

ORANGE TOWNSHIP PUBLIC SCHOOL DISTRICT ENERGY SAVINGS PLAN THROUGH AN ENERGY SAVINGS IMPROVEMENT PROGRAM

February 28, 2023

PREPARED FOR:

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Honeywell

HONEYWELL PROPRIETARY

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

Budgetary Proposal

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

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

Equitable Extension of Time

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

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SECTION A

EXECUTIVE SUMMARY

SECTION A – EXECUTIVE SUMMARY

Thank you for choosing to engage Honeywell to develop an Energy Savings Plan for the Orange Township Public School District (the District).via you Omnia Co-op Membership.

It is understood that in order to remain compliant with the services of the COOP for the Orange Township Public School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc.

During the development of the Energy Savings Plan, Honeywell has completed a thorough investment grade energy audit of the Orange Township Public buildings and grounds. Based on the audit findings and Honeywell's extensive experience in working with school districts, we can confidently state this plan can identify a project that is financially viable in a comprehensive manner to address the District's facility concerns and goals.

This Energy Savings Plan includes projects that achieve energy and operational efficiencies, create a more comfortable and productive environment and are actionable via the New Jersey Energy Savings Improvement Program (NJ ESIP) in accordance with NJ PL2012, c.55.

ESIP Project Specifics

- Model type: ESCO Model
- Architect of Record: To be Confirmed
- Engineer of Record: To be Confirmed
- Financial Advisor: Phoenix Advisors, LLC, Sherry Tracy
- Independent Auditor of the ESP: DLB Associates, Scott Gowers
- Bond Counsel: WILENTZ

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:

- 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

Additionally, the use of Omnia Cooperative in the selection of Honeywell is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- An organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use.”
- In the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit’s bid threshold.”
- The national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires that if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires that a contracting unit can use national cooperatives only when the contracting unit determines “that the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered.”
- The LFN states that if using an online ordering system, local officials must put “appropriate internal controls” in place to ensure that purchases are documented and that an audit trail exists
- Per the LFN, the Orange Township BOE must verify that the selected vendor complies with applicable New Jersey procurement documentation requirements. The following required and other forms can be found in **Appendix 5** of this document:
 - New Jersey Business Registration Certificate for the contractor and any subcontractors (i.e., copy of certificate)
 - Statement of Corporate Ownership (an original form prepared for the contracting agency awarding the contract)
 - Public Contract EEO Compliance (Employee Information Report form or proof of participation in a federally approved affirmative action program)
 - Non-collusion Affidavit

The purpose of this document is to provide all the information required for the Orange Township Public School District to determine the best path forward in the implementation of a District-Wide NJ ESIP Project. It is important to note that the Energy Savings Plan provides a comprehensive evaluation of ALL potential ECMs within the District. This 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.

This 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 the Orange Township Public School District buildings included in the Energy Savings Plan. It provides an overview of the current usage and a cost per square foot by building of utility expenses.

The report also compares the Orange Township Public School District’s 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 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 the Orange Township Public School District are identified for the purposes of potential inclusion in the program. Final selected ECMs are to be determined solely by the Orange Township Public School District and the financial goals outlined within the ESIP program to be self-funding within existing budget guidelines. The sample ECM selections and preliminary financials are based on the selections noted in Form II in the Technical and financial summary.
- D. Technical and Financial Summary** – This section includes an accounting of all technical and financial outcomes associated with the ECMs as presented. The 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 19-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.

Appendices 1-6 – The following files have been uploaded to a Teams Folder once reviewed will be provided on a USB drive to be included with our final submission:

- **Appendix 1** — Local Government Energy Audits
- **Appendix 2**— ECM Calculations
- **Appendix 3**— Equipment Cut Sheets
- **Appendix 4**— Lighting Line By Line
- **Appendix 5**— Required Forms & Omnia Cooperative / NJ Procurement Documentation

BENEFITS

The measures investigated in this Energy Savings Plan could result in an annual utility savings of 4,982,010 kWh of electricity and 108,080 therms. Additionally, these energy savings will result in a net reduction of greenhouse gases and will reduce the school district’s carbon footprint by 2,084 MTE of CO2 annually. This is equivalent to removing 440 cars from the road annually and /or 1,973 forested acres per year. All these savings are achieved while improving the classroom environment and renewing many items that have been in service beyond useful life expectancy.

Overall, it is evident that the Orange Township Public School District 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 appreciate the opportunity to provide the District with this guideline to improve the comfort and efficiency of your facilities through the successful implementation of this Energy Savings Plan should the district decide to move forward with a project.



SECTION B

PRELIMINARY UTILITY ANALYSIS (PUA)

SECTION B –PRELIMINARY UTILITY ANALYSIS (PUA)

Honeywell

Preliminary Utility Analysis

Orange BOE
City of Orange, 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 Envelope
- 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)

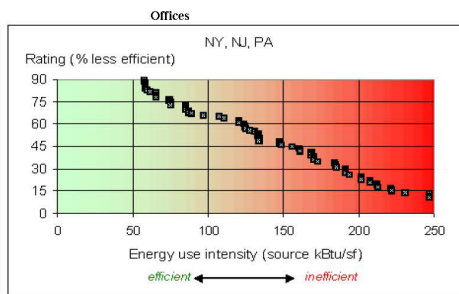
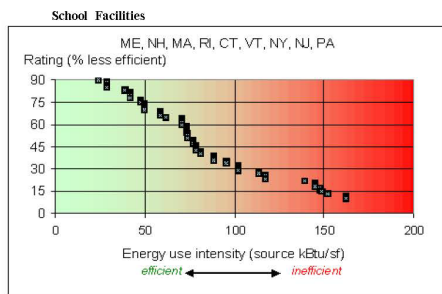
Energy Benchmarking

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. 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 Natural Gas Use (Therms)	Annual Total Non-Electrical Fuel Oil Use (Gal)	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	Administrative Offices	459,005	15,476	0	21,000	148	300	5%
2	Bell Stadium Warehouse, Garage and Field Hous	59,663	36	2,829	7,600	79	133	20%
3	Central Elementary School	174,802	28,583	0	52,400	66	89	30%
4	Forest Street Community School	299,576	21,791	0	56,400	57	94	30%
5	Heywood Avenue School	339,699	22,637	0	64,600	53	89	30%
6	Orange High School and Prep Academy	2,064,175	125,617	0	246,169	80	138	15%
7	John R. Lewis Early Childhood Center	98,065	15,476	0	11,944	158	214	5%
8	Lincoln Avenue School	1,596,398	29,262	0	129,854	64	150	15%
9	Oakwood Ave Community School	312,808	37,611	0	74,100	65	94	30%
10	Orange Early Childhood Center	128,269	7,256	0	19,203	61	107	30%
11	Park Avenue School	798,534	41,788	0	103,193	67	121	20%
12	Rosa Parks Community School	1,028,033	45,619	0	84,700	95	179	5%
13	Scholars Academy	45,508	16,469	0	37,000	49	57	70%
14	STEM Academy of Orange	164,812	1,387	13,382	43,300	59	86	35%
		7,569,347						



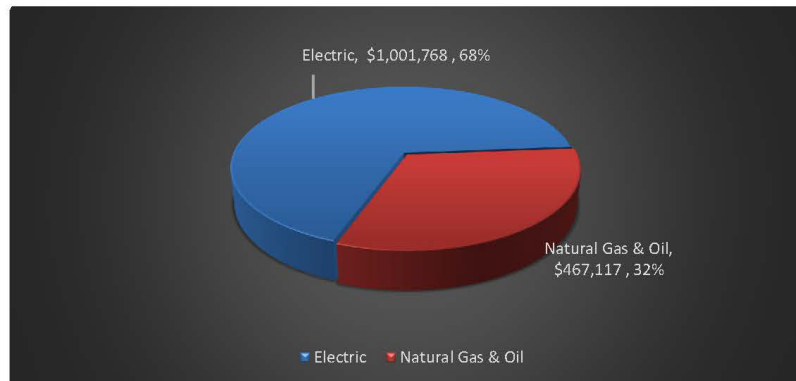
Historical Summary

Utility Analysis Period: March 2021 - Feb 2022

	Electric	Natural Gas & Oil
Utility Costs*	\$1,001,768	\$467,117
Utility Usage (kWh, Therms)	7,569,347	409,008
\$ Cost/Unit (kWh, Therms)	\$0.13235	\$1.142
Annual Electric Demand (kW)	23,328	

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

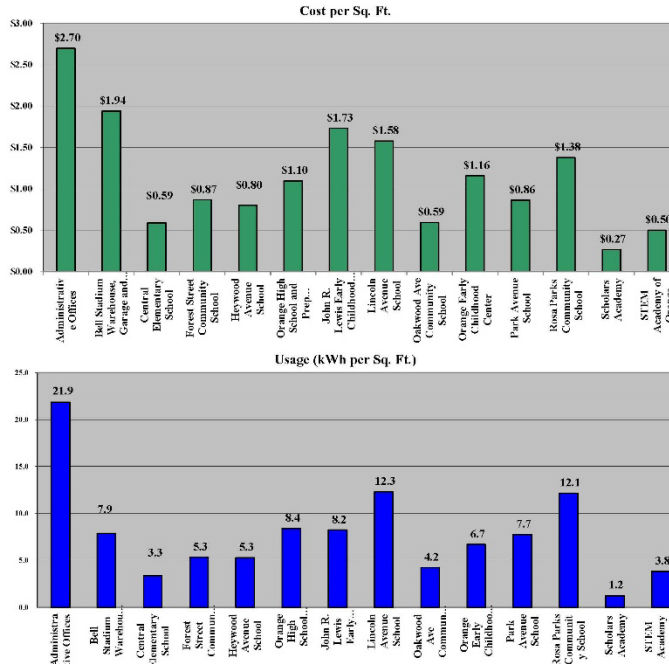
Actual Cost by Utility March 2021 - Feb 2022



Total Cost
\$1,468,885

Utility Analysis
Electric

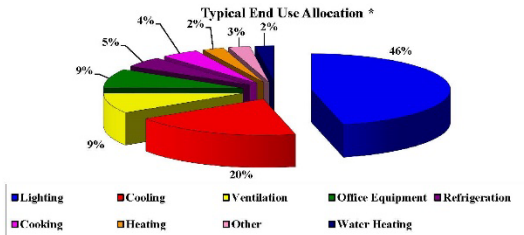
Square Footage Analysis



Note: Average kWh/SF for School buildings in this climate zone is 9.0

Electric

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.

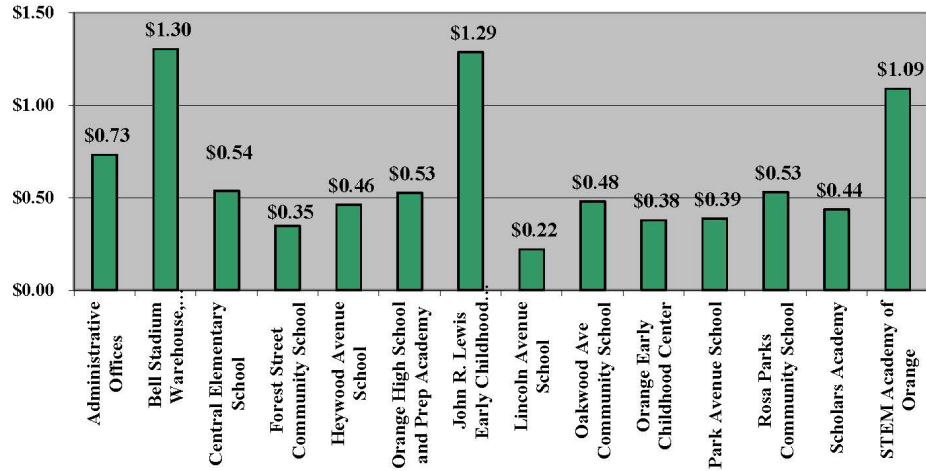
Typical Allocation Applied to Your Electric Cost**

Lighting	\$463,819
Cooling	\$196,347
Ventilation	\$92,163
Office Equipment	\$86,152
Refrigeration	\$47,083
Cooking	\$44,078
Heating	\$25,044
Other	\$25,044
Water Heating	\$22,039
Your Total Cost March 2021 - Feb 2022	\$1,001,768

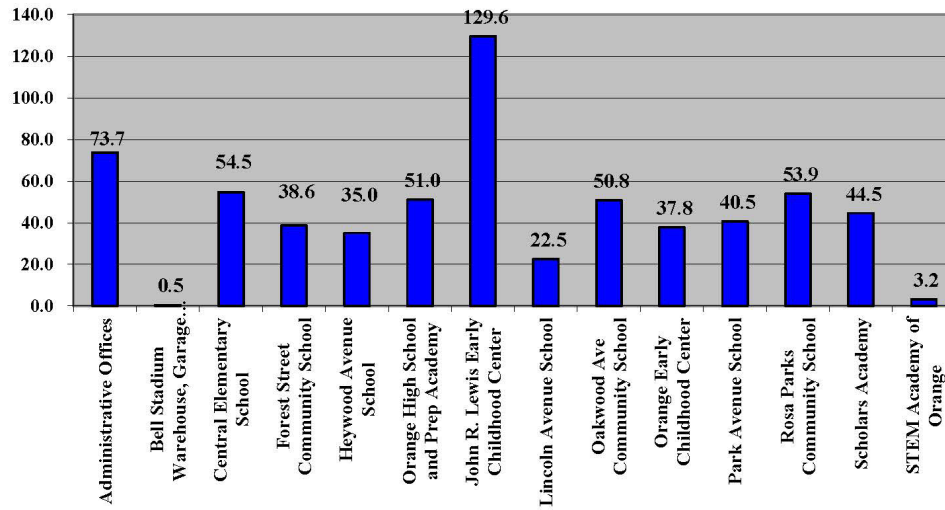
Utility Analysis

Natural Gas & Oil

**Square Footage Analysis
Cost per Sq. Ft.**



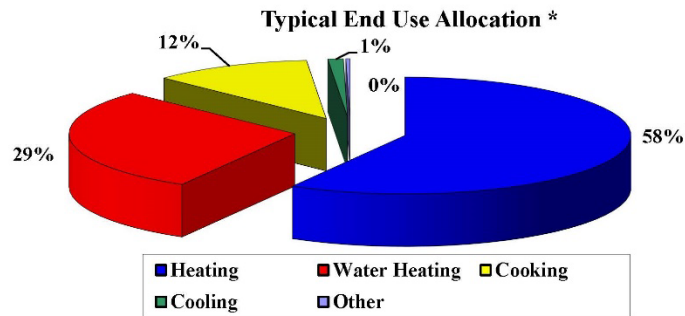
Usage (kBtu per Sq. Ft.)



Note: Average kBtu/SF for School buildings in this climate zone is 46.1

Utility Analysis Natural Gas & Oil

Sources of Usage Natural Gas & Oil



**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 & Oil

Heating	\$272,329
Water Heating	\$134,997
Cooking	\$53,251
Cooling	\$5,138
Other	\$1,401
Your Total Cost March 2021 - Feb 2022	\$467,117

Annual Emissions & Environmental Impact

Orange BOE March 2021 - Feb 2022

Based on the US Environmental Protection Agency -
Greenhouse Gas Equivalencies Calculator
<http://www.epa.gov/cleanenergy/energy-resources/calculator.html>

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

Total Annual Electric usage	7,569,347	kWh
Annual Natural Gas usage	409,008	Therms

Electric Emissions	
0.00070742	MTeCO ₂ per kWh saved
Natural Gas Emissions	
0.05302541	MTeCO ₂ per MMBtu saved
Equillivent Cars	
0.214132762	Cars/ 1MTeCO ₂
Forrested Acres	
1.3063142	Forrested Acres Factor/ 1MTeCO ₂

Annual Greenhouse Gas Emissions (Metric tons of equivalent of CO ₂)		
eCO ₂ (Electric)	5,355	MT
eCO ₂ (Gas)	2,167	MT
Total eCO ₂	7,521.489	MT

This is equivalent to one of the following:	
1614	No. of passenger vehicles - annual greenhouse gas emissions
9825	No. of acres of U.S. forests - carbon sequestered annually



Potential Retrofits

Retrofit Description	Utility/Fuel Type	Common Recommendations for Action
Lighting Retrofit and Motion Sensors	Electric/Natural Gas	Upgrade lighting and lighting controls
De-Stratification Fans	Electric/Natural Gas	Redistribution of Conditioned Air
Boiler Replacement	Natural Gas	Install high efficient, modular, condensing boilers
DHW Boiler/Tank Replacements	Electric/Natural Gas	Higher Efficiency Units
RTU Replacements	Electric/Natural Gas	Higher Efficiency Units
Building Management System Upgrades	Electric/Natural Gas	Reduce equipment run-time and provide better comfort
Building Envelope Improvements	Electric/Natural Gas	Reduce building leakage
Roof Replacements	Electric/Natural Gas	Reduce building leakage
Computer Controllers	Electric	Put computers to sleep when building is unoccupied
Install Premium Efficient Motors/Variable Frequency Drives	Electric	Provide more efficient motors and variable frequency drives
Transformer Replacements	Electric	Provide more efficient transformers with reduced amounts of excess heat to the spaces
Water Thermal Conservation	Natural Gas	Lower water thermal consumption



SECTION C

ENERGY CONSERVATION MEASURES

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 the District. 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 ECMs for your facilities.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
1A LED Lighting	■		■	■	■	■	■	■	■	■	■	■	■	■
1B Stadium Lights		■												
1C Destratification Fans			■	■	■	■		■	■		■	■	■	■
2A Boiler Replacements	■	■		■	■				■		■	■	■	
2B Domestic Water Heater Replacements									■		■	■	■	
2C Steam Traps		■	■	■	■	■			■				■	
2D Unit Ventilator Replacements					■				■			■		
2E Premium Efficiency Motors and VFDs						■		■				■		
2F Chiller Replacements								■			■	■		
2G Roof Top Unit Upgrades						■			■	■				

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2H Split System Upgrades	■					■	■							
2I AHU Replacements													■	
2J Boiler Controls			■	■		■								
3A Building Management Controls	■			■	■	■			■					■
3B Building Sustainability Manager HBSM	■	■	■	■	■	■	■	■	■	■	■	■	■	■
4A Building Envelope Improvements	■	■	■	■	■	■	■	■	■	■	■	■	■	■
4B Pipe Insulation	■	■	■	■	■	■			■		■	■	■	■
4C Roof Replacements	■	■	■	■	■	■	■	■	■	■	■	■	■	■
4D Window Replacements			■											
5A Cogeneration CHP						■								
6A Solar PV Purchase	■		■		■	■	■	■	■	■	■	■		■
6B Community Solar	■	■	■	■	■	■	■	■	■	■	■	■	■	■
6C Replace Solar Inverters								■			■			
6D Solar PPA	■		■		■	■	■	■	■	■	■	■		■

ECM 1A LED Lighting Upgrades

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. Lighting controls reduce or eliminate reliance on occupants or staff to turn lights off when spaces are unoccupied by automatically turning lighting fixtures off thereby reducing electrical energy consumption.
- **Improved teacher and student performance** from enhanced lighting quality that translates to an enhanced learning working environment.
- **Improved equipment longevity** by reducing amount of light usage and extending the useful life of your lighting system. LED bulbs and diodes have an outstanding operational lifetime expectation of up to 100,000 hours. This is 11 years of continuous operation, or 22 years of 50% operation. 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, reducing the runtime of lighting system and components, and providing for longer lasting and technologically advanced lights, without the need to address deficient or bad ballasts.
- **Ecologically friendly** LED lights are free of toxic chemicals. Most conventional fluorescent lighting bulbs contain a multitude of materials 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 lifetime 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	Administrative Offices	Bell Stadium Warehouse, Garage and Field House	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
1A LED Lighting	▪		▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

EXISTING CONDITIONS

Indoor lighting predominantly consists of T-8 lamps, with a small quantity of T-12 and compact fluorescent lamps (CFLs) along with incandescent bulbs. In general, lighting is operated on switches.

SCOPE OF WORK

The proposed lighting system is based on the most recent 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 Light Emitting Diode (LED) lamps. The District will receive many benefits from the lighting system upgrade.



Lighting at Oakwood Ave Community School



Lighting at Central Elementary School

LED OUTDOOR LIGHTING UPGRADES

EXISTING CONDITIONS

The District has various types of High Intensity Discharge (HID) light fixtures and older LED fixtures, which are not as efficient as modern LED types. Parking lot and building exterior lights consist of pole mounted shoe-box type and wall pack HID fixtures.

SCOPE OF WORK

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.

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 1B Stadium Lighting

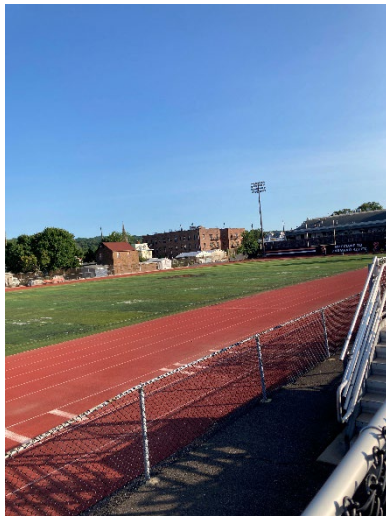
The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology. New stadium lighting will reduce energy and maintenance costs over typical high intensity discharge (HID) equipment.
- **Reduced maintenance and operational costs** by reducing the runtime of lighting system and components.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
1B Stadium Lights		▪												

EXISTING CONDITIONS

Bell Stadium has 96 existing 1650-Watt HID equipment. HID lamps have a lifespan of approximately 2,000 hours. HIDs are responsible for producing glares and do not provide instant light when turned on, they need time to warm-up.



Bell Stadium Warehouse, Garage and Field House - Lighting



Bell Stadium Warehouse, Garage and Field House - Lighting

Honeywell proposes the installation of new LED field lighting. The new lighting system can be controlled manually at the field or with wireless communication system, which includes remote programming for up to eight dynamic lighting scenes and user training.

Table 1B.1 Proposed Stadium Lighting

Building	Manufacture	Model	Watts	Qty
Bell Stadium Warehouse, Garage and Field House	Ephesus	EPH-LS-16-1200L	1,200	48
Bell Stadium Warehouse, Garage and Field House	Ephesus	EPH-LS-08-068N	680	2
TOTAL				50

SCOPE OF WORK

New lighting will be installed. Lower energy cost by adjusting light levels by occupancy, turning lights off when not needed.

CHANGES IN INFRASTRUCTURE

New LED lighting will be installed as part of this ECM.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 1C De-Stratification Fans w/ UV Disinfection

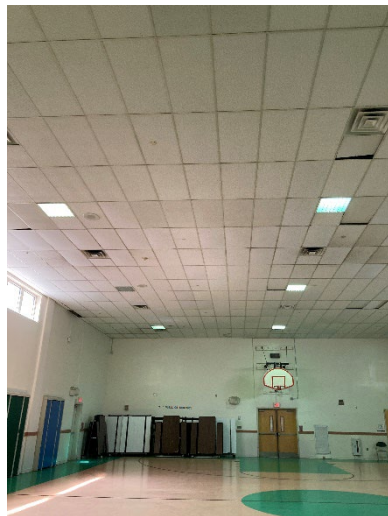
The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
1C De-stratification 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.



Oakwood Ave Community School - MPR



Lincoln Avenue School - MPR

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 even out the air temperature 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 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.

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

Based on preliminary site investigation conducted by our staff, we propose to install the de-stratification fans as indicated in the table below.

