Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	15820964
Facility	Consentino Middle School	**Gas PA**		**Application #**	15820966

This Minimum Requirements Document ("MRD") states the minimum equipment specifications and operational requirements of the energy saving equipment and system(s) planned for the project identified above per the project's design documents. Equipment and systems shall be installed per the minimum requirements in this document to ensure that the demand and energy savings estimated in the Mass Save engineering analysis/energy model are realized. Upon construction completion, the Mass Save will verify that these minimum requirements are met before making incentive payments. Verification may include a physical post inspection walk through and review of documents and trend data identified in these MRDs.

The Energy Conservation Measures (ECMs) in this project provide both electric and gas savings (as applicable). The ECMs and associated fuel savings are listed in the table below. A separate detailed MRD for each ECM follows on subsequent pages.

	Applicability	
ECM	**Electric**	**Gas**
ECM 1: Enhanced Building Envelope	☒	☒
ECM 2: Interior Lighting	☒	☐
ECM 3: Exhaust Air Energy Recovery Exceeding Baseline Requirements	☐	☒
ECM 4: Enhanced DCV	☒	☒
ECM 5: Efficient Reheat after Dehumidification	☐	☒
ECM 6: High Efficiency Chiller	☒	☐
ECM 7: Optimized Hot Water Supply Temperature Reset	☐	☒
ECM 8: Low Flow Fixtures	☐	☒

In the event there are to be changes to the equipment and systems described in these MRDs, customers must notify the Mass Save Program Administrators of the expected changes prior to the equipment purchase and installation, as the change in design and operation may affect the available incentive and anticipated energy savings.

Technical Representative	**Pre-Installation**		**Post-Installation**	
	Signature	Date	Signature	Date
Customer				
Electric PA	sekar Iyer	12/05/2024		
Gas PA	sekar Iyer	12/05/2024		

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

Metering and Reporting Requirements

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Provide a set of approved submittals, invoices and photographs corresponding with major equipment that is key in attaining the % EUI reduction before the date of substantial completion.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2.	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	4.	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	5.	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

ECM 1: Enhanced Building Envelope

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Roof construction shall consist of single-ply membrane roofing with a minimum 9" of rigid polyisocyanurate insulation. The assembly shall have an overall U-value of 0.019 or lower.	
Yes ❑ No ❑	2. Typical exterior wall sections with brick veneer or fiber cement facades shall have 4" of continuous insulation (min. R-21.6) and 6" batt insulation between 6" metal studs, 16" o.c. (min R-21, minimum equivalent continuous R-7.4). Overall assembly U-value before derating for clear field and linear thermal bridges shall be U-0.031 or lower.	
Yes ❑ No ❑	3. Windows shall have the following thermal performance.	

Fenestration type	Overall Assembly U-value	SHGC
Fixed/Curtainwall	0.24 or lower	0.31 or similar
Operable	0.24 or lower	0.31 or similar

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	4. N/A	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	5. Complete submittals for roof and wall insulation, clearly indicating the insulation's thermal properties (including the R-value per inch of thickness and the total thickness of the roof insulation), shall be forwarded to an approved by the customer prior to installation.	
Yes ❑ No ❑	6. Complete submittals for windows, clearly showing assembly U-value (using the NFRC rating method) and SHGC, shall be forwarded to and approved by the customer prior to installation	
Yes ❑ No ❑	7. A copy of the above submittals shall also be forward to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	8. N/A	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	9. N/A	

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

ECM 2: Interior Lighting

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Furnish interior lighting fixtures and install the complete lighting system, including lighting controls according to the **Conformed Set dated April 26, 2024.** The installed lighting power shall not exceed 89.7 kW (average 0.513 W/ft^2 based on the building area of 174,801 sf). Occupancy/vacancy sensors shall be provided in most spaces, per construction documents. The light level in the spaces shall comply with appropriate codes, with the owner's requirements, and with the recommendations of the IES standards.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2. N/A	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3. Complete submittals for all lighting fixtures, lamps, and all controls, including wiring diagrams, shall be forwarded to and approved by the customer prior to the installation. Documentation shall clearly indicate the total fixture wattage and the quantity of fixtures provided.	
Yes ❑ No ❑	4. A copy of the above submittals shall also be forwarded to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	5. N/A	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	6. N/A	

