ENE Systems, Inc./Energy Efficient Investments, Inc.
Investment Grade Audit

FOR:

Addison Northwest School District

Prepared by:

Michael Davey, CEM

Date: December 13, 2017

EEI
ENERGY EFFICIENT INVESTMENTS INC.

ENE
SYSTEMS
REDUCING THE OPERATING AND ENERGY COSTS OF YOUR FACILITY

Executive Summary

EEI is located in Merrimack, NH, and has a proven track record of designing and implementing energy improvements to mechanical systems, building controls systems, insulation, and renewable systems. EEI is also an approved energy management contractor with Better Buildings, Pay for Performance, Eversource, Liberty Utilities, and Unitil in New Hampshire.

The Addison Northwest Supervisory Union is in Vergennes, VT and includes four schools and one Office Building.

EEI has developed a plan which could reduce annual energy expenditures in the district by more than $212,000.00

EEI in its role as Energy Service Company (ESCO) has agreed to develop an energy project targeting energy savings at the locations identified below:

Building	Location
Vergennes Elementary	43 East St, Vergennes, VT 05491
Vergennes Union High School	50 Monkton Rd, Vergennes, VT 05491
Addison Central School	121 VT Route 17 W Addison VT 05491
Ferrisburgh Elementary	56 Little Chicago Rd, Ferrisburgh, VT 05456

The development of every energy project starts with the initial energy assessment which includes a site visit and the collection of utility and operational costs for each location. The next step entails defining measures, budgetary costs, and estimated savings values by measure for each building. This information is documented in the **Preliminary Investment Grade Audit (PIGA)**.

On the following page, the Energy Conservation Measures Matrix shows the upgrades for Addison Northwest Supervisory, including conversion of Vergennes Union High School and Vergennes Elementary to natural gas. Approval of this Final Investment Grade Audit will lead to an **Energy Performance Contract (EPC)** which will clearly define the responsibilities of each party and will include a **Measurement and Verification (M&V)** procedure that will be used to measure the energy performance of the new systems and equipment installed throughout the Addison Northwest Supervisory school district.

After a review of many potential energy efficiency measures and other needed improvements at the 4 schools, the district's facilities committee considered 4 different options ranging from comprehensive projects focusing on building efficiency, safety, security, and infrastructure improvements to a project solely focused on energy efficiency measures. The board selected the more comprehensive option A, which also includes solar. Please refer to the ECM matrix on the following page.

Option A

Measure	Description	Cost	Savings	Rebate	Payback
Vergennes Elementary					
ECM 1	Controls Upgrade	$197,752.50	$1,800.00		
ECM 2	Add Cooling Front Office and 50 Week Classrooms	$105,336.00			
ECM 3	New ERV Gym	$243,750.00	$3,500.00		
ECM 4	New Boiler, and HWH and Modify Piping	$368,410.00	$21,746.56		
ECM 5	Kitchen Exhaust and Make Up Air	$157,070.00	-$1,800.00		
ECM 6	Walk In Cooler Controls	$13,300.00	$1,300.00		
ECM 7	Remove 1970 Unit Vents and add ERU	$215,460.00	$4,000.00		
ECM 8	LED Lighting with Smart Controls	$115,356.00	$10,000.00		
ECM 9	Security	$63,940.00	$0.00		
ECM 10	Fire Suppression System and FA Upgrades	$334,800.00			
ECM 11	Electrical Upgrades	$150,000.00			
	Total VES	**$1,965,174.50**	**$40,546.56**	**$0.00**	
Vergennes Union High School					
ECM 1	Controls Upgrade	$342,562.50	$7,000.00		
ECM 2	Steam Conversion, 2 New Boilers, Convert Back Up Boiler, New ERVS and Select Heat Pumps	$2,970,986.00	$81,081.00		
ECM 3	Replace 3 RTUs with heat pump RTUs	$187,650.00	$1,200.00		
ECM 4	Solar	$550,000.00	$34,000.00		
ECM 5	Transformers	$47,880.00	$3,360.00		
ECM 6	Walk In Cooler Controls	$13,300.00	$1,300.00		
ECM 7	LED Lighting with Smart Controls	$293,000.00	$22,000.00		
ECM 8	Security	$265,200.00			
ECM 9	Retro Commission	$66,500.00	$7,600.00		
ECM 10	Building Insulation	$50,540.00	$4,000.00		
	VUHS	**$4,787,618.50**	**$161,541.00**	**$0.00**	
Addison Central School					
ECM 1	Controls Upgrade	$5,000.00			
ECM 2	LED Lighting with Smart Controls	$49,000.00	$3,500.00		
ECM 3	Security	$35,000.00			
	ACS Total	**$89,000.00**	**$3,500.00**	**$0.00**	
Ferrisburgh Elementary					
ECM 1	Controls Upgrade	$5,000.00	$500.00		
ECM 2	Gym ERV	$226,100.00	$1,000.00		
ECM 3	LED Lighting with Smart Controls	$91,390.00	$5,183.00		
ECM 4	Walk In Cooler Controls	$13,300.00	$1,300.00		
ECM 5	Kitchen Hood & Make Up Air	$82,460.00	-$1,200.00		
ECM 6	Security	$52,000.00			
ECM 7	Electric FA Upgrade	$95,000.00			
	FES	**$565,250.00**	**$6,783.00**	**$0.00**	
	District Total	**$7,407,043.00**	**$212,370.56**	**$100,000.00**	
	Payment and Performance Bond	$74,070.43			
	Contingency	$148,140.86			
	Total Addison Northwest	**$7,629,254.29**	**$212,370.56**	**$100,000.00**	**35.45**
Potential Deducts	Exclude Solar	$7,079,254.29	$178,370.56	$100,000.00	