Table 1C.1 Proposed De-Stratification Fans

Building	Location	Airius Model	Qty PureAir	Qty AirPear
Orange High School and Prep Academy	HS Gym	(4) A-25-SP-STD-120-W (4)A-25-SP-STD-120-W-PHI	4	4
Orange High School and Prep Academy	HS Aux Gym	(3)S-25-SP-SH-120-W (2)S-25-SP-SH-120-W-PHI	3	2
Orange High School and Prep Academy	Prep Academy Gym	(4)A-25-SP-STD-120-W (3)A-25-SP-STD-120-W-PHI	4	3
Heywood Avenue School	Gym	(2) A-25-SP-STD-120-W (1) A-25-SP-STD-120-W-PHI	2	1
Central Elementary School	Gym	(2)A-25-SP-STD-120-W (2)A-25-SP-STD-120-W-PHI	2	2



Building	Location	Airius Model	Qty PureAir	Qty AirPear
Forest Street Community School	MPR	(2)S-25-SP-SH-120-W (1)S-25-SP-SH-120-W-PHI	2	1
Scholars Academy	MPR	(3)A-15-SP-STD-120-W (2)A-15-SP-STD-120-W-PHI	3	2
Lincoln Avenue School	MPR	(3) S-25-SP-SH-120-W (2) S-25-SP-SH-120-W-PHI	3	2
Oakwood Ave Community School	MPR	(2)S-25-SP-SH-120-W (2) S-25-SP-SH-120-W-PHI	2	2
Park Avenue School	Gym	(3) A-25-SP-STD-120-W (2)A-25-SP-STD-120-W-PHI	3	2
Park Avenue School	MPR	(2) S-25-SP-SH-120-W (2) S-25-SP-SH-120-W-PHI	2	2
Rosa Parks Community School	Gym	(3)S-25-SP-SH-120-W (2) S-25-SP-SH-120-W-PHI	3	2
STEM Academy of Orange	Gym	(3) A-25-SP-STD-120-W (2) A-25-SP-STD-120-W-PHI	3	2
TOTAL			36	27

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.

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 2A Boiler Replacements

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2A Boiler Replacements	▪	▪		▪	▪				▪		▪	▪	▪	

EXISTING CONDITIONS

Some boilers within the School District are near or past the end of their useful life and are less efficient compared to new boilers. Some existing boilers can be replaced with high efficiency condensing boilers or high efficiency steam boilers.



Oakwood Ave Community School - Boiler



Scholars Academy - Boiler

EXISTING BOILERS TO BE REPLACED

Table 2A.1 Existing Boilers

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Administrative Offices	Hot Water	Weil McLain	LGB-14	1,190	NG	2

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Bell Stadium Warehouse, Garage and Field House	Steam	Weil McLain	780	753	Fuel Oil #2	1
Heywood Avenue School	Hot Water	Slant Finn	Caravan GG-240 HES	240	NG	3
Oakwood Ave Community School	Hot Water	Slant Fin	Caravan GG-399 HES	327.0	NG	3
Park Avenue School	Steam	Smith	3500A-S/W-11	2,117.0	NG	2
Park Avenue School	Hot Water	Weil McLain	1288	3,000.0	NG	1
Rosa Parks Community School	Hot Water	Weil McLain	988	2,176.0	NG	3
Forest Street Community School	Hot Water	Slant Fin	Caravan GG-399 HEC	327.0	NG	5
Oakwood Ave Community School	Steam	Weil-McLain		1,987.0	NG	1
Scholars Academy	Steam	HB Smith	28A-S-10	2,498.0	NG	1
Oakwood Ave Community School	Steam	Weil-McLain	Model 88 Series 2	1,987.0	NG	1

PROPOSED SOLUTION

It is recommended that the boilers listed in the table above be replaced with boilers operating at higher efficiency as provided in table below. New condensing hot water boilers have thermal efficiencies that range from 88% – 95% depending on the return hot water temperature from the heating loop. With proper design, it is typical to see thermal efficiencies of around 92%. Thermal efficiency is only one part of the equation that makes up the seasonal efficiency of a boiler.

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

Table 2A.2 Proposed Boilers

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Administrative Offices	Hot Water	Aerco	AM 500	500	NG	3
Bell Stadium Warehouse, Garage and Field House	Steam	Weil McLain	LGB-7	473	NG	1
Heywood Avenue School	Hot Water	Weil McLain	EVG-299	243	NG	3
Oakwood Ave Community School	Hot Water	Aerco	AM 399	399	NG	2
Park Avenue School	Steam	HB Smith	28HE-S-11	2,155	NG	3
Park Avenue School	Hot Water	Aerco	AM-1000	1,000	NG	3
Rosa Parks Community School	Hot Water	Aerco	AM 1000	1,000	NG	3
Forest Street Community School	Hot Water	Weil McLain	EVG-299	243	NG	5

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Oakwood Ave Community School	Steam	Weil McLain	888	1,987	NG	1
Scholars Academy	Steam	HB Smith	28HE-S-12	2,360	NG	1
Oakwood Ave Community School	Steam	Weil McLain	888	1,987	NG	1

SCOPE OF WORK

The following outlines the boiler replacement:

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

New boilers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

O&M IMPACT

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

Resource Use	Annual savings will result from greater combustion efficiency, reduced maintenance costs, and better control and setback.
Waste Production	Existing boilers scheduled for removal will be disposed of properly.

Environmental Regulations	No environmental impact is expected; all regulations will be adhered to in accordance with EPA and local code requirements.
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ECM 2B Domestic Hot Water Heater Replacement

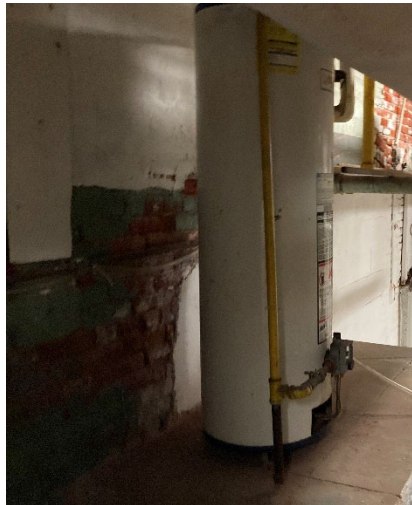
The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2B Domestic Water Heater Replacements									▪		▪	▪	▪	

EXISTING CONDITIONS

Some existing Domestic Hot Water (DHW) heaters are near or past the end of their useful life.



Oakwood Ave Community School – Water Heater



Rosa Parks Community School – Water Heater

EXISTING HOT WATER HEATER TO BE REPLACED

Table 2B.1 Existing Hot Water Heaters

Building	Manufacturer	Model	Output (MBH)	Storage	Fuel	Qty
Rosa Parks Community School	AO Smith	BTR-197 -110	199	100	NG	2

Building	Manufacturer	Model	Output (MBH)	Storage	Fuel	Qty
Rosa Parks Community School	AO Smith	BTR-197 -110	199	100	NG	1
Park Avenue School	AO Smith	BTH 150 100	150	100	NG	1
Oakwood Ave Community School	AO Smith	HW-300 100	300	-	NG	1
Scholars Academy	Bradford White	RG275H6N	76	75	NG	1

PROPOSED SOLUTION

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

Table 2B.2 Proposed Hot Water Heaters

Building	Manufacturer	Model	Output (MBH)	Storage	Fuel	Qty
Rosa Parks Community School	AO Smith	BTH-399	383	100	NG	1
Rosa Parks Community School	AO Smith	BTH-199	199	100	NG	1
Park Avenue School	AO Smith	BTH-150	144	100	NG	1
Oakwood Ave Community School	AO Smith	BTH-299	287	100	NG	1
Scholars Academy	AO Smith	BTX-100	95	50	NG	1

*Additional units may be included during the IGA.

SCOPE OF WORK

The following outlines the Domestic Hot Water Heater replacement:

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

<p>Existing Efficiency Proposed Efficiency Energy Savings \$</p>	<p>= Existing Efficiency + Existing Heat Exchanger Efficiency = Efficiency of the New Domestic Hot Water Heater = DHW Load x (Existing Equipment Efficiency – New Equipment Efficiency)</p>
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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.

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 2C Steam Trap Upgrades

The key benefits of this ECM include:

- **Energy savings** from reducing heating losses caused by old, inefficient steam traps
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.
- **Operational savings** from less frequent need to repair or replace key heating equipment

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2C Steam Traps		▪	▪	▪	▪	▪			▪				▪	

EXISTING CONDITIONS

When steam heats the building and transfers heat throughout the building, it condenses back to water. The condensate must be trapped and sent back to the boiler. When steam traps fail, the steam does not condense, which reduces the heat transfer, causing unnecessary heat losses. The repair or replacement of the steam traps will reduce unnecessary losses.

Traps are designed to drain only the condensate and prevent live steam from entering the condensate return piping. As the distribution system ages, the moving parts in the trap tend to get sluggish or fail altogether. This failure results in live steam entering the condensate return piping. The cumulative effect of this is to return the condensate above the flash point, resulting in steam and hence valuable heating energy loss at the boiler. This loss of energy can be minimized by a thorough survey to identify leaking traps by use of infrared temperature sensing instruments.



Oakwood Ave Community School – Steam Trap



Central Elementary School - Steam Trap

PROPOSED SOLUTION

Honeywell recommends replacing or retrofitting the traps per the following scope of work. The steam trap retrofit includes surveying all the existing steam traps and engineering appropriate replacements. During construction, Honeywell will provide all materials, fittings, labor and supervision for the timely completion of the project. All existing strainers, isolation valves, check valves, and fittings in good repair will be reused.

Table 2C.1 - Proposed Steam Traps

Building	1/2 Thermo	3/4 Thermo	3/4" F&T	1" F&T	1-1/4" F&T	1-1/2" F&T	2" F&T	1/2" INS	3/4" INS	1" INS
Bell Stadium Warehouse, Garage/Field House	0	0	9	0	0	0	0	0	0	0
Central Elementary School	0	0	10	14	0	0	0	0	0	0
Forest Street Community School	0	0	8	16	3	4	1	0	0	0
Heywood Avenue School	0	0	2	102	4	5	0	10	0	0
Oakwood Ave Community School	1	8	23	12	21	1	0	2	0	0
Orange High School and Prep Academy	8	0	15	34	38	8	1	27	18	1
Scholars Academy	0	0	7	20	0	0	3	31	0	0
Total	9	8	74	198	66	18	5	70	18	1

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:

Annual Steam Loss Due to Failure Traps	= Steam loss trough Orifice * Qty of steam trap * Failure rate * Annual Heating Hours
Energy Savings \$	= Annual Steam loss/ Boiler Efficiency

EQUIPMENT INFORMATION

Manufacturer and Type	Steam Trap selection will be determined in conjunction with District.
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 steam traps will be installed.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the trap installation.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result the reduction of steam loss from malfunctioning traps resulting in lower fuel consumption. The equipment uses no other resources.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	Asbestos abatement may be required.

ECM 2D Unit Ventilator Replacements with Cooling

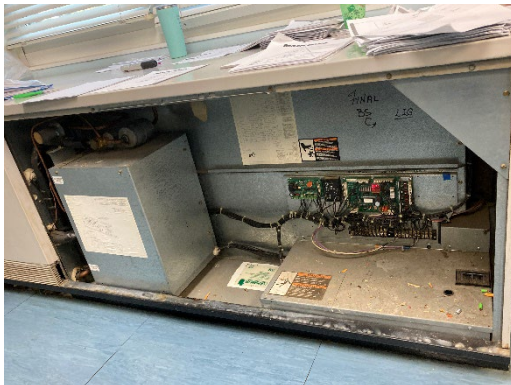
The key benefits of this ECM include:

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

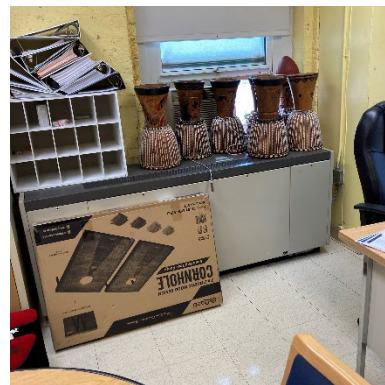
ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2D Unit Ventilator Replacements					▪				▪			▪		

EXISTING CONDITIONS

Honeywell observed that some of the existing unit ventilators are beyond the useful life and being inoperable or unrepairable.



Heywood Avenue School – Unit Ventilator



Oakwood Ave Community School – Unit Ventilator

PROPOSED SOLUTION

Honeywell proposes to replace existing unit ventilators new unit ventilators. New units will be equipped with open protocol factory mounted controls which can be tied into existing BMS system.

Table 2D.1 – Proposed Unit Ventilators

Building	Type	Location	Make	Model	Qty
Heywood Avenue School	Replace	Classrooms	MagicAire	MASCB5	9
Oakwood Ave Community School	Replace	Classrooms	Trane	HUV125	14

Building	Type	Location	Make	Model	Qty

SCOPE OF WORK

The following outlines the unit ventilator replacements:

1. Disconnect electrical and steam from existing units.
2. Install new univents and reconnect, steam and electric.
3. 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 Univent Efficiency	= Heat Input x Existing Efficiency
Proposed Univent Efficiency	= Heat Input x New Efficiency
Energy Savings \$	= Heating Production (Proposed Efficiency – Existing Efficiency)

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

New unit ventilators will be installed and programmed in the locations listed above; in addition, training for maintenance personnel will be required as well as on-going, annual preventive maintenance.

O&M IMPACT

The new unit ventilators will decrease the O&M cost for maintaining the equipment .

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	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.
Waste Production	Existing units scheduled for removal will be disposed of properly.
Environmental Regulations	Minor support will be required for the interruption of utilities for brief tie-in periods. Continuity of service must be maintained for the customer.

ECM 2E Premium Efficiency Motors, Pumps and VFDs

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2E Premium Efficiency Motors and VFDs						▪		▪				▪		

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.



Orange High School and Prep Academy – Motor



Lincoln Avenue School – Motor

EXISTING MOTORS TO BE REPLACED

Table 2E.1 Existing Motors

Building	Configuration	Qty	Motor HP	Existing Efficiency	VFD
Lincoln Avenue School	CHW Pump	3	25.0	93.6%	Y

Building	Configuration	Qty	Motor HP	Existing Efficiency	VFD
Rosa Parks Community School	HW Pump	2	15.0	91.0%	Y
Orange High School and Prep Academy	CHW Pump - Old Wing	2	7.5	91.0%	Y
Rosa Parks Community School	CHW Pump	3	20.0	91.7%	Y
Rosa Parks Community School	Boiler Pump	3	0.8	84.0%	Y

PROPOSED SOLUTION

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

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

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

ECM 2F Chiller Replacements

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2F Chiller Replacements								▪			▪	▪		

EXISTING CONDITIONS

Chiller units serving the buildings are near the end of its useful life and are costly to maintain. Replacing 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.



Rosa Parks Community School – Chiller



Park Avenue School – Chiller

EXISTING CHILLER UNITS

Table 2F.1 - Existing Chillers

Building	Location Served	Manufacturer	Model	Tons	Qty
Park Avenue School	Building	York	YCAV0187VA46	180.0	2
Rosa Parks Community School	Building	York	YCAS0208EB46	208.0	2
Lincoln Avenue School	Building	Trane	RTAC 3004	300.0	2

PROPOSED SOLUTION

Honeywell proposes replacing the existing chiller units in the table above. Existing electrical power supply will be reconnected to the new units. The units will communicate with the existing or enhanced BMS.

Table 2F.2 - Proposed Chillers

Building	Location Served	Manufacturer	Model	Tons	Qty
Park Avenue School	Building	Trane	ACSA1802EUA	180.0	2
Rosa Parks Community School	Building	Trane	ACSA2002EUA	200.0	2
Lincoln Avenue School	Building	Trane	ACRC3004EU	300.0	2

SCOPE OF WORK

The following outlines the scope of work to install the chiller unit listed in the table above.

- Disconnect existing electric connections.
- Disconnect piping from the unit.
- Remove existing unit.
- Rig and set new unit.
- 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	= Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)
--------------------------------	--

EQUIPMENT INFORMATION

Manufacturer and Type	Several quality and cost-effective manufacturers are available.
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 chillers will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

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 units scheduled for removal will be disposed of properly.
Environmental Regulations	No environmental impact is expected.

ECM 2G Roof Top Unit Replacements

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2G Roof Top Unit Upgrades						▪			▪	▪				

EXISTING CONDITIONS

Some Rooftop Units (RTUs) serving the locations photographed below 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.



Orange Early Childhood Center - RTU Orange Early Childhood Center - RTU

EXISTING ROOFTOP UNITS TO BE REPLACED

Table 2G.1 Existing Rooftop Units

Building	Location Served	Manufacturer	Model	Tons	Qty
Oakwood Ave Community School	Gymnasium	Trane	SFHFC40EJT45C58D1E01A0 D00G0K000RT00060	40.0	1
Oakwood Ave Community School	Corridor	Lennox	LGA060HHH	5.0	1
Oakwood Ave Community School	Kitchen	Reznor	RG250-8-S-MV	-	1

Building	Location Served	Manufacturer	Model	Tons	Qty
Orange Early Childhood Center	Building	Rheem	RKKAA072CL13E	6.0	1
Orange Early Childhood Center	Building	York	ZF180N32B2AAA1B	14.5	1
Orange Early Childhood Center	Building	Rheem	RKNLB180CM25E	15.0	1
Orange High School and Prep Academy	Orange Prep Academy	Carrier	50TJ-028	28.0	1
Orange High School and Prep Academy	Orange Prep Academy	Carrier	50TJ-028	28.0	1
Orange High School and Prep Academy	Orange Prep Academy	Carrier	50TJ-028	28.0	1

PROPOSED SOLUTION

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

Table 2G.2 Proposed Rooftop Units

Building	Location Served	Manufacturer	Model	Tons	Qty
Oakwood Ave Community School	Gymnasium	Trane	SHMF40T*46CLDDD11D0D E0V00A004Z1M840	40.0	1
Oakwood Ave Community School	Corridor	Trane	YHC067E3RZA	5.0	1
Oakwood Ave Community School	Kitchen	Trane	GRDA25PDMF0N2CW302A	0.0	1
Orange Early Childhood Center	Building	Trane	YHJ072A3S0H	6.0	1
Orange Early Childhood Center	Building	Trane	YHJ180A3SOH	15.0	1
Orange Early Childhood Center	Building	Trane	YHJ180A3SOH	15.0	1
Orange High School and Prep Academy	Orange Prep Academy	Trane	RAUJC304	30.0	1
Orange High School and Prep Academy	Orange Prep Academy	Trane	RAUJC304	30.0	1
Orange High School and Prep Academy	Orange Prep Academy	Trane	RAUJC304	30.0	1

SCOPE OF WORK

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

1. Disconnect existing RTU electric connections.
2. Disconnect piping and air ducts from the unit.
3. Remove unit from the base.
4. Modify base for new unit if necessary.

5. Rig and set new unit at the base.
6. Inspect piping and air ducts before reconnecting them to the unit.
7. Reconnect piping and air ducts.
8. Repair duct and piping insulation.
9. Connect electric power.
10. Start up and commissioning of new unit.
11. Maintenance operator(s) training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

Electric Energy savings	= Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)
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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 rooftop units will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

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 2H Split System Upgrades

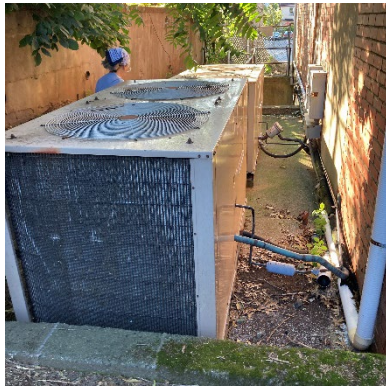
The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2H Split System Upgrades	▪					▪	▪							

EXISTING CONDITIONS

Honeywell identified some condensing units 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.



John R. Lewis Early Childhood Center
–
Split System



Administrative Offices –
Split System

EXISTING CONDENSING UNITS TO BE REPLACED

Table 2H.1 Existing Condensing Units

Building	Area Served	Manufacturer	Model	Tons	Qty
John R. Lewis Early Childhood Center	Building	York	HAHB-T180AB	15.0	1
John R. Lewis Early Childhood Center	Building	York	HAHB-T180AB	15.0	1

Building	Area Served	Manufacturer	Model	Tons	Qty
Administrative Offices	2 nd Floor	York	H2CA480A46A	40.0	1
Administrative Offices	1 st Floor	York	H2CA360A46D	30.0	1
Administrative Offices	Admin Offices	York	H3CE180A46A	15.0	1

PROPOSED SOLUTION

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

Table 2H.2 Proposed Rooftop Units

Building	Area Served	Manufacturer	Model	Tons	Qty
John R. Lewis Early Childhood Center	Building	Trane	TTA18044C	15.0	1
John R. Lewis Early Childhood Center	Building	Trane	TTA18044C	15.0	1
Administrative Offices	2nd Floor	Trane	RAUJC304	40.0	1
Administrative Offices	1st Floor	Trane	RAUJC304	30.0	1
Administrative Offices	Admin Offices	Trane	TTA18044C	15.0	1

SCOPE OF WORK

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

New split systems will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

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

ECM 21 AHU Replacements

The key benefits of this ECM include:

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

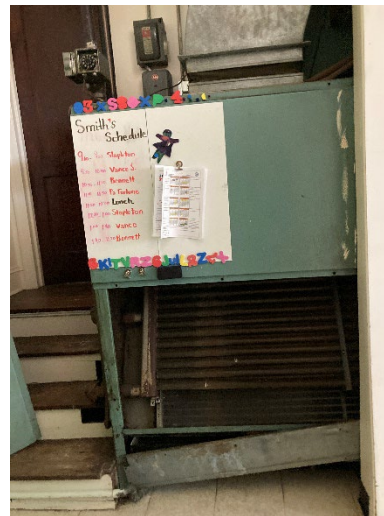
ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
21 AHU Replacements													▪	

EXISTING CONDITIONS

Some Air Handling Units (AHUs) serving the locations photographed below 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 units in operation.



Scholars Academy - AHU



Scholars Academy - AHU

EXISTING AHU TO BE REPLACED

Table 2I.1 Existing AHUs

Building	Location Served	Make	Model	Qty
Scholars Academy	MPR	Carrier	38AB016550	2

PROPOSED SOLUTION

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

Table 2I.2 Proposed AHUs

Building	Location Served	Make	Model	Qty
Scholars Academy	MPR	Trane	TWE18043BAA/TWA18043DAA	2

SCOPE OF WORK

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

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

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

Electric Energy savings	= Existing unit energy consumption (kWh) – replacement unit energy consumption (kWh)
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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 units will be installed in itemized locations; in addition, training for maintenance personnel will be required, as well as on-going, annual preventive maintenance.

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 2J Boiler Burner Controls

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
2J Boiler Burner Controls			▪	▪		▪								

EXISTING CONDITIONS

Honeywell observed that the existing boiler burners have limited fuel / air ratio controls in place, which reduces your ability to optimize combustion efficiency and system reliability. The below table indicates which systems Honeywell recommends installation of new advanced combustion controls to decrease costs and increase efficiency. In cases where burners cannot be retrofit with controls, new burners will be installed.



Central Elementary School - Boiler Controls



Orange High School and Prep Academy – Boiler Controls

EXISTING BOILERS BURNER TO BE UPGRADED

Table 2J.1 Existing Boiler Burners To Be Upgraded

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Central Elementary School	Steam	Power Flame	CR3-G-25	3,425	NG	1
Central Elementary School	Steam	Power Flame	BCCR3-G-25	3,422	NG	1

Building	Type	Manufacturer	Model	Output (MBH)	Fuel	Qty
Forest Street Community School	Steam	Power Flame	C2-G-20B	1,951	NG	1
Orange High School and Prep Academy	Steam	Industrial Combustion	LNEG-210	16,738	NG	2

PROPOSED SOLUTION

Typically, boilers are sized to accommodate the coldest days (approximately 5% of the year). During these periods of maximum demand, the burner is constantly on and operating at maximum capacity. The burner cycles on and off, maintaining temperature or pressure in the boiler. It is during these periods of lesser demand, that the controller will monitor the boiler make up rate, and efficiently manage the firing of the boiler.

The length of the burner’s off-cycle is the best measure of total heating demand or load. In other words, the load is directly related to the time it takes for water (or steam) in the boiler to drop from its high-limit temperature (or pressure) to its low-limit or “call” setting. When demand is high, these off-cycles are short and the on-cycles are longer. When demand is lower, off-cycles are longer and on-cycles are reduced.

The device, which is a microprocessor-based computer, constantly monitors the demand on the boiler by assimilating all factors affecting a building’s heating requirements, including occupancy, climate, wind chill, solar gain, type of building, and many others.

Proposed Systems and Scope of Work

Honeywell will replace the burners on the boilers listed above with new, natural gas-fired burners, utilizing advanced controls.