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

ECM 3: Exhaust Air Energy Recovery Exceeding Baseline Requirements

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. For the systems listed in Table 3-1 at the end of this document provide total enthalpy exhaust recovery wheels with effectiveness as indicated.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2. The energy recovery wheel shall operate as described in the controls outline on the following page, and shall be coordinated with hot water coil, chilled water coil, and economizer [see sequences detailed below].	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3. Complete submittals for all subject systems, and associated controls shall be forwarded to and approved by the customer prior to installation.	
Yes ❑ No ❑	4. Copies of all above submittals shall also be forwarded to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	5. Provide trend data for the following control or monitoring points for RTUs listed. Trend data shall be provided separately for the cooling and heating season. In each season the data shall cover approximately two weeks. Data shall be provided in an electronic format that is compatible with Microsoft Excel. Trends shall show value of each point at 30-minute intervals.	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

Yes ❑ No ❑	6. For RTUs- 4 and 8: (mixed air systems)[1],[2] • Space temperature (setpoint and actual) • Supply airflow and/or fan speed (setpoint and actual) • OA flow (and/or damper position) • Economizer mode status • CHW coils valve position • HW coils valve position • Energy recovery device operation status • RA temperature (before energy recovery wheel) • EA temperature (after energy recovery wheel) • OA temperature (before and after energy recovery wheel) • MA temperature	

[1] MA: Mixed Air
RA: Return Air
OA: Outside Air
EA: Exhaust Air

[2] The intended energy recovery control sequence, economizer and DAT controls, per Conformed Drawings Volume 3 M5.05, are as follows:
The controller shall modulate the energy recovery wheel as follows:
Cooling Recovery Mode: The controller shall measure the total wheel discharge air temperature and modulate the total wheel speed or bypass dampers to maintain the supply air temperature setpoint and run whenever:

1. The RTU return air temperature is 5°F (adj.) or more below the outside air temperature
2. AND the economizer is off
3. AND the supply fan is on.

Heating Recovery Mode: The controller shall measure the total wheel discharge air temperature and modulate the total wheel speed or bypass dampers to maintain the supply air temperature setpoint and run whenever:

1. The RTU return air temperature is 5°F (adj.) or more above the outside air temperature
2. AND the economizer is off
3. AND the supply fan is on.

Ecnomizer: The controller shall measure the return and outside air enthalpies and modulate the outside air damper, recirculation damper (during unoccupied conditions) and wheel bypass dampers as required to maintain the supply air temperature setpoint. The total energy recovery wheel shall be off. The economizer shall be enabled whenever:

1. Outside air temperature is less than 65°F (adj.)
2. AND the outside air enthalpy is less than return air enthalpy
3. AND the outside air temperature is less than the return air temperature
4. AND the supply fan status is on

The economizer shall be disabled whenever:

1. Outside air temperature drops below 40°F (adj.)
2. OR on loss of supply fan status
3. OR the FREEZESTAT is on.

DAT: The heating coil valve and chilled water valve shall modulate to maintain the units discharge air temperature setpoint, based on the space calling for cooling or heating.

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

Yes ❑ No ❑	7. For RTU-1, 2, 3, 5, 6, 7, 9, 10 and ERVs- 1 and 2: (100%/capable OA systems)[3] • DAT setpoint and actual • Supply static pressure setpoint and actual • Airflow and/or fan speed (supply and exhaust) • Economizer mode status • CHW coils valve position • HW coils valve position • Energy recovery device operation status • RA temperature (before energy recovery wheel) • EA temperature (after energy recovery wheel) • OA temperature (before and after energy recovery wheel)	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	8. N/A	