1. Utility Data Analysis

In order to understand the energy use of each building we analyzed the energy consumption data of each building. We used historical oil delivery data and electrical bills. To understand how the buildings behave during the heating and cooling seasons we analyze the consumption as it is related to heating (HDD) and cooling degree days (CDD). This gives us a baseline to understand how the building may react to changes that we make to the heating system, cooling system, and building envelope of the building.

Building Summary Information		
Project Name:	Addison Northwest Supervisory Union	
Annual Utility Data		
Total District Use 2016-2017		
	Oil (gal)	63,576
	Elec (KWH)	1,103,944
Contract Utility Rates		
Oil	Oil Rate	$3.00
Natural Gas	Therm Rate	$1.02
Electricity	Electric Rate	$0.16
Burlington, VT	Balance Point (65°)	
	HDD	6337
	CDD	376

1. Economic Analysis

Making good economic decisions requires analysis of available information and understanding the monetary value of time. A Discounted Life Cycle Cost Analysis (DLCCA) is very useful for this type of analysis when multiple alternatives exist. This is the Federal Energy Management Program (FEMP) approved method of analysis and is used to aid in decisions that are based on the most favorable economic outcome. The School District can see the estimated time it will take for this energy project to payback shown on the ECM Matrix on page 3.

EEI is working with many other area school districts to reduce their dependence on #2 fuel oil by conversion or partial conversion of all buildings to either natural gas, propane, or wood pellet. For the Addison Northwest School district, the best options are conversion to natural gas at Vergennes Union High School and Vergennes Elementary School and for the Addison Central School and Ferrisburgh Elementary School to remain on oil.

The key assumptions EEI used in our Economic Analysis include the baseline fuel usage and KWH use in which savings calculations were based on the fiscal year 2016 totals. Building interior lighting fixtures were assumed to run 2,500 hours per year, this is based on observation and interviews with staff. Exterior fixtures were assumed to run 4,380 hours per year.

2. Energy Conservation Measures

In this section of the document we will define the Energy Conservation Measures we have evaluated for this project. Then we will define the measures on a building by building basis. Careful consideration was given to each measure and its interaction with the overall building performance.

General ECM Descriptions

Vergennes Elementary

ECM 1 – Controls Upgrade

- Cut and Cap of existing pneumatic lines. Tubing removal by others.
- Integration to Boiler factory supplied BACnet card and install factory sensors as required. Provide BACnet IP controller for two sets of lead/lag system pump control, pump speed based on differential pressure, modulating min. flow bypass valves, HWS temp, 2 HWR temps, OA temp, and OA humidity. Monitor two DHW supply temp. Control 1 DHW recirc pump based occupancy schedule and strapon aquastat. Provide 4 pump VFDs. Install by others.
- DDC control for basement and library AHUs to include actuators for dampers, RA temp, mixed air temp, SA temp, filter status, fan enable, fan speed, fan status, freezestat status, and modulating heat valve. Provide VFDs for basement AHU return and supply fans.
- DDC control for two Gym HVs to include actuators for dampers, RA temp, mixed air temp, SA temp, filter status, fan enable, fan speed, fan status, freezestat status, and modulating heat valve. Provide VFDs. Provide space temp sensor with occupancy and CO2.
- DDC control of ERU to replace I/A controls to include the same points as the 2005 project. Provide new control devices, reuse all wiring, and enclosures.
- DDC control of all 23 FTR zones. Provide new two position control valves and space sensors with CO2.
- DDC control of 4 CUHs and 2 UHs to include two position control valves, fan enable, fan status, strapon aquastat, and blank plate sensors.
- DDC control of 6 UVs to include new actuators, heat valves, and all control devices. Provide space sensor with CO2.
- DDC control of 3 EFs.
- DDC enable of Kindergarten ERVs and heat (if possible). Provide two space sensors to include temperature, occupancy, humidity, and CO2.
- 8 hours of owner training, engineered submittals and as build documents.