Honeywell Slate™

SLATE™ from Honeywell brings together configurable safety and programmable logic for the first time ever. It’s one platform from one vendor that can easily be customized for almost any application – in less time with less complexity.

This upgrade will provide a combustion curve and light-off points including minimum/maximum firing rate points resulting in a precise firing rate control over the entire firing rate of the burner. Combustion efficiency will be maximized throughout the combustion curve and will provide a fuel curve to achieve maximum efficiency.

Modulating Burner Control

The Modulating Burner integrates flame safeguard control, fuel-air ratio control, O2 Trim, VFD control, and proportional integral derivative (PID) control into a single, integrated, user-friendly system.

The features integrated into the burner provide energy savings, reduced emissions, reduced installation costs and enhanced safety.



Fuel Metering

- Reduced fuel use.
- Increased burner efficiency.
- Greenhouse gas emissions reduction.

Easy Access Panels

- Total access to components.
- Easy maintenance.

Graphic Burner Management System

- Graphic annunciation of critical burner functions.



SCOPE OF WORK

The following outlines the boiler burner controls:

1. Disconnect electrical and gas from existing boiler burner.
2. Install new burner controls on existing burner (where applicable).
3. Start up, commissioning and operator training.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

New combustion controls will be installed and programmed in the locations listed above; in addition, training for maintenance personnel will be required as well as on-going, annual preventive maintenance.

O&M IMPACT

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from greater boiler load control, reduced maintenance costs control and setback.
Waste Production	Existing equipment 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 3A Building Management Controls

The key benefits of this ECM include:

- **Improve Air Quality** by more precise control of air filtration, air composition and ultra-violet cleaning to create a healthier school building environment.
- **Operational efficiency** resulting from better control and system wide visibility.
- **Remote operation** of HVAC systems via mobile phone or off-site computer.
- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Occupancy comfort and productivity** resulting from enhanced temperature and humidity control throughout your buildings.
- **Deliver a comprehensive open protocol Building Management System.** Verify design is customized for each building yet uniform throughout the district. Assure longevity of control system with proper commissioning and training.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
3A Building Management Controls	▪			▪	▪	▪			▪					▪

EXISTING CONDITIONS

Honeywell has performed a survey of the existing temperature controls throughout the School District. Upon inspection, it was noted that the level of controls technology varies widely throughout the District. However, regardless of the systems in place, all building control systems can benefit from upgrades and implementing energy conservation enhancements. Upgrade may include new digital controls retrofit of equipment with pneumatics and legacy electronic systems, modifying existing digital control systems to implement energy-saving sequences, or the integration and consolidation of disparate systems into a single front end user interface.

Table 3A.1 Existing Controls Summary

Building	Existing Controls
Administrative Offices	JCI Metasys
Bell Stadium Warehouse, Garage and Field House	Thermostat
Central Elementary School	Pneumatics/Steam 1 Pipe
Forest Street Community School	BAPI

Building	Existing Controls
Heywood Avenue School	Trane
Orange High School and Prep Academy	JCI Metasys/Pneumatics
John R. Lewis Early Childhood Center	Honeywell/Daikin Thermostat
Lincoln Avenue School	JCI Metasys
Oakwood Ave Community School	Andover Controls
Orange Early Childhood Center	Thermostat
Park Avenue School	JCI Metasys
Rosa Parks Community School	JCI Metasys
Scholars Academy	Danfoss Thermostatic
STEM Academy of Orange	Trane



Orange High School and Prep Academy – JCI Metasys



Lincoln Avenue School – JCI Metasys

PROPOSED SOLUTION

4. Building Automation System (BAS) Front-End Equipment:

- a. **Enterprise Level Control System [Trane Tracer Ensemble]** – Integrate all of the new/existing Trane Tracer System controllers that are a part of this project onto the newly installed Enterprise level control system [Cloud-based]
- b. **System Level Controller(s) (Trane Tracer SC+)** – Furnish and install system level controllers at Orange High School. Expand the existing Trane Tracer System controllers at Orange Prep Academy, STEM Academy, Oakwood Ave, Forest Street and Heywood. Provide any necessary hardware/software upgrades
 - i. Furnish and install all necessary communication bus to the below identified equipment in each school

- c. **New Graphics** – Provide updated graphics at each of the schools for the below identified equipment as a part of this project

5. Associated Mechanical Equipment:

a. Heywood

- i. (1) Steam Plant – Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Furnish and install (3) auxiliary space temperature sensors per floor for averaging
- ii. (46) Occupied Area Radiator Valves – Furnish new radiator valves. Reuse existing low voltage wiring if possible [provide new if needed] and tie in to new DDC controller. Provide new space temp sensors for control of radiator valves and integrate to DDC controller. Mechanical install of valves by others.
- iii. (50) Unoccupied Radiator Valves – Furnish new Thermostatic radiator valves. Mechanical install of valves by others.
- iv. (9) New Unit Ventilators - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system.

b. Forest Street Community School

- i. (19) Occupied Area Radiator Valves - Furnish new radiator valves. Reuse existing low voltage wiring if possible [provide new if needed] and tie in to new DDC controller. Provide new space temp sensors for control of radiator valves and integrate to DDC controller. Mechanical install of valves by others.
- ii. (18) Unoccupied Radiator Valves - Furnish new radiator valves. Reuse existing low voltage wiring if possible [provide new if needed] and tie in to new DDC controller. Provide new space temp sensors for control of radiator valves and integrate to DDC controller. Mechanical install of valves by others.

c. Oakwood Ave Community School

- i. (1) Steam Plant - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system
- ii. (26) Occupied Area Radiator Valves - Furnish new radiator valves. Reuse existing low voltage wiring if possible [provide new if needed] and tie in to new DDC controller. Provide new space temp sensors for control of radiator valves and integrate to DDC controller. Mechanical install of valves by others.
- iii. (7) Unit Ventilators - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system.
- iv. (25) Unoccupied Radiator Valves - Furnish new Thermostatic radiator valves. Mechanical install of valves by others.
- v. (7) Cabinet Unit Heaters - Furnish new Thermostatic radiator valves & Aquastats. Mechanical install of valves by others

d. STEM Academy of Orange

- i. (2) H&V Units - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Provide Demand Control Ventilation control
- ii. (15) Pneumatic Unit Ventilators - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Demo all pneumatics
- iii. (2) Trane Unit Ventilators – Integrate existing (2) Unit Ventilators with existing Trane DDC controllers
- iv. (27) Unoccupied Area Radiator Valves - Furnish new Thermostatic radiator valves. Mechanical install of valves by others.
- v. (1) Cabinet Unit Heater - Furnish new Thermostatic radiator valves & Aquastats. Mechanical install of valves by others

e. Orange High School & Prep Academy

- i. (2) Gym H&Vs - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Provide Demand Control Ventilation control
- ii. (3) Unit Ventilators - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system.
- iii. (80) Occupied Area Radiator Valves - Furnish new radiator valves. Reuse existing low voltage wiring if possible [provide new if needed] and tie in to new DDC controller. Provide new space temp sensors for control of radiator valves and integrate to DDC controller. Mechanical install of valves by others.
- iv. (36) Unoccupied Radiator Valves - Furnish new Thermostatic radiator valves. Mechanical install of valves by others.
- v. (2) RTUs – Furnish new Wi-Fi Thermostats for control, and integrate to system controller

f. Administrative Offices

- i. (1) Hot Water Plant - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Demo all existing KMC controls and replace with new.
- ii. (3) AHUs - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Demo all existing KMC controls and replace with new.
- iii. (22) VAVs - Furnish and install all necessary DDC controllers, end devices, and sensors to provide control. Provide all necessary labor to program and integrate onto the local system controller, and enterprise control system. Demo all existing KMC controls and replace with new.

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

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 3B Building Sustainability Manager HBSM

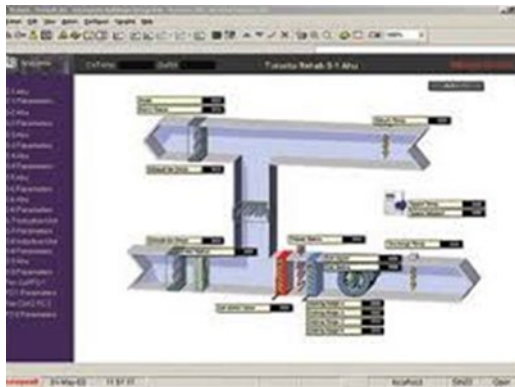
The key benefits of this ECM include:

- **Energy savings** from reducing total energy consumption with more efficient, state of the art technology.
- **Cloud-Based Solution** that connects to a building’s existing systems - without the need for capital investment - and optimizes energy consumption to drive up savings.
- **Monitor Energy Consumption** savings and zone comfort levels for any duration of time.
- **Reduced maintenance and operational costs** by reducing the runtime of HVAC systems.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
3B Building Sustainability Manager HBSM	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

EXISTING CONDITIONS

HVAC Systems are the biggest consumer of energy in commercial facilities, and most rely on conservative and inefficient control strategies. Manual or scheduled set-point adjustment strategies simply can’t account for the complexity of a building’s dynamic occupancy and weather conditions – while maintaining comfort levels.



HVAC Equipment Control



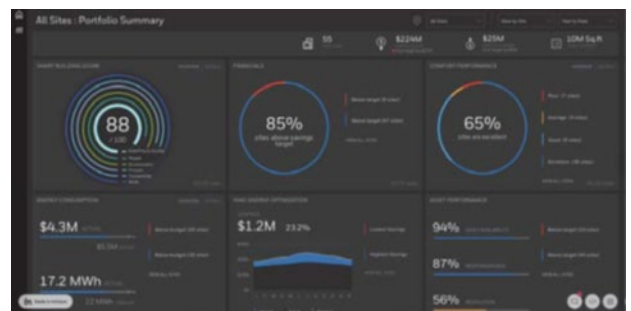
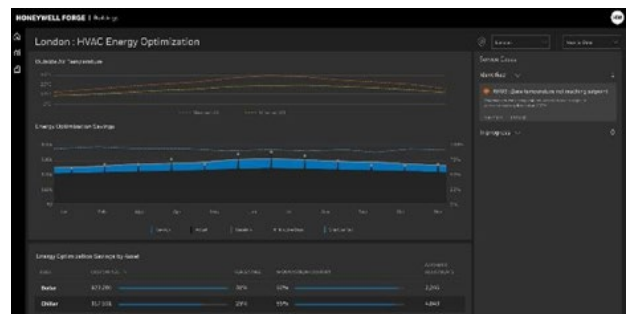
HVAC Equipment Control

PROPOSED SOLUTION

We propose to deploy Honeywell Forge Predictive Maintenance, an application that automates the detection of faults and anomalies in the operation of building heating, ventilation, and air conditioning (HVAC) systems which impact building comfort, energy consumption or the life cycle of the assets. Faults are raised in the way of service cases containing actionable recommendations about how to address the fault and are presented to the building operator via the enterprise dashboards. By adopting a Predictive Maintenance program, building operators can transition from costly preventative and reactive maintenance programs to a pro-active or just-in-time maintenance program. The benefits of a Predictive Maintenance program include:

- Reduced labor/subcontract cost associated with performing preventative maintenance activities
- Reduced labor/subcontract cost by identification of Service Case root cause with recommended actions to resolve the fault
- Reduced energy cost by immediately identifying and addressing anomalies which impact energy consumption
- Increased occupant productivity by immediately identifying and addressing anomalies which impact occupant comfort
- Reduced capital and operational expenses by identifying and addressing anomalies which impact the life cycle of equipment and components
- Boost operational continuity by reducing equipment failures and reactive activity

Healthy Buildings Technologies provide a set of tools to help building operators optimize the health of their building environments, operate more cleanly and safely, comply with social distancing policies, and reassure occupants as part of a return-to-business strategy. Honeywell Forge integrates building controls, air quality sensors, video feeds and secure access points then applies advanced analytics to calculate a simple, real-time Healthy Building Score. Site-level performance scores are aggregated for comparison and benchmarking across your portfolio to inform your strategic plan. The package provides insights and analytics to improve indoor environment, highlight proactive actions and automate incident response standards to manage and respond to alerts, anytime, anywhere.



SCOPE OF WORK

System Agnostic

Works with the existing BMS system using the open integration power of Niagara ®.

Safe & Secured

Built-in safety features ensure HVAC systems are always controlled – even during unexpected disturbances.

Autonomous Control

No need for customer intervention or expertise through this closed loop, continuously monitored solution.

Real-Time Intelligence

Advanced machine learning calculates occupancy and weather data to optimize set-points every 15-minutes.

Domain Expertise

A solution built on over one-hundred years of experience in building technologies.

Smart Visualization

Solution identifies pre-existing faults and delivers real-time energy, savings and comfort metrics.

Energy needs fluctuate based on seasons, weather, occupancy and usage. With Energy Optimization we have demonstrated that we can use the latest self-learning algorithms to optimize building operation.

CHANGES IN INFRASTRUCTURE

None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

None.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result from optimized building operation.
Waste Production	No waste will be generated as a result of this ECM.
Environmental Regulations	No environmental impact is expected.

ECM 4A Building Envelope Improvements

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	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
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.

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.



Rosa Parks Community School - Building Envelope



Forest Street Community School - Building Envelope

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

PROPOSED SOLUTION

Building	Attic Air Barrier Retrofit (SF)	Attic Flat Insulation (SF)	Caulking (LF)	Door - Install Jamb Spacer (Units)	Door Weather Stripping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Install New Attic Hatch (Units)	Insulation Soffit Baffles (JT)	Overhang Air Sealing (LF)	Overhang Air Sealing (SF)	Overhead Door Weather Stripping (Units)	Retrofit Attic Hatch (Units)	Roll-Up Door Weather Stripping (Units)	Roof-Wall Intersection Air Sealing (LF)	Roof-Wall Intersection Air Sealing (SF)
Administrative Offices				2	2	2								167	
Bell Stadium Warehouse, Garage and Field House						1					2				
Central Elementary School				2		7									
Forest Street Community School					4	12			6	12					
Heywood Avenue School				10	6	18								383	
John R. Lewis Early Childhood Center	2,650	2,650				4	2	135						180	
Lincoln Avenue School				2	12	12							1	258	
Oakwood Ave Community School					3	11									
Orange Early Childhood Center						3							1	457	65
Orange High School and Prep Academy				5	27	26							3		
Park Avenue School					13	8									
Rosa Parks Community School			2,939	2	5	5									

Building	Attic Air Barrier Retrofit (SF)	Attic Flat Insulation (SF)	Caulking (LF)	Door - Install Jamb Spacer (Units)	Door Weather Stripping - Doubles (Units)	Door Weather Stripping - Singles (Units)	Install New Attic Hatch (Units)	Insulation Soffit Baffles (UT)	Overhang Air Sealing (LF)	Overhang Air Sealing (SF)	Overhead Door Weather Stripping (Units)	Retrofit Attic Hatch (Units)	Roll-Up Door Weather Stripping (Units)	Roof-Wall Intersection Air Sealing (LF)	Roof-Wall Intersection Air Sealing (SF)
Scholars Academy			4,276		1	4									
STEM Academy of Orange		6,050		1	6	5					1	2			
Total Quantity	2,650	8,700	7,215	24	79	118	2	135	6	12	3	2	5	1,445	65

Roof-Wall Joints

Existing – Buildings throughout the School District were found to require roof-wall joint air sealing.

Proposed – Honeywell recommends using a high-performance sealant. In some buildings, two-component foam will be used. Any cantilevers off the buildings will be sealed with backer rod and sealant. Finally, the inside vestibule corners should be sealed with backer rod and sealant.

Roof Penetrations

Existing - There are many roof top exhaust fans that require damper cleaning, lubrication, and inspection for proper operation and to seal the roof deck to prevent penetration. Some units may be deemed to be too oversized for this service. Some buildings have roof-top AHUs with ducts that may show air leak during an IGA.

Proposed – Honeywell recommends if there is leak, these duct penetrations will be sealed with two-component polyurethane foam. Skylights will also be sealed. Sealant will be injected behind the drip cap to eliminate airflow.

Roof Overhangs

Existing – We found that roof overhangs at exterior doors are open to the drop ceilings, providing a pathway allowing heated and cooled air to escape between the interior and exterior of the building.

Proposed – Honeywell proposes to install rigid foam boards and seal the perimeter and any penetrations with spray foam to prevent air leak and provide a sufficient thermal barrier between the spaces.

Doors

Existing – Doors in the district need 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.

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 4B Roof Replacements

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** thanks to a tighter and more efficient building envelope.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
4B Roof Replacements	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

EXISTING CONDITIONS

The existing roof warranties are due to expire in the near future. The heat loss and heat gains occurring due to low R-value of the existing roof insulation can be improved through sealing. Additionally, roofs in poor condition can lead to water migration and future building envelope problems. Potential problematic leakage areas can be around perimeters and equipment curbing. The following building roofs will be upgraded to the extent needed to meet the maximum permissible solar installation.



Lincoln Avenue School – Existing Roof



Rosa Parks Community School – Existing Roof

PROPOSED SOLUTION

Honeywell proposes applying a coating to existing roofs in order to extend the roof warranty, provide resistance to water intrusion, UV exposure and natural weathering. The roof upgrade will allow for less infiltration through the roof and air conditioning units to work less.

Table 4B.1 Existing Roof Area to Upgrade

Building	Square Footage	Roof Type
Administrative Offices	9,091	Mineral Modified Bitumen
Bell Stadium Warehouse, Garage/Field House	10,909	Gravel Surface BUR
Central Elementary School	13,545	Built Up Roof BUR
Forest Street Community School	89,364	Modified Bitumen
Heywood Avenue School	3,927	Gravel Surface BUR
Orange High School and Prep Academy	4,091	Gravel Surface BUR
John R. Lewis Early Childhood Center	9,727	Gravel Surface BUR
Lincoln Avenue School	9,091	Mineral Modified Bitumen
Oakwood Ave Community School	10,909	Gravel Surface BUR
Orange Early Childhood Center	13,545	Built Up Roof BUR
Park Avenue School	89,364	Modified Bitumen
Rosa Parks Community School	3,927	Gravel Surface BUR
Scholars Academy	4,091	Gravel Surface BUR
STEM Academy of Orange	9,727	Gravel Surface BUR
Total Quantity	126,349	

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

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

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

INTERFACE WITH BUILDING

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

CHANGES IN INFRASTRUCTURE

The existing roofing will be sealed at the above referenced roof locations.

SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 4C Pipe Insulation

The key benefits of this ECM include:

- **Energy savings** from increased equipment efficiency.
- **Equipment longevity** due to more efficient and less wasteful equipment utilization.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
4C Pipe Insulation	▪	▪	▪	▪	▪	▪			▪		▪	▪	▪	▪

EXISTING CONDITIONS

An insulation audit was conducted identifying an approximated quantity of heat that is lost from various locations throughout the buildings. The heat losses result from hot piping giving off heat to the space around it. This measure will insulate these surfaces, resulting in energy savings and improved comfort of those areas in or near occupied spaces.



Forest Street ES - Pipe Insulation



Oakwood ES - Pipe Insulation

PROPOSED SOLUTION

Honeywell proposes insulating pipes and valves with appropriately sized fiberglass insulation. The following table lists the recommended insulation scope.

Table 4C.1 - Proposed Pipe Insulation Scope

Building	Ball Valve Insulation (Units)	Bonnet Insulation (Units)	Butterfly Valve Insulation (Units)	Check Valve Insulation (Units)	End Cap Insulation (Units)	Flange Insulation (Units)	Flex Fitting Insulation (UT)	Flo-Check Insulation (Units)	Gate Valve Insulation (Units)	Pipe Fitting Insulation (Units)	Pipe Reducer Insulation (Units)	Pump Insulation (Units)	Steam Trap Insulation (Units)	Straight Pipe Insulation (LF)	Strainer Insulation (Units)	Strainer Insulation (Units)	Suction Diffuser Insulation (Units)	Tank Insulation (Units)	Triple Duty Valve Insulation (Units)	
Administrative Offices	17					4	7	4		22				55		3				17
Bell Stadium Warehouse, Garage and Field House	1			1						25		1		65			1			1
Central Elementary School	1			1	5	19			12	59	3			243				1		1
Forest Street Community School	1		4	2	1	19	4		5	28	3			80		2	1			1
Heywood Avenue School	2	1	4	3		14	4	1		9		2		34	2					2
Oakwood Ave Community School	4	1		1	1	6	3		4	29	7			57	1	2	1			4
Orange High School and Prep Academy	6		4	5	4	79	6		9	139	6	4	7	840	11	4	4			6
Park Avenue School	9	3	2	1	2	22	2	1	2	45		4		130	2	3	1	3		9
Rosa Parks Community School			3	3		23	4			5	6	3		4		2	1			
Scholars Academy	4			1	3	7			2	47	3			122						4
STEM Academy of Orange	4		17	5		44				21		9		51			1	4		4
Total Quantity	49	5	34	23	16	237	30	6	34	429	28	23	7	1,681	16	16	10	8		49

ENERGY SAVINGS METHODOLOGY AND RESULTS

Energy savings results from significantly reducing the heat lost to the atmosphere from the piping and valve surfaces. In general, Honeywell uses the following approach to determine savings for this specific measure:

Energy savings	$= \text{Heat Loss Rate per foot of Uninsulated Pipe} - \text{Heat Loss Rate per foot of Insulated Pipe} \times (\text{Length of Pipe} \times \text{Hours of Operation}) \times \text{Cost/btu} / (\text{Boiler Efficiency})$
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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

The service to the specific lines may require interruption to allow for the repair or replacement. Coordination with site personnel will be required to minimize interruption to the buildings affected.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

Coordination of the electrical tie-in will be required.

ENVIRONMENTAL ISSUES

Resource Use	Energy savings will result the reduction of heat loss from uninsulated lines resulting in lower fuel consumption. The equipment uses no other resources.
Waste Production	This measure produces no waste by products.
Environmental Regulations	Asbestos abatement may be required

ECM 4D Window Replacements

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	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
4D Window Replacements			▪											

EXISTING CONDITIONS

Some of the windows in the District are single pane acrylic with aluminum frame. Due to age, construction type, and condition, the windows incur excess air infiltration and provide average thermal resistance to heat transfer.



Bookbinder School - Existing Windows



Country Club Administration Building - Existing Windows

PROPOSED SOLUTION

Honeywell proposes the installation of new energy efficient, double-paned windows to reduce infiltration, infrared and conductive losses. Overall, through the implementation of this measure, the building will reduce its heating fuel usage and cooling costs each year. The upgrade will result in savings and improved comfort to students and teachers which in turn will foster a better learning environment.

Table 4D.1 Existing Windows to be Replaced

Building	Area (SF / LF)	U-Factor/R-Factor Existing Window	U-Factor/R-Factor Proposed Window
Central Elementary School	6,825	1.00	0.50
Total	6,825		

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.

EQUIPMENT INFORMATION

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

CHANGES IN INFRASTRUCTURE

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 5A Cogeneration CHP

The key benefits of this ECM include:

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

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
5A Cogeneration CHP						▪								

EXISTING CONDITIONS

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



Cogeneration Configuration



Ecopower CHP

PROPOSED SOLUTION

Honeywell recommends the installation of the Ecopower micro-cogeneration system provides heat and electrical power in a cost effective and environmentally friendly manner. Using a natural gas or propane fueled Marathon Engine, the system captures thermal energy for space heating or domestic hot water. The micro-CHP uses heat generated by an internal combustion engine to produce between 13,000 - 47,000 BTU of heat per hour while simultaneously co-generating 1.2 - 4.4kW of electricity per hour. The system is thermally driven. The Ecopower will anticipate the heat demand from sensors located in the house, buffer tank or outside and varies its output to satisfy the demand. It will modulate (slow down or speed up) to run at a level to maintain a constant heat requirement in order to keep the engine running as long as possible, ensuring maximum electrical generation.

