MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL SCHOOLS BOARD OF EDUCATION

Energy Savings Plan

Revised February 20, 2020

Honeywell

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MIDDLESEX COUNTY VOCATIONAL AND TECHNICAL SCHOOLS BOARD OF EDUCATION

Energy Savings Plan

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HONEYWELL PROPRIETARY

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SECTION A EXECUTIVE SUMMARY

Honeywell is pleased to submit this Energy Savings Plan for Middlesex County Vocational and Technical Schools (MCVTS). During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit of MCVTS's buildings and grounds. Based on the audit findings and Honeywell's extensive experience in working with school district's, we can confidently state that we can deliver a financially viable, comprehensive solution to address MCVTS facility concerns. Our Energy Savings Plan includes projects that achieve energy and operational efficiencies, create a more comfortable and productive working environment and 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 and identification of who will provide these services;
- An assessment of risks involved in the successful implementation of the plan;
- Identify the eligibility for, and costs and revenues associated with, the PJM Independent System Operator for demand response and curtail-able 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 MCVTS 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 MCVTS identified. This 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 decisions to be made. The information is divided into the following sections:

A. Executive Summary (This Section)

B. Preliminary Utility Analysis – The Preliminary Utility Analysis (PUA) defines the utility baseline for MCVTS 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 MCVTS 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 School 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 MCVTS are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined by MCVTS 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 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 (BPU) 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 includes a project specific Safety Management Plan and provides an overview of our 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.

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

H. **Energy Calculations and Greenhouse Gas Reduction Summary –** This section titled Appendix 2: ECM Calculations 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 3rd party engineering firm review for verification.

A summary of all savings based on the Recommended ESIP Project includes a **reduction in 1,502 Metric Tons of Greenhouse Gas (GHG) emissions**. It is the equivalent of removing **317 cars** from the road for an entire year and is the same as planting **1423 acres of forest**.

I. Equipment Cut-sheets – This section titled Appendix 3: Equipment Cut-sheets 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.

J. Safety Management Plan – This section titled Appendix 4: Safety Management Plan establishes a plan for the implementation of Honeywell's Safe Operations Management (SOM) program. The document includes procedures and requirements specific to MCVTS 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.

In accordance with the NJ ESIP process, the next step in the project development phase is for Honeywell to provide our recommendations and for MCVTS to select the desired content of the project based upon MCVTS 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 MCVTS 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 MCVTS is well positioned to implement a program that will upgrade your facilities, while funding itself within the requirements of the law and with zero impact on your taxpayer base. We welcome this opportunity to continue to partner with MCVTS to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan.

Sincerely,

Joseph Coscia
Sr. Business Consultant

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SECTION B PRELIMINARY UTILITY ANALYSIS

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Honeywell

Preliminary Utility Analysis

Middlesex County Vocational School, NJ
Middlesex County, NJ

Helping customers manage energy resources to improve financial performance

Executive 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)

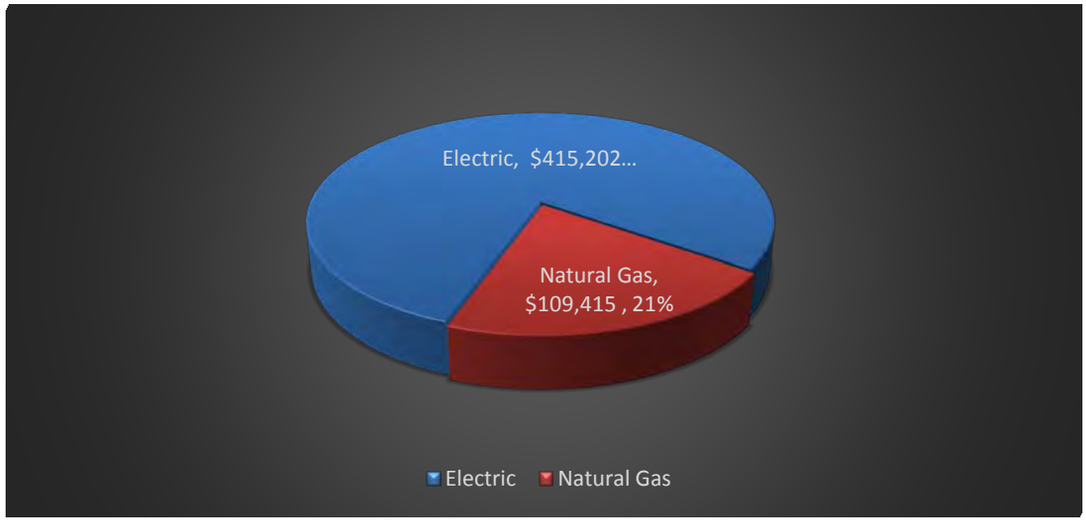
Historical Summary

Utility Analysis Period:
Jan 2018 through Dec 2018

	Electric	Natural Gas
Utility Costs*	$415,202	$109,415
Utility Usage (kWh, Therms)	3,299,533	131,480
$ Cost/Unit (kWh, Therms)	$0.12584	$0.832
Annual Electric Demand (kW)	8,818	

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

Actual Cost by Utility
Jan 2018 through Dec 2018



Total Cost
$524,616

Energy Benchmarking

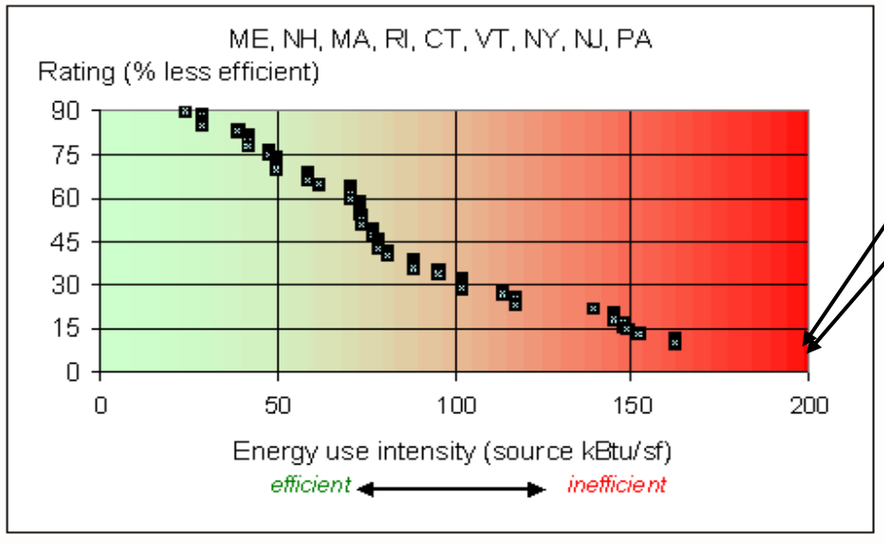
The calculation of EUI (Energy Use Intensity) is shown below. EUI, expressed in kBtu/sf, is normalized for floor area, the most dominant influence on energy use in most buildings. Its use usually provides a good approximation of how your building's energy performance compares to others. Site EUI indicates 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?
above 60%	below 25%	No
40 to 60%	20 to 35%	Maybe
20 to 40%	35 to 50%	Yes
Below 20%	above 50%	Definitely

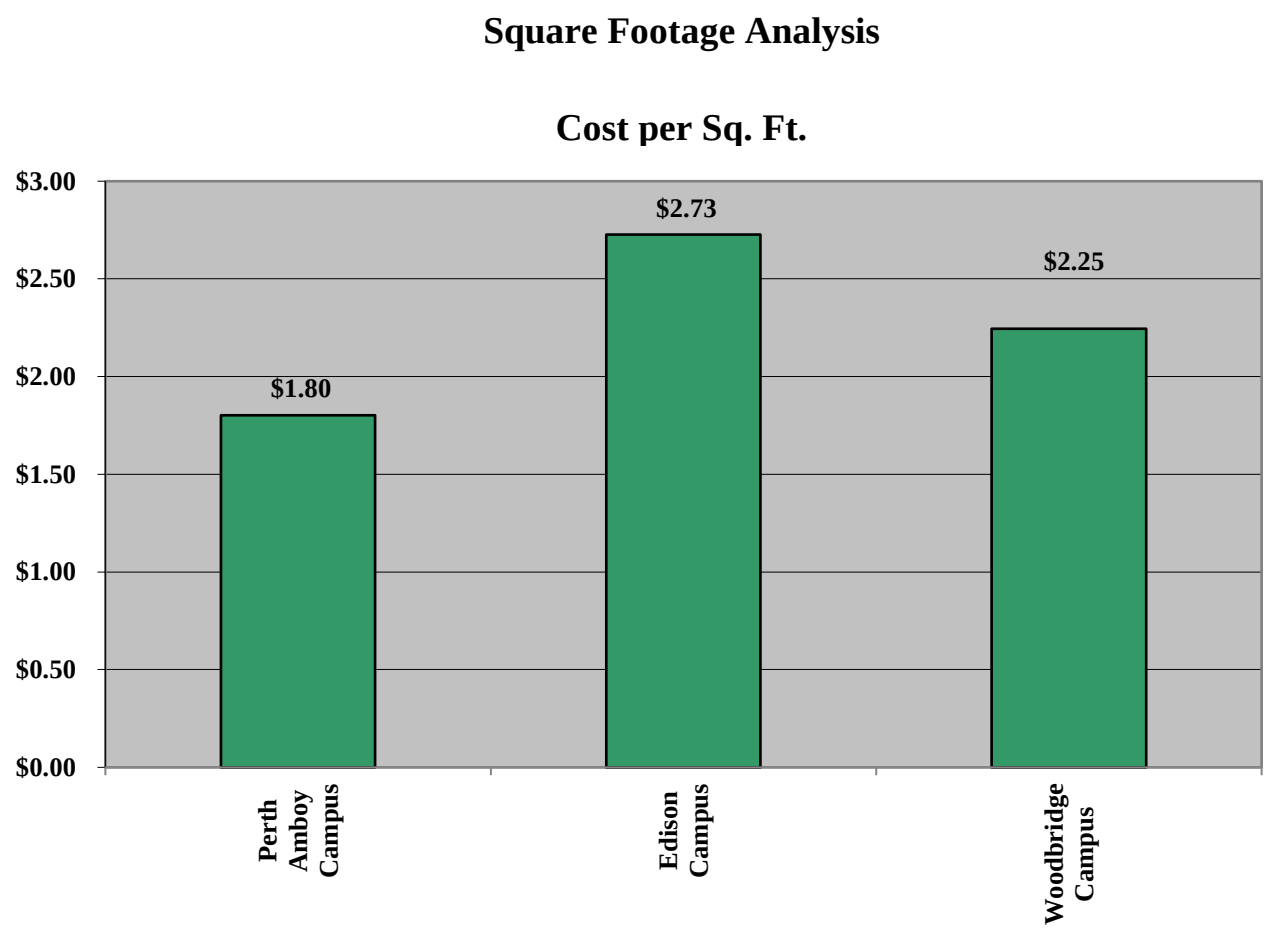
Site EUI Rank		Annual Total Electrical Use (kWh)	Annual Total Non-Electrical Fuel Use (Therms)	Building Gross Floor Area (sq-ft)	Site EUI Rating	Source EUI: Annual Total Source Energy Use per Sq-Ft (kBtu/sf)	Rating (Regional Source EUI Comparison)
1	Perth Amboy Campus	2,259,867	71,315	150,000	**99**	**203**	**10%**
2	Edison Campus	280,586	15,151	15,200	**163**	**291**	**3%**
3	Woodbridge Campus	759,080	45,015	46,000	**154**	**268**	**5%**

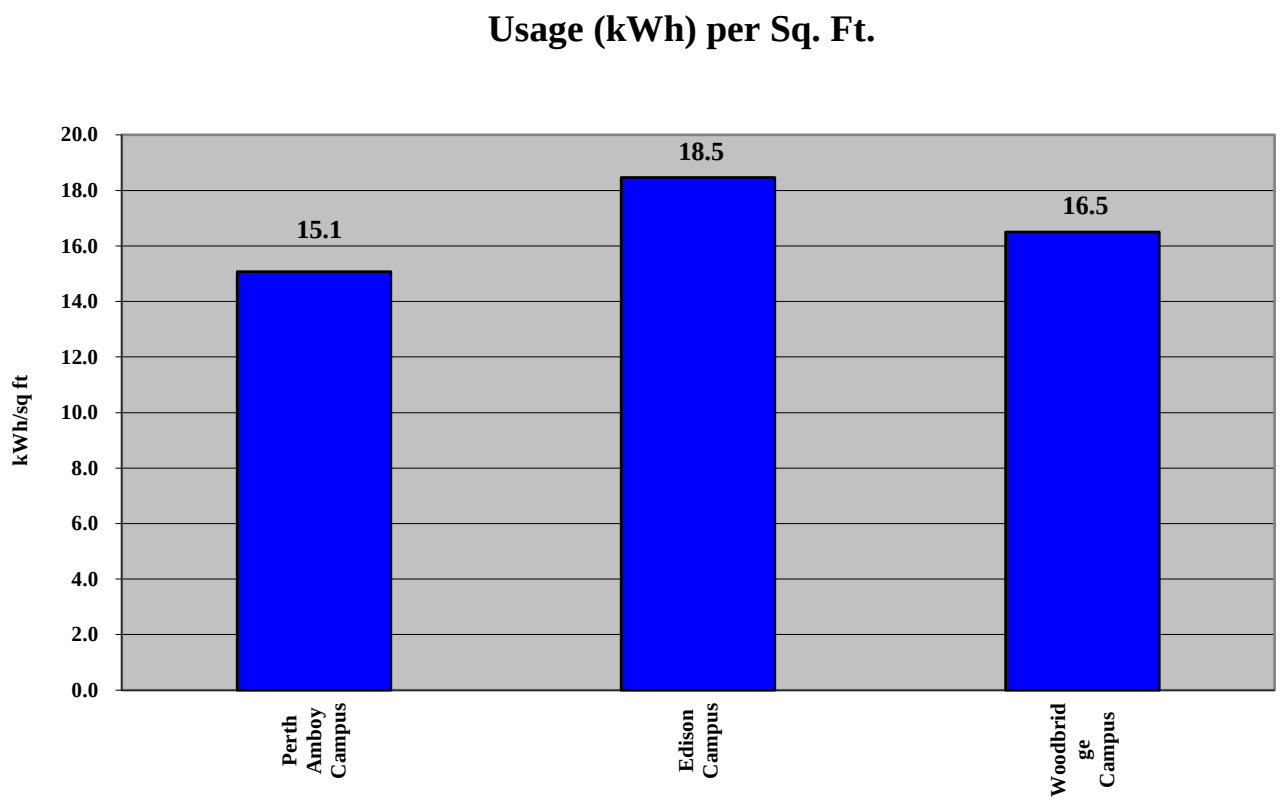
School Facilities



Source EUI	Est Regional Rating	Building
203	10%	Perth Amboy Campus
291	3%	Edison Campus
268	5%	Woodbridge Campus

