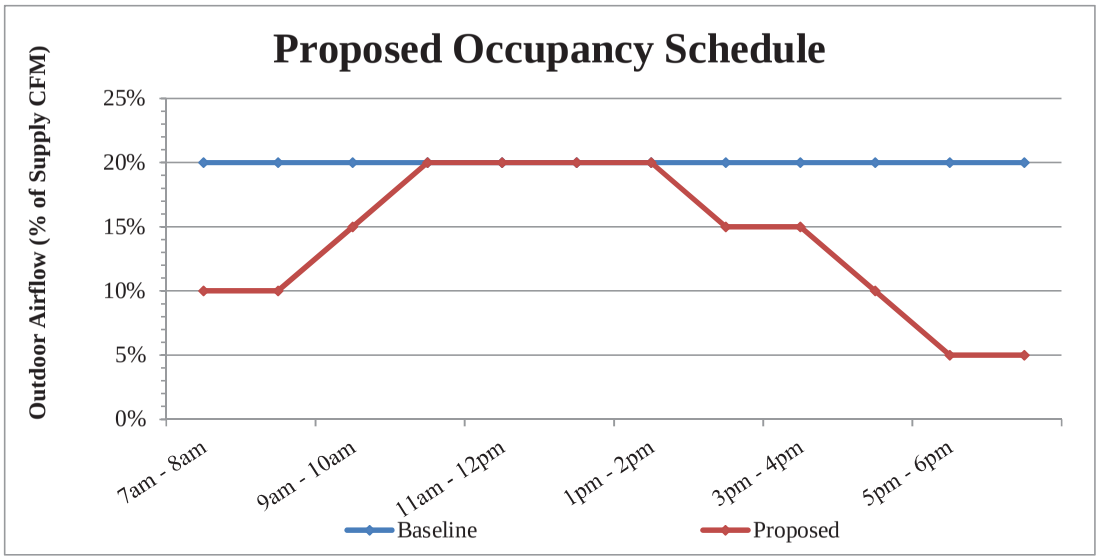
OAT (°F)	Fan Speed
> 80	85%
79 - 70	70%
69 - 40	60%
< 40	50%

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C5	**Demand Controlled Ventilation: Occupancy Profile**

Building Occupancy Profile

Hour	Baseline		Proposed	
	% Min OA	OA CFM	% Min OA	OA CFM
7am - 8am	20%		10%	
8am - 9am	20%		10%	
9am - 10am	20%		15%	
10am - 11am	20%		20%	
11am - 12pm	20%		20%	
12pm - 1pm	20%		20%	
1pm - 2pm	20%		20%	
2pm - 3pm	20%		15%	
3pm - 4pm	20%		15%	
4pm - 5pm	20%		10%	
5pm - 6pm	20%		5%	
6pm - 7pm	20%		5%	
Total Hours	12		12	
Avg % OA	20%		14%	



- Min OA is based on assumed typical building occupancy
  - OA flow can be further reduced if CO_2 sensors can show no occupancy
- AHUs are assumed to provide consistent levels of OA during occupied hours

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C6	**Kitchen Exhaust Hood Control System**

Utility Costs		
Electricity:	$0.090	/kWh
Natural Gas:	$0.858	/Therm

Energy Savings Summary

	Existing Fan Energy (kWh)	Existing Heating Use (Therms)	Proposed Fan Energy (kWh)	Proposed Heating Use (Therms)
Student Union	7,674	5,156	2,632	3,609
Parker Theater	1,517	922	520	645
Hasbrouck Dining	5,581	3,656	1,914	2,559
TOTALS	14,773	9,733	5,067	6,813

Notes:
- Reduction is based off of a study performed by the Food Service Technology Center
- 5 degree weather BINs used for calculation and determination of heating required
- No mechanical cooling is provided to kitchen areas.
- System cost is based upon estimate from contractor
- Savings includes VFD fan power reduction as well as heating energy saved.
- Existing Fan Flow Rate and Static Pressure are assumed values as existing equipment values could not be obtained.
- Existing flow rate calculated at 1000 CFM per linear foot of hood

Savings Summary	
Site Electricity Savings (kWh):	**9,706**
Site Gas Savings (Therms):	**2,920**
Energy Savings (MMBTU Source):	**416**
Cost Savings ($):	**$ 3,373**
Emissions Reduction (lb CO_2):	**55,386**
Cost Estimate ($):	**$ 21,039**
Simple payback:	**6.2**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C6	**Kitchen Exhaust Hood Control System**
Building	**Student Union**