SCOPE OF WORK

Table 5A.1 Proposed Cogeneration Units

Building	Manufacturer	Model	kW	Qty.
Orange High School and Prep Academy	Axiom	Ecopower	4.4	1

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

Year	Distributed Generation
Installation	
1	\$1,485
2	\$1,518
3	\$1,552
4	\$1,586
5	\$1,621
6	\$1,656
7	\$1,693
8	\$1,730
9	\$1,768
10	\$1,807
11	\$1,847
12	\$1,887
13	\$1,929
14	\$1,971
15	\$2,015
16	\$2,059
17	\$2,104
18	\$2,150
19	\$2,198
Totals	\$34,574

EQUIPMENT INFORMATION

Manufacturer and Type	Axiom Ecopower, Electrical Output 1.2-4.4 kW, Thermal Output 13,000 - 47,000 Btu/hr, Overall efficiency 93%
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

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

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

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

ECM 6A Solar PV Purchase

The key benefits of this ECM include:

- **Reduced utility costs.**
- **Additional savings** from solar can provide the schools 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.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
6A Solar PV Purchase	▪		▪		▪	▪	▪	▪	▪	▪	▪	▪		▪

ECM OVERVIEW

Similar to Solar PPA, another option is a self-owned solar project. Energy storage projects were previously ineligible for tax credits unless they were connected directly to solar power projects.

The Inflation Reduction Act removes these requirements and allows energy storage projects to receive the same 30% tax credit, even if they are stand-alone facilities. Batteries connected to a solar power project will continue to qualify for the credit, even if they are no longer being charged by solar power. Solar power projects eligible for the full 30% tax credit can increase their tax credit by an additional 10% – to 40% in total – by purchasing domestically produced hardware. Per the document, 100% of steel and iron must be US manufactured in the United States. For manufactured goods – like solar panels, inverters, and electrical gear – the goods must initially be 40% US manufactured, though this percentage will increase in the future.

Historically, the federal solar tax credit has only been available to for-profit businesses that pay taxes. Because of this, solar ownership has been less viable for tax-exempt organizations, and power purchase agreements have been the only real option.

Thanks to the Inflation Reduction Act, tax-exempt organizations can now receive a direct payment worth 30% of their solar installation costs, making solar installation and ownership a more viable option for public schools, government buildings, and non-profit organizations.

Honeywell will evaluate the two methods of Solar Procurement for the District to further assess the feasibility of a solar photovoltaic system on District owned roofs to generate on-site renewable electricity.

Honeywell will oversee the design and construction of the system. We will assist in the 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 a new solar PV system at the potential buildings listed in the chart below.

Table 6A.1 Proposed Solar PV System

Building	Type	kW DC	kWh AC Generated
Administrative Offices	Roof-mount	110.5	149,952
Central Elementary School	Roof-mount	125.5	170,307
Heywood Avenue School	Roof-mount	117.0	158,772
Orange High School and Prep Academy	Roof-mount	1224.0	1,661,002
John R. Lewis Early Childhood Center	Roof-mount	66.5	90,242
Lincoln Avenue School	Roof-mount	223.5	303,296
Oakwood Ave Community School	Roof-mount	36.5	49,532
Orange Early Childhood Center	Roof-mount	81.0	109,919
Park Avenue School	Roof-mount	172.5	234,087
Rosa Parks Community School	Roof-mount	129.5	175,735
STEM Academy of Orange	Roof-mount	163.0	221,196
Total		2,449.5	3,324,040



Administrative Offices – Solar PPA



Central Elementary School – Solar PPA



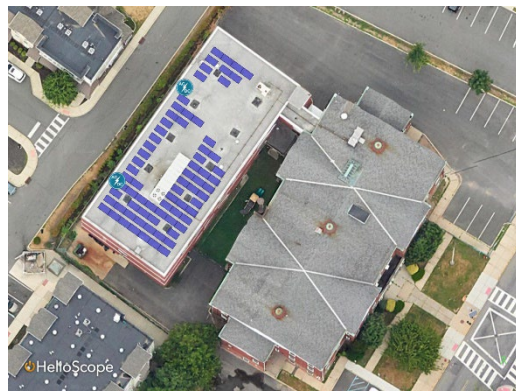
Heywood Avenue School – Solar PPA



Orange High School and Prep Academy – Solar PPA



John R. Lewis Early Childhood Center – Solar PPA



Oakwood Ave Community School – Solar PPA



Orange Early Childhood Center – Solar PPA



Rosa Parks Community School – Solar PPA



STEM Academy of Orange – Solar PPA



Lincoln Avenue School – Solar PPA



Park Avenue School – Solar PPA

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the current District’s kWh price.

CHANGES IN INFRASTRUCTURE

The proposed solar array would be roof-mounted only.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

ECM 6B Remote Solar - Net Metering

The key benefits of this ECM include:

- **Reduced utility costs.**
- **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.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
6B Community Solar	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

ECM OVERVIEW

Similar to Solar PPA, customers who are unable to install solar system on their site due to shading, interconnection, roof conditions and other factors can install Remote Solar. This solution is especially important for end users whose ability to install solar on the premises is limited.

With Remote Solar, the solar system is developed in a geographic location within the end user’s utility territory through a Power Purchase agreement. Solar energy is obligated by the customer and transferred thereto in the form of utility credits as if solar were connected at their facilities.

Honeywell will assist in the feasibility study during your IGA, in conjunction with your technical consultant and legal team, to provide RFP development, solicitation, and oversight of the Remote Solar Net Metering Program. Honeywell will solicit proposals from qualified providers who are able to provide this solution within a 24- to 36-month window from time of engagement.

PROPOSED SOLUTION

Honeywell proposes the District to install Remote Solar Net Metering in order to reduce utility costs.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on the difference in kWh price between the Remote Solar rate and the District’s current electrical rate.

CHANGES IN INFRASTRUCTURE None.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES None.

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

ECM 6C Replace Solar Inverters

The key benefits of this ECM include:

- **Reduced utility costs.**
- **Educational asset** to provide additional tools for teachers to engage students on sustainability and the environment.
- **Lower upfront costs** than replacing the whole solar system.

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
6C Replace Solar Inverters								▪			▪			

ECM OVERVIEW

To ensure a solar system is working properly, both the solar panels and the inverters must be working at optimum condition. Solar panels are usually more reliable and long-lasting as they are made to expose to the outside and sustain inclement weather. They could last for 25 years or more. On the other hand, inverters are more complex electronic machines and have a shorter lifespan of about 10-15 years. As a result, inverters will need to be replaced at some point during the productive period of solar power system. A drop in electricity production could be a sign for inverter failure.



Lincoln Avenue School - Solar Inverter



Park Avenue School - Solar Inverter

EXISTING CONDITIONS

There are existing roof-mount solar systems at Lincoln Avenue School and Park Avenue School installed in 2010. The systems are not working properly and not producing electricity as expected.

Table 6C.1 Existing Solar PV System

Building	kW DC	Potential kWh AC Generated with Inverter Replacements
Lincoln Avenue School	110.0	136,788
Park Avenue School	112.4	139,773

PROPOSED SOLUTION

Honeywell proposes to replace the old solar inverters. This will allow the current solar system to function and produce electricity properly.

ENERGY SAVINGS METHODOLOGY AND RESULTS

Savings are based on kWh generated by the solar systems.

CHANGES IN INFRASTRUCTURE

The proposed solar array would be roof-mounted only.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.



SECTION D

TECHNICAL & FINANCIAL SUMMARY

ECM 6D Solar 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 schools 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.
- **Low risk** given that maintenance is provided by the 3rd party system owner.
- **No upfront costs.**

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
6D Solar PPA	▪		▪		▪	▪	▪	▪	▪	▪	▪	▪		▪

ECM OVERVIEW

Honeywell recommends that the District further assess the feasibility of a solar photovoltaic system on District owned roofs or grounds to generate on-site renewable electricity.

If interconnection is available, 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 lower electricity t 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.

Honeywell will oversee the design and construction of the system. We will assist in the 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

If this option is viable, Honeywell proposes to install a new solar PPA system at the potential buildings listed in the chart below.

Table 6A.1 Proposed Solar PPA System

Building	Type	kW DC	kWh AC Generated
Administrative Offices	Roof-mount	110.5	149,952
Central Elementary School	Roof-mount	125.5	170,307
Heywood Avenue School	Roof-mount	117.0	158,772
Orange High School and Prep Academy	Roof-mount	1224.0	1,661,002
John R. Lewis Early Childhood Center	Roof-mount	66.5	90,242
Lincoln Avenue School	Roof-mount	223.5	303,296
Oakwood Ave Community School	Roof-mount	36.5	49,532
Orange Early Childhood Center	Roof-mount	81.0	109,919
Park Avenue School	Roof-mount	172.5	234,087
Rosa Parks Community School	Roof-mount	129.5	175,735
STEM Academy of Orange	Roof-mount	163.0	221,196
Total		2,449.5	3,324,040



Administrative Offices – Solar PPA



Central Elementary School – Solar PPA



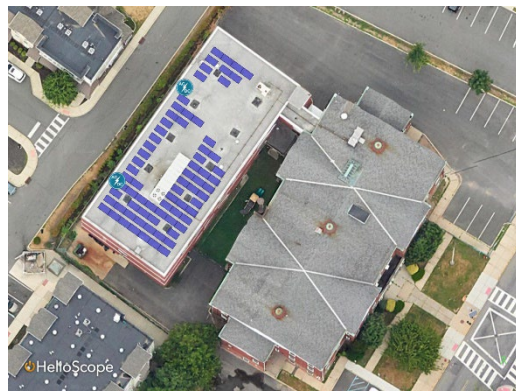
Heywood Avenue School – Solar PPA



Orange High School and Prep Academy – Solar PPA



John R. Lewis Early Childhood Center – Solar PPA



Oakwood Ave Community School – Solar PPA



Orange Early Childhood Center – Solar PPA



Rosa Parks Community School – Solar PPA



STEM Academy of Orange – Solar PPA



Lincoln Avenue School – Solar PPA



Park Avenue School – Solar PPA

ENERGY SAVINGS METHODOLOGY AND RESULTS

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

CHANGES IN INFRASTRUCTURE

The proposed solar array would be roof-mounted only.

CUSTOMER SUPPORT AND COORDINATION WITH UTILITIES

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

ENVIRONMENTAL ISSUES

Resource Use	None.
Waste Production	None.
Environmental Regulations	Aside from the environmental benefits of increasing energy awareness no other environmental impact is expected.

SECTION D – TECHNICAL & FINANCIAL SUMMARY

1. RECOMMENDED ESIP PROJECT

Form II: Recommended Project — Energy Conservation Measures (ECMs) Summary Form

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

ESCO Name: Honeywell International

Proposed Preliminary Energy Savings Plan: ECMs (Base Project)	Estimated Costs \$	Estimated Annual Savings \$	Estimated Simple Payback (years)
1A LED Lighting	\$ 3,541,336	\$ 446,720	7.93
2A Boiler Replacements	\$ 1,731,296	\$ 78,453	22.07
2B Domestic Water Heater Replacements	\$ 113,982	\$ 305	373.22
2C Steam Traps	\$ 247,591	\$ 13,537	18.29
2D Unit Ventilator Replacements	\$ 980,885	\$ 11,564	84.82
2E Chiller Replacements	\$ -	\$ 30,262	-
2F Roof Top Unit Upgrades	\$ -	\$ 26,460	-
3A Building Management Controls	\$ 5,472,430	\$ 291,826	18.75
4A Building Envelope Improvements	\$ 339,010	\$ 16,723	20.27
4B Roof Replacements	\$ -	\$ 3,292	-
5A Cogeneration CHP	\$ 235,385	\$ 784	300.32
6A Solar PV	\$ 3,736,659	\$ 206,060	18.13
Add additional lines as needed* Project Summary:	\$ 16,398,572	\$ 1,125,985	14.56

Optional ECMs Considered, but not included with base project at this time	Estimated Costs \$	Estimated Annual Savings \$	Estimated Simple Payback (years)
1B Stadium Lights	\$ 549,478	\$ 13,203	41.62
1C Destratification Fans	\$ 554,158	\$ 11,340	48.87
2G Premium Efficiency Motors and VFDs	\$ 169,714	\$ 7,473	22.71
2H Split System Upgrades	\$ 1,508,494	\$ 12,014	125.56
2I AHU Replacements	\$ 470,121	\$ 6,942	67.72
2J Boiler Controls	\$ 371,269	\$ 18,392	20.19
3B Building Sustainability Manager HBSM	\$ 519,777	\$ 10,550	49.27
4C Pipe Insulation	\$ 339,209	\$ 8,783	38.62
4D Window Replacements	\$ 2,280,521	\$ 8,163	279.36
6B Community Solar	\$ 0	\$ 82,351	0.00
6C Replace Solar Inverters	\$ 107,820	\$ 38,878	2.77
6D Solar PPA	\$ 33,860	\$ 107,409	0.32

Form III: Recommended Project — Projected Annual Energy Savings Data Form

<p>FORM III ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP) PROJECTED ANNUAL ENERGY SAVINGS DATA FORM ORANGE BOE ENERGY SAVING IMPROVEMENT PROGRAM</p>
--

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)	23,328	\$167,477	7,724	\$57,411
Electric Energy (KWH)	7,569,347	\$1,001,768	4,982,010	\$580,131
Natural Gas (therms)	426,155	\$428,903	108,080	\$109,545
Fuel Oil (Gal)	2,829	\$9,666	426	\$1,455
Steam (Pounds)				
Water (gallons)				
Other (Specify Units)				
Other (Specify Units)				
Avoided Emissions (1)	Provide in Pounds (Lbs)			
NOX	5,129			
SO2	3,338			
CO2	4,593,505			

(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

<p>FORM IV ESCO's PRELIMINARY ENERGY SAVINGS PLAN (ESP): PROJECTED ANNUAL ENERGY SAVINGS DATA FORM IN MMBTUs ORANGE BOE ENERGY SAVING IMPROVEMENT PROGRAM</p>
--

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)	25,827	16,999	
Natural Gas (MMBTUs)	42,616	10,808	
Fuel Oil (MMBTUs)	396	60	
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 VI: Recommended Project — District Preliminary Annual Cash Flow Analysis Forms

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

ESCO Name: Honeywell International

Note: Proposers must use the following assumptions in all financial calculations:

(a) The cost of all types of energy should be assumed to inflate at: 2.4% gas, 2.2% electric per year

- 1. Term of Agreement: 20 (Years) (Months)
- 2. Construction Period ⁽²⁾ (months): 18
- 3. Cash Flow Analysis Format:

Capital Project	\$	16,398,572						
Technical Energy Audit	\$	95,657						
Project Costs ⁽¹⁾	\$	16,494,229						
Capital Contribution	\$	(2,624,830)						
Bond Counsel Muni Advisor Budget	\$	150,000						
Financed Value:	\$	14,019,399						

Interest Rate to Be Used for Proposal Purposes: 4.00%

Year	Annual Energy Savings ⁽⁵⁾	Solar Savings	Annual Operational Savings	Energy Rebates/Incentives ⁽⁴⁾		Total Annual Savings	Annual Project Costs	Board Costs	Annual Service Costs ⁽³⁾	Net Cash-Flow to Client	Cumulative Cash Flow
				Value	Utility						
Installation						\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
1	\$ 705,227	\$ 206,060	\$ 377,443	\$ 1,306,372	PSEG & IRA Tax Credits	\$ 2,595,102	\$ (2,575,673)	\$ (2,575,673)	\$ -	\$ 19,429	\$ 19,429
2	\$ 554,604	\$ 209,540	\$ 377,443	\$ -		\$ 1,141,587	\$ (1,122,158)	\$ (1,122,158)	\$ -	\$ 19,429	\$ 38,858
3	\$ 566,998	\$ 213,079	\$ 117,443			\$ 897,520	\$ (878,091)	\$ (878,091)	\$ -	\$ 19,429	\$ 58,287
4	\$ 579,669	\$ 216,678	\$ 117,443			\$ 913,791	\$ (894,362)	\$ (894,362)	\$ -	\$ 19,429	\$ 77,717
5	\$ 592,625	\$ 220,338	\$ 117,443			\$ 930,406	\$ (910,977)	\$ (910,977)	\$ -	\$ 19,429	\$ 97,146
6	\$ 605,872	\$ 224,059				\$ 829,932	\$ (810,502)	\$ (810,502)	\$ -	\$ 19,429	\$ 116,575
7	\$ 619,416	\$ 227,844				\$ 847,260	\$ (827,831)	\$ (827,831)	\$ -	\$ 19,429	\$ 136,004
8	\$ 633,264	\$ 231,692				\$ 864,956	\$ (845,527)	\$ (845,527)	\$ -	\$ 19,429	\$ 155,433
9	\$ 647,422	\$ 235,605				\$ 883,027	\$ (863,598)	\$ (863,598)	\$ -	\$ 19,429	\$ 174,862
10	\$ 661,898	\$ 239,585				\$ 901,483	\$ (882,054)	\$ (882,054)	\$ -	\$ 19,429	\$ 194,291
11	\$ 676,699	\$ 243,631				\$ 920,331	\$ (900,901)	\$ (900,901)	\$ -	\$ 19,429	\$ 213,720
12	\$ 691,832	\$ 247,746				\$ 939,579	\$ (920,149)	\$ (920,149)	\$ -	\$ 19,429	\$ 233,150
13	\$ 707,305	\$ 251,931				\$ 959,236	\$ (939,807)	\$ (939,807)	\$ -	\$ 19,429	\$ 252,579
14	\$ 723,125	\$ 256,186				\$ 979,311	\$ (959,882)	\$ (959,882)	\$ -	\$ 19,429	\$ 272,008
15	\$ 739,300	\$ 260,513				\$ 999,813	\$ (980,384)	\$ (980,384)	\$ -	\$ 19,429	\$ 291,437
16	\$ 755,838	\$ 264,913				\$ 1,020,751	\$ (1,001,322)	\$ (1,001,322)	\$ -	\$ 19,429	\$ 310,866
17	\$ 772,747	\$ 269,387				\$ 1,042,134	\$ (1,022,705)	\$ (1,022,705)	\$ -	\$ 19,429	\$ 330,295
18	\$ 790,036	\$ 273,937				\$ 1,063,973	\$ (1,044,544)	\$ (1,044,544)	\$ -	\$ 19,429	\$ 349,724
19	\$ 807,712	\$ 278,564				\$ 1,086,276	\$ (1,066,847)	\$ (1,066,847)	\$ -	\$ 19,429	\$ 369,153
20	\$ 825,786	\$ 283,269				\$ 1,109,055	\$ (1,089,625)	\$ (1,089,625)	\$ -	\$ 19,429	\$ 388,583
Totals	\$ 13,657,375	\$ 4,854,559	\$ 1,107,215	\$ 1,306,372		\$ 20,925,521	\$ (20,536,938)	\$ (20,536,938)	\$ -	\$ 388,583	\$ 388,583

NOTES:

- (1) Includes: Hard costs and project service fees defined in ESCO's PROPOSED "FORM V"
- (2) No payments are made by 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.
- (4) As of July 1, 2021, all of former NJ Clean Energy Program incentive programs transitioned over to the investor-owned gas and electric utility companies. Subsequently, the BPU is requiring that all ESIP projects consult with the DCA and follow all DCA guidance regarding the procurement of all subcontractors.
- (5) Installation Savings is included in year 1.

Building-by-Building Simple Payback Summary

Building & ECM	kWh Savings (\$)	kW Savings (\$)	Natural Gas Savings (\$)	Fuel Oil Savings (\$)	Annual Energy Cost Savings (\$)	Annual Operational Savings (\$)	Estimated Costs (\$)	Simple Payback
Administrative Offices	\$ 35,653	\$ 868	\$ 7,124	\$ -	\$ 72,622	\$ 28,978	\$ 761,098	7.0
1A LED Lighting	\$ 11,186	\$ 868	\$ (709)	\$ -	\$ 15,324	\$ 3,978	\$ 126,394	5.5
2A Boiler Replacements	\$ -	\$ -	\$ 3,684	\$ -	\$ 13,684	\$ 10,000	\$ -	-
3A Building Management Controls	\$ 4,355	\$ -	\$ 3,204	\$ -	\$ 22,559	\$ 15,000	\$ 270,258	8.0
4A Building Envelope Improvements	\$ 144	\$ -	\$ 409	\$ -	\$ 553	\$ -	\$ 8,587	10.4
4B Roof Replacements	\$ 122	\$ -	\$ 535	\$ -	\$ 657	\$ -	\$ -	-
6A Solar PV	\$ 19,845	\$ -	\$ -	\$ -	\$ 19,845	\$ -	\$ 355,859	12.0
Bell Stadium Warehouse, Garage and Field House	\$ 79	\$ -	\$ -	\$ 1,455	\$ 1,534	\$ -	\$ 7,530	3.3
2C Steam Traps	\$ -	\$ -	\$ -	\$ 1,098	\$ 1,098	\$ -	\$ 4,718	2.9
4A Building Envelope Improvements	\$ 79	\$ -	\$ -	\$ 357	\$ 436	\$ -	\$ 2,811	4.3
Central Elementary School	\$ 7,090	\$ 2,162	\$ 6,160	\$ -	\$ 35,991	\$ 20,578	\$ 938,014	17.4
1A LED Lighting	\$ 4,963	\$ 2,162	\$ (513)	\$ -	\$ 12,190	\$ 5,578	\$ 172,088	9.4
2C Steam Traps	\$ -	\$ -	\$ 607	\$ -	\$ 607	\$ -	\$ 12,582	13.8
3A Building Management Controls	\$ 2,037	\$ -	\$ 5,858	\$ -	\$ 22,895	\$ 15,000	\$ 749,329	21.9
4A Building Envelope Improvements	\$ 91	\$ -	\$ 208	\$ -	\$ 298	\$ -	\$ 4,015	9.0
Forest Street Community School	\$ 21,246	\$ 3,768	\$ 6,726	\$ -	\$ 62,041	\$ 30,301	\$ 737,490	7.9
1A LED Lighting	\$ 17,842	\$ 3,768	\$ (823)	\$ -	\$ 26,088	\$ 5,301	\$ 166,804	4.3
2A Boiler Replacements	\$ -	\$ -	\$ 1,413	\$ -	\$ 11,413	\$ 10,000	\$ 192,360	11.3
2C Steam Traps	\$ -	\$ -	\$ 922	\$ -	\$ 922	\$ -	\$ 16,776	12.1
3A Building Management Controls	\$ 3,174	\$ -	\$ 4,687	\$ -	\$ 22,861	\$ 15,000	\$ 350,466	10.2
4A Building Envelope Improvements	\$ 229	\$ -	\$ 528	\$ -	\$ 757	\$ -	\$ 11,083	9.8
Heywood Avenue School	\$ 32,340	\$ 4,134	\$ 13,596	\$ -	\$ 91,066	\$ 40,996	\$ 2,137,288	15.7
1A LED Lighting	\$ 18,426	\$ 4,134	\$ (1,357)	\$ -	\$ 27,199	\$ 5,996	\$ 197,564	4.8
2A Boiler Replacements	\$ -	\$ -	\$ 512	\$ -	\$ 10,512	\$ 10,000	\$ -	-
2C Steam Traps	\$ -	\$ -	\$ 4,297	\$ -	\$ 4,297	\$ -	\$ 64,484	10.0
2D Unitventilator Replacements	\$ 371	\$ -	\$ 1,193	\$ -	\$ 11,564	\$ 10,000	\$ 969,943	56.0
3A Building Management Controls	\$ 2,797	\$ -	\$ 6,524	\$ -	\$ 24,321	\$ 15,000	\$ 694,091	19.1
4A Building Envelope Improvements	\$ 440	\$ -	\$ 1,616	\$ -	\$ 2,056	\$ -	\$ 29,251	9.5
4B Roof Replacements	\$ 158	\$ -	\$ 810	\$ -	\$ 969	\$ -	\$ -	-
6A Solar PV	\$ 10,147	\$ -	\$ -	\$ -	\$ 10,147	\$ -	\$ 181,955	12.0
John R. Lewis Early Childhood Center	\$ 4,045	\$ 644	\$ 475	\$ -	\$ 6,450	\$ 1,287	\$ 121,511	12.6
1A LED Lighting	\$ 3,699	\$ 644	\$ (139)	\$ -	\$ 5,491	\$ 1,287	\$ 35,836	4.4
4A Building Envelope Improvements	\$ 345	\$ -	\$ 614	\$ -	\$ 959	\$ -	\$ 85,675	59.6
Lincoln Avenue School	\$ 77,686	\$ 13,274	\$ 4,256	\$ -	\$ 133,340	\$ 38,124	\$ 830,701	4.2
1A LED Lighting	\$ 62,879	\$ 13,274	\$ (3,366)	\$ -	\$ 95,911	\$ 23,124	\$ 737,513	5.1
3A Building Management Controls	\$ 14,340	\$ -	\$ 6,244	\$ -	\$ 35,584	\$ 15,000	\$ 64,309	1.2
4A Building Envelope Improvements	\$ 467	\$ -	\$ 1,378	\$ -	\$ 1,846	\$ -	\$ 28,879	10.4