ECM 2 – Add Cooling Front Office and 50 Week Classrooms

There are 4 classrooms that are used more than 50 weeks a year according the principal for various programs. EEI proposes to install 5 Mitsubishi mini split systems to the 3 classrooms and the front office.

ECM 3 – New Gym ERV

There are 2 H&V units that service the gym space that are so loud that the staff shuts the unit off during the day. EEI proposes removing these units and installing 2 gas fired, roof mounted Energy Recovery Ventilators unit with VFD Drives. This would include new ductwork for distribution.

ECM 4 – New Boiler, and HWH and Modify Piping

The elementary school currently has 2 boiler plants. One of the boilers was installed in 1973. This proposal is for a new condensing gas boiler and a consolidation of boiler plants with integrated piping.

ECM 5 – Kitchen Exhaust and Make-Up Air

The kitchen currently does not have code required make up air or exhaust hood with fire suppression system. This proposal is for a new roof mounted make up air unit, stainless steel exhaust hood sized for the existing equipment, and an Ansul fire suppression system.

ECM 6 – Walk-In Cooler Controls

EEI recommends refrigeration controllers on walk-in coolers and freezers and installing electronically commutated (EC) motors on evaporator fans at Vergennes Elementary School. A controller can start/stop the evaporator fans when operation is unnecessary. The EC motors are 30% more efficient than the standard two-pole motors. Energy savings will be realized by reducing the runtime of the compressors and evaporator fans as well as the reduction in power load of the new fans. Each walk-in cooler or freezer will have a new EC fan motor and blade installed as well as a dedicated controller. In addition, controllers will be installed on the freezer to optimize the operation of the electric defroster and door heater. The controller unit senses when refrigerant has ceased flowing through the evaporator coil and controls the fan motors. Door and frame heaters are controlled based on dew point, reducing their run time by 95% in chillers and 60% in freezers. The controllers will reduce compressor and evaporator runtime by up to 10%.

Calculations
Energy savings will result from both reducing the fan power and the efficient control of the evaporator fans and door heaters. In general, EEI uses the following approach to determine savings for this specific measure:

Existing kW Cost per kWh
Cost of Existing Equipment
Cost of Proposed Equipment Energy Savings

Listed Equipment Amperage x Voltage of Equipment Average Site Data Package $/kWh
= Existing kW x Cost per kWh x Effective Full Load Hours
= Existing kW x Cost per kWh x Full Load Hours Using Control
= Existing Equipment Costs- Proposed Equipment Costs

ECM 7 – Remove 1970's Unit Ventilators and add ERU

Each 1970's wing has classroom has unit ventilator which will be replace with AAON attic mounted ERU and new ductwork. Each room will also receive radiant heat.

ECM 8 – LED Lighting with Smart Controls

The schools currently utilize a combination of T8 and T5 fluorescent lighting. EEI proposes replacing the existing fixtures with new LED lighting. EEI performed a detailed survey of the interior and exterior spaces in order to identify opportunities in which we can improve lighting quality, reduce maintenance costs, and save energy.

The existing lighting demand (kW) per fixture, hours of operation, fixture quantities, and recommended retrofits are based on the physical inspection and site visits conducted by EEI in late 2016. As a result of the survey and analysis, EEI has developed a high efficiency lighting upgrade project that will provide the schools listed with new LED fixtures with smart controls, resulting in guaranteed annual energy savings and a reduction in electrical demand.

LED type lighting provides significant illumination, has longer life expectancy, increased savings in electric consumption, and provides dimming capabilities. Also, by standardizing all fixtures will reduce future maintenance requirements. Therefore, new lighting levels will meet or exceed existing light levels while still saving energy.

LED fixtures in a school environment have an estimated life of more than 20 years. There is significant maintenance savings when LED fixtures are used due to longer lifespan.