[3] The intended energy recovery control sequence, economizer and DAT controls, per Conformed Drawings Volume 3 M5.03-M5.06, are as follows:

The controller shall modulate the energy recovery wheel as follows:

Cooling Recovery Mode: The wheel shall modulate to maintain the supply air temperature setpoint and run whenever:

4. The unit return air temperature is below the outside air temperature
5. AND the supply and exhaust fan is on.

Heating Recovery Mode: The wheel shall modulate to maintain the supply air temperature setpoint and run whenever:

4. The unit return air temperature is above the outside air temperature
5. AND the supply and exhaust fan is on.

Economizer: The controller shall measure the return and outside air enthalpy and modulate the outside air damper, exhaust air damper & return air damper to maintain the space or supply air temperature setpoint. The exhaust fan shall modulate based on outside air damper position. The economizer shall be enabled whenever:

1. Outside air temperature is less than 65°F (adj.)
2. AND the outside air temperature is less than the return air temperature
3. AND the outside air enthalpy is less than the return air enthalpy
4. AND the supply and exhaust fan status is on.

The economizer shall be disabled whenever:

5. Outside air enthalpy is greater than the return air enthalpy
6. OR on loss of supply or exhaust fan status.

DAT (for all RTUs except 4 & 8): The supply air setpoint will be reset based on outdoor air temperature. When the outdoor air temperature is below 65°F (adj.) the supply air setpoint shall be 68°F (adj.) and shall reset to 63°F (adj.) at an outdoor temperature above 80°F (adj.) the reset shall be linear between these two setpoints.

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

Table 3-1

Unit ID / Service	Serves	Proposed Energy Recovery Effectiveness[4]		Unit ID / Service	Serves	Proposed Energy Recovery Effectiveness[4]
RTU-1	Classrooms	69%		RTU-7	Café/Small Dining	65%
RTU-2	Classrooms	69%		RTU-8	Gym	79%
RTU-3	Classrooms	69%		RTU-9	Locker Rooms	82%
RTU-4	Kitchen/Custodial	80%		RTU-10	Admin	62%
RTU-5	Media/Technology	72%		ERV-1	Corridor	75%
RTU-6	Art/Music/Alt P.E.	65%		ERV-2	SRO Office	75%

[4] Based on ASHRAE 90.1 definition and at design conditions, the effectiveness represents the approximate enthalpy change of the OA as compared to the enthalpy change if the OA were heated to the temperature of the exhaust air.

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

ECM 4: Enhanced DCV

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Provide CO_2 sensors per the conformed set (April 26, 2024) at each VAV box for all the spaces that are regularly occupied such as classrooms along with controls to modulate the box damper position (supply flow) based on CO_2 levels. Also provide a CO_2 sensor in the return duct for RTUs- 1, 2, 3, 5, 6, 7, and 9 along with controls to modulate the units outside air damper according to the measured CO_2 concentration. If any VAV box is fully open but the CO_2 sensor is not satisfied, the OA damper on the associated RTU shall modulate open until space CO_2 sensors are satisfied.	
Yes ❑ No ❑	2. Provide CO_2 sensos in spaces served by RTUs- 4 (kitchen) and 8 (gym) per the conformed set (April 26, 2024) along with controls to modulate the OA damper position (supply flow) based on CO_2 levels.	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	3. <u>RTUs- 4 and 8: (single-zone systems)[5]:</u> CO_2 sensor in each return air duct (or space) shall be used to control OA flow for the associated RTU. The RTU's OA flow will vary between 25% and 100% of the scheduled OA flow based on CO_2 level. The reduced OA CO_2-based control shall be overridden when economizer cooling is required or if additional makeup air is required for the kitchen (RTU-4 only).	
Yes ❑ No ❑	4. <u>RTUs-1, 2, 3, 5, 6, 7, and 9: (100% OA capable systems)[6]:</u> Each CO_2 sensor located in a space shall be used to control the associated terminal box for the space. When in occupied mode (determined via occupancy sensor) the terminal box shall modulate based on CO_2 levels between minimum (50%) and maximum (design, 100%) positions to maintain room CO_2 setpoints (800 ppm, adj.). The position of the RTU damper shall be controlled based on the critical zone.	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	5. Complete submittals for all subject RTUs, CO_2 sensors, associated dampers and terminal units, and sequences of operation shall be forwarded to and approved by the customer prior to installation. Submittals shall clearly show minimum flow settings for RTUs and terminal units.	
Yes ❑ No ❑	6. A copy of all the above submittals shall be forwarded to and approved by the customer prior to installation.	
Yes ❑ No ❑	7. A copy of the above submittals shall also be forwarded to National Grid.	