Assumptions		
Exhaust Fan Flow Rate	2,750	CFM
Exhaust Fan Static Pressure	1.75	in W.G
Exhaust System Efficiency (Motor & Fan)	53%	
Boiler Efficiency	78%	
Typical Room Temperature Setpoint	70	Deg. F
Reduction due to VFD Usage	30%	
Anticipated VFD CFM	1,925	

Reduction is based off of a study performed by the Food Service Technology Center

Weather Data			Existing System BIN Analysis					Proposed System BIN Analysis					
Mid-pts	DB (F)	Total Run Hours	Fixed Speed Exhaust Fan HP	Fixed Speed Exhaust Fan kW	Fixed Speed Exhaust Fan kWh	Fixed Speed Heating Load (BTU)	Fixed Speed Heating Load (therms)	Fixed Speed Exhaust HP	VFD Exhaust HP	VFD Exhaust kW	VFD Exhaust Fan kWh	VFD Heating Load (BTU)	VFD Heating Load (therms)
92.5	90 to 95	12	1.43	1.07	12.8	0	0	1.43	0.49	0.37	4.4	0	0
87.5	85 to 90	98	1.43	1.07	104.4	0	0	1.43	0.49	0.37	35.8	0	0
82.5	80 to 85	311	1.43	1.07	331.4	0	0	1.43	0.49	0.37	113.7	0	0
77.5	75 to 80	383	1.43	1.07	408.2	0	0	1.43	0.49	0.37	140.0	0	0
72.5	70 to 75	514	1.43	1.07	547.8	0	0	1.43	0.49	0.37	187.9	0	0
67.5	65 to 70	639	1.43	1.07	681.0	0	0	1.43	0.49	0.37	233.6	0	0
62.5	60 to 65	745	1.43	1.07	794.0	0	0.0	1.43	0.49	0.37	272.3	0	0.0
57.5	55 to 60	713	1.43	1.07	759.9	33,936,058	339.4	1.43	0.49	0.37	260.6	23,755,240	237.6
52.5	50 to 55	653	1.43	1.07	695.9	43,512,404	435.1	1.43	0.49	0.37	238.7	30,458,683	304.6
47.5	45 to 50	500	1.43	1.07	532.9	42,836,538	428.4	1.43	0.49	0.37	182.8	29,985,577	299.9
42.5	40 to 45	623	1.43	1.07	664.0	65,235,288	652.4	1.43	0.49	0.37	227.7	45,664,702	456.6
37.5	35 to 40	574	1.43	1.07	611.7	71,032,500	710.3	1.43	0.49	0.37	209.8	49,722,750	497.2
32.5	30 to 35	437	1.43	1.07	465.7	62,398,558	624.0	1.43	0.49	0.37	159.7	43,678,990	436.8
27.5	25 to 30	271	1.43	1.07	288.8	43,855,096	438.6	1.43	0.49	0.37	99.1	30,698,567	307.0
22.5	20 to 25	271	1.43	1.07	288.8	49,014,519	490.1	1.43	0.49	0.37	99.1	34,310,163	343.1
17.5	15 to 20	170	1.43	1.07	181.2	33,983,654	339.8	1.43	0.49	0.37	62.1	23,788,558	237.9
12.5	10 to 15	101	1.43	1.07	107.6	22,113,173	221.1	1.43	0.49	0.37	36.9	15,479,221	154.8
7.5	5 to 10	84	1.43	1.07	89.5	19,990,385	199.9	1.43	0.49	0.37	30.7	13,993,269	139.9
2.5	0 to 5	59	1.43	1.07	62.9	15,164,135	151.6	1.43	0.49	0.37	21.6	10,614,894	106.1
-2.5	-5 to 0	20	1.43	1.07	21.3	5,521,154	55.2	1.43	0.49	0.37	7.3	3,864,808	38.6
-7.5	-10 to -5	14	1.43	1.07	14.9	4,131,346	41.3	1.43	0.49	0.37	5.1	2,891,942	28.9
-12.5	-15 to -10	9	1.43	1.07	9.6	2,827,212	28.3	1.43	0.49	0.37	3.3	1,979,048	19.8
TOTALS		7,201		1.07	7,674	515,552,019	5,156			0.37	2,632	360,886,413	3,609