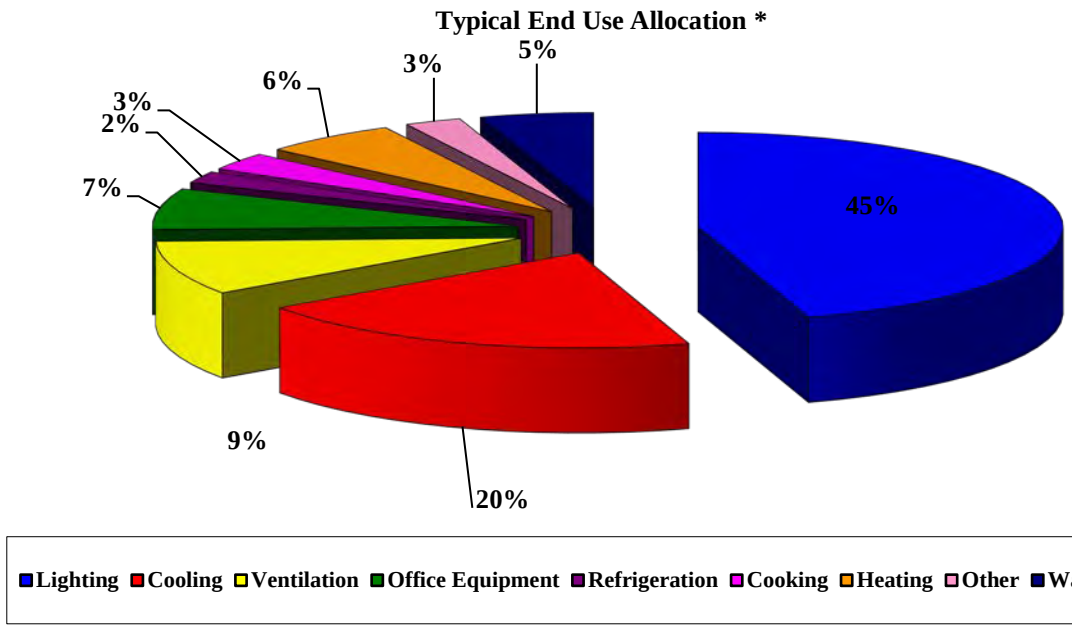
Utility Analysis
Electric





Utility Analysis

Sources of Electric Consumption

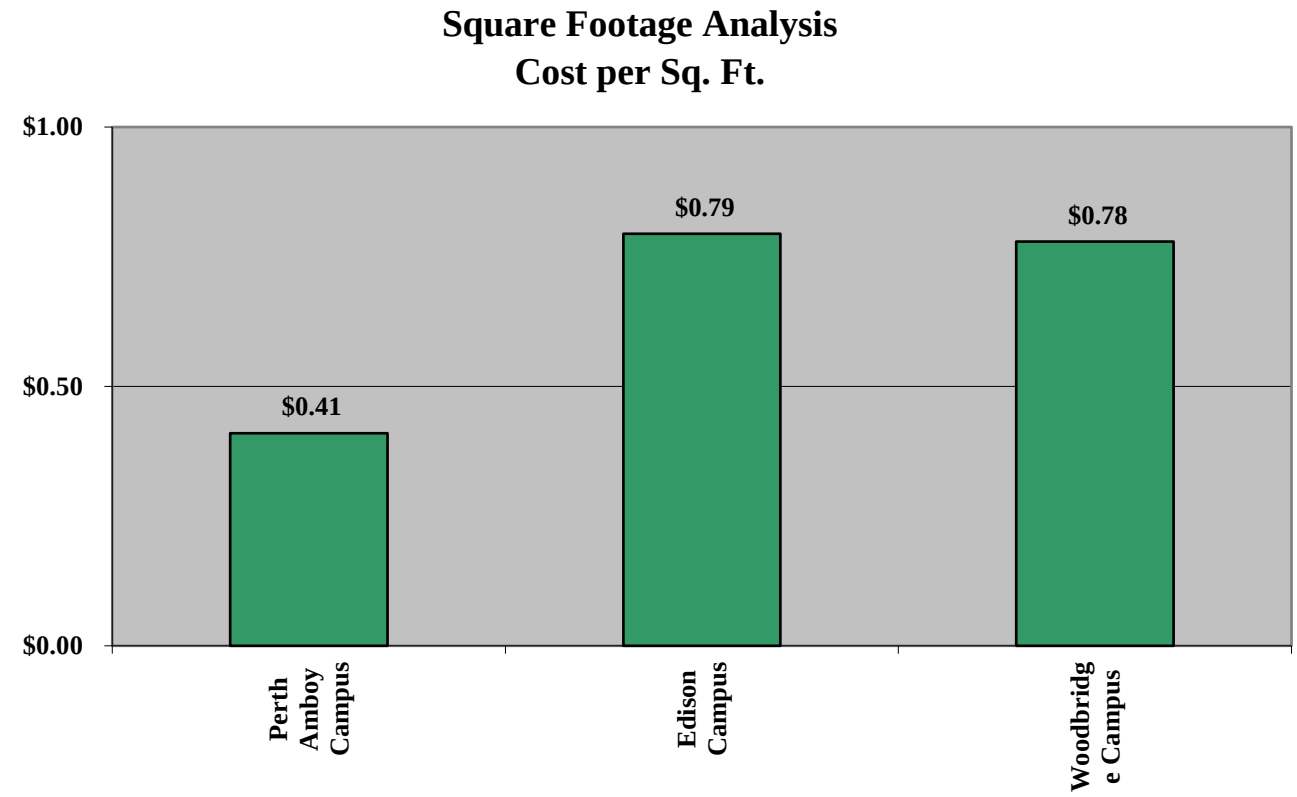


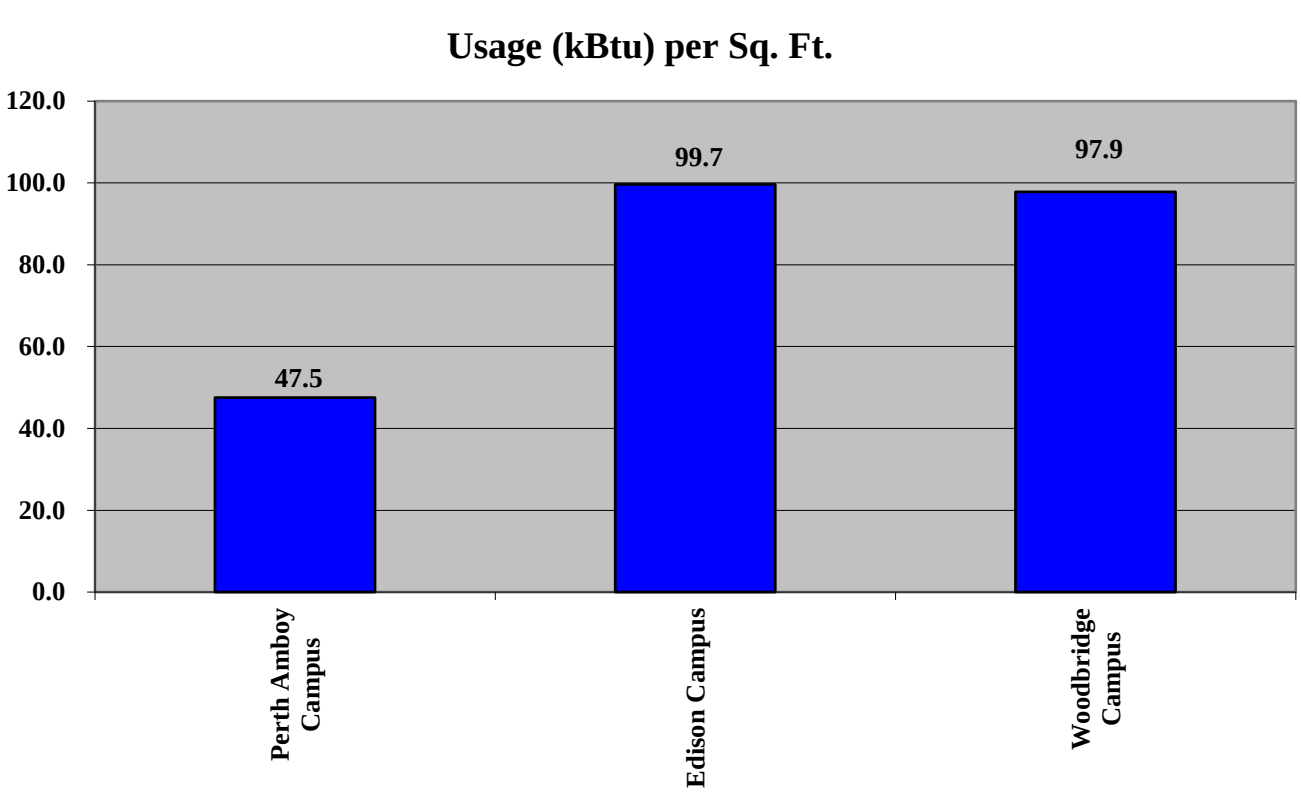
**This allocation is generic and is not a representation of the actual end use in your buildings included in this report.

Typical Allocation Applied to Your Electric Cost**

	Lighting	$186,841
	Cooling	$83,040
	Ventilation	$38,199
	Office Equipment	$29,064
	Refrigeration	$8,304
	Cooking	$12,456
	Heating	$24,912
	Other	$10,380
	Water Heating	$20,760
Your Total Cost	**Jan 2018 through Dec 2018**	**$415,202**

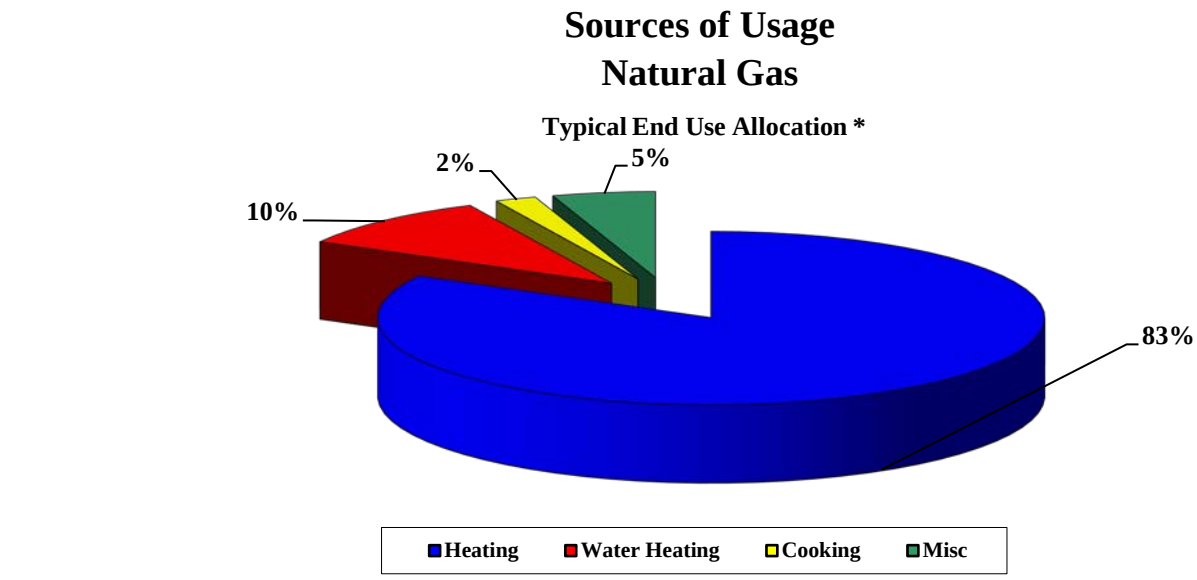
Utility Analysis
Natural Gas





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



**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	$90,814
	Water Heating	$10,941
	Cooking	$2,188
	Misc	$5,471
Your Total Cost	**Jan 2018 through Dec 2018**	**$109,415**

Annual Emissions & Environmental Impact

Middlesex County Vocational School, NJ

Calendar Year Jan 2018 through Dec 2018

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

Total Annual Electric usage	3,299,533	kWh
Annual Natural Gas usage	131,480	Therms

Annual Greenhouse Gas Emissions

CO2	6,001,258	pounds
SO2	15,211	pounds
NOx	10,394	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

Potential Retrofits

Retrofit Description	Utility/Fuel Type	Symptomatic Issues	Common Recommendations for Action
Lighting Retrofit and Motion Sensors	Electric/Natural Gas	Elevated EUI	Lighting and Controls UpGrade
De-Stratification Fans	Electric/Natural Gas	Elevated EUI	Redistribution of Conditioned Air
DHW Boiler Replacements	Electric/Natural Gas	Elevated EUI	Higher Efficiency Units
Classroom Unit Replacments	Electric	Elevated EUI	Higher Efficiency Units
RTU Replacements	Electric/Natural Gas	Elevated EUI	Higher Efficiency Units
Boiler Replacements	Natural Gas	Elevated EUI	Higher Efficiency Units
Burner Replacements	Natural Gas	Elevated EUI	Decrease Thermal Losses
Building Envelope Improvements	Electric/Natural Gas	Elevated EUI	Reduce Building In leakage
Roof Top Unit Replacements	Electric	Elevated EUI	Lower Energy Consumption
Computer Controllers	Electric	Elevated EUI	Lower Energy Consumption
Install Premium Efficient Motors	Electric	Elevated EUI	Lower Energy Consumption
CHP	Electric/Natural Gas	Elevated EUI	Lower Energy Consumption
Load Reduction	Electric	Elevated EUI	Lower Energy Supply Side Consumption

SECTION C ENERGY CONSERVATION MEASURES (ECMS)

Introduction

The information used to develop this Section was obtained through the independent energy audit building surveys to collect equipment information, 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 done a review of the Energy Conservation Measures (ECMs) which would provide energy and cost savings to MCVTS. This report aims to be 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. What follows is a general description of the energy auditing process and the detailed descriptions of the Energy Conservation Measures for your facilities.

ENERGY CONSERVATION MEASURES

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
1A LED Lighting	●	●	●
1B Vending Misers	●	●	●
1C Destratification Fans	●		●
2A Boiler Replacements		●	
2B DHW Heater Replacements	●	●	
2C RTU Replacements	●	●	
2D Split System Replacements	●	●	●
2E Chiller Replacements			●
2F Motor and VFD Replacements	●	●	●
2G Kitchen Hood Control	●		
2H Refrigeration Controls	●		
2I Window AC Unit Replacements			●
2J Multi-Zone VRF System Replacement			●
3A Building Management Systems	●	●	●
4A Building Envelope Improvements (BEI)	●	●	●
4B Woodbridge Guidance Area BEI			●
5A Permanent Load Reduction	●	●	●
6A Solar PPA	●	●	●
7A High Efficiency Transformers	●		●
8A Water Conservation	●	●	●

OVERVIEW

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

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

Reject and Accept Measures Based On

- Alignment with Critical Success Factors (CSF)
- Value to the School
- Economic Financial Payback
- Equipment Service Life
- Effect on Current Space Conditions

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

- Reduction of space heating and cooling loads by performing a systems review, with complete consideration of current indoor environmental quality standards.
- Review and redesign lighting systems noting reductions in the internal heat gain in the affected spaces.
- Load reduction measures always precede optimization measures.

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:

1. Optimized flow rates (steam, water, and air).
2. 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 MCVTS would reap from the mechanical portion of the measures:

1. Avoid costly repairs and replace equipment that would have to be replaced in the next five years.
2. Improve compliance with ASHRAE Ventilation Standards.
3. Trend ventilation rates; thus, insuring compliance through documentation.
4. Operate a more weather sensitive facility.
5. Allow for a greater capability of central monitoring and troubleshooting via remote.
6. Reduce costs and optimize staff efficiency through greater operating flexibility.

Indoor Air Quality

Implementation of new energy-related standards and practices has contributed to a degradation of indoor air quality. In fact, the quality of indoor air has been found to exceed the Environmental Protection Agency (EPA) standards for outdoor air in many homes, businesses, and factories.

The American Council of Governmental Industrial Hygienists' (ACGIH) booklet. "Threshold Limit Values," has published air quality standards for the industrial environment. No such standards currently exist for the residential, commercial, and institutional environments, although the ACGIH standards are typically and perhaps inappropriately used. The EPA has been working to develop residential and commercial standards for quite some time.

Recent studies indicate that for even the healthiest students, indoor air pollution can reduce the ability to learn. As an example, if you were to place several students in a room where it is hot, there is little or no air circulation and other children are coughing and sneezing, exposing the student body to airborne related illnesses such as the cold or flu. Honeywell has addressed this issue by focusing on the proper operation and replacement of the unit ventilators and air handler equipment which will assure IAQ standards are met.

ECM 1A LED LIGHTING

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption with more efficient, 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 working and learning environment.
- **Improved equipment longevity** by reducing amount of light usage and extending the useful life of your lighting system. LED bulbs and diodes have an outstanding operational life time expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. Operational savings in terms of bulb and ballast replacement are significant based on this technology.
- **Reduced maintenance and operational costs** by modernizing your lighting system and providing for longer lasting and technologically advanced lights, without the need to address deficient or bad ballasts.
- **Reduced carbon footprint** with ecologically friendly LED lights that are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a multitude of materials like mercury that are dangerous for the environment. LED lights contain no toxic materials and are 100% recyclable, and will help to reduce carbon footprint by up to a third. The long operational life time span mentioned above means also that one LED light bulb can save material and production of 25 incandescent light bulbs. A big step towards a greener future!

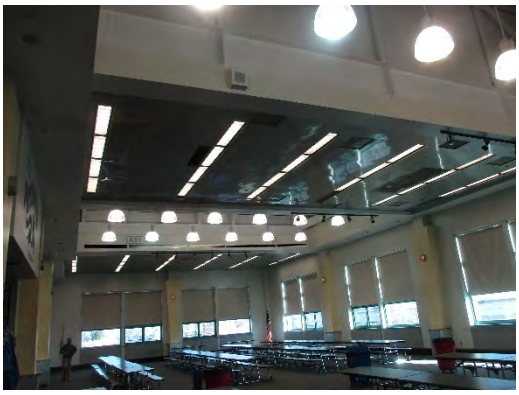
ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
1A LED Lighting	●	●	●

Existing Conditions

Indoor lighting predominantly consists of standard T-8s and some, CFLs and few incandescent bulbs. In general lighting is operated on switches; however, some rooms have occupancy sensors. Outdoors lighting consists of wall mounted CFLs and the parking lot has post mounted HPS.

Scope of Work

The proposed lighting system is based on the recent investment grade lighting system audit where existing lighting systems were analyzed and inventoried. Honeywell proposes to retrofit all existing T-8 and T-12 fixtures with high efficiency LED lamps. A detailed line by line lighting plan is included within the calculation section of this document.

