Piscataway Township Schools Energy Savings Plan

April 1, 2021

Honeywell

PISCATAWAY
TOWNSHIP SCHOOLS

Piscataway Township Schools Energy Savings Plan

April 1, 2021

PREPARED FOR:

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Honeywell

HONEYWELL **PROPRIETARY**

Non-Disclosure Statement

This proposal or qualification data includes data that shall not be disclosed outside Piscataway Township Schools and shall not be duplicated, used or disclosed — in whole or part — for any purposed other than to evaluate this proposal or quotation. If, however, a contract is awarded to this Offeror as a result of — or in connection with — the submission of this data, **Piscataway Township Schools** shall have the right to duplicate, use, or disclose the data to the extent provided in the resulting contract. This restriction does not limit **Piscataway Township Schools'** right to use information contained in this data if it is obtained from another source without restriction. The data subject to this restriction are contained in all sheets.

Right to Negotiate

Honeywell has reviewed the Request for Proposals and, if selected, reserves the right to negotiate mutually acceptable terms and conditions of any resulting contract.

Budgetary Proposal

Notwithstanding any other provision of this document, this budgetary proposal is provided for information and planning purposes only, is non-binding, and does not constitute an offer capable of acceptance. Honeywell will be pleased to provide a firm price proposal upon request, subject to its internal approval requirements.

Honeywell reserves the right, in its discretion, to increase the price(s) set forth in this Proposal in the event that tariffs (or similar governmental charges) imposed by the United States or other countries result in any increase in the costs that Honeywell used to determine such price(s).

Equitable Extension of Time

Notwithstanding anything to the contrary, in light of the COVID-19 pandemic, the effects of which cannot be foreseen, the parties agree that Honeywell shall be entitled to an equitable extension of time to deliver or perform its work and appropriate additional compensation to the extent Honeywell's delivery or performance, or the delivery or performance of its suppliers and/or subcontractors, is in any way delayed, hindered or otherwise affected by the COVID-19 pandemic.

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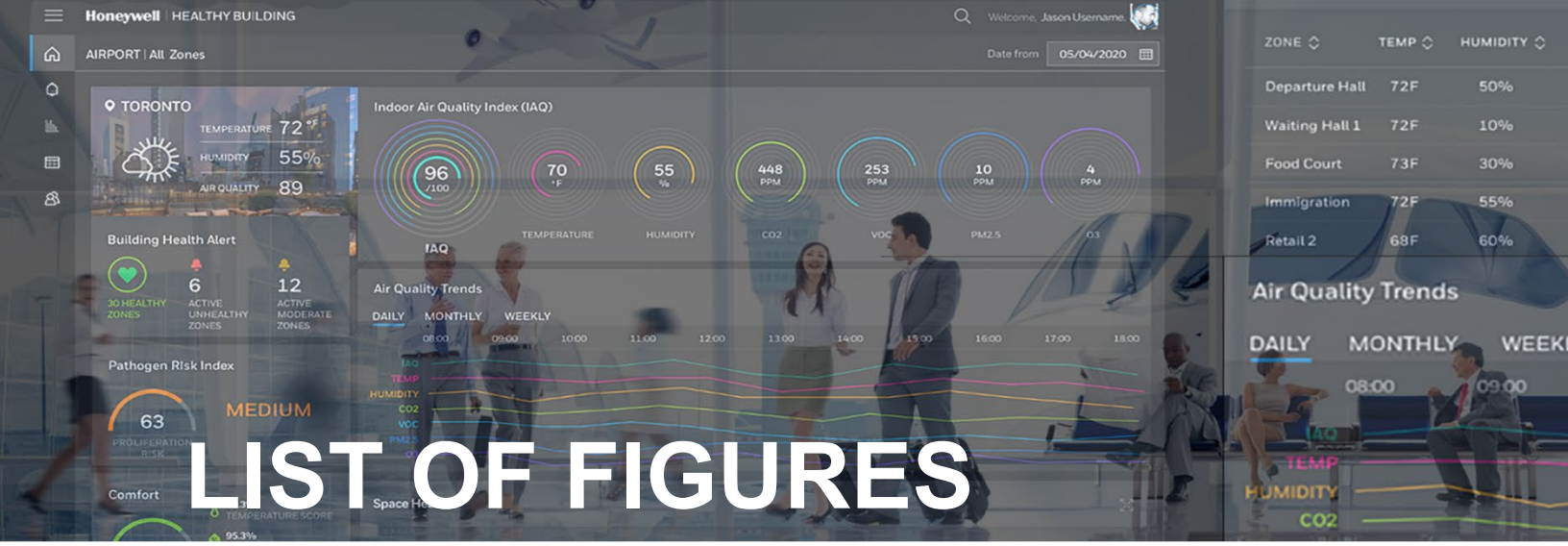


LIST OF FIGURES

SECTION A

EXECUTIVE SUMMARY

SECTION A – EXECUTIVE SUMMARY

Honeywell is pleased to submit this Energy Savings Plan for the Piscataway Township Schools (District). During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit (Audit) of the District buildings. Based on the audit findings and Honeywell's extensive experience in working with school districts, we can confidently state that we can deliver a financially viable, comprehensive solution to address the District's facility concerns and goals. Our Energy Savings Plan includes projects that achieve energy and operational efficiencies which are actionable via the New Jersey Energy Savings Improvement Program (NJ ESIP) in accordance with NJ PL2012, c.55.

The Energy Savings Plan is the core of the NJ ESIP process. It describes the energy conservation measures that are planned and the cost calculations that support how the plan will pay for itself through the resulting energy savings. Under the law, the Energy Savings Plan must address the following elements:

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

The purpose of this document is to provide all the information required for the District to determine the best path forward in the implementation of a district-wide NJ ESIP project. It is important to note that the Energy Savings Plan provides a comprehensive evaluation of *all* potential ECMs within the District. This inclusion is not meant to infer that all the ECMs identified can be implemented. However, if the ECM is part of this plan, it may be implemented later as additional funding becomes available or technology changes to provide for an improved financial return.

Our Energy Savings Plan is structured to clearly demonstrate compliance with the NJ ESIP law, while also presenting the information in an organized manner, which allows for informed decision-making. The information is divided into the following sections:

A. Executive Summary

This section provides an overview of this document's key components and the benefits of implementing the outlined measures.

B. Preliminary Utility Analysis

The Preliminary Utility Analysis (PUA) defines the utility baseline for the District buildings included in the Energy Savings Plan. It provides an overview of the current usage and a cost per square foot by building of utility expenses. The report also compares the Piscataway Township Schools utility consumption to that of other districts in the same region on a per-square-foot basis.

C. Energy Conservation Measures

This section includes a detailed description of the ECMs we have selected and identified for your district. It is specific to your facilities in scope, savings methodology and environmental impact. It is intended to provide a basis of design for each measure in narrative form. It is not intended to be a detailed specification for construction. All potential ECMs for the District are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined by Piscataway Township Schools in conjunction with Honeywell during the project development phase of the NJ ESIP process.

D. Technical and Financial Summary

This section includes an accounting of all technical and financial outcomes associated with the ECMs as presented on the New Jersey Board of Public Utilities (BPU) Forms II through IV. Information detailed on the forms includes projected implementation hard costs, projected energy savings, projected operational savings and projected environmental impact. Form VI: Annual Cash Flow Analysis provides a “rolled-up” view of the overall project financials, inclusive of financing costs, on an annual basis as well as over the entire 15- or 20-year term of the agreement.

E. Measurement & Verification and Maintenance Plan

This section identifies the intended methods of verification and measurement for calculating energy savings. These methods are compliant with the International Measurement and Verification Protocols (IMVP), as well as other protocols previously approved by the Board of Public Utilities in New Jersey. This section also includes the recommended maintenance requirements for each type of equipment. Consistent maintenance is essential to achieving the energy savings projected in this plan.

F. Design Approach

This section includes a summary of Honeywell’s best practices for the successful implementation of a NJ ESIP project. It provides an overview of our dedication to safety, project management procedure, construction management and a sample schedule for the overall completion of the project. Within the schedule, we clearly define the tasks directed towards compliance with architectural, engineering and bidding procedures in accordance with New Jersey Public Contracts Law.

APPENDICES

Appendix 1. Independent Energy Audits

This section includes, for reference, the independent energy audits as previously received by Piscataway Township Schools through the Local Government Energy Audit (LGEA) program. The audits provided by TRC Energy Services have been included on a USB drive as Appendix 1. A comparison can be made between the ECMs outlined in these Independent Energy Audits and the ECMs described in the overall Energy Savings Plan.

Appendix 2. Energy Calculations and Greenhouse Gas Reduction Summary

This section titled Appendix 2: ECM Calculations, included on a USB drive, includes all the energy calculations required to ensure compliance with the law and to confirm the energy savings can, and will, be achieved. These calculations are subject to an independent third-party engineering firm review for verification.

Appendix 3. Safety Management Plan

This section titled Appendix 3: Safety Management Plan, included on a USB drive, establishes a plan for the implementation of Honeywell's Safe Operations Management (SOM) program. The document includes procedures and requirements specific to Piscataway Township Schools necessary to support a safe workplace for all stake holders. The Safety Management Plan is a living document, which will be updated and modified to maintain its relevance throughout the project as site conditions and circumstances change.

Appendix 4. Equipment Cutsheets

This section titled Appendix 4: Equipment Cutsheets, included on a USB drive, includes specification data for the equipment which shall be utilized as the basis of design for plans and specifications during the subsequent project development and NJ public bid phase.

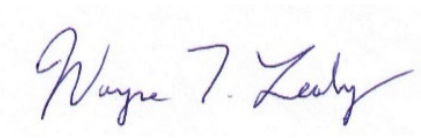
BENEFITS

The measures investigated in this Energy Savings Plan could result in an annual utility savings of **4,360,837** kWh of electricity and save **102,290** therms of natural gas. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the school district's carbon footprint by **2,834** MTE of CO_2 annually. This is equivalent to removing 598 cars from the road annually and /or adding **2,684** forested acres per year. All these savings are achieved while improving the classroom environment and renewing many items that have been in service beyond useful life expectancy

In accordance with the NJ ESIP process, the next step in the project development phase is for Honeywell to provide our recommendations and for Piscataway Township Schools to select the desired content of the project based upon the District's unique goals and objectives. The selections will consider the projected costs, projected energy and operational savings, available financing options at the time of the agreement, interest rates, length of term and District priorities, which will all play a part in the final selection and cash flow of ECMs. The definitive requirement under NJ PL2012, c.55 is that the project is self-funding within the 15- or 20-year term as outlined in the legislation.

Overall, it is evident that Piscataway Township Schools is well positioned to implement a program that will upgrade facilities, while funding itself within the requirements of the law. We welcome this opportunity to partner with the District to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan.

Sincerely,



Wayne Leahy

Business Consultant

SECTION B

PRELIMINARY UTILITY ANALYSIS

SECTION B – PRELIMINARY UTILITY ANALYSIS

Honeywell

Preliminary Utility Analysis

Piscataway Township Board of Education
Piscataway Township, NJ

Helping customers manage energy resources to improve financial performance

Historical Summary

Honeywell would like to thank you for the opportunity of providing you with this Preliminary Utility Analysis. A one year detailed billing analysis was completed for all utility data provided by your staff. The facility's electric and gas consumption were compared to a benchmark of typical facilities of similar use and location. It should be noted however, that some of Buildings which make up the benchmarking standards are not equipped with mechanical cooling (air conditioning). Therefore, these buildings may unjustly appear to be less efficient in comparison.

Through our Energy Services offerings, Honeywell's goal is to form a long term partnership for the purpose of meeting your current infrastructure needs by focusing to:

- Improve Operational Cost Structures
- Ensure Satisfaction
- Upgrade Infrastructure While Reducing Costs
- Meet Strategic Initiatives
- Leverage Teamwork
- Pursue Mutual Interests
- Provide Financing Options

How does it work?

Under an energy retrofit solution, Honeywell installs new, energy efficient equipment and optimizes your facility, as part of a multi-year service contract. Most of these improvements are cost-justified by energy and operational savings. Some of the energy conservation measures provide for a quick payback, and as such, would help offset other capital intensive energy conservation measures such as, boilers, package rooftop units, domestic hot water heaters, etc. The objective is to provide you with reduced operating costs, increased equipment reliability, optimized equipment use, and improved occupant comfort.

After review of the utility analysis, you can authorize Honeywell to proceed with the development of a detailed engineering report. The report development phase allows Honeywell to prepare an acceptable list of proposed energy conservation measures, which are specific to the selected facility. Some examples of typical Energy Conservation Measures include:

- Lighting
- Control Systems
- Boilers
- AC Units/Condensers
- Building Enevelope
- Package Rooftop Units
- Domestic Hot Water Heaters
- Plug Load Management

Why Honeywell?

- Honeywell is one of the world leaders in providing infrastructure improvements
- With Honeywell as your building partner, you gain the advantage of more than 115 years of leadership in building services
- Honeywell has the infrastructure and manpower in place to manage and successfully implement your project
- Honeywell has over 30 years experience in the energy retrofit marketplace with over $5 Billion in customer energy savings
- Honeywell provides you with "Single Source Responsibility" - from Engineering to Implementation, Servicing and Financing (if desired)

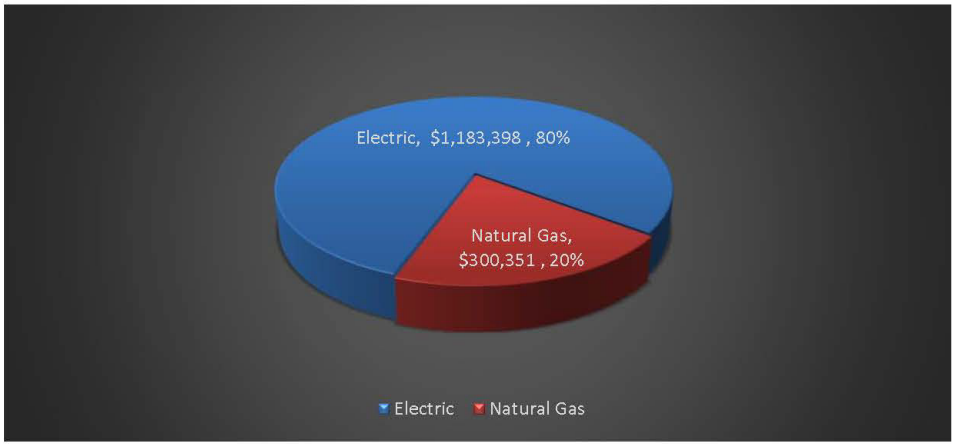
Historical Summary

Utility Analysis Period:
March 2019 through February 2020

	Electric	Natural Gas
Utility Costs*	$1,183,398	$300,351
Utility Usage (kWh, Therms)	8,153,905	363,823
Unblended $ Cost/Unit (kWh, Therms	$0.1077	$0.6825
Annual Electric Demand (kW)	36,355	

* Costs include energy and demand components, as well as taxes, surcharges, etc.

Actual Cost by Utility
March 2019 through February 2020



Total Cost
$1,483,750

Energy Benchmarking

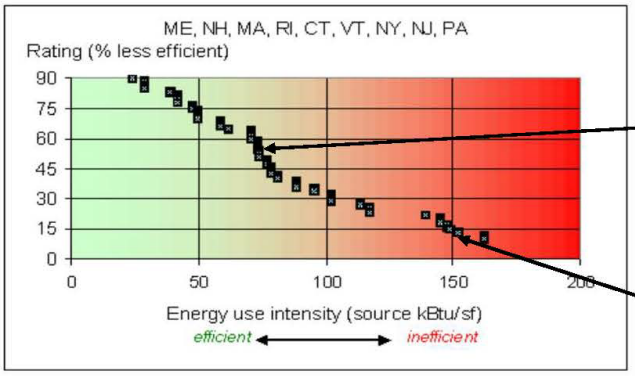
The calculation of EUI (Energy Use Intensity) is shown below. EUI, expressed in kBtu/sf, is normalized for floor area, the most dominant influence on energy use in most buildings. Its use usually provides a good approximation of how your building's energy performance compares to others. Site EUI indicates the rate at which energy is used at your building (the point of use). Source EUI indicates the rate at which energy is used at the generation sources serving your building (the point of source) and indicates the societal energy penalty due to your building The lower the EUI, the higher the rating, indicating that the building is more efficient than other buildings. The greater the EUI, the lower the rating, indicating that there is an opportunity for higher potential benefits from operational improvements.

The Source EUI below has been applied to a Department of Energy statistical model from the Oak Ridge National Laboratory web site, http://eber.ed.ornl.gov/benchmark. The Department of Energy has estimated energy use and cost reductions for building source EUI ratings (percentiles) in the table below. Please see the DOE Regional Source EUI Comparison graph below to rate your building in relation to the regional distribution of similar type buildings. (Note: The Source EUI includes the inefficiencies of electrical generation and transmission. A reduction in 'electrical' source EUI includes a benefit in terms of reduction of air pollution emissions and green house gases, and is thus an indicator of societal benefit.)

Source EUI Rating for your Building	Energy use and cost reduction potential (%)	Walk-thru energy assessment recommended?
Below 20%	Below 25%	No
20 to 40%	20 to 35%	Maybe
40 to 60%	35 to 50%	Yes
Above 60%	Above 50%	Definitely

Site EUI Rank		Annual Total Electrical Use (kWh)	Annual Total Non-Electrical Fuel Use (Therms)	Building Gross Floor Area (sq-ft)	Site EUI Rating	Source EUI: Annual Total Source Energy Use per Sq-Ft (kBtu/sf)	Rating (Regional Source EUI Comparison)
1	Piscataway High School	3,531,468	145,984	440,024	61	116	58%
2	Quibbletown Middle School	370,462	33,602	107,733	43	67	33%
3	T. Schor Middle School	606,900	20,660	96,301	43	87	43%
4	Ethel Road Maintenance/Transportation Comple	158,477	16,587	85,035	26	39	19%
5	Conackamack Middle School	221,463	25,164	77,258	42	62	31%
6	Martin Luther King Intermediate School	616,075	3,752	72,541	34	93	46%
7	Eisenhower Elementary School	499,241	24,925	67,190	62	114	57%
8	Arbor Intermediate School	463,445	36,070	64,282	81	131	65%
9	Knollwood Elementary School	373,374	18,166	60,493	51	94	47%
10	Randolphville Elementary School	220,547	12,197	60,493	33	58	29%
11	Grandview Elementary School	589,760	23,157	59,282	73	142	71%
12	Fellowship Farms School/Administration Buildi	502,693	3,559	36,440	57	152	76%

School Facilities

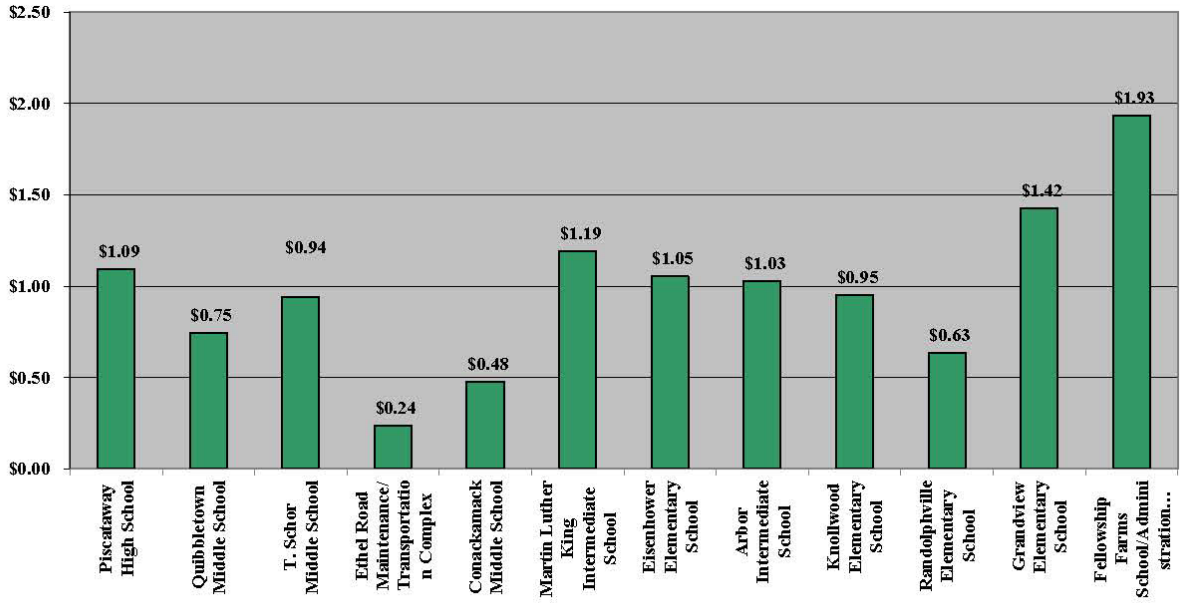


Source EUI	Est Regional Rating	Building
116	58%	Piscataway High School
67	33%	Quibbletown Middle School
87	43%	T. Schor Middle School
39	19%	Ethel Road Maintenance/Transportation Co
62	31%	Conackamack Middle School
93	46%	Martin Luther King Intermediate School
114	57%	Eisenhower Elementary School
131	65%	Arbor Intermediate School
94	47%	Knollwood Elementary School
58	29%	Randolphville Elementary School
142	71%	Grandview Elementary School
152	76%	Fellowship Farms School/Administration Bui

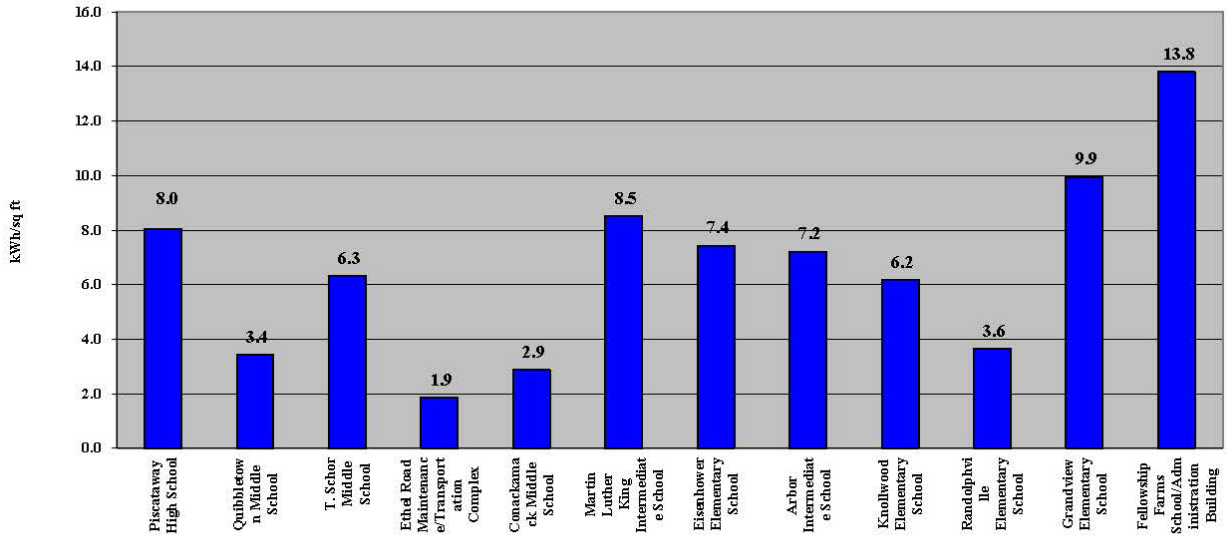
Utility Analysis
Electric

Square Footage Analysis

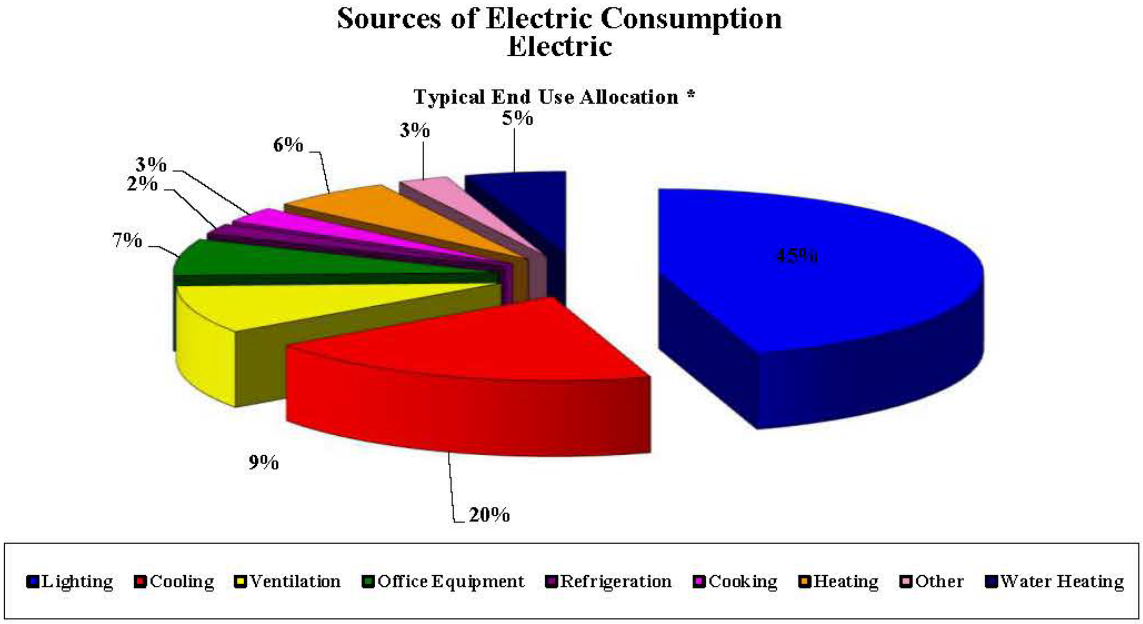
Cost per Sq. Ft.



Usage (kWh per Sq. Ft.)



Utility Analysis

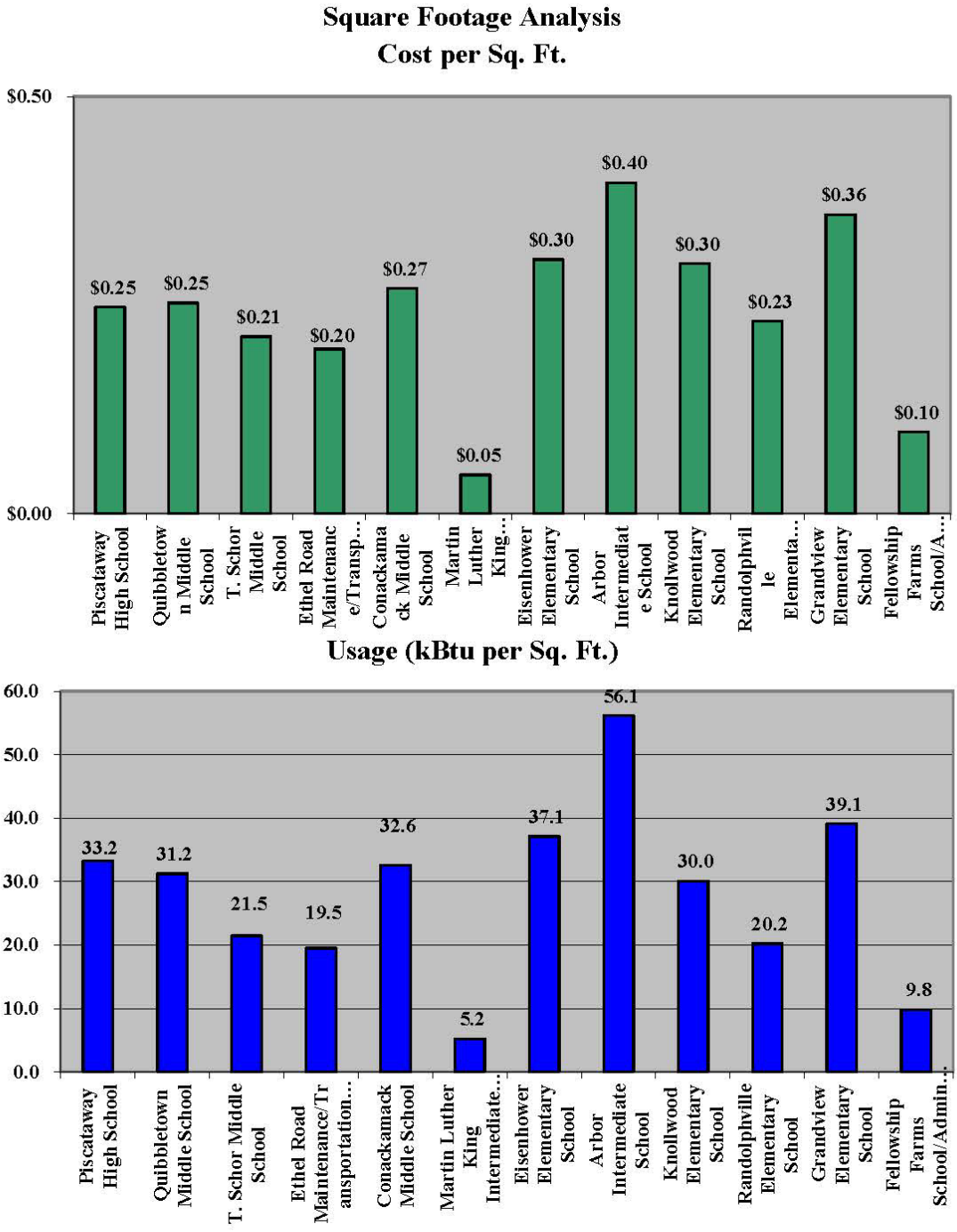


**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

	Lighting	$532,529
	Cooling	$236,680
	Ventilation	$108,873
	Office Equipment	$82,838
	Refrigeration	$23,668
	Cooking	$35,502
	Heating	$71,004
	Other	$29,585
	Water Heating	$59,170
Your Total Cost	**March 2019 through February 2020**	**$1,183,398**

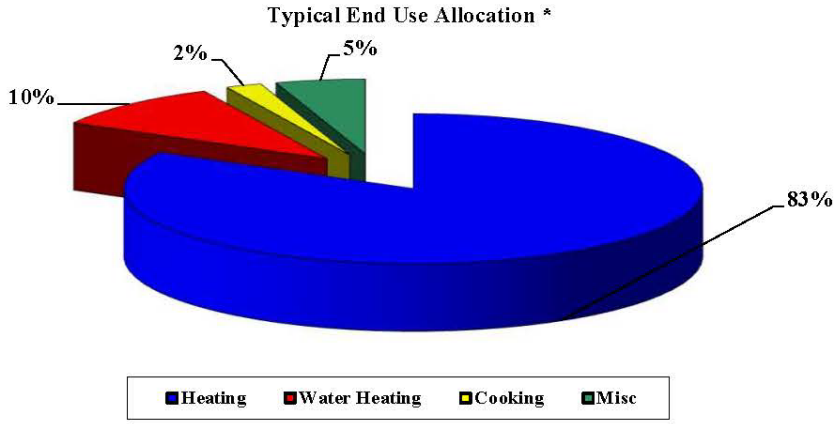
Utility Analysis
Natural Gas



There is a fairly direct correlation between your gas usage and heating degree days, indicating that the vast majority of your natural gas usage is for space heating.

Utility Analysis
Natural Gas

Sources of Usage
Natural Gas



**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Cost**
Natural Gas

	Heating	$249,292
	Water Heating	$30,035
	Cooking	$6,007
	Misc	$15,018
Your Total Cost	**March 2019 through February 2**	**$300,351**

Annual Emissions & Environmental Impact

Piscataway Township Board of Education

Calendar Year March 2019 through February 2020

The following energy usage, cost and pollution have been quantified:

Total Annual Electric usage	8,153,905	kWh
Annual Natural Gas usage	363,823	Therms

Annual Greenhouse Gas Emissions

CO2	15,332,251	pounds
SO2	37,590	pounds
NOx	25,685	pounds

This is equivalent to one of the following:

300	No. of passenger vehicles - annual greenhouse gas emissions
176,715	Gallons of gasoline consumed - CO_2 emissions
3,653	Barrels of oil consumed - CO_2 emissions
134	No. of homes energy use for one year - CO_2 emissions
40,282	No. of tree seedlings grown for 10 years - carbon sequestered
335	No. of acres of pine or fir forests - carbon sequestered annually
65,458	No. of propane cylinders used for home barbeques - CO_2 emissions
8	No. of railcars' worth of coal burned - CO_2 emissions

Based on the US Environmental Protection Agency -
Clean Energy Power Profiler

SECTION C
ENERGY CONSERVATION MEASURES

SECTION C – ENERGY CONSERVATION MEASURES

INTRODUCTION

The information used to develop this Section was obtained through the independent energy audit building surveys, numerous on-site facility surveys, interviews with operators and end users, and an understanding of the components to the systems at the sites. The information obtained includes nameplate data, equipment age, condition, the system's design and actual load, operational practices and schedules, and operations and maintenance history.