[5] Per Conformed Drawings Volume 3 M5.05 and correspondence with the design team:
CO_2 Control: Upon a rise in space CO_2 (greater than 800 PPM) the outdoor air damper shall modulate open. Upon a rise in space CO_2 10% or more than the design of 800 PPM (adj.) an alarm will be generated at the BMS with a 20 min. (adj.) delay. Once levels begin to drop below 800 PPM, the outdoor air damper shall return control to the room thermostat and modulate according to the demand.

[6] Per Conformed Drawings Volume 3 M5.03-M5.05:
CO_2 Control: As the space CO_2 level rises, the VAV boxes will open to increase ventilation, the supply fan and exhaust fan shall ramp up to meet the demand of the VAV boxes, to reduce CO_2 levels back to levels below set point. Once the level of CO_2 is reduced below set point (750 PPM adj.) for a period of 30 min. (adj.), the fans will revert to normal occupied operation.

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	8. Provide trend logs for OA temperature (global point) and for the control or monitoring points as listed below for each RTU and selected spaces. Trending data shall be provided separately for cooling season and for heating season. In each season the trending data shall cover approximately a two-week period. Data shall be provided in an electronic format that is compatible with Microsoft Excel. Trends shall show value of each point at 30-minute intervals	
Yes ❑ No ❑	9. For RTUs-1, 2, 3, 5, 6, 7, and 9 (100% outdoor air capable systems): • Supply static pressure (setpoint and actual) • Airflow and/or fan speed (supply and exhaust) • OA damper position	
Yes ❑ No ❑	10. For approximately 20% of VAV boxes served by: RTU-1, 2, 3, 5, 6, 7, and 9: • Room CO_2 level (setpoint and actual) • Room status (occupied/unoccupied) • Room temperature (setpoint and actual) • VAV box air flow	
Yes ❑ No ❑	11. For RTUs- 4 and 8: (single-zone, mixed air systems): • Economizer mode status • Outside air flow and/or damper position (setpoint and actual) • CO_2 level in space or return air (setpoint and actual) • Kitchen hood status and flow (RTU-4 only) • Space temperature (setpoint and actual) • Supply airflow and/or fan speed (setpoint and actual)	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	12. N/A	

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

ECM 5: Efficient Reheat after Dehumidification

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Provide sensible energy recovery wheel located downstream from the cooling coil for RTUs 1, 2, 3, 5, 6, 7, and 9, for reheat after dehumidification.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2. The energy recovery wheel shall operate when the units are in operation in occupied mode and in dehumidification cycle, to maintain DAT. It should be off otherwise.[7]	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3. Complete submittals for all units listed above, including sensible energy recovery wheels and all associated controls, including wiring diagrams and sequences of operation, shall be forwarded to and approved by the customer prior to installation.	
Yes ❑ No ❑	4. A copy of the above submittals shall also be forwarded to National Grid.	

[7] The intended sensible energy recovery control sequence, per Conformed Drawings Volume 3 page M5.03, is as follows:
The controller shall modulate the sensible energy recovery wheel as follows:
Cooling Reheat Mode: The wheel shall modulate to reheat the supply air temperature to meet the supply air setpoint or the space temperature setpoint and run whenever:

6. The cooling coil leaving air temperature is below the unit discharge air temperature setpoint
7. AND the chilled water coil is enabled.