Examples of existing interior lighting

LED Parking Lot Lighting Upgrades

Existing Conditions

MCVTS parking lots consist of various types of HID light fixtures, which are not as efficient as modern LED types. Parking lot exterior lights consist of pole mounted shoe-box type and wall pack HID fixtures on daylight sensors and timers.


Example of existing/new outdoor lighting fixtures

Scope of Work

Outdoor Lighting

The exterior wall-packs and pole-mounted shoebox fixtures are currently high wattage HID lamps. These 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 the 20,000 hours of the existing metal halide lamps.

To retrofit these lights with energy efficient LEDs, the existing ballasts that are in the space behind the light will be removed. Once removed, we will replace them with LED drivers which will use approximately 24V and will not need the existing ballast. The existing lamps are removed and new energy efficient LED

lamps are installed in their place. Replacements or maintenance is not required on these type fixtures for up to 100,000 hours or 15-20 years depending on usage time.

The exterior wall-packs and pole-mounted shoebox fixtures are currently high wattage HID lamps. These 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 the 20,000 hours of the existing metal halide lamps.

To retrofit these lights with energy efficient LEDs, the existing ballasts that are in the space behind the light will be removed. Once removed, we will replace them with LED drivers which will use approximately 24V and will not need the existing ballast. The existing lamps are removed and new energy efficient LED lamps are installed in their place. Replacements or maintenance is not required on these type fixtures for up to 100,000 hours or 15-20 years depending on usage time.

Changes in Infrastructure

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

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 VENDING MISERS

The key benefits of this ECM include:

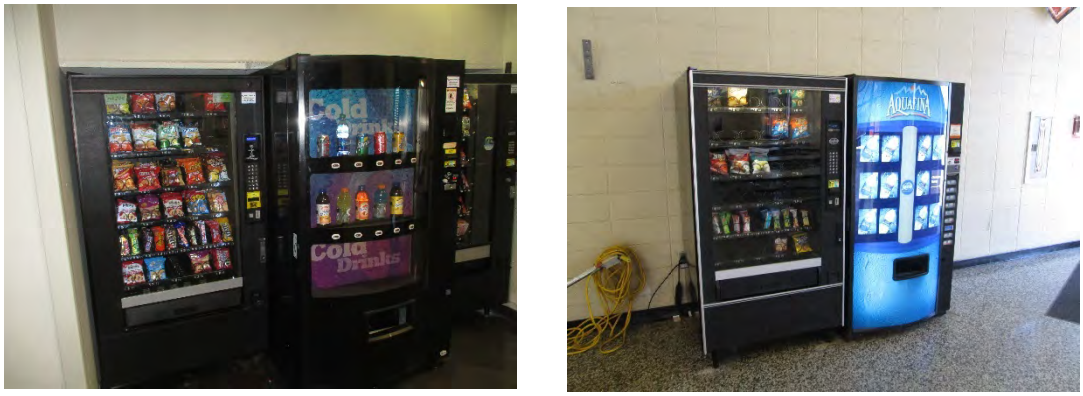
- **Energy savings** by better managing the power consumption of electrical equipment.
- **Longer equipment life** thanks to reduced usage.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
1B Vending Misers	●	●	●

The District has plug loads for equipment such as vending machines at multiple school locations. As such, Honeywell has investigated the use of plug controllers for these areas.

Existing Conditions

Vending machines are located throughout your facilities offering soft drinks to the occupants. A typical cold drink machine consumes over 5,000 kWh annually.



Vending and Snack Machines to be retrofitted with controls

Table 1B.1 Proposed Vending Machines for Vending Miser Controls

Building	Type	Location	Qty
Perth Amboy Campus	Cold Beverage	Cafeteria	1
Perth Amboy Campus	Cold Beverage	Teacher Lounge	1
Perth Amboy Campus	Cold Beverage	Gym	1
Perth Amboy Campus	Snack	Cafeteria	1
Edison Campus	Cold Beverage	Common Area	1
Edison Campus	Snack	Common Area	1
Edison Campus	Snack	Common Area	1
Woodbridge Campus	Cold Beverage	Cafeteria	1
Woodbridge Campus	Cold Beverage	Faculty Lounge	1
Total			9

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 plug load control 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 your facilities, 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	None.
Environmental Regulations	No environmental impact is expected.

ECM 1C DESTRATIFICATION FANS

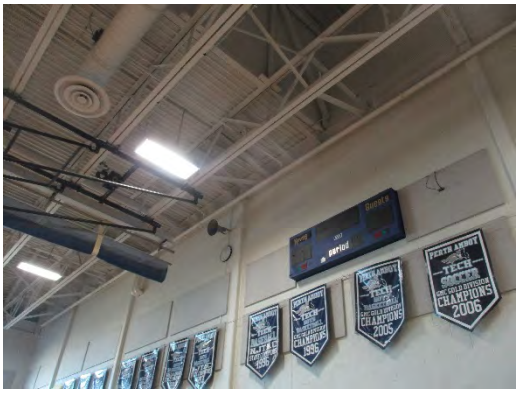
The key benefits of this ECM include:

- **Improved efficiency and energy savings** through more equal distribution of conditioned air space.
- **Increased equipment longevity** due to lower utilization of equipment to condition air.
- **Increased comfort** of occupants to improve productivity of students and teacher.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
1C Destratification Fans	●	●	●

Existing Conditions

Warm air stratifies close to the ceiling in high ceiling areas such as in a gymnasium or auditorium. Elevated levels of heat transfer through the high walls and roof causes elevated heat loss.



Examples of spaces for Destratification Fans

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, it is even greater. That 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 de-stratify the air to a zero 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 area 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.

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

Table 1C.1 Proposed De-Stratification Fans

School	Location	Qty	Type
Perth Amboy Campus	Cafeteria	4	Air Pear 45
Perth Amboy Campus	Auto Shop	3	Air Pear 25
Perth Amboy Campus	Gym	9	Air Pear 25
Woodbridge Campus	Multi-Purpose	3	Air Pear 25
Totals		**19**	

Scope of Work

Per De-Stratification Fan:

- Shut off the main electric power to the area in which the unit(s) will be installed.
- Install new de-stratification fan and wiring.
- Re-energize.
- 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 increase run time of the fan motors.
Waste Production	None.
Environmental Regulations	No environmental impact is expected.

ECM 2A BOILER REPLACEMENTS

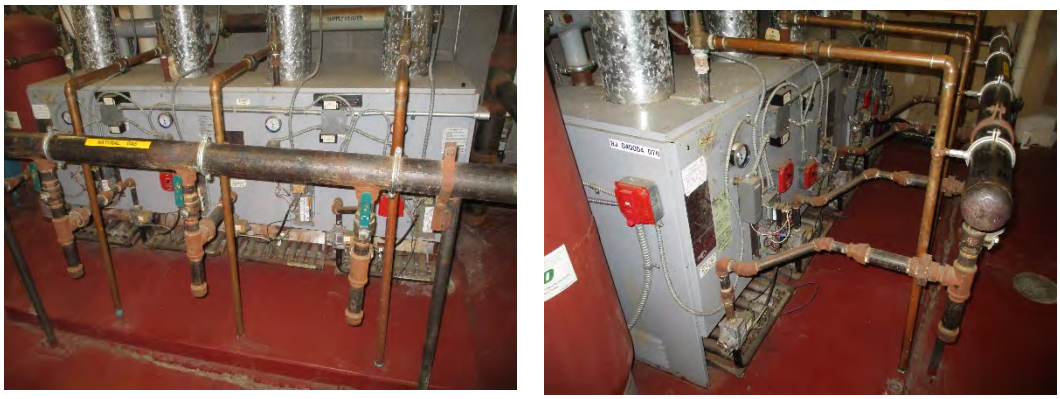
The key benefits of this ECM include:

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

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2A Boiler Replacements		●	

Existing Conditions

The boilers in the District are close to their useful life and are not as efficient as condensing boilers.



Existing Boilers at Edison Campus

Table 2A.1 Existing Boilers to be Replaced

Building	Location	Manufacturer	Model	Qty	Input (MBH)	Fuel
Edison Campus	Boiler Room	Hydrotherm	MR-1200-PV	1	1,200	Natural Gas

Proposed Solution

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency listed 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%.

Table 2A.2 Proposed Boiler Equipment

Building	Location	Manufacturer	Model	Qty	Input (MBH)	Fuel
Edison Campus	Boiler Room	Lochinvar	AWN-501PM	2	500	Natural Gas

Scope of Work

The following outlines the boiler replacement:

- Disconnect gas back to shutoff valve and electric back to source panel-board.
- Remove existing boilers.
- Install new boilers.
- Connect gas and heating hot water appurtenances to new boilers.
- Terminate and power new boiler electric circuiting.
- 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. 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 boiler will be installed in itemized locations; in addition, training for maintenance personnel will be required as well as on-going, annual preventive maintenance.

O&M Impact

The new boilers will decrease the O&M cost significantly 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	Energy savings will result from greater combustion efficiency, reduced maintenance costs 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 (DHW) HEATER REPLACEMENTS

The key benefits of this ECM include:

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

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2B DHW Heater Replacements	●	●	

Existing Conditions

The existing domestic hot water heaters are generally in good condition but are not high-efficiency units.

Existing DHW System to be replaced.

Table 2B.1 Existing Domestic Hot Water Heater Equipment

Building	Manufacturer	Model	Qty	Capacity MBH	Storage (Gal)	Fuel
Edison Campus	Lochinvar	RWN270PM	1	216	200	Natural Gas
Perth Amboy Campus	PVI	1060N250-PV	2	600	250	Natural Gas

Proposed Solution

Honeywell proposes replacing the existing DHW heaters at the above schools with highly efficient condensing DHW heaters. New condensing DHW heaters have efficiencies between 92% - 94%. They provide better control with capabilities as night setback, temperature adjustments and demand control hot water.

Table 2B.2 Proposed Domestic Hot Water Heater Equipment

Building	Manufacturer	Model	Qty	Capacity MBH	Storage (Gal)	Fuel
Edison Campus	PVI	25 L 100A-GCL	1	200	100	Natural Gas
Perth Amboy Campus	PVI	70 L 130A-GCML	2	692	130	Natural Gas

Scope of Work

The following outlines the domestic hot water heater replacement:

- Demolish and remove old water heaters and storage tanks
- Furnish and install condensing gas fired domestic hot water heaters as specified in the table above.
- Install all required piping, controls, and breeching.
- Install mixing valve.
- Install storage tank
- 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 boiler 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	This ECM will produce no waste by-products.
Environmental Regulations	No environmental impact is expected.

Utility Interruptions

Proper phasing procedures will minimize gas interruptions.

ECM 2C ROOF TOP UNIT (RTU) REPLACEMENTS

The key benefits of this ECM include:

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

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2C RTU Replacements	●	●	

Existing Conditions

Some Rooftop Units (RTUs) serving the schools marked above are inefficient or past their useful lives. 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 RTUs in operation.

Table 2C.1 Existing Rooftop Units to be Replaced.

Building	Make	Model	Location Served	Qty.	Tons
Edison Campus	Trane	YCH600AELE2A7M	Building	1	50
Edison Campus	Trane	YCH600AELE2A7M	Building	1	50
Perth Amboy Campus	McQuay	RPS040CLW	C102 Gym Unit	1	40
Perth Amboy Campus	McQuay	RPS040CLW	C103 Gym Unit	1	40
Perth Amboy Campus	McQuay	RPS040CLW	C201 Cafeteria Unit	1	40
Perth Amboy Campus	McQuay	RPS040CLW	C101 C Section First Floor Classrooms/Halls	1	40
Perth Amboy Campus	McQuay	RPS060CLW	B201 Science and Second Floor Hallways	1	60
Perth Amboy Campus	McQuay	RPS060CLW	B101 First Floor Tech Shops	1	60
Perth Amboy Campus	McQuay	RPS040CLW	C202 Kitchen and ARA Supply	1	40
Perth Amboy Campus	Lennox	LGA102HH3G	B103 HVAC Shop	1	8.5
Perth Amboy Campus	Lennox	LGA102HH3G	B104 Auto Shop	1	8.5
Perth Amboy Campus	Lennox	LGC300SH1G	B102 Wood Shop	1	25
Perth Amboy Campus	Lennox	LGA072HH2G	B107 Garage for Loading Dock	1	6
Perth Amboy Campus	Lennox	LGA102HH3G	B105 Electric Shop	1	8.5

Building	Make	Model	Location Served	Qty.	Tons
Perth Amboy Campus	AAON	RK20-3E0750	A102 Main Office	1	20
Total				15	

Proposed Solution

Honeywell proposes replacing the existing rooftop 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 RTUs. 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.

Table 2C.2 Proposed Rooftop Units

Building	Make	Model	Location Served	Qty.	Tons
Edison Campus	Trane	YCH600BE	Building	1	50
Edison Campus	Trane	YCH600BE	Building	1	50
Perth Amboy Campus	Daikin	RPS042DLW	C102 Gym Unit	1	40
Perth Amboy Campus	Daikin	RPS042DLW	C103 Gym Unit	1	40
Perth Amboy Campus	Daikin	RPS042DLW	C201 Cafeteria Unit	1	40
Perth Amboy Campus	Daikin	RPS042DLW	C101 C Section First Floor Classrooms/Halls	1	40
Perth Amboy Campus	Daikin	RPS062DLW	B201 Science and Second Floor Hallways	1	60
Perth Amboy Campus	Daikin	RPS062DLW	B101 First Floor Tech Shops	1	60
Perth Amboy Campus	Daikin	RPS042DLW	C202 Kitchen and ARA Supply	1	40
Perth Amboy Campus	Trane	YZC102	B103 HVAC Shop	1	8.5
Perth Amboy Campus	Trane	YZC102	B104 Auto Shop	1	8.5
Perth Amboy Campus	Trane	YHD300G4	B102 Wood Shop	1	25
Perth Amboy Campus	Trane	YZC072	B107 Garage for Loading Dock	1	6
Perth Amboy Campus	Trane	YZC102	B105 Electric Shop	1	8.5
Perth Amboy Campus	Trane	YHD240G4	A102 Main Office	1	20
Total				15	

* indicates unit included in the financial summary of recommended project

Scope of Work

The following outlines the scope of work to install the units stated in the above table:

- Disconnect existing RTU electric connections.
- Disconnect piping and air ducts from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Run new gas line for gas fired heater. (if required).
- Rigging and setting new 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 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 unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2D SPLIT SYSTEM REPLACEMENT

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption
- **Equipment longevity** due to more efficient and less wasteful equipment utilization
- **Operational savings** from less frequent need to repair or replace key HVAC equipment thanks to less frequent equipment use

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2D Split System Replacements	●	●	

Existing Conditions

Honeywell identified condensing units in some of your buildings as being inefficient and having exceeded 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.

2D.1 Existing Split System Units to be Replaced

Building	Make	Model	Qty.	Tons	SEER
Perth Amboy Campus	EMI	SCC12D	1	1.0	10.5
Perth Amboy Campus	EMI	SCC12D	1	1.0	10.5
Edison Campus	Mitsubishi	PU18EK	1	1.5	10.5

Proposed Solution

Honeywell proposes replacing the existing condensing units 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 building management system.

Table 2D.2 Proposed Split Systems

Building	Make	Model	Qty.	Tons	SEER
Perth Amboy Campus	Trane	4TXK8509A10N0C/ 4MXW8509A10N0C	1	1.0	20.0
Perth Amboy Campus	Trane	4TXK8509A10N0C/ 4MXW8509A10N0C	1	1.0	20.0
Edison Campus	Trane	4TXK8518A10N0C/ 4MXW8518A10N0C	1	1.5	18.0

* indicates unit included in the financial summary of recommended project.

Scope of Work

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

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rigging and setting new 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 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 rooftop unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2E CHILLER REPLACEMENTS

The key benefits of this ECM include:

- **Energy Savings** from reducing total energy consumption.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace key HVAC equipment thanks to less frequent equipment use.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2E Chiller Replacements			●

Existing Conditions

The chillers located throughout the District are in varying conditions based upon age of associated systems. Some of the chillers serving the school distrcit are inefficient and have exceeded their useful 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.

Table 2E.1 Air-cooled Chillers to be Replaced

Building	Qty.	Make	Model	Tonnage	Efficiency (kw/ton)
Woodbridge Campus	1	McQuay	AGZ060	60	1.14
Woodbridge Campus	1	McQuay	AGZ070	70	1.14

Proposed Solution

Honeywell is proposing to replace the existing chillers listed in the table above. The new chillers will be sized for the existing load and be installed at the same location as the existing chiller. Electrical power will be reconnected to the new motors. The new unit will be equipped with factory installed microprocessor controls that improve unit efficiency. The units will also communicate with the existing or enhanced building management system.