Honeywell has completed a review of the Energy Conservation Measures (ECMs) which would provide energy and cost savings to Piscataway Township Schools (District). This report is an assessment of the feasibility and cost effectiveness of such measures, and an indication of the potential for their implementation. The ECMs listed below have been reviewed throughout your facilities for consideration within a complete Energy Savings Plan. This report provides a general description of the energy auditing process and the detailed descriptions of the available ECMs for your facilities.

ENERGY CONSERVATION MEASURES

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/ Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School/ Administration Building
1A LED Lighting Upgrades	●	●	●	●	●	●	●	●	●	●	●	●
1B Lighting Controls	●	●	●								●	
1C Vending Misers	●	●	●	●		●	●	●	●			●
1D De-stratification Fans	●	●	●		●	●	●	●	●	●		
1E Plug Load Management via Wifi	●	●	●	●	●	●	●	●	●	●	●	●
1F Building Voltage Reduction	●		●			●						
2A Boiler Upgrade	●				●			●	●	●		●
2B Domestic Hot Water Replacement	●	●		●	●	●		●	●	●	●	●
2C Rooftop Unit Replacement	●	●	●		●	●	●	●	●	●	●	●
2D Walk-In Cooler/Freezer Upgrade	●		●								●	
2E Premium Efficiency Motors and VFDs	●	●			●							
2F Split System Replacement	●		●		●			●	●	●	●	
2G Kitchen Equipment Replacements	●	●	●		●	●	●	●	●	●	●	
2H Unit Ventilator Replacements									●	●		

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/ Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School/ Administration Building
2I Cooling Tower Replacement	●											
2J Energy Wheel Replacement at HS	●											
2K Fellowship Farms VRV Upgrade												●
2L Gym & Maintenance Heater Upgrades	●			●								
3A Building Management System Upgrades	●	●	●		●	●	●	●	●	●	●	●
3B Demand Control Ventilation		●			●	●			●	●	●	
3C Exhaust Fan Controls	●	●	●		●	●	●	●	●	●	●	●
3D Healthy Buildings – Student & Staff Security	●	●	●	●	●	●	●	●	●	●	●	●
3E Healthy Buildings - Bipolar Ionization	●	●	●	●	●	●	●	●	●	●	●	●
4A Building Envelope Improvement	●	●	●		●	●	●	●	●	●	●	●
4B Roof Replacement	●					●	●		●		●	
4C Window Replacements	●					●	●					
4D Door Replacement	●				●	●	●	●	●	●	●	●
5A Permanent Load Reduction	●	●	●	●	●	●	●	●	●	●	●	●
6A Transformer Replacement	●	●			●	●	●	●	●	●	●	●
7A Cogeneration	●											
8A Solar PPA	●	●	●	●		●	●	●	●		●	●
9A Computer Power Management	●	●	●	●	●	●	●	●	●	●	●	●
10A Water Conservation	●	●	●	●	●	●	●	●	●	●	●	●
11A High School Kitchen Renovation	●											

ECMs Included in Recommended Project ●
ECMs Analyzed for Alternate Projects ●

OVERVIEW

Honeywell has closely evaluated and audited the District to develop the optimum mix of energy saving measures. These site-specific measures have been selected and developed using the following process:

- Review Site Audits
- Engineering Team Site Visits
- Develop Measures
- Review Measures with Team

REJECT AND ACCEPT MEASURES BASED ON

- Value as prioritized by Piscataway Township Schools
- Economic Financial Payback
- Equipment Service Life
- Effect on Current Space Conditions

In developing the proposed measures, the following considerations were critical:

- LED lighting replacement in all possible locations throughout the District
- Replacement of unitary electric and gas heating HVAC units
- Inefficient kitchen equipment replacement

Bin weather data was used from a 15-year average reported from Newark, NJ. Ventilation rates, taken from ASHRAE published standard, were predicted by using the building's population multiplied by cfm/person during occupied hours.

Reasonable infiltration rates were assumed based on the building's fenestration conditions and expected values for typical buildings. A reduced infiltration rate was assumed for the unoccupied hours. Envelope heat loss calculations assumed a reasonable heat transmission rate (U value) based on the construction of the buildings. Wall area and glass area were estimated by supplied drawings and field photographs.

Current efficiencies were derived from assumed and later to be measured boiler efficiencies, and assumed system losses due to thermal losses, distribution losses and loose operational control. The current assumed boiler system efficiencies were then applied to the calculated load and calibrated to last year's actual fuel consumption.

DEMAND SENSITIVE OPERATION

Review existing and proposed thermal loads. For example, the review process will facilitate the application of:

- Optimized flow rates (steam, water, and air).
- Optimized operation of equipment, matching current occupancy use profiles, and considering both outside and indoor space temperatures.

BENEFITS OF MECHANICAL IMPROVEMENTS

Listed below are some of the benefits that the District would reap from the mechanical portion of the measures:

- Avoid costly repairs and replace equipment that would have to be replaced in the near future.
- Allowing for a greater capability of central monitoring and troubleshooting via remote.
- Greater operating flexibility to reduce costs and optimize staff productivity.

ECM 1A — LIGHTING UPGRADES

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption with the installation of higher efficiency, state of the art technology. Today's most efficient way of illumination and lighting has an estimated energy efficiency of 80%-90% when compared to traditional lighting and conventional light bulbs.
- **Improved teacher and student performance** from enhanced lighting quality that translates to an enhanced learning working environment.
- **Improved equipment longevity** by reducing amount of light usage and extending the useful life of your lighting system. Light Emitting Diode (LED) bulbs and diodes have an outstanding operational lifetime expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. Significant operational savings in terms of bulb and ballast replacement result from the adoption of this technology.
- **Reduced maintenance and operational costs** by modernizing your lighting system and providing for longer lasting, technologically advanced lights – without the need to address deficient or bad ballasts.
- **Ecologically friendly** LED lights are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a multitude of materials such as mercury that are dangerous for the environment. LED lights do not contain toxic materials, are 100% recyclable and reduce the carbon footprint by up to a third. Furthermore, the long operational lifetime span means that one LED light bulb can replace the material and production of 25 incandescent light bulbs.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
LED Lighting Upgrades	●	●	●			●					●	
LED Lighting Direct Install				●	●		●	●	●	●		●

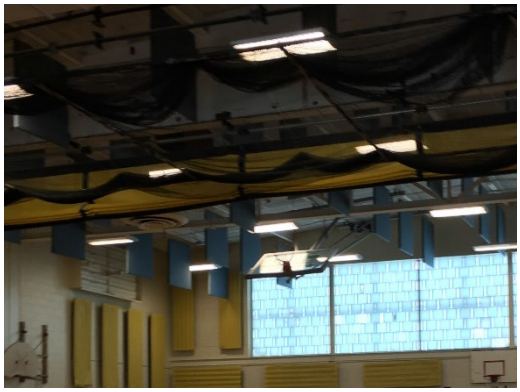
EXISTING CONDITIONS

Exterior areas currently have a majority of energy efficient LED technology existing, with a few remaining high intensity discharge fixtures. There are a few interior areas that are converted to LED technology such as select common areas and stairwells. Based on the findings, existing linear fluorescent T8 lighting technologies found in much of the facility included in the scope of work contain 32w T8 lamps with a mix of low power and normal power electronic ballast.

SCOPE OF WORK

The existing T8 and T5 linear fluorescent, incandescent, and compact fluorescent technologies create opportunity for energy savings through fixture replacement and energy efficient retrofits. The few remaining interior HID fixtures also present an opportunity for energy savings through fixture replacements where applicable. This upgrade will reduce the facility's energy consumption via the replacement of outdated lighting sources with more efficient LED technology.

Existing Lighting at Piscataway HS



Existing Lighting at Quibbletown MS

DIRECT INSTALL

Direct Install, offered through the Clean Energy Office of the NJ Board of Public Utilities (BPU), is another turnkey solution that makes it easy and affordable to upgrade to high efficiency equipment. The program pays up to 80% of retrofit costs, dramatically improving your payback on the project for eligible facilities.

Honeywell has identified the eligibility of the Maintenance/Transportation Complex and the following schools for lighting upgrade incentives through the Direct Install program:

- Ethel Road Maintenance/Transportation Complex
- Conackamack Middle School
- Eisenhower Elementary School
- Arbor Intermediate School
- Knollwood Elementary School
- Randolphville Elementary School
- Fellowship Farms School/Administration Building

LED OUTDOOR LIGHTING UPGRADES

EXISTING CONDITIONS

The District has various types of High Intensity Discharge (HID) light fixtures some LED fixtures. Parking lot and building exterior lights consist of pole mounted shoe-box type and wall pack fixtures.

Existing Wallpack at Quibbletown MS

Existing Pole Light at Grandview ES

SCOPE OF WORK

OUTDOOR LIGHTING

Any exterior wall-packs and pole-mounted shoebox fixtures not already upgraded to LED types will be replaced with lower wattage LED fixtures. The LED technologies offer significant advantages such as extended lamp life, minimal lumen depreciation, “instant on” and very high energy conversion efficiency. These fixtures will provide substantial maintenance savings via the new 100,000-hour LED lamp life versus 20,000 hours for the existing metal halide lamps.

CHANGES IN INFRASTRUCTURE

New LED lamps and fixtures will be installed as part of this ECM. Existing poles and shoe box fixtures will be utilized where possible.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage. A slight increase in heating energy is resultant from the reduced heat output of more efficient lamps.
Waste Production	All lamps and ballasts that are removed will be properly disposed.
Environmental Regulations	No environmental impact is expected.

ECM 1B — LIGHTING CONTROLS

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology. Lighting controls reduce or eliminate reliance on occupants or staff to turn lights off when spaces are unoccupied by automatically turning lighting fixtures off thereby reducing electrical energy consumption.
- **Reduced maintenance and operational costs** by reducing the runtime of lighting system and components.

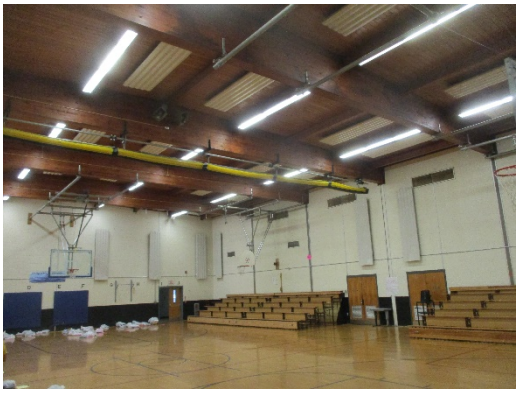
ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Lighting Controls	●	●	●								●	

EXISTING CONDITIONS

Educational institutions, such as K-12 districts, are focused on providing classrooms and campuses for their students and teachers that are safe, healthy, energy-efficient, by providing the best environment for learning, while also chartered with reducing the costs of building operations.

SOLUTION

Lighting controls will be installed in select areas where applicable in each facility, generating additional energy savings, by reduction of burn hours when area/room is unoccupied. These controls will be wired wherever feasible, and not battery powered, to avoid additional maintenance requirements.



Lighting Control Space at Grandview

Lighting Control Space at Piscataway HS

Example of interior lighting sensor

Example of Exterior lighting sensor

SCOPE OF WORK

Lighting controls will be integrated into existing lighting circuits, where applicable, throughout the district.

CHANGES IN INFRASTRUCTURE

New lighting control devices will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

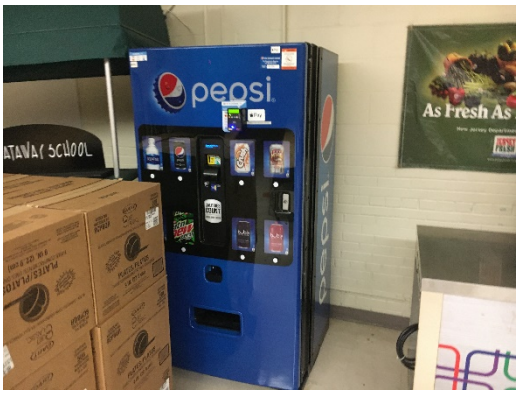
Resource Use	Energy savings will result from reduced electric energy usage. A slight increase in heating energy is resultant from the reduced heat output from lighting that is turned off.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

Many vending machines were observed within different buildings across the District. As such, Honeywell has investigated the use of vending machine misers.

EXISTING CONDITIONS

Vending machines are located throughout multiple buildings offering soft drinks to building occupants. A typical cold drink machine consumes over 5,000 kWh of electricity annually.

Vending Machines at Piscataway HS



Beverage Machines at Piscataway HS

Building	Type	Qty	Location
Piscataway High School	Snack	2	Various
Piscataway High School	Cold Beverage	5	Various
Arbor Intermediate School	Cold Beverage	1	Faculty Room
Ethel Road Maintenance/Transportation Complex	Cold Beverage	1	Building 7&8
Eisenhower Elementary School	Snack	1	Cafeteria
Eisenhower Elementary School	Cold Beverage	1	Faculty Room
Knollwood Elementary School	Cold Beverage	1	Room 111
Martin Luther King Intermediate School	Snack	1	Cafeteria
Martin Luther King Intermediate School	Cold Beverage	1	Faculty Room
Fellowship Farms School/Administration Building	Snack	1	122
Fellowship Farms School/Administration Building	Cold Beverage	1	122
Quibbletown Middle School	Snack	1	Cafeteria
T. Schor Middle School	Cold Beverage	1	Faculty Room
Total		**18**	

PROPOSED SOLUTION

During the site visit, Honeywell noted vending machines providing an opportunity for energy savings by shutting off non-critical loads during the non-occupied periods.

The Vending Miser Occupancy Control (VMOC) also monitors electrical current used by the vending machine. This ensures that the unit will never power down a vending machine while the compressor is running, so a high head pressure start never occurs. In addition, the current sensor ensures that every time the vending machine is powered up, the cooling cycle is run to completion before again powering down the vending machine. The Coca Cola Company and Pepsi Corporation approve the proposed controller for use on their machines.

INTERFACE WITH EXISTING EQUIPMENT

All the VMOC devices are easily installed. The vending machine controllers are installed separately from the machine, and implementation will occur during working hours. A period of three (3) weeks will be required to verify proper calibration of the sensors.

With respect to the vending machines in the various buildings, Honeywell has estimated the number and types of vending machines based on our site tour. During the implementation phase, Honeywell will check with the vendor about the type and specification of the vending machines as it relates to any internal time clocks which may exist inside the machine. Should this be the case, the savings and cost will be adjusted accordingly.

CHANGES IN INFRASTRUCTURE

New vending machine controls will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1C — VENDING MISERS

The key benefits of this ECM include:

- **Energy savings** through better management of the power consumption of electrical equipment.
- **Longer equipment life** resulting from reduced usage.

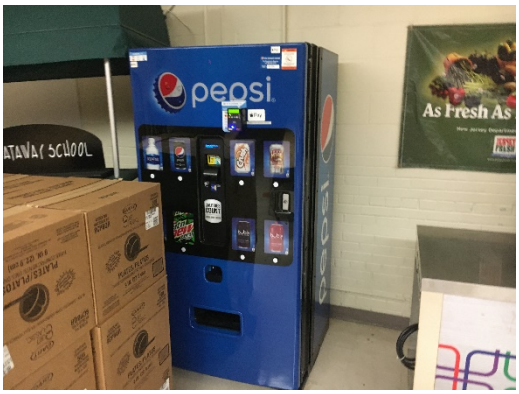
ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Vending Misers	●	●	●	●		●	●	●	●			●

Many vending machines were observed within different buildings across the District. As such, Honeywell has investigated the use of vending machine misers.

EXISTING CONDITIONS

Vending machines are located throughout multiple buildings offering soft drinks to building occupants. A typical cold drink machine consumes over 5,000 kWh of electricity annually.

Vending Machines at Piscataway HS



Beverage Machines at Piscataway HS

Building	Type	Qty	Location
Piscataway High School	Snack	2	Various
Piscataway High School	Cold Beverage	5	Various
Arbor Intermediate School	Cold Beverage	1	Faculty Room
Ethel Road Maintenance/Transportation Complex	Cold Beverage	1	Building 7&8
Eisenhower Elementary School	Snack	1	Cafeteria
Eisenhower Elementary School	Cold Beverage	1	Faculty Room
Knollwood Elementary School	Cold Beverage	1	Room 111
Martin Luther King Intermediate School	Snack	1	Cafeteria
Martin Luther King Intermediate School	Cold Beverage	1	Faculty Room
Fellowship Farms School/Administration Building	Snack	1	122
Fellowship Farms School/Administration Building	Cold Beverage	1	122
Quibbletown Middle School	Snack	1	Cafeteria
T. Schor Middle School	Cold Beverage	1	Faculty Room
	Total	**18**	

Proposed Vending Machines for Vending Miser Controls

PROPOSED SOLUTION

During the site visit, Honeywell noted vending machines providing an opportunity for energy savings by shutting off non-critical loads during the non-occupied periods.

The Vending Miser Occupancy Control (VMOC) also monitors electrical current used by the vending machine. This ensures that the unit will never power down a vending machine while the compressor is running, so a high head pressure start never occurs. In addition, the current sensor ensures that every time the vending machine is powered up, the cooling cycle is run to completion before again powering down the vending machine. The Coca Cola Company and Pepsi Corporation approve the proposed controller for use on their machines.

INTERFACE WITH EXISTING EQUIPMENT

All the VMOC devices are easily installed. The vending machine controllers are installed separately from the machine, and implementation will occur during working hours. A period of three (3) weeks will be required to verify proper calibration of the sensors.

With respect to the vending machines in the various buildings, Honeywell has estimated the number and types of vending machines based on our site tour. During the implementation phase, Honeywell will check with the vendor about the type and specification of the vending machines as it relates to any internal time clocks which may exist inside the machine. Should this be the case, the savings and cost will be adjusted accordingly.

CHANGES IN INFRASTRUCTURE

New vending machine controls will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced electric energy usage.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1D — DE-STRATIFICATION FANS

The key benefits of this ECM include:

- **Improved efficiency and energy savings** through improved distribution of conditioned air within a given space.
- **Equipment longevity** due to lower utilization of equipment to condition air.
- **Increased comfort** of students and teachers.
- **Air Purification** for students and teachers in affected locations.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
De-stratification Fans	●	●	●		●	●	●	●	●	●		

EXISTING CONDITIONS

In areas with high ceilings, such as gymnasiums or auditoriums, warm air stratifies close to the ceiling. Elevated levels of heat transfer through the high walls and the roof cause elevated heat loss.

Gym at Piscataway HS

Gym at Randolphville ES

PROPOSED SOLUTION

In areas with 20+ foot ceiling heights, there is approximately a 15°F+ temperature difference between the floor and the ceiling. With higher ceilings, the temperature difference is even greater. This means to generate the heat necessary to maintain a comfortable 70°F temperature at the floor level, where student activities occur, the ceiling could be 85°F or higher.

De-stratification fans even out the air temperature to a 0°F to 3°F differential from floor to ceiling and wall to wall. This will allow HVAC systems to run for a shorter duration because of the absence of extreme temperatures to heat or cool, thus allowing the local thermostats to be satisfied for longer periods of time.

SYSTEMS EVALUATION AND SELECTION

An energy-efficient motor drives a near-silent fan that forces a column of hotter air from the ceiling to the cooler floor below. As this column of warm air nears the floor, it begins to flare out in a circular pattern and rise again creating a torus. While doing so, it warms the cooler air and mixes with air near the floor, increasing the temperature and comfort of occupants. Through a natural law of physics, this torus will continue to re-circulate air, mixing warmer air from the ceiling with cooler air near the floor until the ceiling and air temperatures are nearly equal. As this happens, it will require less and less energy to comfortably heat the work area, allowing thermostats to be lowered and energy savings to be realized. Once started, the entire process of "thermal equalization" will take on average less than 24 hours.

An available option is the Airius PureAir Series, which is an air purification and airflow circulation fan system, incorporating the latest in PHI (Photohydroionization) Cell technology to efficiently and effectively neutralize up to 99% of all harmful germs, bacteria, viruses, mold and other contaminants in any internal environment. The PHI Cell emits 'Ionized Hydroperoxides', a naturally occurring cleaning agent, which are circulated throughout spaces via the fan. As the fans continue to circulate internal atmosphere, the PHI circulates its neutralizing Ionized Hydroperoxides, providing 24/7 continuous Air Purification. The PureAir also provides all the features and benefits of the world's most popular destratification and airflow circulation fan, balancing temperatures, improving comfort, reducing heating and cooling costs and reducing carbon emissions.

Based on site investigation conducted by our staff, we propose to install the following as indicated in the table below:

School	Location	Qty	Type
Piscataway High School	SBA Gym	14	Air Pear 25
Piscataway High School	Patton Gym A	5	Air Pear 25
Piscataway High School	Patton Gym B	6	Air Pear 25
Quibbletown Middle School	Gym	6	Air Pear 25
T. Schor Middle School	Gym	6	Air Pear 25
Conackamack Middle School	Gym	6	Air Pear 25
Piscataway High School	Weight Room	2	Air Pear 25
Piscataway High School	Vocal Music	3	Air Pear 45
Piscataway High School	Band Room	4	Air Pear 45
Total		**52**	

SCOPE OF WORK

Per de-stratification fan:

1. Shut off the main electric power to the area in which the unit(s) will be installed.
2. Install new de-stratification fan and wiring.
3. Re-energize.
4. Inspect unit operation by performing electrical and harmonics testing.

CHANGES IN INFRASTRUCTURE

New de-stratification fans will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced thermal energy usage. A slight increase in electrical energy is resultant from the operation of the fan motors.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1E — PLUG LOAD MANAGEMENT VIA WIFI

The key benefits of this ECM include:

- **Energy savings** by improved management of electrical equipment power consumption.
- **Longer equipment life** as a result of reduced usage.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Plug Load Management via WiFi	●	●	●	●	●	●	●	●	●	●	●	●

EXISTING CONDITIONS

The District is equipped with a host of equipment and devices. A by-product of the electronic devices such as printers, projectors, televisions, and window air conditioning units are their phantom load. Phantom load refers to energy that is used when a device is off. This includes energy used by TV's and copiers when they're in standby mode (i.e. when they can be turned on with a remote), and energy used by chargers or a laptop's AC adapter. Studies estimate that phantom load now accounts for 6% of all energy use. This measure will address energy waste due to phantom loads in your buildings.

Typical electrical draws for when devices are off are as follows:

Copy Machine at Ethel Road Complex

Projector at T. Schor MS

Device	Wattage
Large Copiers	30
Small Printers / Copiers	20
Monitor Combos (Printer)	30
Laptop Charging Carts	35
Projectors	21
Water Fountains	6
Coffee Machines	60
Hot / Cold Water Machines	60

Device	Wattage
Smart Boards	20
Window ACs	100

Electrical Draw per Typical Device

PROPOSED SOLUTION

Honeywell proposes to install plug load management devices to provide a comprehensive solution to the device control dilemma, by using an existing Wi-Fi network. This computer-based system is designed to allow you to program or control your devices with a customizable schedule. These plugs are a switch that stops all electrical power to the device, turning off equipment and eliminating phantom loads, and are a proven technology with a high degree of reliability and security.

The Plug Load Controller enables energy savings by controlling plug loads through occupancy or schedule-based on/off control of receptacles on a circuit. The device is paired with a sensor or a group of sensors in the network to enable occupancy-based control. The controller features two sets of wires to separately power controlled and uncontrolled outlets, so that energy consumption on both uncontrolled and controlled circuits are separately measured.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Installation of the devices will reduce the operating hours of the connected peripheral devices reducing electrical consumption.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION

None.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings result from reduced operating time of controlled equipment.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

ECM 1F — BUILDING VOLTAGE REDUCTION

The key benefits of this ECM include:

- **Energy savings** from reducing over-voltage supplied to the building by the utility, using state of the art technology.
- **Equipment Longevity** due to more efficient equipment utilization.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Building Voltage Reduction	●		●			●						

EXISTING CONDITIONS

While on site, Honeywell logged the voltage being provided to the High School by the local electric utility company. The utility is permitted to provide electrical power within a voltage range, and the logged data showed that actual voltage to the buildings was at the higher end of this range.

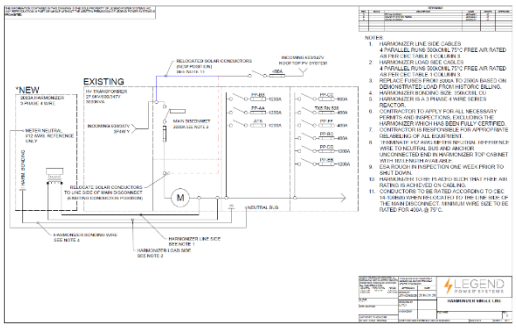
High School Electrical Service

High School Electrical Service

PROPOSED SOLUTION

The SmartGate solution allows for smart, active regulation of voltage levels, as electrical power comes into the building from the local utility. This technology reduces over-voltage to acceptable levels, reducing the power consumed by all equipment downstream from the SmartGate. When voltage levels from the utility drop, this technology goes into bypass mode automatically, ensuring the equipment throughout the building continues to function normally and safely.

SmartGate Voltage Regulator



Sample Integration Diagram

Building	Quantity
Pequannock High School	3
Martin Luther King Intermediate School	1
T. Schor Middle School	1

Locations to Install SmartGate

SCOPE OF WORK

Per Building:

- Coordinate electrical disconnection with the local utility.
- Install new SmartGate unit at main building electrical service.
- Coordinate electrical re-connection with the local utility.
- Inspect unit operation by performing electrical testing; and
- Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized by reduction in voltage to the whole building, resulting in reduced energy usage by downstream equipment.

CHANGES IN INFRASTRUCTURE

New SmartGate unit at the main building electrical service.

CUSTOMER SUPPORT AND COORDINATION

Coordination with the local electrical utility for the disconnection and re-connection of electrical service to the building.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced voltage to the building.
Waste Production	Any waste generated will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2A — BOILER UPGRADE

The key benefits of this ECM include:

- **Reduced energy** usage from improved boiler efficiency resulting from replacement of older equipment, and in certain instances, oversized boilers.
- **Lower operational costs** through less frequent maintenance and operational issues.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Boiler Replacements	●				●			●	●	●		●

EXISTING CONDITIONS

Honeywell has identified four (4) of the existing twenty-nine (29) boilers throughout the District, to be near or beyond their rated useful life as well as inefficient compared to new boilers. Some existing boilers can be replaced with high efficiency, condensing boilers.

Boilers at Piscataway HS

Boilers at Conackamack MS

Building	Type	Manufacturer	Model	Qty	Input (MBH)	Fuel
Piscataway High School	Hot Water	Patterson Kelley	SN1900	3	1,446	NG
Arbor Intermediate School	Hot Water	Patterson Kelley	NM-1000	1	850	NG

Existing Boilers to be Replaced

PROPOSED SOLUTION

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency as provided in table below. New condensing hot water boilers have thermal efficiencies that range from 88% – 95% depending on the return hot water temperature from the heating loop. With proper

design, it is typical to see thermal efficiencies of around 92%. Thermal efficiency is only one part of the equation that makes up the seasonal efficiency of a boiler. Compared to the existing boilers in these schools, the new boilers will provide an increase in boiler efficiency of anywhere between 10% to 15%. Boilers which cannot be converted from steam will be replaced with new steam boilers, which will still operate at to 10% more efficient than the existing boilers.

New boiler sizes and quantities will be based on the heat load of the building with redundancy, taking into account the existing system sizing and level of redundancy.

Building	Type	Manufacturer	Model	Qty	Input (MBH)	Fuel
Piscataway High School	Hot Water	AERCO	BMK2000	3	1,740	NG
Arbor Intermediate School	Hot Water	PK MACH	C-1050	1	986	NG

Proposed Boiler Equipment

SCOPE OF WORK

The following outlines the boiler replacement:

1. Disconnect gas back to shutoff valve and electric back to source panel board.
2. Remove existing boilers.
3. Install new boilers.
4. Connect gas and heating hot water appurtenances to new boilers.
5. Terminate and power new boiler electric circuiting.
6. Start up, commissioning, and operator training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Existing Boiler Efficiency	= Existing Heat Production/ Existing Fuel Input
Proposed Boiler Efficiency	= Proposed Heat Production/ Proposed Fuel Input
Energy Savings $	= Heating Production (Proposed Efficiency – Existing Efficiency)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New boilers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance. New gas piping will need to be run from the new gas service/meter to the equipment.

O&M IMPACT

The new boilers will decrease the O&M cost for maintaining the boilers.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ENVIRONMENTAL ISSUES

Resource Use	Annual savings will result from greater combustion efficiency, reduced maintenance costs, and better control and setback.
Waste Production	Existing boilers scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected; all regulations will be adhered to in accordance with EPA and local code requirements.

ECM 2B — DOMESTIC HOT WATER REPLACEMENT

The key benefits of this ECM include:

- **Reduced energy usage** from improved efficiency resulting from replacement of older, inefficient equipment.
- **Lower operational costs** through less frequent maintenance and operational issues and requirements.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Domestic Hot Water Replacement	●	●		●	●	●		●	●	●	●	●

EXISTING CONDITIONS

During the course of multiple inspections of District schools, Honeywell identified numerous existing Domestic Hot Water (DHW) heaters to be near or beyond their rated useful life, or in fair condition but lower in efficiency compared with new DHW heaters.

Water Heater at Quibbletown MS

Water Heater at Randolphville ES

Building	Qty	Manf.	Model	MBH	Storage (Gal)	Fuel
Conackamack Middle School	3	AO Smith	BTH199	180	100	Natural Gas
Fellowship Farms School/Administration Building	1	P-KW	PKW 72V/2V	226	165	Electric
Grandview Elementary School	1	AO Smith	HW 520 932	429	-	Natural Gas
Martin Luther King Intermediate School	1	AO Smith	BTH199 966	199	100	Natural Gas

Building	Qty	Manf.	Model	MBH	Storage (Gal)	Fuel
Martin Luther King Intermediate School	1	Rheem	G100-250A	250	100	Natural Gas
Piscataway High School	1	AO Smith	BTPN-400000	313	200	Natural Gas
Piscataway High School	2	Primera	100B-00	809	200	Natural Gas
Quibbletown Middle School	1	AO Smith	BTH199	199	100	Natural Gas
Randolphville Elementary School	1	AO Smith	HW-160M 102	160	115	Natural Gas

Existing Domestic Hot Water Heater Equipment

PROPOSED SOLUTION

Honeywell proposes replacing the existing Domestic Hot Water (DHW) heaters at the above locations with highly efficient condensing DHW heaters. New condensing DHW heaters have efficiencies between 97% - 98%. They provide better control with capabilities as night setback, temperature adjustments and demand control hot water.

Building	Qty	Manf.	Model	MBH	Storage (Gal)	Fuel
Conackamack Middle School	3	AO Smith	BTH-199	199	100	Natural Gas
Fellowship Farms School/Administration Building	1	AO Smith	BTH-199	199	100	Natural Gas
Grandview Elementary School	1	AO Smith	BTH-500	499	119	Natural Gas
Martin Luther King Intermediate School	1	AO Smith	BTH-199	199	100	Natural Gas
Martin Luther King Intermediate School	1	AO Smith	BTH-250	250	100	Natural Gas
Piscataway High School	1	AO Smith	BTH-300	300	119	Natural Gas
Piscataway High School	2	Lochinvar	AW-501	500	200	Natural Gas
Quibbletown Middle School	1	AO Smith	BTH-199	199	100	Natural Gas
Randolphville Elementary School	1	AO Smith	BTH-199	199	100	Natural Gas

Proposed Domestic Hot Water Heater Equipment

SCOPE OF WORK

The following outlines the domestic hot water heater replacement:

1. Demolish and remove old water heaters.
2. Furnish and install high efficiency gas fired domestic hot water heaters as specified in the table above.
3. Install all required piping, controls, and breeching as needed.
4. Install mixing valve.
5. Install circulators where needed for building use and kitchen supply.
6. Test and commission.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings are calculated from the domestic hot water heater efficiency differences.

Existing Equipment Efficiency	= Existing Boiler Efficiency + Existing Heat Exchanger Efficiency
Proposed Equipment Efficiency	= Efficiency of the New Domestic Hot Water Heater
Energy Savings	= DHW Load x (Existing Equipment Efficiency – New Equipment Efficiency)

CHANGES IN INFRASTRUCTURE

A new controller for each DHW heater will be installed and programmed. In addition to the controllers, training for maintenance personnel will be required.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
Equipment Identification	As part of the measure design and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from improved thermal efficiency.
Waste Production	Proper disposal of any waste generated.
Environmental Regulations	No environmental impact is expected.