Building & ECM	kWh Savings (\$)	kW Savings (\$)	Natural Gas Savings (\$)	Fuel Oil Savings (\$)	Annual Energy Cost Savings (\$)	Annual Operational Savings (\$)	Estimated Costs (\$)	Simple Payback
Oakwood Ave Community School	\$ 37,816	\$ 3,710	\$ 13,096	\$ -	\$ 96,965	\$ 42,342	\$ 1,477,254	10.2
1A LED Lighting	\$ 21,604	\$ 3,710	\$ (1,103)	\$ -	\$ 31,554	\$ 7,342	\$ 212,112	4.5
2A Boiler Replacements	\$ -	\$ -	\$ 3,487	\$ -	\$ 13,487	\$ 10,000	\$ 581,219	28.8
2C Steam Traps	\$ -	\$ -	\$ 1,881	\$ -	\$ 1,881	\$ -	\$ 35,650	12.7
2F Roof Top Unit Upgrades	\$ 2,889	\$ -	\$ 577	\$ -	\$ 13,465	\$ 10,000	\$ -	-
3A Building Management Controls	\$ 3,111	\$ -	\$ 7,396	\$ -	\$ 25,507	\$ 15,000	\$ 461,691	12.1
4A Building Envelope Improvements	\$ 176	\$ -	\$ 454	\$ -	\$ 630	\$ -	\$ 8,654	9.2
4B Roof Replacements	\$ 113	\$ -	\$ 405	\$ -	\$ 518	\$ -	\$ -	-
6A Solar PV	\$ 9,923	\$ -	\$ -	\$ -	\$ 9,923	\$ -	\$ 177,930	12.0
Orange Early Childhood Center	\$ 6,992	\$ 1,576	\$ 539	\$ -	\$ 11,898	\$ 2,791	\$ 95,828	5.4
1A LED Lighting	\$ 6,766	\$ 1,576	\$ -	\$ -	\$ 11,133	\$ 2,791	\$ 79,614	4.8
4A Building Envelope Improvements	\$ 226	\$ -	\$ 539	\$ -	\$ 765	\$ -	\$ 16,214	14.2
Orange High School and Prep Academy	\$ 232,232	\$ 10,942	\$ 25,317	\$ -	\$ 323,895	\$ 55,405	\$ 5,379,729	11.1
1A LED Lighting	\$ 69,471	\$ 10,795	\$ (3,466)	\$ -	\$ 107,205	\$ 30,405	\$ 775,872	4.8
2C Steam Traps	\$ -	\$ -	\$ 3,711	\$ -	\$ 3,711	\$ -	\$ 78,639	14.1
2F Roof Top Unit Upgrades	\$ 2,995	\$ -	\$ -	\$ -	\$ 12,995	\$ 10,000	\$ -	-
3A Building Management Controls	\$ 14,785	\$ -	\$ 23,442	\$ -	\$ 53,227	\$ 15,000	\$ 1,680,449	21.1
4A Building Envelope Improvements	\$ 756	\$ -	\$ 2,331	\$ -	\$ 3,087	\$ -	\$ 45,169	9.8
5A Cogeneration CHP	\$ 1,338	\$ 147	\$ (702)	\$ -	\$ 784	\$ -	\$ 237,414	202.2
6A Solar PV	\$ 142,887	\$ -	\$ -	\$ -	\$ 142,887	\$ -	\$ 2,562,186	12.0
Park Avenue School	\$ 40,553	\$ 7,008	\$ 10,706	\$ -	\$ 105,555	\$ 47,288	\$ 1,461,452	9.2
1A LED Lighting	\$ 28,112	\$ 7,008	\$ (2,140)	\$ -	\$ 45,268	\$ 12,288	\$ 438,082	6.5
2A Boiler Replacements	\$ -	\$ -	\$ 2,829	\$ -	\$ 12,829	\$ 10,000	\$ 938,405	48.8
2E Chiller Replacements	\$ 4,478	\$ -	\$ -	\$ -	\$ 14,478	\$ 10,000	\$ -	-
3A Building Management Controls	\$ 7,712	\$ -	\$ 9,167	\$ -	\$ 31,878	\$ 15,000	\$ 67,401	1.4
4A Building Envelope Improvements	\$ 251	\$ -	\$ 850	\$ -	\$ 1,101	\$ -	\$ 17,563	10.6
Rosa Parks Community School	\$ 67,212	\$ 6,526	\$ 16,122	\$ -	\$ 136,772	\$ 46,912	\$ 1,765,029	8.6
1A LED Lighting	\$ 29,191	\$ 6,526	\$ (1,950)	\$ -	\$ 45,679	\$ 11,912	\$ 418,286	6.1
2A Boiler Replacements	\$ -	\$ -	\$ 6,527	\$ -	\$ 16,527	\$ 10,000	\$ -	-
2B Domestic Water Heater Replacements	\$ -	\$ -	\$ 305	\$ -	\$ 305	\$ -	\$ 112,711	246.4
2E Chiller Replacements	\$ 5,784	\$ -	\$ -	\$ -	\$ 15,784	\$ 10,000	\$ -	-
3A Building Management Controls	\$ 8,258	\$ -	\$ 9,354	\$ -	\$ 32,612	\$ 15,000	\$ 796,490	16.3
4A Building Envelope Improvements	\$ 518	\$ -	\$ 939	\$ -	\$ 1,457	\$ -	\$ 20,494	9.4
4B Roof Replacements	\$ 203	\$ -	\$ 946	\$ -	\$ 1,149	\$ -	\$ -	-
6A Solar PV	\$ 23,258	\$ -	\$ -	\$ -	\$ 23,258	\$ -	\$ 417,048	12.0
Scholars Academy	\$ 5,661	\$ 571	\$ 1,602	\$ -	\$ 12,249	\$ 4,415	\$ 159,281	8.7
1A LED Lighting	\$ 4,699	\$ 571	\$ (377)	\$ -	\$ 9,308	\$ 4,415	\$ 106,389	7.6
2C Steam Traps	\$ -	\$ -	\$ 1,020	\$ -	\$ 1,020	\$ -	\$ 31,980	20.9
4A Building Envelope Improvements	\$ 963	\$ -	\$ 958	\$ -	\$ 1,921	\$ -	\$ 20,912	7.3
STEM Academy of Orange	\$ 11,527	\$ 2,227	\$ 3,827	\$ -	\$ 35,607	\$ 18,026	\$ 526,368	9.9
1A LED Lighting	\$ 9,700	\$ 2,227	\$ (583)	\$ -	\$ 14,370	\$ 3,026	\$ 105,316	4.9
3A Building Management Controls	\$ 1,501	\$ -	\$ 3,880	\$ -	\$ 20,381	\$ 15,000	\$ 385,130	12.6
4A Building Envelope Improvements	\$ 325	\$ -	\$ 531	\$ -	\$ 856	\$ -	\$ 35,921	28.0
Project Total	\$ 580,131	\$ 57,411	\$ 109,545	\$ 1,455	\$ 1,125,985	\$ 377,443	\$ 16,398,572	9.7

UTILITY AND OTHER REBATES & INCENTIVES

Summary of Total Rebates and Incentives

Year	Prescriptive Lighting	Prescriptive and Custom HVAC	Solar IRA Tax Credit	Total Incentives
Installation				
Year 1	\$288,158	\$70,499	\$947,716	\$1,306,372
Year 2				
Year 3				
Year 4				
Year 5				
Totals	\$288,158	\$70,499	\$947,716	\$1,306,372

Incentives, Rebates and Grants

Honeywell has determined that the Orange Township Public School District is eligible for **\$1,306,372** in estimated total incentives for the projects included in the Prescriptive Lighting Programs, Prescriptive and Custom HVAC, and IRA Tax Credit. Please refer to the tables on below for a breakdown of Orange Township Public School District incentive levels on a building-by-building basis for the incentive.

Prescriptive and Custom

Location	Prescriptive Lighting (Initial Installation)	Prescriptive and Custom HVAC
Administrative Offices	\$14,313	\$1,642.95
Central Elementary School	-	\$577.74
Forest Street Community School	\$12,975	\$842.54
Heywood Avenue School	\$13,026	\$6,097.08
Orange High School and Prep Academy	\$16,334	\$4,894.76
John R. Lewis Early Childhood Center	\$69,353	\$9,027.22
Lincoln Avenue School	\$2,034	\$2,467.44
Oakwood Ave Community School	\$36,787	\$5,639.01
Orange Early Childhood Center	\$18,456	\$9,867.79
Park Avenue School	\$8,624	\$2,147.48
Rosa Parks Community School	\$34,787	\$16,474.69
Scholars Academy	\$51,504	\$4,198.05
STEM Academy of Orange	\$9,196	\$4,298.46
Bell Stadium Warehouse, Garage and Field House	\$769	\$2,323.49
Totals	\$288,158	\$70,499

Solar IRA Tax Credit

The Inflation Reduction Act permitted public, tax-exempt entities to receive Investment Tax Credits (ITC) for solar types of projects. The Orange Township Public School District can take advantage of the ITC for the solar ECMs being implemented at locations specified below:

Clean Energy Investment Tax Credit (ITC) (Tax Mechanism: Investment Tax Credit (ITC) available at COD, IRA #13702, Tax Code 26 U.S. Code 48)									
Projects Placed in Service After 12/31/2024 but before 12/31/2032			Base Credit	Prevailing Wage Adder	Domestic Content Adder	Low Income Bonus	Potential Total ITC	Tax Exempt Bond Finance Reduction*	Potential Total ITC Utilizing Bond Financing
Building	Solar Size KW-DC	Solar Cost	6%	24%	0%	0%	30%	-15%	25.5%
Administrative Offices	110.5	\$357,935	\$21,476	\$85,904	\$0	\$0	\$107,381	-\$16,107	\$91,273
Heywood Avenue School	56.5	\$183,017	\$10,981	\$43,924	\$0	\$0	\$54,905	-\$8,236	\$46,669
Orange High School and Prep Academy	795.6	\$2,577,132	\$154,628	\$618,512	\$0	\$0	\$773,140	-\$115,971	\$657,169
Oakwood Ave Community School	55.25	\$178,968	\$10,738	\$42,952	\$0	\$0	\$53,690	-\$8,054	\$45,637
Rosa Parks Community School	129.5	\$419,480	\$25,169	\$100,675	\$0	\$0	\$125,844	-\$18,877	\$106,968
Totals	1,147	\$3,716,532	\$222,992	\$891,968	\$0	\$0	\$1,114,959	-\$167,244	\$947,716

* The Tax-Exempt Bond Finance Reduction is 15% of the total potential ITC.

3. OPERATIONAL SAVINGS

Summary of Total Operational Savings for Sample Project

Year	Lighting Operation Savings	HVAC Operation Savings	Total Operational Savings
Installation	-	-	-
Year 1	\$117,443	\$260,000	\$377,443
Year 2	\$117,443	\$260,000	\$377,443
Year 3	\$117,443	-	\$117,443
Year 4	\$117,443	-	\$117,443
Year 5	\$117,443	-	\$117,443

Lighting Operational Savings (5 Years)

This Lighting Operational Savings category calculates the existing material costs for lamps and ballasts considering failure rate and average costs and compares to the reduced maintenance costs with all new LEDs to establish the operational savings.

School	Annual Maintenance Savings
Administrative Offices	\$3,978
Central Elementary School	\$5,578
Forest Street Community School	\$5,301
Heywood Avenue School	\$5,996
Orange High School and Prep Academy	\$30,405
John R. Lewis Early Childhood Center	\$1,287
Lincoln Avenue School	\$23,124
Oakwood Ave Community School	\$7,342
Orange Early Childhood Center	\$2,791
Park Avenue School	\$12,288
Rosa Parks Community School	\$11,912
Scholars Academy	\$4,415
STEM Academy of Orange	\$3,026
Total:	\$117,443

Operational Maintenance Cost Savings (2 Years)

The annual maintenance cost savings have been identified to be \$260,000 for the recommended project. Depending on the scope of the final project, the maximum maintenance cost savings would be \$450,343.

Orprange School District HVAC Related Maintenance Costs Fiscal Yr. 20- 21, 21-22, 22- 23, 23- to 2/24 (present)																		
Service	District	OPA	Lincoln	Rosa	Forest	Oakwood	Park	Central	OHS	Heywood	Admin	STEM	JRLECC	Warehouse	OECC	Scholars	Cleveland	Totals
See Annual Ledgers	\$ 1,400.00	\$ 167,600.00	\$ 50.00	\$ 50.00	\$ 4,524.00	\$ 650.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 5,670.00	\$ 4,434.02	\$ 6,100.00	\$ 2,795.00	\$ 1,256.40	\$ 1,500.00	\$ 43,450.00	
	\$ 800.00	\$ 650.00	\$ 480.00	\$ 3,612.45	\$ 1,450.00	\$ 100.00	\$ 480.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 6,130.00	\$ 6,100.00	\$ 2,844.00	\$ 771.67	\$ 4,584.00	\$ 900.00	\$ 4,000.00	
	\$ 1,200.00	\$ 6,000.00	\$ 45,913.43	\$ 1,345.00	\$ 1,340.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 8,029.00	\$ 418.00	\$ 2,722.72	\$ 6,348.43		\$ 2,810.00			
	\$ 1,000.00	\$ 1,500.00	\$ 50.00	\$ 650.00	\$ 6,100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 732.00	\$ 3,350.00	\$ 3,310.00		\$ 1,078.02			
	\$ 2,200.00	\$ 7,500.00	\$ 100.00	\$ 4,524.00	\$ 450.00	\$ 3,300.00	\$ 8,100.00	\$ 100.00	\$ 100.00	\$ 100.00	\$ 172.50	\$ 1,542.41	\$ 561.83		\$ 8,475.00			
	\$ 1,200.00	\$ 750.00	\$ 720.00	\$ 1,450.00	\$ 1,033.81	\$ 100.00	\$ 100.00	\$ 2,796.16	\$ 3,494.52	\$ 100.00	\$ 330.00	\$ 4,700.08			\$ 770.00			
	\$ 1,500.00	\$ 4,831.10	\$ 531.92	\$ 50.00	\$ 3,779.56	\$ 1,500.00	\$ 11,915.73	\$ 910.42	\$ 4,896.00	\$ 6,100.00	\$ 225.00	\$ 1,804.24			\$ 2,400.00			
	\$ 1,300.00	\$ 3,050.00	\$ 1,190.40	\$ 100.00	\$ 4,584.00	\$ 750.00	\$ 5,500.00	\$ 4,390.00	\$ 4,994.00	\$ 2,080.00	\$ 6,355.00	\$ 550.00			\$ 2,475.00			
	\$ 1,300.00	\$ 4,819.00	\$ 3,910.00	\$ 1,500.00	\$ 8,333.00	\$ 100.00	\$ 100.00	\$ 550.00	\$ 3,534.32	\$ 550.00	\$ 2,977.00	\$ 595.20			\$ 2,375.00			
	\$ 1,100.00	\$ 1,214.74	\$ 2,400.00	\$ 750.00	\$ 1,800.00	\$ 3,050.00	\$ 720.00	\$ 4,828.00	\$ 2,354.61	\$ 2,260.00	\$ 5,670.00	\$ 9,410.00						
	\$ 5,000.00	\$ 957.30	\$ 2,450.00	\$ 3,050.00	\$ 19,860.00	\$ 9,120.00	\$ 434.27		\$ 1,012.16	\$ 14,600.00	\$ 1,395.00	\$ 728.89						
	\$ 5,227.56	\$ 1,703.85	\$ 46,775.00	\$ 1,450.00	\$ 33,750.00	\$ 4,590.76	\$ 2,844.00		\$ 2,380.80	\$ 4,320.00	\$ 1,973.00	\$ 1,602.00						
	\$ 9,400.00	\$ 1,218.06	\$ 1,520.00	\$ 2,040.00	\$ 9,142.68	\$ 6,262.54	\$ 7,564.14		\$ 1,250.00	\$ 4,840.00	\$ 840.00	\$ 280.00						
	\$ 3,600.00	\$ 945.00	\$ 4,972.00	\$ 2,619.29	\$ 35,500.00	\$ 1,920.00	\$ 1,920.00		\$ 2,850.00	\$ 102,344.46	\$ 4,170.00	\$ 210.00						
	\$ 600.00	\$ 4,000.00	\$ 4,971.00	\$ 4,340.00	\$ 1,602.00	\$ 2,514.06	\$ 64.60		\$ 5,154.00	\$ 2,000.00	\$ 442.50	\$ 58,233.00						
	\$ 26,563.80	\$ 4,680.00	\$ 4,793.00	\$ 23,061.86	\$ 3,779.56	\$ 1,630.00	\$ 12,287.20		\$ 4,500.00	\$ 6,741.60	\$ 1,605.00	\$ 27,192.00						
	\$ 938.25	\$ 3,331.66	\$ 10,000.00	\$ 9,379.90	\$ 805,712.00	\$ 1,760.00	\$ 7,564.14		\$ 550.00	\$ 5,880.00	\$ 1,108.00	\$ 1,273,126.00						
	\$ 27,211.00	\$ 671,480.66	\$ 8,930.00	\$ 1,883.20	\$ 699,279.00	\$ 4,590.76	\$ 6,872.00		\$ 15,800.00	\$ 1,155.00	\$ 855.00	\$ 6,873.81						
	\$ 4,150.00	\$ 4,982.92	\$ 26,620.00	\$ 1,520.00	\$ 2,766.17	\$ 6,262.54	\$ 1,520.00		\$ 18,500.00	\$ 17,231.28	\$ 382.50							
	\$ 9,400.00		\$ 20,716.00	\$ 10,000.00	\$ 304,904.97	\$ 550.00	\$ 550.00		\$ 3,050.00	\$ 2,000.00	\$ 540.00							
	\$ 5,970.34		\$ 26,620.00	\$ 456.00	\$ 213,719.87	\$ 5,720.00	\$ 10,000.00		\$ 930.00	\$ 1,892.00	\$ 2,977.00							
	\$ 8,286.26		\$ 1,280.00	\$ 13,745.00	\$ 11,358.00	\$ 3,830.00	\$ 24,600.00		\$ 3,550.00	\$ 1,892.00	\$ 1,500.00							
	\$ 9,400.00		\$ 63,033.00	\$ 4,792.00	\$ 2,300.00	\$ 3,500.00	\$ 15,800.00		\$ 1,190.40	\$ 2,400.00	\$ 5,860.00							
	\$ 14,850.00		\$ 6,030.00	\$ 23,061.86	\$ 18,900.00	\$ 945.00	\$ 3,990.00		\$ 725.00	\$ 2,300.00	\$ 3,243.00							
desesa?	\$ 1,496.47		\$ 45,861.00	\$ 9,379.90	\$ 9,600.00	\$ 4,000.00	\$ 12,513.00		\$ 3,950.00		\$ 12,371.00							
	\$ 9,400.00		\$ 6,199.00	\$ 1,883.20	\$ 6,400.00	\$ 1,602.00	\$ 20,717.00		\$ 14,332.00		\$ 4,415.00							
	\$ 28,987.00		\$ 17,499.00	\$ 2,053.00	\$ 8,254.82	\$ 850.00	\$ 50,050.00		\$ 10,850.00		\$ 1,860.00							
	\$ 6,789.50		\$ 17,499.00	\$ 2,053.00		\$ 1,920.00	\$ 26,620.00		\$ 500.00		\$ 760.00							
	\$ 117,096.00		\$ 1,250.00	\$ 12,953.00		\$ 2,514.06	\$ 3,517.00		\$ 1,825.00		\$ 1,220.00							
	\$ 9,400.00		\$ 1,190.40	\$ 412.28		\$ 1,593,499.40	\$ 535.86				\$ 15,661.00							
	\$ 6,000.00		\$ 2,450.00	\$ 14,608.00		\$ 2,640.00	\$ 535.86				\$ 6,286.00							
	\$ 7,076.08		\$ 2,000.00	\$ 19,252.00		\$ 1,226.00	\$ 12,629.00											
			\$ 4,353.00	\$ 2,052.00		\$ 1,097.52	\$ 12,629.00											
			\$ 859.64	\$ 1,097.52		\$ 36,500.00	\$ 859.64											
			\$ 2,053.00	\$ 28,000.00			\$ 2,053.00											
			\$ 2,053.00	\$ 43,800.00			\$ 2,053.00											
			\$ 7,220.00				\$ 725.00											
			\$ 9,295.00				\$ 28,153.00											
			\$ 11,977.00				\$ 4,353.00											
			\$ 9,295.00				\$ 3,950.00											
			\$ 43,218.00				\$ 535.86											
			\$ 1,565.00				\$ 12,625.00											
			\$ 6,030.00				\$ 10,161.00											
			\$ 2,000.00				\$ 4,038.00											
			\$ 16,665.00				\$ 10,850.00											
			\$ 16,665.00				\$ 1,852.00											
			\$ 10,850.00															
			\$ 12,500.00															
			\$ 1,180.00															
			\$ 910.00															
			\$ 8,200.00															
Total for last 42 months	\$ 329,842.26	\$ 562,834.94	\$ 544,892.79	\$ 252,974.46	\$ 2,220,223.44	\$ 1,708,894.64	\$ 345,181.30	\$ 13,974.58	\$ 112,672.81	\$ 189,115.34	\$ 98,143.50	\$ 1,403,454.37	\$ 19,164.26	\$ 3,566.67	\$ 26,223.42	\$ 2,400.00	\$ 47,450.00	\$ 7,881,008.78
Average costs per month	\$ 7,853.39	\$ 13,400.83	\$ 12,973.64	\$ 6,023.20	\$ 52,862.46	\$ 40,687.97	\$ 8,218.60	\$ 332.73	\$ 2,682.69	\$ 4,502.75	\$ 2,336.75	\$ 33,415.58	\$ 456.29	\$ 84.92	\$ 624.37	\$ 57.14	\$ 1,129.76	\$ 187,643.07
Average Annual Costs last 42 Months	\$ 94,240.65	\$ 160,809.98	\$ 155,683.65	\$ 72,278.42	\$ 634,349.55	\$ 488,255.61	\$ 98,623.23	\$ 3,992.74	\$ 32,192.23	\$ 54,032.95	\$ 28,041.00	\$ 400,986.96	\$ 5,475.50	\$ 1,019.05	\$ 7,492.41	\$ 685.71	\$ 13,557.14	\$ 2,251,716.79
ESIP Operational Savings Budget	\$ 18,848.13	\$ 32,162.00	\$ 31,136.73	\$ 14,455.68	\$ 126,869.91	\$ 97,651.12	\$ 19,724.65	\$ 798.55	\$ 6,438.45	\$ 10,806.59	\$ 5,608.20	\$ 80,197.39	\$ 1,095.10	\$ 203.81	\$ 1,498.48	\$ 137.14	\$ 2,711.43	\$ 450,343.36

Max Operational Savings Depending on Final Score

4. TECHNICAL ENERGY AUDIT & PROJECT DEVELOPMENT – SEE FORM VI

The key benefits of this work include:

- Identify potential improvement and energy conservation measures
- Identify baseline energy use
- Identify preliminary costs and savings

ECM Description	Administrative Offices	Bell Stadium Warehouse, Garage and Field House	Central Elementary School	Forest Street Community School	Heywood Avenue School	Orange High School and Prep Academy	John R. Lewis Early Childhood Center	Lincoln Avenue School	Oakwood Ave Community School	Orange Early Childhood Center	Park Avenue School	Rosa Parks Community School	Scholars Academy	STEM Academy of Orange
Technical Energy Audit & Project Development	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪	▪

EXISTING CONDITIONS

The District has completed a Local Government Energy Audit and needs to complete an Energy Savings Plan to move forward with an Energy Savings Improvement Program.