Savings Analysis			
	Existing	**Proposed**	**Totals**
Fan Energy (kWh)	7,674	2,632	5,042
Heating Energy (Therms)	5,156	3,609	1,547

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C6	**Kitchen Exhaust Hood Control System**
Building	**Parker Theater**

Assumptions		
Exhaust Fan Flow Rate	700	CFM
Exhaust Fan Static Pressure	1.75	in W.G
Exhaust System Efficiency (Motor & Fan)	53%	
Boiler Efficiency	80%	
Typical Room Temperature Setpoint	70	Deg. F
Reduction due to VFD Usage	30%	
Anticipated VFD CFM	490	

Reduction is based off of a study performed by the Food Service Technology Center

Weather Data			Existing System BIN Analysis					Proposed System BIN Analysis					
Mid-pts	DB (F)	Total Run Hours	Fixed Speed Exhaust Fan HP	Fixed Speed Exhaust Fan kW	Fixed Speed Exhaust Fan kWh	Fixed Speed Heating Load (BTU)	Fixed Speed Heating Load (therms)	Fixed Speed Exhaust HP	VFD Exhaust HP	VFD Exhaust kW	VFD Exhaust Fan kWh	VFD Heating Load (BTU)	VFD Heating Load (therms)
92.5	90 to 95	12	0.36	0.27	3.3	0	0	0.36	0.12	0.09	1.1	0	0
87.5	85 to 90	98	0.36	0.27	26.6	0	0	0.36	0.12	0.09	9.1	0	0
82.5	80 to 85	310	0.36	0.27	84.1	0	0	0.36	0.12	0.09	28.8	0	0
77.5	75 to 80	368	0.36	0.27	99.8	0	0	0.36	0.12	0.09	34.2	0	0
72.5	70 to 75	440	0.36	0.27	119.4	0	0	0.36	0.12	0.09	40.9	0	0
67.5	65 to 70	504	0.36	0.27	136.7	0	0	0.36	0.12	0.09	46.9	0	0
62.5	60 to 65	573	0.36	0.27	155.4	0	0.0	0.36	0.12	0.09	53.3	0	0.0
57.5	55 to 60	531	0.36	0.27	144.0	6,272,438	62.7	0.36	0.12	0.09	49.4	4,390,706	43.9
52.5	50 to 55	482	0.36	0.27	130.8	7,971,075	79.7	0.36	0.12	0.09	44.8	5,579,753	55.8
47.5	45 to 50	390	0.36	0.27	105.8	8,292,375	82.9	0.36	0.12	0.09	36.3	5,804,663	58.0
42.5	40 to 45	476	0.36	0.27	129.1	12,370,050	123.7	0.36	0.12	0.09	44.3	8,659,035	86.6
37.5	35 to 40	410	0.36	0.27	111.2	12,592,125	125.9	0.36	0.12	0.09	38.1	8,814,488	88.1
32.5	30 to 35	295	0.36	0.27	80.0	10,454,063	104.5	0.36	0.12	0.09	27.4	7,317,844	73.2
27.5	25 to 30	193	0.36	0.27	52.4	7,751,363	77.5	0.36	0.12	0.09	18.0	5,425,954	54.3
22.5	20 to 25	187	0.36	0.27	50.7	8,393,963	83.9	0.36	0.12	0.09	17.4	5,875,774	58.8
17.5	15 to 20	122	0.36	0.27	33.1	6,052,725	60.5	0.36	0.12	0.09	11.4	4,236,908	42.4
12.5	10 to 15	74	0.36	0.27	20.1	4,020,975	40.2	0.36	0.12	0.09	6.9	2,814,683	28.1
7.5	5 to 10	65	0.36	0.27	17.6	3,839,063	38.4	0.36	0.12	0.09	6.0	2,687,344	26.9
2.5	0 to 5	37	0.36	0.27	10.0	2,360,138	23.6	0.36	0.12	0.09	3.4	1,652,096	16.5
-2.5	-5 to 0	13	0.36	0.27	3.5	890,663	8.9	0.36	0.12	0.09	1.2	623,464	6.2
-7.5	-10 to -5	5	0.36	0.27	1.4	366,188	3.7	0.36	0.12	0.09	0.5	256,331	2.6
-12.5	-15 to -10	7	0.36	0.27	1.9	545,738	5.5	0.36	0.12	0.09	0.7	382,016	3.8
TOTALS		5,592		0.27	1,517	92,172,938	922			0.09	520	64,521,056	645