Install (12) Led Gym Lights
Install (374) New LED Fixtures

ECM 9 – Security

EEI recommends installing an expandable, integrated access control and CCTV system to control and monitor the school. The systems will be fully integrated with each other. Exterior entrances will have access control and/or monitored. The entrances with access control will be monitored via IP camera. The main hallways, bus loading/unloading area, parking lots, and other vehicle/pedestrian intersections will also be monitored via IP cameras. This will include all the cameras, video recorders, software, cabling, licenses, switches, panels, and trainings. Included at Vergennes Elementary School will be 8 access controlled doors, 1 AiPhone, 1 duress switch, 12 monitored doors.

ECM 10 – Fire Suppression System and FA Upgrades

EEI proposes installing a new sprinkler system to be designed in accordance with NFPA13 with calculations prepared by a NICET3 level engineering technician. EEI recommends that the majority of the fire protection system be a wet system and limit a dry sprinkler system to the attic spaces. This system would include a new fire alarm panel and new sprinkler devices.

ECM 11- Electrical Upgrades

EEI recommends installing 7 new 100-amp 120/208 volt panelboards to replace the existing non code compliant panelboards and the ungrounded wires between them.

Vergennes Union High School

ECM 1 – Controls Upgrade

EEI proposes to install a complete state of the art Bacnet IP DDC system with at point to point replacement of the following:

- Boiler and DHW system (reuse existing pump VFDs)
- AHU-1 through 10 with 3- 5 HP fan VFDs for AHU-1 and AHU-6). Freezestats will be installed on units that currently do have freeze protection.
- ERU-1 through 13. Freezestats will be installed on units that currently do have freeze protection.
- 30 UH/CUH
- 70 FTR Zones (new valves for everything except the Delta System)
- Auditorium and Kitchen Delta controls (reuse all devices and valves)

This proposal will include new PC server and Niagara N4 Supervisor licensed for up to 200 IP controllers, new graphics, floor plans, trends, archives, and setpoint control. All the existing control devices from the 2000 CTI installation will be replaced as well as actuators, valves, controllers, relays, and sensors.

ECM 2 – Steam Conversion, 2 New Boilers, Convert Back Up Boiler, New ERV, and Select Heat Pumps

EEI recommends converting the existing steam system to a gas fired hydronic system. This would include the installation of 2 new high efficiency 2,000 MBH condensing gas fired boilers to replace 1 of the 2 existing boilers. The remaining existing boiler will be converted to gas as well. The new boilers will act as the primary heating source in a condensing mode, and the existing converted boiler will run as 2nd stage heat when there is a higher demand for heating.

ECM 3 – Replace 3 RTU's with Heat Pump RTU's

There are 3 RTUs with attached failed compressors. The entire system will be replaced with new Carrier Heat RTUs.

ECM 4 – Solar

Electricity generated from electricity-producing solar photovoltaic (PV) panels will reduce the quantity of power purchased from the local utility. Many factors affect the

size of the solar PV installation, including on site load, available and suitable roof space, and available governmental incentives.

Solar electrical energy is generated when the sun's energy strikes the solar photovoltaic (PV) panel. A series of PV panels are combined in a PV array. Electrical energy, in Direct Current (DC), is sent from the array to an inverter, which converts the electricity to Alternating Current (AC) power. The AC electrical output from the inverter is integrated into the building's electrical system. Good practice and typical utility company requirements include the use of a disconnect switch between the inverter output and the tie-in point into the building's electrical system.

Monitoring of electrical output from the PV system can typically be viewed on most inverters. To ensure proper accounting of system output as well as to facilitate that potential revenue can be gained by selling the renewable energy attributes or credits (RECs) (versus the electricity) from the PV system, the system needs a revenue-grade electrical meter to measure AC kilowatt-hour production. EEI proposes to install a 215 kW roof mounted ballasted solar array.

ECM 5 – Transformers

EEI evaluated the electrical systems of the school buildings and determined that the existing transformers at the Vergennes Union High School are standard efficiency models and are not designed to handle the loads of modern facilities. The most common efficiency for commercial and industrial transformers supplying linear loads in the 30-150 kVA range is 95%. Further, conventional transformer losses, which are non-linear, increase by 2.7 times when feeding computer loads. Also, if transformers are not properly vented to the exterior, their heat output adds to the building cooling load.