PROPOSED SOLUTION

The Technical Energy Audit, or Energy Savings Plan (ESP) is the cornerstone of the ESIP program. It lays out what measures will be implemented to save energy, the expected payback period, and how it fits into the overall plan to reduce consumption. The ESP gives a snapshot of the project financial structure. Furthermore, the ESP must be approved by the Board and remain cash flow positive throughout the term of the project. These plans have a lifespan of 15 to 20 years depending on the ECMs being installed.

PROCESS

Honeywell’s approach to the engineering portion of an ESIP is detailed below and will be led by identified engineering team member. A technically sound solution that addresses the District’s current needs and future goals is the cornerstone to a successful Energy Savings Improvement Program.

PRELIMINARY AND INVESTMENT GRADE AUDIT

Preliminary Energy Audit Procedure

- This phase begins the process of identifying possible energy saving measures and infrastructure improvements at the facilities. All possible opportunities will be explored at this stage. These will be evaluated both technically and financially. We also begin to examine the current maintenance procedures taking place at the facility during this audit. The preliminary audit follows the steps below to get to the 30% review with the district.
- Conduct an initial walk-through inspection to become familiar with the buildings, systems equipment, maintenance, operation status, etc.

- Study the plans and specifications and become familiar with the buildings, systems, capacities, equipment, etc.
- Talk with the key decision makers within the District, building operating personnel, occupants, etc. about energy efficiency goals, sustainability goals, HVAC systems, comfort, problems, etc.
- Examine the overall building energy consumption history from the District. Compile a complete energy consumption history on gas, oil, electrical, etc., from utility companies and fuel suppliers. Compare the BTU consumption per square foot per year with other similar buildings and determine degree of variance. 8, 2017 49
- Evaluate current maintenance procedures. Examine future maintenance associated with additional equipment that may be installed.
- Develop a list of existing energy savings opportunities.
- Further develop the most promising energy improvements, based on success criteria.
- Perform preliminary energy savings calculations for the various energy improvements, estimate retrofit costs and calculate estimated paybacks.
- Complete energy baseline analysis for all utilities using the past year of utility data.
- Jointly select with the District at the 30% review which improvements to proceed with and assign priorities. Properly engineer retrofit work and proceed.

Upon completion of this phase of the audit process (equivalent to an ASHRAE Level 1 audit), we will review our findings with the District personnel. Candidate measures will be reviewed on the basis of energy, financial and operational impact. Together with your personnel, we will prioritize facility improvements and energy conservation measures. This is the 30% review identified in the diagram above. Based on the 30% review, a final list of energy conservation measures will then be developed for the in-depth energy audit. Typical financial payback periods are used in this step for the process and are refined as the audit progresses.

Investment Grade Audit Procedures to Final Design

During the investment grade audit phase, we conduct a thorough evaluation of the finalized list of improvements and energy conservation measures that have been mutually agreed upon between Honeywell and Region 4 ESC. This is done to verify project goal requirements along with savings figures, project costs, and maintenance requirements (equivalent to an ASHRAE Level 3 audit). This process comprises five major categories of activity, shown below.

Field Surveys

1. Make a thorough inspection of building systems and equipment and become thoroughly familiar with them. Check out operations, performance, maintenance, malfunctions, comfort, problems, etc.
2. Check nameplate data on equipment.
3. Conduct in-depth interviews with building personnel. Review maintenance, scheduling, performance, comfort, and problems of building, equipment, and systems.
4. Become familiar with actual hours of operation of systems and equipment, and the hours of occupancy of the personnel.

Energy History

1. Field Tests
2. Take test readings of actual flows, temperatures, pressures, rpm's, amps, volts, etc. at HVAC equipment.
3. Monitor readings over a period of time with test and recording equipment (data loggers) where appropriate.
4. Check lighting levels.

Evaluation of Improvements

1. List all project opportunities within the buildings, systems, and equipment.
2. Investigate/apply any applicable grants, incentives, rebates.
3. Develop potential improvements and develop those with most potential in full cooperation with the District write out list of improvements.
4. Calculate the potential energy savings in terms of BTU's and kWh and in cost, using current utility rate structures.
5. Calculate paybacks and return on investments using +/- 10% costs of work data and estimates.

Evaluation of Ongoing Service Needs

1. Review existing maintenance being performed at the facilities.
2. Discuss any gaps in existing equipment maintenance.

Review and Decisions

1. Review with the District. This is the 60% review indicated in the above diagram.
2. Costs of improvements/Improvement Options
3. Energy improvement options
4. Reaffirm Financial Payback Criteria
5. Return on investment
6. Potential savings
7. Select, with the District approval, improvements to proceed with and assign priorities. These final selections will be the outcome of the 90% review described in the diagram above. At the 90% review, final estimated costs will be developed.

After all the technical and financial parameters of the program are identified and the responsibilities of Honeywell and the District are clearly delineated, the contract would be offered to the District. It is structured such that the annual energy cost reductions will, at a minimum, equal or as in most cases, exceed the amortized implementation costs.

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

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

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

Certificates of Participation (COP's)

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

Energy Savings Obligations

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



SECTION E

MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

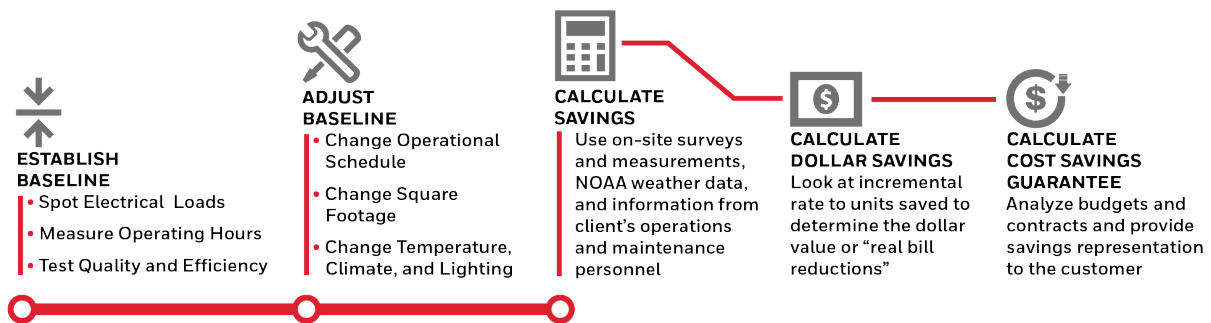
SECTION E – MEASUREMENT & VERIFICATION AND MAINTENANCE PLAN

1. BASELINE

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

Honeywell calculated the baseline based on the systems and operating conditions as they currently exist prior to the pandemic. The baseline was established from 3/2021-2/2022 in accordance with BPU guidelines as being considered a pre-pandemic baseline. Baseline development is 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 was 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, 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 CO2.
3. Lighting level and recording profile/run-hour and occupancy meters.
4. Multimeters, handheld 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 considered 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. The result is a coupled project where the final savings are equal to or greater than anticipated.

2. ADJUSTMENT TO BASELINE METHODOLOGY

The 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 measurement and verification the Orange Township Public School District requires and the needs of the District 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 the installed ECMs. This creates the ability over the life of the contract to continue measuring only savings achieved by the ECM and leaves the District 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:

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:

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

Calculating the units of energy saved is a critical measure of energy efficiency improvements, but it does not indicate the actual dollars saved. To do this, Honeywell has established 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.

$$\text{Annual Savings (\$)} = \sum_{m=1}^{12} \{ (\text{Rate}_{kWh, Base} \times kWh_{saved, m}) + (\text{Rate}_{fuel\ oil, Base} \times Fuel\ Oil_{saved, gal, m}) + (\text{Rate}_{Steam, Base} \times Steam_{Saved, klbs, m}) + (\text{Rate}_{NG} \times NG_{Saved, MCF, m}) \} + (\text{Agreed (\$)})$$

Where

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

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

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

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

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

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

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

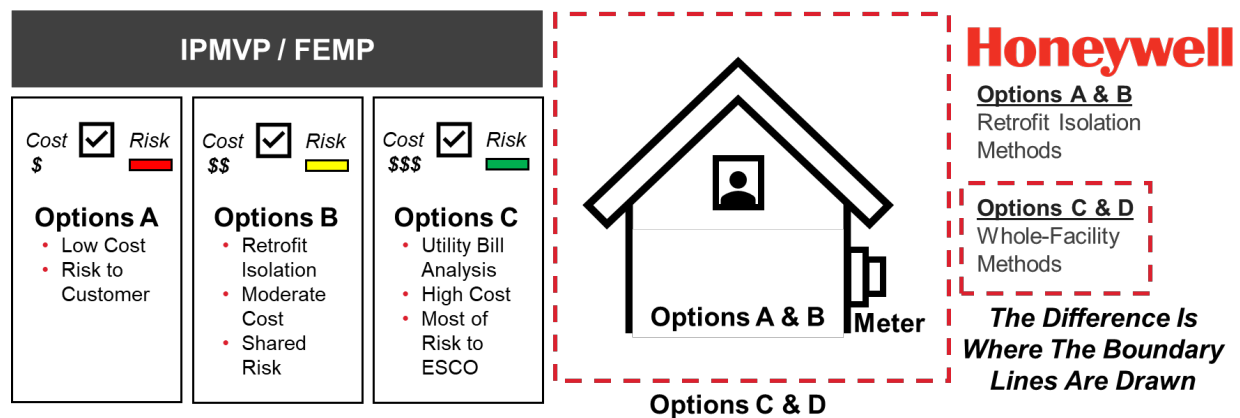
The O&M savings is typically a function of existing the District’s budgets (labor & direct costs), maintenance contracts and operations (supplier) contracts. Honeywell has analyzed the information to provide a conservative savings representation for the District’s review and acceptance. The information 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 the Orange Township Public School District agree on a mutually acceptable methodology for measuring and verifying energy savings that are attributable to the energy conservation measures (ECMs) Honeywell installs. This M&V plan provides the procedures to document the energy and cost savings of each of the proposed ECMs.

The plan for monitoring and verifying energy savings for the proposed ECMs is based on the methods described in the *International Performance Measurement and Verification Protocol (IPMVP)*¹. 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 the Orange Township Public School District 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 Orange Township Public School District to adapt to the demands of future campus growth and changes without the need for the District and Honeywell to negotiate energy baseline adjustments.

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

¹ www.ipmvp.org.

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

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

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
<p>Option A</p> <p>Verifying that the measure has the potential to perform and to generate savings.</p>	<p>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.</p>
<p>Option B</p> <p>Verifying that the measure has the potential to perform and verifying actual performance by end use.</p>	<p>Option B is appropriate for ECMs that require periodic or on-going measurements to quantify energy use, such as the use of variable frequency drives on pump or fan motors. Engineering calculations with metering and monitoring strategy throughout term of the contract.</p>
<p>Option C</p> <p>Verifying that the measure has the potential to perform and verifying actual performance (whole building analysis.)</p>	<p>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.</p> <p>Utility meter billing analysis-using techniques from simple comparison to multivariable regression analysis.</p>
<p>Option D</p> <p>Verifying actual performance and savings through simulation of facility components and/or the whole facility</p>	<p>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.</p>

In general,

$$ECM \text{ Energy Savings} = \text{Baseline Energy Use} - \text{Post-Installation Energy Use}$$

and

$$Energy \text{ Cost savings } (\$) = \text{Total Energy Savings} \times \text{Contractual Energy Rates}$$

Exceptions to this simple equation are as follows:

Projects where an on/off M&V method is used. For example, after a new energy management system is installed, control features are turned off for a set period of time to recreate baseline conditions. Thus, savings are determined after installation by comparing energy use with and without the control features activated.

Since energy use at a facility is rarely, if ever, constant, another way to define M&V is as a comparison of a facility's post-installation energy use with its usage if the ECM or system had not been installed. This considers situations in which baseline energy use must be adjusted to account for changing conditions, such as changes in facility operation, occupancy, or use 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 M&V verification will be conducted by both Honeywell and the Client to ensure that the proper equipment/systems that were installed are operating correctly and have the potential to generate the predicted savings. Verification methods may include surveys, inspections, and/or spot or short-term metering.

Regular Interval Post-Installation Verification

At least annually, Honeywell will verify that the installed equipment/systems have been properly maintained, continue to operate correctly, and continue to have the potential to generate the predicted savings. 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 the Orange Township Public School District.

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 as follows:

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

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

The total kWh savings is the sum of the kWh_{Saved} for all the installed VFDs.

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, An M&V report should use sound technical methodologies to adjust the baseline. An example would be to add or delete building energy impact via the calculated cooling load in tons as a percentage of the existing campus tonnage baseline or use indices like W/ft² and Btu/ft² to calculate the energy consumption of the building and then add or subtract the energy usage to or from the baseline energy consumption.

5. SITE SPECIFIC M&V PLAN

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
1A LED Lighting Upgrades	<ul style="list-style-type: none"> ▪ Upgrade Lighting systems: ▪ Re-lamp/Re-ballast T8/T12 to LED, ▪ Incandescent to LED ▪ Metal Halide and Sodium Vapor to LED High Bays 	Option A <ul style="list-style-type: none"> ▪ Pre and Post measurements ▪ Line by Line scope and engineering calculations 	<ul style="list-style-type: none"> ▪ 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
1B Stadium Lighting	<ul style="list-style-type: none"> ▪ Upgrade Stadium lighting 	Option A <ul style="list-style-type: none"> ▪ Pre and Post measurements ▪ Line by Line scope and engineering calculations 	<ul style="list-style-type: none"> ▪ 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
1C De-Stratification Fans w/ UV Disinfection	<ul style="list-style-type: none"> ▪ Install De-Stratification fans in Gymnasiums to minimize stratification of hot air and maintain hot air flow below the fan level 	Option A <ul style="list-style-type: none"> ▪ Electric energy savings - Engineering calculations based on programmed parameters. Option C <ul style="list-style-type: none"> ▪ Fuel Savings ▪ Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> ▪ Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions ▪ Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions ▪ Electric Energy: Verify savings based on programmed parameters and engineering calculations ▪ Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2A Boiler Replacements	<ul style="list-style-type: none"> Replace boilers in select locations to handle base load 	<p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
2B Domestic Hot Water Heater Replacements	<ul style="list-style-type: none"> Replace heaters in select locations to handle base load 	<p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
2C Steam Traps	<ul style="list-style-type: none"> Comprehensive replacement or internal repair of building steam traps 	<p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
2D Unit Ventilators Replacements	<ul style="list-style-type: none"> Replace antiquated Unit Ventilators. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units <p>Option C</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2E Premium Efficiency Motors and VFDs	<ul style="list-style-type: none"> Install VFDs on select pumps to operate the pump motors in response to the system load. Replace motors with new premium efficiency motors. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations for VFDs following pump affinity laws. Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement motors 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for the pump performance data and motor efficiencies. Post M&V: Obtain trend data for VFD operation from the BMS system to verify baseline calculation assumptions on system loads Verify efficiency of new motors Verify manufacturer provided data for new VFDs – verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2F Chiller Replacements	<ul style="list-style-type: none"> Replace antiquated Chillers with new efficient units 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing units efficiency Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
2G Roof Top Unit Upgrades	<ul style="list-style-type: none"> Replace antiquated Roof Top Units with new high efficiency Rooftop Units. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units <p>Option C:</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing unit efficiency (EER) Post M&V: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
2H Split System Upgrades	<ul style="list-style-type: none"> Replace select split systems with new high efficiency units. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement Units 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing unit efficiency (EER) Post M&V: Verify manufacturer provided data for new split system unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
2I AHU Replacements	<ul style="list-style-type: none"> Replace antiquated Air Handling Units with new high efficiency Units. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data for the existing and replacement units <p>Option C</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing unit efficiency (EER) Post M&V: Verify manufacturer provided data for new rooftop unit (EER) – verify the new equipment and controls are installed and commissioned as recommended by manufacturer Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
2J Boiler Burner Controls	<ul style="list-style-type: none"> Install advanced combustion controls, on existing burners. 	<p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Baseline annual fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform combustion efficiency test on boilers Post M&V: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days Perform efficiency test on replaced boilers to ensure operating conditions are maintained
3A Building Controls Retro-commissioning	<ul style="list-style-type: none"> Upgrade Building Management Systems to DDC and integrate all systems to a central platform. Retro-commissioning existing control systems. 	<p>Option A</p> <ul style="list-style-type: none"> Electric energy savings - Engineering calculations based on programmed parameters. <p>Option C</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
3B Building Sustainability Manager HBSM	<ul style="list-style-type: none"> Install Forge Energy Optimization system 	<p>Option A</p> <ul style="list-style-type: none"> Electric energy savings - Engineering calculations based on programmed parameters. <p>Option C</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify existing operating parameters match the baseline calculation assumptions Post M&V: Verify that systems are installed as specified and controls are programmed to match the savings assumptions Electric Energy: Verify savings based on programmed parameters and engineering calculations Fuel: Compare post installation M&V fuel cost based on fuel billing data and Metrix tuned to normalize to heating degree days
4A Building Envelope Improvements	<ul style="list-style-type: none"> Install weather stripping on doors, seal roof wall joints and roof penetrations 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data <p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify existing conditions Post M&V: Visual inspection per scope of work
4B Roof Replacements	<ul style="list-style-type: none"> Replace existing roofs. 	<p>Option A</p> <ul style="list-style-type: none"> Engineering calculations based on nameplate and manufacturer supplied data <p>Option C</p> <ul style="list-style-type: none"> Utility Bill Comparison for fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify existing conditions Post M&V: Visual inspection per scope of work
4C Pipe Insulation	<p>Insulate Various Piping sizes and runs to prevent thermal losses.</p>	<p>Option C</p> <ul style="list-style-type: none"> Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> Pre-M&V: Verify manufacturer provided data for existing units efficiency. Post M&V: Verify manufacturer provided data for new material verify the new material is installed and commissioned as recommended by manufacturer

ECM # and Name	Summary of ECM	M&V Methodology / Recommendation	Description of M&V – Pre- and Post-Process
4D Window Replacements	Insulate new double-pane windows.	Option A <ul style="list-style-type: none"> ▪ Engineering calculations based on nameplate and manufacturer supplied data. Option C <ul style="list-style-type: none"> ▪ Fuel Savings Utility Bill Comparison for all fuel related measures 	<ul style="list-style-type: none"> ▪ Pre-M&V: Verify existing conditions ▪ Post M&V: Visual inspection per scope of work
5A Cogeneration CHP	Install Cogeneration units	Option A <ul style="list-style-type: none"> ▪ Engineering calculations based on nameplate and manufacturer supplied data for the new unit. 	<ul style="list-style-type: none"> ▪ Pre-M&V: Verify manufacturer provided data for existing units efficiency ▪ Post M&V: Verify manufacturer provided data for new units verify the new equipment and controls are installed and commissioned as recommended by manufacturer
6A Solar PV Purchase	Install Solar Power owned by customer.	<ul style="list-style-type: none"> ▪ N/A 	<ul style="list-style-type: none"> ▪ Pre-M&V: N/A ▪ Post M&V: N/A
6B Community Solar	Purchase solar energy virtually from the Community Solar Program	<ul style="list-style-type: none"> ▪ N/A 	<ul style="list-style-type: none"> ▪ Pre-M&V: N/A ▪ Post M&V: N/A
6C Replace Solar Inverters	Replace existing Solar Inverters	<ul style="list-style-type: none"> ▪ N/A 	<ul style="list-style-type: none"> ▪ Pre-M&V: N/A ▪ Post M&V: N/A
6D Solar PPA	Install Solar Power using Power Purchase Agreement	<ul style="list-style-type: none"> ▪ N/A 	<ul style="list-style-type: none"> ▪ Pre-M&V: N/A ▪ Post M&V: N/A

6. RECOMMENDED PREVENTIVE MAINTENANCE SERVICES

Per the NJ ESIP program, all services are required to be bid by the Orange Township Public School District 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 the District 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 the Orange Township Public School District to evaluate current maintenance practices and procedures. This information will be the basis of a preventive maintenance and performance management plan designed to maximize building operating efficiencies, extend the useful life of your equipment, and support the designed Energy Savings Plan.

At a minimum, we recommend the following tasks be performed on a quarterly basis with the District Wide Building Management System.

SYSTEM SUPPORT SERVICES

1. Review recent mechanical system operation and issues with customer primary contact, on a monthly basis.
2. Review online automation system operation and event history logs and provide summary status to the customer primary contact. Identify systemic or commonly re-occurring events.
3. Check with customer primary contact and logbook to verify that all software programs are operating correctly.
4. Identify issues and prioritize maintenance requests as required.
5. Provide technical support services for trouble shooting and problem solving as required during scheduled visits.
6. Provide ongoing system review and operations training support; including two semi-annual 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 shutdown.

Packaged Air-Conditioning Systems**Services Performed****Preseason Inspection**

1. Energize crankcase heater.
2. Lubricate fan and motor bearings per manufacturer's recommendations.
3. Check belts and sheaves. 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.



APPENDICES

APPENDICES

APPENDIX 1: LOCAL GOVERNMENT ENERGY AUDITS

Please see Appendix 1 provided as a separate accompaniment to this document entitled:
Appendix 1: Local Government Energy Audits

APPENDIX 2: ECM CALCULATIONS

Please see Appendix 2 provided as a separate accompaniment to this document entitled:
Appendix 2- ECM Calculations

APPENDIX 3: EQUIPMENT CUTSHEETS

Please see Appendix 3 provided as a separate accompaniment to this document entitled:
Appendix 3 - Equipment Cutsheets

APPENDIX 4: LIGHTING LINE BY LINE

Please see Appendix 4 provided as a separate accompaniment to this document entitled:
Appendix 4 -Lighting Line by Line

APPENDIX 5: REQUIRED FORMS & OMNIA COOPERATIVE / NJ PROCUREMENT DOCUMENTATION

Per the LFN, the Orange Township Public School District must verify the selected vendor complies with applicable New Jersey procurement documentation requirements by submitting the following required forms.

The following forms are included:

- **New Jersey Business Registration Certificate** for the contractor and any subcontractors (i.e., copy of certificate)
- **Statement of Corporate Ownership** (an original form prepared for the contracting agency awarding the contract)
- **Public Contract EEO Compliance** (Employee Information Report form or proof of participation in a federally approved affirmative action program)
- **Non-Collusion Affidavit**

Form W-9 (Rev. October 2018) Department of the Treasury Internal Revenue Service	Request for Taxpayer Identification Number and Certification ▶ Go to www.irs.gov/FormW9 for instructions and the latest information.	Give Form to the requester. Do not send to the IRS.
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Print or type. See Specific Instructions on page 3.	1 Name (as shown on your income tax return). Name is required on this line; do not leave this line blank. Honeywell International Inc.	
	2 Business name/disregarded entity name, if different from above Honeywell Building Solutions	
	3 Check appropriate box for federal tax classification of the person whose name is entered on line 1. Check only one of the following seven boxes. <input type="checkbox"/> Individual/sole proprietor or single-member LLC <input checked="" type="checkbox"/> C Corporation <input type="checkbox"/> S Corporation <input type="checkbox"/> Partnership <input type="checkbox"/> Trust/estate <input type="checkbox"/> Limited liability company. Enter the tax classification (C=C corporation, S=S corporation, P=Partnership) ▶ _____ Note: Check the appropriate box in the line above for the tax classification of the single-member owner. Do not check LLC if the LLC is classified as a single-member LLC that is disregarded from the owner unless the owner of the LLC is another LLC that is not disregarded from the owner for U.S. federal tax purposes. Otherwise, a single-member LLC that is disregarded from the owner should check the appropriate box for the tax classification of its owner. <input type="checkbox"/> Other (see instructions) ▶ _____	4 Exemptions (codes apply only to certain entities, not individuals; see instructions on page 3): Exempt payee code (if any) <u>5</u> Exemption from FATCA reporting code (if any) <u>D</u> <small>(Applies to accounts maintained outside the U.S.)</small>
	5 Address (number, street, and apt. or suite no.) See instructions. 855 S. Mint Street	Requester's name and address (optional)
	6 City, state, and ZIP code Charlotte, NC 28202	
	7 List account number(s) here (optional)	

Part I Taxpayer Identification Number (TIN) Enter your TIN in the appropriate box. The TIN provided must match the name given on line 1 to avoid backup withholding. For individuals, this is generally your social security number (SSN). However, for a resident alien, sole proprietor, or disregarded entity, see the instructions for Part I, later. For other entities, it is your employer identification number (EIN). If you do not have a number, see <i>How to get a TIN</i> , later. Note: If the account is in more than one name, see the instructions for line 1. Also see <i>What Name and Number To Give the Requester</i> for guidelines on whose number to enter.																																																			
	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td colspan="10" style="text-align: center;">Social security number</td> </tr> <tr> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">-</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">-</td> <td style="width:10%; text-align: center;">[]</td> <td style="width:10%; text-align: center;">[]</td> </tr> <tr> <td colspan="10" style="text-align: center;">or</td> </tr> <tr> <td colspan="10" style="text-align: center;">Employer identification number</td> </tr> <tr> <td style="text-align: center;">2</td> <td style="text-align: center;">2</td> <td style="text-align: center;">-</td> <td style="text-align: center;">2</td> <td style="text-align: center;">6</td> <td style="text-align: center;">4</td> <td style="text-align: center;">0</td> <td style="text-align: center;">6</td> <td style="text-align: center;">5</td> <td style="text-align: center;">0</td> </tr> </table>	Social security number										[]	[]	[]	[]	-	[]	[]	-	[]	[]	or										Employer identification number										2	2	-	2	6	4	0	6	5	0
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Part II Certification Under penalties of perjury, I certify that: 1. The number shown on this form is my correct taxpayer identification number (or I am waiting for a number to be issued to me); and 2. I am not subject to backup withholding because: (a) I am exempt from backup withholding, or (b) I have not been notified by the Internal Revenue Service (IRS) that I am subject to backup withholding as a result of a failure to report all interest or dividends, or (c) the IRS has notified me that I am no longer subject to backup withholding; and 3. I am a U.S. citizen or other U.S. person (defined below); and 4. The FATCA code(s) entered on this form (if any) indicating that I am exempt from FATCA reporting is correct. Certification instructions. You must cross out item 2 above if you have been notified by the IRS that you are currently subject to backup withholding because you have failed to report all interest and dividends on your tax return. For real estate transactions, item 2 does not apply. For mortgage interest paid, acquisition or abandonment of secured property, cancellation of debt, contributions to an individual retirement arrangement (IRA), and generally, payments other than interest and dividends, you are not required to sign the certification, but you must provide your correct TIN. See the instructions for Part II, later.