Savings Analysis			
	Existing	**Proposed**	**Totals**
Fan Energy (kWh)	1,517	520	997
Heating Energy (Therms)	922	645	277

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C6	**Kitchen Exhaust Hood Control System**
Building	**Hasbrouck Dining**

Assumptions		
Exhaust Fan Flow Rate	2,000	CFM
Exhaust Fan Static Pressure	1.75	in W.G
Exhaust System Efficiency (Motor & Fan)	53%	
Boiler Efficiency	80%	
Typical Room Temperature Setpoint	70	Deg. F
Reduction due to VFD Usage	30%	
Anticipated VFD CFM	1,400	

Reduction is based off of a study performed by the Food Service Technology Center

Weather Data			**Existing System BIN Analysis**					**Proposed System BIN Analysis**					
Mid-pts	DB (F)	Total Run Hours	Fixed Speed Exhaust Fan HP	Fixed Speed Exhaust Fan kW	Fixed Speed Exhaust Fan kWh	Fixed Speed Heating Load (BTU)	Fixed Speed Heating Load (therms)	Fixed Speed Exhaust HP	VFD Exhaust HP	VFD Exhaust kW	VFD Exhaust Fan kWh	VFD Heating Load (BTU)	VFD Heating Load (therms)
92.5	90 to 95	12	1.04	0.78	9.3	0	0	1.04	0.36	0.27	3.2	0	0
87.5	85 to 90	98	1.04	0.78	76.0	0	0	1.04	0.36	0.27	26.1	0	0
82.5	80 to 85	311	1.04	0.78	241.1	0	0	1.04	0.36	0.27	82.7	0	0
77.5	75 to 80	383	1.04	0.78	296.9	0	0	1.04	0.36	0.27	101.8	0	0
72.5	70 to 75	514	1.04	0.78	398.4	0	0	1.04	0.36	0.27	136.6	0	0
67.5	65 to 70	639	1.04	0.78	495.3	0	0	1.04	0.36	0.27	169.9	0	0
62.5	60 to 65	745	1.04	0.78	577.4	0	0.0	1.04	0.36	0.27	198.1	0	0.0
57.5	55 to 60	713	1.04	0.78	552.6	24,063,750	240.6	1.04	0.36	0.27	189.6	16,844,625	168.4
52.5	50 to 55	653	1.04	0.78	506.1	30,854,250	308.5	1.04	0.36	0.27	173.6	21,597,975	216.0
47.5	45 to 50	500	1.04	0.78	387.5	30,375,000	303.8	1.04	0.36	0.27	132.9	21,262,500	212.6
42.5	40 to 45	623	1.04	0.78	482.9	46,257,750	462.6	1.04	0.36	0.27	165.6	32,380,425	323.8
37.5	35 to 40	574	1.04	0.78	444.9	50,368,500	503.7	1.04	0.36	0.27	152.6	35,257,950	352.6
32.5	30 to 35	437	1.04	0.78	338.7	44,246,250	442.5	1.04	0.36	0.27	116.2	30,972,375	309.7
27.5	25 to 30	271	1.04	0.78	210.0	31,097,250	311.0	1.04	0.36	0.27	72.0	21,768,075	217.7
22.5	20 to 25	271	1.04	0.78	210.0	34,755,750	347.6	1.04	0.36	0.27	72.0	24,329,025	243.3
17.5	15 to 20	170	1.04	0.78	131.8	24,097,500	241.0	1.04	0.36	0.27	45.2	16,868,250	168.7
12.5	10 to 15	101	1.04	0.78	78.3	15,680,250	156.8	1.04	0.36	0.27	26.9	10,976,175	109.8
7.5	5 to 10	84	1.04	0.78	65.1	14,175,000	141.8	1.04	0.36	0.27	22.3	9,922,500	99.2
2.5	0 to 5	59	1.04	0.78	45.7	10,752,750	107.5	1.04	0.36	0.27	15.7	7,526,925	75.3
-2.5	-5 to 0	20	1.04	0.78	15.5	3,915,000	39.2	1.04	0.36	0.27	5.3	2,740,500	27.4
-7.5	-10 to -5	14	1.04	0.78	10.9	2,929,500	29.3	1.04	0.36	0.27	3.7	2,050,650	20.5
-12.5	-15 to -10	9	1.04	0.78	7.0	2,004,750	20.0	1.04	0.36	0.27	2.4	1,403,325	14.0
TOTALS		7,201		0.78	5,581	365,573,250	3,656			0.27	1,914	255,901,275	2,559

