MONROE COUNTY REQUEST FOR PROPOSALS [RFP]

Energy Consumption Reduction Plan for the Monroe County Correctional Facility

Release Date: February 3, 2012

Response Deadline: March 9, 2012

Maggie Brooks
County Executive

Monroe County
Department of Environmental Services
50 West Main Street
Rochester, NY 14614
monroecounty.gov

NO RESPONSE FORM

If you choose not to respond to this Request for Proposals, please fax this form back to MONROE COUNTY at your earliest convenience, to the attention of:

Meagan Brennan
Monroe County Office of Purchasing & Central Services
200 County Office Building
Rochester, NY 14614
Fax (585) 753-1104

RFP **Energy Consumption Reduction Plan for the Monroe County Correctional Facility**

Company: _____

Address: _____

_____

_____

Contact: _____

Contact Phone: _____

Email: _____

Reason for No-Response: _____

Project capacity. _____

Cannot bid competitively. _____

Cannot meet delivery requirements. _____

Cannot meet specifications. _____

Do not want to do business with Monroe County. _____

*Other: _____

_____

_____

Suggested changes to RFP _____

Specifications for next _____

Request for Proposals. _____

_____

_____

_____

_____

*Other reasons for not responding might include insufficient time to respond, do not offer product or service, specifications too stringent, scope of work too small or large, unable to meet insurance requirements, cannot meet delivery or schedule requirements, etc

TABLE OF CONTENTS

	Section 1 – Invitation to Participate	
1.1	Purpose	4
1.2	RFP Coordinator; Issuing Office	4
1.3	Presentation and Clarification of the County's Intentions	4
1.4	Time Line	5
1.5	An Overview of the Organization	5
	Section 2 –Scope of Work	
2.1	Overview	6
2.2	Detailed Scope of Work	6
2.3	Facility Information	7
	Section 3 – Specific Proposal Requirements	
3.1	Submission of Respondent's Proposal	13
3.2	Response Date	14
3.3	Clarification of RFP and Questions	14
3.4	Addenda to RFP	14
3.5	Organization of Proposal	14
3.6	Method of Evaluation	16
3.7	Oral Presentation	17
3.8	Investigations	18
	Section 4 – General Information for the Vendor	
4.1	Reservation of Rights	19
4.2	Contract Negotiation	19
4.3	Acceptance of Proposal Content	19
4.4	Prime Responsibilities	19
4.5	Property Rights	20
4.6	Contract Payment	20
4.7	News Release	20
4.8	Notification of Vendor Selection	21
4.9	Independent Price Determination	21
4.10	Incurring Costs	21
4.11	Material Submitted	21
4.12	Indemnification	22
4.13	Insurance Requirements	22
4.14	Proposal Certification	23
	Appendices	
Appendix A	Sample Standard Monroe County Contract	24
Appendix B	Project Implementation Costs	35
Appendix C	NYS Energy Law – Article 9	36
Appendix D	Flex Tech Benchmarking Pilot Program Draft Report	38

SECTION 1 - INVITATION TO PARTICIPATE

1.1 Purpose

Monroe County ("the County") is soliciting proposals from Energy Service Company (ESCO) Respondents to implement a facilities improvement project at the Monroe County Correctional Facility (Henrietta location). Prospective Respondents must offer a proposal that will meet the scope of services, qualifications and general description of work activities identified in this Request for Proposals ("RFP").

In responding to this RFP, Respondents must follow the prescribed format as outlined in Section 3. By so doing, each Respondent will be providing the County comparable data submitted by other Respondents and, thus, be assured of fair and objective treatment in the County review and evaluation process.

Pending final approval from the Monroe County Legislature, the County's objective is to enter into a one-year agreement with the option to renew for two (2) additional one-year terms.

1.2 RFP Coordinator; Issuing Office

This RFP is issued for the County. The RFP Coordinator, identified below, is the sole point of contact regarding this RFP from the date of distribution until the selection of the successful Respondent.

Meagan Brennan
Monroe County Purchasing and Central Services
39 West Main Street
Room 200
Rochester, New York 14614
Fax: (585) 753- 1104
Email: mbrennan@monroecounty.gov

Only those Respondents who have registered and received a copy of this RFP via the County website at www.monroecounty.gov/bid/rfps will receive addenda, if issued.

1.3 Presentation and Clarification of the County's Intentions

As a result of this RFP, the County intends to enter into a contract with the selected Respondent to supply the services described in Section 2. However, this intent does not commit the County to award a contract to any responding Respondent, or to pay any costs incurred in the preparation of the proposal in response to this request, or to procure or contract for any services. The County reserves the right, in its sole discretion, to (a) accept or reject in part or in its entirety any proposal received as a result of this RFP if it is in the best interest of the County to do so; (b) award one or more contracts to one or more qualified Respondents if necessary to achieve the objectives of this RFP and if it is in the best interest of the County to do so.

1.4 Time Line

The schedule of events for this RFP is anticipated to proceed as follows:

- This RFP will be distributed on February 3, 2012.

- **A pre-proposal meeting and walk-through inspection tour will be conducted for potential Respondents on February 17, 2012 at 10:00 AM. This will be the only opportunity for vendors to view the facility during the open RFP period. Individuals who would like to attend the tour must RSVP by February 15, 2012** to the RFP Coordinator at the email address provided in Section 1.2. The location for the tour will be the Monroe County Correctional Facility, 750 East Henrietta Road, Rochester, NY, 14623. The following information must be provided in the RSVP for all individuals expected to attend the tour:

    - Company name
    - Name
    - Title
    - Email Address
    - Phone Number

- All requests for RFP clarification must be submitted in writing to the RFP Coordinator at the email address provided in Section 1 and received no later than 3:00 PM EST on February 24, 2012.

- All questions will be answered and documented in writing as an Addendum to the RFP, and posted on the County web site. These will be sent out to all Respondents who received the original RFP on or before February 29, 2012.

- **Final RFP submissions must be received by 3:00 PM EST on March 9, 2012** at the address shown in Section 3.1. The right to withdraw will expire on this date and time.

1.5 An Overview of the Organization

The County is located in the Finger Lakes Region of New York State, where the Genesee River meets the south shore of Lake Ontario. The County has a population of over 735,000 residents. The County is comprised of 19 towns, 10 villages and the City of Rochester, the third largest city in New York State.

Monroe County government, with a workforce of approximately 4,600 full and part-time employees, has an annual operating budget close to $1 Billion. County government provides a variety of services, including: public safety, health and human services, economic development, recreation, transportation and environmental services. The County also owns and operates the Greater Rochester International Airport and Seneca Park Zoo.

The County is a community of innovators on the cutting edge of scientific research and discovery; a community of entrepreneurs; home to some of the world's best-known brands and fastest growing companies; and, a community recognized for its leadership in arts, culture and higher education.

SECTION 2 – SCOPE OF WORK

2.1 Overview

The County is soliciting proposals from Respondents to implement an energy performance project in order to assist in making the Monroe County Correctional Facility and its infrastructure as efficient as practical. The County expects that this will be done through the installation of new equipment, energy conservation measures, and the implementation of optimally efficient operation and maintenance procedures. The County wishes to implement the proposed energy project on an energy performance contract basis in accordance with the New York State Energy Law, Article 9, attached hereto as Appendix C.

Respondents must provide a guaranteed savings agreement, i.e. savings, increased revenues and/or guarantee payments will equal or exceed the cost of the lease payments or debt service. It is expected that savings and/or guarantees provided by the selected Respondent will fully offset the project costs involved for the County. Respondents must submit with their proposal the attached Appendix B, Project Implementation Costs.

To assist in the preparation of Respondent's proposals, the County has attached a draft of a Flex Tech Benchmarking Report (Appendix D) that includes potential Energy Conservation Measures (ECMs) for the Correctional Facility. Respondents should not limit themselves to these potential ECMs in preparing their proposals. Monroe County is interested in any and all ECMs that are in the best financial interest of the County to improve the operation of the facility.

Respondents must detail their proposed arrangements for acquisition, financing, and ownership of equipment to be installed as part of this project that responsibly maximize the net economic benefit to the County and/or reduce the risk to the County.

2.2 Detailed Scope of Work

Respondents must provide a comprehensive performance services implementation plan that includes, but is not limited to:

1. The performance of an investment quality comprehensive performance audit.

2. The design and specification of the proposed equipment and systems.

3. Services associated with the procurement, installation, and commissioning of new equipment and systems.

4. Preventive and emergency maintenance and servicing of the equipment installed.

5. Staff training.

6. Services in connection with the arrangement of program financing.

7. Savings/revenue enhancement performance guarantees.

8. The selected Respondent must work cooperatively with the County staff in

coordinating this project.

9. Maximize available incentives/rebates from government agencies and/or utility companies (e.g. NYSERDA).

10. The selected Respondent must be able to integrate their method of measurement and verification into Monroe County's Energy Dashboard.

Respondents must identify measures that can be taken to reduce operating costs for all activities and energy sources, including natural gas and electricity, and to reduce consumption for heating, cooling, ventilation, refrigeration, lighting, water heating, and other systems in each facility. Measures may involve controlling, modifying, adding, or replacing equipment and systems.

As a result of a comprehensive audit, Respondents shall include a table of the identified measures that clearly lists the costs and benefits of each measure to allow the County to select the group of measures to be included in the final contract.

A more detailed scope of work will be developed with the selected Respondent and Monroe County.

2.3 Facility Information

Utility Information will be provided at the Pre-Proposal Tour.

Building Description

The Monroe County Correctional Facility is owned and operated by Monroe County. It was constructed in 1990; two modular buildings were added shortly thereafter. The main facility is a single-story building divided into five (5) sections. Each section has a small second floor area for additional detainee housing. Each of the five primary areas has a penthouse mechanical room located on the roof that houses the air handling units and exhaust fans for the respective section. Each of the five separate living areas includes office space, rest rooms, a laundry room, a gymnasium, and a kitchen. Central offices serve the entire building. The two modular buildings were originally mobile office trailers that have been incorporated into the facility. A large greenhouse was added to the complex around 2000 that operates 365 days a year. The greenhouse is just over 12,000 square feet, with 9,300 square feet of heated space.

The building construction is reinforced concrete with a brick and block exterior. The flat roof has a rubber membrane with insulation that was replaced about five (5) years ago. The windows are single glazed, thermally broken ballistic glass in aluminum frames.

The mechanical equipment for each living area is located above the respective living area and the main boiler room is located on the first floor.

The building is occupied 24 hours a day, with few areas occupied for shorter hours.