Sign Here	Signature of U.S. person ▶	Date ▶ 1/4/2023
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General Instructions

Section references are to the Internal Revenue Code unless otherwise noted.

Future developments. For the latest information about developments related to Form W-9 and its instructions, such as legislation enacted after they were published, go to www.irs.gov/FormW9.

Purpose of Form

An individual or entity (Form W-9 requester) who is required to file an information return with the IRS must obtain your correct taxpayer identification number (TIN) which may be your social security number (SSN), individual taxpayer identification number (ITIN), adoption taxpayer identification number (ATIN), or employer identification number (EIN), to report on an information return the amount paid to you, or other amount reportable on an information return. Examples of information returns include, but are not limited to, the following.

- Form 1099-DIV (dividends, including those from stocks or mutual funds)
- Form 1099-MISC (various types of income, prizes, awards, or gross proceeds)
- Form 1099-B (stock or mutual fund sales and certain other transactions by brokers)
- Form 1099-S (proceeds from real estate transactions)
- Form 1099-K (merchant card and third party network transactions)
- Form 1098 (home mortgage interest), 1098-E (student loan interest), 1098-T (tuition)
- Form 1099-C (canceled debt)
- Form 1099-A (acquisition or abandonment of secured property)

Use Form W-9 only if you are a U.S. person (including a resident alien), to provide your correct TIN.

If you do not return Form W-9 to the requester with a TIN, you might be subject to backup withholding. See What is backup withholding, later.

 <h2 style="text-align: center;">STATE OF NEW JERSEY BUSINESS REGISTRATION CERTIFICATE</h2>	
Taxpayer Name:	HONEYWELL INTERNATIONAL INC.
Trade Name:	ADI GLOBAL DISTRIBUTION
Address:	101 COLUMBIA RD MORRISTOWN, NJ 07960-4640
Certificate Number:	0073401
Effective Date:	August 19, 1985
Date of Issuance:	August 25, 2021
For Office Use Only:	
20210825150427681	

Certificate Number
604863

Registration Date: 06/02/2022
Expiration Date: 06/01/2024



State of New Jersey
 Department of Labor and Workforce Development
 Division of Wage and Hour Compliance
Public Works Contractor Registration Act

Pursuant to N.J.S.A. 34:11-56.48, et seq. of the Public Works Contractor Registration Act, this certificate of registration is issued for purposes of bidding on any contract for public work or for engaging in the performance of any public work to:

2022
Honeywell International Inc.

Responsible Representative(s):
Doug Wright, President
Alastair Reynolds, Vice-President
Derek Skellon, General Manager

Responsible Representative(s):
Laura Lathello, Vice-President
Matthew Drobnish, Manager
Darius Adamczyk, Chairman


Robert Asaro-Angelo, Commissioner
Department of Labor and Workforce Development

NON TRANSFERABLE

This certificate may not be transferred or assigned and may be revoked for cause by the Commissioner of Labor and Workforce Development.



CERTIFICATE OF LIABILITY INSURANCE

DATE(MM/DD/YYYY)
03/23/2023

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must have ADDITIONAL INSURED provisions or be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER Aon Risk Services Northeast, Inc. New York NY Office One Liberty Plaza 165 Broadway, Suite 3201 New York NY 10006 USA	CONTACT NAME: PHONE (A/C. No. Ext): (866) 283-7122 FAX (A/C. No.): 800-363-0105 E-MAIL ADDRESS:														
	INSURED Honeywell International Inc. 855 S. Mint Charlotte NC 28202 USA	<table border="1"> <tr> <th>INSURER(S) AFFORDING COVERAGE</th> <th>NAIC #</th> </tr> <tr> <td>INSURER A: Greenwich Insurance Company</td> <td>22322</td> </tr> <tr> <td>INSURER B: XL Insurance America Inc</td> <td>24554</td> </tr> <tr> <td>INSURER C: XL Specialty Insurance Co</td> <td>37885</td> </tr> <tr> <td>INSURER D:</td> <td></td> </tr> <tr> <td>INSURER E:</td> <td></td> </tr> <tr> <td>INSURER F:</td> <td></td> </tr> </table>	INSURER(S) AFFORDING COVERAGE	NAIC #	INSURER A: Greenwich Insurance Company	22322	INSURER B: XL Insurance America Inc	24554	INSURER C: XL Specialty Insurance Co	37885	INSURER D:		INSURER E:		INSURER F:
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INSURER D:															
INSURER E:															
INSURER F:															

COVERAGES CERTIFICATE NUMBER: 570098453817 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS. **Limits shown are as requested**

INSR LTR	TYPE OF INSURANCE	ADDITIONAL INSURED	SUBROGATION	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS
A	<input checked="" type="checkbox"/> COMMERCIAL GENERAL LIABILITY <input type="checkbox"/> CLAIMS-MADE <input checked="" type="checkbox"/> OCCUR GEN'L AGGREGATE LIMIT APPLIES PER: <input checked="" type="checkbox"/> POLICY <input type="checkbox"/> PRO-JECT <input type="checkbox"/> LOC OTHER:			RGC943763010	04/01/2023	04/01/2024	EACH OCCURRENCE \$5,000,000 DAMAGE TO RENTED PREMISES (Ea occurrence) \$5,000,000 MED EXP (Any one person) \$50,000 PERSONAL & ADV INJURY \$5,000,000 GENERAL AGGREGATE \$5,000,000 PRODUCTS - COMP/POP AGG Included
A	AUTOMOBILE LIABILITY <input checked="" type="checkbox"/> ANY AUTO <input type="checkbox"/> OWNED AUTOS ONLY <input type="checkbox"/> HIRED AUTOS ONLY <input type="checkbox"/> SCHEDULED AUTOS <input type="checkbox"/> NON-OWNED AUTOS ONLY			RAC943764210 AOS	04/01/2023	04/01/2024	COMBINED SINGLE LIMIT (Ea accident) \$1,000,000 BODILY INJURY (Per person) BODILY INJURY (Per accident) PROPERTY DAMAGE (Per accident)
A	<input type="checkbox"/> UMBRELLA LIAB <input checked="" type="checkbox"/> OCCUR <input checked="" type="checkbox"/> EXCESS LIAB <input type="checkbox"/> CLAIMS-MADE <input type="checkbox"/> DED <input type="checkbox"/> RETENTION			RA0943764510 Excess Auto	04/01/2023	04/01/2024	EACH OCCURRENCE \$4,000,000 AGGREGATE
B	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY ANY PROPRIETOR / PARTNER / EXECUTIVE OFFICER/MEMBER EXCLUDED? (Mandatory in NH) If yes, describe under DESCRIPTION OF OPERATIONS below	Y/N	N/A	RWD943540310 AOS	04/01/2023	04/01/2024	<input checked="" type="checkbox"/> PER STATUTE <input type="checkbox"/> OTHER E.L. EACH ACCIDENT \$5,000,000 E.L. DISEASE-EA EMPLOYEE \$5,000,000 E.L. DISEASE-POLICY LIMIT \$5,000,000
C	Excess Workers Compensation			RWE943540410 AZ, OH, WA SIR applies per policy terms & conditions	04/01/2023	04/01/2024	EL Each Accident \$5,000,000 EL Disease - Ea Emp \$5,000,000 EL Annual Aggregate \$5,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)
 Evidence of Coverage, Blanket Additional Insured where required by written contract endorsement is included on the Auto and General Liability policies. Blanket Contractual Liability is included on the Auto and General Liability policies. A Waiver of Subrogation where required by written contract is included on the Auto and General Liability policies. Honeywell will provide the ISO endorsement form numbers where required by written contract upon request.

CERTIFICATE HOLDER Honeywell International Inc. 855 S. Mint Charlotte NC 28202 USA	CANCELLATION SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS. AUTHORIZED REPRESENTATIVE
--	--

ACORD 25 (2016/03)

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Holder Identifier :

Certificate No : 570098453817



STATEMENT OF OWNERSHIP DISCLOSURE

N.J.S.A. 52:25-24.2 (P.L. 1977, c.33, as amended by P.L. 2016, c.43)

This statement shall be completed, certified to, and included with all bid and proposal submissions. Failure to submit the required information is cause for automatic rejection of the bid or proposal.

Name of Organization: Honeywell International Inc. _____

Organization Address: 115 Tabor Road, Morris Plains, NJ 07950 _____

Part I Check the box that represents the type of business organization:

- Sole Proprietorship (skip Parts II and III, execute certification in Part IV)
- Non-Profit Corporation (skip Parts II and III, execute certification in Part IV)
- For-Profit Corporation (any type) Limited Liability Company (LLC)
- Partnership Limited Partnership Limited Liability Partnership (LLP)
- Other (be specific): _____

Part II

- The list below contains the names and addresses of all stockholders in the corporation who own 10 percent or more of its stock, of any class, or of all individual partners in the partnership who own a 10 percent or greater interest therein, or of all members in the limited liability company who own a 10 percent or greater interest therein, as the case may be. **(COMPLETE THE LIST BELOW IN THIS SECTION)**
- OR**
- No one stockholder in the corporation owns 10 percent or more of its stock, of any class, or no individual partner in the partnership owns a 10 percent or greater interest therein, or no member in the limited liability company owns a 10 percent or greater interest therein, as the case may be. **(SKIP TO PART IV)**

(Please attach additional sheets if more space is needed):

Name of Individual or Business Entity	Home Address (for Individuals) or Business Address

Part III DISCLOSURE OF 10% OR GREATER OWNERSHIP IN THE STOCKHOLDERS, PARTNERS OR LLC MEMBERS LISTED IN PART II

If a bidder has a direct or indirect parent entity which is publicly traded, and any person holds a 10 percent or greater beneficial interest in the publicly traded parent entity as of the last annual federal Security and Exchange Commission (SEC) or foreign equivalent filing, ownership disclosure can be met by providing links to the website(s) containing the last annual filing(s) with the federal Securities and Exchange Commission (or foreign equivalent) that contain the name and address of each person holding a 10% or greater beneficial interest in the publicly traded parent entity, along with the relevant page numbers of the filing(s) that contain the information on each such person. **Attach additional sheets if more space is needed.**

Website (URL) containing the last annual SEC (or foreign equivalent) filing	Page #'s

Please list the names and addresses of each stockholder, partner or member owning a 10 percent or greater interest in any corresponding corporation, partnership and/or limited liability company (LLC) listed in Part II other than for any publicly traded parent entities referenced above. The disclosure shall be continued until names and addresses of every noncorporate stockholder, and individual partner, and member exceeding the 10 percent ownership criteria established pursuant to N.J.S.A. 52:25-24.2 has been listed. **Attach additional sheets if more space is needed.**

Stockholder/Partner/Member and Corresponding Entity Listed in Part II	Home Address (for Individuals) or Business Address

Part IV Certification

I, being duly sworn upon my oath, hereby represent that the foregoing information and any attachments thereto to the best of my knowledge are true and complete. I acknowledge: that I am authorized to execute this certification on behalf of the bidder/proposer; that the **<name of contracting unit>** is relying on the information contained herein and that I am under a continuing obligation from the date of this certification through the completion of any contracts with **<type of contracting unit>** to notify the **<type of contracting unit>** in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification, and if I do so, I am subject to criminal prosecution under the law and that it will constitute a material breach of my agreement(s) with the, permitting the **<type of contracting unit>** to declare any contract(s) resulting from this certification void and unenforceable.

Full Name (Print):	Caroline Jackson	Title:	Sr. Bus. Consultant
Signature:		Date:	07/14/2023



**State of New Jersey**

PHILIP D. MURPHY
Governor

DEPARTMENT OF THE TREASURY
DIVISION OF PURCHASE AND PROPERTY
CONTRACT COMPLIANCE & AUDIT UNIT
EEO MONITORING PROGRAM
33 WEST STATE STREET
P. O. BOX 206
TRENTON, NEW JERSEY 08625-0206

ELIZABETH MAHER MUOIO
State Treasurer

SHEILA Y. OLIVER
Lt. Governor

MAURICE A. GRIFFIN
Acting Director

RENEWAL NOTICE

The Certificate of Employee Information Report (hereinafter referred to as the "State Certificate") issued by this Division is due to expire within the next 90 days. In order for your firm to continue to provide a current State Certificate for public contract awards, you must apply for renewal by properly completing the following renewal documents:

1. The Employee Information Report Form AA-302 for the facility indicated on the "State Certificate" and any additional New Jersey facilities, with a check in the amount of **\$150.00** payable to "**the Treasurer, State of New Jersey**" (fee is non-refundable) and
2. The Vendor Activity Summary Report forms, one for each of the four (4) personnel activities noted (new hires, promotions, transfers and terminations etc.) for the previous "State Certificate" period, or
3. If you are operating under a federally approved affirmative action plan, a photocopy of the letter of Federal Approval issued by the US Department of Labor, Office of Federal Contract Compliance Programs, not greater than one year old, may be submitted to the awarding agency in lieu of the State Certificate. Please do not submit an EEO-1 Report as it will not be accepted.

All goods, service and professional service vendors are encouraged to complete and file these renewal documents electronically by accessing the Division's website at www.state.nj.us/treasury/contract_compliance. This website provides access to the forms in electronic format or on-line internet submission registration via the internet. You may also call the Division at (609) 292-5473 and a representative will assist you. Please have your State Certificate number ready when calling. Your State Certificate number is noted at the end of your company name on your mailing label.

Upon receipt of the above-referenced documents, the Division will approve or reject your application within sixty (60) days of submission. If your application is approved, the Division will issue a State Certificate provided your firm meets the standards of good faith compliance with the Affirmative Action Regulations set forth in N.J.A.C. 17:27-1.1 et seq. Periodic reviews may be conducted and additional information may be requested, as required by the Division. In all instances, however, a copy of the State Certificate must be presented to the public agency awarding the contract, prior to the award of the contract.

Rev. 4-18

INSTRUCTIONS FOR COMPLETING THE EMPLOYEE INFORMATION REPORT (FORM AA302)

IMPORTANT: READ THE FOLLOWING INSTRUCTIONS CAREFULLY BEFORE COMPLETING THE FORM. PRINT OR TYPE ALL INFORMATION. FAILURE TO PROPERLY COMPLETE THE ENTIRE FORM **AND TO SUBMIT THE REQUIRED \$150.00 NON-REFUNDABLE FEE MAY DELAY ISSUANCE OF YOUR CERTIFICATE. IF YOU HAVE A CURRENT CERTIFICATE OF EMPLOYEE INFORMATION REPORT, DO NOT COMPLETE THIS FORM UNLESS YOU ARE RENEWING A CERTIFICATE THAT IS DUE FOR EXPIRATION. DO NOT COMPLETE THIS FORM FOR CONSTRUCTION CONTRACT AWARDS.**

ITEM 1 - Enter the Federal Identification Number assigned by the Internal Revenue Service, or if a Federal Employer Identification Number has been applied for, or if your business is such that you have not or will not receive a Federal Employer Identification Number, enter the Social Security Number of the owner or of one partner, in the case of a partnership.

ITEM 2 - Check the box appropriate to your TYPE OF BUSINESS. If you are engaged in more than one type of business check the predominate one. If you are a manufacturer deriving more than 50% of your receipts from your own retail outlets, check "Retail".

ITEM 3 - Enter the total "number" of employees in the entire company, including part-time employees. This number shall include all facilities in the entire firm or corporation.

ITEM 4 - Enter the name by which the company is identified. If there is more than one company name, enter the predominate one.

ITEM 5 - Enter the physical location of the company. Include City, County, State and Zip Code.

ITEM 6 - Enter the name of any parent or affiliated company including the City, County, State and Zip Code. If there is none, so indicate by entering "None" or N/A.

ITEM 7 - Check the box appropriate to your type of company establishment. "Single-establishment Employer" shall include an employer whose business is conducted at only one physical location. "Multi-establishment Employer" shall include an employer whose business is conducted at more than one location.

ITEM 8 - If "Multi-establishment" was entered in item 8, enter the number of establishments within the State of New Jersey.

ITEM 9 - Enter the total number of employees at the establishment being awarded the contract.

ITEM 10 - Enter the name of the Public Agency awarding the contract. Include City, County, State and Zip Code. This is not applicable if you are renewing a current Certificate.

ITEM 11 - Enter the appropriate figures on all lines and in all columns. THIS SHALL ONLY INCLUDE EMPLOYMENT DATA FROM THE FACILITY THAT IS BEING AWARDED THE CONTRACT. DO NOT list the same employee in more than one job category. **DO NOT attach an EEO-1 Report.**

Racial/Ethnic Groups will be defined:

Black: Not of Hispanic origin. Persons having origin in any of the Black racial groups of Africa.

Hispanic: Persons of Mexican, Puerto Rican, Cuban, or Central or South American or other Spanish culture or origin, regardless of race.

American Indian or Alaskan Native: Persons having origins in any of the original peoples of North America, and who maintain cultural identification through tribal affiliation or community recognition.

Asian or Pacific Islander: Persons having origin in any of the original peoples of the Far East, Southeast Asia, the Indian Sub-continent or the Pacific Islands. This area includes for example, China, Japan, Korea, the Phillipine Islands and Samoa.

Non-Minority: Any Persons not identified in any of the aforementioned Racial/Ethnic Groups.

ITEM 12 - Check the appropriate box. If the race or ethnic group information was not obtained by 1 or 2, specify by what other means this was done in 3.

ITEM 13 - Enter the dates of the payroll period used to prepare the employment data presented in Item 12.

ITEM 14 - If this is the first time an Employee Information Report has been submitted for this company, check block "Yes".

ITEM 15 - If the answer to Item 14 is "No", enter the date when the last Employee Information Report was submitted by this company.

ITEM 16 - Print or type the name of the person completing the form. Include the signature, title and date.

ITEM 17 - Enter the physical location where the form is being completed. Include City, State, Zip Code and Phone Number.

TYPE OR PRINT IN SHARP BALL POINT PEN

THE VENDOR IS TO COMPLETE THE EMPLOYEE INFORMATION REPORT FORM (AA302) AND RETAIN A COPY FOR THE VENDOR'S OWN FILES. THE VENDOR SHOULD ALSO SUBMIT A COPY TO THE PUBLIC AGENCY AWARDED THE CONTRACT IF THIS IS YOUR FIRST REPORT; AND FORWARD ONE COPY **WITH A CHECK IN THE AMOUNT OF \$150.00 PAYABLE TO THE TREASURER, STATE OF NEW JERSEY (FEE IS NON-REFUNDABLE)** TO:

NJ Department of the Treasury
Division of Purchase & Property
Contract Compliance Audit Unit
EEO Monitoring Program
P.O. Box 206

Trenton, New Jersey 08625-0206

Telephone No. (609) 292-5473

Your will find Honeywell's Equal Employment Opportunity ("EEO") and Affirmative Action statement after the last page of thi

INSTRUCTIONS**VENDOR ACTIVITY SUMMARY REPORTS**

1. You should complete 4 blank Vendor Activity Summary Reports with your AA-302, Employee Information Report Renewal Application package. These 4 Reports are to be completed for new hires, promotions, transfers and terminations that took place between the time you received your Certificate of Employee Information Report (hereafter referred to as "Certificate") and the date of your Renewal Application.

2. The Vendor Activity Summary Reports must be completed to show your firm's total personnel actions for the previous Certificate period. For example, if your firm renews its Certificate every 3 years, one of the reports should indicate the total number of people hired during the entire 3-year period during which you held the Certificate. Another report should indicate the total number of people terminated during that 3-year period. The third report should indicate the total number of people transferred during that 3-year period and the final report should indicate the total number of people promoted during that 3-year period. Please note, there is no need to re-state the information provided on the AA-302 form.



This is to certify that the contractor listed below has submitted an Employee Information Report pursuant to N.J.A.C 17:27-1.1 et. Seq and the State Treasurer has approved said report. The approval will remain in effect for the period of 15-MAY-2021 to 15-MAY-2024.

Honeywell International, Inc.

[115 Tabor Road](#)

[Morris Plains, NJ 07950](#)

Certification 137

PB-AAF.1 R5/26/09

Affirmative Action Supplement

AFFIRMATIVE ACTION	Term Contract - Advertised Bid Proposal
Department of the Treasury Division of Purchase & Property State of New Jersey 33 W. State St., 9th Floor PO Box 230 Trenton, New Jersey 08625-0230	Bid Number: _____ Bidder: _____

**EXHIBIT A
MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq. (P.L. 1975, C. 127)
N.J.A.C. 17:27
GOODS, PROFESSIONAL SERVICE AND GENERAL SERVICE CONTRACTS**

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Except with respect to affectional or sexual orientation and gender identity or expression, the contractor will ensure that equal employment opportunity is afforded to such applicants in recruitment and employment, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex. Such equal employment opportunity shall include, but not be limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative or workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor, where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq., as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to afford equal employment opportunities to minority and women workers consistent with Good faith efforts to meet targeted county employment goals established in accordance with N.J.A.C. 17:27-5.2, or Good faith efforts to meet targeted county employment goals determined by the Division, pursuant to N.J.A.C. 17:27-5.2.

The contractor or subcontractor agrees to inform in writing its appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, labor unions, that it does not discriminate on the basis of age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personnel testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

In conforming with the targeted employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation, gender identity or expression, disability, nationality or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor shall submit to the public agency, after notification of award but prior to execution of a goods and services contract, one of the following three documents:

- Letter of Federal Affirmative Action Plan Approval
- Certificate of Employee Information Report
- Employee Information Report Form AA302

The contractor and its subcontractors shall furnish such reports or other documents to the Division of Public Contracts Equal Employment Opportunity Compliance as may be requested by the office from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Public Contracts Equal Employment Opportunity Compliance for conducting a compliance investigation pursuant to **Subchapter 10 of the Administrative Code at N.J.A.C. 17:27.**

*** NO FIRM MAY BE ISSUED A PURCHASE ORDER OR CONTRACT WITH THE STATE UNLESS THEY COMPLY WITH THE AFFIRMATIVE ACTION REGULATIONS**

PLEASE CHECK APPROPRIATE BOX (ONE ONLY)

I HAVE A CURRENT NEW JERSEY AFFIRMATIVE ACTION CERTIFICATE, (PLEASE ATTACH A COPY TO YOUR PROPOSAL).