EEI recommends the replacement of existing inefficient transformers in order to improve the energy efficiency of the electrical distribution systems through the replacement of the transformers with new high efficiency units. The scope of work for this measure would include:

2 Transformers

(1) 225 KVA
(1) 112.5 KVA

ECM 6 – Walk-In Cooler Controls

EEI recommends refrigeration controllers on walk-in coolers and freezers and installing electronically commutated (EC) motors on evaporator fans at Vergennes Elementary School. A controller can start/stop the evaporator fans when operation is unnecessary. The EC motors are 30% more efficient than the standard two-pole motors. Energy savings will be realized by reducing the runtime of the compressors and evaporator fans as well as the reduction in power load of the new fans. Each walk-in cooler or freezer will have a new EC fan motor and blade installed as well as a dedicated controller. In addition, controllers will be installed on the freezer to optimize the operation of the electric defroster and door heater. The controller unit senses when refrigerant has ceased flowing through the evaporator coil and controls the fan motors. Door and frame heaters are controlled based on dew point, reducing their run time by 95% in chillers and 60% in freezers. The controllers

will reduce compressor and evaporator runtime by up to 10%.

Calculations
Energy savings will result from both reducing the fan power and the efficient control of the evaporator fans and door heaters. In general, EEI uses the following approach to determine savings for this specific measure:

Existing kW Cost per kWh
Cost of Existing Equipment
Cost of Proposed Equipment Energy Savings

Listed Equipment Amperage x Voltage of Equipment Average Site Data Package $/kWh
= Existing kW x Cost per kWh x Effective Full Load Hours
= Existing kW x Cost per kWh x Full Load Hours Using Control
= Existing Equipment Costs- Proposed Equipment Costs

ECM 7 – LED Lighting with Smart Controls

The schools currently utilize a combination of T8 and T5 fluorescent lighting. EEI proposes replacing the existing fixtures with new LED lighting. EEI performed a detailed survey of the interior and exterior spaces in order to identify opportunities in which we can improve lighting quality, reduce maintenance costs, and save energy.

The existing lighting demand (kW) per fixture, hours of operation, fixture quantities, and recommended retrofits are based on the physical inspection and site visits conducted by EEI in late 2016. As a result of the survey and analysis, EEI has developed a high efficiency lighting upgrade project that will provide the schools listed with new LED fixtures with smart controls, resulting in guaranteed annual energy savings and a reduction in electrical demand.

LED type lighting provides significant illumination, has longer life expectancy, increased savings in electric consumption, and provides dimming capabilities. Also, by standardizing all fixtures will reduce future maintenance requirements. Therefore, new lighting levels will meet or exceed existing light levels while still saving energy.

LED fixtures in a school environment have an estimated life of more than 20 years. There is significant maintenance savings when LED fixtures are used due to longer lifespan.

Install (17) 2x2 LED Retrofit Kits
Install (430) 2x4 LED Retrofit Kits
Install (587) New LED Fixtures
Install (54) New LED Gym Fixtures
Install (20) New LED Parking Lot Fixtures

ECM 8 – Security

EEI recommends installing an expandable, integrated access control and CCTV system to control and monitor the school. The systems will be fully integrated with each other. Exterior entrances will have access control and/or monitored. The entrances with access control will be monitored via IP camera. The main hallways, bus loading/unloading area, parking lots, and other vehicle/pedestrian intersections will also be monitored via IP cameras. This will include all the cameras, video recorders, software, cabling, licenses,

switches, panels, and trainings. Included at Vergennes Union High School is 2 added access controlled doors, 1 AiPhone, 1 duress switch, and 20 monitored doors.

ECM 9- Retro Commission

This is an allowance for engineering at maintenance team to install repair and replace any damaged existing to remain equipment.

ECM 10- Building Insulation

This measure includes air sealing roof wall gap.

Addison Central School

ECM 1 – Controls Upgrade

This measure includes retro commissioning of the systems with a point to point checkout.

ECM 2 – LED Lighting with Smart Controls

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The existing lighting demand (kW) per fixture, hours of operation, fixture quantities, and recommended retrofits are based on the physical inspection and site visits conducted by EEI in late 2016. As a result of the survey and analysis, EEI has developed a high efficiency lighting upgrade project that will provide the schools listed with new LED fixtures with smart controls, resulting in guaranteed annual energy savings and a reduction in electrical demand.

LED type lighting provides significant illumination, has longer life expectancy, increased savings in electric consumption, and provides dimming capabilities. Also, by standardizing all fixtures will reduce future maintenance requirements. Therefore, new lighting levels will meet or exceed existing light levels while still saving energy.