Heating Ventilation and Air Conditioning Systems

Heating Plant: The main building is heated by a hot water heating system. The modular buildings are heated by gas fired rooftop units. The greenhouse is heated by gas fired unit heaters.

The hot water is generated by two Fulton steam boilers. Only one boiler is required to maintain the building temperature throughout the year. The boilers maintain a pressure of 8 psi all year and serve both the heating system and the domestic hot water heaters. The steam heats the heating water in two shell and tube heat exchangers. The hot water is circulated throughout the distribution system with two base mounted pumps with standard efficiency motors. The pumps operate most of the year, providing heat to the reheat coils, and run at a constant speed. The distribution system is a two pipe system with two-way control valves at each heating coil.

Boiler Make	**Model**	**Year Built**	**Qty**	**Capacity (Lbs/Hr Steam)**	**HP**
Fulton	ICS 50	2003	2	1725	50

Cooling Plant: Cooling is provided by 2 reciprocating liquid chillers. Each chiller is designed for 50% of the total load. Generally, one chiller operates at a time and the second acts as a standby. The chillers are original to the building and were manufactured by York. Each chiller has an air cooled condenser located on the roof. The chilled water is circulated to the AHU's by two base mounted pumps. The pump motors are standard efficiency motors that operate at a constant speed.

Chiller Make	**Model**	**Year Built**	**Qty.**	**Capacity (Tons)**	**kW**	**Volts**
York	YCR G00/46XD	1989	2	85	96.6	460
Condenser Make	**Model**	**Year Built**	**Qty**	**Refrigerant**	**Fans**	**CFM**
York	VCB-128	1989	2	R-22	4	3400

Major Air Handling Systems: There are five (5) separate living areas in the building that are conditioned from air handling units. Each living area is served by two AHU's; one for the living space and one for the office space. Each AHU has a return air fan and a supply air fan. The fans on all but one AHU operate at a fixed speed. The living space AHU has outside air and return air entering a mixing box. A hot water coil and a chilled water coil maintain a constant discharge temperature. The office AHU's have outside air and return air entering a mixing box with a chilled water coil; four (4) of the AHU's do not have a heating coil. There are 3 exhaust fans for each living area: one for the bathrooms, one for the laundry room, and one for the mechanical room.

The distribution system is a low pressure, single duct system. Four (4) air handling units serve 30 variable air volume (VAV) "boxes" in the system. Each box contains a damper and a heating coil. The damper has a pneumatic actuator that modulates to control the volume of air entering the space. The heating coil has a pneumatic control valve to vary the temperature based on demand. A pneumatic thermostat located in the respective space controls both the damper actuator and the control valve for the hot water coil. Each of the four AHU's has a static pressure (SP) control. On three of the AHU's the SP is maintained by modulating a series of vanes located on the inlet of the fan. On the fourth AHU the SP is maintained by controlling the speed of the fan with a variable speed drive. As the VAV box dampers close the SP increases the AHU's react accordingly to prevent the SP from exceeding a predetermined limit.

The remaining AHU's are constant volume systems. Each AHU may or may not have a preheat and/or a reheat coil to control the space temperature depending on the space

being served. All of the AHU's have a cooling coil that is served by the building liquid chillers.

Unit ID	Location	Service	Capacity (CFM)	Min. O.A. CFM	Motor HP (Sup & Ret Fan)	S.P. Control	Cooling Coil	Heating Coil
AHU-1	Mech Rm C-202	NE Support	2,700	560	3	Y	Y	N
AHU-2	Mech Rm C-202	Male East	7,300	1,200	7.5	N	Y	Y
AHU-3	Mech Rm E-205	Entrance	11,300	2,100	20	Y	Y	N
AHU-4	Mech Rm E-205	Male West	5,600	1,200	5	N	Y	Y
AHU-5	Mech Rm F-204	NW Support	4,250	700	3	Y	Y	N

Location	Service	Capacity (CFM)	Min. O.A. CFM	Motor HP (Sup & Ret Fan)	S.P. Control	Cooling Coil	Heating Coil
Mech Rm F-204	Female	5,800	1,200	5	N	Y	Y
Roof	Kitchen	4,800	1,150	5	N	Y	Y
Mech Rm G-202	SW Support	3,400	850	5	Y	Y	N
Mech Rm G-202	Work Release E	1,100	1,100	7.5	N	Y	Y
Mech Rm H-202	Multi-Purpose	750	750	5	N	Y	Y
Mech Rm H-202	Work Release W	900	900	5	N	Y	Y

Unitary Systems (packaged and split): There are seven (7) packaged rooftop HVAC units and one (1) ductless split system serving the facility. The packaged systems serve the modular units and the gymnasium. The ductless split system serves the central control room. These units are controlled by a wall thermostat and are not interfaced with the building automation system. All of the package units are natural gas heat with DX cooling. Each package unit has a built-in economizer.

Make	Model	Qty	Input (MBH)	Serves /Notes
York	D1NA042N07246A	2	90	Classrooms
York	D2CG072N07946A	4	100	Dormitories
York	D1EG120N16546DKF	1	204	Gymnasium

Each modular unit has a central exhaust fan and a bathroom exhaust fan that operate 24 hours a day. The break room exhaust fan is operated by a toggle switch.

Pumps: There are a total of 15 pumps in the building. Eleven pumps have small fractional horsepower motors and serve each of the air handling units. Four (4) pumps are primary pumps that circulate hot water and chilled water throughout the distribution system.

Tag	Fluid	GPM	Ft. Hd.	HP	Motor Eff.	Duty	Serves /Notes
HWP-1 & 2	HW	270	75	10	85.6%	Duty/Backup	Primary HW
CWP-1 & 2	CHW	280	75	10	85.6%	Duty/Backup	Primary CHW

Building Automation System: The building temperature is controlled by an Andover Building Automation System (BAS). The system consists of direct digital controls over pneumatic valves and actuators. The BAS is original to the building and consideration is being given to upgrading the system in the future. The space temperature is maintained at a constant occupied level 24 hours a day. The heating hot water temperature is reset based on the outdoor air temperature. There are 30 variable air volume (VAV) boxes in the building that are controlled by pneumatic valves, actuators, and thermostats.

The BAS has had either two or three upgrades in the last 20 years and the current version is about nine (9) years old. This is considered very obsolete by today's standards. It does contain some functionality to assist the maintenance staff with troubleshooting and predictive/proactive maintenance; however, the system lacks the storage capacity to use it effectively.

Excessive temperature/comfort complaints indicate a deficiency in the accuracy/calibration of the BAS and/or pneumatic controls. Component failures of the pneumatic control system have caused the control system to entrain excessive moisture. This condition has required the maintenance staff to replace all of the thermostats. Another problem arises in that it is very difficult and costly to remove all the moisture from the system and the new thermostats may be subjected to premature failure.

The HVAC roof top units (RTU) for the modular units are controlled by residential style wall thermostats. Each RTU has a built-in economizer control that adjusts the amount of outside air based on a minimum amount and the temperature outdoors. The economizer is designed to reduce the amount of mechanical cooling required on days when the outdoor air temperature is low enough to provide "free" cooling. A minimum set point ensures that the minimum required ventilation air is provided at all times. Indications are that the economizers and/or minimum set-points may not be working properly or are not set properly.

Other Energy-using Systems

Lighting: Interior lighting in the modular buildings, greenhouse, and the kitchen have been ungraded to T-8 lamps and electronic ballasts. The lighting in the main building remains the original T-12 fluorescent lamps and magnetic ballasts. The gymnasium consists of eight 300 watt high pressure sodium fixtures. There are no specific lighting controls incorporated into the facility.

The exterior lights attached to the building are controlled by photocells. The pole lights are controlled by a timer. Two of the new pole lights are controlled by both a photocell and the timer.

The maintenance staff has been upgrading the T-12 lamps and ballasts as they fail. However, a very small percentage has been completed to date. All of the fixtures in the main building should be upgraded with Super T-8 lamps and electronic ballasts.

Domestic Hot Water (DHW): DHW is produced by 2 Aerco, high capacity Helitherm heat exchangers. The primary source of heat comes from the steam boilers. The heat exchangers are original to the building and are model number SW1B-1-07. One (1) heat exchanger can provide 100% of the domestic hot water needs to the building. The hot water heaters maintain a constant temperature of 115°F. A single circulating pump circulates the hot water throughout the building. An aquastat was installed to start and stop the pump when the hot water reaches the furthest fixtures in the building. The aquastat is set at 140°F. Because of this high setting the pump never shuts off.

Domestic hot water is provided to the two modular units from two gas fired hot water heaters. Each modular is served by a single heater. The break room in the modular unit has a small 10 gallon electric heater.

Make	Model	Capacity	Input (MBH)	Recovery (GPH)	Year
Bradford White	MI100T6BN	100	85	82.4	2011
State Industries	SBS7576NE	74	75.1	72.82	2005

Laundry: Each living area has its own laundry. The laundry consists of a single clothes washer and electric clothes dryer. The appliances are all top load residential models that are replaced frequently. Originally, there were commercial gas dryers in each living area. Excessive maintenance necessitated their replacement with residential electric dryers. The new dryers are manufactured by Whirlpool and are model EED4400WQ. The clothes washers are manufactured by Whirlpool and are Estate models #ETW4400WQ. The clothes washers are not Energy Star rated.

Kitchen: The kitchen serves three meals a day, seven days a week. Operations begin at about 4:00 AM in preparation for breakfast and end around 6:30 PM. The cooking equipment is gas fired. A range hood operates about 14 hours a day and is interlocked with a dedicated make up air unit. The make up air unit is a direct fired gas unit with an output of 410.0 MBH. Hot water is provided to the dishwasher from the central DWH heaters and boosted at the dishwasher with an electric booster heater. The booster heater was manufactured by Hubbell and is a model #J1630T4 rated for 30 kW. The dishwasher was manufactured by Hobart and is model #CPW80A with a 15kW electric heater. The booster heater remains on all the time and the exhaust fan is turned on and off manually.

Unit ID	Type	Capacity (CFM)	Motor HP
MA-1	Makeup Air	6,830	3
EF-13	Exhaust Fan	7500	3

Greenhouse: The greenhouse is in use 365 days a year and provides flowers for Monroe County parks and activities. The temperature in the greenhouse is maintained at 72-73°F. The space is heated with gas fired unit heaters. The greenhouse is not metered separately and is included in the Correctional Facility gas and electric consumption. One quarter of the greenhouse has been isolated from the rest with a wood partition and is not heated. Four (4) unit heaters serve the heated portion of the greenhouse and are manufactured by Modine, model PV-300. Each heater has an input of 300,000 BTUH and is controlled by a space thermostat.

