



# Lindenhurst Union Free School District

## An Energy Conservation Plan

March 15, 2017

**Lindenhurst**  
UNION FREE SCHOOL DISTRICT



# Agenda

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- Introduction to the Team
- Phases 1 & 2 Overview
- Project Overview
- Energy Efficiency Measures
- Cost and Savings Summary
- Next Steps
- Questions

# Performance Contract Team

- Account Executive
  - Danny Haffel
- Operations Manager
  - Robert Rolston, CEM, LEED AP
- Energy Engineering Manager
  - Ken Petersen, PE, CEM, LEED AP
- Senior Engineer
  - Pratik Thakkar
- Over 50 Years of Combined Experience in school construction and SED design
- Dedicated NYSED Team located in Albany
- Undisputed Leader in Energy Performance Contracting Nationwide
- Long Island Team Entering into 95<sup>th</sup> Project
- Long Island Team #1 in Region with 84% Market Share



## Phase 1 Overview

- Phase 1 Construction Ended: October 2006
- Boiler Replacements at Daniel ES & Lindenhurst MS
- Lighting Upgrades
- Weatherization
- Steam Trap Replacement at Bower, Rall and MS
- Guarantee Period Year: 11
- Actual Savings Exceeded by: 31%

*Before*



*After*



**Lindenhurst Middle School**

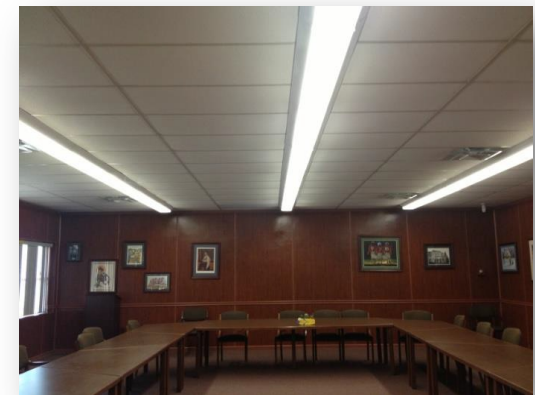
## Phase 2 Overview

- Phase 2 Construction Ended: April 2013
- Boiler Replacements at Albany Ave & McKenna
- Lighting Upgrades
- Energy Management System
- Pipe & Valve Insulation
- Motor Replacements
- Guarantee Period Year: 4
- Actual Savings Exceeded by: 16%

*Before*



*After*



**McKenna Conference Room**

## Project Overview

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Annual District  
Energy Savings:  
**\$545,992 – 49.8%**

Project Cost:  
**\$10,578,025**

Energy Efficiency  
Measures (EEM) :  
**17**

Payback Period:  
**17 years**

Cumulative Cash  
Flow:  
**\$5,771,791**

# Energy Efficiency Measures



# Lighting - Interior Retrofits & Controls

- LED Retrofits throughout the District
- Fixture Controls and Daylight Harvesting

Building	Proposed Retrofits
Lindenhurst High School	2332
Lindenhurst Middle School	2415
Albany Avenue School	532
Alleghany Avenue School	429
Daniel Street School	527
Harding Avenue School	381
Kellum Street School	559
West Gates Avenue School	386
William Rall School	719
McKenna Administration	335
<b>Total</b>	<b>8615</b>



Savings: \$104,910

## Lighting – Exterior

- Upgrade existing exterior lights to LED
- Total Exterior Retrofits: 356
- Includes Wall Packs, Flood Lights and Parking Area Lights
- Integrated Photocells where applicable



Savings: \$7,841

# Energy Management System

## ■ Temperature Setback

- Supervisory Controllers
  - Remove Andover/Siemens at Alleghany, Harding, Kellum and Rall
  - Integrate to Single Districtwide Temperature Control Network
- Boiler Room Automatic Temperature Control
- Air Handling Unit DDC Refit – 29 Units Total
- Districtwide BMS Server