Table 2E.2 Proposed Chillers

Building	Qty.	Make	Model	Tonnage	Efficiency (kw/ton)
Woodbridge Campus	1	Trane	CGAM060A	60	0.68
Woodbridge Campus	1	Trane	CGAM070A	70	0.68

Scope of Work

The following outlines the scope of work to install the chiller stated in the above table:

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rigging and setting new unit at the base.
- Inspect piping before reconnecting them to the unit.
- Reconnect piping.
- Repair 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 Energy Savings	Current Chiller Demand – Proposed Chiller Demand.

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.
Environmental Regulations	No environmental impact is expected.

ECM 2F MOTOR AND VFD REPLACEMENTS

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 startup wear.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2F Motor and VFD Replacements	●		●

ECM Overview

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

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:

Table 2F.1 Existing Motor and VFD Replacements

Building	Equipment Description	Qty	Motor HP	Replace Motor Y/N	Add VFD Y/N
Woodbridge Campus	Chilled Water Pumps	2	5.0	Y	Y
Perth Amboy Campus	Water Supply Pump	2	3.0	Y	Y

Proposed Solution

Honeywell identified several of your buildings have pump systems, hydronic systems and the motors that serve them 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 replacing of all above-mentioned single speed standard efficiency motors (that do not have VFDs) with new premium efficiency motors, 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 (if 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 to regulate the speed of the pump according to 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 speed 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. No expansion of the facilities will be necessary.

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 byproducts. Old motors shall be disposed of in accordance with all federal, state, and local codes.
Environmental Regulations	No environmental impact is expected.

ECM 2G KITCHEN HOOD CONTROLS

The key benefits of this ECM include:

- **Reduced energy usage** from improved boiler efficiency thanks to replacement of older equipment.
- **Reduced cleaning costs** thanks to less utilization of existing systems.
- **Lower operational costs** through less frequent maintenance and operational issues.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2G Kitchen Hood Control	●		

Existing Conditions

Many of your kitchens utilize a constant volume kitchen exhaust hood system. This system operates at full load, even when there is no activity in the kitchen. It also requires operating the exhaust fan at full load. This wastes both fan energy and heating energy. When the hood is not utilized, an opportunity exists to reduce airflow and conserve energy.

Proposed Solution

Honeywell recommends installing a microprocessor based controls system whose sensors automatically regulate fan speed based on cooking load, time of day and hood temperature while minimizing energy usage. The system includes a temperature sensor installed in the hood exhaust collar, IP sensors on the ends of the hood that detect the presence of smoke or cooking effluent and VFD that control the speed of the fans. This will result in energy and cost savings, noise reduction, longer equipment life and reduction in cleaning costs.

Table 2G.1 Proposed Existing Kitchen Hoods to be installed with Controllers

Building	EF Name	Interlock	Location	Number of Hoods
Perth Amboy Campus	KEF-1	MUA-1 + Local Switch	Cafeteria Kitchen	1
Perth Amboy Campus	KEF-2	MUA-2 + Local Switch	Cafeteria Kitchen	1
Perth Amboy Campus	KEF-3A	MUA-3 + Local Switch	Classroom Kitchen	1
Perth Amboy Campus	KEF-3B	MUA-3 + Local Switch	Classroom Kitchen	1
Perth Amboy Campus	KEF-4A	MUA-4 + Local Switch	Classroom Kitchen	1
Perth Amboy Campus	KEF-4B	MUA-4 + Local Switch	Classroom Kitchen	1

Building	EF Name	Interlock	Location	Number of Hoods
Perth Amboy Campus	KEF-5	Local Switch	Classroom Kitchen	1
Total				7

Scope of Work

- Install a temperature sensor in the hood to monitor temperature of the exhaust gas.
- Install a set of two photo sensors on the sides to monitor smoke density across the hood.
- Install a control panel with a small point controller and a set of relays in the kitchen close to the hood.
- Provide electric wiring from the new panel to the sensors, exhaust fan motor as well as to the closest electric panel for power supply.
- Provide connection to the BMS system for remote monitoring, control, and alarming. This system could also be stand-alone to save on cost.
- Commission control components and sequences, and calibrate control loops.

Sequence of operation will enable the exhaust fans when either temperature or smoke density in the range hoods is above a pre-set value. Time delays between start and stop will be programmed to prevent motor short cycling. Schedule programming could be implemented as well.

Energy Savings Methodology and Results

The savings approach is based upon reducing the amount of conditioned air that is being exhausted when there is no cooking taking place.

Changes in Infrastructure

There will be improvements in HVAC equipment and controls for not operating fans continuously.

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 2H REFRIGERATION CONTROLS

The key benefits of this ECM include:

- **Energy Savings** from reducing total energy consumption.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace equipment thanks to less frequent equipment use.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2H Refrigeration Controls	●		

Existing Conditions

In many refrigeration, walk-in freezers and coolers, the compressor is oversized and cycles on/off frequently. This compressor cycling results in higher energy consumption and may reduce the life of the compressor.


Typical Walk-In Freezer and Refrigerators

Table 2H.1 *Existing Walk-In Refrigerator/Freezers to be installed with Controllers*

Building	Location	Walk-In Refrigerators	Walk-In Freezers
Perth Amboy Campus	Classroom Kitchen	1	-
Perth Amboy Campus	Classroom Kitchen	-	1
Perth Amboy Campus	Cafeteria Kitchen	1	-
Perth Amboy Campus	Cafeteria Kitchen	-	1

Existing Walk-In Refrigerator/Freezers to be Installed with Controllers

Proposed Solution

Honeywell will install a controller refrigeration sensor manufactured by Intellydyne at the above-mentioned buildings to reduce the compressor cycles of the kitchen walk-in coolers and freezers. The installation of this ECM will have no negative impact on system operation or freezing of food products. By reducing the cycling, the sensor 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 kitchen walk-in coolers and freezers and will extend the operating life of the compressor. Consequently, the compressor will not have to be replaced as often.

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 2I WINDOW UNIT REPLACEMENT

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption
- **Equipment longevity** due to more efficient and less wasteful equipment utilization
- **Operational savings** from less frequent need to repair or replace key HVAC equipment thanks to less frequent equipment use

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2I Window Unit Replacements			●

Existing Conditions

Honeywell identified Window AC units in some of your buildings as being inefficient and having exceeded 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.

Table 2I.1 - Existing Window AC Units

Building	Make	Location Served	Qty.	Tons	SEER
Woodbridge Campus	Friedrich	Offices	1	1.5	12.0
Woodbridge Campus	Friedrich	Offices	1	1.5	12.0
Woodbridge Campus	Friedrich	Offices	1	1.5	12.0
Woodbridge Campus	Friedrich	Offices	1	2.0	12.0
Woodbridge Campus	Friedrich	Offices	1	2.0	12.0
Woodbridge Campus	Friedrich	Offices	1	2.0	12.0
Woodbridge Campus	Friedrich	Offices	1	1.5	12.0
Woodbridge Campus	Friedrich	Offices	1	1.5	12.0

Proposed Solution

Honeywell proposes replacing the existing condensing units 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 building management system.

Table 2I.2 Proposed Window AC Units

Building	Make	Location Served	Qty.	Tons	SEER
Woodbridge Campus	Friedrich	Offices	1	1.5	16.4
Woodbridge Campus	Friedrich	Offices	1	1.5	16.4
Woodbridge Campus	Friedrich	Offices	1	1.5	16.4
Woodbridge Campus	Friedrich	Offices	1	2.0	16.2
Woodbridge Campus	Friedrich	Offices	1	2.0	16.2
Woodbridge Campus	Friedrich	Offices	1	2.0	16.2
Woodbridge Campus	Friedrich	Offices	1	1.5	16.4
Woodbridge Campus	Friedrich	Offices	1	1.5	16.4

Scope of Work

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

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rigging and setting new 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 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 rooftop unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2J MULTI-ZONE VRF SYSTEM REPLACEMENT

The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace key HVAC equipment thanks to less frequent equipment use.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
2J Multi-Zone VRF System Replacement			●

Existing Conditions

Honeywell identified condensing units in some of your buildings as being inefficient and having exceeded 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.

2J.1 Existing Split System Units to be Replaced

Building	Make	Model	Qty.	Tons	SEER
Woodbridge Campus *	Mitsubishi	PURY-100TMU-A	1	8.5	9.0

Proposed Solution

Honeywell proposes replacing the existing condensing units 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 building management system.

Table 2J.2 Proposed Split Systems

Building	Make	Model	Qty.	Tons	SEER
Woodbridge Campus*	Trane	4TVR0120B300NB/ 4MXC8524A10N0AA	1	12.0	24.5

* indicates unit included in the financial summary of recommended project.

Scope of Work

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

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove unit from the base.
- Modify base for new unit if necessary.
- Rigging and setting new 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 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 rooftop unit scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 3A BUILDING MANAGEMENT SYSTEM (BMS) UPGRADES

The key benefits of this ECM include:

- **Operational efficiency** thanks to better control and system wide visibility.
- **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	Perth Amboy Campus	Edison Campus	Woodbridge Campus
3A Building Management Control Systems	●	●	●

Honeywell has performed an assessment of the existing temperature controls of MCVTS (Perth Amboy, Woodbridge, and Edison). Upon inspection, it was noted that Perth Amboy and Woodbridge are being controlled by JCI Metasys Proprietary control systems dating to 2002. Edison Academy is controlled by a CM3 system that is running well.

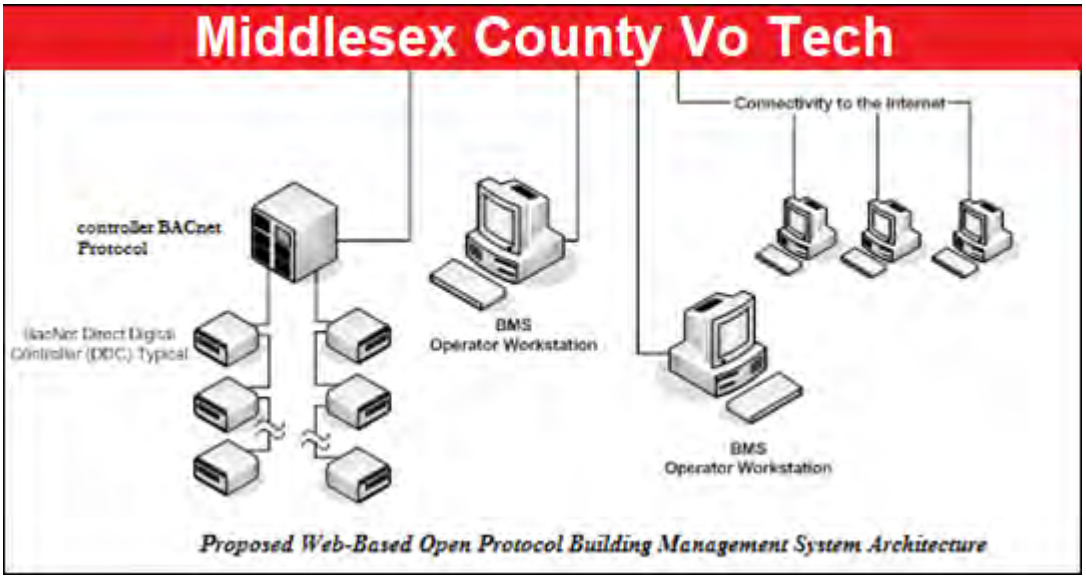
Existing Conditions

Perth Amboy, Woodbridge, and Edison schools are fully automated but do not function as designed and are no longer manufactured as the field controllers are 1-2 generations old. Many the mechanical equipment is in mechanical rooms, on the roofs of the buildings or in the attic areas. The buildings contain the following equipment but are not limited to roof top units (RTUs), air handler units (AHUs), heating ventilation units (HVs/UVs), hot water boilers, chillers, condensing units, and exhaust fans (EFs).

Proposed Conditions

Honeywell proposes to establish a consistent web-enabled BMS for MCVTS that will utilize the latest technology in building automation. The BMS shall communicate over the District's local area network (LAN) via the industry standard BACnet open protocol. Existing vintage DDC and electronic HVAC controls shall be upgraded to the latest an open protocol BACnet direct digital controllers and connected to the existing Honeywell Enterprise Building Integrator (EBI) building automation system which is controlling MCVTS East Brunswick High School.

Honeywell proposes to integrate and control equipment that are standalone and simultaneously leverage the existing systems and replace legacy controllers as needed to maximize the energy savings. In addition, three dimensional graphical representations of all connected heating, ventilating and air conditioning equipment shall be provided to allow for intuitive control, monitoring, and scheduling of all systems. Operators shall be capable of system control and/or monitoring from any local computer or smart devices via a standard internet connection. The open protocol based system provides and delivers smarter buildings and enterprise systems through the integration of things. The Result? Improved business efficiency, greater control, and faster decision making.



MCVTS Typical Local BMS Network Topology

Operational and Maintenance Impact

Upgrading and consolidating all HVAC controls under one system will result in the following benefits to MCVTS.

1. Minimize time for the maintenance department to troubleshoot problems by allowing operators to investigate and resolve facility issues at any computer connected either locally or remotely (from home) to the IT network.
2. Ensure a comfortable and productive learning environment for patrons and staff by improving the HVAC controls through technology enhancements and repairs.
3. Minimize unexpected disruptions to the buildings by notifying operators of problematic and/or inefficient system operation prior to irrevocable equipment failures.
4. Eliminate unnecessary energy consumption by individually scheduling equipment operation based on real-time space occupancy status, holiday, and summer schedules.
5. Reduce building heating, ventilating and air conditioning repair costs by providing operators with direct access to information used in the troubleshooting process.
6. Identify opportunities for improvement and prioritize repairs based on energy benchmarking data available through advanced reporting and trending capabilities.
7. Mobile access to approve personnel on and off campus to the systems.

Application and Control Programs

Outcome Based Analytics

Outcome Based Analytics is Honeywell's smart big data solution, helping you to save and make money through better decision making and improve the quality of life for those who live and work inside the building(s).

With the power to digitise the way mechanical services are carried out, Outcome Based Analytics provides facilities managers and other key stakeholders with a better view of their asset health and reduces total cost of ownership through significant savings on capital expenditure and operating

expenses. Outcome Based Analytics is an option that is available for MCVTS as part of an overall BMS strategy and platform.

Night Setback and Setup

Design and implementation of a more aggressive setback and setup schedule will help to further eliminate energy waste in each of your buildings by utilizing an optimal start/stop schedule.

Set Point Optimization

Honeywell will help deliver temperature uniformity by calibrating thermostats to the same set point, thereby achieving optimum comfort for your occupants by reducing the occurrence of hot and cold spots. We will also help you to reduce energy waste caused when adjacent areas cause your systems to overcompensate due to running in different operating modes.

Heating/Cooling Mode Selection

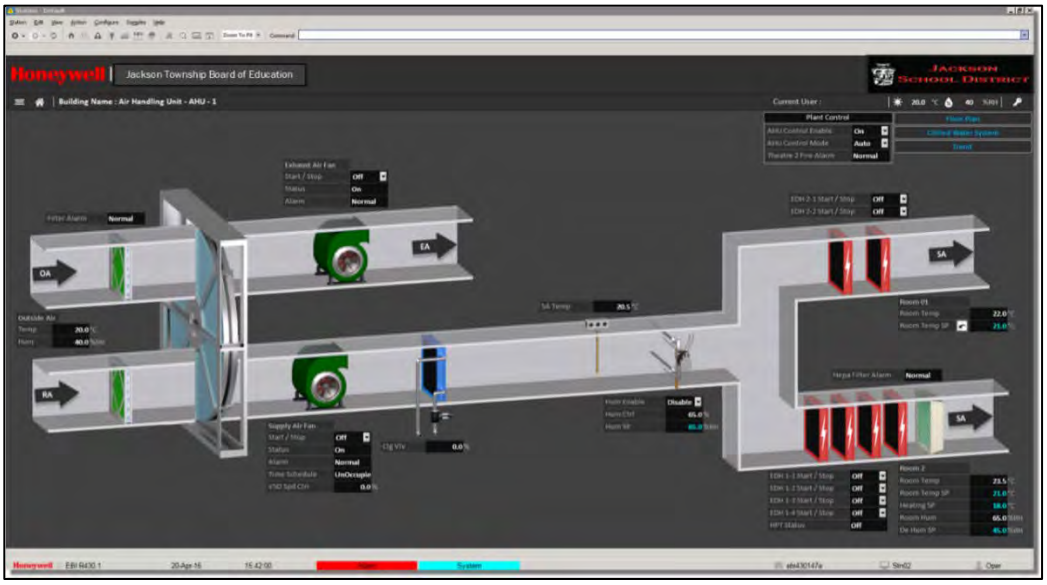
A modern, state of the art BMS can make real time decisions about the heating and cooling needs of any of your buildings. Honeywell will help you establish optimal system configurations to ensure that your buildings are always in optimal settings to deliver a more comfortable space and reduce energy waste.