Operating Parameters and Current Facility Requirements

The Correctional Facility is occupied 24 hours a day. There are no areas that are currently being set back at night. Space temperature set points range from 68 to 72°F. However, excessive comfort complaints indicate that the actual temperature swings well beyond the set points. Temperature swings can be both above and below set point during the heating and cooling seasons. Other than the kitchen and a few temperature controlled fans, the primary building exhaust fans operate 24 hours a day. Ventilation is provided by the air handling units. The original design called for the air handling units to provide a minimum of 25% fresh air to the building.

High pressure steam was supplied to the original building by Monroe Community College. In 2003, the steam from the college was cut off and the two steam boilers were installed. The boilers operate all year and maintain 8 psi steam pressure. The only steam load in the building is the hot water heating system and the domestic hot water heaters.

The two York liquid chillers are original to the building. They are controlled by the BAS and scheduled to start around April 15th and shut down September 30. They also have a lockout temperature of 65°F programmed in.

SECTION 3 - SPECIFIC PROPOSAL REQUIREMENTS

3.1 Submission of Respondent's Proposal(s)

A. Acceptance Period and Location: To be considered, Respondents must submit a complete response to this RFP. Respondents not responding to all information requested in this RFP or indicating exceptions to those items not responded to may have their proposals rejected as being non-responsive.

Sealed proposals must be received at the address below on or before 3:00 p.m. Eastern Standard Time, on March 9, 2012.

Meagan Brennan
Monroe County Purchasing and Central Services
39 West Main Street
Room 200
Rochester, New York 14614
Email address: mbrennan@monroecounty.gov

Refer to Section 3 for further detail regarding response formats and requirements. There will be no public opening of the proposals.

B. Withdrawal Notification: Respondents receiving this RFP who do not wish to submit a proposal should reply with the "No Response Form" [page 2 of this RFP] to be received by the indicated contact on the form no later than the proposal submission date. This RFP is the property of the County and may not be reproduced or distributed for purposes other than proposal submission without the written consent of the Monroe County Attorney.

C. Required copies: Respondents must submit one (1) signed original Proposal and six (6) complete copied sets of the signed original Proposal. **Proposals should be clearly marked as "Proposal for Energy Consumption Reduction Plan for the Monroe County Correctional Facility."** The Respondent must also respond electronically in addition to submitting hardcopies of its proposal as provided above. The Respondent will make no other distribution of proposals. An official authorized to bind the Respondent to its provisions must sign the Proposal.

D. Pricing Period: For this RFP, the proposal must remain valid for a minimum of 120 days past the due date for receipt of RFPs.

E. Economy of Preparation: Proposals should be prepared as simply as possible and provide a straightforward, concise description of the Respondent's capabilities to satisfy the requirements of the RFP. Expensive bindings, color displays, promotional material, etc. are not necessary or desired. **Emphasis should be concentrated on accuracy, completeness, and clarity of content.** All parts, pages, figures, and tables should be numbered and clearly labeled. Vague terms such as "Respondent complies" or "Respondent understands" should be avoided.

3.2 Response Date

To be considered, sealed proposals must arrive on or before the location, time and date specified in Section 3.1.A. **Requests for extension of the submission date will not be granted.** Respondents mailing proposals should allow ample delivery time to assure timely receipt of their proposals

3.3 Clarification of RFP and Questions

Questions that arise prior to or during proposal preparation must be submitted **in writing or via email** pursuant to the instructions in Section 1 of this RFP. Questions and answers will be provided to all Respondents who have received RFPs and must be acknowledged in the RFP response. No contact will be allowed between the Respondent and any other member of the County with regard to this RFP during the RFP process unless specifically authorized in writing by the RFP Coordinator. Prohibited contact may be grounds for Respondent disqualification.

3.4 Addenda to the RFP

In the event it becomes necessary to revise any part of this RFP, addenda will be provided to all Respondents that received the original RFP. **An acknowledgment of such addenda, if any, must be submitted with the RFP response. Applicants will only receive notices of addenda by downloading the original RFP document via the Monroe County website at www.monroecounty.gov.**

3.5 Organization of Proposal

This section outlines the information that must be included in your proposal. Please respond with your information in the same order as the items in the section.

A. Transmittal Letter. Each response to the RFP should be accompanied by a letter of transmittal not exceeding one (1) page that summarizes key points of the proposal and which is signed by an officer of the firm authorized to commit the Respondent to the obligations contained in the proposal. The transmittal letter should also include a phone number, fax number and e-mail address for the Respondent's contact person.

B. Table of Contents. Include a Table of Contents at the beginning, which clearly outlines the contents of your proposal.

C. Company Information. Provide information related to your company and any companies you are proposing to use as sub-contractors. Specifically address the following:

1. Year the company was organized.

2. Identification of company ownership.

3. Financial history of the company covering the last three years. Attach the most recent copy of your latest financial statements prepared by an independent certified public accountant in accordance with generally accepted accounting principals. Also include the following information: current balance sheet, statement of revenues and expenses, statement of cash flows, and appropriate notes to these documents. 501(c)(3) organizations must submit their most recent Form 990.

4. Functions and location of your nearest regional office to Monroe County.

5. Anticipated growth of your organization including expansion of the client base and acquisitions

6. Any conflicts of interest that may affect the County's potential selection of, or entering into an agreement with, your organization, i.e. your organization currently holds an agreement with the County for other services, a relative of any employee if the Respondent is a member of the selection committee, etc.

D. Experience. Provide information that clearly demonstrates your organization's prior experience and background (both business and technical) in engagements similar to this project. This section must include:

1. A list of at least three prior successful Power Correction Factor projects your organization has completed either as a consultant or contractor.
2. A list of all public sector clients in the State of New York, the dates of engagement for each client. Include the following information for each public sector client:

   a. Name and address of the client;
   b. Approximate annual budget;
   c. Name and telephone number of contact person;
   d. Summary of the savings and/or cost reductions obtained on behalf of the client as a result of your services.

2. Résumés for the key personnel to be involved in providing services to the County.

E. Respondent's proposal. Respondent must submit a detailed Project Narrative and Work Plan that describes:

1) its expertise and that of its proposed personnel and how its management procedures will ensure quality work is performed;
2) how its proposed services and proposed work plan will meet the tasks and deliverables as described in Section 2 of this Request for Proposals;
3) proposed quality control mechanisms that ensure a high level of quality and commitment to excellence.

F. Cost Proposal. Respondents must detail the proposed method of compensation for the services. Respondents should submit with their proposal, a completed Appendix B, Project Implementation Costs.

G. **Insurance Certificates.** Each Respondent must supply a copy of their current Certificate of Insurance showing the insurance coverage at or above those described in Section 4.13 of this RFP.

H. **Exceptions to General Information for the Respondent.** For all exceptions to Section 4, the Respondent must indicate on a separate sheet labeled "Exceptions Taken to the General Information for the Respondent," the section number of any requirement to which an exception is being taken and an explanation of their position.

I. **Exceptions to the Standard Monroe County Contract.** For all exceptions to the Standard Monroe County Contract, the Respondent must indicate on a separate sheet labeled "Exceptions Taken to the Standard Monroe County Contract," the section number of any requirement to which an exception is being taken and an explanation of their position. It is not intended that new contract wording be proposed by the Respondent, but rather that the Respondent explain their position so that the conflict can be evaluated. If no exceptions are noted, the Respondent is presumed to have agreed with all sections of the standard contract.

J. **Certification.** Proposals should include a letter from an authorized corporate officer certifying the accuracy of the information provided and guaranteeing the proposed prices.

3.6 Method of Evaluation

A. **Evaluation Committee:** Selected personnel from the County will form the evaluation committee for this RFP. It will be the responsibility of this committee to evaluate all properly prepared and submitted proposals for the RFP and make a recommendation for award.

B. **Proposal Evaluation Criteria**

Upon review of proposals received in response to this RFP, the County expects to select a single Energy Services Company (ESCO) to provide comprehensive energy services as outlined in Section 2 above. If a viable project is identified, the ESCO and the County will then negotiate an energy performance contract to provide for the implementation of the proposed project.

Proposals will be evaluated and scored on the basis of the following criteria:

1. Qualifications and Project Experience Rating

Points will be awarded based on demonstrated experience with similar projects and responses from project references. Experience with similar projects will be understood to include development of design-build projects, performance contracts, or as a first tier subcontractor on a significant design-build/performance contract project.

2. Staffing Plan

Points will be awarded based on qualifications of proposed project team professionals, documented technical and project administration skills, and experience of the proposed project team. Only those individuals proposed to work directly on the subject project should be included in the Staffing Plan. Project teams that are primarily or completely composed of staff from the proposer will be ranked higher. Indicate what disciplines will be self-performed and supply resumes for all superintendents and foreman that will make up the self-performance team.

3. Technical Capability

Points will be awarded based on the approach your organization will take in delivering the comprehensive technical services required to audit, design, install, monitor and maintain the proposed energy efficiency improvements. Project teams that can deliver the aforementioned project services primarily or completely composed of staff from the proposer's organization will be ranked higher.

4. Financial Terms

The County is interested in selecting an ESCO that conducts business with a philosophy of full disclosure of all project costs.

Consideration will be given to proposals that responsibly maximize the net economic benefit to the County over the term of the energy services agreement, and that responsibly minimize the risk to the County in connection with the proposed transaction.

Factors that will be considered include: installation cost, the proposed term (length) of the energy services agreement, the approach to project financing, and the projected net dollar benefit to the County from entering into the transaction. It will be required that all respondents provide a parental guarantee. A commitment letter from the parent company will be required with this response.

5. Proposed Project Schedule

Proposals will be evaluated on the reasonableness, clear presentation, length and detail of the proposed project schedule. The proposal should include descriptions of how the proposer intends to achieve the project schedule.

C. **Contract Approval Process:** Respondents must be aware that any contract resulting from this request for proposals is subject to prior approval by the Monroe County Legislature and the Monroe County Law Department.

3.7 Oral Presentation

Respondents who submit a proposal may also be required to make an oral

presentation of their proposal to the County. These presentations will provide an opportunity for the Respondent to clarify their proposal to ensure a thorough mutual understanding. At the same time, the County is under no obligation to offer any Respondent the opportunity to make such a presentation.

3.8 Investigations

The County reserves the right to conduct any investigations necessary to verify information submitted by the Respondent and/or to determine the Respondent's capability to fulfill the terms and conditions of the RFP contract document. The County reserves the right to visit a prospective Respondent's place of business to verify the existence of the company and the management capabilities required to administer this agreement. The County will not consider Respondents that are in bankruptcy or in the hands of a receiver at the time of tendering a proposal or at the time of entering into a contract.