UTILITY INTERRUPTIONS

Proper phasing procedures will minimize gas interruptions.

ECM 2C — ROOFTOP UNIT REPLACEMENT

The key benefits of this ECM include:

- **Reduced energy** usage from improved efficiency resulting from replacement of older equipment.
- **Lower operational costs** through less frequent maintenance requirements and operational issues.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Rooftop Unit Replacement	●	●	●		●	●	●	●	●	●	●	●

EXISTING CONDITIONS

Over the course of multiple, extensive site surveys focusing on HVAC Rooftop Units (RTUs) throughout the District, Honeywell identified many of the three hundred and fifty nine (359) existing units in need of replacement due to age, condition, and/or energy inefficiency. Many of these units, district-wide, utilize the older refrigerant R-22 to operate, which has been phased out due to environmental concerns and therefore is becoming increasingly more expensive to purchase for the servicing older units. Replacing these units with new, high efficiency units not only reduces energy costs but also repair costs that would otherwise been necessary to keep the old RTUs operating.

Rooftop Unit at Piscataway HS

Rooftop Unit at Arbor IS

Building	Make	Model	Tons	Qty.
Arbor Intermediate School	Lennox	GCS16-048	4.0	8
Arbor Intermediate School	Lennox	GCS16-036	3.0	1
Arbor Intermediate School	Lennox	LGA072SS	6.0	1
Arbor Intermediate School	Lennox	LGA100SS1G	8.5	1
Arbor Intermediate School	Lennox	LGA210SS1G	17.5	1
Arbor Intermediate School	Lennox	LGA240SH	20.0	2
Conackamack Middle School	Carrier	48ZND030	30.0	1
Conackamack Middle School	Carrier	50DP012520	10.0	1
Eisenhower Elementary School	Lennox	LGA300	25.0	1
Eisenhower Elementary School	Lennox	GCS-16-060	5.0	4
Eisenhower Elementary School	Lennox	GCS-16-048	4.0	27
Eisenhower Elementary School	Lennox	GCS-20-048	4.0	2
Eisenhower Elementary School	Lennox	LGA150	12.0	1
Eisenhower Elementary School	Lennox	LGA088	7.5	2
Fellowship Farms School/Administration Building	Carrier	50TJ-009---611	7.5	1
Martin Luther King Intermediate School	Lennox	GCS-20-048	4.0	15
Martin Luther King Intermediate School	Lennox	GCS-16-048	4.0	17
Martin Luther King Intermediate School	Lennox	LGA300	25.0	1
Martin Luther King Intermediate School	Lennox	LGA150	12.0	1
Martin Luther King Intermediate School	Lennox	LGA088	7.5	2
Martin Luther King Intermediate School	Carrier	48HJE006	5.0	4
Martin Luther King Intermediate School	Carrier	48HJE007	6.0	1
Martin Luther King Intermediate School	Lennox	LGA072	6.0	1
Piscataway High School	TRANE	YCH211B3L	17.5	1
Piscataway High School	Lennox	GCS16-060	5.0	1
Piscataway High School	Lennox	GCS20-048	4.0	5
Piscataway High School	Lennox	LGA060	5.0	2
Piscataway High School	Lennox	LGA120SH	10.0	1
Piscataway High School	Lennox	LGA180SS	15.0	1
Piscataway High School	Lennox	LGA150	12.5	2
Piscataway High School	Munters	HCUb80404	10.0	1
Piscataway High School	Munters	HCUb60304	15.0	1
Piscataway High School	Carrier	50CD008	7.5	1
Piscataway High School	Carrier	50CD006	5.0	2
Piscataway High School	Carrier	48TJE006	5.0	1
Piscataway High School	TRANE	YCH103B	8.5	1
Piscataway High School	Lennox	LGA072	6.0	4
Piscataway High School	Munters	AM20N	-	1
Piscataway High School	Munters	AM30N	-	1
T. Schor Middle School	Carrier	48HJT004	3.0	1
T. Schor Middle School	Lennox	LGA240	20.0	2
T. Schor Middle School	Carrier	48HJT005	4.0	5
T. Schor Middle School	Lennox	LGA150	12.5	1
T. Schor Middle School	Lennox	LGA180	15.0	2
T. Schor Middle School	Lennox	LGA120	10.0	3
T. Schor Middle School	Modine	-	-	4

Existing Rooftop Units

PROPOSED SOLUTION

Honeywell proposes replacing the many of the existing RTUs listed in the above table. The new units, listed in the table below, will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new units. The new units will be equipped with factory-installed microprocessor controls that improve unit efficiency. The units will also communicate with the building management system.

Building	Make	Model	Tons	Qty.
Arbor Intermediate School	Carrier	48FCFA05	4.0	8
Arbor Intermediate School	Carrier	48FCEA04	3.0	1
Arbor Intermediate School	Carrier	48HCDD07	6.0	1
Arbor Intermediate School	Carrier	48HCDD09	8.5	1
Arbor Intermediate School	Carrier	48HCED20	17.5	1
Arbor Intermediate School	Carrier	48HCFD24	20.0	2
Conackamack Middle School	TRANE	YCD360	30.0	1
Conackamack Middle School	Carrier	50HC-D11	10.0	1
Eisenhower Elementary School	Carrier	48HCFD28	25.0	1
Eisenhower Elementary School	Carrier	48FCFA06	5.0	4
Eisenhower Elementary School	Carrier	48FCFA05	4.0	27
Eisenhower Elementary School	Carrier	48FCFA05	4.0	2
Eisenhower Elementary School	Carrier	48HCFD14	12.5	1
Eisenhower Elementary School	Carrier	48HCED08	7.5	2
Fellowship Farms School/Administration Building	Carrier	48HCDD09	8.5	1
Martin Luther King Intermediate School	TRANE	TZC048	4.0	15
Martin Luther King Intermediate School	TRANE	TZC048	4.0	17
Martin Luther King Intermediate School	TRANE	YHD300	25.0	1
Martin Luther King Intermediate School	TRANE	YZD150	12.5	1
Martin Luther King Intermediate School	TRANE	TZC090	7.5	2
Martin Luther King Intermediate School	TRANE	TZC060	5.0	4
Martin Luther King Intermediate School	TRANE	TZC072	6.0	1
Martin Luther King Intermediate School	TRANE	TZC072	6.0	1
Piscataway High School	TRANE	YZD210	17.5	1
Piscataway High School	TRANE	TZC060	5.0	1
Piscataway High School	TRANE	TZC048	4.0	5
Piscataway High School	TRANE	TZC060	5.0	2
Piscataway High School	TRANE	TZC120	10.0	1
Piscataway High School	TRANE	YZD180	15.0	1
Piscataway High School	TRANE	YZD150	12.5	2
Piscataway High School	TRANE	TZC120	10.0	1
Piscataway High School	TRANE	YZD180	15.0	1
Piscataway High School	TRANE	WHC090	7.5	1
Piscataway High School	TRANE	WHC060	5.0	2
Piscataway High School	TRANE	TZC060	5.0	1
Piscataway High School	TRANE	TZC102	8.5	1
Piscataway High School	TRANE	TZC072	6.0	4

Building	Make	Model	Tons	Qty.
Piscataway High School	TRANE	OANG000	-	1
Piscataway High School	TRANE	OANG000	-	1
T. Schor Middle School	TRANE	TZC036	3.0	1
T. Schor Middle School	TRANE	YHD240	20.0	2
T. Schor Middle School	TRANE	TZC048	4.0	5
T. Schor Middle School	TRANE	YZD150	12.5	1
T. Schor Middle School	TRANE	YZD180	15.0	2
T. Schor Middle School	TRANE	TZC120	10.0	3
T. Schor Middle School	Modine	HBP250	1	4

Proposed Rooftop Units

The potential upgrade of RTUs also provides the opportunity to investigate technologies that may mitigate the airborne transmission of the bacterial and viral pathogens by purifying air, improving ventilation and more precisely managing airflows.

SCOPE OF WORK

The following outlines the scope of work to install the RTUs identified in the above table:

1. Disconnect existing RTU electric connections.
2. Disconnect piping and air ducts from the unit.
3. Remove unit from the base.
4. Modify base for new unit if necessary.
5. Rig and set new unit at the base.
6. Inspect piping and air ducts before reconnecting them to the unit.
7. Reconnect piping and air ducts.
8. Repair duct and piping insulation.
9. Connect electric power.
10. Start up and commissioning of new unit.
11. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy savings	Existing unit energy consumption (kWh, Therms) – replacement unit energy consumption (kWh, Therms)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. The District and Honeywell will determine final selections.
Equipment Identification	Product cut sheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2D — WALK-IN COOLER/FREEZER UPGRADE

The key benefits of this ECM include:

- **Energy savings** from reducing equipment runtime.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace equipment resulting from to less frequent equipment operation.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Walk-In Cooler/Freezer Upgrade	●		●								●	

EXISTING CONDITIONS

In many refrigerators, walk-in freezers and coolers, the compressor is oversized and cycles on/off frequently. This frequent compressor cycling results in higher energy consumption and may reduce the life of the compressor. Additionally, District maintenance personnel informed Honeywell of numerous issues regarding the substandard operation and sealing of the cooler/freezer doors.

Walk-in Cooler at Piscataway HS

Walk-in Cooler at Grandview ES

Building	Location	Walk-In Refrigerators	Walk-In Freezers
Piscataway High School	Kitchen	3	2
Grandview Elementary School	Kitchen	1	0
T. Schor Middle School	Kitchen	1	0
Total		5	2

Existing Walk-In Refrigerator/Freezers to receive Controls

PROPOSED SOLUTION

Honeywell proposes to upgrade the existing walk-in coolers and freezers by either refurbishing or replacing the unit doors and seals. Honeywell will also install a controller manufactured by Intellidyne at the school identified above to reduce the compressor cycles of the walk-in coolers and freezers. The installation of this ECM will not negatively impact system operation or freezing of food products. By reducing the cycling, the controller will improve operating efficiency and reduce the electric consumption by 10% to 20%.

This control enhancement will save energy through the reduced compressor cycling in the walk-in coolers and freezers and will extend the operating life of the compressor. Consequently, more frequent compressor replacements will be avoided.

In addition, the external walk-in freezer at the High School Central Kitchen will be completely replaced.

- Intellidyne Sensor Features
- Automatic restart on power failure.
- Surge protection incorporated into circuitry.
- Fully compatible with all energy management systems.
- UL listed.
- Maintenance free.

INTELLIDYNE SENSOR BENEFITS

- Patented process reduces air conditioning electric consumption typically 10% to 20%.
- Increased savings without replacing or upgrading costly system components.
- “State-of-the-art” microcomputer controller – LED indicators show operating modes.
- Protects compressor against momentary power outages and short cycling.
- Simple 15-minute installation by qualified installer.
- No programming or follow-up visits required.
- Maximum year-round efficiency.
- Reduces maintenance and extends compressor life.
- Fail-safe operation.
- Guaranteed to save energy.
- UL listed, “Energy Management Equipment”.

Intellidyne’s patented process determines the cooling demand and thermal characteristics of the entire air conditioning system by analyzing the compressor’s cycle pattern, and dynamically modifies that cycle pattern to provide the required amount of cooling in the most efficient manner. This is accomplished in real-time by delaying the start of the next compressor “on” cycle, by an amount determined by the cooling demand analysis. These new patterns also result in less frequent and more efficient compressor cycles.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM is realized by the reduction in run time of the compressors and fan motors in the freezers/refrigerators.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from the reduced electrical consumption of the compressor.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2E — PREMIUM EFFICIENCY MOTORS AND VFDS

The key benefits of this ECM include:

- **Energy savings** from reduced run hours and reduced motor speeds.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization and reduced start-up wear.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Premium Efficiency Motors & VFDs	●	●			●							

ECM OVERVIEW

Variable Frequency Drives (VFDs) allow motors to run at specified speeds rather than just on or off while allowing systems to more precisely move heat. Honeywell recommends this ECM due to the significant savings potential given the relationship between energy consumption and motor speed.

Pump Motors at Piscataway HS

Pump Motors at Quibbletown MS

EXISTING CONDITIONS

Honeywell has identified standard efficiency electric motors on several pumps. Energy savings can be obtained by replacing the standard efficiency motors with premium efficiency motors as well as by installing VFDs on systems that have two-way control valves.

The motors that were identified in the buildings are listed as follows:

Building	Equipment Description	Qty	Motor HP	Replace Motor Y/N	Add VFD Y/N
Piscataway High School	Heating Hot Water Pump	1	10.0	Y	Y
Piscataway High School	Heating Hot Water Pump	1	5.0	Y	Y
Conackamack Middle School	Heating Hot Water Pump	2	7.5	Y	Y
Quibbletown Middle School	Heating Hot Water Pump	2	10.0	Y	Y

PROPOSED SOLUTION

Honeywell observed that several motors and pumps that are sized to meet peak heating or cooling conditions. However, we've learned that most operating hours occur during conditions that require less than peak loads.

Honeywell proposes replacement of all above-mentioned single speed standard efficiency motors (that do not have VFDs) with new premium efficiency motors and installing new couplings where applicable. In addition, Honeywell recommends installing VFDs on these pumps. Energy used by the motor can be reduced by varying the flow in response to varying loads in the space. Motor speed may be controlled either based on the pressure in the distribution system or based on time of day.

Honeywell recommends fitting unit ventilators with two-way valves (provided that unit ventilators located at end of piping branches are fitted with three-way valves to keep hot water moving through the distribution piping at all times).

Honeywell also recommends installing VFDs on the heating hot water pumps and chilled water pumps to better match pumping output to system requirements and reduce energy waste. Each motor will be equipped with new selector relays that will allow one drive to operate per pump with the VFD drive. Honeywell also recommends installation of new differential pressure sensors and tying them to the control system to allow you to regulate the speed of the pump per load requirements. Lastly, we recommend installation of VFDs on the cooling system pump motors that have higher horsepower. VFDs will maintain temperatures in the unit by adjusting the speed of both the motor and the pump and can be connected to your BMS.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy consumed by electric motors varies inversely with the cube of the motor speed. Variable frequency drives reduce motor speed (in response to load) thus reducing energy consumption exponentially.

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
Equipment Identification	Product cut sheets and specifications for generally used are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New motors will be installed in place of the old motors.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will also be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reducing electrical usage by operating higher efficiency motors for the same horsepower output. The equipment uses no other resources.
Waste Production	This measure will produce waste by-products. Old motors shall be disposed of in accordance with all federal, state, and local codes.
Environmental Regulations	No environmental impact is expected.

ECM 2F — SPLIT SYSTEM REPLACEMENT

The key benefits of this ECM include:

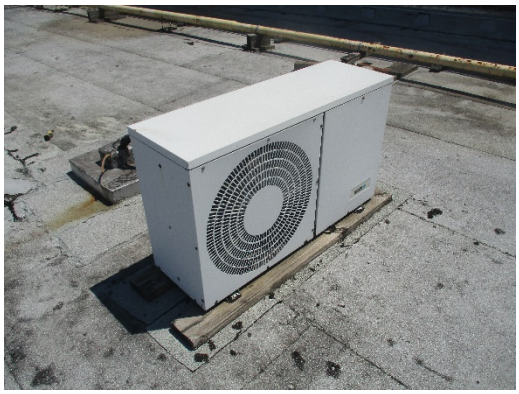
- **Energy savings** from increased equipment efficiency.
- **Equipment longevity improvement** due to improved efficiency and less wasteful equipment utilization.
- **Operational savings** from less frequent requirements to repair or replace key HVAC equipment.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Split System Replacement	●		●		●			●	●	●	●	

EXISTING CONDITIONS

Honeywell conducted numerous site visits and identified some split system units as inefficient and beyond their useful service life. Replacing these units with new, high efficiency units will reduce energy costs over the long term, and repair costs that would otherwise have been necessary to maintain the operation of the existing, old units.

Split System Unit at Randolphville ES



Split System Unit at Conackamack MS

Building	Make	Model	Qty.	Tons
Arbor Intermediate School	Trane	TTA240	1	20.0
Conackamack Middle School	Sanyo	C1211	1	1.0
Conackamack Middle School	EMI	-	2	3.0
T. Schor Middle School	Sanyo	CH2422	1	1.0

Existing Split Systems

PROPOSED SOLUTION

Honeywell proposes replacing all of the existing split system units listed in the table above. The new units will be installed in the same location as the existing units. Existing electrical power supply will be reconnected to the new motors. The new units will be equipped with factory-installed microprocessor controls that improve unit efficiency. The units will also communicate with the existing or enhanced BMS.

Building	Make	Model	Qty.	Tons
Arbor Intermediate School	TRANE	TTA240	1	20.0
Conackamack Middle School	TRANE	PLAA12	1	1.0
Conackamack Middle School	TRANE	PLAA36	2	3.0
T. Schor Middle School	TRANE	PLAA12	1	1.0

Proposed Split Systems

SCOPE OF WORK

The following outlines the scope of work to install the condensing units listed in the Proposed Split Systems table above.

1. Disconnect existing electric connections.
2. Disconnect piping from the unit.
3. Remove unit from the base.
4. Modify base for new unit if necessary.
5. Rig and set new unit at the base.
6. Inspect piping and air ducts before reconnecting them to the unit.
7. Reconnect piping and air ducts.
8. Repair duct and piping insulation.
9. Connect electric power.
10. Start up and commissioning of new unit.
11. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy savings	Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	Product cut sheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing condensing units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2G — KITCHEN EQUIPMENT REPLACEMENTS

The key benefits of this ECM include:

- **Energy savings** by upgrading outdated equipment to high efficiency units.
- **Lower operational costs** by decreasing maintenance calls and part replacements.
- **Fewer maintenance issues** by removing outdated equipment with hard-to-find replacement parts.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Kitchen Equipment Replacements	●	●	●		●	●	●	●	●	●	●	

EXISTING CONDITIONS

Honeywell extensively surveyed all existing kitchen equipment at each District school and collected valuable information from the maintenance personnel regarding specific pieces of equipment which have caused numerous, ongoing maintenance problems for District staff. These older pieces of equipment require replacement parts which are difficult or impossible to procure and are a continual source of problem-calls. Some existing kitchen cooking equipment utilizes electricity to generate heat, which is significantly more expensive than using natural gas. Honeywell was also informed that while the service-line equipment at some schools was recently upgraded, some older service-line equipment still remains and is in need of replacement.

Piscataway HS Susan B Anthony Dishwasher

Quibbletown MS Service Line Equipment

PROPOSED SOLUTION

After thoroughly surveying one hundred and eighty one (181) unique pieces of kitchen equipment throughout District schools, Honeywell has developed a replacement scope targeting thirteen (13) of the units in most need of replacement due to their age, low efficiency, and/or ongoing maintenance issues.

This scope focuses on equipment at the high school central kitchen that was perceived to be in greatest need of equipment replacement.

Honeywell has experience with complete kitchen replacements and redesigns through the ESIP program. In addition to installing new energy efficient equipment, kitchen staff were provided additional food preparation workspace with improved functionality/ease-of-use. Below is a list of the equipment that Honeywell observed during numerous, targeted site surveys:

Building	Location	Type	Qty.	Replace
Eisenhower Elementary School	Kitchen	Hot Food Serving Counter / Table	1	Y
Eisenhower Elementary School	Kitchen	Serving Counter, Utility	2	Y
Eisenhower Elementary School	Kitchen	Serving Counter, Utility	1	Y
Grandview Elementary School	Kitchen	Serving Counter, Utility	1	Y
Grandview Elementary School	Kitchen	Chest Freezer	1	Y
Grandview Elementary School	Kitchen	Serving Counter, Cold Food	1	Y
Grandview Elementary School	Kitchen	Hot Food Serving Counter / Table	1	Y
Martin Luther King Intermediate School	Kitchen	Serving Counter, Utility	2	Y
Martin Luther King Intermediate School	Kitchen	Serving Counter, Utility	1	Y
Martin Luther King Intermediate School	Kitchen	Hot Food Serving Counter / Table	1	Y
Quibbletown Middle School	Kitchen	Reach-In Refrigerator	1	Y

Existing Kitchen Equipment

SCOPE OF WORK

- Disconnect and remove select existing kitchen equipment.
- Run new gas or electrical service to equipment as needed.
- Install and connect new kitchen equipment.
- Start-up and test new units.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon the difference in energy use between the existing and new kitchen equipment.

CHANGES IN INFRASTRUCTURE

New gas and electrical service may need to be run from the new gas service/meter to the kitchen.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy use.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2H — UNIT VENTILATOR REPLACEMENTS

The key benefits of this ECM include:

- **Improved efficiency and energy savings** from increased equipment efficiency.
- **Equipment longevity** due to efficiency improvement and less wasteful equipment utilization.
- **Operational savings** from less frequent requirement to repair or replace equipment.
- **Improved environment** for students and teachers from quieter equipment operation within the classrooms.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Unit Ventilator Replacements									●	●		

EXISTING CONDITIONS

After numerous visits to the District and discussions with maintenance personnel, Honeywell determined that the unit ventilators listed below were prone to coil leaks and had exceeded their expected useful life. Even though the unit ventilators are maintained, and the filters are replaced regularly, there are other old components such as the coils, fan motors, dampers, etc. that need additional attention. When these components do not operate properly or require servicing, they consume additional electricity and heating energy. In addition, older units have a greater probability of more frequent failures of their components requiring costly maintenance.

Unit Ventilator at Randolphville ES

Unit Ventilator at Knollwood ES

PROPOSED SOLUTION

Honeywell proposes to replace the existing unit ventilators listed below and integrate the new units into the Siemens BMS system for enhanced operation, control, and visibility within the system. Maintenance costs will be reduced, by avoiding frequent damper, actuator, etc. replacements while space conditions will be maintained as designed.

Building	Qty
Knollwood Elementary School	10
Randolphville Elementary School	10

Existing Unit Ventilators

SCOPE OF WORK

The following outlines the unit ventilator replacements:

1. Disconnect existing electrical connections.
2. Disconnect piping from the unit.
3. Remove existing unit.
4. Set new unit in same location.
5. Inspect piping and air ducts before reconnecting them to the unit.
6. Reconnect piping and air ducts.
7. Repair duct and piping insulation as needed.
8. Connect electric power.
9. Start up and commissioning of new unit.
10. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

In general, Honeywell uses the following approach to determine savings for this specific measure:

Electric and Thermal Energy Savings	Existing unit energy consumption (kWh) and (therms) – new unit energy consumption (kWh) and (therms).

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	As part of the ECM design and approval process, specific product selection will be provided for your review and approval.

CHANGES IN INFRASTRUCTURE

New unit ventilators will be installed at the locations listed above.

O&M IMPACT

New units will decrease overall maintenance requirements compared to the existing units.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reducing electrical and thermal usage by operating unit ventilators at higher efficiencies. The equipment uses no other resources.
Waste Production	Existing equipment scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2I — COOLING TOWER REPLACEMENT

he key benefits of this ECM include:

- **Improved efficiency and energy savings** from better heat rejection and reduced fan operation.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent equipment repairs and downtime.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Cooling Tower Replacement	●											

EXISTING CONDITIONS

The existing cooling tower at the Piscataway High School is inefficient and past its useful life. The cooling tower should be replaced and sized to meet the building load requirements. High efficiency units will reduce energy consumption and the need for costly repairs necessary to maintain the operation of the old unit. A newer unit will also have a reduction in required fan power as well.

Building	Location	Make	Model	Quantity
Piscataway High School	SBA Roof	BAC	F1601-N	1

Existing Cooling Tower

Cooling tower at Piscataway HS

Cooling tower at Piscataway HS

PROPOSED SOLUTION

Honeywell proposes to replace the existing cooling tower. The new cooling tower design will result in greater operating efficiency. Part-load operation will result in increased overall plant efficiency and will lower energy consumption. The design features satisfy today's environmental concerns, minimize

operating costs, maximize operating reliability, and simplify maintenance requirements. The new tower will also be equipped with VFDs which offer additional benefits including:

- Precise leaving fluid temperature control which provides a more efficient method to vary airflow compared to fan cycling, fan dampers, or mechanical speed changers.
- Soft starts, stops, and smooth accelerations which prolong the mechanical system (fans, motors, belts, bearings, etc.) life while reducing maintenance.
- The soft-start feature minimizes start-up noise and smooth acceleration making the tower sound less noticeable.
- Reduces wear on the motor.

The new units are listed in the table below and will have higher efficiency components, namely the fans, motors, and coils.

Building	Location	Make	Model	Quantity
Piscataway High School	SBA Roof	BAC	FXV-1212C-24T-K	1

Proposed Cooling Tower

SCOPE OF WORK

The following outlines the scope of work to replace the cooling towers stated in the above table:

- Disconnect existing Cooling Tower electrical and hydronic connections.
- Remove existing Cooling Tower and set new unit.
- Connect hydronic piping.
- Connect electric power.
- Connect Control wiring.
- Start up and commissioning of new unit.
- Operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric and Thermal Energy Savings	Existing unit energy consumption (kWh) – proposed unit energy consumption (kWh).

EQUIPMENT INFORMATION

Manufacturer and Type	Honeywell and the Customer will determine final selections.
Equipment Identification	Product cutsheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency operation.
Waste Production	Existing tower and associated piping and equipment scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2J — ENERGY WHEEL REPLACEMENT AT HS

The key benefits of this ECM include:

- **Improved efficiency and energy savings** from pre-conditioning the incoming ventilation air.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent equipment repairs and replacements.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Energy Wheel Replacement at HS	●											

EXISTING CONDITIONS

Four (4) of the air handling units at the High School are equipped with energy recovery wheels, several of which are not operational resulting in increased thermal requirements to meet the demand of the areas which they serve.

Energy Recovery Wheel at High School

Energy Recovery Wheel at High School

PROPOSED SOLUTION

Honeywell proposes to replace the units in the table below. The new units will be recommissioned to ensure proper operating sequences. Replacing the energy recovery wheels will permit the effective heat exchange between the return and incoming ventilation air resulting in lower HVAC energy usage, and faster heating of the spaces served.

Building	Location	Quantity
Piscataway High School	HVAC-3	1
Piscataway High School	HVAC-4	2
Piscataway High School	HVAC-5	1
Piscataway High School	HV-3	1

Proposed Energy Recovery Wheels to be Replaced

SCOPE OF WORK

The following outlines the scope of work to replace the energy recovery wheels identified in the above table:

- Disconnect existing Energy Recovery Wheel electrical and mechanical connections.
- Remove existing Energy Recovery Wheel and set new unit.
- Reconnect Energy Recovery Wheel electrical and mechanical connections.
- Start up and commissioning of new unit.
- Operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric and Thermal Energy Savings	Existing unit energy consumption (therms) – replaced unit energy consumption (therms).

EQUIPMENT INFORMATION

Manufacturer and Type	Honeywell and the Customer will determine final selections.
Equipment Identification	Product cutsheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency operation.
Waste Production	Existing energy recovery wheels and associated electric wiring scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2K — FELLOWSHIP FARMS VRV UPGRADE

The key benefits of this ECM include:

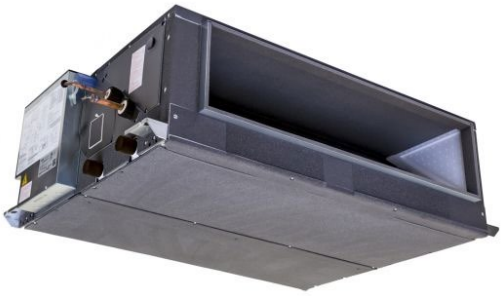
- **Energy savings** from increased equipment efficiency.
- **Equipment longevity improvement** due to improved efficiency and less wasteful equipment utilization.
- **Operational savings** from less frequent requirements to repair or replace key HVAC equipment.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
2K Fellowship Farms VRV Upgrade												●

EXISTING CONDITIONS

The existing heating and cooling system at Fellowship Farms is inefficient and past its useful service life and in need of replacement. Maintenance of the grade-level PTAC units are problematic given their exposure to salting the parking lot. Replacing this system with a multizone Variable Refrigerant Volume (VRV) system with new, high efficiency units will reduce energy costs over the long term, and repair costs that would otherwise have been necessary to maintain the operation of the existing, old units.

Example of Outdoor Units



Example of Indoor Units

PROPOSED SOLUTION

Honeywell proposes replacing the existing heating and cooling units with a new, multizone VRV system capable of heating and cooling. The new VRV system will eliminate the need for existing PTAC and unit ventilators while meeting heating, ventilation, and cooling needs of the facility at increased efficiencies and greater energy savings. additional benefits include low noise and a smaller footprint which improve the space conditions inside the building as well as reduced maintenance. The units will also communicate with the BMS.

Building	Make	Model	Tons	Indoor Unit Qty.
Fellowship Farms School/Administration Building	TRANE	CityMulti	125	45

Proposed VRV System

SCOPE OF WORK

The following outlines the scope of work to install the VRV system in the table above.

- Disconnect existing electric connections.
- Disconnect piping from the existing units.
- Remove units from the base.
- Remove existing PTACs and unit ventilators, repair and finish.
- Rig and set new units.
- Provide VRV indoor units.
- Ceiling removal/replacement and architectural finish work.
- Reconnect piping and air ducts.
- Connect electric power.
- Start up and commissioning of new system.
- Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric Energy savings	Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available. Honeywell and the customer will determine final selections.
Equipment Identification	Product cut sheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing equipment scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2L — GYM & MAINTENANCE HEATER UPGRADES

The key benefits of this ECM include:

- **Reduced energy usage** from improved energy efficiency resulting from replacement of older equipment.
- **Lower operational costs** through less frequent maintenance and operational issues.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Gym & Maintenance Heater Upgrades	●			●								

EXISTING CONDITIONS

The furnace and H&V units serving the Patton Gym and areas of the Ethel Road Complex are inefficient and past their useful service life. Replacing these units with new, high efficiency units will save energy costs over the long term while reducing repair costs that would otherwise have been necessary to keep the old units in operation.

Patton Gym H&V Unit


Ethel Road Complex Furnace

PROPOSED SOLUTION

Honeywell proposes to replace the units in the table below. The new units will have higher efficiency components, namely the fans, motors, and coils. The units will also communicate with the existing or enhanced building management system.

Building	Location	Qty.	Supply CFM (each)
Piscataway High School	Patton Gym	4	2,000
Ethel Road Maintenance/Transportation Complex	Various	5	1,000

Proposed H&V Units to be Replaced

SCOPE OF WORK

The following outlines the scope of work to refurbish the air handling units stated in the above table:

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove unit from the base
- Modify based for new unit if necessary
- Rigging and setting new H&V unit at the base
- Inspect piping and air ducts before reconnecting them to the unit.
- Reconnect piping and air ducts.
- Repair duct and piping insulation.
- Connect electric power.
- Start up and commissioning of new unit.
- Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the energy efficiency between the existing and new units. The savings are generally calculated as:

Electric and Thermal Energy Savings	Existing unit energy consumption (therms) – replacement unit energy consumption (therms).

EQUIPMENT INFORMATION

Manufacturer and Type	Honeywell and the Customer will determine final selections.
Equipment Identification	Product cutsheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher efficiency units.
Waste Production	Existing H&V units and associated equipment will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3A — BUILDING MANAGEMENT SYSTEM UPGRADES

The key benefits of this ECM include:

- **Improve Air Quality** by more precise control of air filtration, air composition to create a healthier school building environment.
- **Operational efficiency** resulting from better control and system wide visibility.
- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Occupancy comfort and productivity** resulting from enhanced temperature and humidity control throughout your buildings.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Building Management System Upgrades	●	●	●		●	●	●	●	●	●	●	●

EXISTING CONDITIONS

Based on numerous site surveys and extensive discussions with District maintenance personnel and Siemens representatives, Honeywell has determined that while the existing Siemens Building Management System (BMS) is connected to most of the existing equipment throughout the District, additional equipment could be integrated into the BMS.