## ■ Demand Controlled Ventilation at High School and Middle School (Auditorium, Gym & Library) AHUs and H&V Units

## ■ Optimal Start at all locations

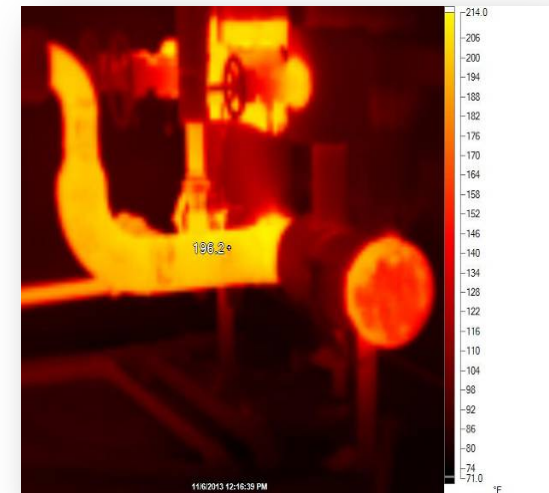
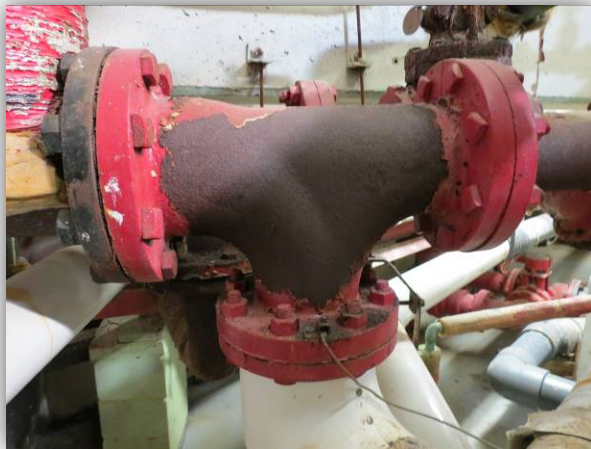


Savings: \$156,425

# Heating Distribution System – Pipe & Valve Insulation

- Pipe, Valve & Tank Insulation on Uninsulated Piping in all the buildings.
- All Areas in unconditioned spaces (per SED standards)

Building	Length (ft) or Surface Area (sqft)
Albany Avenue	35.15
Allegheny Avenue	3
Daniel Street	6.8
Harding Avenue	2.1
High School	85
Kellum Street	60
McKenna Admin	7.8
Middle School	196
West Gates Avenue	10.1
William Rall	107.8
<b>Total</b>	<b>513.75</b>



Savings: \$ 5,616

# Roof Replacement

- New Versico Roof at Daniel Street Elementary School with 20 year Warranty:  
Approx. 72,000 Sq. ft.
- EPDM Roof Replacement – Full Removal of Existing Roof
- Asbestos Abatement as Required