Optimal Start/Stop

Honeywell understands that equipment start times are typically set to run earlier than normal to ensure optimal comfort is maintained during hot and cold weather seasons. We will work with staff to ensure that optimal start and stop features are fully utilized to optimize occupancy comfort and eliminate energy waste.

Remote Access

Facility managers will be able to login in to their BMS system from anywhere via their smartphone or iPad/Tablet or other internet enable devices. This added granular view will allow them to verify existing conditions and effectively manage their alarms and critical conditions and take steps to remediate the situation.



Sample BMS Graphic

Scope of Work

1. Perth Amboy Campus

1.1 BMS

Existing State

a. Existing JCI Metasys.
b. Six (6) N30 plant controllers with VAV controllers for classroom VAVs & DX9100 controllers for RTUs, AHUs, H&Vs & boilers.
    1. N30 Lan A Sec A 1st Floor: 20 VAVs, 3 DX9100
    2. N30 Lan B Sec A 2nd Floor: 30 VAVs, 1 UNT
    3. N30 Lan C Sec B 1st Floor: 20 VAVs, 7 DX9100, 2 UNT
    4. N30 Lan D Sec B 2nd Floor: 20 VAVs, 1 DX9100, 2 UNT (smoke dampers RTU 201)
    5. N30 Lan E Sec CA 1st Floor: 18 VAVs, 6 DX9100, 2 UNT
    6. N30 Lan F Sec C 1st Floor: 27 VAVs, 5 DX9100, 1 UNT (smoke dampers)

Proposed State

a. Honeywell proposes to expand the existing Honeywell EBI system that currently controls the East Brunswick campus to control the Perth Amboy campus.
b. Replace the six (6) JCI N30 plant controllers with Honeywell BACnet compatible plant controllers.
c. Remote access via computers, laptops, and mobile devices.
d. Ability to view and control each school from anywhere in the district via the EBI system.
e. Establish a common communication platform throughout the entire District.
f. Replace older equipment to maximize the energy savings.
g. Generate 3-dimensional graphical representation of all connected heating, cooling, ventilating, and air conditioning equipment to allow for intuitive control and monitoring of all systems.

1.2 Roof Top Units

- A101 Aaon (media center):
- A102 (faculty & admin area):
- A103 (faculty & admin area):
- B102 (auto):
- B103 (construction & technology areas)
- B104 (construction & technology areas)
- B105 (construction & technology areas)
- B106 (construction & technology areas)
- B107 (construction & technology areas)
- A201 (various areas)
- B101 (various areas)
- B201 (various areas)
- C101 (various areas)
- C201 (various areas)
- C102 (gym area)
- C103 (gym area)

Existing State

a. RTU units are controlled by JCI DX9100 & UNT controllers.
b. Some of the units contain both supply fan and return fan.

c. RTUs control various shops, admin area, gym etc.

Proposed State

a. Install new BACnet controllers to control the RTUs.
b. Establish connectivity between the RTU controllers and the network controller.
c. Generate a 3-dimensional graphical representation of the equipment allowing building operators to monitor and adjust operating parameters of the AHU.
d. Establish an equipment run schedule based on the actual building usage.

Benefits

a. **Occupancy Impact:** Improved space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space temperature setpoint and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide BMS.

1.3 Heating Aerco Hot Water Boiler (Typical of 5)

Existing State

a. Hot water boilers are controlled by an old JCI DX-9100 controller.

Proposed State

a. Install new open protocol BACnet controller to control and monitor the hot water boilers.
b. Control and monitor system start/stop and status.
c. Install and control VFD drives for the pumps if applicable.
d. Generate 3-D graphical representation of the boilers to monitor and control the units.
e. Create equipment schedule based on the school's hours of operation.

Benefits

a. **Student Impact:** Improve space temperature and ventilation control ensuring a comfortable learning environment.
b. **Electrical Impact:** Reduce electrical consumption by de-energizing the fan when the space is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing space heating temperature setpoints when the space is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the district-wide building automation system. Reduce repair duration and class disruptions associated with hot and cold calls by providing building operators with the means to view room conditions from a BAS workstation, which allows for remote troubleshooting and issue resolution.

Heat Recovery Unit (Typical of 2)

Existing State

a. HRU 1 & HRU 2 (boys & girls' locker room) units are controlled by JCI unitary controllers.

Proposed State

a. Install new open protocol BACnet controller.
b. Establish connectivity between the new BACnet controllers and the new network controller.
c. Create 3-D representation of the new systems to allow for intuitive control and monitoring.
d. Establish equipment runtime.

Benefits

a. **Occupancy Impact:** Improve space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space temperature set point and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide building management system.

1.4 Kitchen Exhaust & Make-Up Air Units (Typical of 4)

Existing State

a. MAU 1-4 (kitchen) units are controlled by JCI DX9100 controllers.

Proposed State

a. Install new open protocol BACnet controller.
b. Establish connectivity between the new BACnet controllers and the new network controller.
c. Create 3-D representation of the new systems to allow for intuitive control and monitoring.
d. Establish equipment runtime.

Benefits

a. **Occupancy Impact:** Improved space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space temperature set point and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide building management system.

1.5 Variable Air Volume Boxes (Typical of 120)

Existing State

a. VAV A-101 to A120; A-201 to A-230; B-101 to B-120; B-201 to B-220; C-103 to C-118; C-201 to C-222 units are controlled by JCI VAV controllers.

Proposed State

a. Install new open protocol BACnet VAV controller.
b. Establish connectivity between the new BACnet controllers and the new network controller.
c. Create 3-D representation of the new systems to allow for intuitive control and monitoring.
d. Establish equipment runtime.

Benefits

a. **Occupancy Impact:** Improved space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space temperature set point and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide BMS.

1.6 Exhaust Fans

Existing State

a. Exhaust fans are controlled by old JCI controllers.
b. Other are either manually start/stop or run continuously.

Propose State

a. Incorporate exhaust fan command start/stop and status into the network controller.
b. Generate 3-D graphical representation of the exhaust fan allowing building operators to schedule operating hours.

Benefits

a. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the district-wide building automation system.
b. **Electrical Impact:** Reduce electrical consumption by de-energizing the fan when the space served is unoccupied.

2. Woodbridge Academy

2.1 BMS

Existing State

a. Existing JCI Metasys Win98/NT system (not functioning).
b. Two (2) N30 plant controllers with DX9100 controllers for AHUs, boilers, & chillers.

Proposed State

a. Honeywell proposes to expand the existing Honeywell EBI system that currently controls the East Brunswick campus to control the Woodbridge Academy as well.
b. Replace the two (2) JCI N30 plant controllers with Honeywell BACnet compatible plant controllers.
c. Remote access via computers, laptops, and mobile devices.
d. With the ability to view and control each school from anywhere in the district via the EBI system.
e. Establish a common communication platform throughout the entire District.
f. Replace older equipment to maximize the energy savings.
g. Generate 3-dimensional graphical representation of all connected heating, cooling, ventilating, and air conditioning equipment to allow for intuitive control and monitoring of all systems.

2.2 Air Handler Unit 1-6 (Typical of 6)

Existing State

a. AHU units are controlled by older JCI DX9100 controllers.

Proposed State

a. Install new open protocol BACnet controllers to control the respective AHU.
b. Replace existing sensors that are incompatible with the new BACnet controllers.
c. Establish connectivity between the AHU controller and the network controller.
d. Generate a 3-dimensional graphical representation of the equipment allowing building operators to monitor and adjust operating parameters of the AHU.
e. Establish an equipment run schedule based upon the actual building usage.

Benefits

a. **Occupancy Impact:** Improved space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space. temperature set point and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
d. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide BMS.

2.3 Air Cooled Chilled Water Systems (McQuay Typical of 2)

Existing State

a. Water cooled chillers are controlled by a JCI DX9100 controller.
b. Comprises of chiller with 2 Pumps.

Proposed State

a. Install new open protocol BACnet controller to control and monitor the chilled water system.
b. Control and monitor system status, alarm, and enable.
c. Install and control VFD drives for the pumps if applicable.
d. Generate 3-D graphical representation of the boilers to monitor and control the units.

e. Create equipment schedule based on MCVTS hours of operation.

Benefits

a. **Student Impact:** Improve space temperature and ventilation control ensuring a comfortable learning environment.
b. **Electrical Impact:** Reduce electrical consumption by de-energizing the fan when the space is unoccupied.
c. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the district-wide building automation system. Reduce repair duration and class disruptions associated with hot and cold calls by providing building operators with the means to view room conditions from a BAS workstation, which allows for remote troubleshooting and issue resolution.

2.4 Heating Hot Water Boiler/How Water System

Existing State

a. Two (2) boilers & two (2) pumps are controlled by JCI DX-9100 controller.
b. Three (3) Benchmark hot water boilers & two (2) pumps are controlled by JCI DX-9100 controller.

Proposed State

a. Install new open protocol BACnet controller to control and monitor the hot water boilers.
b. Control and monitor system start/stop and status.
c. Install and control VFD drives for the pumps if applicable.
d. Generate 3-D graphical representation of the boilers to monitor and control the units.
e. Create equipment schedule based on the school's hours of operation.

Benefits

d. **Student Impact:** Improve space temperature and ventilation control ensuring a comfortable learning environment.
e. **Electrical Impact:** Reduce electrical consumption by de-energizing the fan when the space is unoccupied.
f. **Natural Gas Impact:** Reduce natural gas consumption by reducing space heating temperature setpoints when the space is unoccupied.
g. **Operational Impact:** Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the district-wide building automation system. Reduce repair duration and class disruptions associated with hot and cold calls by providing building operators with the means to view room conditions from a BAS workstation, which allows for remote troubleshooting and issue resolution.

2.5 Air Handler Unit (Attic area) AHU -1, HRU 1 & 2 & AHU-2

Existing State

a. AHU units are controlled by older JCI DX9100 controllers.

Proposed State

a. Install new open protocol BACnet controllers to control the respective AHU.
b. Replace existing sensors that are incompatible with the new BACnet controllers.

c. Establish connectivity between the AHU controller and the network controller.
d. Generate a 3-dimensional graphical representation of the equipment allowing building operators to monitor and adjust operating parameters of the AHU.
e. Establish an equipment run schedule based upon the actual building usage.

Benefits

a. **Occupancy Impact:** Improved space temperature and ventilation control ensuring a comfortable occupancy environment.
b. **Electrical Impact:** Reduce electrical consumption by increasing cooling space. temperature set point and de-energizing the fan when the space served is unoccupied.
c. **Natural Gas Impact:** Reduce natural gas consumption by reducing heating space temperature set point when the space served is unoccupied.
   Operational Impact: Improve maintenance response times by automatically notifying building operators of system deficiencies on a real-time basis via the Network-wide BMS.

3. Edison

3.1 Existing State

a. CM3 Building Automation appears to be functioning.

Proposed State

a. Integrate existing CM3 system and map points back to Existing EBI System at East Brunswick Facility.

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
	= Reduced BTU x Cost per BTU
Cost of Proposed Heating/Cooling	= Existing Costs – Proposed Costs
Energy Savings $	

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 4A BUILDING ENVELOPE IMPROVEMENTS (BEI)

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** by way of enhanced temperature and humidity control throughout your buildings.
- **Improved building envelope** from addressing building gaps that allow unconditioned air penetration.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
4A 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.

During our building examination, 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.

Honeywell has helped customers, such as 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.

Building Envelope Opportunities

Table 4A.1 Building Envelope Work Scope

School	AC Unit Weatherization (Units)	Caulking (LF)	Door Weather Stripping Doubles (Units)	Door Weather Stripping Singles (Units)	Roll-Up Door Weather Stripping (Units)	Roof-Wall Intersection Air Sealing (LF)	Wall Air Sealing (SF)
Edison Academy		68	2	2		306	630
Perth Amboy Campus			16	8	7		
Woodbridge Campus	11		11	9			
Total Quantity	**11**	**68**	**29**	**19**	**7**	**306**	**630**

Proposed Solution

Roof-Wall Joints

Existing – Buildings throughout the county 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 required by the heating system.

Changes in Infrastructure

Building envelopes 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 WOODBRIDGE GUIDANCE AREA BEI

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** by way of enhanced temperature and humidity control throughout your buildings.
- **Improved building envelope** from addressing building gaps that allow unconditioned air penetration.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
4B Woodbridge Guidance BEI			●

Existing Conditions

The guidance office of the Woodbridge Campus is a partially converted porch which has had issues in the past with heating and cooling of the space. The floor of the porch area is a concrete slab which is uninsulated. The windows are single pane and not efficient. Pre-set zone valves control heating and base board radiators were installed against interior walls and are not effective in tempering outside area leaking through the building envelope exterior.

Building Envelope Opportunities in Guidance office

Table 4B.1 Guidance Office Work Scope

School	Window Replacement (SF)	Radiant Floor Heating
Woodbridge Campus	354	300

Proposed Solution

Windows

Replace single pane low E windows with energy efficient high E double pane windows

Radiant Floor Heat

Install radiant floor heating in outer porch area of office tying into existing heating hydronic system.

Controls

Install thermostat control valves in place of preset zone valves to control radiant flooring and radiant heaters in office.

Benefits

This work will allow for more efficient operation of the area 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 required by the heating system.

Changes in Infrastructure

Building envelopes 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 5A PERMANENT LOAD SHED 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 demand response program.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
5A Permanent Load Reduction	●	●	●

Existing Conditions

Currently the District does not participate in the PJM Demand Response Program. The PJM programs offer the District the ability to respond to capacity emergencies when called upon by PJM, benefit from permanent kW load reductions associated with implementing Energy Efficiency (EE) improvements and general a new revenue stream from participation.

Proposed Solution

Honeywell proposes to continue to utilize a registered Demand Response Curtailment Service Provider (CSP) to provide energy response services to the District. Through the CSP, the District will participate in the PJM Capacity Market Program and PJM Energy Efficiency Program. These programs are offered through the PJM Regional Transmission Organization (RTO), and Independent System Operator (ISO). The Capacity Market Program allows PJM customers the ability to respond to capacity emergencies when called upon by PJM, and the energy efficiency program pays PJM customers for implementing ECMs that result in permanent load reductions during defined hours.

Table 5A.1 Proposed Permanent Load Reduction

Building	Permanent Load Reduction (KW)
Perth Amboy Campus	111.72
Edison Campus	25.75
Woodbridge Campus	44.23
Total	**181.70**

The PJM Energy Efficiency Program

Energy efficiency measures consist of installing more efficient devices or implementing more efficient processes/systems that exceed then-current building codes or other relevant standards. An energy efficiency resource must achieve a permanent, continuous reduction in demand for electricity. Energy efficiency measures are fully implemented throughout the delivery year without any requirement of notice, dispatch, or operator intervention. A demand response resource can reduce its demand for electricity when instructed; this means PJM considers it a “dispatchable resource”. A demand response resource can participate in the RPM market for as long as its ability to reduce its demand continues. A demand response resource must be willing to reduce demand for electricity up to 10 times each year when called for a reduction. In a year without any reduction calls, the demand response resource is required to demonstrate the ability to reduce demand for electricity during a test of reduction capability. Data will be submitted by the demand response resource to prove compliance with reductions from actual calls or reductions from capability tests. An energy efficiency resource is one that reduced their demand for electricity through an energy efficiency measure that does not require any additional action by the consumer.

Energy Savings Methodology and Results

Revenue is generated through participation in the PJM DR 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 SOLAR POWER PURCHASE AGREEMENT (PPA)

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 deliver greater budgetary certainty utilizing clean electricity.
- Additional savings from solar can provide the District with more potential ESIP funding to expand the overall project scope and include additional projects.
- Educational asset to provide additional tools for teachers to engage students on sustainability and the environment.
- Resiliency by way of battery storage potential that can let you operate buildings in island mode during grid disruptions.
- Low risk given that maintenance is provided by the 3rd party system owner. No upfront costs.

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
6A Solar PPA	●	●	●

ECM Overview

Honeywell recommends that the District further assess the feasibility of a solar photovoltaic system on district owned land and buildings to generate 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 solar system's power production is purchased by you for a predetermined price ($/kWh) and for a predetermined period. This stable price for electricity will be lower than the utilities and third party suppliers, thereby allowing you to benefit from cheaper 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 change, helping to deliver greater savings within your ESIP project to help fund other measures.

Examples of Roof Top Solar Installations

Honeywell will oversee the design, construction and help with the operations and maintenance of the system. We will first help conduct a feasibility study during your IGA, in conjunction with your technical

consultant and legal team, to provide RFP development, solicitation and oversight of the installation of a solar photovoltaic system.

Proposed Solution

Honeywell proposes to install the solar PPA system at the buildings listed in the chart below.