Savings Analysis			
	Existing	**Proposed**	**Totals**
Fan Energy (kWh)	5,581	1,914	3,667
Heating Energy (Therms)	3,656	2,559	1,097

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boilers**

Savings Summary	
Site Electricity Savings (kWh):	0
Site Gas Savings (Therms):	26,773
Energy Savings (MMBTU Source):	2,803
Cost Savings ($):	$ 22,959
Emissions Reduction (lb CO_2):	326,227
Cost Estimate ($):	$ 404,210
Simple payback:	17.6

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - Day Care Center**

Baseline Equipment		
# Boilers:	1	
Boiler Input:	300	MBH
Boiler Efficiency:	78%	

Proposed Equipment		
# Condensing Boilers:	1	
Condensing Boiler Input:	300	MBH
Average Boiler Efficiency:	90%	

Utility Costs		
Natural Gas:	$0.858	therm

Weather Data					**Baseline**		**Proposed**		**Savings**	
Avg.	**ΔT**	**Total hours**	**Heating Load (MBH)**	**Fraction of Annual Peak Load**	**Boiler Efficiency**	**Boiler Input (therm)**	**Boiler Efficiency**	**Boiler Input (therm)**	**Gas Input (therm)**	**Gas Input ($)**
57.5	55 to 60	885	8	3.4%	78%	92	94.6%	75	16	$14
52.5	50 to 55	837	24	10.3%	78%	260	94.0%	216	44	$38
47.5	45 to 50	604	40	17.2%	78%	312	93.4%	261	51	$44
42.5	40 to 45	756	56	24.1%	78%	547	92.8%	460	87	$75
37.5	35 to 40	747	73	31.0%	78%	695	92.1%	589	107	$92
32.5	30 to 35	553	89	37.9%	78%	629	91.5%	536	93	$80
27.5	25 to 30	374	105	44.8%	78%	503	90.9%	432	71	$61
22.5	20 to 25	337	121	51.7%	78%	523	90.3%	452	71	$61
17.5	15 to 20	214	137	58.6%	78%	376	89.7%	327	49	$42
12.5	10 to 15	127	153	65.5%	78%	250	89.1%	219	31	$27
7.5	5 to 10	110	169	72.4%	78%	239	88.4%	211	28	$24
2.5	0 to 5	77	186	79.3%	78%	183	87.8%	163	20	$18
-2.5	-5 to 0	33	202	86.2%	78%	85	87.2%	76	9	$8
-7.5	-10 to -5	20	218	93.1%	78%	56	86.6%	50	6	$5
-12.5	-15 to -10	10	234	100.0%	78%	30	86.0%	27	3	$2
Total						**4,259**		**3,649**	**610**	**$523**

Savings Summary	
Energy Savings (therm):	**610**
Energy Savings ($):	**$523**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - Student Health Center**

Baseline Equipment		
# Boilers:	1	
Boiler Input:	789	MBH
Boiler Efficiency:	78%	

Proposed Equipment		
# Condensing Boilers:	1	
Condensing Boiler Input:	800	MBH
Average Boiler Efficiency:	90%	