SECTION 4 - GENERAL INFORMATION FOR THE RESPONDENT

4.1 Reservation of Rights

The County reserves the right to refuse any and all proposals, in part, or in their entirety, or select certain products from various Respondent proposals, or to waive any informality or defect in any proposal should it be deemed to be in the best interest of the County. The County is not committed, by virtue of this RFP, to award a contract, or to procure or contract for services. The proposals submitted in response to this request become the property of the County. If it is in its best interest to do so, the County reserves the right to:

A. Make selections based solely on the proposals or negotiate further with one or more Respondents. The Respondent selected will be chosen on the basis of greatest benefit to the County as determined by an evaluation committee.

B. Negotiate contracts with the selected Respondents.

C. Award a contract to more than one Respondent.

4.2 Contract Negotiation

Negotiations may be undertaken with those Respondents whose proposals prove them to be qualified, responsible, and capable of fulfilling the requirements of this RFP. The contract that may be entered into will be the most advantageous to the County, price and other factors considered. The County reserves the right to consider proposals or modifications thereof received at any time before a contract is awarded, if such action is in the best interest of the County. Attached as RFP Appendix A is a copy of the Standard Monroe County Contract which contains mandatory provisions.

Negotiations do not include further revisions to the mandatory provisions depicted in Appendix A. Respondents must take exception as instructed in Section 3.5.I. if necessary. Any exceptions will be evaluated by the Monroe County Law department prior to proposal rating.

4.3 Acceptance of Proposal Content

The contents of the proposal of the successful Respondent may become contractual obligations, should a contract ensue. Failure of a Respondent to accept these obligations may result in cancellation of the award. The awarded respondent will be required to provide Monroe County with a *Word* version of its final proposal.

4.4 Prime Responsibilities

The selected Respondent will be required to assume responsibility for all services offered in its proposal whether or not provided by them. The selected Respondent will be liable, both individually and severally, for the performance of all obligations under the awarded contract and will not be relieved of non-performance of any of its subcontractors. Further, the County shall approve all subcontractors and will consider the selected Respondent to

be the sole point of contact with regard to contractual matters, including payment of any and all charges resulting from the contract.

4.5 Property Rights

For purposes of this RFP and for the contract, the term "Work" is defined as all data, records, files, information, work products, discs or tapes developed, produced or generated in connection with the services to be provided by the Respondent. The County and the Respondent intend the contract to be a contract for services and each considers the Work and any and all documentation or other products and results of the services to be rendered by the Respondent to be a work made for hire. In submitting a proposal in response to this RFP, the Respondent acknowledges and agrees that the Work (and all rights therein) belongs to and shall be the sole and exclusive property of the County.

The Respondent and the Respondent's employees shall have no rights in or ownership of the Work and any and all documentation or other products and results of the services or any other property of the County. Any property or Work not specifically included in the Contract as property of the Respondent shall constitute property of the County.

In addition to compliance with the right to audit provisions of the contract, the Respondent must deliver to the County, no later than the twenty-four (24) hours after receipt of the County's written request for same; all completed, or partially completed, Work and any and all documentation or other products and results of the services under such contract. The Respondent's failure to timely deliver such work or any and all documentation or other products and results of the services will be considered a material breach of the contract. With the prior written approval of the County, this twenty-four (24) hour period may be extended for delivery of certain completed, or partially completed, work or other such information, if such extension is in the best interests of the County.

The Respondent will not make or retain any copies of the Work or any and all documentation or other products and results of the services provided under such Contract without the prior written consent of the County.

4.6 Contract Payment

Actual terms of payment will be the result of agreements reached between Monroe County and the Respondent selected.

4.7 News Release

News releases pertaining to this RFP or the services to which it relates will not be made without prior approval by the County and then only in coordination with the County Department of Communications and Special Events.

4.8 Notification of Respondent Selection

All Respondents who submit proposals in response to this RFP will be notified by the RFP Coordinator of acceptance or rejection of their proposal.

4.9 Independent Price Determination

A. By submission of a proposal, the Respondent certifies, and in case of a joint proposal, each party thereto certifies as to its own organization, that in connection with the proposal:

(1) The prices in the proposal have been arrived at independently without consultation, communication, or agreement, with any other Respondent or competitor for the purpose of restricting competition; and

(2) No attempt has been made or will be made by the Respondent to induce any other person or firm to submit or not to submit a proposal for the purpose of restricting competition.

B. Each person signing the proposal certifies that:

(1) They are the person in the Respondent's organization responsible within that organization for the decision as to prices being offered in the proposal and they have not participated and will not participate in any action contrary to A (1) and (2) above; or

(2) They are not the person in the Respondent's organization responsible within that organization for the decision as to prices being offered in the proposal but that he has been authorized in writing to act as agent for the persons responsible for such decisions in certifying that such persons have not participated, and will not participate, in any action contrary to A (1) and (2) above, and that as their agent, does hereby so certify; and that he has not participated, and will not participate in any action contrary to A (1) and (2) above.

C. A proposal will not be considered for award if the sense of the statements required in the proposal has been altered so as to delete or modify A (1) and (2) above.

4.10 Incurring Costs

The County is not liable for any costs incurred by Respondent prior to the effective date of the contract.

4.11 Material Submitted

All right, title and interest in the material submitted by the Respondent as part of a proposal shall vest in Monroe County upon submission of the Respondent's proposal to Monroe County without any obligation or liability by Monroe County

to the Respondent. Monroe County has the right to use any or all ideas presented by a Respondent.

Monroe County reserves the right to ownership, without limitation, of all proposals submitted. However, because Monroe County could be required to disclose proposals under the New York Freedom of Information Law (Public Officers Law §§ 84 – 90), Monroe County will, to the extent permitted by law, seek to protect the Respondent's interests with respect to any trade secret information submitted as follows:

Pursuant to Public Officers Law § 87, Monroe County will deny public access to Respondent's proposal to the extent the information constitutes a trade secret, which if disclosed would cause substantial harm to the Respondent's competitive position, provided the Respondent identified the information it considers to be a trade secret and explains how disclosure would cause harm to the Respondent's competitive position.

4.12 Indemnification

The Respondent shall defend, indemnify and save harmless the County, its officers, agents, servants and employees from and against all liability, damages, costs or expenses, causes of actions, suits, judgments, losses, and claims of every name not described, including attorneys' fees and disbursements, brought against the County which may arise, be sustained, or occasioned directly or indirectly by any person, firm or corporation arising out of or resulting from the performance of the services by the Respondent, its agents or employees, the provision of any products by the Respondent, its agents or employees, arising from any act, omission or negligence of the Respondent, its agents or employees, or arising from any breach or default by the Respondent, its agents or employees under the Agreement resulting from this RFP. Nothing herein is intended to relieve the County from its own negligence or misfeasance or to assume any such liability for the County by the Respondent.

4.13 Insurance Requirements

The Respondent shall procure and maintain at their own expense until final completion of the work covered by the Contract, insurance for liability for damages imposed by law of the kinds and in the amounts hereinafter provided, issued by insurance companies authorized to do business in the State of New York, covering all operations under the Contract whether performed by the Respondent or by their subcontractors.

The successful Respondent shall furnish to the County a certificate or certificates of insurance in a form satisfactory to the County Attorney showing that he has complied with all insurance requirements set forth in the contract for services, that certificate or certificates shall provide that the policies shall not be changed or canceled until thirty (30) days written notice has been given to the County. Except for Workers' Compensation Insurance, no insurance required herein shall contain any exclusion of municipal operations performed in connection with the Contract resulting from this proposal solicitation. The kinds and amounts of insurance are as follows:

A. WORKERS' COMPENSATION AND DISABILITY INSURANCE: A policy covering the operations of the Respondent in accordance with the provisions of Chapter 41 of the Laws of 1914, as amended, known as the Workers' Compensation Law, covering all operations under contract, whether performed by them or by their subcontractors. The Contract shall be void and of no effect unless the person or corporation making or executing same shall secure compensation coverage for the benefits of, and keep insured during the life of said Contract, such employees in compliance with the provisions of the Workers' Compensation Law known as the Disability Benefits Law (chapter 600 of the Laws of 1949) and amendments hereto.

B. LIABILITY AND PROPERTY DAMAGE INSURANCE issued to the Respondent naming Monroe County as an additional insured, and covering liability with respect to all work performed by him under the Contract. The minimum limits for this policy for property damage and personal injury shall be $1,000,000 per occurrence and $3,000,000 aggregate covered under liability and damage property. All of the following coverage shall be included:

Comprehensive Form
Premises-Operations
Products/Completed Operations
Contractual Insurance covering the Hold Harmless Provision
Broad Form Property Damage
Independent Respondents
Personal Injury

C. CONTRACTOR'S PROTECTIVE LIABILITY INSURANCE issued to the Respondent and covering the liability for damages imposed by law upon the said Respondent for the acts or neglect of each of his subcontractors with respect to all work performed by said subcontractors under the Contract.

D. PROFESSIONAL LIABILITY INSURANCE covering errors and omissions of the Respondent with minimum limits of $1,000,000 per occurrence and $3,000,000 aggregate coverage.

E. MOTOR VEHICLE INSURANCE issued to the Respondent and covering liability and property damage on the Respondent's vehicles in the amount of $1,000,000 per occurrence.

4.14 Proposal Certification

The Respondent must certify that all material, supervision, and personnel will be provided as proposed, at no additional cost above the proposal price. Any costs not identified and subsequently incurred by the County must be borne by the Respondent. This certification is accomplished by having the Proposal signed by an individual who has the authority to bind the Respondent.

APPENDIX A
SAMPLE STANDARD MONROE COUNTY CONTRACT

The County contemplates that, in addition to all terms and conditions described in this RFP, final agreement between the County and the selected Respondent will include, without limitation, the terms contained in this Appendix A, Standard Monroe County Contract.

Respondents should note that, at a minimum, all the contractual provisions included in the sample contract herein will automatically be deemed part of the final Contract. Although such provisions will govern all proposals as submitted, the County may later amend such provisions. The sample contract is included so that all proposals will be governed by the same contractual terms

THIS AGREEMENT, made this _____ day of _____, 20___, by and between MONROE COUNTY, a municipal corporation, with offices at 39 West Main Street, Rochester, New York 14614, hereinafter referred to as the "COUNTY", and _____ with offices at _____, hereinafter referred to as the "CONTRACTOR".