Location	Rating - kW-DC
Piscataway Campus	2,400.0

Proposed Solar Arrays

Energy Savings Methodology and Results

Savings are based on the difference in kWh price between the power purchasing agreement and the current electrical supplier.

Changes in Infrastructure

The proposed solar array would be installed at various locations (roof) based on feasibility.

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	This measure will produce no waste by-products.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

ECM 7A HIGH EFFICIENCY TRANSFORMERS

The key benefits of this ECM include:

- **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	Perth Amboy Campus	Edison Campus	Woodbridge Campus
7A High Efficiency Transformers	●		

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.

Typical Transformers

Systems Evaluation and Selection

Typical transformers are not designed to handle harmonic loads of today's modern facilities, and suffer significant losses as a result, 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:

Table 7A.1 Existing Transformers to be Replaced

Building	Tag Number	Location ID	Designation	Qty	kVA
Perth Amboy Campus	57075	Janitor by A-109	T9	1	112.5
Perth Amboy Campus	57076	B116 Maint. Shop	T15	1	15.0
Perth Amboy Campus	57077	A-109	RPA1A	1	75.0
Perth Amboy Campus	57078	B-117	T14	1	112.5
Perth Amboy Campus	57079	B-119	HTS	1	75.0
Perth Amboy Campus	57080	B-122A	BTS	1	45.0
Perth Amboy Campus	57081	B-123	ETS	1	45.0
Perth Amboy Campus	57082	B-123	ETS2	1	75.0
Perth Amboy Campus	57083	B-124	T13	1	112.5
Perth Amboy Campus	57084	By C-153	T6	1	75.0
Perth Amboy Campus	57085	Gym Storage	T5	1	225.0
Perth Amboy Campus	57086	Boiler Rm	MR	1	45.0
Perth Amboy Campus	57087	Boiler Rm	MCB T7	1	150.0
Perth Amboy Campus	57088	ER by C-206-A	T4	1	112.5
Perth Amboy Campus	57089	B-213	T3	1	112.5
Perth Amboy Campus	57090	ER by A-224	T1	1	75.0
Perth Amboy Campus	57091	A-200-B	RPA2B	1	112.5
Total				**17**	

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:

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

Energy Savings Methodology and Results

The energy savings for this ECM is 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 parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 8A WATER CONSERVATION

The key benefits of this ECM include:

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

ECM Description	Perth Amboy Campus	Edison Campus	Woodbridge Campus
8A Water Conservation	●	●	●

Existing Conditions

Honeywell conducted an engineering analysis of all points of water use in the facilities. The domestic water systems (flushing, washing and bathing fixtures) is typically the largest source of savings and provides great potential for improvement of their performance. What often is find during this detailed assessment is that most buildings consume much more water in sinks, toilets and urinals than is necessary. This savings can be realized even in buildings where the toilets and urinals are already "low-flow" design. It is not unusual to find the majority of the fixtures could also operate much more effectively (perform better). Often these systems could be upgraded aesthetically as the chrome/brass piping is in poor condition, or there is a desire to add infrared (hands free) flushing and/or washing.

Typical Water Fixtures

Systems Evaluation and Selection

Our recommended approach for the domestic water systems is to eliminate only unnecessary water consumption by "tuning" (with Variable Flow Technology) each domestic water fixture to the "right" amount of water, thereby creating savings. **The objective is to save utility expense AND increase the performance of your plumbing systems.** Because each fixture will receive individual engineering attention, all infrastructure will perform at (or better than) design levels. As we retrofit a fixture, we replace all "wear" parts, those components that often require maintenance. In doing so, we establish a new "zero baseline" of maintenance. Our recommendations will include replacing existing Flushometer valve bodies as needed for standardization and aesthetics of bathrooms. The following are examples of the proposed strategies to improve the efficiency and performance of toilets, urinals, sink faucets and showers:

Table 8A.1 water fixtures to be retrofitted

Building	Bottle Fill Stations	Lavatory Sinks	General Use Sinks	Flushometer Toilets	Urinals
Woodbridge Campus	4	25	5	35	8
Perth Amboy Campus	6	71	10	49	12
Edison Campus	2	25	2	13	2
Totals	12	121	17	97	22

Scope of Work

Flushometers (Toilets and Urinals):

Benefits of our proposed approach include:

- Increased Performance and Flush-to-Flush Consistency. The first objective is to ensure each fixture operates properly. Our calibration and tuning via Variable Flow Technology will ensure each fixture is using the right amount of water.
- Standardization and Reduce Maintenance Costs. By having only one valve throughout the campus, staff may eliminate the wide variety of replacement components they now have in inventory. Likewise, the replacement of all wear parts will create a new “zero baseline” for future maintenance.

Flushometer Scope

- Valve Recommissioning: Replace diaphragm kit and inner cap. Re- engineering of the new kit will provide the proper flush curve for each fixture.
- Valve Rebuilding: Remove and replace diaphragm kit and inner cap. Re- engineering of the new kit will provide the proper flush curve for each fixture. Replace vacuum breaker, handle assembly and O-Rings.
- New Valve X-Body: Remove and replace the valve body assembly for standardization, aesthetic enhancement and a maintenance baseline.
- Spud and/or Flushtube Replacement: Remove and replace the fixture spuds and flashtubes (optional or as needed).

Tank Toilet Retrofit Upgrade

- Remove and replace the flapper, flow diverter ballcock assembly, and refill tube. As necessary, to ensure proper operation during the warranty period,
- Improved Flushing Effectiveness: all fixtures will operate at the “right” amount of water.
- Establishes New Baseline of Maintenance: all new components will resist the rigors of substantial use. This creates a new “zero baseline” for maintenance and translates into significantly reduced labor and costs for years to come.

Sinks

- Pressure Independent Performance. End-users will enjoy the same level of performance regardless of incoming pressure (flow rate is constant at pressures between 20 and 80 psi). Pressure variations within the facility would be transparent to the end-users.
- Invisible to End-Users. Because we carefully apply the appropriate flow rate and pattern to each sink (based upon sink application), end-users will not realize a decline in performance.

- Long-Life. Because our flow components are robust in their construction, these devices will serve you well for years to come. Furthermore, we protect the longevity of these products by applying tamper-resistant technology.
- One Size Fits All. No longer will you need to stock different aerators for the various faucets within your facility. Rather, because we adapt all faucets to accommodate the same-size flow control device, you need only one size.

Water Fountains

The water fountains were also identified by the staff as being in constant need of repair. It is also noted water fountains consume between 7.8 to 10.8 kWh per week of usage. This is based on a refrigeration cycle time of 60% and a 40-hour occupied week.

The District's existing drinking fountains will be retrofitted with combination water fountain/water bottle fill stations. This measure will help reduce plastic cup and bottle disposal, thereby reducing the amount of waste the school is contributing to landfills.

- Replace existing Refrigerated Water Fountains with Two (2) combination water fountain / bottle fill stations.
- Honeywell recommends retrofitting the drinking fountains with the Elkay EZH2O Model EZWSRK retrofit kit. This unit will provide pure, drinking water at a rate 3 times faster than if filling at a normal drinking fountain. The system is sanitary, no touch, sensor operated with a 20 second shut off timer. Additionally, it provides a laminar flow to minimize splashing and has a “Green Ticker” which counts the quantity of bottles saved from the landfill. Water Savings Methodology and Results.
- The energy savings for this ECM is realized by reduction in water usage by use of more efficient fittings and valves.

Changes in Infrastructure

New fixtures and/or internals 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	Water savings will result from decreased usage due higher efficiency fixtures.
Waste Production	Any removed parts will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

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SECTION D TECHNICAL AND FINANCIAL SUMMARY

1. Recommended ESIP Project

MCVT Project	Recommended ESIP Project
Value of Project	$4,776,591
Term of Repayment	15 Years
Projected Energy, Solar and Operational Savings	$5,711,543
Projected NJ Rebates & Incentives	$250,314
Projected Interest Rate	2.5%

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 the MCVTS use in reviewing available scope combinations and options.

Building by Building Simple Payback Summary (Hard Costs Only)

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

FORM II

ENERGY CONSERVATION MEASUREs (ECMs) SUMMARY FORM
MIDDLESEX COUNTY VOCATIONAL SCHOOL
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	$ 830,685	$ 96,663	8.59
1B Vending Misers	$ 3,207	$ 710	4.52
1C Destratification Fans	$ 56,426	$ 2,594	21.75
2A Boiler Replacements	$ 95,823	$ 1,150	83.31
2B DHW Heater Replacements	$ 124,731	$ 1,628	76.62
2C RTU Replacements	$ 1,404,303	$ 10,900	128.84
2D Multi-Zone VRFSystem Replacement	$ 139,699	$ 123	1,134.99
3A Building Management Control Systems	$ 872,396	$ 102,389	8.52
4A Solar PPA	$ -	$ 146,946	-
5A Permanent Load Reduction	$ -	$ -	-
9A Design Allowance	$ 89,094	$ -	-
0	$ -	$ -	-
Add additional lines as needed* **Project Summary:**	$ 3,616,365	$ 363,103	9.96

Optional ECMs Considered, but not included with base project at this time	Estimated Installed Hard Costs (1) $	Estimated Annual Savings $	Estimated Simple Payback (years)
2E Chiller Replacements	$ 463,288	$ 3,384	136.89
2F Motor and VFD Replacements	$ 250,946	$ 2,575	97.45
2G Kitchen Hood Control	$ 141,517	$ 3,090	45.80
2H Refrigeration Controls	$ 5,702	$ 154	36.92
2I Window AC Unit Replacements	$ 144,332	$ 225	641.93
2J Split System Replacements	$ 25,243	$ 40	624.68
4A Wooddbridge Guidance Office BEI	$ 229,423	$ 374	612.90
4B Building Envelope Improvements	$ 46,513	$ 3,275	14.20
7A Transformers	$ 230,460	$ 13,050	17.66
8A Water Conservation	$ 85,382	$ 5,572	15.32
0	$ -	$ -	-

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

PROJECTED ANNUAL ENERGY SAVINGS DATA FORM
MIDDLESEX COUNTY VOCATIONAL SCHOOL
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)	24,180	$161,364	1,935	$13,258
Electric Energy (KWH)	9,077,722	$1,139,385	2,306,958	$244,284
Natural Gas (therms)	130,673	$109,554	54,641	$44,862
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	2,694			
SO2	5,098			
CO2	3,311,735			

(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

PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs
MIDDLESEX COUNTY VOCATIONAL SCHOOL
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)	30,973	7,871	
Natural Gas (MMBTUs)	13,067	5,464	
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

FINAL COST FORM
MIDDLESEX COUNTY VOCATIONAL SCHOOL
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]:	$3,616,365	
Project Service Fees		
Investment Grade Energy Audit	$54,245	1.50%
Design Engineering Fees	$0	0.00%
Construction Management & Project Administration	$216,982	6.00%
System Commissioning	$27,123	0.75%
Equipment Initial Training Fees	$27,123	0.75%
ESCO Overhead	$361,636	10.00%
ESCO Profit	$180,818	5.00%
Project Service Fees Sub Total	$325,473	9.00%
TOTAL FINANCED PROJECT COSTS:	$4,484,292	24.00%
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)	$0.00	0.00%
Measurement and Verification (Associated w/ Savings Guarantee Option)	$25,000.00	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	$25,000.00	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.

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

*Annual Service only applies if customer accepts energy guarantee.

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

FORM VI

ESCO's FINAL ANNUAL CASH FLOW ANALYSIS FORM
MIDDLESEX COUNTY VOCATIONAL SCHOOL
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 and

1. Term of Agreement: **15** (Years) (Months)
2. Construction Period [2] (months): **12**
3. Cash Flow Analysis Format:

Engineering Fees	$	292,299
Project Cost Form V	$	4,484,292
Project Cost [1]:	**$**	**4,776,591**

Interest Rate Used for Proposal Purposes: **2.5%**

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
Installation	$ 46,637	$ 44,084		$ 11,250	$ 101,971	$ -	$ -	$ -	$ 101,971
1	$ 155,457	$ 146,946	$ 60,699	$ 202,481	$ 565,584	$ (561,784)	$ (586,784)	$ (25,000)	$ 3,800
2	$ 158,967	$ 150,179	$ 60,699	$ 25,318	$ 395,163	$ (391,363)	$ (391,363)	$ -	$ 3,800
3	$ 162,556	$ 153,483	$ 60,699	$ 5,633	$ 382,371	$ (378,571)	$ (378,571)	$ -	$ 3,800
4	$ 166,227	$ 156,860	$ 60,699	$ 5,633	$ 389,418	$ (385,618)	$ (385,618)	$ -	$ 3,800
5	$ 169,980	$ 160,311	$ 60,699	$ -	$ 390,990	$ (387,190)	$ (387,190)	$ -	$ 3,800
6	$ 173,818	$ 163,838		$ -	$ 337,656	$ (333,856)	$ (333,856)	$ -	$ 3,800
7	$ 177,743	$ 167,442		$ -	$ 345,185	$ (341,385)	$ (341,385)	$ -	$ 3,800
8	$ 181,757	$ 171,126		$ -	$ 352,883	$ (349,083)	$ (349,083)	$ -	$ 3,800
9	$ 185,862	$ 174,890		$ -	$ 360,752	$ (356,952)	$ (356,952)	$ -	$ 3,800
10	$ 190,059	$ 178,738		$ -	$ 368,797	$ (364,997)	$ (364,997)	$ -	$ 3,800
11	$ 194,351	$ 182,670		$ -	$ 377,022	$ (373,222)	$ (373,222)	$ -	$ 3,800
12	$ 198,741	$ 186,689		$ -	$ 385,430	$ (381,630)	$ (381,630)	$ -	$ 3,800
13	$ 203,230	$ 190,796		$ -	$ 394,026	$ (390,226)	$ (390,226)	$ -	$ 3,800
14	$ 207,820	$ 194,994		$ -	$ 402,814	$ (399,014)	$ (399,014)	$ -	$ 3,800
15	$ 212,514	$ 199,284		$ -	$ 411,798	$ (408,002)	$ (408,002)	$ -	$ 3,796
Totals	$ 2,785,718	$ 2,622,329	$ 303,495	$ 250,314	$ 5,961,857	$ (5,802,890)	$ (5,827,890)	$ (25,000)	$ 158,967

3rd P4P Rebate	$	177,163
Total Cash Flow	$	336,130

NOTES:
(1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
(2) No payments are made by MIDDLESEX COUNTY VOCATIONAL SCHOOL 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.

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BUILDING BY BUILDING SIMPLE PAYBACK SUMMARY (HARD COSTS ONLY)

Building & ECM	kWh Savings ($)	kW Savings ($)	Natural Gas Savings ($)	Fuel Oil Savings ($)	Water Savings ($)	Annual Energy and Operational Cost Savings ($)	Annual Operational Savings ($)	Net Cost ($)	Simple Payback
Edison Campus	**$ 19,825**	**$ 3,088**	**$ 4,885**	$ -	$ -	**$ 31,795**	**$ 3,998**	**$ 677,937**	**18.9**
1A LED Lighting	$ 8,690	$ 1,502	$ (56)	$ -	$ -	$ 14,133	$ 3,998	$ 99,927	5.5
1B Vending Misers	$ 152	$ -	$ -	$ -	$ -	$ 152	$ -	$ 1,069	7.0
2A Boiler Replacements	$ -	$ -	$ 1,150	$ -	$ -	$ 1,150	$ -	$ 95,823	83.3
2B DHW Heater Replacements	$ -	$ -	$ 137	$ -	$ -	$ 137	$ -	$ 41,577	302.6
2C RTU Replacements	$ 5,634	$ 1,586	$ -	$ -	$ -	$ 7,219	$ -	$ 376,754	52.2
3A Building Management Control Systems	$ 5,349	$ -	$ 3,654	$ -	$ -	$ 9,003	$ -	$ 62,786	7.0
Perth Amboy Campus	**$ 59,007**	**$ 7,442**	**$ 24,648**	$ -	$ -	**$ 130,821**	**$ 39,724**	**$ 2,339,903**	**13.7**
1A LED Lighting	$ 32,701	$ 6,538	$ (268)	$ -	$ -	$ 58,696	$ 19,724	$ 560,658	7.1
1B Vending Misers	$ 328	$ -	$ -	$ -	$ -	$ 328	$ -	$ 1,426	4.3
1C Destratification Fans	$ (247)	$ -	$ 2,500	$ -	$ -	$ 2,253	$ -	$ 47,517	21.1
2B DHW Heater Replacements	$ -	$ -	$ 1,490	$ -	$ -	$ 1,490	$ -	$ 83,154	55.8
2C RTU Replacements	$ 2,777	$ 904	$ -	$ -	$ -	$ 3,681	$ -	$ 1,027,549	279.2
3A Building Management Control Systems	$ 23,448	$ -	$ 20,926	$ -	$ -	$ 64,374	$ 20,000	$ 619,599	7.3
Piscataway Campus	**$ 146,946**	$ -	$ -	$ -	$ -	**$ 146,946**	$ -	$ -	**0.0**
6A Solar PPA	$ 146,946	$ -	$ -	$ -	$ -	$ 146,946	$ -	$ -	0.0
Woodbridge Campus	**$ 18,506**	**$ 2,729**	**$ 15,328**	$ -	$ -	**$ 53,540**	**$ 16,977**	**$ 509,431**	**7.2**
1A LED Lighting	$ 14,225	$ 2,729	$ (97)	$ -	$ -	$ 23,834	$ 6,977	$ 170,100	5.5
1B Vending Misers	$ 229	$ -	$ -	$ -	$ -	$ 229	$ -	$ 713	3.1
1C Destratification Fans	$ (48)	$ -	$ 389	$ -	$ -	$ 341	$ -	$ 8,909	26.1
2J Multi-Zone VRFSystem Replacement	$ 123	$ -	$ -	$ -	$ -	$ 123	$ -	$ 139,699	1135.0
3A Building Management Control Systems	$ 3,976	$ -	$ 15,037	$ -	$ -	$ 29,013	$ 10,000	$ 190,010	4.9
Project Total	$ 244,284	$ 13,258	$ 44,862	$ -	$ -	$ 363,103	$ 60,699	$ 3,527,271	8.3

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 in order 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 $9M 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.