## Daniel Street Elementary School

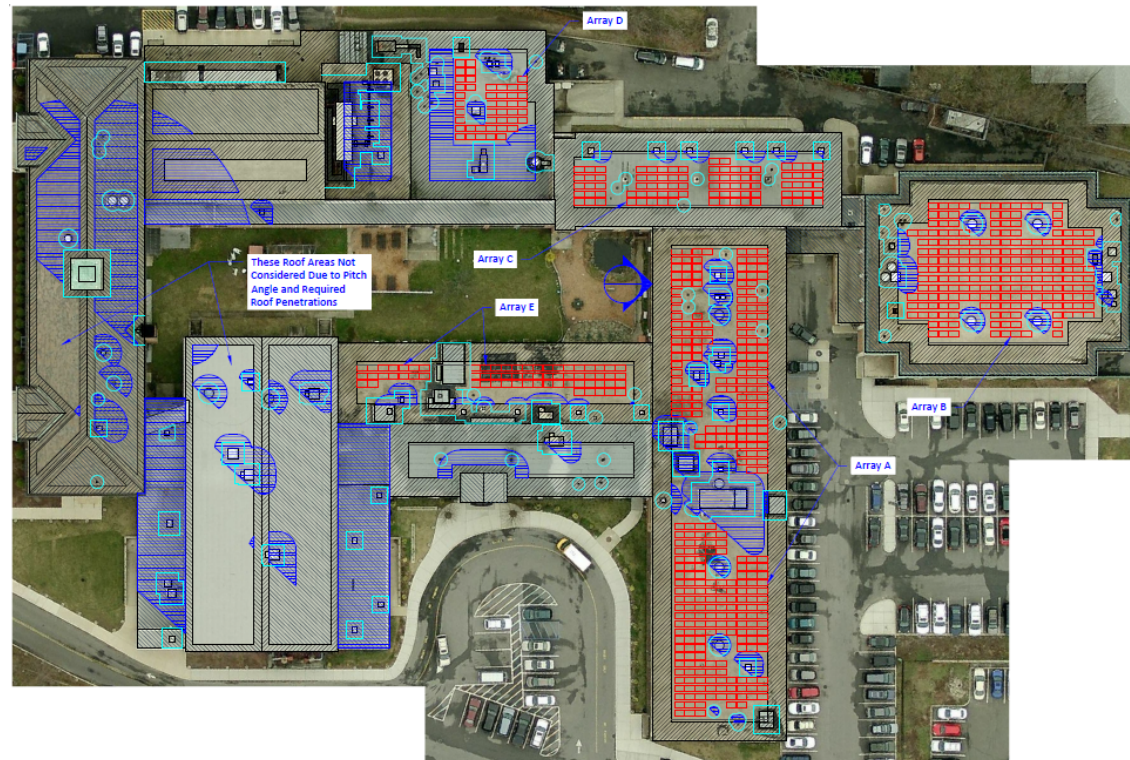


Savings: \$13,039

# Photovoltaic Electric Generation

- Total Photovoltaics proposed at the District: 932.08 kW

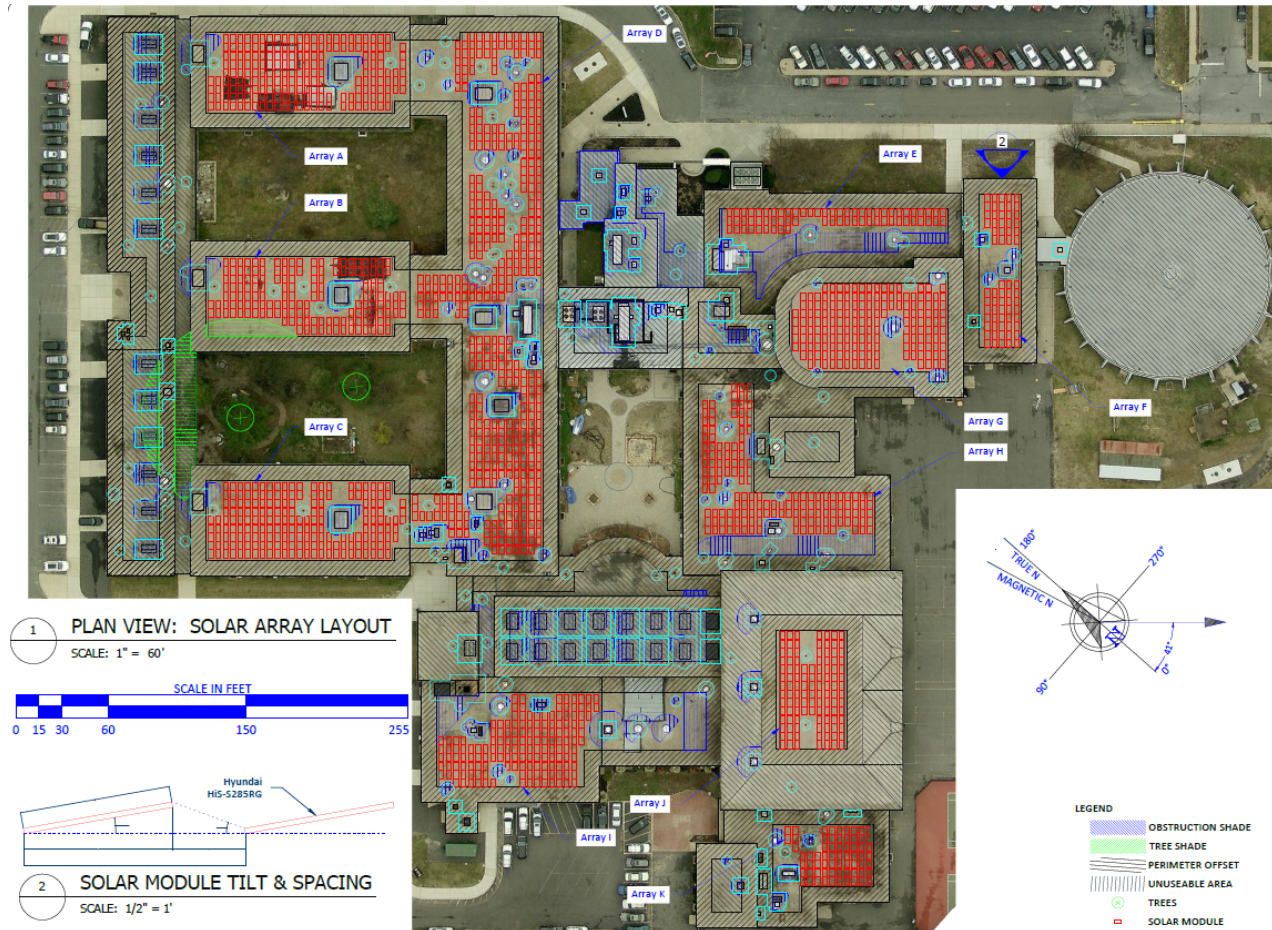
Building	System Size
Lindenhurst High School	414.96 kW
Lindenhurst Middle School	197.12 kW
Harding Ave Elementary	184.8 kW
Daniel Street Elementary	135.2 kW
<b>Total</b>	<b>932.08 kW</b>