WITNESSETH:

WHEREAS, the County is desirous of obtaining the services of the CONTRACTOR to perform the scope of work set forth in Section l hereof, and

WHEREAS, the COUNTY issued a Request for Proposal ("RFP"), and

WHEREAS, the CONTRACTOR has submitted a proposal, dated _____, to perform the requested services, and

WHEREAS, the County Legislature of the County of Monroe by Resolution Number _____ of 20___, authorized the County Executive, or her designee, to enter into a contract for services as hereinafter described, and

WHEREAS, the CONTRACTOR is willing, able, and qualified to perform such services,

NOW, THEREFORE, in consideration of the mutual covenants and agreements hereinafter set forth the parties hereto mutually agree as follows:

I. SCOPE OF SERVICES

The Contractor shall perform the following services for the County:

A.

B.

II. TERM OF CONTRACT

The term of this Agreement shall be for the period of _____ through _____.

This Agreement shall remain in effect for the period specified above, unless it is terminated by either party hereto, upon 30 day's prior written notice sent by registered or certified mail to the County's _____ Director or the Contractor. This notice shall be sent to the respective party at the addresses first above set forth or at such other address as specified in writing by either party. Upon termination of this Agreement, the Contractor shall have no further responsibility to the County or to any other person with respect to those services specified in this Agreement. Upon termination of this Agreement, the County shall be obligated to pay the Contractor for services only performed through the date of termination. Following such payment, the County shall have no further obligations to the Contractor under this Agreement.

III. PAYMENT FOR SERVICES

The County agrees to pay the Contractor, and the Contractor agrees to be paid, a sum in full satisfaction of all expenses and compensation due the Contractor not to exceed _____($_____).

Payment by the County for the sum(s) herein contracted for shall be made upon the submission of properly executed Monroe County claim vouchers, supported with such information and documentation necessary to substantiate the voucher, approved by the County's Director of _____, or by his/her designee, and audited by the Controller of the County.

The County may audit records relating to expenses for services provided by the Contractor pursuant to this Agreement at any time during this Agreement and through and including twelve (12) months following this Agreement.

The Contractor shall prepare and make available such statistical and financial service and other records requested by the County. These records shall be subject at all reasonable times to inspection, review or audit by the County, the State of New York and other personnel duly authorized by the County. These records shall be maintained for the period set forth in the State regulations.

IV. AMENDMENTS

This Agreement may be modified or amended only in writing duly executed by both parties. Any modification or amendment shall be attached to and become part of this Agreement. All notices concerning this Agreement shall be delivered in writing to the parties at the principal addresses as set forth above unless either party notifies the other of a change in address.

V. INSURANCE

The Contractor will at its own expense, procure and maintain a policy or policies of insurance during the term of this Agreement. The policy or policies of insurance required are standard Workers' Compensation and Disability Insurance, if required by law; professional liability and general liability insurance (including, without limitation, contractual liability) with single limits of liability in the amount of $1,000,000 per occurrence, and $3,000,000 aggregate coverage; automobile liability insurance in the

amount of $1,000,000 with a minimum of $1,000,000 each occurrence, bodily injury, and property damage. Original certificates evidencing such coverage and indicating that such coverage will not be cancelled or amended in any way without thirty (30) days prior written notice to the County, shall be delivered to the County before final execution of this Agreement and original renewal certificates conforming to the requirements of this section shall be delivered to the County at least sixty (60) days prior to the expiration of such policy or policies of insurance. The Contractor's general liability insurance shall provide for and name Monroe County as an additional insured. All policies shall insure the County for all claims arising out of the Agreement. All policies of insurance shall be issued by companies in good financial standing duly and fully qualified and licensed to do business in New York State or otherwise acceptable to the County.

If any required insurance coverage contain aggregate limits or apply to other operations of the Contractor, outside of those required by this Agreement, the Contractor shall provide Monroe County with prompt written notice of any incident, claims settlement, or judgment against that insurance which diminishes the protection of such insurance affords Monroe County. The Contractor shall further take immediate steps to restore such aggregate limits or shall provide other insurance protection for such aggregate limits.

VI. INDEMNIFICATION

The Contractor shall defend, indemnify and save harmless the County, its officers, agents, servants and employees from and against all liability, damages, costs or expenses, causes of actions, suits, judgments, losses, and claims of every name not described, including attorneys' fees and disbursements, brought against the County which may arise, be sustained, or occasioned directly or indirectly by any person, firm or corporation arising out of or resulting from the performance of the services by the Contractor, its agents or employees, the provision of any products by the Contractor, its agents or employees, arising from any act, omission or negligence of the Contractor, its agents or employees, or arising from any breach or default by the Contractor, its agents or employees under the Agreement resulting from this RFP. Nothing herein is intended to relieve the County from its own negligence or misfeasance or to assume any such liability for the County by the Contractor.

VII. INDEPENDENT CONTRACTOR

For the purpose of this Agreement, the Contractor is and shall in all respects be considered an independent contractor. The Contractor, its individual members, directors, officers, employees and agents are not and shall not hold themselves out nor claim to be an officer or employee of Monroe County nor make claim to any rights accruing thereto, including, but not limited to, Workers' Compensation, unemployment benefits, Social Security or retirement plan membership or credit.

The Contractor shall have the direct and sole responsibility for the following: payment of wages and other compensation; reimbursement of the Contractor's employees' expenses; compliance with Federal, state and local tax withholding requirements pertaining to income taxes, Workers' Compensation, Social Security, unemployment and other insurance or other statutory withholding requirements; and all obligations

imposed on the employer of personnel. The County shall have no responsibility for any of the incidences of employment.

VIII. TITLE TO WORK

A. The title to all work performed by the Contractor and any unused materials or machinery purchased by the Contractor with funds provided by the County in order to accomplish the work hereunder shall become legally vested to the County upon the completion of the work required under this Agreement. The Contractor shall obtain from any subcontractors and shall transfer, assign, and/or convey to Monroe County all exclusive, irrevocable, or other rights to all work performed under this Agreement, including, but not limited to trademark and/or service mark rights, copyrights, publication rights, distribution rights, rights of reproduction, and royalties.

B. No information relative to this Agreement shall be released by the Contractor or its employees for publication, advertising or for any other purpose without the prior written approval of the County. The Contractor hereby acknowledges that programs described herein are supported by this Agreement by the County and the Contractor agrees to state this fact in any and all publicity, publications and/or public information releases.

IX. EXECUTORY NATURE OF CONTRACT

This Agreement shall be deemed executory only to the extent of the funding available and the County shall not incur any liability beyond the funds annually budgeted therefore. The County may make reductions in this Agreement for the loss/reduction in State Aid or other sources of revenues. If this occurs, the Contractor's obligations regarding the services provided under this Agreement may be reduced correspondingly.

X. NO ASSIGNMENT WITHOUT CONSENT

The Contractor shall not, in whole or in part, assign, transfer, convey, sublet, mortgage, pledge, hypothecate, grant any security interest in, or otherwise dispose of this Agreement or any of its right, title or interest herein or its power to execute the Agreement, or any part thereof to any person or entity without the prior written consent of the County.

XI. FEDERAL SINGLE AUDIT ACT

In the event the Contractor is a recipient through this Agreement, directly or indirectly, of any funds of or from the United States Government, Contractor agrees to comply fully with the terms and requirements of Federal Single Audit Act [Title 31 United States Code, Chapter 75], as amended from time to time. The Contractor shall comply with all requirements stated in Federal Office of Management and Budget Circulars A- 102, A-110 and A-133, and such other

circulars, interpretations, opinions, rules or regulations that may be issued in connection with the Federal Single Audit Act.

Of the amount specified in Section ____ of this Agreement, _____($_____) of such amount or _____ (___%) of such amount, is being passed-through the County from the United States Government under the following:

Award Name:

Award Number:

Award Year:

Name of Federal Agency:

Catalog of Federal Domestic
Assistance (CFDA) Number:

The Award [ ] is [ ] is not related to Research and Development.

If on a cumulative basis the Contractor expends Five Hundred Thousand and no/100 Dollars ($500,000.00) or more in federal funds in any fiscal year, it shall cause to have a single audit conducted, the Data Collection Form (defined in Federal Office of Management and Budget Circular A-133) shall be submitted to the County; however, if there are findings or questioned costs related to the program that is federally funded by the County, the Contractor shall submit the complete reporting package (defined in Federal Office of Management and Budget Circular A-133) to the County.

If on a cumulative basis the Contractor expends less than Five Hundred Thousand and no/100 Dollars ($500,000.00) in federal funds in any fiscal year, it shall retain all documents relating to the federal programs for three (3) years after the close of the Contractor's fiscal year in which any payment was received from such federal programs.

All required documents must be submitted within nine (9) months of the close of the Contractor's fiscal year end to:

Monroe County Internal Audit Unit
401 County Office Building
39 West Main Street
Rochester, New York 14614

The Contractor shall, upon request of the County, provide the County such documentation, records, information and data and response to such inquiries as the County may deem necessary or appropriate and shall fully cooperate with internal and/or independent auditors designated by the County and permit such auditors to have access to, examine and copy all records,

documents, reports and financial statements as the County deems necessary to assure or monitor payments to the Contractor under this Agreement.

The County's right of inspection and audit pursuant to this Agreement shall survive the payment of monies due to Contractor and shall remain in full force and effect for a period of three (3) years after the close of the Contractor's fiscal year in which any funds or payment was received from the County under this Agreement.

XII. RIGHT TO INSPECT

Designated representatives of the County shall have the right to monitor the provision of services under this Agreement which includes having access at reasonable times and places to the Contractor's employees, reports, books, records, audits and any other material relating to the delivery of such services. The Contractor agrees to maintain and retain all pertinent records related to this Agreement for a period of ten (10) years after final payment.

XIII. JOB OPENINGS

The Contractor recognizes the continuing commitment on the part of Monroe County to assist those receiving temporary assistance to become employed in jobs for which they are qualified, and the County's need to know when jobs become available in the community.

The Contractor agrees to notify the County when the Contractor has or is about to have a job opening within Monroe County. Such notice shall be given as soon as practicable after the Contractor has knowledge that a job opening will occur. The notice shall contain information that will facilitate the identification and referral of appropriate candidates in a form and as required by the Employment Coordinator. This would include at least a description of conditions for employment, including the job title and information concerning wages, hours per work week, location and qualifications (education and experience.)