Honeywell has determined that MCVTS is eligible for **$462,197** in estimated total incentives for the projects. This includes **$404,948** in the NJ Clean Energy Pay for Performance Program, **$22,531** for Permanent Load Reduction Incentives and **$34,720** in Prescriptive Lighting Savings.

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

P4P Incentives

	P4P Incentives			
Description	**1st Incentive**	**2nd Incentive**	**3rd Incentive**	**Total Incentive**
Perth Amboy Campus	$11,250	$196,848	$196,848	$404,946
Edison Campus	$0	$0	$0	$0
Woodbridge Campus	$0	$0	$0	$0
East Brunswick Campus	$0	$0	$0	$0
Piscataway Campus	$0	$0	$0	$0
TOTALS	**$11,250**	**$196,848**	**$196,848**	**$404,946**

Permanent Load Reduction Incentives

	Permanent Load Reduction Incentives			
Description	**1st Year Incentive**	**2nd Year Incentive**	**3rd Year Incentive**	**4th Year Incentive**
Permanent Load Reduction Incentives	$5,633	$5,633	$5,633	$5,633

Prescriptive Lighting Incentives

	Prescriptive Lighting Incentives			
Description	**1st Year Incentive**	**2nd Year Incentive**	**3rd Year Incentive**	**4th Year Incentive**
Perth Amboy Campus	$0			
Edison Campus	$12,720			
Woodbridge Campus	$22,000			
TOTALS	**$34,720**			

Total Rebates and Incentives

	Total Rebates and Incentives			
Year	**P4P Incentives**	**Permanent Load Reduction Incentives**	**Prescriptive Lighting Incentives**	**Total Incentives**
Installation	$11,250			$11,250
Year 1	$196,848	$5,633	$34,720	$237,201
Year 2	$196,848	$5,633		$202,481
Year 3		$5,633		$5,633

Year	Total Rebates and Incentives			
	P4P Incentives	Permanent Load Reduction Incentives	Prescriptive Lighting Incentives	Total Incentives
Year 4		$5,633		$5,633
TOTALS	**$404,947**	**$22,531**	**$34,720**	**$462,198**

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), MCVTS may authorize a lease purchase agreement between MCVTS and a financier. Ownership of the equipment or improved facilities will pass to MCVTS 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 MCVTS 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 MCVTS. Payments are typically scheduled to commence after the construction is complete and acceptance of the project has been received by MCVTS. Typically, payment terms are structured so there is no up-front capital expense to MCVTS 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, if 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.

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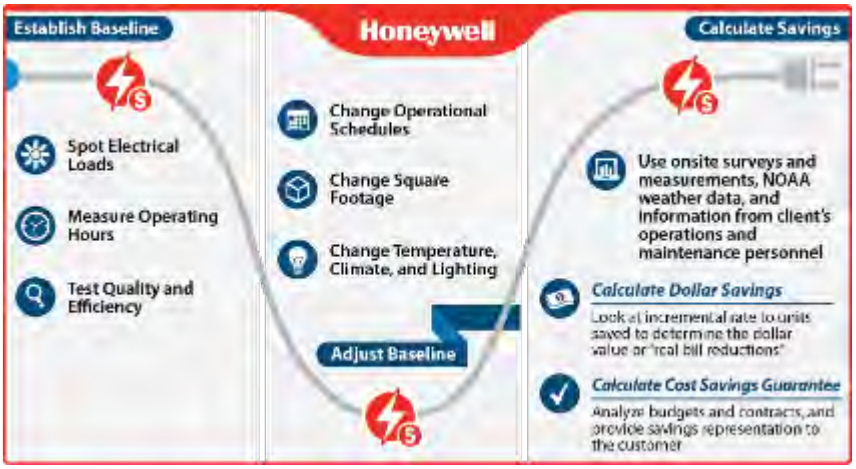
SECTION E MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

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 effected 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. A summary of some of the methods, which will be used by Honeywell to establish baselines and support, calculated savings are listed below.



1. Spot measurements of electrical loads such as lighting, fan and pump motors, chillers, electric heat, etc.
2. Measurement of equipment operating hours using electric data recorders.
3. 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.
4. Spot measurement for boiler efficiencies, water use.
5. Running measurements of chiller operation, including simultaneous measurement of input kWh or steam flow, and chilled water supply and return temperatures and flow (gpm).
6. 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's maintains a significant inventory of metering equipment utilized by its auditors and Energy Engineers to ascertain critical data about the operation of the facility.

Typically, Honeywell's auditors use the following equipment for their onsite measurements:

1. Recording and instantaneous power and harmonic analyzers.
2. Data loggers for pressures, temperatures, flow rates, humidity and CO_2.
3. Lighting level and recording profile/run-hour and occupancy meters.
4. Multimeters, hand held kW meters.
5. Combustion analyzers.
6. Ultrasonic flow meters.
7. 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 of 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 each project, in detail, for the anticipated savings and never hesitates to reduce the anticipated energy calculations where experience dictates necessary. The result is a coupled project where the final savings are equal to or greater than anticipated.

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 MCVTS will establish the base rates that will act as "floor" rates in calculating the savings. These are usually the rates that are in effect at the time of the start of the contract or rates used for audit estimated savings.

2. Adjustment to Baseline Methodology[1]

Honeywell's methodology 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

[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 an independent engineering.

measurement and verification MCVTS requires and the needs of MCVTS 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 MCVTS free to make future changes to the building or systems without affecting the savings agreement. It also necessitates fewer provisions for making adjustments to the baseline.

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

1. Changes in the number of days in the annual review cycle.
2. Changes in the square footage of the facilities.
3. Changes in the operational schedules of the facilities.
4. Changes in facility indoor temperatures.
5. Significant changes in climate.
6. Significant changes in the amount of equipment or lighting utilized in the facility.

Examples of situations where the baseline needs to be adjusted are: i) changes in the amount of space being air conditioned, ii) changes in auxiliary systems (towers, pumps, etc.) and iii) changes in 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 and 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/ft^2 and Btu/ft^2 to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

3. Energy Savings Calculations

In calculating energy savings, Honeywell's highly experienced audit staff uses onsite 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:

1. Local weather data.
2. Utility bills and sub-metered consumption trends.
3. Utility rate structure.
4. Facility use and occupancy data.
5. Internal equipment loads.
6. Interviews of operations and maintenance staff and management.
7. Building construction, age, use and layout.
8. Schematics of energy and water distribution systems.
9. Identification and inventory of HVAC equipment.
10. Identification and inventory of process equipment.
11. Design, configuration and operating characteristics of HVAC systems.

12. Design, configuration and operating characteristics of process systems.
13. Control strategies and sequences of operation for HVAC and other process equipment.
14. Identification and count of all lighting fixtures and determination of power consumption for each type.
15. Identification and inventory of lighting control methods.
16. Measurement of foot-candle levels at sample locations.
17. Power quality and harmonics, power factor.
18. 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 MCVTS will establish the base rates that will act as "floor" rates in calculating the savings. These are usually the rates that are in effect at the time of the start of the contract or rates used for audit estimated savings.

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

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 MCVTS 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 existing the MCVTS budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell will analyze the information to provide a conservative savings representation for the MCVTS review and acceptance. The information will include all calculations and assumptions.

4. Measurement & Verification

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 MCVTS agree on a mutually acceptable methodology for measuring and verifying energy savings that are attributable to the 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 and Verification Protocol (IPMVP). Our approach to M&V is directly consistent with, and in compliance with, the IPMVP. This protocol provides a framework for the most widely accepted and used M&V methods by the industry.

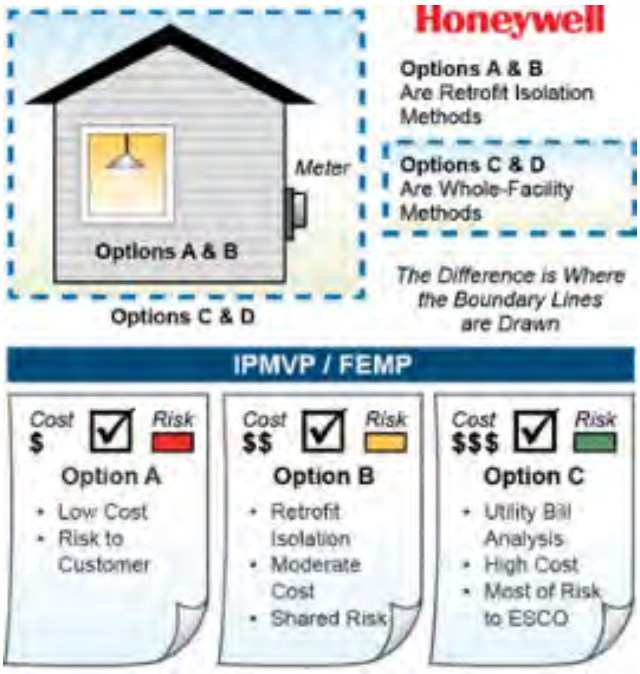
Engineering calculations of energy and cost savings for the project are based on operating parameters (such as weather, temperature settings, run hours, occupancy patterns, and space usage) and equipment performance characteristics. The M&V plan uses the operating parameters established in the baseline 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 MCVTS 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 the District to adapt to the demands of future campus growth and changes without the need for MCVTS and Honeywell to negotiate energy baseline adjustments.

Our typical M&V plan will utilize broadband Internet access to the appropriate MCVTS control interfaces to both 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 District 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 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 that have 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 on-going measurements to quantify energy use; such as the use of VSDs 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 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 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 or 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/verify 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 verification will be conducted by both Honeywell and the District 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. 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 by using the same methodology as described in the detail M&V plan for each ECM. The start and the completion time for each ECM must be agreed to between Honeywell and MCVTS.

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 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 calculating the

savings. Thermal savings are tied to the electrical savings in the manner described in the detail M&V plan. The results are extrapolated to cover all the VFDs installed by Honeywell. The savings for each of the monitored VFD is calculated on an interval basis.

5. Site Specific M&V Plan

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 1A – LED Lighting	Upgrade Lighting systems: Re-lamp/Re-ballast T-8 to LED New Fixtures 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 Option C: Thermal energy savings based on utility data	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 – Vending Misers	Install Vending machine energy management devices	Option A: Pre-and Post-measurements Line by Line scope and engineering calculations	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 1C - De-Stratification Fans	Install De-Stratification fans in Gymnasiums, Cafeterias and Auditoriums to minimize stratification of hot air and maintain hot air flow below the fan level	Option C: Thermal energy savings based on utility data	Pre-M&V: Verify parameters used in engineering calculations with equipment name plate data and savings assumptions
ECM 2A – Boiler Replacements	Replace boilers in select locations in kind to handle base load	Option C: Thermal energy savings based on utility data	Pre-M&V: Verify parameters used in engineering calculations with equipment name plate data and savings assumptions
ECM 2B – Domestic Hot Water Replacements	Replace existing domestic hot water heater with condensing natural gas domestic hot water heater	Option C: Thermal energy savings based on utility data	Pre-M&V: Verify parameters used in engineering calculations with equipment name plate data and savings assumptions
ECM 2C - Rooftop Unit Replacement	Replace antiquated Roof Top Units with new high	Option A: Engineering calculations based on nameplate and manufacturer	Pre-M&V: Verify manufacturer provided data for existing unit efficiency (SEER) Post M&V: Verify manufacturer provided data for new condensing unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
	efficiency VFD equipped Rooftop Units	supplied data for the existing and replacement units	
ECM 2D– Split System Replacements	Replace Split systems at various building 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 Chiller unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2E- Chiller Replacements	Replace Chillers 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 (kW/ton) Post M&V: Verify manufacturer provided data for new Chiller unit (kW/ton) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2F - Motors and VFD Replacements	Install VFDs on hot water and chilled water pumps to operate the pump motors in response to the system load. Replace antiquated motors with new premium efficiency motors	Option A: Engineering calculations for VFD 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 chiller efficiency (kW/ton) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2G - Kitchen Hood Controls	Install control devices on the Kitchen hoods to control exhaust air in response to the cooking load. Replace fan motors with new premium efficiency motors and VFD drives	Option A: Engineering calculations for s following affinity laws. Engineering calculations based on nameplate, manufacturer supplied data and operating hours for the existing and replacement motors Option C: Thermal energy savings based on utility data	Pre-M&V: Verify manufacturer provided data for the motor 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
ECM 2H – Refrigeration Controllers	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 contract

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 2I –Window AC Unit Replacements	Replace/Refurbish antiquated Window AC 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 condensing unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
ECM 2J – Multi-Zone VRF System Replacements	Replace Split systems at various building 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 Chiller unit (SEER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
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: Thermal energy savings based on utility data	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
ECM 4A - Building Envelope Improvements (BEI)	Install weather stripping on doors, seal roof wall joints and roof penetrations	Option A: Electric energy savings - Engineering calculations based on programmed parameters. Option C: Thermal energy savings based on utility data	Pre-M&V: None Post M&V: Savings stipulated based on engineering calculations for the term of contract
ECM 4B – Woodbridge Guidance Office BEI	Install weather stripping on doors, seal roof wall joints and roof penetrations	Option A: Electric energy savings - Engineering calculations based on programmed parameters. Option C: Thermal energy savings based on utility data	Pre-M&V: None Post M&V: Savings stipulated based on engineering calculations for the term of contract

ECM # and Name	Summary of ECM	Measurement and Verification Methodology / Recommendation	Description of M&V – Pre and Post Process
ECM 5A – Permanent Load Reduction	Savings from KW demand reduction	N/A	Pre-M&V: N/A Post M&V: N/A
ECM 6A – Solar PPA	Install roof mounted solar PV arrays	N/A	Pre-M&V: Utilize baseline kWh consumption determine kWh produced Post M&V: Measure and Provide a report of the kWh generated
ECM 7A – High Efficiency Transformers	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 8A – Water Conservation	Install high efficiency water fixtures	Option A: Engineering calculations based on increase in water usage efficiency and lower flow rates	Pre-M&V: None Post M&V: Savings stipulated based on engineering calculations for the term of contract

6. Guarantee of Savings

The approach that Honeywell utilizes in this asset management program includes two key components: a performance guarantee and financial savings. Honeywell guarantees the District 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 the District expects.

Honeywell also guarantees it will meet the objectives mutually defined with the District. Honeywell takes its commitment to partner with MCVTS for the life of the contract seriously, 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 NJ ESIP legislation. The basis of an energy performance contract is that much of the risk is shifted from the District to the ESCO. The strength of the Guarantee is only as good as the Company backing it and their financial solvency. With over $41.8 Billion in assets, Honeywell has the financial strength and background to support the District for the long term.

Savings Guarantee: With the understanding that MCVTS 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 MCVTS. A first-party guarantee eliminates the risk on the District and places it directly onto Honeywell.*** This differs from some other ESCO's who provide a third-party guarantee, which insulates them from the owner using insurance instruments.

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

For all equipment covered by the Energy Savings Guarantee, MCVTS shall be responsible for on-going maintenance and component replacement in accordance with manufacturer's standards. The District 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 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 NJ ESIP legislation, acceptance of a performance guarantee is optional at MCVTS sole discretion. In the same way, the duration of the guarantee is also optional. Many of Honeywell's NJ customers have elected to keep the guarantee in force for less than the total performance periods, i.e. three (3) to five (5) years. Others have elected to accept a one (1) 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 unique organization. The key point is that 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 the District does elect to accept a guarantee, NJ 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 the District.

The RFP requires that the cost of the guarantee be identified during this response phase. 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 the District opts to accept the Savings Guarantee, the fee indicated on Form V in Section H-1 will be applicable to account for on-going Honeywell service costs incurred during the M&V of the savings.