Existing Controls

Existing Controls

PROPOSED SOLUTION

Honeywell has worked extensively with Siemens to develop the following scope to address key BMS-related priorities throughout the District, including:

- Upgrading the software graphics and scheduling capabilities.
- Conversion of high school induction boxes to VAV boxes.
- Integration of exhaust fans into BMS.
- Converting remaining pneumatic valves and dampers to DDC and integrating into the Siemens system.
- Connection of new rooftop units (RTUs) to BMS.
- Install controls for hot-water baseboard values, VAV boxes, and damper actuators.
- Upgrade DDC control panels.
- Eliminating need for pneumatic air compressors for controls.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy that needs to pre-heat or cool the buildings. The savings are generally calculated as:

Existing Heating BTU & Cost per BTU	= Metered data from existing meter readings
Cost of Existing Heating	= Average site data $/CCF or $/Gallon
Reduction in Heating/Cooling BTU	= Reduction in outside air CFM x 1.08 x Delta T x Operating Hours
Cost of Proposed Heating/Cooling	= Reduced BTU x Cost per BTU
Energy Savings $	= Existing Costs – Proposed Costs

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

Upgrade of Siemens front-end interface and select controllers/equipment.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy usage.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3B — DEMAND CONTROL VENTILATION (DCV)

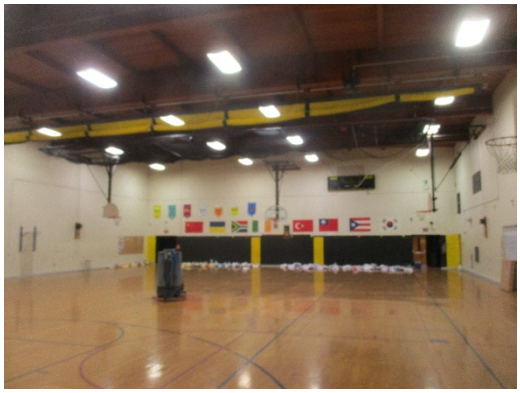
The key benefits of this ECM include:

- **Improve Air Quality** by optimizing the amount of fresh air supply to create a healthier building environment.
- **Operational efficiency** resulting from more precise control and reduced outside air intake.
- **Energy Savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy comfort and productivity** by way of enhanced temperature and humidity control throughout your buildings.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Demand Control Ventilation		●			●	●			●	●	●	

EXISTING CONDITIONS

The HVAC units serving large one zone spaces such as auditoriums, cafeterias, gymnasiums, music rooms, and libraries are often designed for peak occupancy conditions to supply outside air to the space with return air from space being exhausted. Most of the time these spaces are not fully occupied, which increase energy demand for heating and cooling of excessive amount of outside air.



Conackamack MS

Quibbletown MS

PROPOSED SOLUTION

Honeywell will coordinate with Siemens to install CO_2 sensors at the below locations. The CO_2 sensors will provide the control signal for the air handlers to optimize the quantity of fresh air required. The installation of CO_2 sensors will read the levels of CO_2 in the space and ensure that only the required outside air is supplied and heated to meet the minimum outdoor air requirements. This control strategy will reduce the amount of outside air intake and thus reduce the heating energy used by the air handling units. Based on this fact, there are reduced requirements for outside air to the spaces.

Building	Area Served	Number of Units	CFM Total (each unit)
Randolphville Elementary School	Gym	1	10,000
Knollwood Elementary School	Gym	1	10,000
Conackamack Middle School	Cafeteria	1	12,000
Grandview Elementary School	-	1	6,000
Grandview Elementary School	-	1	7,500
Martin Luther King Intermediate School	Cafeteria	1	10,000
Quibbletown Middle School	Auditorium x2, library, orchestra	3	16,000
Quibbletown Middle School	-	1	24,000

Existing units to utilize CO_2 sensors

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy that needs to pre-heat or cool the outside air. The savings are generally calculated as:

Existing Heating BTU & Cost per BTU	= Metered data from existing meter readings
Cost of Existing Heating	= Average site data $/CCF or $/Gallon
Reduction in Heating/Cooling BTU	= Reduction in outside air CFM x 1.08 x Delta T x Operating Hours
Cost of Proposed Heating/Cooling	= Reduced BTU x Cost per BTU
Energy Savings $	= Existing Costs – Proposed Costs

The baseline adjustment calculations are included with the energy calculations.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced energy.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3C — EXHAUST FAN CONTROLS

The key benefits of this ECM include:

- **Energy Savings** from reducing total runtime of energy consuming exhaust fans.
- **Equipment longevity** due to fewer annual equipment run hours.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Exhaust Fan Controls	●	●	●		●	●	●	●	●	●	●	●

EXISTING CONDITIONS

After discussing the operation of exhaust fans with maintenance personnel, Honeywell determined that a large majority of the exhaust fans across the District are manually controlled via breakers and/or timeclocks. This can lead to fans which run continuously, or far more than what is required.

Exhaust Fans at Piscataway HS

Exhaust Fans at Piscataway HS

PROPOSED SOLUTION

Honeywell will coordinate with Siemens to install new controllers to control the exhaust fans, incorporate exhaust fan command start/stop and status into the BMS, and schedule the fans to operate only when the buildings are open.

Building	Number of Fans
Piscataway High School	10
Quibbletown Middle School	40
T. Schor Middle School	5
Conackamack Middle School	5
Martin Luther King Intermediate School	6
Eisenhower Elementary School	6
Arbor Intermediate School	5
Knollwood Elementary School	9
Randolphville Elementary School	9
Grandview Elementary School	3
Fellowship Farms School/Administration Building	5

Buildings where exhaust fans will be controlled

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon reducing the amount of energy consumed by the fans by reducing the number of hours over which they operate.

CHANGES IN INFRASTRUCTURE

Exhaust fans will be connected to BMS system as part of this measure.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced fan run hours.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3D — HEALTHY BUILDINGS: STUDENT & STAFF SECURITY

The key benefits of this ECM include:

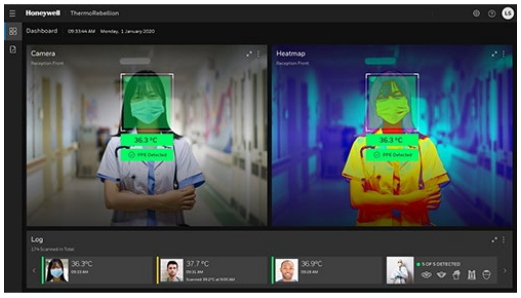
- **Building Entrant thermal screening** through the utilization of thermal imaging technologies.
- **Operational efficiency** resulting from monitoring control.
- **Occupancy comfort and productivity** by way of enhanced temperature monitoring throughout the facility.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Healthy Buildings – Student & Staff Security	●	●	●	●	●	●	●	●	●	●	●	●

EXISTING CONDITIONS

Currently the District has not employed thermal imaging technologies to mitigate the potential transmission of viral and bacterial contaminants that could be introduced into its schools through individuals entering a building.

ThermoRebellion



ThermoRebellion

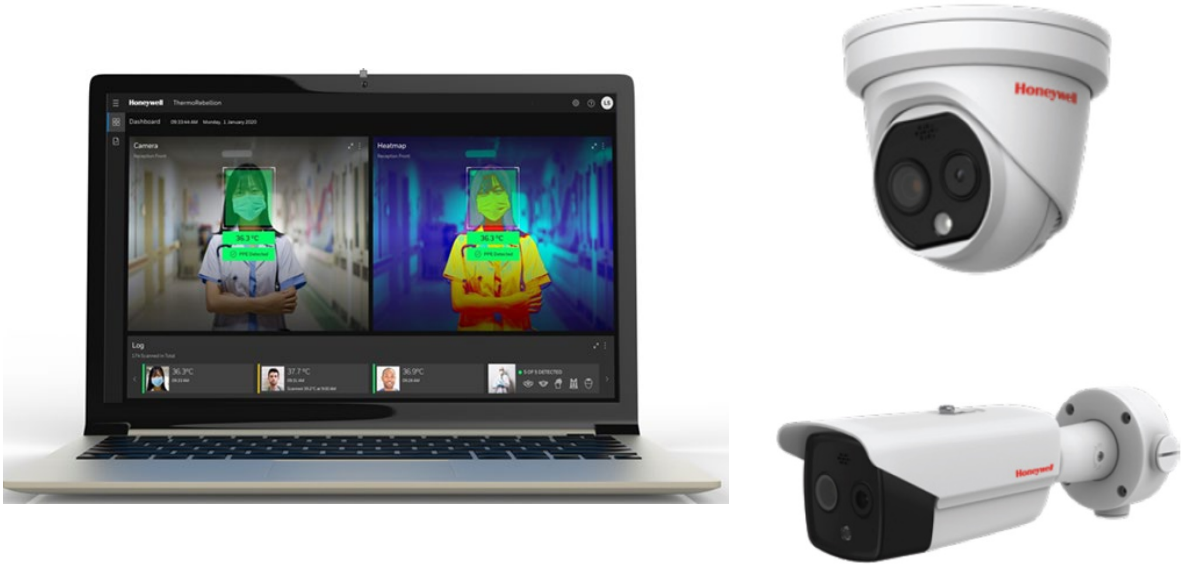
PROPOSED SOLUTION

Honeywell proposes a temperature monitoring solution that incorporates advanced, infrared imaging technology and artificial intelligence algorithms to conduct non-invasive, preliminary screening and disinfection of a visitor, staff and/or student upon entry into a District school.

TEMPERATURE SENSING

The Honeywell ThermoRebellion temperature monitoring solution can be rapidly deployed at the entryway of school buildings to quickly and efficiently identify whether personnel exhibit an elevated facial temperature. As individuals pass in front of a high-resolution, thermal imaging camera, their skin temperature is automatically detected within two seconds and displayed on an accompanying monitor. This can alert a person with an elevated temperature to seek additional screening. In addition, operators gain reliable, real-time information about personnel entering their facilities enabling them to take measures to keep their premises safe and secure.

The Honeywell ThermoRebellion system can also identify if individuals are wearing the required personal protective equipment needed for entering the building.



Example of Honeywell ThermoRebellion

Building	ThermoRebellion Cameras
Piscataway High School	6
Quibbletown Middle School	3
T. Schor Middle School	3
Ethel Road Maintenance/Transportation Complex	2
Conackamack Middle School	3
Martin Luther King Intermediate School	2
Eisenhower Elementary School	2
Arbor Intermediate School	2
Knollwood Elementary School	2
Randolphville Elementary School	2
Grandview Elementary School	2
Fellowship Farms School/Administration Building	2

Locations for Thermal Cameras

ECM 3E — HEALTHY BUILDINGS: BIPOLAR IONIZATION

The key benefits of this ECM include:

- **Improved indoor air quality** through reduction of VOCs, particulates and air stream disinfection.
- **Lower operational costs** through reduced ventilation air requirements resulting in less frequent maintenance and operational issues.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Healthy Buildings – Bipolar Ionization	●	●	●	●	●	●	●	●	●	●	●	●

EXISTING CONDITIONS

The air handling equipment serving the buildings listed above operate in a variety of environments where the indoor air quality is paramount in the safety of its occupants. Honeywell understands in the current environment, reducing ventilation air may not be an option in some cases. Cleaning and disinfection of the recirculated air can reduce the potential for disease transmission in existing modes of operation and limit the need for increasing ventilation air. Further cleaning of recirculated air provides the opportunity to reduce operating costs. The table below lists the air handling systems identified during building surveys.

Building	Quantity	Equipment Type	Supply CFM	NPBI Device	No. per Device	Total Count
Arbor Intermediate School	8	RTU	1600	FC-24	1	8
Arbor Intermediate School	1	RTU	1200	FC-24	1	1
Arbor Intermediate School	1	RTU	2400	FC-24	1	1
Arbor Intermediate School	1	RTU	3400	FC-48	1	1
Arbor Intermediate School	1	RTU	7000	FC-48	2	2
Arbor Intermediate School	2	RTU	8000	FC-48	2	4
Conackamack Middle School	1	RTU	12000	FC-48	3	3
Conackamack Middle School	1	RTU	4000	FC-48	1	1
Eisenhower Elementary School	1	RTU	10000	FC-48	3	3
Eisenhower Elementary School	4	RTU	2000	FC-24	1	4
Eisenhower Elementary School	27	RTU	1600	FC-24	1	27
Eisenhower Elementary School	2	RTU	1600	FC-24	1	2
Eisenhower Elementary School	1	RTU	4800	FC-48	2	2
Eisenhower Elementary School	2	RTU	3000	FC-24	1	2
Fellowship Farms School/Administration Building	1	RTU	3000	FC-24	1	1
Martin Luther King Intermediate School	15	RTU	1600	FC-24	1	15
Martin Luther King Intermediate School	17	RTU	1600	FC-24	1	17
Martin Luther King Intermediate School	1	RTU	10000	FC-48	3	3

Building	Quantity	Equipment Type	Supply CFM	NPBI Device	No. per Device	Total Count
Martin Luther King Intermediate School	1	RTU	4800	FC-48	2	2
Martin Luther King Intermediate School	2	RTU	3000	FC-24	1	2
Martin Luther King Intermediate School	4	RTU	2000	FC-24	1	4
Martin Luther King Intermediate School	1	RTU	2400	FC-24	1	1
Martin Luther King Intermediate School	1	RTU	2400	FC-24	1	1
Piscataway High School	1	RTU	7000	FC-48	2	2
Piscataway High School	1	RTU	2000	FC-24	1	1
Piscataway High School	5	RTU	1600	FC-24	1	5
Piscataway High School	2	RTU	2000	FC-24	1	2
Piscataway High School	1	RTU	4000	FC-48	1	1
Piscataway High School	1	RTU	6000	FC-48	2	2
Piscataway High School	2	RTU	5000	FC-48	2	4
Piscataway High School	1	RTU	4000	FC-48	1	1
Piscataway High School	1	RTU	6000	FC-48	2	2
Piscataway High School	1	RTU	3000	FC-24	1	1
Piscataway High School	2	RTU	2000	FC-24	1	2
Piscataway High School	1	RTU	2000	FC-24	1	1
Piscataway High School	1	RTU	3400	FC-48	1	1
Piscataway High School	4	RTU	2400	FC-24	1	4
Piscataway High School	1	RTU	4000	FC-48	1	1
Piscataway High School	1	RTU	6000	FC-48	2	2
T. Schor Middle School	1	RTU	1200	FC-24	1	1
T. Schor Middle School	2	RTU	8000	FC-48	2	4
T. Schor Middle School	5	RTU	1600	FC-24	1	5
T. Schor Middle School	1	RTU	5000	FC-48	2	2
T. Schor Middle School	2	RTU	6000	FC-48	2	4
T. Schor Middle School	3	RTU	4000	FC-48	1	3
T. Schor Middle School	4	RTU	7500	FC-48	2	8

Existing Units

Ionization

Ionization

PROPOSED SOLUTION

Improvement in the indoor air quality may be realized from the installation of Needlepoint Bipolar Ionization (NPBI) devices in the air handling systems listed in the table above. The scope of this measure includes installation at central station air handling equipment as well as packaged rooftop equipment. The proposed measure will implement an upgrade to the existing systems as it is an air quality control solution which permits application of the ASHRAE 62-1 IAQP methodology for calculating required ventilation air.

Plasma ionization uses an electric charge to create a plasma field with a high concentration of positive and negative ions. These systems can be installed in air handling equipment to reduce the number of particles and microorganisms contained in airstreams that are transferred throughout a facility. Ions attach to airborne particles (i.e. dust, pet dander, pollen) that are then subsequently attracted to one another, effectively increasing their mass and size. These larger particles are then removed from the airstream by the filtration system. These ions also serve to steal hydrogen away from microorganisms contained in the airstream leaving them to die and thus further improving Indoor Air Quality (IAQ) for occupants.

Example Plasma Ionization Bar System

The NPBI devices will be installed in the ventilation units on the leading face of the heating/cooling coil bank. The installation for mechanical ventilation systems will utilize a testing, adjustment and balancing (TAB) contractor to measure and record the existing outside air volume for each air handling unit. The measured value will become the revised baseline. Upon review and agreement with the District, the TAB contractor will reset the outside air dampers to reduce the ventilation rate by 20% or as directed by the District.

Additional benefits include reduction in airborne particulates, mold, spores, bacteria and airborne viruses. Clean heating hot water and chilled water coils improving heat transfer and reducing pressure drop.

SCOPE OF WORK

The following outlines the scope of work to install NPBI in the RTUs identified in the above table.

Honeywell will assemble, as required, and install ion sensors in the supply air duct downstream of the AHU/RTU to measure the concentration of ions in the air stream in ions/cc/sec.

The ionization units have an internal contact which closes when the ion generator is active. These contacts will be connected to the BMS verifying the device is ready to produce ions. To verify ions are being produced, a duct-mounted ion sensor will be installed in the common supply air duct downstream of the AHU. The scalable output of the sensor will be connected to the BMS for monitoring the operation of the ionization equipment.

Installation of the NPBI equipment:

1. Install the device in accordance with the manufacturer's instructions.
2. Attach the frame of the coil with the ionization tips in the air stream.
3. Connect electric power.
4. Start up and commissioning of new units.
5. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based on the ventilation reduction with the installation of the NPBI devices. The savings are generally calculated as:

Electric and Thermal Energy Savings	Existing unit energy consumption (kWh) and (therms) – post installation energy consumption (kWh) and (therms). Savings will be achieved by reducing the existing ventilation rate by 20% but in no case less than the value determined by the IAQP calculation.

EQUIPMENT INFORMATION

Manufacturer and Type	Honeywell and the Customer will determine final selections.
Equipment Identification	Product cutsheets and specifications are available upon request. As part of the measure, design, and approval process, specific product selection will be provided for your review and approval.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the installation and electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from the reduction of heating and air conditioning loads treating outdoor ventilation air.
Waste Production	Waste products generated from this project will be disposed of in accordance with all Federal, State, and local codes.
Environmental Regulations	No environmental impact is expected. Where reduction on ventilation air volumes are recommended Honeywell will provide the required calculations demonstrating compliance with the requirements of ASHRAE 62.1-2019 or similar Code requirement of the authority having jurisdiction.

ECM 4A — BUILDING ENVELOPE IMPROVEMENTS

The key benefits of this ECM include:

- **Energy savings** from reducing unwanted outside air infiltration.
- **Equipment longevity** resulting from more efficient and less wasteful equipment utilization.
- **Occupancy comfort and productivity** improvement through superior temperature and humidity control throughout your buildings.
- **Improved building envelope** by remediating building gaps that allow unconditioned air penetration.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Building Envelope Improvements	●	●	●		●	●	●	●	●	●	●	●

EXISTING CONDITIONS

Heat loss due to infiltration is a common problem, particularly in places with long and cold winter seasons such as NJ. This problem has been shown to represent the single largest source of heat loss or gain through the building envelopes of nearly all types of buildings. Our work has found 30% to 50% of heat loss attributable to air leaks in buildings.

Honeywell uncovered several leaks that allow for heat loss to occur during the winter season and unwanted heat gains during the summer season. These problems include door gaps, exhaust fans in poor condition, open windows or windows in poor condition, lack of air sealing, and insulation.

Windows at Piscataway HS

Roof/Wall Seam at Knollwood ES

Honeywell has helped customers like you to address these problems with a comprehensive and thorough building envelope solution that seals up your buildings to improve occupancy comfort and help eliminate unwanted energy waste. We propose to conduct a comprehensive weatherization job to weatherproof doors and windows, caulk and seal leaks, and install spray foam and rigid foam boards to stop unwanted air movement and provide a thermal barrier between spaces. Part of this process may include decoupling floor-to-floor and compartmentalizing of components of the building to equalize pressure differences.

PROPOSED SOLUTION

Roof-Wall Joints

- **Existing** – Buildings throughout the District were found to require roof-wall joint air sealing.
- **Proposed** – Honeywell recommends using a high-performance sealant. In some buildings, two-component foam will be used. Any cantilevers off the buildings will be sealed with backer rod and sealant. Finally, the inside vestibule corners should be sealed with backer rod and sealant.

Roof Penetrations

- **Existing** − There are many roof top exhaust fans that require damper cleaning, lubrication, and inspection for proper operation and to seal the roof deck to prevent penetration. Some units may be deemed to be too oversized for this service. Some buildings have roof-top AHUs with ducts that may show air leak during an IGA.
- **Proposed** – Honeywell recommends if there is leak, these duct penetrations will be sealed with two-component polyurethane foam. Skylights will also be sealed. Sealant will be injected behind the drip cap to eliminate airflow.

Roof Overhangs

- **Existing** – We found that roof overhangs at exterior doors are open to the drop ceilings, providing a pathway allowing heated and cooled air to escape between the interior and exterior of the building.
- **Proposed** – Honeywell proposes to install rigid foam boards and seal the perimeter and any penetrations with spray foam to prevent air leak and provide a sufficient thermal barrier between the spaces.

Windows

- **Existing** −The operable windows in most of your buildings could present air leak issues that require weather stripping with fuzz or gasket type materials.
- **Proposed** – Honeywell recommends installing weather stripping and door sweeps to prevent air leak.

Doors

- **Existing** – Doors in this facility need full weather-stripping replacement and/or door sweeps.
- **Proposed** – Honeywell recommends new weather stripping and door sweeps to be installed where needed.

BENEFITS

This work will allow for more efficient operation of your buildings by reducing heating and cooling losses throughout the year. In addition, the draftiness of the buildings and hot and cold spots will be significantly reduced. A reduction in air infiltration will also minimize potential concerns for dirt infiltration or indoor air quality concerns including allergies.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved building envelope will limit conditioned air infiltration through openings in the building air barrier. Less infiltration means less heating and cooling required by the HVAC system.

CHANGES IN INFRASTRUCTURE

Building envelope will be improved with little or no noticeable changes.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minimal coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Some existing caulking and weather-stripping will be removed and disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 4B — ROOF REPLACEMENT

The key benefits of this ECM include:

- **Energy savings** from reducing unwanted outside air infiltration.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Occupancy comfort and productivity** resulting from tighter and more efficient building envelope.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Roof Replacement	●					●	●		●		●	

EXISTING CONDITIONS

Honeywell has investigated the replacement of specific roofs throughout the District based on locations of new proposed solar arrays. While these roofs were considered to be in good condition and suitable for the new arrays, Honeywell investigate their potential replacement.

Building	New Roof Square Footage*
Eisenhower Elementary School	38,500
Grandview Elementary School	68,500
Knollwood Elementary School	35,700
Martin Luther King Intermediate School	66,100
Piscataway High School	26,900

Roofing at Piscataway HS

Roofing at Eisenhower ES

PROPOSED SOLUTION

Honeywell proposes the removal of the existing roof and the installation of a new energy efficient, Ethylene Propylene Diene Monomer (EPDM) roof or built up roof in the areas specified in the table above. Additional insulation will be installed to increase the effective R-value relative to the existing roof. Overall, through the implementation of this measure the District will reduce its heating fuel usage and air conditioning costs each year.

ENERGY SAVINGS METHODOLOGY

Following approach is used to determine savings for this specific measure:

Existing Roof Efficiency	= Existing U + Existing Infiltration Rate
Proposed Roof Efficiency	= Proposed U + Proposed Infiltration Rate
Energy Savings (Btu) Winter Savings(Therms) Summer Savings (Tons Cooling)	= UAdTproposed – UAdTexisting = Energy Savings/Boiler Eff./100,000 = Energy Savings/12,000 Btu/Ton

INTERFACE WITH BUILDING

The new roof will be constructed to match existing, maintaining contours of the existing building.

ENERGY SAVINGS METHODOLOGY

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved roof will limit conditioned air infiltration through openings in the building air barrier. Less infiltration means less heating and cooling required by HVAC systems.

CHANGES IN INFRASTRUCTURE

EPDM roofing will be installed at the above referenced roof locations.

SUPPORT AND COORDINATION WITH UTILITIES

Coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Existing roof materials will be removed and disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 4C — WINDOW REPLACEMENTS

The key benefits of this ECM include:

- **Energy savings** from reducing unwanted heat transfer.
- **Occupancy comfort and productivity** by way of enhanced temperature control throughout your buildings.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Window Replacements	●					●	●					

EXISTING CONDITIONS

During Honeywell's site visits to the District, maintenance personnel informed us of the poor condition of some of the windows throughout the district. The performance of these windows is poor, allowing infrared heat to be radiated out during the winter, solar energy to increase the load in the classrooms during the warmer months, and increased moisture infiltration.

Windows at Piscataway HS

Windows at Eisenhower ES

PROPOSED SOLUTION

Honeywell proposes to replace the problematic windows with new, high efficiency, double-pane windows. These new windows can be installed with argon gas, and a low-emissivity coating, both of which help to further reduce unwanted heat transfer through the window. When installed, the new windows will also reduce unwanted air infiltration through the window and around the window frames, further reducing energy loss while simultaneously increasing the comfort of occupants in those rooms.

Building	New Window Qty.
Piscataway High School	117

Building	New Window Qty.
Martin Luther King Intermediate School	167
Martin Luther King Intermediate School	6
Eisenhower Elementary School	173
Eisenhower Elementary School	6
Total	469

Window Replacement Opportunities

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved windows will limit heat gain and loss from the spaces, decreasing energy used by the heating and cooling systems.

Following approach is used to determine savings for this specific measure:

Existing Window Efficiency	U_E = 1/Existing R
Proposed Window Efficiency	U_P = 1/Proposed R
Energy Savings $	= (U_E – U_P) * $Area_{windows}$ * audit hours * ($dTemperature_{BIN}$) * ($1/n_{boiler}$) * fuel unit cost

CHANGES IN INFRASTRUCTURE

New windows, and window film will be installed.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minimal coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Any waste materials generated will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 4D — DOOR REPLACEMENTS

Body text

The key benefits of this ECM include:

- **Energy savings** from reducing unwanted heat transfer.
- **Occupancy comfort and productivity** by way of enhanced temperature control throughout your buildings.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
Door Replacements	●				●	●	●	●	●	●	●	●

EXISTING CONDITIONS

During site visits and meetings with district personnel, Honeywell observed the conditions of several single and double doors were in poor condition and deteriorated. There is air loss occurring along the doorways due to the poor condition of the doors as well as missing and damaged weather stripping and door sweeps. The existing conditions of the doorways permit heat transfer into and out of the conditioned spaces as well as increased moisture infiltration resulting in increased electric and gas consumption to treat the space.

Doors at Arbor IS

Doors at Eisenhower ES

PROPOSED SOLUTION

Honeywell proposes to replace the problematic doors and include weather-stripping in the door and frame as well as astragals on the double doors. Each doorway addressed will receive new door sweeps to optimize the seal at the bottom of the door.

The installation of new polyethylene clad urethane foam weather strip is recommended to seal the edges of exterior doors, including strike side, hinge side, and header. Brush seals are also recommended to be installed to seal exterior door bases and double door center astragals.

Building	Single Doors	Double Doors
Piscataway High School	20	9
Conackamack Middle School	13	1
Martin Luther King Intermediate School	7	
Eisenhower Elementary School	7	
Arbor Intermediate School		4
Knollwood Elementary School	3	
Randolphville Elementary School	2	1
Grandview Elementary School	7	3
Fellowship Farms School/Administration Building	9	1
Totals	**68**	**19**

Door Replacement Opportunities

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized at the buildings' HVAC equipment. The improved door fenestrations will limit heat gain and loss from the spaces, decreasing energy used by the heating and cooling systems.

Following approach is used to determine savings for this specific measure:

Existing Door Efficiency	U_E = 1/Existing R
Proposed Door Efficiency	U_P = 1/Proposed R
Energy Savings $	= (U_E – U_P) * $Area_{doors}$ * audit hours * ($dTemperature_{BIN}$) * ($1/n_{boiler}$) * fuel unit cost

CHANGES IN INFRASTRUCTURE

New doors (single, double) requiring weather stripping, door kits are recommended. Door kits are composed of perimeter retainers (typically aluminum or vinyl), which create a positive seal at the door jamb sides and header. Door sweep selection depends on the door type and condition of the threshold area:

- For metal doors having uneven sills with no threshold, brush sweeps are recommended
- For metal doors with even sills and thresholds, vinyl sweeps are recommended

Areas requiring expanding foam insulation shall utilize commercial grade two-part foam sealant, typically Touch n' Seal. For penetrations requiring perimeter sealant, caulking is recommended. Proposed caulk sealant is typically commercial grade polyurethane (BASF) or silicone (Tremco).

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minimal coordination efforts will be needed to reduce or limit impact to building occupants.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from reduced HVAC energy usage and better occupant comfort.
Waste Production	Any waste materials generated will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 5A — PERMANENT LOAD REDUCTION PROGRAM

The key benefits of this ECM include:

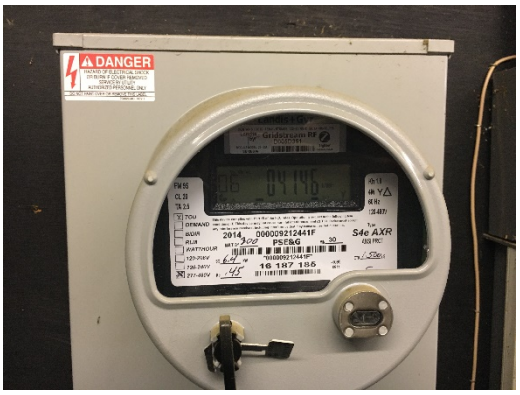
- **Energy savings** from reducing energy loads during peak hours.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Revenue generation** from participation in the PJM permanent load reduction program.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
5A Permanent Load Reduction	●	●	●	●	●	●	●	●	●	●	●	●

PROPOSED SOLUTION

Honeywell proposed to facilitate the District's participation in the PJM Energy Efficiency Program. This program is offered through the PJM Regional Transmission Organization (RTO), and Independent System Operator (ISO). The energy efficiency program pays PJM customers for implementing ECMs that result in permanent load reductions during defined hours.

Electrical Service at Conackamack MS



Electrical Service at Eisenhower ES

PJM PERMANENT LOAD REDUCTION

PJM offers incentives to customers who install energy-efficient equipment that permanently reduces the use of electric during peak times. Documentation of the type of new energy-efficient equipment installed, when it was installed, and how it is being used is required. PJM also requires a measurement of electric D usage during the peak summer periods to verify whether a building is actually using less energy. Also, as a cooperative, PJM relies on its members to combine projects together to make sure the volume is significant enough to impact their system. The table below outlines the anticipated kW reduction that will be incentivized by PJM.

Building	Permanent Load Reduction (KW)
Piscataway High School	211
Quibbletown Middle School	60
T. Schor Middle School	51
Ethel Road Maintenance/Transportation Complex	20
Conackamack Middle School	35
Martin Luther King Intermediate School	30
Eisenhower Elementary School	40
Arbor Intermediate School	47
Knollwood Elementary School	32
Randolphville Elementary School	33
Grandview Elementary School	35
Fellowship Farms School/Administration Building	25

Proposed Permanent Load Reduction

ENERGY SAVINGS METHODOLOGY AND RESULTS

Revenue is generated through participation in the PJM program.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Initiation of demand response curtailment will be required.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	This measure will produce no waste by-products.
Environmental Regulations	None.

ECM 6A — TRANSFORMER REPLACEMENT

The key benefits of this ECM include:

- **Guaranteed energy savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
6A Transformer Replacement	●	●			●	●	●	●	●	●	●	●

EXISTING CONDITIONS

The transformers in locations within the electrical distribution systems in the District consist of 480 Volts. Distribution transformers are installed in the boiler rooms and in various electrical and utility closets to step down the voltage to 120-208 Volts. Typically, an electrical distribution system has some losses associated with the electrical system and a considerable portion of these losses are associated with distribution transformers.

Transformer at Piscataway HS

Transformer at Arbor IS

SYSTEMS EVALUATION AND SELECTION

Typical transformers are not designed to handle harmonic loads of today's modern facilities, and suffer significant losses, even if the transformer is relatively new. Typically, conventional transformer losses, which are non-linear, increase by 2.7 times when feeding computer loads. The nonlinear load loss multiplier reflects this increase in heat loss, which decreases the net transformer efficiency. Also, unlike most substation transformers that are vented to the exterior, building transformers are ventilated within the building they are located, and their heat losses therefore add to the cooling load.