Notice shall be given in writing to:

Employment Coordinator
Monroe County Department of Human Services
Room 535
691 St. Paul St.
Rochester, New York 14605
Fax: (585) 753-6322
Telephone: (585) 753-6308

The Contractor recognizes that this is an opportunity to make a good faith effort to work with Monroe County for the benefit of the community. Nothing contained in this provision, however, shall be interpreted as an obligation on the part of the Contractor to employ any individual who may be referred by or through the County for job openings as a result of the above notice. Any

decisions made by the Contractor to hire any individual referred by or through the County shall be voluntary and based solely upon the Contractor's job requirements and the individual's qualifications for the job, as determined by the Contractor.

XIV. NON-DISCRIMINATION

The Contractor agrees that in carrying out its activities under the terms of the Agreement that it shall not discriminate against any person due to such person's age, marital status, disability, genetic predisposition or carrier status, race, color, creed, sexual orientation, sex or national origin, and that at all times it will abide by the applicable provisions of the Human Rights Law of the State of New York as set forth in Section 290-301 of the Executive Law of the State of New York.

XV. CONTRACTOR QUALIFIED, LICENSED, ETC.

The Contractor represents and warrants to the County that it and its employees is duly and fully qualified under the laws of the state of its incorporation and of the State of New York, to undertake the activities and obligations set forth in this Agreement, that it possesses as of the date of its execution of this Agreement, and it will maintain throughout the term hereof, all necessary approvals, consents and licenses from all applicable government agencies and authority and that it has taken and secured all necessary board of directors and shareholders action and approval.

XVI. CONFIDENTIAL INFORMATION

A. For the purpose of this Agreement, "Confidential Information" shall mean information or material proprietary to the County or designated as "Confidential Information" by the County, and not generally known by non-County personnel, which Contractor may obtain knowledge of or access to as a result of a contract for services with the County. The Confidential Information includes, but is not limited to, the following types of information or other information of a similar nature (whether or not reduced to writing): methods of doing business, computer programs, computer network operations and security, finances and other confidential and proprietary information belonging to the County. Confidential Information also includes any information described above which the County obtained from another party which the County treats as proprietary or designates as Confidential Information, whether or not owned or developed by the County. Information publicly known and that is generally employed by the trade at the time that Contractor learns of such information or knowledge shall not be deemed part of the Confidential Information.

1. Scope of Use

a. Contractor shall not, without prior authorization from Monroe County, acquire, use or copy, in whole or in part, any Confidential

Information.

b. Contractor shall not disclose, provide or otherwise make available, in whole or in part, the Confidential Information other than to those employees of Contractor who have executed a confidentiality agreement with the County, have a need to know such Confidential Information, and who have been authorized by Monroe County to receive such Confidential Information.

c. Contractor shall not remove or cause to be removed, in whole or in part, from County facilities, any Confidential Information, without the prior written permission of Monroe County.

d. Contractor shall take all appropriate action, whether by instruction, agreement or otherwise, to insure the protection, confidentiality and security of the Confidential Information and to satisfy its obligations under this Confidentiality Agreement.

2. Nature of Obligation

a. Contractor acknowledges that the County, because of the unique nature of the Confidential Information, would suffer irreparable harm in the event that Contractor breaches its obligation under this Agreement in that monetary damages would be inadequate to compensate the County for such a breach. The parties agree that in such circumstances, the County shall be entitled, in addition to monetary relief, to injunctive relief as may be necessary to restrain any continuing or further breach by Contractor, without showing or proving any actual damages sustained by the County.

XVII. GENERAL PROVISIONS

This Agreement constitutes the entire Agreement between the County and the Contractor and supersedes any and all prior Agreements between the parties hereto for the services herein to be provided. The Agreement shall be governed by and construed in accordance with the laws of New York State without regard or reference to its conflict of law principles.

XVIII. FEDERAL, STATE AND LOCAL LAW AND REGULATIONS COMPLIANCE

Notwithstanding any other provision in this Agreement, the Contractor remains responsible for ensuring that any service(s) provided pursuant to this Agreement complies with all pertinent provisions of Federal, State and local statutes, rules and regulations.

XIX. USAGE OF COMPUTER AND ELECTRONIC EQUIPMENT

The Contractor acknowledges and agrees that usage of any computer hardware, computer software and/or electronic equipment used in the course of carrying out duties under this Agreement will be governed by all applicable laws, rules and

regulations, including County policies and procedures.

XX. MISCELLANEOUS

The Contractor agrees to comply with all confidentiality and access to information requirements in Federal, State and Local laws and regulations.

IN WITNESS WHEREOF, the parties hereto have executed this Agreement the last day and year written below.

COUNTY OF MONROE

By_____
Maggie Brooks
County Executive

CONTRACTOR

By_____

Name:

Title:

_____
Contractor's Federal ID Number or
Social Security Number

State of New York)
) ss:
County of Monroe)

On the ____ day of _____ in the year _____ before me, the undersigned, a Notary Public in and for said State, personally appeared MAGGIE BROOKS, personally known to me or proved to me on the basis of satisfactory evidence to be the individual whose name is subscribed to the within instrument and acknowledged to me that she executed the same in her capacity, and that by her signatures on the instrument, the individual(s), or the person upon behalf of which the individual acted, executed the instrument.

_____
Notary Public

State of New York)
) ss:

County of Monroe)

On the ____ day of _____ in the year _____ before me, the undersigned, a Notary Public in and for said State, personally appeared _____, personally known to me or proved to me on the basis of satisfactory evidence to be the individual(s) whose name(s) is (are) subscribed to the within instrument and acknowledged to me that he/she/they executed the same in his/her/their capacity(ies), and that by his/her/their signatures(s) on the instrument, the individuals(s), or the person upon behalf of which the individual(s) acted, executed the instrument.

_____
Notary Public

SAMPLE CONTRACT APPENDIX A
CERTIFICATION REGARDING
DEBARMENT, SUSPENSION, AND RESPONSIBILITY

The undersigned certifies, to the best of his/her knowledge and belief, that the Contractor and its principals:

1. Are not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded by any Federal department or agency;

2. Have not within a three-year period preceding this transaction/application/proposal/ contract/agreement 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;

3. 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 2 of this certification; and

4. Have not within a three-year period preceding this transaction/ application/proposal/contract/agreement had one or more public transactions (Federal, State or local) terminated for cause or default.

Date: _____ _____
[Print Name of Contractor]

By: _____
[Print Signature]

_____
[Print Name]

_____
[Print Title/Office]

APPENDIX B
PROJECT IMPLEMENTATION COSTS

Total Project Cost		Less than $750,000	$750,001 to $1,500,000	Greater than $1,500,001
Comprehensive Energy Audit:		$0	$0	$0
Construction Mark-up (1)				
Design and Specifications (A/E Fees)		0.0 %	0.0 %	0.0 %
Administration		0.0 %	0.0 %	0.0 %
Cost of Risk		0.0 %	0.0 %	0.0 %
Construction Management		0.0 %	0.0 %	0.0 %
Hazardous Waste Administration		0.0 %	0.0 %	0.0 %
Profit		0.0 %	0.0 %	0.0 %
Training		0.0 %	0.0 %	0.0 %
Other: _____		0.0 %	0.0 %	0.0 %
	Total	**0.0** %	**0.0 %**	**0.0 %**
Ongoing Project Management Costs				
Annual Service Agreement/Maintenance Cost		$0	$0	$
Annual Savings Measurement and Verification		$0	$0	$
Other Service Fee		$0	$0	$
Other Project Information				
Escalation rate for Service		0.0 %/yr	0.0 %/yr	0.0 %/yr
Escalation rate for M&V		0.0 %/yr	0.0 %/yr	0.0 %/yr
Escalation rate for Energy		0.0 %/yr	0.0 %/yr	0.0 %/yr
Escalation rate for O&M Savings		0.0 %/yr	0.0 %/yr	0.0 %/yr

Note 1. For the purpose of calculating construction mark-up percentages, the unburdened construction cost shall be defined as the value of the final construction cost paid for facility improvements without any additional mark-up by the Respondent. Construction shall be defined as the cost of the facility improvement work and shall not include any of the activities listed above as overheads.

Note 2. The customer has the option to obtain all project costs and have each cost element making up the project be reviewed for cost reasonableness by an independent third party

APPENDIX C

NEW YORK STATE ENERGY LAW
ARTICLE 9 - ENERGY PERFORMANCE CONTRACTS
IN CONNECTION WITH PUBLIC BUILDINGS AND FACILITIES

§9-101. Purpose

The purpose of this article is to obtain long-term energy and cost savings for agencies and municipalities by facilitating prompt incorporation of energy conservation improvements or energy production equipment, or both, in connection with buildings or facilities owned, operated or under the supervision and control of agencies or municipalities, in cooperation with providers of such services and associated materials from the private sector. Such arrangements will improve and protect the health, safety, security, and welfare of the people of the state by promoting energy conservation and independence, developing alternate sources of energy, and fostering business activity.

§ 9-102. Definitions

For the purposes of this article, the following words and phrases shall have the following meanings unless a different meaning is plainly required by the context.

1. "Owner" means any state department, agency, board, commission, office, or division.

2. "Municipality" means a municipal corporation, as defined in section two of the general municipal law, school district, board of cooperative educational services, fire district, district corporation or special improvement district governed by a separate board of commissioners.

3. "Public authority" means any public authority, public benefit corporation, or the port authority of New York and New Jersey, to the extent its facilities are located within the state of New York.

4. "Energy performance contract" means an agreement for the provision of energy services, including but not limited to electricity, heating, ventilation, cooling, steam or hot water, in which a person agrees to install, maintain or manage energy systems or equipment to improve the energy efficiency of, or produce energy in connection with, a building or facility in exchange for a portion of the energy savings or revenues.

§ 9-103. Energy performance contracts

1. Notwithstanding any other provision of law, any agency, municipality, or public authority, in addition to existing powers, is authorized to enter into energy performance contracts of up to thirty-five years duration, provided, that the duration of any such contract shall not exceed the reasonably expected useful life of the energy facilities or equipment subject to such contract.

2. Any energy performance contract entered into by any agency or municipality shall contain the following clause: "This contract shall be deemed executory only to the extent of the monies appropriated and available for the purpose of the contract, and no liability on account therefore shall be incurred beyond the amount of such monies. It is understood that neither this contract nor any representation by any public employee or officer creates any legal or moral obligation to request, appropriate or make available monies for the purpose of the contract."

3. In the case of a school district or a board of cooperative educational services, an energy performance contract shall be an ordinary contingent expense, and shall in no event be construed as or deemed a lease or lease-purchase of a building or facility, for purposes of the education law.

4. Agencies, municipalities, and public authorities are encouraged to consult with and seek advice and assistance from the New York state energy research and development authority concerning energy performance contacts.