I HAVE A VALID FEDERAL AFFIRMATIVE ACTION PLAN APPROVAL LETTER, (PLEASE ATTACH A COPY TO YOUR PROPOSAL).

I HAVE COMPLETED THE ENCLOSED FORM AA302 AFFIRMATIVE ACTION EMPLOYEE INFORMATION REPORT.

Your will find Honeywell's Equal Employment Opportunity ("EEO") and Affirmative Action - in this pdf.

EXHIBIT A

MANDATORY EQUAL EMPLOYMENT OPPORTUNITY LANGUAGE
N.J.S.A. 10:5-31 et seq., N.J.A.C. 17:27

GOODS, PROFESSIONAL SERVICES AND GENERAL SERVICE CONTRACTS

During the performance of this contract, the contractor agrees as follows:

The contractor or subcontractor, where applicable, will not discriminate against any employee or applicant for employment because of age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Except with respect to affectional or sexual orientation, the contractor will take affirmative action to ensure that such applicants are recruited and employed, and that employees are treated during employment, without regard to their age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex. Such action shall include, but not limited to the following: employment, upgrading, demotion, or transfer; recruitment or recruitment advertising; layoff or termination; rates of pay or other forms of compensation; and selection for training, including apprenticeship. The contractor agrees to post in conspicuous places, available to employees and applicants for employment, notices to be provided by the Public Agency Compliance Officer setting forth provisions of this nondiscrimination clause.

The contractor or subcontractor, where applicable will, in all solicitations or advertisements for employees placed by or on behalf of the contractor, state that all qualified applicants will receive consideration for employment without regard to age, race, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex.

The contractor or subcontractor, where applicable, will send to each labor union or representative or workers with which it has a collective bargaining agreement or other contract or understanding, a notice, to be provided by the agency contracting officer advising the labor union or workers' representative of the contractor's commitments under this act and shall post copies of the notice in conspicuous places available to employees and applicants for employment.

The contractor or subcontractor where applicable, agrees to comply with any regulations promulgated by the Treasurer pursuant to N.J.S.A. 10:5-31 et seq. as amended and supplemented from time to time and the Americans with Disabilities Act.

The contractor or subcontractor agrees to make good faith efforts to employ minority and women workers consistent with the applicable county employment goals established in accordance with N.J.A.C. 17:27-5.2, or a binding determination of the applicable county employment goals determined by the Division, pursuant to N.J.A.C. 17:27-5.2.

EXHIBIT A (Cont)

The contractor or subcontractor agrees to inform in writing its appropriate recruitment agencies including, but not limited to, employment agencies, placement bureaus, colleges, universities, labor unions, that it does not discriminate on the basis of age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex, and that it will discontinue the use of any recruitment agency which engages in direct or indirect discriminatory practices.

The contractor or subcontractor agrees to revise any of its testing procedures, if necessary, to assure that all personal testing conforms with the principles of job-related testing, as established by the statutes and court decisions of the State of New Jersey and as established by applicable Federal law and applicable Federal court decisions.

In conforming with the applicable employment goals, the contractor or subcontractor agrees to review all procedures relating to transfer, upgrading, downgrading and layoff to ensure that all such actions are taken without regard to age, creed, color, national origin, ancestry, marital status, affectional or sexual orientation or sex, consistent with the statutes and court decisions of the State of New Jersey, and applicable Federal law and applicable Federal court decisions.

The contractor and its subcontractor shall furnish such reports or other documents to the Division of Contract Compliance & EEO as may be requested by the Division from time to time in order to carry out the purposes of these regulations, and public agencies shall furnish such information as may be requested by the Division of Contract Compliance & EEO for conducting a compliance investigation pursuant to Subchapter 10 of the Administrative Code at N.J.A.C.17:27.

Caroline Jackson,
Sr. Bus. Consultant

Name of Vendor

is aware of our obligation to the State
of New Jersey pursuant to NJSA 10:5-31

Caroline Jackson

Signature of Highest Official



Country(ies): U.S.	Policy Title: EQUAL EMPLOYMENT OPPORTUNITY AND AFFIRMATIVE ACTION	Effective Date: 01/01/2000
Policy Number: 2060		Revision Date: 10/01/2017

PURPOSE

This Policy sets forth Honeywell’s Equal Employment Opportunity (“EEO”) and Affirmative Action statement.

SCOPE AND ELIGIBILITY

Honeywell’s employment practices will conform to both the spirit and the letter of Federal, state and local laws and regulations regarding nondiscrimination in employment. This Policy applies to all Honeywell sites within the United States, other than National Technology and Engineering Solutions of Sandia, LLC sites.

POLICY

1. HIRING STATEMENT

All applicants for employment with Honeywell will be considered without regard to sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status, national origin, citizenship or any other legally protected status.

The Human Resources leaders at each Company site (“HR Site Leaders”) are responsible for monitoring, at least annually, the selection process for all positions filled at their site. They accomplish this by determining whether there are selection disparities and, if so, whether impediments to equal employment opportunity exist. If impediments are not based on legitimate business practices, the HR Site HR Leaders are responsible for removing such impediments.

2. EMPLOYMENT ACTIONS

There shall be no discrimination with regard to sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status national origin, citizenship or any other legally protected status in any employment actions including, but not limited to, promotions, demotions, transfers, layoffs or terminations, compensation, use of facilities and selection for training or related programs.

HR Site Leaders are responsible for monitoring, at least annually, all employment actions including, but not limited to, promotions, demotions, transfers, layoffs or terminations, compensation, use of facilities and selection for training or related programs at their sites. They accomplish this by determining whether there are disparities and, if so, whether impediments to equal employment opportunity exist. If impediments are not based on legitimate business practices, the HR Site Leaders are responsible for removing such impediments.

2. WORK ENVIRONMENT

It is the Company's policy to maintain a work environment that fosters respect for all employees. A good working environment includes freedom from harassment based on sex, race, color, ethnicity, affectional or sexual orientation, gender identity, physical or mental disability, genetic information, age, pregnancy, religion/creed, marital status, civil union status, protected veteran status, national origin, citizenship or any other legally protected status.

HR Site Leaders are responsible for posting the policy statement attached hereto as Exhibit A or, in the case of the Company's Minnesota locations, Exhibit B.

3. GOVERNMENT CONTRACT COMPLIANCE

Honeywell is a U.S. Federal Government contractor and subcontractor subject to Executive Order ("EO") 11246, Section 4212 of the Vietnam Era Veterans' Readjustment Assistance Act of 1974, as amended ("Section 4212"), and Section 503 of the Rehabilitation Act of 1973, as amended ("Section 503"). It is Honeywell's policy to take affirmative action to employ, advance in employment, and otherwise treat as qualified minorities, women, protected veterans, and individuals with disabilities without regard to their race/ ethnicity, sex, protected veteran status, or physical or mental disability. Honeywell will also provide reasonable accommodation to the known physical or mental limitations of an otherwise qualified employee or applicant for employment, unless the accommodation would impose undue hardship on the operation of the Company's business.

HR Site Leaders are responsible for making the non-confidential portions of their site's affirmative action plans ("AAPs") for individuals with disabilities and protected veterans available to applicants and employees. The non-confidential portions of the AAPs are available to applicants and employees upon request to the HR Site Leader during the working hours of 9:00 AM through 4:30 PM.

4. NO RETALIATION

Honeywell prohibits retaliation and will not tolerate harassment, intimidation, threats, coercion, or discrimination against applicants or employees because they have engaged in, or may engage in, (1) filing a complaint; (2) assisting or participating in an investigation, compliance review, hearing, or any other activity related to the administration of EO 11246, Section 503, Section 4212, or any other Federal, state or local law requiring equal opportunity; (3) opposing any act or practice made unlawful by EO 11246, Section 503, Section 4212 or any other Federal, state or local law requiring equal opportunity; or (4) exercising any other right protected by such laws or their implementing regulations.

DEFINITIONS

Honeywell or Company. For purposes of this Policy, Honeywell or Company shall mean Honeywell International Inc., its subsidiaries and affiliates, and their respective predecessors and successors.

Law. For purposes of this Policy, Law means all applicable federal, state and local laws and regulations.

RESPONSIBILITY FOR THE POLICY

This Policy is administered by Honeywell Human Resources, in consultation with the Honeywell Law Department.

Honeywell's Chief Executive Officer shall fully support the Company's affirmative action program and commit to the implementation of the Company's EEO and Affirmative Action policies.

The Company's Director, Staffing Excellence, shall (i) be responsible for the maintenance of the Company's EEO programs, and (ii) be responsible for (but is not restricted to) establishing and implementing reporting procedures and related systems for monitoring and auditing the Company's EEO practices.

RELATED POLICIES, INFORMATION AND RESOURCES

Workplace Harassment (Policy 2025)

Reduction-in-Force (Policy 2031)

Employees and Applicants with Disabilities (Policy 2079)

The following laws, all as amended, along with any implementing regulations:

- Title VII of the Civil Rights Act of 1964
- The Equal Pay Act of 1963
- The Age Discrimination in Employment Act of 1967
- The Americans with Disabilities Act of 1990
- The Job for Veterans Act (PL 107-288)
- Civil Rights Act of 1991
- Section 503 of the Rehabilitation Act of 1973
- Section 4212 of the Vietnam Era Veterans Readjustment Assistance Act of 1974
- Genetic Information Nondiscrimination Act of 2007
- Executive Order 11246

EXHIBITS

Exhibit A: Equal Employment and Affirmative Action Policy Statement for all U.S. and Expatriate Employees EEO AA Policy Statement 2017.pdf

Exhibit B: Equal Employment and Affirmative Action Policy Statement for Minnesota EEO AA Policy Statement MN 2017.pdf

REPORTING CONCERNS AND SEEKING GUIDANCE

Additional guidance can be sought by contacting a Human Resources representative.

REVISION HISTORY

This Policy was originally effective January 1, 2000. It was amended and restated effective January 1, 2001, May 15, 2009, September 19, 2011, and October 6, 2014.

MANAGEMENT'S RIGHTS

The Company, in its sole discretion, reserves the exclusive right to interpret, administer and apply this Policy, to make any exceptions to it, and to change this Policy at any time and for any reason.

This Policy is not intended to create contractual obligations. Employment with the Company in the U.S. (other than Puerto Rico) is at will, which means that either the Company or the employee may terminate the employment relationship at any time and for any reason, without notice. The Company reserves the right to modify, amend, or terminate this Policy at any time. This Policy supersedes any prior policies of Honeywell, whether written or oral, on the topics covered in this Policy.

This Policy is the property of Honeywell International Inc. and is published on the Company's intranet at <http://policy.honeywell.com>. It is the reader's responsibility to review the intranet publication of this policy to ensure the most current version is being referenced before taking action based on this printed copy, which may be outdated.



DISCLOSURE OF INVESTMENT ACTIVITIES IN IRAN FORM

STATE OF NEW JERSEY
DEPARTMENT OF THE TREASURY - DIVISION OF PURCHASE AND PROPERTY
33 WEST STATE STREET, P.O. BOX 230 TRENTON, NEW JERSEY 08625-0230

BID SOLICITATION # AND TITLE: Orange Township Public Schools

VENDOR/BIDDER NAME: Honeywell International Inc.

Pursuant to N.J.S.A. 52:32-57, et seq. (P.L. 2012, c.25 and P.L. 2021, c.4) any person or entity that submits a bid or proposal or otherwise proposes to enter into or renew a contract must certify that neither the person nor entity, nor any of its parents, subsidiaries, or affiliates, is identified on the New Jersey Department of the Treasury's Chapter 25 List as a person or entity engaged in investment activities in Iran.

CHECK THE APPROPRIATE BOX

[X] I certify, pursuant to N.J.S.A. 52:32-57, et seq. (P.L. 2012, c.25 and P.L. 2021, c.4), that neither the Vendor/Bidder listed above nor any of its parents, subsidiaries, or affiliates is listed on the New Jersey Department of the Treasury's Chapter 25 List of entities determined to be engaged in prohibited activities in Iran.

OR

[] I am unable to certify as above because the Vendor/Bidder and/or one or more of its parents, subsidiaries, or affiliates is listed on the New Jersey Department of the Treasury's Chapter 25 List. I will provide a detailed, accurate and precise description of the activities of the Vendor/Bidder, or one of its parents, subsidiaries or affiliates, has engaged in regarding investment activities in Iran by completing the information requested below.

Entity Engaged in Investment Activities None
Relationship to Vendor/ Bidder
Description of Activities
Duration of Engagement
Anticipated Cessation Date
Attach Additional Sheets If Necessary.

CERTIFICATION

I, the undersigned, certify that I am authorized to execute this certification on behalf of the Vendor/Bidder, that the foregoing information and any attachments hereto, to the best of my knowledge are true and complete. I acknowledge that the State of New Jersey is relying on the information contained herein, and that the Vendor/Bidder is under a continuing obligation from the date of this certification through the completion of any contract(s) with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification. If I do so, I will be subject to criminal prosecution under the law, and it will constitute a material breach of my agreement(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Signature: Caroline Jackson Date: 07/14/2023

Caroline Jackson, Sr. Business Consultant
Print Name and Title



**Certification Regarding
Debarment, Suspension, and Other Responsibility Matters
Primary Covered Transactions**

This certification is required by the regulations implementing Executive Order 12549, Debarment and Suspension, 13 CFR Part 145. The regulations were published as Part VII of the May 26, 1988 *Federal Register* (pages 19160-19211). Copies of the regulations are available from local offices of the U.S. Small Business Administration.

(BEFORE COMPLETING CERTIFICATION, READ INSTRUCTIONS ON REVERSE)

- (1) The prospective primary participant certifies to the best of its knowledge and belief that it and its principals:
 - (a) Are not presently debarred, suspended, proposed for disbarment, declared ineligible, or voluntarily excluded from covered transactions by any Federal department or agency;
 - (b) Have not within a three-year period preceding this application been convicted of or had a civil judgment rendered against them for commission of fraud or a criminal offense in connection with obtaining, attempting to obtain, or performing a public (Federal, State, or local) transaction or contract under a public transaction; violation of Federal or State antitrust statutes or commission of embezzlement, theft, forgery, bribery, falsification or destruction of records, making false statements, or receiving stolen property;
 - (c) Are not presently indicted for or otherwise criminally or civilly charged by a governmental entity (Federal, State, or local) with commission of any of the offenses enumerated in paragraph (1)(b) of this certification; and
 - (d) Have not within a three-year period preceding this application had one or more public transactions (Federal, State, or local) terminated for cause or default.
- (2) Where the prospective primary participant is unable to certify to any of the statements in this certification, such prospective primary participant shall attach an explanation to this proposal.

Business Name Honeywell International Inc.

Date 07/14/2023

By Caroline Jackson
Name and Title of Authorized Representative

Caroline Jackson
Signature of Authorized Representative

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INSTRUCTIONS FOR CERTIFICATION

1. By signing and submitting this proposal, the prospective primary participant is providing the certification set out below.
2. The inability of a person to provide the certification required below will not necessarily result in denial of participation in this covered transaction. The prospective participant shall submit an explanation of why it cannot provide the certification set out below. The certification or explanation will be considered in connection with the department or agency's determination whether to enter into this transaction. However, failure of the prospective primary participant to furnish a certification or an explanation shall disqualify such person from participation in this transaction.
3. The certification in this clause is a material representation of fact upon which reliance was placed when the department or agency determined to enter into this transaction. If it is later determined that the prospective primary participant knowingly rendered an erroneous certification, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.
4. The prospective primary participant shall provide immediate written notice to the department or agency to which this proposal is submitted if at any time the prospective primary participant learns that its certification was erroneous when submitted or has become erroneous by reason of changed circumstances.
5. The terms "covered transaction," "debarred," "suspended," "ineligible," "lower tier covered transaction," "participant," "person," "primary covered transaction," "principal," "proposal," and "voluntarily excluded," as used in this clause, have the meanings set out in the Definitions and Coverage sections of the rules implementing Executive Order 12549. You may contact the department or agency to which this proposal is submitted for assistance in obtaining a copy of those regulations (13 CFR Part 145).
6. The prospective primary participant agrees by submitting this proposal that, should the proposed covered transaction be entered into, it shall not knowingly enter into any lower tier covered transaction with a person who is debarred, suspended, declared ineligible, or voluntarily excluded from participation in this covered transaction, unless authorized by the department or agency entering into this transaction.
7. The prospective primary participant further agrees by submitting this proposal that it will include the clause titled "Certification Regarding Debarment, Suspension, Ineligibility and Voluntary Exclusion--Lower Tier Covered Transactions," provided by the department or agency entering into this covered transaction, without modification, in all lower tier covered transactions and in all solicitations for lower tier covered transactions.
8. A participant in a covered transaction may rely upon a certification of a prospective participant in a lower tier covered transaction that it is not debarred, suspended, ineligible, or voluntarily excluded from the covered transaction, unless it knows that the certification is erroneous. A participant may decide the method and frequency by which it determines the ineligibility of its principals. Each participant may, but is not required to, check the Nonprocurement List.
9. Nothing contained in the foregoing shall be construed to require establishment of a system of records in order to render in good faith the certification required by this clause. The knowledge and information of a participant is not required to exceed that which is normally possessed by a prudent person in the ordinary course of business dealings.
10. Except for transactions authorized under paragraph 6 of these instructions, if a participant in a covered transaction knowingly enters into a lower tier covered transaction with a person who is suspended, debarred, ineligible, or voluntarily excluded from participation in this transaction, in addition to other remedies available to the Federal Government, the department or agency may terminate this transaction for cause or default.

CERTIFICATION FOR EXECUTIVE ORDER NO. 291

STATE OF NEW JERSEY

DEPARTMENT OF THE TREASURY- DIVISION OF PURCHASE AND PROPERTY

33 WEST STATE STREET, P.O. BOX 230 TRENTON, NEW JERSEY 08625-0230

On March 2, 2022, Governor Murphy signed Executive Order 291, which is attached here. In part, EO 291 requires that "The Division of Purchase and Property in the Department of the Treasury shall review relevant State contracts to determine if any are with companies owned or controlled by the government of Russia, Belarus, or their instrumentalities, or businesses that invest directly in such companies, directly or as subcontractors".

Your company has been identified as one which has an active contract with the State of New Jersey. As a Contractor, pursuant to the State of New Jersey Standard Terms and Conditions, your company must comply with all local, State and Federal laws, rules and regulations - this includes executive orders. Accordingly, please select the appropriate response below.

I, on behalf of the Contractor identified below, certify that neither the Contractor nor any subcontractors used by the Contractor to provide goods or services to the State of New Jersey, is owned or controlled by the government of Russia, Belarus, or their instrumentalities; and, that neither the Contractor nor any subcontractors invest directly in any company that is owned or controlled by the government of Russia, Belarus, or their instrumentalities.

I, on behalf of the Contractor identified below, am unable to certify that neither the Contractor nor any subcontractors used by the Contractor to provide goods or services to the State of New Jersey, is owned or controlled by the government of Russia, Belarus, or their instrumentalities; and, that neither the Contractor nor any subcontractors invest directly in any company that is owned or controlled by the government of Russia, Belarus, or their instrumentalities.

Please identify/explain the ownership, control and or investment activities of the Contractor or subcontractor below.

I, the undersigned, certify that I am authorized to execute this certification on behalf of the Contractor, that the foregoing information and any attachments hereto, to the best of my knowledge are true and complete. I acknowledge that the State of New Jersey is relying on the information contained herein, and that the Contractor is under a continuing obligation from the date of this certification through the completion of any contract(s) with the State to notify the State in writing of any changes to the information contained herein; that I am aware that it is a criminal offense to make a false statement or misrepresentation in this certification. If I do so, I may be subject to criminal prosecution under the law, and it will constitute a material breach of my contract(s) with the State, permitting the State to declare any contract(s) resulting from this certification void and unenforceable.

Caroline Jackson

07/14/2023

Signature Authorized Representative

Date

Caroline Jackson

Print Name and Title Authorized Representative

Sr. Business Consultant

Print Name of Contractor

Please complete and return this certification via email to acctspayable@orange.k12.nj.us

HONEYWELL INTERNATIONAL INC
 115 TABOR ROAD
 MORRIS PLAINS, NJ 07950

State of New Jersey



**DEPARTMENT OF THE TREASURY
 DIVISION OF PROPERTY MANAGEMENT AND CONSTRUCTION
 33 WEST STATE STREET - P.O. BOX 034
 TRENTON, NEW JERSEY 08625-0034**



NOTICE OF CLASSIFICATION

In accordance with N.J.S.A. 18A:18A-27 et seq (Department of Education) and N.J.S.A. 52:35-1 (Department of the Treasury) and any rules and regulations issued pursuant hereto, you are hereby notified of your classification to do State work for the Department (s) as previously noted.

Aggregate Amount	Trade(s) & License(s)	Effective Date	Expiration Date
Unlimited	C043 -CONTROL SYSTEMS	04/01/2023	03/31/2025
	C098 -ENERGY MANAGEMENT SYSTEMS	04/01/2023	
	C036 -ENERGY SERVICES/ESCO	04/01/2023	
	C049 -FIRE ALARM/SIGNAL SYSTEMS license #: 34BF00009500	04/01/2023	
	C032 -HVACR license #: 19HC00404900	04/01/2023	
	C050 -SECURITY/INTRUSION ALARMS	04/01/2023	

- Licenses associated with certain trades are on file with the Division of Property Management & Construction (DPMC).
- Current license information must be verified prior to bid award.
- A copy of the DPMC 701 Form (Total Amount of Uncompleted Projects) may be accessed from the DPMC website at <https://www.nj.gov/treasury/dpmc/Assets/Files/DPMC701.pdf>.

ANY ATTEMPT BY A CONTRACTOR TO ALTER OR MISREPRESENT ANY INFORMATION CONTAINED IN THIS FORM MAY RESULT IN PROSECUTION AND/OR DEBARMENT, SUSPENSION OR DISQUALIFICATION. INFORMATION ON AGGREGATE AMOUNTS CAN BE VERIFIED ON THE DPMC WEB SITE.

NJ Co-Op Purchasing Required Information

Since the Orange Township Board of Education is a member in good standing with the Omnia Cooperative, use of Omnia Cooperative in the selection of Honeywell under contract # R221502 is allowed under NJ Public Contracts law as outlined in LFN 2012-10 and consists of the following elements and authorized by DLGS/DCA as well as the following elements:

- “an organization (profit or not-for-profit) that coordinates and aggregates contracts from different state and local governments and promotes their use.”
- “in the context of the LPCL and PSCL, the provisions of this notice apply when the aggregate value of the goods or services (see N.J.A.C. 5:34-8.2) exceeds the contracting unit’s bid threshold.”
- the national cooperative contract must have been advertised as a national or regional cooperative and awarded pursuant to a competitive bidding process that complies with the laws applicable.
- The LFN requires if a national cooperative contract is chosen, the calculation of cost savings from using this approach must be documented: The Law requires a contracting unit can use national cooperatives only when the contracting unit determines “ the use of the cooperative purchasing agreement shall result in cost savings after all factors, including charges for service, material, and delivery, have been considered.”
- The LFN states if using an online ordering system, local officials must put “appropriate internal controls” in place to ensure purchases are documented and that an audit trail exists

This document will certify Honeywell and the use of this cooperative purchasing agreement will remain compliant with the services of the COOP for the Orange Township Public School District; that ALL public works in conjunction with the School District and in accordance with NJ Public Contract Law (NJSA 18A:18A-1 et seq.) will be procured according to State requirements. To clarify further, this applies to a public works projects including and not limited to installing electrical, lighting, plumbing, HVAC, BMS systems etc. Additionally, that no on-line ordering system will be used as part of this process.

It is estimated the cost savings to the District by using the Cooperative Agreement will save approximately \$6,600 in legal fees, 100-man hours as well as significant lost energy savings per month for every month waiting to administer the RFP process on their own. Because Omnia has undertaken the competitive process on the district’s behalf, the savings can be achieved as outlined in this plan approximately 10 months sooner than via a local competitive contracting approach.



For more information

www.honeywell.com/us/en/industries/buildings-cities

Honeywell Energy Services Group

Caroline Jackson

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IS
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MAKE IT**

Honeywell