**Lindenhurst Middle School**

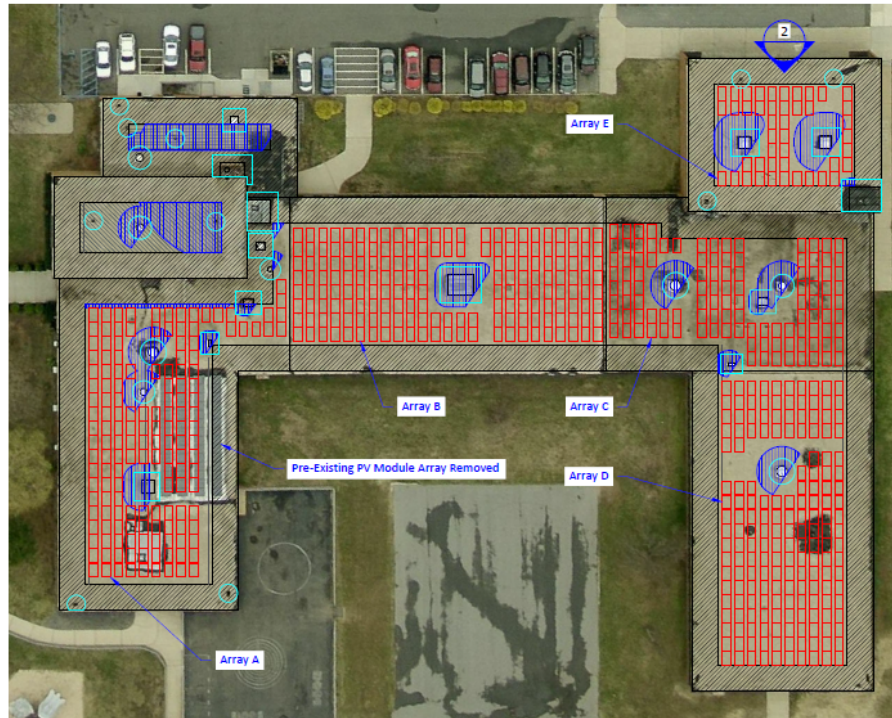
Savings: \$161,052

# Photovoltaic Electric Generation (Cont.)

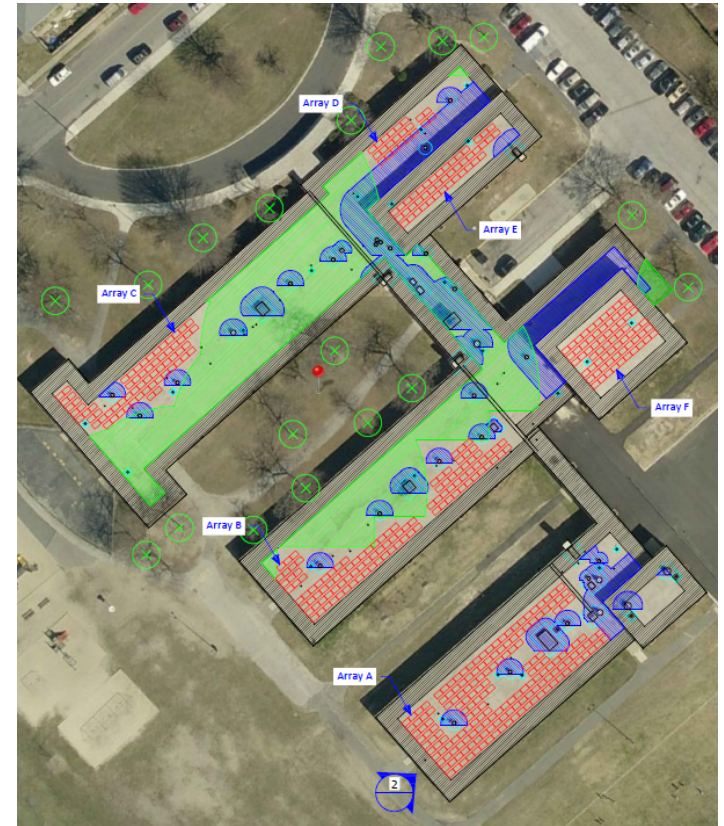


## Lindenhurst High School

## Photovoltaic Electric Generation (Cont.)



**Harding Ave  
Elementary School**



**Daniel Street  
Elementary School**

## Photovoltaic Electric Generation (Cont.)

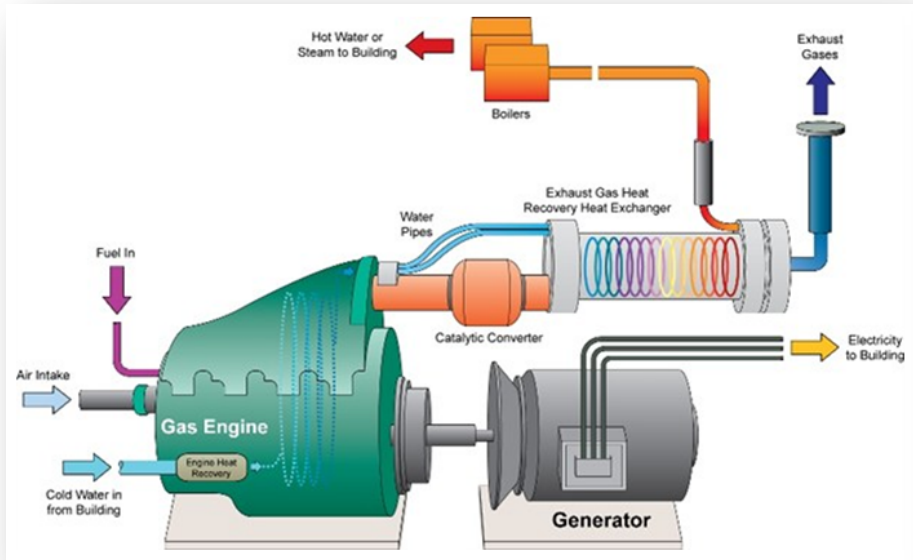
- Total PV Size for NYSED Projects with the team: Over 10.1 MW
- Recent Projects with ECG Engineering, P.C.: Over 5 MW

Recent PV Projects with ECG Engineering, P.C.	PV Size (kW)
Commack School District	1,786.84
Sachem School District	2,194.00
Newburgh School District	1,053.36



# Cogeneration

- 100kW Cogeneration Unit at Lindenhurst High School
- Generate Electricity and Provide Heat to the Hot Water Heating, Pool Heating and Domestic Hot Water Heating Systems at the High School



Savings: \$44,301

# Unit Ventilator Replacement

- Total Unit Ventilators to be Replaced: 119 at High School
- Supplies Required amount of Outside Air
- Energy Efficient Units – Reduced Energy Consumption



Savings: \$4,352

## Energy Efficiency Measures – Continued

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- Boiler/Furnace/DHW Controllers – Savings \$3,687
- Air Handling Unit Upgrade – VFD on Fans – Savings \$741
- Motor Replacements – Savings \$1,253
- Computer Power Management – Savings \$14,817
- Vending Machine Controllers – Savings \$1,802
- Plug Load Controllers – Savings \$24,373
- Air Conditioning Compressor Controllers – Savings \$909
- Refrigeration Compressor Controllers – Savings \$876