Utility Costs		
Natural Gas:	$0.858	therm

Weather Data					**Baseline**		**Proposed**		**Savings**	
Avg.	**ΔT**	**Total hours**	**Heating Load (MBH)**	**Fraction of Annual Peak Load**	**Boiler Efficiency**	**Boiler Input (therm)**	**Boiler Efficiency**	**Boiler Input (therm)**	**Gas Input (therm)**	**Gas Input ($)**
57.5	55 to 60	885	21	3.4%	78%	241	94.6%	198	42	$36
52.5	50 to 55	837	64	10.3%	78%	683	94.0%	567	116	$100
47.5	45 to 50	604	106	17.2%	78%	822	93.4%	686	135	$116
42.5	40 to 45	756	149	24.1%	78%	1,440	92.8%	1,211	229	$197
37.5	35 to 40	747	191	31.0%	78%	1,829	92.1%	1,548	281	$241
32.5	30 to 35	553	233	37.9%	78%	1,655	91.5%	1,410	245	$210
27.5	25 to 30	374	276	44.8%	78%	1,323	90.9%	1,135	188	$161
22.5	20 to 25	337	318	51.7%	78%	1,375	90.3%	1,188	187	$161
17.5	15 to 20	214	361	58.6%	78%	990	89.7%	861	129	$111
12.5	10 to 15	127	403	65.5%	78%	657	89.1%	575	82	$70
7.5	5 to 10	110	446	72.4%	78%	628	88.4%	554	74	$64
2.5	0 to 5	77	488	79.3%	78%	482	87.8%	428	54	$46
-2.5	-5 to 0	33	531	86.2%	78%	224	87.2%	201	24	$20
-7.5	-10 to -5	20	573	93.1%	78%	147	86.6%	132	15	$12
-12.5	-15 to -10	10	615	100.0%	78%	79	86.0%	72	7	$6
Total						**11,200**		**9,597**	**1,604**	**$1,376**

Savings Summary	
Energy Savings (therm):	**1,604**
Energy Savings ($):	**$1,376**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - Lenape**

Baseline Equipment		
# Boilers:	2	
Boiler Input:	2,520	MBH
Boiler Efficiency:	78%	

Proposed Equipment		
# Condensing Boilers:	2	
Condensing Boiler Input:	2,520	MBH
Average Boiler Efficiency:	90%	

Utility Costs		
Natural Gas:	$0.858	therm

Weather Data					Baseline		Proposed		Savings	
Avg.	ΔT	Total hours	Heating Load (MBH)	Fraction of Annual Peak Load	Boiler Efficiency	Boiler Input (therm)	Boiler Efficiency	Boiler Input (therm)	Gas Input (therm)	Gas Input ($)
57.5	55 to 60	885	136	3.4%	78%	1,538	94.6%	1,268	270	$232
52.5	50 to 55	837	407	10.3%	78%	4,364	94.0%	3,621	743	$637
47.5	45 to 50	604	678	17.2%	78%	5,249	93.4%	4,384	865	$742
42.5	40 to 45	756	949	24.1%	78%	9,197	92.8%	7,733	1,464	$1,256
37.5	35 to 40	747	1,220	31.0%	78%	11,684	92.1%	9,890	1,794	$1,539
32.5	30 to 35	553	1,491	37.9%	78%	10,572	91.5%	9,009	1,563	$1,341
27.5	25 to 30	374	1,762	44.8%	78%	8,450	90.9%	7,250	1,200	$1,030
22.5	20 to 25	337	2,033	51.7%	78%	8,785	90.3%	7,589	1,196	$1,026
17.5	15 to 20	214	2,304	58.6%	78%	6,323	89.7%	5,499	823	$706
12.5	10 to 15	127	2,576	65.5%	78%	4,194	89.1%	3,673	521	$447
7.5	5 to 10	110	2,847	72.4%	78%	4,015	88.4%	3,541	474	$407
2.5	0 to 5	77	3,118	79.3%	78%	3,078	87.8%	2,734	344	$295
-2.5	-5 to 0	33	3,389	86.2%	78%	1,434	87.2%	1,283	151	$130
-7.5	-10 to -5	20	3,660	93.1%	78%	938	86.6%	845	93	$80
-12.5	-15 to -10	10	3,931	100.0%	78%	504	86.0%	457	47	$40
Total						**71,545**		**61,301**	**10,244**	**$8,789**

Savings Summary	
Energy Savings (therm):	**10,244**
Energy Savings ($):	**$8,789**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - College Hall**

Baseline Equipment		
# Boilers:	1	
Boiler Input:	750	MBH
Boiler Efficiency:	85%	

Proposed Equipment		
# Condensing Boilers:	1	
Condensing Boiler Input:	800	MBH
Average Boiler Efficiency:	90%	