5. Notwithstanding any other provision of law, in order to convey an interest in real property necessary for the construction of facilities or the operation of equipment provided for in an energy performance contract, any agency, municipality or public authority may enter into a lease of such real property to which it holds title or which is under its administrative jurisdiction as is necessary for such construction or operation, with an energy performance contractor, for the same length of time as the term of such energy performance contract, and on such terms and conditions as may be agreeable to the parties thereto and are not otherwise inconsistent with law, and notwithstanding that such real property may remain useful to such agency, municipality or public authority for the purpose for which such real property was originally acquired or devoted or for which such real property is being used.

6. In lieu of any other competitive procurement or acquisition process that may apply pursuant to any other provision of law, an agency, municipality, or public authority may procure an energy performance contractor by issuing and advertising a written request for proposals in accordance with procurement or internal control policies, procedures, or guidelines that the agency, municipality, or public authority has adopted pursuant to applicable provisions of the state finance law, the executive law, the general municipal law, or the public authorities law, as the case may be.

7. Sections one hundred three and one hundred nine-b of the general municipal law shall not apply to an energy performance contract for which a written request for proposals is issued pursuant to subdivision six of this section.

8. In the case of a school district or a board of cooperative educational services, an energy performance contract shall be developed and approved pursuant to the requirements of this section and pursuant to regulations promulgated by the commissioner of education in consultation with the New York state energy research and development authority. Such regulations shall include, but shall not be limited to: a list of the appropriate type of projects that qualify as energy performance contracts; an approval process that includes review of the type and nature of the proposed project, the scope and nature of the work to be performed, and a detailed breakdown of the energy savings to be derived each year and for the duration of the energy performance contract; and a process for ensuring that districts have obtained financing at the lowest cost possible. Such regulations shall require that all energy performance contracts which contain maintenance and monitoring charges as part of the energy performance contract price state such maintenance and monitoring charges separately in the contract in a clear and conspicuous manner. Such regulations shall not apply to energy performance contracts entered into prior to the effective date of such regulations, nor shall they apply to energy performance contracts for which a request for proposals was issued prior to such effective date.

Added L. 1985, c. 733, § 2; amended L. 1989, c. 638, §§ 1,2; amended L. 1994, c. 368, §§ 1,2; amended L.1995, c.83, §47; amended L. 1997, c. 436, §78.

APPENDIX D
FLEX TECH BENCHMARKING PILOT PROGRAM DRAFT REPORT

(See Attached)

An Independent Contractor to:

nyserda
Energy. Innovation. Solutions.

Flex Tech Benchmarking Pilot Program Draft Report

Monroe County Correctional Facility
750 East Henrietta Rd.
Rochester, NY 14623

October 12, 2011

FB-00129

Prepared for:
The New York State
Energy Research and Development Authority
Albany, NY

Clararose Voigt, Project Manager
Contract Number 20625

C.J. Brown Energy, P.C.
Energy Utilization Specialists

NOTICE

This report was prepared by C. J. Brown Energy P.C. in the course of performing work contracted for and sponsored by the New York State Energy Research and Development Authority (hereafter “NYSERDA”). C.J. Brown Energy is located at 4245 Union Road, Suite 204, Buffalo, NY 14225, and may be contacted at 716-565-9190, by fax at 716-633-5598.

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Table of Contents

Executive Summary **2**

Introduction to Benchmarking 2
Project Background 2
Energy Usage History 2
Summary of Findings 2

Building Description **4**

Heating Ventilation and Air Conditioning Systems 4
Other Energy-using Systems 7
Discussion of Operations and Maintenance Issues 9
Methodology 9

Energy Usage Analysis & EPA Portfolio Manager Results **10**

Overall Energy Performance 10
Energy Usage Index & Target Indices 10
Energy Usage Profiles 10
ENERGY STAR Benchmarking Score 11

Areas of Opportunity **12**

Energy Conservation Measures **12**

Temperature Control; Issue #1, 2, & 4 12
Temperature Setback; Issue #3 12
Control DHW Circulating Pump; Issue #5 12
Lighting Retrofit; Issue #6 12
Install Premium Efficiency Motors; Issue #7 12
Install Variable Speed Drive to Control Heating Pumps; Issue #8 12
Install Variable Speed Drive to Control AHU-8 Fan Motors; Issue #9 12
Vary Exhaust Hood Flow Based on Cooking Activity; #10 12
Replace Old Refrigerator; Issue #11 12
Convert Booster Heater from Electricity to Natural Gas; Issue #12 12
Replace Steam Boilers with Condensing Hot Water Boilers; Issue #13 12

Energy Conservation Opportunities **13**

Summary of Energy Savings Potential and Recommended Next Steps **14**

Appendices **15**

Appendix A - Application **15**

Appendix B – Interview Questionnaire **16**

Appendix C – Current Facility Requirements **17**

Appendix D – Issues Database **18**

Appendix E – Master List of ECMs **19**

EPA Portfolio Manager Statement of Energy Performance **20**

Energy Use and Cost Analysis by Energy Type **21**

Monroe County – Correctional Facility
750 East Henrietta Rd.
Rochester, NY 14623

Executive Summary

Introduction to Benchmarking

The intent of this study is to determine how the existing building systems work together and to identify no or low-cost operation and maintenance improvements. Recommendations may include building system adjustments to achieve performance as intended in the original design or to optimize or improve the performance of existing systems. The primary objective is to optimize daily operations, thereby reducing energy consumption without significant capital investment.

Energy efficient capital improvements that are thought to be cost effective are also offered as recommendations. This report was developed using customer-provided equipment and system information, utility usage information and data gathered from site assessments.

Project Background

Facility type:	Correctional Facility
Gross floor area (sq.ft.):	105,800
Approximate Number of Occupants:	460

Energy Usage History

Electric Distribution Provider:	Rochester Gas & Electric, #2001-2984-108
Gas Distribution Provider:	Rochester Gas & Electric, #2001-2984-017
Annual Electricity Consumption:	1,798,650 kWh
Peak Electric Demand:	473 kW
Annual Electricity Cost:	$160,509
Annual Gas Consumption:	11,190 Dekatherms
Annual Gas Cost:	$96,723

Summary of Findings

According to the Department of Energy's Portfolio Manager website, on a scale of 1 to 100, your facility has an energy benchmark score of 19 relative to the other Residence Hall/Dormitory buildings in the national database. Portfolio Manager does not have a correctional facility as a space type in their database therefore the closest type for comparison was the Residence Hall/Dormitory. This score indicates that your facility utilizes energy more efficiently than 19% of other Residence Hall/Dormitories.

The natural gas use in this facility is much higher than normal. It should be noted here that a major energy consumer at the Monroe County Correctional Facility is the greenhouse. It is estimated that this operation at the Correction Facility consumes 25% of the total gas consumption which equates to approximately $24,000 of your natural gas bill. The calculations developed to arrive at this number can be viewed at the end of this document.

Based on our site interview and facility examination, we recommend the following measures to reduce energy use and cost:

Issue Number	ECM Description
1, 2, & 4	Temperature Control Upgrade
3	Setback Greenhouse Temperature at Night
5	Install Control on Domestic Hot Water Pump
6	Lighting System Upgrade
7	Install Premium Efficiency Motors
8	Install VFD to Control Hot Water Pump
9	Install VFD's on AHU-8 Fan Motors
10	Vary Exhaust Hood Flow Base on Cooking
11	Replace Old Refrigerator
12	Convert Booster form Electricity to Nat. Gas
13	Install High Efficiency Boilers
ECO	Install VFD to Control Chilled Water Pumps
ECO	Recover Heat from Building Exhaust
ECO	Install High Efficiency Chillers
ECO	Upgrade Clothes Washers to Energy Star

Building Description

The Monroe County Correctional Facility is owned and operated by Monroe County. It was constructed in 1990 with two modular buildings added shortly thereafter. The main facility is a single story building divided into five (5) sections. Each section has a small second floor area for additional detainee housing. Each of the five primary areas has a penthouse mechanical room located on the roof that houses the air handling units and exhaust fans for the respective section. Each of the five separate living areas includes office space, rest rooms, and a laundry room; a gymnasium, a kitchen, and central offices serve the entire building. The two modular buildings were originally mobile office trailers that have been incorporated into the facility. A large greenhouse was added to the complex around 2000 that operates 365 days a year. The greenhouse is just over 12,000 square feet with 9,300 square feet heated.

The building construction is reinforced concrete with a brick and block exterior. The flat roof has a rubber membrane with insulation that was replaced about 5 years ago. The windows are single glazed, thermally broken ballistic glass in aluminum frames.

The mechanical equipment for each living area is located above the respective living area and the main boiler room is located on the first floor.

The building is occupied 24 hours a day with few areas occupied for shorter hours.

Heating Ventilation and Air Conditioning Systems

Heating Plant

The main building is heated by a hot water heating system. The modular buildings are heated by gas fired rooftop units. The greenhouse is heated by gas fired unit heaters.

The hot water is generated by two Fulton steam boilers. Only one boiler is required to maintain the building temperature throughout the year. The boilers maintain a pressure of 8 psi all year and serve both the heating system and the domestic hot water heaters. The steam heats the heating water in two shell and tube heat exchangers. The hot water is circulated throughout the distribution system with two base mounted pumps with standard efficiency motors. The pumps operate most of the year, providing heat to the reheat coils, and run at a constant speed. The distribution system is a two pipe system with two-way control valves at each heating coil.

Boiler Make	Model	Year Built	Qty	Capacity (Lbs/Hr Steam)	HP
Fulton	ICS 50	2003	2	1725	50

Cooling Plant

Cooling is provided by 2 reciprocating liquid chillers. Each chiller is designed for 50% of the total load. Generally, one chiller operates at a time and the second acts as a standby. The chillers are original to the building and were manufactured by York. Each chiller has an air cooled condenser located on the roof. The chilled water is circulated to the AHU's by two base mounted pumps. The pump motors are standard efficiency motors that operate at a constant speed.

Chiller Make	Model	Year Built	Qty.	Capacity (Tons)	kW	Volts
York	YCR G00/46XD	1989	2	85	96.6	460
Condenser Make	Model	Year Built	Qty	Refrigerant	Fans	CFM
York	VCB-128	1989	2	R-22	4	3400

Major Air Handling Systems

There are 5 separate living areas in the building that are conditioned from air handling units. Each living area is served by two AHU's; one for the living space and one for the office space. Each AHU has a return air fan and a supply air fan. The fans on all but one AHU operate at a fixed speed. The living space AHU has outside air and return air entering a mixing box. A hot water coil and a chilled water coil maintain a constant discharge temperature. The office AHU's have outside air and return air entering a mixing box with a chilled water coil; four (4) of the AHU's do not have a heating coil. There are 3 exhaust fans for each living area; one for the bathrooms, one for the laundry room, and one for the mechanical room.