# Cost and Savings Summary



# Sample Positive Cash Flow!

	A1	A2	A3	A=A2-A3	B	D=A1+A+B	E	F	H	D+E	
Yr	NYSED Building Aid	Annual Energy Cost With Out Savings	Annual Energy Cost with Improvements	Annual Energy Savings	Annual O&M savings	Total Annual Savings	Annual Lease Payment	Annual Service M&V Costs (For Illustration)	Cogen Maintenance	Annual Cash Flow	Cumulative Cash Flow
1	\$430,598	\$1,095,954	\$542,850	\$553,104	\$31,976	\$1,015,678	(\$867,963)	(\$15,000)	\$0	\$147,715	\$147,715
2	\$430,598	\$1,117,873	\$553,707	\$564,166	\$31,976	\$1,026,740	(\$867,963)	(\$15,450)	\$0	\$158,778	\$306,493
3	\$430,598	\$1,140,231	\$564,781	\$575,450	\$31,976	\$1,038,024	(\$867,963)	(\$15,914)	\$0	\$170,061	\$476,554
4	\$430,598	\$1,163,035	\$576,077	\$586,959	\$31,976	\$1,049,533	(\$867,963)	\$0	\$0	\$181,570	\$658,124
5	\$430,598	\$1,186,296	\$587,598	\$598,698	\$31,976	\$1,061,272	(\$867,963)	\$0	\$0	\$193,309	\$851,433
6	\$430,598	\$1,210,022	\$599,350	\$610,672	\$31,976	\$1,073,246	(\$867,963)	\$0	\$0	\$205,283	\$1,056,716
7	\$430,598	\$1,234,222	\$611,337	\$622,885	\$31,976	\$1,085,459	(\$867,963)	\$0	\$0	\$217,496	\$1,274,212
8	\$430,598	\$1,258,907	\$623,564	\$635,343	\$31,976	\$1,097,917	(\$867,963)	\$0	(\$7,112)	\$222,842	\$1,497,054
9	\$430,598	\$1,284,085	\$636,035	\$648,050	\$31,976	\$1,110,624	(\$867,963)	\$0	(\$7,254)	\$235,407	\$1,732,461
10	\$430,598	\$1,309,767	\$648,756	\$661,011	\$31,976	\$1,123,585	(\$867,963)	\$0	(\$7,399)	\$248,223	\$1,980,683
11	\$430,598	\$1,335,962	\$661,731	\$674,231	\$31,976	\$1,136,805	(\$867,963)	\$0	(\$7,547)	\$261,295	\$2,241,978
12	\$430,598	\$1,362,681	\$674,966	\$687,716	\$31,976	\$1,150,290	(\$867,963)	\$0	(\$7,698)	\$274,629	\$2,516,607
13	\$430,598	\$1,389,935	\$688,465	\$701,470	\$31,976	\$1,164,044	(\$867,963)	\$0	(\$7,852)	\$288,229	\$2,804,836
14	\$430,598	\$1,417,734	\$702,234	\$715,499	\$31,976	\$1,178,073	(\$867,963)	\$0	(\$8,009)	\$302,101	\$3,106,937
15	\$430,598	\$1,446,088	\$716,279	\$729,809	\$31,976	\$1,192,383	(\$867,963)	\$0	(\$8,169)	\$316,251	\$3,423,188
16	\$0	\$1,475,010	\$730,605	\$744,405	\$31,976	\$776,381	\$0	\$0	(\$8,333)	\$768,048	\$4,191,236
17	\$0	\$1,504,510	\$745,217	\$759,293	\$31,976	\$791,269	\$0	\$0	(\$8,499)	\$782,770	\$4,974,006
18	\$0	\$1,534,600	\$760,121	\$774,479	\$31,976	\$806,455	\$0	\$0	(\$8,669)	\$797,786	\$5,771,791
<b>Total</b>	<b>\$6,458,975</b>	<b>\$23,466,913</b>	<b>\$11,623,674</b>	<b>\$11,843,239</b>	<b>\$575,562</b>	<b>\$18,877,776</b>	<b>(\$13,019,441)</b>	<b>(\$46,364)</b>	<b>(\$86,544)</b>	<b>\$5,771,791</b>	<b>\$5,771,791</b>

**Proposed Project at 3.25% interest rate and 60.1% aid**

# Positive Cash Flow!

## Proposed Project at 3.25% interest rate and 60.1% aid

	Year 1	Total
Tax exempt lease payment	\$(867,963)	(\$13,019,441)
Energy savings	\$553,104	\$11,843,239
O&M savings	\$31,976	\$575,562
NYSSSED aid	\$430,598	\$6,458,975
Annual M&V Service Cost*	\$(15,000)	\$(46,364)
Annual Cogen Maintenance**	\$0	\$(86,544)
Net cash flow to District	\$147,715	\$5,771,791

- Estimated Rebate: \$284,380

\*Annual M&V Service for illustration only (No Charge or Credit)

\*\*Cogen Maintenance included for first seven (7) years

## Project Timeline

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Questions?