Utility Costs		
Natural Gas:	$0.858	therm

Weather Data					Baseline		Proposed		Savings	
Avg.	ΔT	Total hours	Heating Load (MBH)	Fraction of Annual Peak Load	Boiler Efficiency	Boiler Input (therm)	Boiler Efficiency	Boiler Input (therm)	Gas Input (therm)	Gas Input ($)
57.5	55 to 60	885	22	3.4%	85%	229	94.6%	206	23	$20
52.5	50 to 55	837	66	10.3%	85%	649	94.0%	587	62	$53
47.5	45 to 50	604	110	17.2%	85%	781	93.4%	711	70	$60
42.5	40 to 45	756	154	24.1%	85%	1,369	92.8%	1,254	115	$98
37.5	35 to 40	747	198	31.0%	85%	1,739	92.1%	1,604	135	$116
32.5	30 to 35	553	242	37.9%	85%	1,573	91.5%	1,461	112	$96
27.5	25 to 30	374	286	44.8%	85%	1,257	90.9%	1,176	82	$70
22.5	20 to 25	337	330	51.7%	85%	1,307	90.3%	1,231	77	$66
17.5	15 to 20	214	374	58.6%	85%	941	89.7%	892	49	$42
12.5	10 to 15	127	418	65.5%	85%	624	89.1%	596	28	$24
7.5	5 to 10	110	462	72.4%	85%	597	88.4%	574	23	$20
2.5	0 to 5	77	506	79.3%	85%	458	87.8%	443	15	$13
-2.5	-5 to 0	33	550	86.2%	85%	213	87.2%	208	5	$5
-7.5	-10 to -5	20	594	93.1%	85%	140	86.6%	137	3	$2
-12.5	-15 to -10	10	638	100.0%	85%	75	86.0%	74	1	$1
Total						**10,647**		**9,941**	**706**	**$606**

Savings Summary	
Energy Savings (therm):	**706**
Energy Savings ($):	**$606**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - Esopus**

Baseline Equipment		
# Boilers:	2	
Boiler Input:	3,348	MBH
Boiler Efficiency:	78%	

Proposed Equipment		
# Condensing Boilers:	2	
Condensing Boiler Input:	2,000	MBH
Average Boiler Efficiency:	90%	

Utility Costs		
Natural Gas:	$0.858	therm

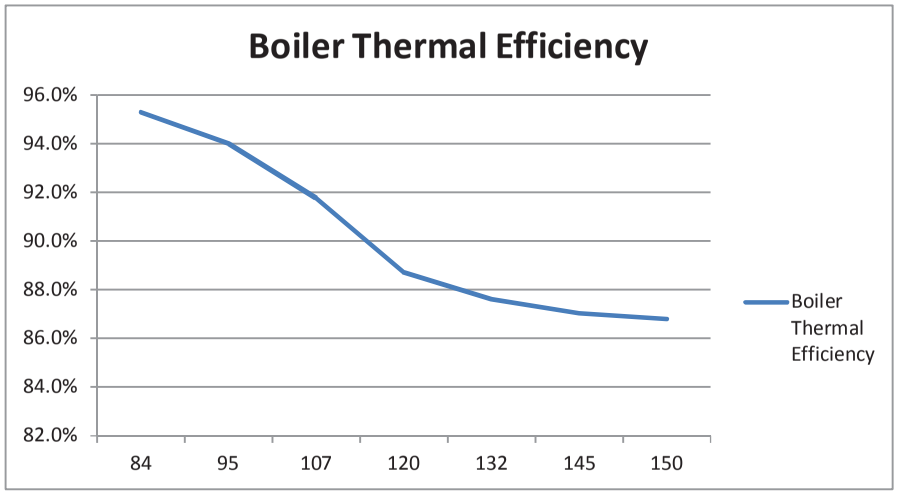
Weather Data					Baseline		Proposed		Savings	
Avg.	ΔT	Total hours	Heating Load (MBH)	Fraction of Annual Peak Load	Boiler Efficiency	Boiler Input (therm)	Boiler Efficiency	Boiler Input (therm)	Gas Input (therm)	Gas Input ($)
57.5	55 to 60	885	180	3.4%	78%	2,043	94.6%	1,684	359	$308
52.5	50 to 55	837	540	10.3%	78%	5,798	94.0%	4,811	987	$847
47.5	45 to 50	604	900	17.2%	78%	6,973	93.4%	5,824	1,149	$986
42.5	40 to 45	756	1,261	24.1%	78%	12,219	92.8%	10,274	1,945	$1,669
37.5	35 to 40	747	1,621	31.0%	78%	15,523	92.1%	13,140	2,384	$2,045
32.5	30 to 35	553	1,981	37.9%	78%	14,045	91.5%	11,969	2,076	$1,781
27.5	25 to 30	374	2,341	44.8%	78%	11,226	90.9%	9,632	1,594	$1,368
22.5	20 to 25	337	2,701	51.7%	78%	11,672	90.3%	10,083	1,589	$1,364
17.5	15 to 20	214	3,062	58.6%	78%	8,400	89.7%	7,306	1,094	$938
12.5	10 to 15	127	3,422	65.5%	78%	5,572	89.1%	4,880	692	$594
7.5	5 to 10	110	3,782	72.4%	78%	5,334	88.4%	4,704	630	$540
2.5	0 to 5	77	4,142	79.3%	78%	4,089	87.8%	3,632	457	$392
-2.5	-5 to 0	33	4,502	86.2%	78%	1,905	87.2%	1,704	201	$172
-7.5	-10 to -5	20	4,863	93.1%	78%	1,247	86.6%	1,123	124	$106
-12.5	-15 to -10	10	5,223	100.0%	78%	670	86.0%	608	62	$53
Total						**95,053**		**81,443**	**13,610**	**$11,677**