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, all services are required to be bid by MCVTS for services as desired. 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 MCVTS 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 MCVTS 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 MCVTS 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 lunches and learn sessions.
7. Establish dedicated, site-specific emergency stock of spare parts to ensure prompt replacement of critical components. These will be stored in a secure location with controlled access.

Configuration Management

1. Update documentation and software archives with any minor changes to software made 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:
2. Check for PC errors on boot up
3. Check for Windows errors on boot up
4. Check for software operations and performance, responsiveness of system, speed of software
5. Routinely backup system files, on an annual basis:
6. Trend data, alarm information and operator activity data
7. Custom graphics and other information
8. Ensure disaster recovery procedures are updated with current files
9. Clean drives and PC housing, on an annual basis:
10. Open PC and remove dust and dirt from fans and surfaces
11. Open PC interface assemblies and remove dust and dirt
12. Clean and verify operation of monitors.
13. Verify printer operation, check ribbon or ink.
14. Initiate and check log printing functions.
15. Verify modem operation (if applicable).
16. 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 Shut-down

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

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. 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. Adjust 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. Adjust as required.
3. Check condensate pan and drain.
4. Check operating conditions. Adjust as required.
5. Log all operating data.

Seasonal Shut-down *

1. Shut down per manufacturer's recommendations.

* If no Shut-down is required then (2) 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 Shut-down

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

SECTION F DESIGN APPROACH

In accordance with the ESIP PL 2012, c.55 as part of the implementation process, an agreement between MCVTS and Honeywell will determine the energy conservation measures (ECM's) 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 the MCVTS 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 in Appendix 5.

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 NJ delivering ESIP projects with results that meet or exceed expectations.

Honeywell will demonstrate our partnership-based commitment to MCVTS throughout the development and delivery of your ESIP project, as we have done for dozens of other K-12 school districts throughout NJ under the ESIP Law. Our approach is backed by our references and 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: IGA
- Phase 2: Project Implementation
- Phase 3: Commissioning and Training
- Phase 4: Energy Savings Guarantee Period

The IGA will commence with a kickoff meeting between key project stakeholders of MCVTS and Honeywell to review the ESIP Process, including the expectations of both parties during the IGA, audit parameters, reporting methods, building access protocols, availability of utility, and building data. 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.

A. IGA DEVELOPMENT PROCESS

Our IGA development process includes the following steps:

Step 1: Discovery

The first step of your IGA is to gain a thorough comprehension of MCVTS key priorities and requirements. Honeywell will work with you to identify what your key needs and goals include and investigate your buildings and systems with that in mind during this step.

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

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

Honeywell will schedule site visits to commence at the earliest convenience. Utility data is a key component used for 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 serve to provide the means for our engineers to complete their calculations. Data required for this step includes 24 months of electric, thermal, 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.

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. Your project will have a dedicated team consisting of project management and engineering who have helped deliver similarly sized project under ESIP in recent past.

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 MCVTS 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 ESIP project scope, by analyzing all aspects of your energy consumption to deliver an optimal project scope based on realistic savings potential. Our unique collaborative approach ensures that we deliver on your expectations while providing for turnkey solutions that are cost effective.

Step 3: Cost and Savings Forecasting

Honeywell will then move on to analyze and quantify your unique savings guarantee utilizing MCVTS 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. This will help to 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 will leverage our experience delivering more than two dozen NJ ESIP projects since 2009 to help MCVTS 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 (HGF), will work to ensure that you 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:

B. 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 1980's, 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 over 400 projects and over $500 Million in project investment.

C. PROJECT MANAGEMENT POLICY: HONEYWELL'S COMMITMENT TO HEALTH, SAFETY, THE ENVIRONMENT, AND SCHOOL

All of Honeywell's Project Management Plans begin with Safety. By integrating health, safety, and environmental considerations into all aspects of our business, we help 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 customers' needs and our business objectives.

Our Safety Commitment to 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 our customers to protect and safeguard our construction sites, our employees, sub-contractors, your staff, and most of all your children.

Our projects all begin with the following steps:

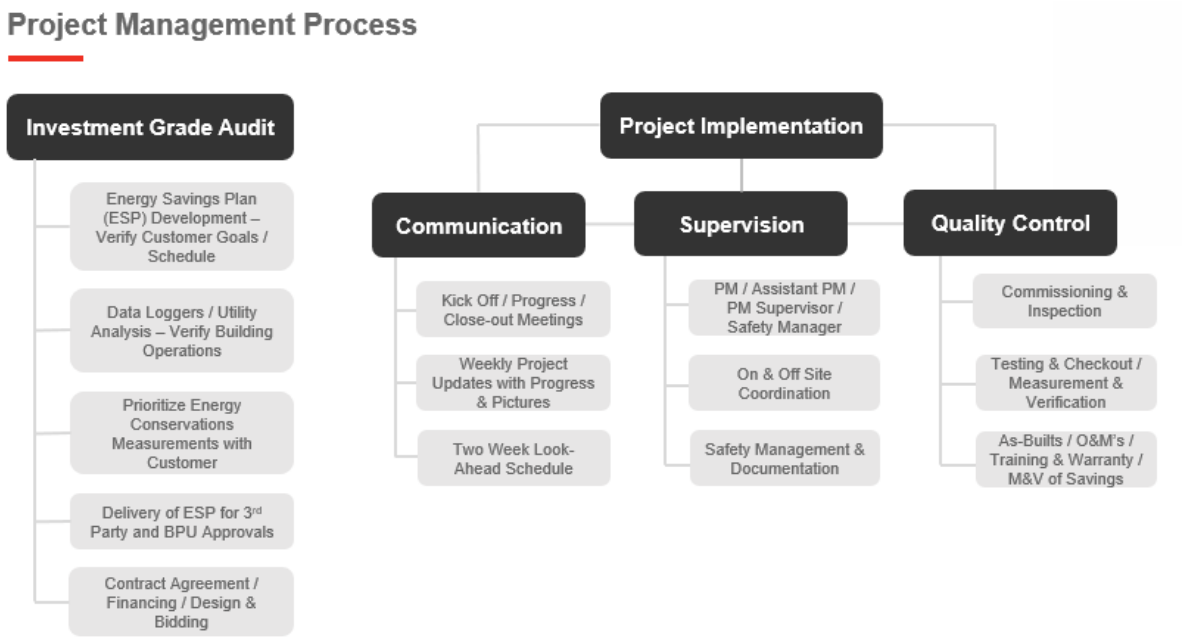
- Safety training for employee's and sub-contractors.
- Detailed work schedules around the school day.
- Detailed background checks of personnel.
- Detail logs of sub-contractor personnel.
- On-Site logs of time sheets, contact information for all personnel.
- Clearly displayed identification badges of all construction personnel.
- On-site daily supervision of all sub-contractors.
- Detailed and weekly reviews of accident reports and remediation strategy.

Our Safety Commitment to Our Customers and Employees

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.

D. PROJECT MANAGEMENT PROCESS



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

A Honeywell Project Management Plan defines plans 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. This begins by designating one of our project managers to be responsible for keeping the customer abreast of the status of the project.

As the facilities improvements portion of the partnership begins, the Project Manager serves as a single focal point of responsibility for all aspects of the partnership. The Project Manager monitors labor, material, and project modifications related to the District/Honeywell partnership and makes changes to ensure achievement of performance requirements in the facilities modernization component. The Project Manager regularly reviews the on-going process of the project with the customers.

The Project Manager will develop and maintain effective on-going contact with the District and all other project participants to resolve issues and update project status.

There are several challenges in this position. The Project Manager must staff the project and create a work force 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, Bob Letso, will sit down with your administrative and building staff to outline the ECMs that we will be installing in your building. We will discuss proper contractor protocol of checking in and out of the buildings daily, wearing identifiable shirts, 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 success factor in any construction management plan, and our project manager will be the key focal point during the installation process.

Our team will prevent schedule slippages 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 prior to the scheduled date of delivery. Our thorough survey, evaluation, and analysis of existing conditions, performed prior to the commencement of construction, will also prevent schedule slippages.

Honeywell is required to subcontract various portions of our projects to local contractors. Within the District project, all subcontractors will be selected in accordance with NJ public contracts law. Typical areas that are subcontracted are as follows:

- Electrical Installation.
- Water Conservation (Plumbing).
- HVAC Installation (depends upon the project size and scope).
- Associated General Contracting specialty items to support the project etc., (ceilings, windows, concrete, structural steel, roofing, demolition and removal of equipment, painting and rigging).

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.

Approval of subcontractors that Honeywell proposes to use lies with the District.

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 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.

Prior to District acceptance of 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 District 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, the District will be required to secure the services of a 3rd 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 the District. However, at the option of the District, 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. Listed in tables following this section are standards for building design. 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.

In the case of fluorescent lighting upgrades, we recommend that a group re-lamping of lamps be done approximately five years after the initial installation depending upon run times. Your building facility staff, on an as needed basis, can complete normal routine maintenance of lamps and ballasts. This maintains the quality of the lighting levels, and color rendering qualities of the lamps.

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 MCVTS 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.

Regarding ventilation, Honeywell will upgrade ventilation to meet current standards in those areas where our scope of work involves upgrades to or replacement of systems providing building ventilation. We generally will not upgrade ventilation in those areas where our work doesn't involve the upgrade or replacement of systems or equipment providing ventilation to a building or facility.

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 of the disciplines that would apply to MCVTS:

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	●	●
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	●	

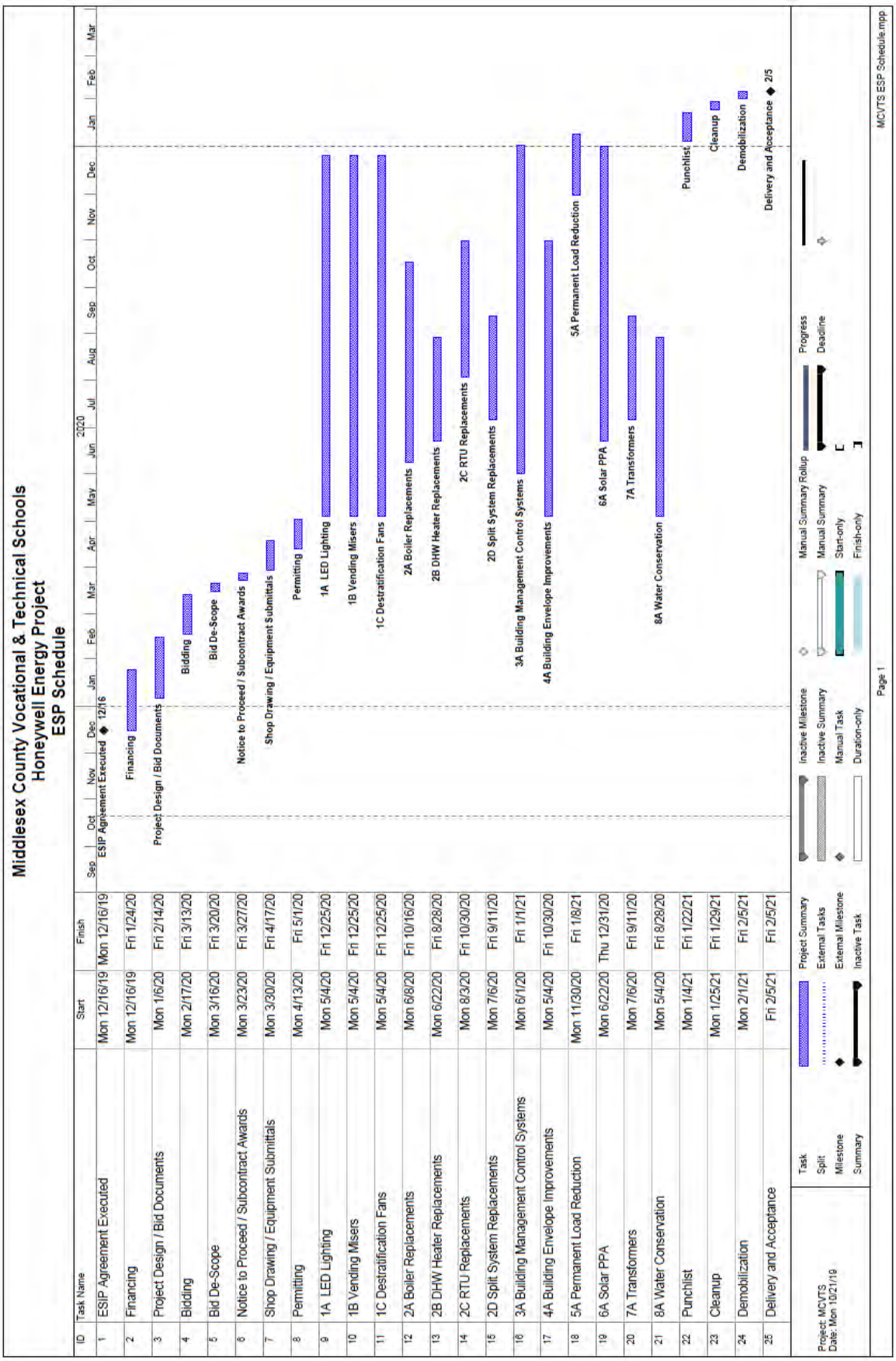
6. Hazardous Waste Disposal or Recycling

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 MCVTS. Honeywell will work with MCVTS to review your hazardous material reports, and will identify the areas where work will be completed so that MCVTS 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 MCVTS 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.

7. Implementation Schedule

Attached please find a sample schedule for construction and completion of the Project.


Middlesex County Vocational & Technical Schools
Honeywell Energy Project
ESP Schedule
ID
Task Name
Start
Finish
1 ESIP Agreement Executed Mon 12/16/19 Mon 12/16/19
2 Financing Mon 12/16/19 Fri 1/24/20
3 Project Design / Bid Documents Mon 1/6/20 Fri 2/14/20
4 Bidding Mon 2/17/20 Fri 3/13/20
5 Bid De-Scope Mon 3/16/20 Fri 3/20/20
6 Notice to Proceed / Subcontract Awards Mon 3/23/20 Fri 3/27/20
7 Shop Drawing / Equipment Submittals Mon 3/30/20 Fri 4/17/20
8 Permitting Mon 4/13/20 Fri 5/1/20
9 1A LED Lighting Mon 5/4/20 Fri 12/25/20
10 1B Vending Misers Mon 5/4/20 Fri 12/25/20
11 1C Destratification Fans Mon 5/4/20 Fri 12/25/20
12 2A Boiler Replacements Mon 6/8/20 Fri 10/16/20
13 2B DHW Heater Replacements Mon 6/22/20 Fri 8/28/20
14 2C RTU Replacements Mon 8/3/20 Fri 10/30/20
15 2D Split System Replacements Mon 7/6/20 Fri 9/11/20
16 3A Building Management Control Systems Mon 6/1/20 Fri 1/1/21
17 4A Building Envelope Improvements Mon 5/4/20 Fri 10/30/20
18 5A Permanent Load Reduction Mon 11/30/20 Fri 1/8/21
19 6A Solar PPA Mon 6/22/20 Thu 12/31/20
20 7A Transformers Mon 7/6/20 Fri 9/11/20
21 8A Water Conservation Mon 5/4/20 Fri 8/28/20
22 Punchlist Mon 1/4/21 Fri 1/22/21
23 Cleanup Mon 1/25/21 Fri 1/29/21
24 Demobilization Mon 2/1/21 Fri 2/5/21
25 Delivery and Acceptance Fri 2/5/21 Fri 2/5/21
Project: MCVTS
Date: Mon 10/21/19
Task
Split
Milestone
Summary
Project Summary
External Tasks
External Milestone
Inactive Task
Inactive Milestone
Inactive Summary
Manual Task
Duration-only
Manual Summary Rollup
Manual Summary
Start-only
Finish-only
Progress
Deadline
Page 1
MCVTS ESP Schedule.mpp
ESIP Agreement Executed 12/16
Financing
Project Design / Bid Documents
Bidding
Bid De-Scope
Notice to Proceed / Subcontract Awards
Shop Drawing / Equipment Submittals
Permitting
1A LED Lighting
1B Vending Misers
1C Destratification Fans
2A Boiler Replacements
2B DHW Heater Replacements
2C RTU Replacements
2D Split System Replacements
3A Building Management Control Systems
4A Building Envelope Improvements
5A Permanent Load Reduction
6A Solar PPA
7A Transformers
8A Water Conservation
Punchlist
Cleanup
Demobilization
Delivery and Acceptance 2/5
2020
Dec
Jan
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APPENDIX 1 INDEPENDENT ENERGY AUDITS

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APPENDIX 2 ECM CALCULATIONS

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APPENDIX 3 CUTSHEETS

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APPENDIX 4 SAFETY MANAGEMENT PLAN

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