LED fixtures in a school environment have an estimated life of more than 20 years. There is significant maintenance savings when LED fixtures are used due to longer lifespan.

Install (4) 2x2 LED Retrofit Kits
Install (10) 2x4 LED Retrofit Kits
Install (174) New LED Fixtures
Install (16) New LED Gym Fixtures

ECM 3 – Security

EEI recommends installing an expandable, integrated access control and CCTV system to control and monitor the school. The systems will be fully integrated with each other.

Exterior entrances will have access control and/or monitored. The entrances with access control will be monitored via IP camera. The main hallways, bus loading/unloading area, parking lots, and other vehicle/pedestrian intersections will also be monitored via IP cameras. This will include all the cameras, video recorders, software, cabling, licenses, switches, panels, and trainings. Included at Addison Central School is 4 access controlled doors, 1 AiPhone, 1 duress switch, and 15 monitored doors.

Ferrisburgh Elementary

ECM 1- Controls Upgrade

This measure includes integration of new equipment with existing DDC Controls

ECM 2 – Gym ERV

The gymnasium area currently does not have any ventilation. EEI recommends that a gas fired, roof mounted Energy Recovery Ventilator be installed to heat and ventilate the space. This would include new ductwork for distribution.

ECM 3 – LED Lighting with Smart Controls

The schools currently utilize a combination of T8 and T5 fluorescent lighting. EEI proposes replacing the existing fixtures with new LED lighting. EEI performed a detailed survey of the interior and exterior spaces in order to identify opportunities in which we can improve lighting quality, reduce maintenance costs, and save energy.

The existing lighting demand (kW) per fixture, hours of operation, fixture quantities, and recommended retrofits are based on the physical inspection and site visits conducted by EEI in late 2016. As a result of the survey and analysis, EEI has developed a high efficiency lighting upgrade project that will provide the schools listed with new LED fixtures with smart controls, resulting in guaranteed annual energy savings and a reduction in electrical demand.

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LED fixtures in a school environment have an estimated life of more than 20 years. There is significant maintenance savings when LED fixtures are used due to longer lifespan.

Install (16) 2x4 LED Retrofit Kits
Install (12) New LED Gym Fixtures
Install (170) New LED Fixtures
Install (2) New LED exterior fixtures

ECM 4 – Walk-In Cooler Controls

EEI recommends refrigeration controllers on walk-in coolers and freezers and installing electronically commutated (EC) motors on evaporator fans at Vergennes Elementary School. A controller can start/stop the evaporator fans when operation is unnecessary. The EC

motors are 30% more efficient than the standard two-pole motors. Energy savings will be realized by reducing the runtime of the compressors and evaporator fans as well as the reduction in power load of the new fans. Each walk-in cooler or freezer will have a new EC fan motor and blade installed as well as a dedicated controller. In addition, controllers will be installed on the freezer to optimize the operation of the electric defroster and door heater. The controller unit senses when refrigerant has ceased flowing through the evaporator coil and controls the fan motors. Door and frame heaters are controlled based on dew point, reducing their run time by 95% in chillers and 60% in freezers. The controllers will reduce compressor and evaporator runtime by up to 10%.

Calculations
Energy savings will result from both reducing the fan power and the efficient control of the evaporator fans and door heaters. In general, EEI uses the following approach to determine savings for this specific measure:

Existing kW Cost per kWh
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= Existing kW x Cost per kWh x Full Load Hours Using Control
= Existing Equipment Costs- Proposed Equipment Costs

ECM 5 – Kitchen Hood and Make Up Air

The kitchen currently does not have code required make up air or exhaust hood with a fire suppression system. This proposal is for a new roof mounted make up air unit, stainless steel exhaust hood sized for the existing equipment, and an Ansul fire suppression system.

ECM 6 – Security

EEI recommends installing an expandable, integrated access control and CCTV system to control and monitor the school. The systems will be fully integrated with each other. Exterior entrances will have access control and/or monitored The entrances with access control will be monitored via IP camera. The main hallways, bus loading/unloading area, parking lots, and other vehicle/pedestrian intersections will also be monitored via IP cameras. This will include all the cameras, video recorders, software, cabling, licenses, switches, panels, and trainings. Included at Ferrisburgh Elementary School is 8 access controlled doors, 1 AiPhone, 1 duress switch, and 11 monitored doors.

ECM 7 – Electric FA Upgrades

EEI proposes to install a new fire alarm system with a new fire alarm panel and field devices.