Savings Summary	
Energy Savings (therm):	**13,610**
Energy Savings ($):	**$11,677**

EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C7	**Condensing Boiler - Boiler Efficiency Calculation**

Avg Temp in bin	Fraction of Peak Heating Load	Supply Water T	Return Water T	Condensing Mode	Boiler Thermal Efficiency
60	0%	86	84	y	95.3%
48	17%	102	95	y	94.0%
35	34%	118	107	y	91.8%
21	54%	137	120	y	88.7%
7.5	72%	154	132	n	87.6%
-7.5	93%	174	145	n	87.0%
-12.5	100%	180	150	n	86.8%



EYP/energy

Project Name:	**SUNY New Paltz**
Project Number:	**4013032.01**
ECM-C8	**Chiller Replacement**

Chiller Part Load Efficiency		
% Load	Existing (kW/ton)	New (kW/ton)
100%	0.788	0.415
75%	0.667	0.294
50%	0.599	0.226
25%	0.756	0.383

Assumptions	
Chiller % Load	Temp (°F)
85%	92
0%	55

Peak Tonnage	
Existing (tons)	New (tons)
250	250

Utility Costs		
Electricity:	$0.11	kWh

Weather Data			Load data		Existing Chiller			New Chiller			Savings	
Avg.	ΔT	Total (hrs)	% Cooling Load	Cooling Load (tons)	% Load	kW/ton	Cooling Energy (kWh)	% Load	kW/ton	Cooling Energy (kWh)	Energy Savings (kWh)	Energy Savings ($)
92.5	90-95	12	86%	215.4	86%	0.721	1,864	86%	0.348	900	964	$103
87.5	85-90	98	75%	186.7	75%	0.666	12,187	75%	0.293	5,364	6,823	$732
82.5	80-85	305	63%	157.9	63%	0.635	30,583	63%	0.262	12,615	17,968	$1,927
77.5	75-80	375	52%	129.2	52%	0.603	29,245	52%	0.230	11,169	18,075	$1,938
72.5	70-75	552	40%	100.5	40%	0.661	36,652	40%	0.288	15,958	20,694	$2,219
67.2	65-70	700	28%	70.1	28%	0.737	36,167	28%	0.364	17,873	18,295	$1,962
62.5	60-65	771	17%	43.1	17%	0.805	26,750	17%	0.432	14,362	12,387	$1,328
Total			-	-	-	-	**173,447**	-	-	**78,241**	**95,206**	**$ 10,209**

Savings Summary	
Site Electricity Savings (kWh):	**95,206**
Site Gas Savings (therms)	**0**
Energy Savings (MMBTU Source)	**1,085**
Emission Reduction	**194,291**
Total Savings ($):	**$10,209**
Estimated Total Project Cost:	**$421,053** - *From Cost Estimate Sheet*
Simple Payback (years):	**41.2**

Assumptions:

(1) Chiller operate on days where temperature will reach at least 60°F. Assume chiller does not run when temperature below 55°F.

Appendix 5 – Energy Modeling

Required in the sample report in the RFP, may not use

Appendix 6 – Schematics

Required in the sample report in the RFP, may not use

Appendix 7 – Spec Sheets

Required in the sample report in the RFP, may use sparingly