Based on site investigation conducted by our staff, we identified the following transformers that we propose to replace with energy efficient replacements at a size matching the existing loads as indicated in the table below:

Building	Location	kVA	Qty
Fellowship Farms School/Administration Building	Gen Rm	75.0	1
Fellowship Farms School/Administration Building	Gen Rm	75.0	1
Fellowship Farms School/Administration Building	Gen Rm	45.0	1
Fellowship Farms School/Administration Building	Gen Rm	45.0	1
Fellowship Farms School/Administration Building	Gym Storage	30.0	1
Fellowship Farms School/Administration Building	Custodian Office	45.0	1
Fellowship Farms School/Administration Building	Custodian Office	75.0	1
Arbor Intermediate School	Boiler Rm	30.0	1
Arbor Intermediate School	Boiler Rm	112.5	1
Arbor Intermediate School	Boiler Rm	30.0	1
Arbor Intermediate School	Supply Rm Boys Bathroom	225.0	1
Conackamack Middle School	Main Electric	750.0	1
Eisenhower Elementary School	Storage 1	75.0	1
Eisenhower Elementary School	Storage 1	25.0	1
Eisenhower Elementary School	Main Electric	75.0	1
Eisenhower Elementary School	Main Electric	45.0	1
Eisenhower Elementary School	Main Electric	15.0	1
Eisenhower Elementary School	Main Electric	25.0	1
Eisenhower Elementary School	Main Electric	45.0	1
Grandview Elementary School	Basement Electric	225.0	1
Grandview Elementary School	Electric Rm by 41	75.0	1
Grandview Elementary School	Electric Rm by door 5	225.0	1
Grandview Elementary School	Boiler Rm	15.0	1
Knollwood Elementary School	Main Electric Rm	500.0	1
Martin Luther King Intermediate School	Main Electric	45.0	1
Martin Luther King Intermediate School	Main Electric	25.0	1
Martin Luther King Intermediate School	Main Electric	45.0	1
Martin Luther King Intermediate School	Main Electric	75.0	1
Martin Luther King Intermediate School	Main Electric	15.0	1
Piscataway High School	Patton Wing Rm 140	15.0	1
Piscataway High School	Patton Wing by 147	225.0	1
Piscataway High School	Behind Patton Kitchen	75.0	1
Piscataway High School	Behind Patton Kitchen	30.0	1
Piscataway High School	Basement Electric	45.0	1
Piscataway High School	By A04	75.0	1
Quibbletown Middle School	Main Electric	750.0	1
Randolphville Elementary School	Boiler Rm by Gym	500.0	1

Existing Transformers to be Replaced

PROPOSED SOLUTION

The proposed transformers will be Power Smiths High Efficiency K-Star Harmonic Mitigating units. They are Energy-Star rated and meet the new TP1 Law requiring replacement of transformers of 600 volts or under.

SCOPE OF WORK

Remove and install new E-saver transformers.

Per Transformer Unit:

1. Shut off the main electric power to the transformer to be replaced.
2. Disconnect the existing transformer and install replacement unit.
3. Turn power back on.
4. Inspect unit operation by performing electrical and harmonics testing.
5. Dispose of old transformers properly.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The energy savings for this ECM are realized by reduction in electric energy lost in the existing transformers as a result of the higher efficiency of the new transformers.

CHANGES IN INFRASTRUCTURE

New transformers where indicated.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of services for the affected areas.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from increased voltage conversion efficiency.
Waste Production	Any removed transformers and parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 7A — COGENERATION

The key benefits of this ECM include:

- **Energy savings** from utilizing a Combined Heat and Power (CHP) (aka cogeneration) system to supplement the existing heating system.
- **Operational savings** resulting from improved operational efficiencies unique to CHP technology.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
7A Cogeneration	●											

EXISTING CONDITIONS

No Combined Heat and Power (i.e. cogeneration) units are currently located within the District.

PROPOSED SOLUTION

Honeywell recommends the installation of one Yanmar 35 kW CHP generating unit that will generate electric power and produce thermal energy that can supplement heating loads. This system will be appropriate to this site given the year-round operational needs of this facility and leverage healthy state rebates to help pay for it. Since the unit is a synchronous generator it does not require any excitation energy to produce electricity and therefore may be used for emergency back-up power.

Yanmar Unit

Yanmar Low Emissions CHP Module takes the many benefits of modular cogeneration. Modules come fully pre-packaged from the factory, including engine, generator, oil/ jacket/ exhaust heat recovery, controls, electrical switchgear, emissions controls, and modem for remote monitoring and data-logging. This allows for standardization and minimizes installation cost and complexity in the field. Also, the comprehensive third-party (ETL/IEEE/NYSIR/UL) certifications provide streamlined interconnection permitting with the local electric utility and are NJDEP Air Permit Exempt.

SCOPE OF WORK

Building	Qty	Make	Model
Piscataway High School	1	Yanmar	CP-35

Recommended Cogeneration Unit

EQUIPMENT INFORMATION

Manufacturer and Type	Yanmar-CP35, Electrical Output 35 kW, Thermal Output 203,000 Btu/hr, or approved equal.
Equipment Identification	Product cut sheets and specifications for generally used are available upon request. As part of the measure design and approval process, specific product selection will be provided for your review and approval.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on energy conversion of natural gas to thermal and electrical energy.

CHANGES IN INFRASTRUCTURE

The proposed micro-generator unit would reside in or near the boiler room.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods. The customer and Honeywell will decide upon the exact location of the CHP installation.

ENVIRONMENTAL ISSUES

Resource Use	Energy will be generated to supplement energy purchased from the electrical utility.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	Aside from the environmental benefits from on-site energy generation, no other environmental impact is expected.

ECM 8A — SOLAR POWER PURCHASE AGREEMENT

The key benefits of this ECM include:

- **Reduced utility costs**.
- **Guaranteed utility rates** for 15 years to provide a valuable hedge against future price volatility and greater budgetary certainty utilizing renewable, clean electricity.
- **Additional savings** from solar can potentially provide the District with additional ESIP funding to expand overall project scope and additional improvement projects.
- **Educational asset** to provide additional tools for teachers to engage students on sustainability and the environment stewardship.
- **Low risk** with system maintenance provided by the third-party system owner.
- **No upfront costs**.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
8A Solar Power Purchase Agreement	●	●	●	●		●	●	●	●		●	●

ECM OVERVIEW

While on site, Honeywell observed numerous solar photovoltaic (PV) arrays atop various schools throughout the District. While these PV arrays are owned by the District, Honeywell recommends the installation of additional solar photovoltaic systems on District owned roofs to generate additional on-site renewable electricity. This could be provided at no upfront cost via a power purchase agreement (PPA). A PPA is a public-private partnership financial arrangement in which a third-party solar company owns, operates, and maintains your photovoltaic system, while the host customer agrees to provide the site for the system on its property. The District purchases the solar system's electricity output at a predetermined price ($/kWh) and for a predetermined period. This stable price for electricity is developed to be lower than the utilities and third-party suppliers, thereby allowing the District to benefit from lower electricity prices, on-site renewable energy generation, a reduction in greenhouse gas emissions and a powerful educational tool for your teachers and students. Meanwhile, the system will not add any additional maintenance costs since it is owned by the third-party solar company. One of the more significant benefits of this potential ECM is that it will provide for a rate reduction based upon current electric rates, contributing to greater savings within your ESIP project to fund other measures.

Rooftop Solar Array

Rooftop Solar Array

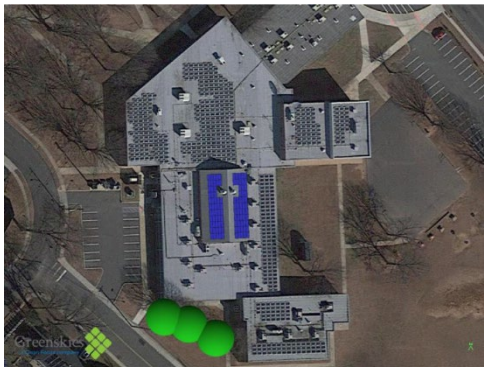
Honeywell will assist the District in the development of technical specifications for a Solar Power Purchase Agreement (PPA) Request for Proposal (RFP) to be procured separately by the District in accordance with LFN 2009-10 / Chapter 83 of P.L. 2008. Honeywell will also prepare a written report for the evaluation committee to determine its selection of a PPA provider. Once a PPA is executed, the PPA provider is responsible for turnkey design, installation, operation, and maintenance of the installed photovoltaic energy systems. Honeywell will inform the PPA provider of all ESIP construction work in order to coordinate the installation requirements of both projects.

PROPOSED SOLUTION

Honeywell analyzed solar energy system installation viability at each District school by examining the estimated post-ESIP electrical use with the known roof ages and remaining warranties. This enabled Honeywell to maximize the amount of solar electricity produced, minimize the amount of electricity still purchased from the grid, while avoiding penalization for overproducing solar electricity at any given building. Therefore, Honeywell proposes the installation of solar PV systems through a PPA at the buildings listed in the chart below. Note that the presence of existing solar PV systems at a building does not preclude it from benefiting from additional solar generation. See detailed preliminary installations below. If implemented, these arrays will bring their respective buildings to or near net-zero electricity purchases from the utility grid.

Location	Solar kW-DC
Piscataway High School	221.0
Quibbletown Middle School	69.4
T. Schor Middle School	262.8
Ethel Road Maintenance/Transportation Complex	50.0
Martin Luther King Intermediate School	295.1
Eisenhower Elementary School	210.9
Arbor Intermediate School	54.0
Knollwood Elementary School	185.5
Grandview Elementary School	266.4
Fellowship Farms School/Administration Building	141.3
Total	1,756.3

Proposed Solar Arrays

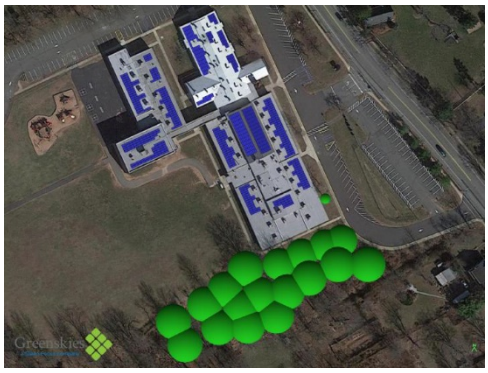


Proposed Solar at Arbor IS

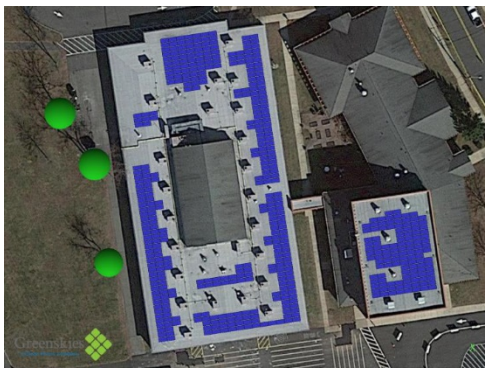
Proposed Solar at Eisenhower ES

Proposed Solar at Ethel Road Garage

Proposed Solar at Fellowship Farms ES

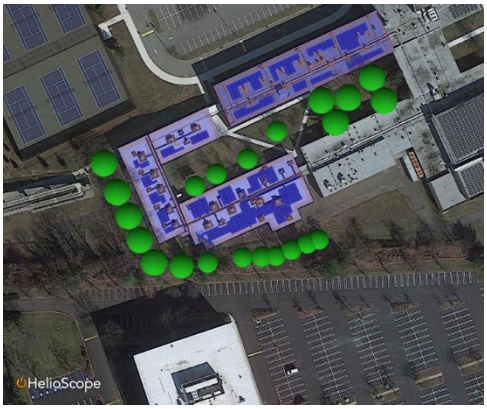


Proposed Solar at Grandview ES

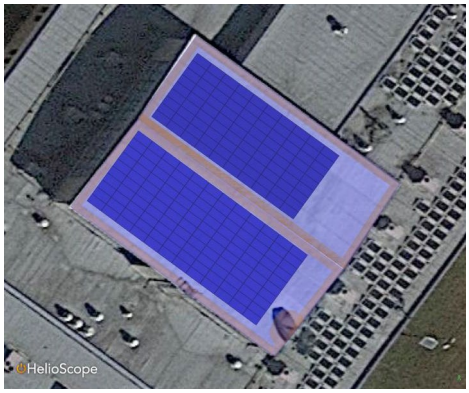


Proposed Solar at Knollwood ES

Proposed Solar at MLK IS



Proposed Solar at Piscataway HS



Proposed Solar at Quibbletown MS

Proposed Solar at T. Schor MS

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the difference in kWh price between the PPA and the District's current electrical supplier.

CHANGES IN INFRASTRUCTURE

The proposed solar array would be roof-mounted only.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness, no other environmental impact is expected.

ECM 9A — COMPUTER POWER MANAGEMENT

The key benefits of this ECM include:

- **Guaranteed energy savings** by better managing the power consumption of computer equipment.
- **Security protection** preventing external access since the computer system is shut down after hours.
- **Virus protection** from the ability to shut down the computers before viruses reach the network.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
9A Computer Power Management	●	●	●	●	●	●	●	●	●	●	●	●

EXISTING CONDITIONS

Information Technology (IT) is a major consumer of energy in school buildings and campuses. At more than 25% of total energy consumption energy efficient IT becomes less of a nice-to-have and more of a necessity. This ECM implements a power management system for all of your LAN based computers, printers and copiers throughout the building. The software system will automatically shut down your IT equipment at scheduled times to prevent unnecessary energy consumption during unoccupied hours.

Computers at Quibbletown MS

Computers at Piscataway HS

Honeywell proposes computer power management software *Surveyor* by Verdiem to manage PC consumption from phantom power, providing a detailed breakdown of usage by IT device type to allow energy managers to better plan, manage and optimize an organization's overall power consumption. This ECM will also provide for enhanced staff productivity. Energy consumption of distributed IT devices can be reduced by up to 60%. Verdiem helps IT departments to accurately measure IT device energy consumption, enforce policies for greater energy efficiency, and optimize savings.

Building	Number of Computers
Piscataway High School	800
Quibbletown Middle School	400
T. Schor Middle School	400
Ethel Road Maintenance/Transportation Complex	50
Conackamack Middle School	400
Martin Luther King Intermediate School	100
Eisenhower Elementary School	100
Arbor Intermediate School	100
Knollwood Elementary School	100
Randolphville Elementary School	100
Grandview Elementary School	100
Fellowship Farms School/Administration Building	50
Totals	2,700

Computer Power Management Locations

ENERGY SAVINGS METHODOLOGY AND RESULTS

Annual savings for administrative and student computers is based on previous logging results for computers with similar usage types.

CHANGES IN INFRASTRUCTURE

Server will be integrated into current IT network.

CUSTOMER SUPPORT AND COORDINATION WITH SOFTWARE

Support will be required for software deployment by IT department.

ENVIRONMENTAL ISSUES

Resource Use	Annual savings for administrative and student computers are based on previous logging results for computers with similar usage types.
Waste Production	None.
Environmental Regulations	No environmental impact is expected.

ECM 10A — WATER CONSERVATION

The key benefits of this ECM include:

- **Reduction in water consumption** from replacing the existing plumbing fixtures to lower water flow rates.
- **Improved performance of existing systems** by optimizing equipment.
- **Reduction in maintenance costs** from new flush valves and tuning each fixture to the right amount of water.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
10A Water Conservation	●	●	●	●	●	●	●	●	●	●	●	●

ECM OVERVIEW

Honeywell will seek to increase the operational performance of your water systems with the minimal water required to provide optimal performance.

EXISTING CONDITIONS

These are a mixture of wall hung and floor mounted toilets exceeding 1.5 gallons per flush (gpf), in addition to faucet flow aerators which exceed 1.0 gpm. These fixtures use more water than is generally needed to accomplish their task.

Flush Valve at Arbor IS

Sink Faucet at Conackamack MS

PROPOSED SOLUTION

Commercial Toilet Retrofits

The water conservation retrofit is designed to provide high-efficiency plumbing retrofits to upgrade low-efficiency plumbing fixtures in all areas of the schools and administration building. Retrofits are excluded where existing plumbing fixtures are operating at maximum efficiency, are used for janitorial or laboratory uses, or are cost prohibitive to replace.

Commercial flush valve toilets will be retrofitted with new American Standard (or equivalent) commercial toilets and Sloan (or equivalent) diaphragm flush valves with manual activation. Gravity tank toilets will be replaced with new American Standard (or equivalent) gravity flush two-piece comfort height and primary height toilets. Toilets shall be installed with new Bemis (or equivalent) commercial open front plastic seats (white color), less cover.

a) New flushometer valves shall be installed to the minimum required height of 6" above flood plain (toilet rim) as required by CL1001 universal plumbing code.

b) New flushometer valves and tank type toilets shall be installed with new Bak-Chek™ control stop valves or angle stop valves for isolation.

c) New flushometer valves shall include replacement of 1" horizontal water supply lines to install plumb flushometer valves when installing new toilet bowls (as necessary). All piping modifications shall conform with material that complies with standard trade practice and like materials.

d) New toilets bowls shall meet ADA compliance, floor mounted ADA toilets shall be replaced with new ADA height toilets.

e) New toilets bowls shall be securely connected to water supply lines and waste connections. Minor repairs to floor mount toilet flanges and wall mount carrier rods shall be made to ensure secure toilet bowl connections in compliance with local pluming code.

Commercial Urinal Retrofits

Commercial flush valve urinals shall be retrofitted with new Sloan Regal (or equivalent) diaphragm flush valves with manual activation. Urinal china shall remain intact.

a) New flushometer valves shall be installed to the minimum required height of 6" above flood plain (urinal rim) as required by CL1001 universal plumbing code.

b) New flushometer valves shall be installed with new Bak-Chek™ control stop valves for isolation.

c) New flushometer valves shall include replacement of 3/4" horizontal water supply lines to install plumb flushometer valves to existing china (as necessary). All piping modifications shall conform with material that complies with standard trade practice and like materials.

d) New flushometer valves shall be installed with new complete spud coupling assemblies for secure connection to (existing) urinal china.

Commercial Faucet Retrofits

Faucets shall be retrofitted with new Neoperl (or equivalent) tamper-resistant faucet restrictor. New faucet restrictors:

a) Shall provide non-splashing, non-aerated spray at 1.0 gpf and below, shall be pressure-compensating for constant flow from 20 to 80 psi.

b) Shall have chrome plated vandal-proof housings.

c) Shall be equipped with anti-clogging dome screen filters sediment and particles.

d) Shall conform to ANSI/NSF 61 and ASME A112.18.1M and CSA B125 certification.

CHANGES IN INFRASTRUCTURE

New low-flow water fixture components will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Minor support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Water savings will result from lower water flows through new fixtures.
Waste Production	Old components will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 11A — HIGH SCHOOL KITCHEN RENOVATION

The key benefits of this ECM include:

- **Energy savings** by upgrading outdated equipment to high efficiency units.
- **Lower operational costs** by decreasing maintenance calls and part replacements.
- **Fewer maintenance headaches** by removing outdated equipment with hard-to-find replacement parts.

ECM Description	Piscataway High School	Quibbletown Middle School	T. Schor Middle School	Ethel Road Maintenance/Transportation Complex	Conackamack Middle School	Martin Luther King Intermediate School	Eisenhower Elementary School	Arbor Intermediate School	Knollwood Elementary School	Randolphville Elementary School	Grandview Elementary School	Fellowship Farms School / Administration Building
High School Kitchen Renovation	●											

EXISTING CONDITIONS

Honeywell extensively surveyed the equipment and layout of the existing equipment at the High School Central Kitchen, considered detailed input from the District about the preference for a more open, less "institutional" kitchen and serving area design. The currently kitchen layout, especially of the serving area, is enclosed and uninviting. Additionally, much of the kitchen equipment is outdated, inefficient, and difficult to find maintain due to limited-to-no parts availability.

Central Kitchen Refrigerator

Central Kitchen Cooking Equipment

PROPOSED SOLUTION

Given the existing conditions surveyed of the Central Kitchen layout and equipment, Honeywell developed a comprehensive overhaul of both. This proposed design is more open and fosters a more inviting atmosphere to students as they interact with the space. Equipment replacements will increase energy efficiency and reduce maintenance headaches by eliminating older equipment which has limited parts availability.

SCOPE OF WORK

- Disconnect and remove existing kitchen equipment.
- Run new gas or electrical service to equipment as needed.
- Install and connect new kitchen equipment.
- Start-up and test new units.

ENERGY SAVINGS METHODOLOGY AND RESULTS

The savings approach is based upon the difference in energy use between the existing and new kitchen equipment.

CHANGES IN INFRASTRUCTURE

Gas and/or electrical connections may need to be relocated depending on the final layout selected by the District.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Support will be required for the interruption of utilities for brief tie-in periods.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from higher equipment efficiency.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

SECTION D

TECHNICAL & FINANCIAL SUMMARY

Section D – Technical & Financial Summary

1. Recommended ESIP Project

	Recommended ESIP Project
Value of Project	$16,825,709
Term of Repayment	18 Years
Projected Savings Over Term	$20,430,255
Projected NJ Rebates & Incentives	$1,897,397
Projected Interest Rate	2.2%

RECOMMENDED PROJECT TECHNICAL AND FINANCIAL SUMMARY DOCUMENTS

Form II: Energy Conservation Measures (ECMs) Summary Form

Form III: Projected Annual Energy Savings Data Form

Form IV: Projected Annual Energy Savings Data Form in MMBTUs

Form V: ESCOs Proposed Final Project Cost Form

Form VI: ESCOs Preliminary Annual Cash Flow Analysis Form

BUILDING-BY-BUILDING SIMPLE PAYBACK SUMMARY

A simple payback summary broken down by building by ECM has been provided for use by Piscataway Township Schools (District) in reviewing available scope of work combinations and options.

Building by Building Simple Payback Summary (Hard Costs Only)

FORM II: RECOMMENDED PROJECT — ENERGY CONSERVATION MEASURES (ECMS) SUMMARY FORM

FORM II-2
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ENERGY CONSERVATION MEASUREs (ECMs) SUMMARY FORM
PISCATAWAY TOWNSHIP BOE
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: Honeywell International

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
1A LED Lighting Upgrades	$ 2,150,583	$ 423,046	5.08
1B Lighting Controls	$ 33,827	$ 3,222	10.50
1C Vending Misers	$ 5,940	$ 1,385	4.29
1D De-stratification Fans	$ 177,283	$ 5,548	31.96
2A Boiler Upgrade	$ 418,404	$ 3,093	135.27
2C Rooftop Unit Replacement	$ 5,042,510	$ 60,875	82.83
2E Premium Efficiency Motors and VFDs	$ 67,167	$ 11,038	6.09
2F Split System Replacement	$ 164,634	$ 788	208.84
2I Cooling Tower Replacement	$ 397,496	$ 20,107	19.77
2J Energy Wheel Replacement at HS	$ 343,686	$ 22,358	15.37
2L Gym & Maintenance Heater Upgrades	$ 86,642	$ 218	398.23
3A Building Management System Upgrades	$ 2,942,161	$ 86,243	34.11
3C Exhaust Fan Controls	$ 110,988	$ 8,649	12.83
3E Healthy Buildings - Bipolar Ionization	$ 249,155	$ 6,424	38.78
4A Building Envelope Improvement	$ 220,284	$ 30,761	7.16
5A Permanent Load Reduction	$ -	$ -	-
6A Transformer Replacement	$ 450,578	$ 32,040	14.06
7A Cogeneration	$ 275,000	$ 16,235	16.94
8A Solar PPA	$ -	$ 226,255	-
10A Water Conservation	$ 598,936	$ 71,240	8.41
Add additional lines as needed* **Project Summary:**	$ 13,735,273	$ 1,029,526	13.34

Optional ECMs Considered, but not included with base project at this time	Estimated Installed Hard Costs [1] $	Estimated Annual Savings $	Estimated Simple Payback (years)
1E Plug Load Management via Wifi	$ 254,925	$ 15,548	16.40
1F Building Voltage Reduction	$ 264,000	$ 6,612	39.92
2B Domestic Hot Water Replacement	$ 401,522	$ 3,335	120.40
2D Walk-In Cooler/Freezer Upgrade	$ 166,735	$ 758	219.84
2G Kitchen Equipment Replacements	$ 104,710	$ 1,532	68.37
2H Unit Ventilator Replacements	$ 386,660	$ 420	919.82
2K Fellowship Farms VRV Upgrade	$ 1,797,737	$ 32,700	54.98
3B Demand Control Ventilation	$ 220,000	$ 2,160	101.87
3D Healthy Buildings – Student & Staff Security	$ 975,260	$ -	-
4B Roof Replacement	$ 3,370,510	$ 19,224	175.32
4C Window Replacements	$ 1,359,221	$ 2,432	558.87
4D Door Replacement	$ 653,419	$ 1,101	593.39
9A Computer Power Management	$ 55,089	$ 4,567	12.06
11A High School Kitchen Renovation	$ 1,499,938	$ 2,480	604.69

Add additional lines as needed*

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

FORM III: RECOMMENDED PROJECT — PROJECTED ANNUAL ENERGY SAVINGS DATA FORM

FORM III-2
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP)
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
PISCATAWAY TOWNSHIP BOE
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual savings for each fuel type MUST be completed using the following format. Data should be given in the form of fuel units that appear in the utility bills.

Energy/Water	ESCO Developed Baseline (Units)	ESCO Developed Baseline (Costs $)	Proposed Annual Savings (Units)	Proposed Annual Savings (Costs $)
Electric Demand (KW)	36,355	$251,468	6,626	$45,665
Electric Energy (KWH)	8,153,905	$1,183,398	4,360,837	$700,343
Natural Gas (therms)	363,823	$300,351	102,290	$69,533
Fuel Oil (Gal)	0	$0	0	$0
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	5,084			
SO2	9,637			
CO2	6,248,487			

(1) ESCOs are to use the rates provided as part of this RFP to calculate Avoided Emissions. Calculation for all project energy savings and greenhouse gas reductions will be conducted in accordance with adopted NJBPU protocols

(2) "ESCOs Developed Baseline": Board's current annual usages and costs as determined by the proposing ESCO; based off Board's utility information as provided to proposing ESCO.

(3) "Proposed Annual Savings": ESCOs proposed annual savings resulting from the Board's implementation of the proposed ESP, as based upon "ESCOs Developed Baseline".

FORM IV: RECOMMENDED PROJECT — PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUS

FORM IV-2
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs
PISCATAWAY TOWNSHIP BOE
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

The projected annual energy savings for each fuel type MUST be completed using the following format. Data should be given in equivalent MMBTUs.

ENERGY	ESCO Developed Baseline	ESCO Proposed Savings Annual	Comments
Electric Energy (MMBTUs)	27,821	14,879	
Natural Gas (MMBTUs)	36,382	10,229	
Fuel Oil (MMBTUs)	0	0	
Steam (MMBTUs)			
Other (Specify) (MMBTUs)			
Other (Specify)			

NOTE: MMBTU Defined: A standard unit of measurement used to denote both the amount of heat energy in fuels and the ability of appliances and air conditioning systems to produce heating or cooling.

FORM V: RECOMMENDED PROJECT — ESCO'S PROPOSAL PROJECT COST FORM

FORM V-2

ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCOs PROPOSED FINAL PROJECT COST FORM FOR BASE CASE PROJECT
PISCATAWAY TOWNSHIP BOE
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **HONEYWELL INTERNATIONAL**

PROPOSED CONSTRUCTION FEES

Fee Category	Fees [1] Dollar ($) Value	Percentage of Hard Costs
Estimated Value of Hard Costs [2]:	$13,735,273	
Project Service Fees		
Investment Grade Energy Audit	$171,691	1.25%
Design Engineering Fees	$789,778	5.75%
Construction Management & Project Administration	$618,087	4.50%
System Commissioning	$68,676	0.50%
Equipment Initial Training Fees	$68,676	0.50%
ESCO Overhead	$961,469	7.00%
ESCO Profit	$412,058	3.00%
Project Service Fees Sub Total	$1,716,909	12.50%
TOTAL FINANCED PROJECT COSTS:	$16,825,709	22.50%
ESCO Termination Fee (To be paid only if the Board decides not to proceed beyond the ESP)	$0	0.00%

PROPOSED ANNUAL SERVICE FEES

First Year Annual Service Fees	Fees [1] Dollar ($) Value	Percentage of Hard Costs
SAVINGS GUARANTEE (OPTION)	$0	0.00%
Measurement and Verification (Associated w/ Savings Guarantee Option)	$36,000	Flat Fee
ENERGY STAR™ Services (optional)	Included	0.00%
Post Construction Services (If applicable)	N/A	-
Performance Monitoring	Included	-
On-going Training Services	N/A	-
Verification Reports	Included	-
TOTAL FIRST YEAR ANNUAL SERVICES	$36,000	Flat Fee

NOTES:
(1) Fees should include all mark-ups, overhead, and profit. Figures stated as a range will NOT be accepted.
(2) The total value of Hard Costs is defined in accordance with standard AIA definitions that include:

Labor Costs, Subcontractor Costs, Cost of Materials and Equipment, Temporary Facilities and Related Items, and Miscellaneous Costs such as Permits, Bonds Taxes, Insurance, Mark-ups, Overhead and Profit, etc.

*Annual Service only applies if customer accepts energy guarantee.

FORM VI: RECOMMENDED PROJECT — ESCO'S PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM

FORM VI
ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP):
ESCO's PRELIMINARY ANNUAL CASH FLOW ANALYSIS FORM
PISCATAWAY TOWNSHIP BOE
ENERGY SAVING IMPROVEMENT PROGRAM

ESCO Name: **Honeywell International**

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

1. Term of Agreement: **18** (Years) (Months)
2. Construction Period[2] (months): **12**
3. Cash Flow Analysis Format:

Project Cost:	$	16,825,709
Direct Install Rebate:	$	(487,512)
Honeywell Contract Valu	$	**16,338,197**
ESSER Funds:	$	-
Lease Issuance Fees:	$	55,000
Project Cost [1]:	**$**	**16,393,197**

Interest Rate to Be Used for Proposal Purpo: **2.2%**

Year	Annual Energy Savings	Solar Savings	Annual Operational Savings	Energy Rebates/Incentives	Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs [3]	Net Cash-Flow to Client	Cumulative Cash Flow
Installation	$ 197,827				$ 197,827		$ -	$ -	$ 197,827	$ 197,827
1	$ 659,422	$ 226,255	$ 143,849	$ 58,191	$ 1,087,717	$ (1,069,797)	$ (1,105,797)	$ (36,000)	$ 17,920	$ 215,747
2	$ 672,525	$ 231,233	$ 143,849	$ 656,676	$ 1,704,283	$ (1,686,363)	$ (1,686,363)	$ -	$ 17,920	$ 233,667
3	$ 685,920	$ 236,320	$ 143,849	$ 656,676	$ 1,722,765	$ (1,704,845)	$ (1,704,845)	$ -	$ 17,920	$ 251,587
4	$ 699,613	$ 241,519	$ 143,849	$ 19,171	$ 1,104,152	$ (1,086,232)	$ (1,086,232)	$ -	$ 17,920	$ 269,507
5	$ 713,611	$ 246,832	$ 143,849	$ 19,171	$ 1,123,463	$ (1,105,543)	$ (1,105,543)	$ -	$ 17,920	$ 287,427
6	$ 727,921	$ 252,262		$ -	$ 980,183	$ (962,263)	$ (962,263)	$ -	$ 17,920	$ 305,347
7	$ 742,548	$ 257,812		$ -	$ 1,000,361	$ (982,441)	$ (982,441)	$ -	$ 17,920	$ 323,267
8	$ 757,502	$ 263,484		$ -	$ 1,020,986	$ (1,003,066)	$ (1,003,066)	$ -	$ 17,920	$ 341,187
9	$ 772,788	$ 269,281		$ -	$ 1,042,069	$ (1,024,149)	$ (1,024,149)	$ -	$ 17,920	$ 359,107
10	$ 788,415	$ 275,205		$ -	$ 1,063,620	$ (1,045,700)	$ (1,045,700)	$ -	$ 17,920	$ 377,027
11	$ 804,389	$ 281,259		$ -	$ 1,085,648	$ (1,067,728)	$ (1,067,728)	$ -	$ 17,920	$ 394,947
12	$ 820,719	$ 287,447		$ -	$ 1,108,166	$ (1,090,246)	$ (1,090,246)	$ -	$ 17,920	$ 412,867
13	$ 837,412	$ 293,771		$ -	$ 1,131,183	$ (1,113,263)	$ (1,113,263)	$ -	$ 17,920	$ 430,787
14	$ 854,477	$ 300,234		$ -	$ 1,154,711	$ (1,136,791)	$ (1,136,791)	$ -	$ 17,920	$ 448,707
15	$ 871,922	$ 306,839		$ -	$ 1,178,761	$ (1,160,841)	$ (1,160,841)	$ -	$ 17,920	$ 466,627
16	$ 889,755			$ -	$ 889,755	$ (871,835)	$ (871,835)	$ -	$ 17,920	$ 484,547
17	$ 907,985			$ -	$ 907,985	$ (890,065)	$ (890,065)	$ -	$ 17,920	$ 502,467
18	$ 926,621			$ -	$ 926,621	$ (908,776)	$ (908,776)	$ -	$ 17,845	$ 520,312
Totals	$ 14,331,372	$ 3,969,753	$ 719,245	$ 1,409,885	$ 20,430,255	$ (19,909,943)	$ (19,945,943)	$ (36,000)	$ 520,312	$ 520,312

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

***Annual Service only applies if customer accepts energy guarantee.**

HONEYWELL IS NOT ACTING AS A MUNICIPAL ADVISOR OR FIDUCIARY ON YOUR BEHALF. ANY MUNICIPAL SECURITIES OR FINANCIAL PRODUCTS INFORMATION PROVIDED IS FOR GENERAL INFORMATIONAL AND EDUCATIONAL PURPOSES ONLY AND YOU SHOULD OBTAIN THE ADVICE OF A LICENSED AND QUALIFIED FINANCIAL ADVISOR REGARDING SUCH INFORMATION.