Heating Recovery Mode: The wheel shall be off during heating mode. The wheel shall rotate periodically (quarter turn every hour) to maintain even wear on the wheel.

Minimum Requirements Document

Customer		**Electric PA**	National Grid	**Application #**	
Facility	Consentino Middle School	**Gas PA**		**Application #**	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	5. Provide trend logs for the following points: • OA temperature – global point • OA humidity or dew point For each RTU • Energy recovery device operation status • Economizer mode status • RA/SA space humidity (setpoint and actual) • Airflow and fan speed (supply and return) • DA temperature (setpoint and actual) Trending data shall be provided for heating season and shall cover a period of approximately two weeks. Data shall be provided in an electronic format that is compatible with Microsoft Excel. Trends shall show value of each point at 30-minute intervals.	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	6. N/A	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

ECM 6: High Efficiency Chiller

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Purchase and install a high-efficiency air-cooled modular chiller with VFD capacity control. Chiller shall be a Multistack ACF (R-513A), or equal, rated at 350 tons, 0.6102 kW/ton full load, 0.6291 kW/ton IPLV at AHRI conditions.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2. Chiller shall be controlled to maintain chilled water supply temperature at setpoint (44°F, adj.). Controls shall stage chillers for optimal plant efficiency.	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3. Complete submittals for the chiller and associated controls shall be forwarded to and approved by the customer prior to installation.	
Yes ❑ No ❑	4. A copy of the above submittals shall also be forwarded to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	5. N/A	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	6. N/A	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

ECM 7: Optimized Hot Water Supply Temperature Reset

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	1. Provide DDC controls to allow aggressive HW temperature setpoint reset.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	2. The hot water (HW) design supply temperature is 160°F and the design return temperature is 140°F. The HW supply temperature shall be reset based on the outdoor air temperature, between 160°F at 0°F OA temperature and 110°F at 60°F OA temperature. All setpoints are adjustable.	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	3. Provide ATC submittal or similar with the final control sequences.	
Yes ❑ No ❑	4. A copy of the above submittals shall also be forwarded to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	5. Trend data shall be submitted to demonstrate the proper setup and operation of the controls. Two weeks of 15-minute interval trend data from the non-cooling season shall be submitted in .csv file format. Trend data points shall include: •Hot water supply temperature •Outdoor air dry-bulb and wet-bulb temperature	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	6. N/A	

Minimum Requirements Document

Customer		Electric PA	National Grid	Application #	
Facility	Consentino Middle School	Gas PA		Application #	

ECM 8: Low Flow Fixtures

Yes/No checkboxes are intended for use as program administrator's post-installation inspection record (check one).

EQUIPMENT: *Provide a list of equipment or materials installed as part of this project. Include equipment counts, HP, kW, efficiency and capacity ratings, rating conditions, location of controls hardware, etc.*

	Project Design Intent	Post Inspection Findings
Yes ❑ No ❑	7. Provide lavatory faucets with design flow rates of 0.35 gpm or less.	

SEQUENCES OF OPERATION: *Provide a description of equipment operating sequences, setpoints, operating schedules, balancing requirements (flow, velocity, head, etc.) or any other required operating parameters. Describe requirements separately.*

Yes ❑ No ❑	8. N/A	

DOCUMENTATION: *List written documentation required to train, verify, operate, or maintain the equipment being installed or controlled. This may include specification sheets, test reports, construction drawings, etc.*

Yes ❑ No ❑	9. Complete submittals for subject plumbing fixtures shall be forwarded to and approved by the customer prior to installation.	
Yes ❑ No ❑	10. A copy of the above submittals shall also be forwarded to National Grid.	

POST INSTALLATION VERIFICATION: *Provide a list of controls and monitoring capabilities required to verify proper system operation. Trends should document operational sequences, set points and scheduling of equipment as described in TA Study.*

Yes ❑ No ❑	11. N/A	

OTHER REQUIREMENTS: *Describe any requirements for demolition, removal, etc. of existing equipment.*

Yes ❑ No ❑	12. N/A	