BUILDING-BY-BUILDING SIMPLE PAYBACK SUMMARY (HARD COSTS ONLY)

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Arbor Intermediate School	**$ 30,484**	**$ 2,943**	**$ 4,559**	**$ -**	**$ 2,486**	**$ 49,914**	**$ 9,442**	**$ 1,053,403**	**21.1**
1A LED Lighting Upgrades	$ 12,631	$ 2,660	$ (562)	$ -	$ -	$ 24,171	$ 9,442	$ 94,818	3.9
1C Vending Misers	$ 107	$ -	$ -	$ -	$ -	$ 107	$ -	$ 330	3.1
2A Boiler Upgrade	$ -	$ -	$ 538	$ -	$ -	$ 538	$ -	$ 70,050	130.1
2C Rooftop Unit Replacement	$ 4,128	$ -	$ 715	$ -	$ -	$ 4,843	$ -	$ 464,723	96.0
2F Split System Replacement	$ 519	$ -	$ -	$ -	$ -	$ 519	$ -	$ 96,773	186.6
3A Building Management System Upgrades	$ 3,061	$ -	$ 2,278	$ -	$ -	$ 5,339	$ -	$ 196,870	36.9
3C Exhaust Fan Controls	$ 346	$ -	$ -	$ -	$ -	$ 346	$ -	$ 1,551	4.5
3E Healthy Buildings - Bipolar Ionization	$ (43)	$ -	$ 492	$ -	$ -	$ 450	$ -	$ 18,971	42.2
4A Building Envelope Improvement	$ 1,507	$ -	$ 996	$ -	$ -	$ 2,503	$ -	$ 20,135	8.0
6A Transformer Replacement	$ 3,279	$ 283	$ -	$ -	$ -	$ 3,562	$ -	$ 44,199	12.4
8A Solar PPA	$ 4,949	$ -	$ -	$ -	$ -	$ 4,949	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 102	$ -	$ 2,486	$ 2,588	$ -	$ 44,983	17.4
Conackamack Middle School	**$ 15,816**	**$ 2,603**	**$ 4,517**	**$ -**	**$ 6,362**	**$ 37,402**	**$ 8,105**	**$ 467,326**	**12.5**
1A LED Lighting Upgrades	$ 8,330	$ 2,044	$ (576)	$ -	$ -	$ 17,903	$ 8,105	$ 83,956	4.7
1D De-stratification Fans	$ (77)	$ -	$ 730	$ -	$ -	$ 652	$ -	$ 19,061	29.2
2C Rooftop Unit Replacement	$ 921	$ -	$ 216	$ -	$ -	$ 1,137	$ -	$ 128,115	112.7
2E Premium Efficiency Motors and VFDs	$ 2,207	$ 356	$ -	$ -	$ -	$ 2,563	$ -	$ 22,943	8.9
2F Split System Replacement	$ 258	$ -	$ -	$ -	$ -	$ 258	$ -	$ 56,875	220.7
3A Building Management System Upgrades	$ 1,291	$ -	$ 3,049	$ -	$ -	$ 4,340	$ -	$ 55,998	12.9
3C Exhaust Fan Controls	$ 305	$ -	$ -	$ -	$ -	$ 305	$ -	$ 1,551	5.1
3E Healthy Buildings - Bipolar Ionization	$ (10)	$ -	$ 252	$ -	$ -	$ 242	$ -	$ 6,279	25.9
4A Building Envelope Improvement	$ 679	$ -	$ 698	$ -	$ -	$ 1,377	$ -	$ 10,883	7.9
6A Transformer Replacement	$ 1,912	$ 202	$ -	$ -	$ -	$ 2,114	$ -	$ 40,993	19.4
10A Water Conservation	$ -	$ -	$ 148	$ -	$ 6,362	$ 6,510	$ -	$ 40,671	6.2
Eisenhower Elementary School	**$ 51,112**	**$ 2,738**	**$ 5,662**	**$ -**	**$ 7,440**	**$ 74,363**	**$ 7,410**	**$ 1,496,095**	**20.1**
1A LED Lighting Upgrades	$ 10,890	$ 2,430	$ (689)	$ -	$ -	$ 20,040	$ 7,410	$ 74,664	3.7
1C Vending Misers	$ 118	$ -	$ -	$ -	$ -	$ 118	$ -	$ 660	5.6
2C Rooftop Unit Replacement	$ 7,113	$ -	$ 1,551	$ -	$ -	$ 8,664	$ -	$ 967,589	111.7
3A Building Management System Upgrades	$ 3,197	$ -	$ 2,171	$ -	$ -	$ 5,369	$ -	$ 282,250	52.6
3C Exhaust Fan Controls	$ 403	$ -	$ -	$ -	$ -	$ 403	$ -	$ 9,016	22.4
3E Healthy Buildings - Bipolar Ionization	$ (91)	$ -	$ 1,193	$ -	$ -	$ 1,102	$ -	$ 44,336	40.2
4A Building Envelope Improvement	$ 406	$ -	$ 1,272	$ -	$ -	$ 1,678	$ -	$ 17,956	10.7
6A Transformer Replacement	$ 3,314	$ 309	$ -	$ -	$ -	$ 3,623	$ -	$ 52,746	14.6
8A Solar PPA	$ 25,761	$ -	$ -	$ -	$ -	$ 25,761	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 164	$ -	$ 7,440	$ 7,605	$ -	$ 46,880	6.2
Ethel Road Maintenance/Transportation Complex	**$ 14,238**	**$ 865**	**$ (591)**	**$ -**	**$ 257**	**$ 17,411**	**$ 2,642**	**$ 44,707**	**2.6**
1A LED Lighting Upgrades	$ 7,550	$ 865	$ (618)	$ -	$ -	$ 10,440	$ 2,642	$ 40,449	3.9
1C Vending Misers	$ 113	$ -	$ -	$ -	$ -	$ 113	$ -	$ 330	2.9
8A Solar PPA	$ 6,574	$ -	$ -	$ -	$ -	$ 6,574	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 27	$ -	$ 257	$ 284	$ -	$ 3,928	13.9
Fellowship Farms School/Administration Building	**$ 47,017**	**$ 1,611**	**$ 744**	**$ -**	**$ 1,447**	**$ 55,997**	**$ 5,177**	**$ 210,832**	**3.8**
1A LED Lighting Upgrades	$ 13,014	$ 1,284	$ (1,075)	$ -	$ -	$ 18,400	$ 5,177	$ 48,580	2.6
1C Vending Misers	$ 123	$ -	$ -	$ -	$ -	$ 123	$ -	$ 660	5.4
2C Rooftop Unit Replacement	$ 295	$ -	$ -	$ -	$ -	$ 295	$ -	$ 41,576	140.8
3A Building Management System Upgrades	$ 3,289	$ -	$ 403	$ -	$ -	$ 3,692	$ -	$ 12,940	3.5
3C Exhaust Fan Controls	$ 350	$ -	$ -	$ -	$ -	$ 350	$ -	$ 1,551	4.4
3E Healthy Buildings - Bipolar Ionization	$ (2)	$ -	$ 65	$ -	$ -	$ 62	$ -	$ 1,105	17.7
4A Building Envelope Improvement	$ 1,064	$ -	$ 1,304	$ -	$ -	$ 2,367	$ -	$ 12,730	5.4
6A Transformer Replacement	$ 4,281	$ 327	$ -	$ -	$ -	$ 4,608	$ -	$ 59,421	12.9

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
8A Solar PPA	$ 24,603	$ -	$ -	$ -	$ -	$ 24,603	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 47	$ -	$ 1,447	$ 1,495	$ -	$ 32,269	21.6
Grandview Elementary School	**$ 53,595**	**$ 2,611**	**$ 2,240**	**$ -**	**$ 9,452**	**$ 75,739**	**$ 7,842**	**$ 306,408**	**4.0**
1A LED Lighting Upgrades	$ 11,772	$ 2,238	$ (744)	$ -	$ -	$ 21,107	$ 7,842	$ 132,869	6.3
1B Lighting Controls	$ 170	$ -	$ (9)	$ -	$ -	$ 161	$ -	$ 1,081	6.7
3A Building Management System Upgrades	$ 3,806	$ -	$ 2,031	$ -	$ -	$ 5,837	$ -	$ 57,365	9.8
3C Exhaust Fan Controls	$ 203	$ -	$ -	$ -	$ -	$ 203	$ -	$ 931	4.6
4A Building Envelope Improvement	$ 1,025	$ -	$ 963	$ -	$ -	$ 1,988	$ -	$ 13,999	7.0
6A Transformer Replacement	$ 3,829	$ 373	$ -	$ -	$ -	$ 4,202	$ -	$ 53,247	12.7
8A Solar PPA	$ 32,789	$ -	$ -	$ -	$ -	$ 32,789	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ -	$ -	$ 9,452	$ 9,452	$ -	$ 46,916	5.0
Knollwood Elementary School	**$ 40,860**	**$ 2,156**	**$ 2,375**	**$ -**	**$ 5,990**	**$ 59,614**	**$ 8,234**	**$ 314,192**	**5.3**
1A LED Lighting Upgrades	$ 10,216	$ 1,933	$ (707)	$ -	$ -	$ 19,676	$ 8,234	$ 88,406	4.5
1C Vending Misers	$ 110	$ -	$ -	$ -	$ -	$ 110	$ -	$ 330	3.0
3A Building Management System Upgrades	$ 2,556	$ -	$ 1,849	$ -	$ -	$ 4,405	$ -	$ 124,520	28.3
3C Exhaust Fan Controls	$ 646	$ -	$ -	$ -	$ -	$ 646	$ -	$ 20,515	31.8
4A Building Envelope Improvement	$ 311	$ -	$ 1,066	$ -	$ -	$ 1,377	$ -	$ 12,457	9.0
6A Transformer Replacement	$ 2,553	$ 223	$ -	$ -	$ -	$ 2,776	$ -	$ 31,092	11.2
8A Solar PPA	$ 24,467	$ -	$ -	$ -	$ -	$ 24,467	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 166	$ -	$ 5,990	$ 6,156	$ -	$ 36,873	6.0
Martin Luther King Intermediate School	**$ 64,962**	**$ 2,037**	**$ 3,106**	**$ -**	**$ 5,446**	**$ 82,392**	**$ 6,841**	**$ 1,545,072**	**18.8**
1A LED Lighting Upgrades	$ 8,325	$ 1,779	$ (663)	$ -	$ -	$ 16,282	$ 6,841	$ 113,563	7.0
1C Vending Misers	$ 122	$ -	$ -	$ -	$ -	$ 122	$ -	$ 660	5.4
2C Rooftop Unit Replacement	$ 11,173	$ -	$ 1,444	$ -	$ -	$ 12,617	$ -	$ 913,856	72.4
3A Building Management System Upgrades	$ 4,064	$ -	$ 424	$ -	$ -	$ 4,487	$ -	$ 316,040	70.4
3C Exhaust Fan Controls	$ 415	$ -	$ -	$ -	$ -	$ 415	$ -	$ 9,016	21.7
3E Healthy Buildings - Bipolar Ionization	$ (105)	$ -	$ 1,743	$ -	$ -	$ 1,638	$ -	$ 77,220	47.1
4A Building Envelope Improvement	$ 574	$ -	$ 158	$ -	$ -	$ 733	$ -	$ 25,191	34.4
6A Transformer Replacement	$ 2,881	$ 258	$ -	$ -	$ -	$ 3,139	$ -	$ 36,621	11.7
8A Solar PPA	$ 37,513	$ -	$ -	$ -	$ -	$ 37,513	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ -	$ -	$ 5,446	$ 5,446	$ -	$ 52,905	9.7
Piscataway High School	**$ 240,517**	**$ 18,859**	**$ 30,570**	**$ -**	**$ 23,003**	**$ 367,411**	**$ 54,461**	**$ 5,660,722**	**15.4**
1A LED Lighting Upgrades	$ 117,436	$ 12,885	$ (7,299)	$ -	$ -	$ 177,482	$ 54,461	$ 966,306	5.4
1B Lighting Controls	$ 2,336	$ -	$ (107)	$ -	$ -	$ 2,229	$ -	$ 32,457	14.6
1C Vending Misers	$ 557	$ -	$ -	$ -	$ -	$ 557	$ -	$ 2,310	4.1
1D De-stratification Fans	$ (520)	$ -	$ 4,014	$ -	$ -	$ 3,494	$ -	$ 120,100	34.4
2A Boiler Upgrade	$ -	$ -	$ 2,555	$ -	$ -	$ 2,555	$ -	$ 348,354	136.4
2C Rooftop Unit Replacement	$ 21,820	$ -	$ 2,594	$ -	$ -	$ 24,414	$ -	$ 1,529,717	62.7
2E Premium Efficiency Motors and VFDs	$ 2,633	$ 171	$ -	$ -	$ -	$ 2,804	$ -	$ 18,954	6.8
2I Cooling Tower Replacement	$ 16,179	$ 3,928	$ -	$ -	$ -	$ 20,107	$ -	$ 397,496	19.8
2J Energy Wheel Replacement at HS	$ -	$ -	$ 22,358	$ -	$ -	$ 22,358	$ -	$ 343,686	15.4
2L Gym & Maintenance Heater Upgrades	$ -	$ -	$ 218	$ -	$ -	$ 218	$ -	$ 86,642	398.2
3A Building Management System Upgrades	$ 19,063	$ -	$ 15,668	$ -	$ -	$ 34,731	$ -	$ 1,222,858	35.2
3C Exhaust Fan Controls	$ 685	$ -	$ -	$ -	$ -	$ 685	$ -	$ 3,102	4.5
3E Healthy Buildings - Bipolar Ionization	$ (81)	$ -	$ 1,319	$ -	$ -	$ 1,238	$ -	$ 54,912	44.4
4A Building Envelope Improvement	$ 4,507	$ -	$ 4,159	$ -	$ -	$ 8,666	$ -	$ 59,426	6.9
6A Transformer Replacement	$ 4,595	$ 422	$ -	$ -	$ -	$ 5,016	$ -	$ 59,021	11.8
7A Cogeneration	$ 29,956	$ 1,455	$ (15,176)	$ -	$ -	$ 16,235	$ -	$ 275,000	16.9
8A Solar PPA	$ 21,350	$ -	$ -	$ -	$ -	$ 21,350	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ 269	$ -	$ 23,003	$ 23,272	$ -	$ 140,382	6.0

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Quibbletown Middle School	**$ 60,865**	**$ 3,894**	**$ 4,724**	**$ -**	**$ 1,389**	**$ 84,590**	**$ 13,718**	**$ 823,546**	**9.7**
1A LED Lighting Upgrades	$ 31,456	$ 3,608	$ (1,244)	$ -	$ -	$ 47,538	$ 13,718	$ 198,661	4.2
1B Lighting Controls	$ 431	$ -	$ (14)	$ -	$ -	$ 417	$ -	$ 221	0.5
1C Vending Misers	$ 24	$ -	$ -	$ -	$ -	$ 24	$ -	$ 330	14.0
1D De-stratification Fans	$ (136)	$ -	$ 710	$ -	$ -	$ 574	$ -	$ 19,061	33.2
2E Premium Efficiency Motors and VFDs	$ 5,454	$ 216	$ -	$ -	$ -	$ 5,670	$ -	$ 25,270	4.5
3A Building Management System Upgrades	$ 4,211	$ -	$ 4,354	$ -	$ -	$ 8,565	$ -	$ 429,561	50.2
3C Exhaust Fan Controls	$ 4,309	$ -	$ -	$ -	$ -	$ 4,309	$ -	$ 41,690	9.7
4A Building Envelope Improvement	$ 469	$ -	$ 918	$ -	$ -	$ 1,387	$ -	$ 13,046	9.4
6A Transformer Replacement	$ 1,204	$ 70	$ -	$ -	$ -	$ 1,275	$ -	$ 40,553	31.8
8A Solar PPA	$ 13,442	$ -	$ -	$ -	$ -	$ 13,442	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ -	$ -	$ 1,389	$ 1,389	$ -	$ 55,152	39.7
Randolphville Elementary School	**$ 14,571**	**$ 2,105**	**$ 3,301**	**$ -**	**$ 2,928**	**$ 31,192**	**$ 8,287**	**$ 300,680**	**9.6**
1A LED Lighting Upgrades	$ 9,734	$ 2,034	$ (825)	$ -	$ -	$ 19,230	$ 8,287	$ 88,447	4.6
3A Building Management System Upgrades	$ 1,468	$ -	$ 1,479	$ -	$ -	$ 2,947	$ -	$ 107,701	36.5
3C Exhaust Fan Controls	$ 628	$ -	$ -	$ -	$ -	$ 628	$ -	$ 20,515	32.7
4A Building Envelope Improvement	$ 1,960	$ -	$ 2,466	$ -	$ -	$ 4,426	$ -	$ 10,770	2.4
6A Transformer Replacement	$ 780	$ 71	$ -	$ -	$ -	$ 851	$ -	$ 32,687	38.4
10A Water Conservation	$ -	$ -	$ 181	$ -	$ 2,928	$ 3,109	$ -	$ 40,561	13.0
T. Schor Middle School	**$ 66,305**	**$ 3,242**	**$ 8,327**	**$ -**	**$ 3,936**	**$ 93,500**	**$ 11,690**	**$ 1,512,291**	**16.2**
1A LED Lighting Upgrades	$ 17,273	$ 3,170	$ (1,357)	$ -	$ -	$ 30,776	$ 11,690	$ 219,864	7.1
1B Lighting Controls	$ 446	$ -	$ (30)	$ -	$ -	$ 416	$ -	$ 68	0.2
1C Vending Misers	$ 110	$ -	$ -	$ -	$ -	$ 110	$ -	$ 330	3.0
1D De-stratification Fans	$ (91)	$ -	$ 918	$ -	$ -	$ 827	$ -	$ 19,061	23.0
2C Rooftop Unit Replacement	$ 6,605	$ -	$ 2,299	$ -	$ -	$ 8,904	$ -	$ 996,935	112.0
2F Split System Replacement	$ 12	$ -	$ -	$ -	$ -	$ 12	$ -	$ 10,985	913.9
3A Building Management System Upgrades	$ 4,148	$ -	$ 2,383	$ -	$ -	$ 6,530	$ -	$ 136,057	20.8
3C Exhaust Fan Controls	$ 358	$ -	$ -	$ -	$ -	$ 358	$ -	$ 1,551	4.3
3E Healthy Buildings - Bipolar Ionization	$ (76)	$ -	$ 1,768	$ -	$ -	$ 1,692	$ -	$ 46,332	27.4
4A Building Envelope Improvement	$ 1,912	$ -	$ 2,346	$ -	$ -	$ 4,258	$ -	$ 23,691	5.6
6A Transformer Replacement	$ 801	$ 73	$ -	$ -	$ -	$ 873	$ -	$ -	-
8A Solar PPA	$ 34,806	$ -	$ -	$ -	$ -	$ 34,806	$ -	$ -	-
10A Water Conservation	$ -	$ -	$ -	$ -	$ 3,936	$ 3,936	$ -	$ 57,417	14.6
Project Total	**$ 700,343**	**$ 45,665**	**$ 69,533**	**$ -**	**$ 70,135**	**$ 1,029,526**	**$ 143,849**	**$ 13,735,273**	**13.3**

2. UTILITY AND OTHER REBATES AND INCENTIVES

NJ PAY-FOR-PERFORMANCE PROGRAM (P4P)

Honeywell has been certified as a Pay for Performance Program Partner to provide technical services under direct contract to you. Acting as your energy expert, Honeywell will develop an Energy Reduction Plan for each project with a whole-building technical component of a traditional energy audit, a financial plan for funding the energy efficient measures and a construction schedule for installation. This supports your ability to take a comprehensive, whole-building approach to saving energy in your existing facilities and earn incentives that are directly linked to your savings.

ELIGIBILITY

Existing commercial, industrial and institutional buildings with a peak demand over 100 kW for any of the preceding twelve months are eligible to participate including hotels and casinos, large office buildings, multi-family buildings, supermarkets, manufacturing facilities, schools, shopping malls and restaurants. Buildings that fall into the following five customer classes are not required to meet the 100kW demand to participate in the Program: hospitals, public districts and universities, nonprofits, affordable multifamily housing, and local governmental entities. Your Energy Reduction Plan must define a comprehensive package of measures capable of reducing the existing energy consumption of your building by 15% or more to utilize the Pay Performance Program.

ENERGY STAR PORTFOLIO MANAGER

Pay for Performance takes advantage of the ENERGY STAR Program with Portfolio Manager, EPA's interactive tool that allows facility managers to track and evaluate energy and water consumption across all their buildings. The tool provides the opportunity to load in the characteristics and energy usage of your buildings and determine an energy performance benchmark score. You can then assess energy management goals over time, identify strategic opportunities for savings, and receive EPA recognition for superior energy performance.

INCENTIVES

Incentives for the P4P program are based on the annual electric and natural gas savings produced by the Energy Conservation Measures. There are three incentives to the program; details are included in the follow page. The first incentive is distributed after a finalized project is selected and bid. This usually occurs shortly before construction starts or shortly thereafter. The second incentive is distributed a few months after construction is completed, while the third incentive is distributed usually thirteen to fourteen months after the second incentive - once a year of building usage, post-retrofit, is completed.

INCENTIVES, REBATES AND GRANTS SUMMARY

Honeywell has a great deal of experience in applying for, and successfully securing, all available incentives, rebates and grants for our clients. We have been approved and allocated for over $13M of incentives on behalf of our New Jersey customers alone since the introduction of the Energy Savings Improvement Program legislation in 2009. The New Jersey programs employed included primarily the Office of Clean Energy's Pay for Performance and Cogeneration Incentives. A table of the incentive amounts on a per project basis is provided below.

NJ Customers	Rebate Amount
Hudson County (Projected)	$2,369,012
East Brunswick Public Schools (Projected)	$1,601,318
Passaic County (Projected)	$1,209,061
Bridgewater-Raritan Regional District	$963,034
Elizabeth Schools	$934,209
Old Bridge Board of Education	$906,641
Camden County Technical Schools	$734,803
West Orange Board of Education	$644,744
Montville Township Public Schools (Projected)	$584,221
NH-Voorhees Regional HS District	$511,558
West Morris Regional High School (Projected)	$392,700
Middlesex County Vo-Tech (Projected)	$286,177
Phillipsburg School District	$274,278
Educational Services Commission of NJ	$260,603
Somerset County Vocational	$246,095
Morris County Vocational (Projected)	$231,660
Robbinsville Public School District	$231,015
Bloomfield Board of Education	$225,868
Mountain Lakes Public Schools	$194,722
Rumson Schools (Projected)	$171,741
Hanover Township School District	$169,882
City of Perth Amboy	$137,441
Town of Kearny	$84,147
Frankford School District	$30,743
TOTAL	$13,395,673

Honeywell has determined that Piscataway Township Schools is eligible for **$1,897,397** in estimated total incentives for the projects. This includes **$1,333,201** for the P4P program, **$487,512** in Direct Install incentives, and **$76,684** in Permanent Load Reduction incentives.

Please refer to the tables on below for a breakdown of Piscataway Township Schools incentive levels on a building by building basis for each type of incentive.

P4P INCENTIVES

Building	P4P Incentives			
	First Incentive	Second Incentive	Third Incentive	Total Incentive
Piscataway High School	$33,002	$429,252	$429,252	$891,506
Quibbletown Middle School	$8,080	$60,736	$60,736	$129,553
T. Schor Middle School	$7,223	$65,532	$65,532	$138,287
Martin Luther King Intermediate School	$5,441	$39,838	$39,838	$85,116
Grandview Elementary School	$4,446	$42,147	$42,147	$88,740
TOTALS	**$58,191**	**$637,505**	**$637,505**	**$1,333,201**

DIRECT INSTALL INCENTIVES

Building	Total DI Incentives
Ethel Road Maintenance/Transportation Complex	$25,026
Conackamack Middle School	$62,687
Eisenhower Elementary School	$125,630
Arbor Intermediate School	$131,490
Knollwood Elementary School	$50,469
Randolphville Elementary School	$50,486
Fellowship Farms School/Administration Building	$41,724
TOTALS	**$487,512**

PERMANENT LOAD REDUCTION INCENTIVES

Description	Permanent Load Reduction Incentives			
	1st Year Incentive	2nd Year Incentive	3rd Year Incentive	4th Year Incentive
Permanent Load Reduction Incentives	**$19,171**	**$19,171**	**$19,171**	**$19,171**

TOTAL REBATES AND INCENTIVES

Year	P4P Incentives	Permanent Load Reduction Incentives	Direct Install Incentives	Total Incentives
Installation	$58,191	$0	$487,512	$545,703
Year 1	$637,505	$19,171	$0	$656,676
Year 2	$637,505	$19,171	$0	$656,676
Year 3	$0	$19,171	$0	$19,171
Year 4	$0	$19,171	$0	$19,171
TOTALS	**$1,333,201**	**$76,684**	**$487,512**	**$1,897,397**

3. FINANCING THE ESIP

In accordance with P.L.2012, c.55 an ESIP can be financed through energy savings obligations. The term refers to the two primary financing tools, debt and lease-purchase instruments. Each of these options is discussed below.

Energy savings obligations shall not be used to finance maintenance, guarantees, or the required third-party verification of energy conservation measures guarantees. Energy saving obligations, however, may include the costs of an energy audit and the cost of verification of energy savings as part of adopting an energy savings plan or upon commissioning. While the audit and verification costs may be financed, they are not to be considered in the energy savings plan as a cost to be offset with savings.

In all cases, maturity schedules of lease-purchase agreements or energy savings obligations shall not exceed the estimated average useful life of the energy conservation measures.

An ESIP can also include installation of renewable energy facilities, such as solar panels. Under an energy savings plan, solar panels can be installed, and the reduced cost of energy reflected as savings.

The law also provides that the cost of energy saving obligations may be treated as an element of the local unit's utility budget, as it replaces energy costs.

DEBT ISSUANCE

The law specifically authorizes municipalities, school districts, cities, counties, and fire districts to issue refunding bonds as a general obligation, backed with full faith and credit of the local unit to finance the ESIP. Because an ESIP does not effectively authorize new costs or taxpayer obligations, the refunding bond is appropriate, as it does not affect debt limits, or in the case of a board of education, require voter approval. The routine procedures for refunding bonds found in the Local Bond Law and Public School Bond Law would be followed for issuance of debt, along with any required Bond Anticipation Notes as authorized pursuant to law.

Regarding bonds for public schools, the Department of Education (DOE) has concluded that debt financed ESIP projects are not covered by State aid for debt service or a "Section 15 EFFCA Grant" as there is no new local debt being authorized.

TAX-EXEMPT LEASE PURCHASE FINANCING

The tax-exempt lease is a common form of financing for ESIP projects. Tax-exempt leasing is a tool that meets the basic objectives of debt, spreading the cost of financing over the life of an asset, while avoiding constitutional or statutory limitations on issuing public debt. If structured properly, by including non-appropriation language in the financing documents, the tax-exempt lease will not be considered debt for state law purposes but will be considered debt for federal income tax purposes. Thus, for federal purposes, the interest component of the lease payment is tax-exempt.

Under the New Jersey Energy Savings Improvement Program (ESIP), Piscataway Township Schools may authorize a lease purchase agreement between the District and a financier. Ownership of the equipment or improved facilities will pass to Piscataway Township Schools when all the lease payments have been made. There are legal expenses and other minimal closing costs associated with this type of structure. The lease purchase agreement may not exceed 15 years (commencing upon completion of the construction work), or 20 years where a combined heat and power or cogeneration plant is included in the project. The primary benefits of a lease are lower rates and the acquisition of essential use property without creating debt.

Under a lease there is typically a single investor. The lease may have non-appropriation language that allows the District to access low tax-exempt rates. Some previous customers have chosen to remove the non-appropriation language which has resulted in lower competitive rates.

Repayment of the lease payments is tailored to meet the requirements of Piscataway Township Schools . Payments are typically scheduled to commence after the construction is complete and acceptance of the project has been received by the District. Typically, payment terms are structured so there is no up-front capital expense to the District and payments are aligned within your cash flow and fiscal limits.

CERTIFICATES OF PARTICIPATION (COP'S)

Certificates of Participation are another form of a lease purchase agreement with the differentiating factor being that there are multiple investors participating in the purchase of the lease. COP's require financial disclosure and are typically utilized on higher value projects where one investor doesn't have the capacity to hold a high value lease for a single customer.

ENERGY SAVINGS OBLIGATIONS

Energy Savings Obligations can be issued as refunding bonds in accordance with the requirements of N.J.S.A 40A:11-4.6(c)(3). These bonds may be funded through appropriation for the utility services in the annual budget of the contract unit and may be issued as refunding bonds pursuant to N.J.S.40A:2-52 et seq., including the issuance of bond anticipation notes as may be necessary, provided that all such bonds and notes mature within the periods authorized for such energy savings obligations. Energy savings obligations may be issued either through the contracting unit or another public agency authorized to undertake financing on behalf of the unit but does not require bond referendum.

SECTION E

MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

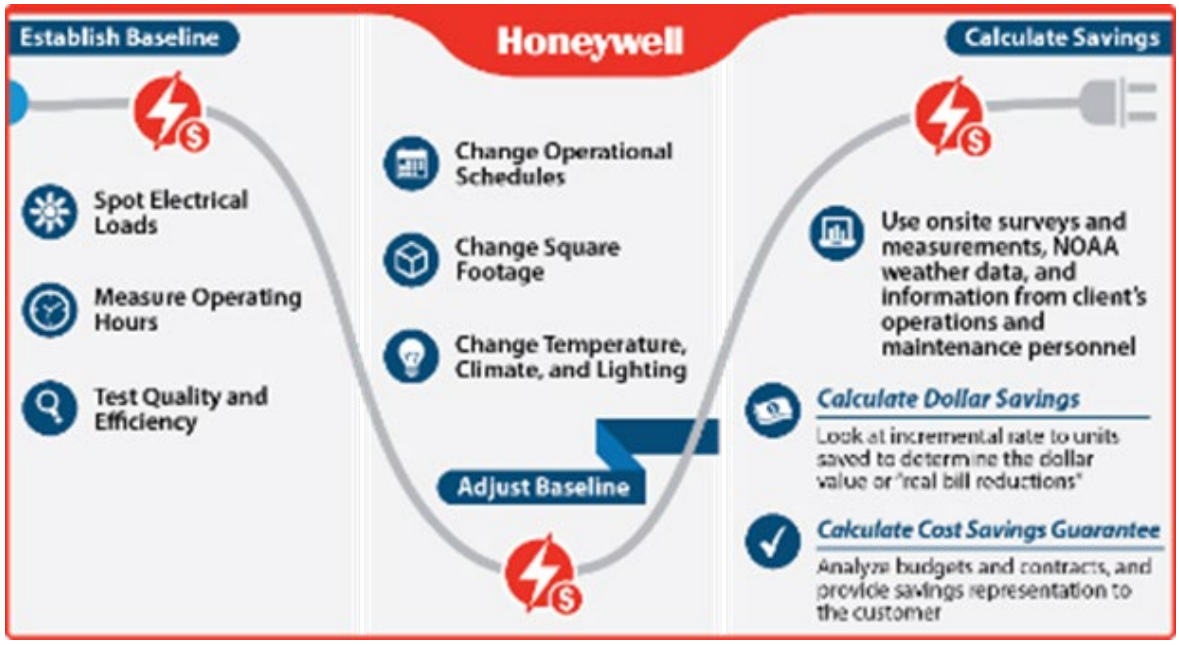
Section E – Measurement & Verification and Maintenance Plan

1. BASELINE

The purpose for establishing a baseline for an energy performance project is to accurately predict what the energy consumption and costs would have been as if the energy project was never completed. The baseline can then be used to measure the improvement in efficiency and determine the overall energy savings of the project. Since the energy consumption of all facilities is somewhat affected by variable weather conditions, a baseline for heating and cooling systems is typically dependent on degree-days or outside temperature. A baseline also needs to incorporate changes in facility use, such as a change in hours of operation or increased levels of outside air. Once again, if these changes would have occurred in the absence of the energy project, they should be incorporated into the project's baseline.

Honeywell will calculate the baseline based on the systems and operating conditions as they currently exist. Honeywell finds baseline development most accurate if specific measurements are taken on equipment over a period of time (early in the audit phase) to determine actual kW, kWh, oil and gas consumption, cfm, gpm, hours of use, etc. Listed below are some of the methods Honeywell will use to establish baselines and support calculated savings.

6. Spot measurements of electrical loads such as lighting, fan and pump motors, chillers, electric heat, etc.
7. Measurement of equipment operating hours using electric data recorders.
8. Measurement of existing operating conditions using data recorders for space temperature and humidity, air handler temperatures (mixed, return, cooling and heating coil discharges), and space occupancy using lighting loggers.



9. Spot measurement for boiler efficiencies, water use.
10. Running measurements of chiller operation, including simultaneous measurement of input kWh or steam flow, and chilled water supply and return temperatures and flow (gpm).
11. Records of operating conditions from building management systems and utility-grade meters.

The data from the above is used to calculate existing energy use, which is then reconciled with current facility utility bills, and adjusted as required to provide a mutually agreed baseline.

To provide valid savings evaluations, Honeywell maintains a significant inventory of metering equipment utilized by its auditors and energy engineers to ascertain critical data about the facility's operation.

Typically, Honeywell's auditors use the following equipment for their on-site measurements:

- Recording and instantaneous power and harmonic analyzers.
- Data loggers for pressures, temperatures, flow rates, humidity and CO2.
- Lighting level and recording profile/run-hour and occupancy meters.
- Multimeters, handheld kW meters.
- Combustion analyzers.
- Ultrasonic flow meters.
- Infrared thermometers

The ECMs installed in many projects allow for energy savings to be identified by direct metering or a combination of metering and calculations with accepted assumptions. In the case of lighting, for example, it is relatively easy to meter representative samples of unique fixture types, both before and after a retrofit, to determine the power consumption difference in watts. When multiplied by the quantity of each fixture type, the total connected load reduction can be derived. In combination with run-time assumptions, or meters, the electrical reduction can be accurately determined. Where possible, direct measurement of ECMs during construction (before and after the retrofit) coupled with energy savings calculations is a method the Honeywell finds to be very accurate and cost-effective.

Due to the nature of some ECMs, or when a combination of ECMs is installed, individual (discrete) metering may not be either possible or able to fully document a baseline and calculate savings. Many of these situations can be handled by combining results from metering along with either engineering-based calculations or output from nationally recognized building simulation programs such as DOE II, ASEAM, TRACE or HAP. This method would be used for ECMs such as night setback, and where no other ECMs have significant interaction with the setback measure.

Formulas exercised in energy savings calculations follow the laws of physics, and many are included in the *ASHRAE Handbook—Fundamentals*. However, such calculations (i.e., equipment operation profiles) must be tempered by experience, past retrofit practice and expectations of future operating conditions to arrive at achievable values in practice. Honeywell always reviews every project, in detail, for the anticipated savings and never hesitates to reduce the anticipated energy calculations where experience dictates necessary. The final result is a coupled project where the final savings are equal to or greater than anticipated.

2. ADJUSTMENT TO BASELINE METHODOLOGY

Honeywell's methodology [1] for establishing and adjusting the baseline is determined by the characteristics of the facility, the conservation technology being installed, the technology being replaced, the type of measurement and verification Piscataway Township Schools requires and the District's needs for future changes in facility use.

The purpose of this flexible approach is to make the most accurate possible measurement of the changes in energy uses that are specifically attributable to Honeywell installed ECMs. This creates the ability over the life of the contract to continue measuring only savings achieved by Honeywell and leaves the Piscataway Township Schools free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for adjusting the baseline.

Modifications to the energy baseline or savings will be made for any of the following:

- Changes in the number of days in the annual review cycle.
- Changes in the square footage of the facilities.
- Changes in the operational schedules of the facilities.
- Changes in facility indoor temperatures.
- Significant changes in climate.
- Significant changes in the amount of equipment or lighting utilized in the facility.

The baseline needs to be adjusted if there are changes in the following: i) the amount of space being air-conditioned, ii) the auxiliary systems (towers, pumps, etc.) and iii) the occupancy or schedule. If the baseline conditions for these factors are not well documented, it becomes difficult, if not impossible, to properly adjust them when they change and require changes to payment calculations. To compensate for any addition or deletion of buildings and impact on the baseline model, Honeywell will use sound technical methodologies to adjust the baseline. An example would be to add or delete building energy impact via the calculated cooling load in tons as a percentage of the existing campus tonnage baseline or use indices like W/ft2 and Btu/ft2 to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

[1] The energy baseline modifications shall use commonly accepted energy engineering methods that are mutually agreeable to both Honeywell and customer. Should agreement on these methods, including the climate adjustments, not be reached between Honeywell and customer, both parties could appeal to a third-party engineering firm.

3. ENERGY SAVINGS CALCULATIONS

In calculating energy savings, Honeywell's highly experienced audit staff uses on-site surveys and measurements, National Oceanic and Atmospheric Administration weather data, detailed discussions with the client's operations and maintenance personnel and engineers, utility records and other sources to ensure accurate energy, water and O&M savings.

Typically, the following data is gathered:

- Local weather data.
- Utility bills and sub-metered consumption trends.
- Utility rate structure.
- Facility use and occupancy data.
- Internal equipment loads.
- Interviews of operations and maintenance staff and management.
- Building construction, age, use and layout.
- Schematics of energy and water distribution systems.
- Identification and inventory of HVAC equipment.
- Identification and inventory of process equipment.
- Design, configuration and operating characteristics of HVAC systems.
- Design, configuration and operating characteristics of process systems.
- Control strategies and sequences of operation for HVAC and other process equipment.
- Identification and count of all lighting fixtures and determination of power consumption for each type.
- Identification and inventory of lighting control methods.
- Measurement of foot-candle levels at sample locations.
- Power quality and harmonics, power factor.
- Indoor air quality issues.

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell and Piscataway Township Schools will establish the base rates that will act as "floor" rates in calculating the savings. These rates are usually in effect at the start of the contract or are used for audit-estimated savings.

The equation below will be used to calculate the annual savings in dollars.

$$AnnualSavings(\$) = \sum_{m=1}^{12}\{(Rate_{kWh,Base} \times kWh_{Saved,m}) + (Rate_{fuel\ Oil,Base} \times Fuel\ Oil_{Saved,gal,m}) + (Rate_{Steam,Base} \times Steam_{Saved,klbs,m}) + (Rate_{NG} \times NG_{Saved,MCF,m})\} + Agreed(\$)$$

where:

$Rate_{kWh,Base}$ = defined base rate for kWh consumption
$kWh_{Saved,m}$ = calculated kWh savings for month *m*

$Rate_{Fuel\ Oil,Base}$ = defined base rate for fuel Oil savings (XX/gal.)
$Fuel\ Oil_{Saved,m}$ = calculated chilled water savings in gal. for month *m*

$Rate_{Steam,Base}$ = defined base rate for steam consumption ($XX/MMBtu.)
$Steam_{Saved,m}$ = calculated Steam savings in MMBtu. for month *m*

$Rate_{NG,Base}$ = defined base rate for natural gas consumption ($XX/Therm)
$NG_{Saved,m}$ = calculated natural gas savings in Therms for month *m*

Agreed($) = Annual savings in dollars (water, sewer, maintenance, etc.)

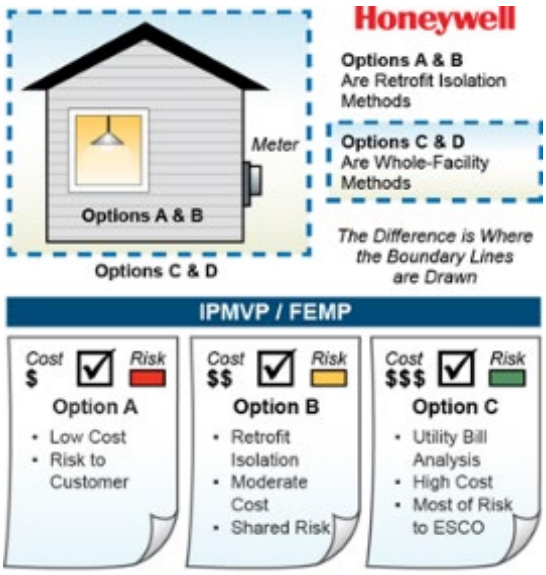
Honeywell assigns dollar values to the true incremental value of savings for energy and water. In other words, we do not combine, for example, demand and consumptions numbers so that there is an average value to savings. Honeywell looks at each incremental rate to units saved to properly determine the value (dollar) to the District or “real bill reductions.” As noted in the RFP, energy escalation rates will be established in accordance with New Jersey Board of Public Utility guidelines.

Based on this, Honeywell will review all utility bills (hourly data), tariffs, special contracts and commodity contracts to develop the incremental value (costs) of each utility.

The O&M savings is typically a function of District’s existing budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell will analyze the information to provide a conservative savings representation for Piscataway Township Schools’ review and acceptance. The information will include all calculations and assumptions.

4. MEASUREMENT & VERIFICATION (M&V)

The purpose of performing any monitoring and verification is to establish an agreed-upon process that provides the customer both a level of satisfaction that the improvements have been delivered and ongoing information as to their operation and performance. Additionally, this effort will be used to assess the actual dollars of savings versus the guarantee level.



It is essential for the success of this program that Honeywell and Piscataway Township Schools agree on a mutually acceptable methodology for measuring and verifying energy savings that are attributable to the energy conservation measures (ECMs) Honeywell installs. This M&V plan provides the procedures to document the energy and cost savings of each of the proposed ECMs.

The plan for monitoring and verifying energy savings for the proposed ECMs is based on the methods described in the ***International Performance Measurement & Verification Protocol (IPMVP)***[2]. Our approach to M&V is directly consistent with, and in compliance with, the IPMVP. This protocol provides a framework for the M&V methods most widely accepted and used by the industry.

Engineering calculations of energy and cost savings for the project are based on operating parameters (such as weather, temperature settings, run hours, occupancy patterns, and space usage) and equipment performance characteristics. The M&V plan uses the operating parameters established in the baseline for all savings calculations during the term of the project. The intent of the M&V plan is to verify that the ECMs installed by Honeywell will provide the expected energy savings. Therefore, Honeywell will collect data and relative information during the post-retrofit period to demonstrate that the installed equipment is performing at expected levels. It is assumed that Piscataway Township Schools will continue to be a dynamic institution adding or renovating buildings and desiring to retain the right to set comfort and operating characteristics. To accommodate this, Honeywell will develop its M&V plan in a way that allows Piscataway Township Schools to adapt to the demands of future campus growth and changes without the need for the District and Honeywell to negotiate energy baseline adjustments.

Our typical M&V plan will utilize broadband Internet access to the appropriate Piscataway Township Schools control interfaces both to confirm operating status and to download trend data to verify proper equipment maintenance.

One year after the commencement date of the ECMs, Honeywell will submit a report verifying and calculating the energy and cost savings for the first year. This report will be submitted for facility review and approval. For the remaining contract term, Honeywell will provide annual reports. These reports will include results of inspections of the installed equipment/systems, energy and cost savings, and recommendations to provide optimum energy performance.

All permanent measurement equipment will be purchased new with a calibration certificate from the manufacturer. The power multi-meter and the TSI multi-meter will be calibrated annually before using them in the annual inspection.

General Approach To M&V

Energy and water savings are determined by comparing the energy and water use associated with a facility or certain systems within a facility before and after the installation of an ECM or other measure. The “before” case is the baseline. The “after” case is the post-installation or performance period. Baseline

[2] www.evo-world.org.

and post-installation energy use measurements or estimates can be constructed using the methods associated with M&V options A, B, C, and D, as described in the IPMVP. The challenge of M&V is to balance M&V costs, accuracy and repeatability with the value of the ECM(s) or systems being evaluated, and to increase the potential for greater savings by careful monitoring and reporting.

M&V Options

The IPMVP guidelines classify the M&V procedures into four categories: Options A, B, C and D. As shown in the table below, these options differ in their approach to the level of complexity of the M&V procedures.

M&V Option	Performance Verification Techniques
Option A Verifying that the measure has the potential to perform and to generate savings.	**Option A** is appropriate for ECMs with energy use that can be readily quantified, such as the use of high-efficiency lighting fixtures, high-efficiency constant speed motors and other standard engineering calculations. Engineering calculations before and after installation spot measurements and use of EMS data points with stipulated values.
Option B Verifying that the measure has the potential to perform and verifying actual performance by end use.	**Option B** is appropriate for ECMs that require periodic or ongoing measurements to quantify energy use, such as the use of variable frequency drives on pump or fan motors. Engineering calculations with metering and monitoring strategy throughout term of the contract.
Option C Verifying that the measure has the potential to perform and verifying actual performance (whole building analysis).	**Option C** is used for ECMs for which the energy use or energy savings cannot be measured directly, such as building envelope modifications. Option C is based on the use of utility meters to quantify building energy use. Utility meter billing analysis-using techniques from simple comparison to multivariable regression analysis.
Option D Verifying actual performance and savings through simulation of facility components and/or the whole facility.	**Option D** is used for ECMs for which the energy use or energy savings cannot be measured directly, or savings for individual ECMs that are heavily interdependent. Calibrated building simulation is used to separate the energy savings attributable to each ECM. Calibrated energy simulation/modeling; calibrated with hourly or monthly utility billing data and/or end-use metering.

In general,

ECM Energy Savings = Baseline Energy Use - Post-Installation Energy Use

And

Energy Cost savings ($) = Total Energy Savings x Contractual Energy Rates

Exceptions to this simple equation are as follows:

- Projects where an on/off M&V method is used. For example, after a new energy management system is installed, control features are turned off for a set period of time to recreate baseline conditions. Thus, savings are determined after installation by comparing energy use with and without the control features activated.
- Since energy use at a facility is rarely, if ever, constant, another way to define M&V is as a comparison of a facility's post-installation energy use with its usage if the ECM or system had not been installed. This considers situations in which baseline energy use must be adjusted to account for changing conditions, such as changes in facility operation, occupancy, or use of external factors such as weather.

Post-Retrofit M&V Activities

There are two components associated with M&V of performance contract projects:

1. Verifying the potential of the ECM to generate savings also stated as confirming that the proper equipment/systems were installed, are performing to specification and have the potential to generate the predicted savings.
2. Determining/verifying energy savings achieved by the installed ECM(s).

Verifying The Potential To Generate Savings

Verifying baseline and post-installation conditions involves inspections (or observations), spot measurements and/or commissioning activities. Commissioning includes the following activities:

- Documentation of ECM or system design assumptions
- Documentation of the ECM or system design intent for use by contractors, agencies and operators
- Functional performance testing and documentation necessary for evaluating the ECM or system for acceptance
- Adjusting the ECM or system to meet actual needs within the capability of the system

Post-Installation Verification

Post-installation M&V verification will be conducted by both Honeywell and the client to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and/or spot or short-term metering.

Regular Interval Post-Installation Verification

At least annually, Honeywell will verify that the installed equipment/systems have been properly maintained, continue to operate correctly and continue to have the potential to generate the predicted savings. A savings report for all the installed ECMs will be submitted each year after the acceptance date of the work performed by Honeywell.

Computation Of Energy Savings

After the ECMs are installed, energy and cost savings will be determined annually by Honeywell in accordance with an agreed-upon M&V approach, as defined in a project-specific M&V plan.

Construction/Interim Savings

Construction or interim savings are usually measured using the same methodology as described in the detailed M&V plan for each ECM. Honeywell and Piscataway Township Schools together must agree to the start and the completion time for each ECM.

Electricity and thermal savings from the ECMs where no detailed long-term data is required to be collected will be stipulated and will be based on the starting and the final completion dates and verification of the operation of the ECMs. For other ECMs where long-term data collection is required by the M&V plan, data will be used to calculate the savings using the same equations as described in the detail plan. For example, to calculate electricity savings for the installation of a Variable Frequency Drive (VFD), the kW is spot measured at a set speed for selected motors through a sampling plan. The measured kW is subtracted from the baseline kW to calculate the savings. Thermal savings are tied to the electrical savings in the manner described in the detailed M&V plan. The results are extrapolated to cover all the VFDs installed by Honeywell.

The savings for each of the monitored VFD are calculated on an interval basis as follows:

$kW_{Saved} = (kW_{Base} - kW_{Spot\ Measured})$

kWh_{Saved} = Estimated operating hours during the interim period * kW_{Saved}

The total kWh savings is the sum of the kWhSaved for all the installed VFDs.

5. SITE-SPECIFIC M&V PLAN

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 1A – LED Lighting Upgrades (with Direct Install)	Upgrade Lighting Systems: Re-lamp/Re-ballast T8 to LED, Incandescent to LED, Metal Halide and Sodium Vapor to LED High Bays	**Option A**: Pre and Post measurements Line by Line scope and engineering calculations	**Pre-M&V**: Measurement of kW for 5% sample fixtures in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours **Post-M&V**: Measurement of kW for 5% sample fixtures in each category Usage Hours to remain same Occupancy schedules to remain same **Energy Savings**: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
ECM 1B – Lighting Controls	Install lighting control devices	**Option A**: Pre and Post measurements Line by Line scope and engineering calculations	**Pre-M&V**: Measurement of kW for 5% sample fixtures in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours **Post-M&V**: Measurement of kW for 5% sample fixtures in each category Usage Hours to remain same Occupancy schedules to remain same **Energy Savings**: Update Line by Line scope with measured kW and usage hours and compare to pre-retrofit calculated savings
ECM 1C – Vending Misers	Install Vending machine energy management devices	**Option A**: Electric energy savings based on number and type of units installed.	**Pre-M&V**: Measurement of kW for 5% sample machines in each category Data log usage hours Data Log occupancy schedules Update Line by Line scope with measured kW and usage hours **Post-M&V**: Measurement of kW for 5% sample machines in each category Usage Hours to remain same Energy Savings scope with measured kW and usage hours and compare to pre-retrofit calculated savings

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 1D – De-Stratification Fans	Install De-Stratification fans in Gymnasiums and Multipurpose Rooms to minimize stratification of hot air and maintain hot air flow below the fan level	**Option A**: Electric energy savings - Engineering calculations based on programmed parameters. **Option C**: Fuel Savings Utility Bill Comparison for fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post-installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 1E – Plug Load Management via Wi-Fi	Provide Wi-Fi enabled programmed electrical control devices to shut down various plug loads when building is not occupied	**Option A**: Engineering calculations based on comparison of existing operations and post installation operation.	**Pre-M&V**: Verify parameters used in the calculations based on data provided by Data loggers on selected pieces of equipment. **Post-M&V**: Verify that the control equipment is installed and programmed as specified. Data log to verify reduced hours of operation.
ECM 1F – Building Voltage Reduction	Install voltage regulation equipment to regulate and reduce voltage coming from the utility.	**Option A**: Engineering calculations based on comparison of existing operations and post installation operation.	**Pre-M&V**: Verify parameters used in the calculations based on data provided by Data loggers on selected pieces of equipment. **Post-M&V**: Verify that the control equipment is installed and programmed as specified. Data log to verify reduced hours of operation.
ECM 2A – Boiler Upgrade	Replace boilers in select locations to handle base load	**Option C**: Fuel Savings Utility Bill Comparison for fuel related measures	**Pre-M&V**: Baseline annual fuel cost based on fuel billing and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers **Post-M&V**: Compare post-installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
ECM 2B – Domestic Hot Water Replacement	Replace existing domestic hot water heaters with condensing natural gas domestic hot water heaters	**Option C**: Utility Bill Comparison for fuel related measures	**Pre-M&V**: Baseline annual fuel cost based on fuel billing and Metrix tuned to normalize to heating degree days **Post-M&V**: Compare post-installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 2C – Rooftop Unit Replacement	Replace antiquated Roof Top Units with new high efficiency Rooftop Units	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units. **Option C**: Utility Bill Comparison for fuel related measures	**Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (SEER). **Post-M&V**: Verify manufacturer provided data for new rooftop unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer.
ECM 2D – Walk-In Cooler/Freezer Upgrade	Install control device on walk-in freezer and refrigerator evaporators to shut down the fan motor when the compressor is off on duty cycle	**Option A**: Stipulated Engineering calculations based on case studies for the Intellidyne control	**Pre-M&V:** None **Post-M&V**: Savings stipulated based on engineering calculations for the term of the contract
ECM 2E – Premium Efficiency Motors & VFDs	Install VFDs on select pumps to operate the pump motors in response to the system load. Replace motors with new premium efficiency motors	**Option A**: Engineering calculations for VFDs following pump affinity laws. Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement motors	**Pre-M&V**: Verify manufacturer provided data for the pump performance data and motor efficiencies. **Post-M&V**: Obtain trend data for VFD operation from the BMS system to verify baseline calculation assumptions on system loads Verify efficiency of new motors Verify manufacturer provided data for new VFDs – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2F – Split System Replacement (with Direct Install)	Replace select split systems with new high efficiency units	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units.	**Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (SEER). **Post-M&V**: Verify manufacturer provided data for new rooftop unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 2G – Kitchen Equipment Replacements	Convert electric kitchen appliances to natural gas	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing electric appliances. **Option C**: Utility Bill Comparison for fuel related measures	**Pre-M&V**: Verify manufacturer provided data for the pump performance data and motor efficiencies. **Post-M&V**: Obtain trend data for VFD operation from the BMS system to verify baseline calculation assumptions on system loads Verify efficiency of new motors Verify manufacturer provided data for new VFDs – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2H – Unit Ventilator Replacements	Replace antiquated Unit Ventilator components for additional efficiency	**Option C**: Utility Bill Comparison for fuel related measures	**Pre-M&V**: Baseline annual fuel cost based on fuel billing and Metrix tuned to normalize to heating degree days **Post-M&V**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 2I – Cooling Tower Replacement	Replace the existing BAC cooling tower at the High School with new cooling towers for improved control of the condenser water.	**Option A**: Electric energy savings – Engineering calculations based on nameplate and manufacturer supplied for the existing and replacement units.	**Pre-M&V**: Verify manufacturer provided data for existing units' fan motor efficiency. **Post-M&V**: Verify that the systems are installed as specified and verify efficiency of the new motors.
ECM 2J – Energy Wheel Replacement	Replace the energy wheels with new high efficiency units	**Option C**: Utility Bill Comparison for fuel related measures	**Pre-M&V**: Baseline annual fuel cost based on fuel billing and Metrix tuned to normalize to heating degree days **Post-M&V**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 2K – Fellowship Farms VRV Upgrade	Replace existing heating and cooling systems with a VRV system.	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units.	**Pre-M&V**: Verify manufacturer provided data for existing unit efficiency (SEER). **Post-M&V**: Verify manufacturer provided data for new system (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 2L – Gym & Maintenance Heater Upgrades	Replacement of existing heating equipment at the Ethel Road Complex, and in the HS Patton gym.	**Option C**: Fuel Savings Utility Bill Comparison for fuel related measures	**Pre-M&V**: Baseline annual fuel cost based on fuel billing and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers **Post-M&V**: Compare post-installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
ECM 3A – Building Management System Upgrades	Upgrade Building Management Systems to DDC and integrate all systems to a central platform such that the systems may be monitored and controlled as programmed to maintain global settings such as night set back, optimum stop-start etc.	**Option A**: Electric energy savings - Engineering calculations based on programmed parameters. **Option C**: Fuel Savings Utility Bill Comparison for fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 3B – Demand Control Ventilation	Install CO2 sensor controls to limit OA based on occupancy of space	**Option A**: Electric energy savings - Engineering calculations based on programmed parameters. **Option C**: Fuel Savings Utility Bill Comparison for fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 3C – Exhaust Fan Controls	Integrate exhaust fans into BMS to control operating times	**Option A**: Engineering calculations based on programmed parameters.	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions. **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions. Verify savings based on programmed parameters and engineering calculations.
ECM 3E – Healthy Buildings - Bipolar Ionization	Install Needlepoint Bi-Polar Ionization devices in Rooftop air-handling equipment	**Option A**: Electric energy savings - Engineering calculations based on programmed parameters. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 4A – Building Envelope Improvement	Install weather stripping on doors and windows, seal roof wall joints, overhangs and roof penetrations	**Option A**: Electric energy savings based on quantity and type of materials installed. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 4B – Roof Replacement	Install new high efficiency roof coating on select areas/buildings	**Option A**: Electric energy savings based on quantity and type of materials installed. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 4C – Window Replacements	Install new high efficiency windows on select areas/buildings	**Option A**: Electric energy savings based on quantity and type of materials installed. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 4D – Door Replacement	Install new high efficiency doors on select areas/buildings	**Option A**: Electric energy savings based on quantity and type of materials installed. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
ECM 6A – Transformer Replacement	Replace existing secondary transformers with high efficiency equivalents	**Option A**: Engineering calculations based on increase in transformer efficiency.	**Pre-M&V**: Measure typical existing transformer (typical one for each size) input and output kW to establish transformer losses **Post-M&V**: Measure input and output kW for new transformer (typical one for each size). Verify savings with engineering calculations.
ECM 7A – Cogeneration	Install combined heat-and-power unit.	**Option A**: Electric energy savings - Engineering calculations based on programmed parameters. **Option C**: Fuel Savings Utility Bill Comparison for all fuel related measures	**Pre-M&V**: Verify existing operating parameters match the baseline calculation assumptions **Post-M&V**: Verify that systems are installed as specified and controls are programmed to match the savings assumptions **Electric Energy**: Verify savings based on programmed parameters and engineering calculations **Fuel**: Compare post M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	Measurement & Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 8A – Solar PPA	Install Solar Power using Power Purchase Agreement	N/A	**Pre-M&V**: N/A **Post-M&V**: N/A
ECM 9A – Computer Power Management	Install computer power management software across district computers	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing electric appliances.	**Pre-M&V**: Complete survey of existing computer equipment to be affected by the upgrade. **Post-M&V**: Verify that software is installed and functioning correctly and as-design across network devices.
ECM 10A – Water Conservation	Install toilet retrofits, urinal retrofits, lavatory sink retrofits	**Option A**: Pre and Post measurements Line by Line scope and engineering calculations	**Pre-M&V**: Billing data, fixture flow rates, usage patterns and occupancy levels from site personnel, verify parameters match baseline calculation assumptions. **Post-M&V**: Verify the fixture count on as-built line by lines, usage rates equal to established baseline, fixture flow rates based on sample measurements based on 80% confidence 20% precision for each fixture type.
ECM 11A – High School Kitchen Renovation	Install high efficiency electric kitchen appliances	**Option A**: Engineering calculations based on nameplate and manufacturer supplied data for the existing electric appliances.	**Pre-M&V**: N/A **Post-M&V**: Verify that the appliances are installed as specified and verify efficiency of the new appliances

Note: Gas savings for Martin Luther King Intermediate will be verified using Option A due to the inability to verify the accuracy of the baseline gas data.

6. GUARANTEE OF SAVINGS

Our team uses an approach in this asset management program comprising two key components: a performance guarantee and financial savings. Honeywell guarantees Piscataway Township Schools that all installations and work performed are subject to final inspection and the District's acceptance. This procedure ensures all work will be to the level of quality Piscataway Township Schools expects.

Honeywell also guarantees it will meet the objectives mutually defined with Piscataway Township Schools. Honeywell takes seriously its commitment to partner with the District for the life of the contract and looks forward to a successful, long-term partnership.

Honeywell considers the guarantee to be the cornerstone of our service to you. To be considered a performance contract, an energy guarantee is an optional component under the New Jersey Energy Savings Improvement Program (ESIP) legislation. The basis of an energy performance contract is that the majority of risk is shifted from Piscataway Township Schools to the ESCO. The strength of the guarantee is only as good as the company backing it and their financial solvency. With over $40.5 billion in assets, Honeywell has the financial strength and background to support Piscataway Township Schools for the long term.

Savings Guarantee: With the understanding that Piscataway Township Schools must maintain fiscal health and accountability, Honeywell can financially guarantee the results of its programs and clearly support this obligation with the commitment to regular review of program results and reconciliation. **Honeywell's financial strength and stability give it the ability to extend a FIRST-PARTY GUARANTEE to Piscataway Township Schools. A first-party guarantee eliminates the risk on Piscataway Township Schools and places it directly onto Honeywell**. This detail differs from some other ESCOs who provide a third-party guarantee, which insulates them from the owner through the use of insurance instruments.

If at the end of any year the program has not met or exceeded the annual guaranteed savings, Honeywell will refund the difference between the guaranteed amount and what was actually saved.

For all equipment covered by the energy savings guarantee, Piscataway Township Schools shall be responsible for ongoing maintenance and component replacement in accordance with manufacturer's standards. The customer will also be responsible for operating the equipment in accordance with manufacturer's specifications.

Honeywell will develop savings methodologies that follow current industry practice, such as those outlined by the New Jersey Board of Public Utilities (BPU) and Federal Energy Management Program's (FEMP) M&V Guidelines: Measurement and Verification for Federal Energy Projects. References to M&V protocols from the IPMVP, ASHRAE Guideline 14 and the Air-Conditioning Refrigeration Institute (ARI) are used to further qualify the M&V plan.

As stated above, under the New Jersey ESIP legislation, acceptance of a performance guarantee is optional at Piscataway Township Schools' sole discretion. Similarly, the duration of the guarantee is also optional. Many of Honeywell's New Jersey customers have elected to keep the guarantee in force for less than the total performance periods, i.e., three to five years. Others have elected to accept a one-year guarantee, while reserving the option to renew for additional years after they have had the opportunity to review the track record of actual savings results. Obviously, this a very customer-specific decision based on the risk management culture of each organization. Honeywell is flexible regarding the structure and duration of the guarantee. The final terms will be discussed and defined as part of our co-authored ESIP project.

Solely for informational purposes, it is worth noting that if Piscataway Township Schools does elect to accept a guarantee, New Jersey ESIP law requires that the District contract with a third-party independent firm to verify that the energy savings are realized. To preserve the independent status of this contractor, these costs are required to be incurred directly by Piscataway Township Schools.

Honeywell develops and implements every project with the same high level of detail and confidence and therefore will always provide a savings guarantee at no additional cost. However, if Piscataway Township Schools elects to accept the savings guarantee, the fee indicated on Form V in Section D will be

applicable to account for ongoing Honeywell service costs incurred during the measurement and verification of the savings (as indicated in Form V of our RFP response).

All guarantees require that the owner maintain the system in accordance with the manufacturer's specifications. Regardless of guarantee acceptance, ongoing maintenance (as recommended by the BPU, Honeywell and/or manufacturer specifications) is required to achieve the projected energy savings. Maintenance should also include a periodic verification of the system to make sure the maintenance is properly conducted, and the system is meeting the original specifications and design.

7. Recommended Preventive Maintenance Services

Per the NJ ESIP program, Piscataway Township Schools is required to bid for all desired services. Based on Honeywell's vast service organization, we are uniquely qualified to develop design specification for the public bidding per NJ Law.

Honeywell strongly believes that the long-term success of any conservation program is equally dependent upon the appropriate application of energy savings technologies, as well as solid fundamental maintenance and support. One of the primary contributors to energy waste and premature physical plant deterioration is the lack of operations, personnel training and equipment maintenance.

Honeywell recommends routine maintenance on the following systems throughout Piscataway Township Schools for the duration of an energy guarantee of savings.

Maintenance, Repair and Retrofit Services:

- Mechanical Systems
- Building Automation Systems
- Temperature Control Systems
- Air Filtration

Honeywell will work with Piscataway Township Schools to evaluate current maintenance practices and procedures. This information will be the basis of a preventive maintenance and performance management plan designed to maximize building operating efficiencies, extend the useful life of your equipment and support the designed Energy Savings Plan.

At a minimum, we recommend the following tasks be performed on a quarterly basis with the Piscataway Township Schools district-wide building management system.

System Support Services

1. Review recent mechanical system operation and issues with customer primary contact, on a monthly basis.
2. Review online automation system operation and event history logs and provide summary status to the customer primary contact. Identify systemic or commonly re-occurring events.
3. Check with customer primary contact and logbook to verify that all software programs are operating correctly.
4. Identify issues and prioritize maintenance requests as required.
5. Provide technical support services for trouble shooting and problem solving as required during scheduled visits.
6. Provide ongoing system review and operations training support, including two semi-annual lunch-and-learn sessions.
7. Establish dedicated, site-specific emergency stock of spare parts to ensure prompt replacement of critical components. These parts will be stored in a secure location with controlled access.

Configuration Management

1. Update documentation and software archives with any minor changes made to software during maintenance work.
2. Verify and record operating systems and databases.
3. Record system software revisions and update levels.
4. Archive software in designated offsite Honeywell storage facility, on an annual basis.
5. Provide offline software imaging for disaster recovery procedures, updated on a regular basis.

Front End / PC Service

1. Verify operation of personal computer and software:
   a. Check for PC errors on boot up
   b. Check for Windows errors on boot up
   c. Check for software operations and performance, responsiveness of system, speed of software
2. Routinely backup system files, on an annual basis:
   a. Trend data, alarm information and operator activity data
   b. Custom graphics and other information
   c. Ensure disaster recovery procedures are updated with current files
3. Clean drives and PC housing, on an annual basis:
   a. Open PC and remove dust and dirt from fans and surfaces
   b. Open PC interface assemblies and remove dust and dirt
   c. Clean and verify operation of monitors
   d. Verify printer operation, check ribbon or ink
   e. Initiate and check log printing functions
   f. Verify modem operation (if applicable)
   g. Review IVR schedule for alarms and review (if applicable)

Temperature Controls

Unit Vents
Services Performed

Annual Inspection

1. Inspect motor and lubricate
2. Lubricate fan bearings
3. Inspect coil(s) for leaks
4. Vacuum interior
5. Test operation of unit controls

Pumps
Services Performed

Preseason Inspection

1. Tighten loose nuts and bolts
2. Check motor mounts and vibration pads
3. Inspect electrical connections and contactors

Seasonal Start-up

1. Lubricate pump and motor bearings per manufacturer's recommendations
2. Visually check pump alignment and coupling
3. Check motor operating conditions
4. Inspect mechanical seals or pump packing
5. Check hand valves

Mid-season Inspection

1. Lubricate pump and motor bearings as required
2. Inspect mechanical seals or pump packing
3. Ascertain proper functioning

Seasonal Shutdown

1. Switch off pump
2. Verify position of hand valves
3. Note repairs required during shutdown

Packaged Air-Conditioning Systems
Services Performed

Preseason Inspection

1. Energize crankcase heater
2. Lubricate fan and motor bearings per manufacturer's recommendations
3. Check belts and sheaves and adjust as required
4. Lubricate and adjust dampers and linkages
5. Check condensate pan

Seasonal Start-up

1. Check crankcase heater operation
2. Check compressor oil level
3. Inspect electrical connections, contactors, relays, operating and safety controls
4. Start compressor and check operating conditions, adjusting as required
5. Check refrigerant charge
6. Check motor operating conditions
7. Inspect and calibrate temperature, safety and operational controls, as required
8. Secure unit panels
9. Pressure wash all evaporator and condenser coils (if applicable)
10. Log all operating data

Mid-season Inspection

1. Lubricate fan and motor bearings per manufacturer's recommendations
2. Check belts and sheaves, adjusting as required
3. Check condensate pan and drain
4. Check operating conditions. Adjust as required
5. Log all operating data

Seasonal Shutdown *

1. Shut down per manufacturer's recommendations

* If no shutdown is required, two mid-season inspections are performed

Boilers

Services Performed

Preseason Inspection

1. Inspect fireside of boiler and record condition
2. Brush and vacuum soot and dirt from flues (not chimneys) and combustion chamber
3. Inspect firebrick and refractory for defects
4. Visually inspect boiler pressure vessel for possible leaks and record condition
5. Disassemble, inspect and clean low-water cutoff
6. Check hand valves and automatic feed equipment; repack and adjust as required
7. Inspect, clean and lubricate the burner and combustion control equipment
8. Reassemble boiler
9. Check burner sequence of operation and combustion air equipment
10. Check fuel piping for leaks and proper support
11. Review manufacturer's recommendations for boiler and burner start-up
12. Check fuel supply
13. Check auxiliary equipment operation

Seasonal Start-up

1. Inspect burner, boiler and controls prior to start-up
2. Start burner and check operating controls
3. Test safety controls and pressure relief valve
4. Perform combustion analysis
5. Make required control adjustments
6. Log all operating conditions
7. Review operating procedures and owner's log with boiler operator

Mid-season Inspection

1. Review operator's log
2. Check system operation
3. Perform combustion analysis
4. Make required control adjustments
5. Log all operating conditions
6. Review operating procedures and log with boiler operator

Seasonal Shutdown

1. Review operator's log
2. Note repairs required

SECTION F
DESIGN APPROACH

SECTION F – DESIGN APPROACH

In accordance with the ESIP PL 2012, c.55 as part of the implementation process, an agreement between the Piscataway Township Schools and Honeywell will determine the energy conservation measures (ECMs) to be implemented. The services of a NJ licensed engineering firm and/or architectural firm shall then be secured to properly comply with local building codes, compliance issues and NJ public contracts law. Specifications will be designed and developed to exact standards as recommended by Honeywell to achieve all savings outlined in this Energy Savings Plan (ESP). Once specifications are completed, Honeywell will publicly solicit contractors capable of meeting the requirements of the specification for each trade. However, even before the completion of the bidding process, Honeywell project management will be engaged to maintain the overall project schedule and ensure Piscataway Township Schools' expectations are met. An overview of these activities and functions are detailed below.

1. Safety Management Plan

All of Honeywell's project management plans begin with safety. By integrating health, safety and environmental considerations into all aspects of our business, we protect our customers, our people and the environment, achieve sustainable growth and accelerated productivity, drive compliance with all applicable regulations and develop the technologies that expand the sustainable capacity of our world. Our health, safety and environment management systems reflect our values and help us meet our customer's needs and our business objectives.

Honeywell's Safety Management Plan is provided as Appendix 3 in a USB drive.

2. Project Management Process

Honeywell approaches any ESIP project with a systematic, tested and proven delivery process based upon industry best practices, including strong project management, open and collaborative communication, superior technical design and state-of-the-art technologies. We go above and beyond, with multiple NJ delivery teams to ensure sufficient resources, meticulous and thorough training and commissioning, and robust maintenance planning that goes the extra mile for the long term. Honeywell excels at project delivery because of our experience in New Jersey delivering ESIP projects with results that meet or exceed expectations.

Honeywell will demonstrate our partnership-based commitment to Piscataway Township Schools throughout the development and delivery of your ESIP project, as we have done for dozens of other public entities throughout New Jersey under the ESIP law. Our approach is backed by our references, track record and highly experienced engineering resources, which will be fully utilized to help you achieve your unique project goals and requirements.

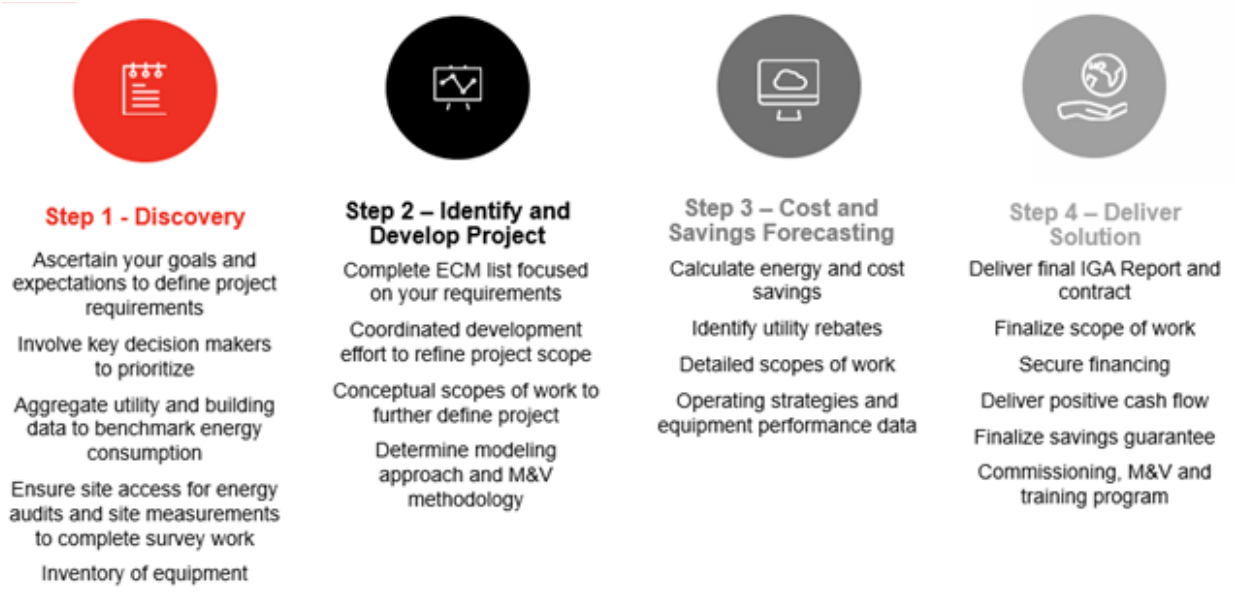
Honeywell prescribes four phases in the ESIP process that constitutes your project, including:

- **Phase 1**: Investment Grade Energy Audit (IGEA)
- **Phase 2**: Project Implementation
- **Phase 3**: Commissioning and Training
- **Phase 4**: Energy Savings Guarantee Period

The IGEA will begin with a kickoff meeting between key project stakeholders of Piscataway Township Schools and Honeywell to review the ESIP process, including the expectations of both parties during the IGEA, audit parameters, reporting methods, building access protocols, availability of utility and building data, etc. Phase 2 will commence after our kickoff meeting has concluded with agreed upon next steps.

Honeywell takes a holistic approach in development of a comprehensive solution that is customized to meet your operational and facility needs and project goals. Our integrated project delivery approach supports continuous and collaborative communication between key stakeholders throughout the process. Our IGEA development process includes the following steps:

Exhibit 1. **IGA Development Process**



STEP 1. DISCOVERY

The first step of your IGEA is to gain a thorough comprehension of Piscataway Township Schools' key priorities and requirements. Honeywell will work with you to identify your key needs and goals and investigate your buildings and systems with these in mind.

Honeywell will initiate your IGEA shortly after formal selection with a kickoff meeting involving all key project decision makers of Piscataway Township Schools and Honeywell. The purpose of this meeting is to establish preliminary project expectations and define key next steps of the process to inform the IGEA.

Honeywell will create a customized plan for developing an efficient, cost-effective and solutions-based project, including schedule, finance, performance requirements and scheduling activities.

Our team will schedule site visits to as early in the process as possible. Utility data is a key component used in establishing your energy baseline to project potential energy savings. Building plans and operating schedules will assist Honeywell to focus our time during the site visits and allow our engineers to complete their calculations. Data required for this step includes 24 months of electric, thermal and water/sewer data, original and renovation drawings, equipment lists, equipment operating schedules, occupancy data and maintenance records, and repair costs.

Our goal for the site surveys is to understand your systems in each facility and to identify potential ECMs for inclusion in your final project scope. This step allows Honeywell to determine needed improvements by evaluating each building and its systems in terms of condition, performance and age, including lighting and HVAC systems, building automation systems, building envelopes, electrical distribution, domestic water and heating systems, etc.

STEP 2. IDENTIFY AND DEVELOP PROJECT

Honeywell will take the findings of our earlier diagnostic phase to develop solutions that address your priorities and key needs as ascertained in Step 1. Our collaborative, solutions-based approach will allow you to maximize savings to invest more into modernizing buildings and generate maximum rebates to help deliver the most positive cash flow available.

Our primary objective is to ensure quality control and on-time delivery throughout your project. To fulfill this goal, we will dedicate our team of project management and engineering professionals, who have recently helped deliver similarly sized projects under the ESIP.

Honeywell will create an exhaustive ECM list following the completion of the site survey process. Each opportunity is then analyzed individually to determine both economic and construction feasibility. Input from Piscataway Township Schools is critical to determine how each ECM fits within your overall project priorities. Honeywell's ECM Opportunity Funnel will help further narrow down the list of potential ECMs to your final, optimal ESIP project scope, analyzing all aspects of your energy consumption, based on realistic savings potential. Our unique collaborative approach ensures that we deliver on your expectations while providing turnkey solutions that are cost effective.

STEP 3. COST AND SAVINGS FORECASTING

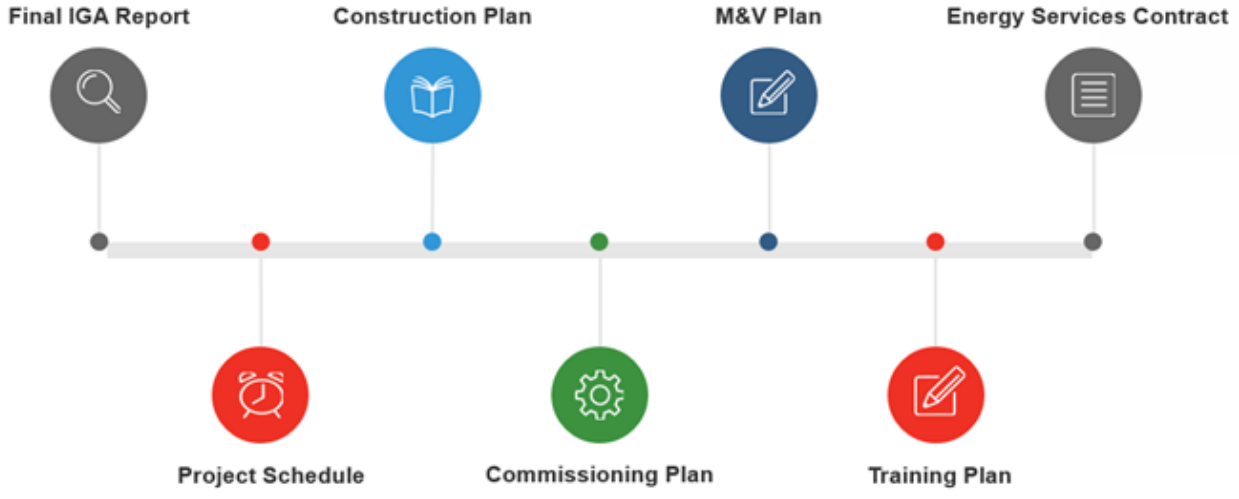
Honeywell will then analyze and quantify your unique savings guarantee with the Piscataway Township Schools' dedicated ESIP team. During this step, we will quantify energy savings by identifying the scope of work and its impact on your facilities and systems. We will measure individual ECMs based on how they will impact future performance of the building(s) as a whole. This will help ensure that the ECM savings are accounted for only once. Results are then subject to peer reviews to verify accurate modeling and savings forecasts based on the proposed scope of work. Honeywell's unique approach to engineering is why we often exceed the savings guarantee of our contracts.

STEP 4 DELIVER SOLUTION

Honeywell has delivered more than two dozen NJ ESIP projects since 2009. We will leverage our experience to help Piscataway Township Schools complete a successful project on time that maximizes realistic savings, cash rebates and positive cash flow. We have learned through this unrivaled experience that what matters most is to meet your expectations and ensure your involvement in the decision-making process. REACT (Rebate Energy Analysis Constructability Tool) will provide for an interactive solution development experience designed to maximize New Jersey Office of Clean Energy rebates. Our No Change Orders policy (which helps distinguish Honeywell from the competition) will further reduce risk and enhance project results. Our in-house finance team (Honeywell Global Finance) will work to secure the most competitive financial offering and interest rate available. No ESCO offers more value throughout the ESIP process than Honeywell.

Our deliverables during this final phase will include:

Exhibit 2. **Step 4 Deliverables**



HONEYWELL PERFORMANCE CONTRACTING

Honeywell is the undisputed performance contracting market leader in the Northeast. Honeywell's Guaranteed Performance Contracting, which we pioneered in the early 1980s, has surpassed the $2 billion mark in cumulative sales. Our performance contracting business features specialized and dedicated resources, including people with expertise specifically to address the needs of our customers. Our portfolio of business experience in the region is more than 400 projects and over $500 million in project investment.

OUR SAFETY COMMITMENT TO PISCATAWAY TOWNSHIP SCHOOLS

In today's world, nothing is more important than safeguarding our families at home, at work and at school. Through Honeywell's safety awareness process, we commit to protect and safeguard our construction sites, our employees, sub-contractors and your staff.

Our projects all begin with the following steps:

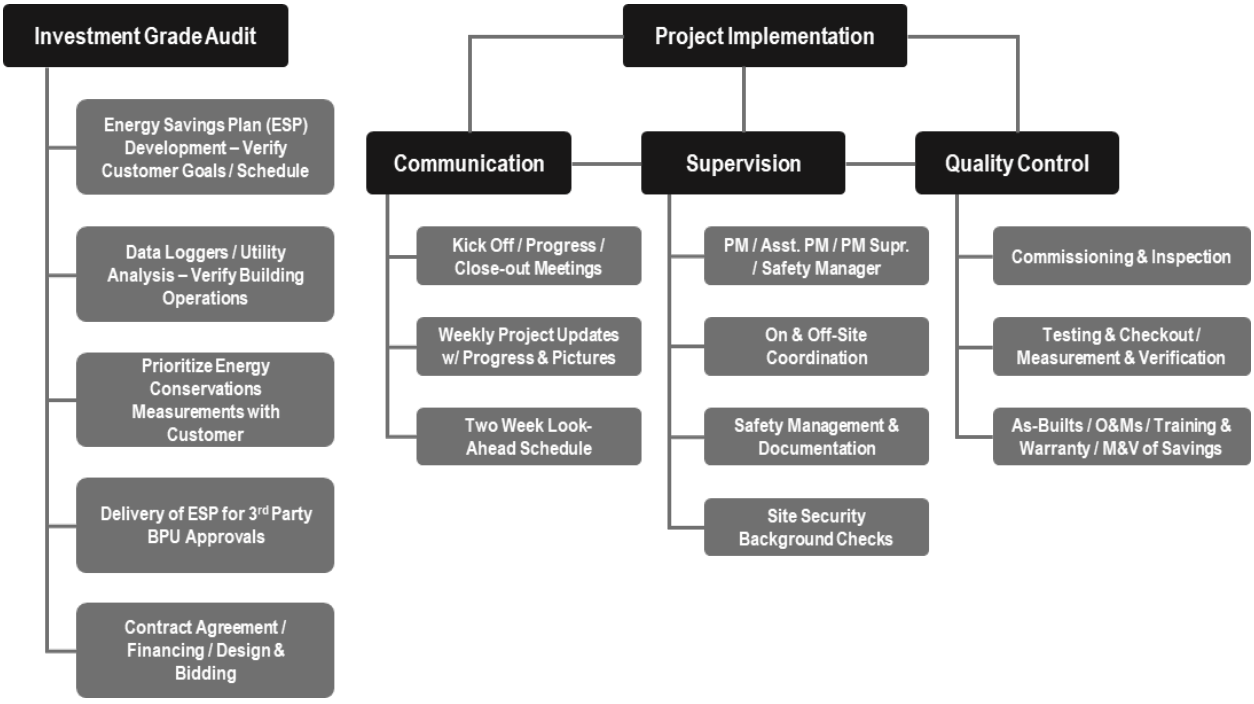
- Safety Training for Employees and Sub-contractors
- Detailed Work Schedules
- Detailed Background Checks of Personnel
- Detailed Logs of Sub-Contractor Personnel
- On-Site Logs of Time Sheets, Contact Information for All Personnel
- Clearly Displayed Identification Badges of All Construction Personnel
- On-Site Supervision of All Sub-contractors
- Detailed and Weekly Reviews of Accident Reports and Remediation Strategy

We protect the safety and health of our customers and employees through prevention of illness, injury and pollution.

- We actively promote and develop opportunities for expanding sustainable capacity by increasing fuel efficiency, improving security and safety, and reducing emissions of harmful pollutants.
- We are committed to compliance with all our health, safety, environmental and legal requirements everywhere we operate.
- Our commitment to health, safety and the environment is an integral aspect of our design of products, processes and services, and of the lifecycle management of our products.
- Our management systems apply a global standard that provides protection of both human health and the environment during normal and emergency situations.
- We identify, control and endeavor to reduce emissions, waste and inefficient use of resources and energy.
- We abide by the company's own strict standards in cases where local laws are less stringent.
- Our senior leadership and individual employees are accountable for their role in meeting our commitments.
- We measure and periodically review our progress and strive for continuous improvement.
- These are our commitments to health, safety, and the environment, and to creating a safe, clean environment everywhere we operate.

PROJECT MANAGEMENT PROCESS

Exhibit 3. **Project Management Process**



The project management process applies technical knowledge, people and communication skills, and management talent in an on-site, proactive manner to ensure that our contract commitments are met on time, within budget and at the quality level you expect.

A Honeywell project management plan defines and controls the tasks that must be completed for your project. But more than task administration, our project management process oversees the efficient allocation of resources to complete those tasks.

Each project and each customer's requirements are unique. At Honeywell, we address customer needs through a formal communication process. We first designate one of our project managers to provide project status updates to the customer.

As the facilities improvements portion of the partnership begins, the project manager serves as a single responsible party for all aspects of the partnership. The project manager monitors labor, material and project modifications related to the Piscataway Township Schools/Honeywell partnership and makes changes to ensure achievement of performance requirements in the facilities modernization component. The project manager regularly reviews the ongoing process of the project with the customers.

The project manager will develop and maintain effective ongoing contact with Piscataway Township Schools and all other project participants to resolve issues.

There are several challenges in this position. The project manager must staff the project and create a workforce capable of handling the technologies associated with the project (pneumatic or electric/electronic controls, mechanical systems, etc.), and plan for and use these personnel to achieve optimum results focused on occupant comfort and guarantee requirements.

3. CONSTRUCTION MANAGEMENT

Prior to any work in the buildings, our project manager will sit down with your administrative and building staff to outline the energy conservation upgrades we will be installing in the building(s). We discuss proper contractor protocol of checking in and out of the buildings daily, wearing identifiable shirts and identification badges, and checking in with your facilities staff. We will coordinate certain projects for different times of the day, so we do not interrupt the building and learning environments. Our staff will work a combination of first and second shifts to accomplish the pre-set implementation schedule.

Communication is the key factor in any successful construction management plan, and our project manager will be the primary point of contact during the installation process.

Our team will prevent delays by continuously tracking the location of all equipment and components required for the project. We make sure all equipment and components will be delivered on time. Our thorough survey, evaluation and analysis of existing conditions, performed before construction, will also prevent deviations from the schedule.

Honeywell is required to subcontract various portions of our projects to contractors. Within the Piscataway Township Schools project, all subcontractors will be selected in accordance with New Jersey public contracts law. Typical subcontracted areas are as follows:

- Electrical installation
- Lighting retrofits
- HVAC installation (depends upon the project size and scope)
- Associated general contracting specialty items to support the project (ceilings, windows, concrete, structural steel, roofing, demolition and removal of equipment, painting and rigging)

Where possible under New Jersey public contracts law, Honeywell uses the following guidelines in hiring subcontractors to perform work on our projects.

- Local presence in the community (customer recommendations)
- Firm’s qualifications and WBE/MBE status
- Firm’s financial stability
- Ability to perform the work within the project timeline
- Price
- Ability to provide service on the equipment or materials installed over a long period of time.

Piscataway Township Schools reserves the right to approve of subcontractors that Honeywell proposes to use.

4. COMMISSIONING

Honeywell provides full commissioning of ECMs as part of our responsibility on this project. We will customize this process based on the complexity of ECMs. Specifically, Honeywell will be responsible for start-up and commissioning of the new equipment and systems to be installed during the project. This step will include verifying that the installed equipment meets specifications, is installed and started up in accordance with manufacturer's recommendations and operates as intended. A commissioning plan will be prepared that describes the functional tests to be performed on the equipment and the acceptance criteria.

Before the customer accepts the project, Honeywell submits the final commissioning report containing signed acceptance sheets for each ECM. Signed acceptance sheets are obtained upon demonstrating the functionality of each ECM to a Piscataway Township Schools appointed representative.

Additionally, Honeywell provides training for facility operators and personnel as needed when each ECM is completed and placed into service. All training is documented in the final commissioning report.

After the completion of the Honeywell commissioning effort, in accordance with New Jersey ESIP legislation, Piscataway Township Schools will be required to secure the services of a third-party independent firm to verify that the new equipment and systems meet the standards set forth in the Energy Savings Plan. To maintain the independence of this review, these costs must be born directly by Piscataway Township Schools. However, at the discretion of Piscataway Township Schools, these services can be financed as a portion of the total project cost.

5. INSTALLATION STANDARDS

When Honeywell designs a solution, we consider current and future operations. For any upgrades we install, we follow building codes/standards, which dictate certain standards for energy or building improvements. During the life of the agreement, there is a partnership approach to maintaining these standards for reasons of comfort and reliability. For lighting, our standard is to meet or exceed Illuminating Engineering Society (IES) light level requirements, achieving the relevant standards wherever possible.

Space temperatures will be set by the energy management system and local building controls and will be maintained on an annual basis. Flexibility will be maintained to regulate space temperatures as required to accommodate building occupant needs.

Your facility staff and building personnel will operate the energy management system with ongoing training and support from Honeywell. Therefore, both Piscataway Township Schools and Honeywell will maintain the standards of comfort. The comfort standards will be maintained throughout the life of the agreement through sound maintenance planning and services recommended as part of this ESP.

HEATING AND COOLING STANDARDS

Heating Temperatures	Cooling Temperatures	Unoccupied Temperatures
70-72° F	72-74° F	58-62° F

Honeywell uses a variety of in-house labor as well as subcontractors to install the energy conservation measures. We have on-staff trained professionals in fire, security, energy management systems, all temperature control systems and HVAC. However, per the ESIP law, all trades will be publicly bid except for specific controls applications. Listed below is a sampling of some disciplines that would apply to Piscataway Township Schools:

Improvements	Honeywell	Subcontractor
Engineering Design/Analysis	√	
Technical Audit	√	
Construction Administration/Management	√	
On-Site Construction Supervision	√	
Installation of Energy Management System	√	√
Manufacturer of Energy Management Equipment	√	√

Improvements	Honeywell	Subcontractor
Installation of HVAC/Mechanical Equipment		√
Installation of Renewable Technology		√
Installation of Building Envelope		√
Energy Supply Management Analysis/Implementation	√	
Installation of Boilers		√
Maintenance of Energy Management Equipment	√	√
Manufacturer/Installation of Temperature Controls	√	√
Monitoring/Verification Guarantee	√	
Training of Owner Staff	√	
Financial Responsibility for Energy Guarantees	√	

HAZARDOUS WASTE DISPOSAL OR RECYCLING

Honeywell disposes of all PCB ballasts or mercury containing materials removed as part of the project per EPA guidelines. Honeywell will complete all the required paperwork on behalf of Piscataway Township Schools. Honeywell will work with the District to review your hazardous material reports and will identify the areas where work will be completed so that the District can contract to have any necessary material abatement completed.

Honeywell can help schedule or coordinate waste removal but does not contract for, or assume responsibility for, the abatement work. Honeywell also has the capabilities to assist Piscataway Township Schools in working with the EPA under compliance management issues. We also develop and manufacture automated systems to track and report a wide variety of environmental factors.

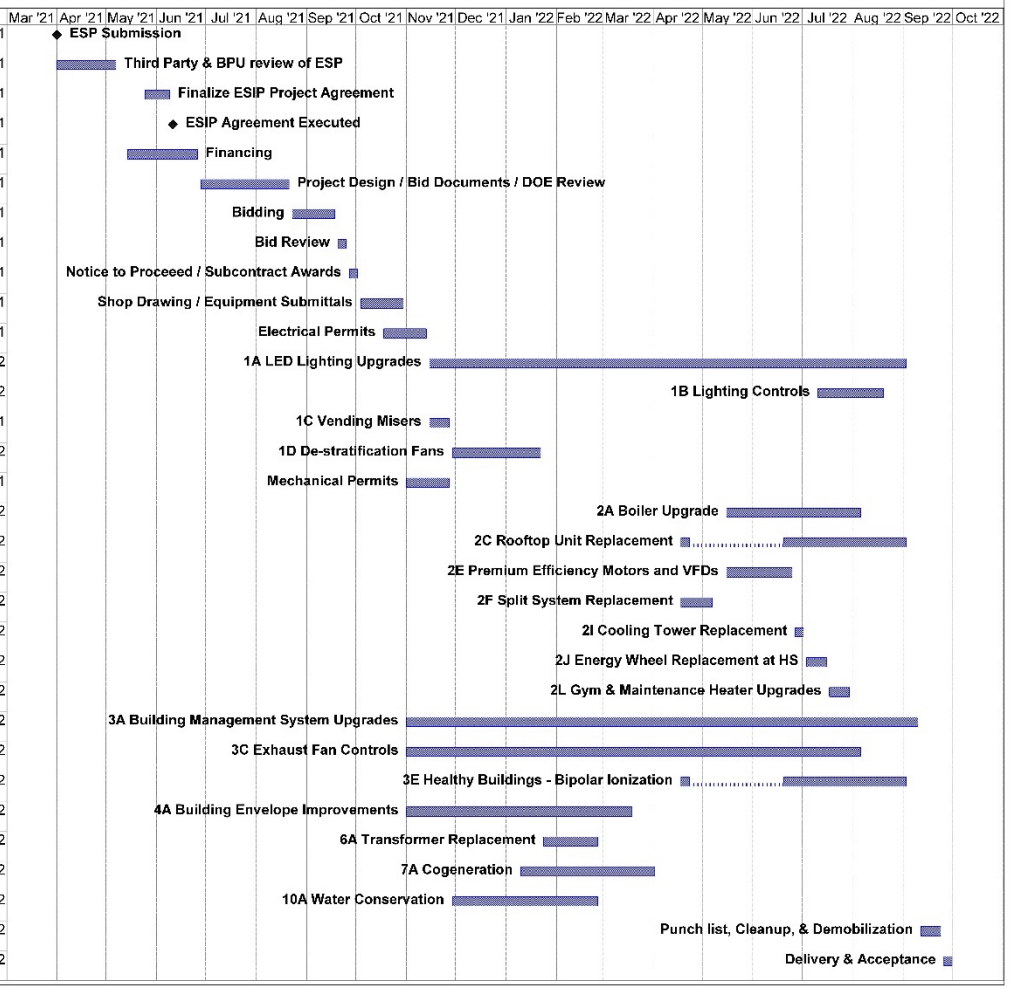
6. IMPLEMENTATION SCHEDULE

Below is a sample schedule for construction and completion of the project.

Piscataway Township Schools
Energy Savings Plan Estimated Construction Schedule

Honeywell

ID	Task Name	Start	Finish
1	ESP Submission	Thu 4/1/21	Thu 4/1/21
2	Third Party & BPU review of ESP	Thu 4/1/21	Thu 5/6/21
3	Finalize ESIP Project Agreement	Tue 5/25/21	Tue 6/8/21
4	ESIP Agreement Executed	Thu 6/10/21	Thu 6/10/21
5	Financing	Fri 5/14/21	Fri 6/25/21
6	Project Design / Bid Documents / DOE Review	Mon 6/28/21	Fri 8/20/21
7	Bidding	Mon 8/23/21	Fri 9/17/21
8	Bid Review	Mon 9/20/21	Fri 9/24/21
9	Notice to Proceeed / Subcontract Awards	Mon 9/27/21	Fri 10/1/21
10	Shop Drawing / Equipment Submittals	Mon 10/4/21	Fri 10/29/21
11	Electrical Permits	Mon 10/18/21	Fri 11/12/21
12	1A LED Lighting Upgrades	Mon 11/15/21	Fri 9/2/22
13	1B Lighting Controls	Mon 7/11/22	Fri 8/19/22
14	1C Vending Misers	Mon 11/15/21	Fri 11/26/21
15	1D De-stratification Fans	Mon 11/29/21	Fri 1/21/22
16	Mechanical Permits	Mon 11/1/21	Fri 11/26/21
17	2A Boiler Upgrade	Mon 5/16/22	Fri 8/5/22
18	2C Rooftop Unit Replacement	Mon 4/18/22	Fri 9/2/22
19	2E Premium Efficiency Motors and VFDs	Mon 5/16/22	Fri 6/24/22
20	2F Split System Replacement	Mon 4/18/22	Fri 5/6/22
21	2I Cooling Tower Replacement	Mon 6/27/22	Fri 7/1/22
22	2J Energy Wheel Replacement at HS	Mon 7/4/22	Fri 7/15/22
23	2L Gym & Maintenance Heater Upgrades	Mon 7/18/22	Fri 7/29/22
24	3A Building Management System Upgrades	Mon 11/1/21	Fri 9/9/22
25	3C Exhaust Fan Controls	Mon 11/1/21	Fri 8/5/22
26	3E Healthy Buildings - Bipolar Ionization	Mon 4/18/22	Fri 9/2/22
27	4A Building Envelope Improvements	Mon 11/1/21	Fri 3/18/22
28	6A Transformer Replacement	Mon 1/24/22	Fri 2/25/22
29	7A Cogeneration	Mon 1/10/22	Fri 4/1/22
30	10A Water Conservation	Mon 11/29/21	Fri 2/25/22
31	Punch list, Cleanup, & Demobilization	Mon 9/12/22	Fri 9/23/22
32	Delivery & Acceptance	Mon 9/26/22	Fri 9/30/22



APPENDICES

For Appendices 1 to 4, please refer to the following files for their electronic version on the USB drive included along in the submission:

- Honeywell – Appendix 1 — INDEPENDENT ENERGY AUDITS (Exhibit 1).pdf
- Honeywell – Appendix 2 — ECM CALCULATIONS.pdf
- Honeywell – Appendix 3 — SAFETY MANAGEMENT PLAN.pdf
- Honeywell – Appendix 4 — EQUIPMENT CUTSHEETS.pdf

THE FUTURE IS WHAT WE MAKE IT

Thank you for considering our proposal. We look forward to working with you in the future.

Wayne Leahy, Business Consultant

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