The distribution system is a low pressure, single duct system. Four (4) air handling units serve 30 variable air volume (VAV) "boxes" in the system. Each box contains a damper and a heating coil. The damper has a pneumatic actuator that modulates to control the volume of air entering the space. The heating coil has a pneumatic control valve to vary the temperature based on demand. A pneumatic thermostat located in the respective space controls both the damper actuator and the control valve for the hot water coil. Each of the four AHU's has a static pressure (SP) control. On three of the AHU's the SP is maintained by modulating a series of vanes located on the inlet of the fan. On the fourth AHU the SP is maintained by controlling the speed of the fan with a variable speed drive. As the VAV box dampers close the SP increases the AHU's react accordingly to prevent the SP from exceeding a predetermined limit.

The remaining AHU's are constant volume systems. Each AHU may or may not have a preheat and/or a reheat coil to control the space temperature depending on the space being served. All of the AHU's have a cooling coil that is served by the building liquid chillers.

Unit ID	Location	Service	Capacity (CFM)	Min. O.A. CFM	Motor HP (Sup & Ret Fan)	S.P. Control	Cooling Coil	Heating Coil
AHU-1	Mech Rm C-202	NE Support	2,700	560	3	Y	Y	N
AHU-2	Mech Rm C-202	Male East	7,300	1,200	7.5	N	Y	Y
AHU-3	Mech Rm E-205	Entrance	11,300	2,100	20	Y	Y	N
AHU-4	Mech Rm E-205	Male West	5,600	1,200	5	N	Y	Y
AHU-5	Mech Rm F-204	NW Support	4,250	700	3	Y	Y	N
AHU-6	Mech Rm F-204	Female	5,800	1,200	5	N	Y	Y
AHU-7	Roof	Kitchen	4,800	1,150	5	N	Y	Y
AHU-8	Mech Rm G-202	SW Support	3,400	850	5	Y	Y	N
AHU-9	Mech Rm G-202	Work Release E	1,100	1,100	7.5	N	Y	Y
AHU-10	Mech Rm H-202	Multi-Purpose	750	750	5	N	Y	Y
AHU-11	Mech Rm H-202	Work Release W	900	900	5	N	Y	Y

Unitary Systems (packaged and split)

There are seven (7) packaged rooftop HVAC units and one (1) ductless split system serving the facility. The packaged systems serve the modular units and the gymnasium. The ductless split system serves the central control room. These units are controlled by a wall thermostat and are not interfaced with the building automation system. All of the package units are natural gas heat with DX cooling. Each package unit has a built-in economizer.

Make	Model	Qty	Input (MBH)	Serves /Notes
York	D1NA042N07246A	2	90	Classrooms
York	D2CG072N07946A	4	100	Dormitories
York	D1EG120N16546DKF	1	204	Gymnasium

Each modular has a central exhaust fan and a bathroom exhaust fan that operate 24 hours a day. The break room exhaust fan is operated by a toggle switch.

Pumps

There are a total of 15 pumps in the building. Eleven pumps have small fractional horsepower motors and serve each of the air handling units. Four (4) pumps are primary pumps that circulate hot water and chilled water throughout the distribution system.

Tag	Fluid	GPM	Ft. Hd.	HP	Motor Eff.	Duty	Serves /Notes
HWP-1 & 2	HW	270	75	10	85.6%	Duty/Backup	Primary HW
CWP-1 & 2	CHW	280	75	10	85.6%	Duty/Backup	Primary CHW

Building Automation System

The building temperature is controlled by an Andover building automation system (BAS). The system consists of direct digital controls over pneumatic valves and actuators. The BAS is original to the building and consideration is being given to upgrading the system in the future. The space temperature is maintained at a constant occupied level 24 hours a day. The heating hot water temperature is reset based on the outdoor air temperature. There are 30 variable air volume (VAV) boxes in the building that are controlled by pneumatic valves, actuators, and thermostats.

The BAS has had 2 or three upgrades in the last 20 years and the current version is about 9 years old. This is considered very obsolete by today's standards. It does contain some functionality to assist the maintenance staff with troubleshooting and predictive/proactive maintenance; however the system lacks the storage capacity to use it effectively.

Excessive temperature/comfort complaints indicate a deficiency in the accuracy/calibration of the BAS and/or pneumatic controls. Component failures of the pneumatic control system have caused the control system to entrain excessive moisture. This condition has required the maintenance staff to replace all of the thermostats. Another problem arises in that it is very difficult and costly to remove all the moisture from the system and the new thermostats may be subjected to premature failure.

The roof top (RTU) HVAC units for the modular units are controlled by residential style wall thermostats. Each RTU has a built-in economizer control that adjusts the amount of outside air based on a minimum amount and the temperature outdoors. The economizer is designed to reduce the amount of mechanical cooling required on days when the outdoor air temperature is low enough to provide "free" cooling. A minimum set point ensures that the minimum required ventilation air is provided at all times. Indications are that the economizers and/or minimum set-points are not working properly or are not set properly.

Other Energy-using Systems

Lighting

Interior lighting in the modular buildings, greenhouse, and the kitchen have been ungraded to T-8 lamps and electronic ballasts. The lighting in the main building remains the original T-12 fluorescent lamps and magnetic ballasts. The gymnasium consists of eight 300 watt high pressure sodium fixtures. There are no specific lighting controls incorporated into the facility.

The exterior lights attached to the building are controlled by photocells. The pole lights are controlled by a timer. Two of the new pole lights are controlled by both a photocell and the timer.

The maintenance staff has been upgrading the T-12 lamps and ballasts as they fail. However a very small percentage has been completed to date. All of the fixtures in the main building should be upgraded with Super T-8 lamps and electronic ballasts.

Domestic Hot Water

DHW is produced by 2 Aerco, high capacity Helitherm heat exchangers. The primary source of heat comes from the steam boilers. The heat exchangers are original to the building and are model number SW1B-1-07. One (1) heat exchanger can provide 100% of the domestic hot water needs to the building. The hot water heaters maintain a constant temperature of 115℉. A single circulating pump circulates the hot water throughout the building. An aquastat is installed to start and stop the pump when the hot water reaches the furthest fixtures in the building. The aquastat is set at 140℉. Because of this high setting the pump never shuts off.

Domestic hot water is provided to the two modular units from two gas fired hot water heaters. Each modular is served by a single heater. The break room in the modular unit has a small 10 gallon electric heater.

Make	Model	Capacity	Input (MBH)	Recovery (GPH)	Year
Bradford White	MI100T6BN	100	85	82.4	2011
State Industries	SBS7576NE	74	75.1	72.82	2005

Laundry

Each living area has its own laundry. The laundry consists of a single clothes washer and electric clothes dryer. The appliances are all top load residential models that are replaced frequently. Originally there were commercial gas dryers in each living area. Excessive maintenance necessitated their replacement with residential electric dryers. The new dryers are manufactured by Whirlpool and are model EED4400WQ. The clothes washers are manufactured by Whirlpool and are Estate models #ETW4400WQ. The clothes washers are not Energy Star rated.

Kitchen

The kitchen serves three meals a day seven days a week. Operations begin about 4:00 AM in preparation for breakfast and end around 6:30 PM. The cooking equipment is all gas fired. A range hood operates about 14 hours a day and is interlocked with a dedicated make up air unit. The makeup air unit is a direct fired gas unit with an output of 410.0 MBH. Hot water is provided to the dishwasher from the central DWH heaters and boosted at the dishwasher with an electric booster heater. The booster heater was manufactured by Hubbell and is a model #J1630T4 rated for 30 kW. The dishwasher was manufactured by Hobart and is model #CPW80A with a 15kW electric heater. The booster heater remains on all the time and the exhaust fan is turned on and off manually.

Unit ID	Type	Capacity (CFM)	Motor HP
MA-1	Makeup Air	6,830	3
EF-13	Exhaust Fan	7500	3

Greenhouse

The greenhouse is in use 365 days a year and provides flowers for Monroe County parks and activities. The temperature in the greenhouse is maintained at 72-73℉. The space is heated with gas fired unit heaters. The greenhouse is not metered separately and is included in the Correctional Facility gas and electric consumption. One quarter of the greenhouse has been isolated from the rest with a wood partition and is not heated. Four (4) unit heaters serve the heated portion of the greenhouse and are manufactured by Modine, model PV-300. Each heater has an input of 300,000 BTUH and is controlled by a space thermostat. Operating Parameters and Current Facility Requirements

The Correctional Facility is occupied 24 hours a day. There are no areas that are currently being set back at night. Space temperature set points range from 68 to 72℉. However, excessive comfort complaints indicate that the actual temperature swings well beyond the set points. Temperature swings can be both above and below set point during the heating and cooling seasons. Other than the kitchen and a few temperature controlled fans, the primary building exhaust fans operate 24 hours a day. Ventilation is provided by the air handling units. The original design called for the air handling units to provide a minimum of 25% fresh air to the building.

High pressure steam was supplied to the original building by the Monroe County Community College. In 2003 the steam from the college was cut off and the two steam boilers were installed. The boilers operate all year and maintain 8 psi steam pressure. The only steam load in the building is the hot water heating system and the domestic hot water heaters.

The two York liquid chillers are original to the building. They are controlled by the BAS and scheduled to start around April 15th and shut down September 30. They also have a lockout temperature of 65℉ programmed in.

Discussion of Operations and Maintenance Issues

For the most part the facility is well maintained. There are some issues that can be attributed to the temperature control system. The BAS is a very old version and is outdated. Although it has seen some upgrades over the years it lacks the ability to enhance the maintenance operations any further.

The BAS overlays pneumatic controls and the pneumatic control system has a number of deficiencies. The original air dryer failed sometime back and caused an excessive amount of moisture to flood the control system. Although the maintenance staff has been making an effort to dry the system out and replace thermostats, this may be contributing to the complaint calls.

Other temperature control issues that were observed were air handling unit damper linkages disconnected, some fresh air dampers closed off completely, some fresh air dampers fully open, roof top HVAC units with the fresh air dampers fully closed, and combustion vent fan on the gymnasium roof top unit running continually without the unit firing.

The domestic hot water circulating pump runs continually even though there is a device in place to cycle the pump. This condition creates and unnecessary load on the water heaters. Simply adjusting the set point of the controller will allow the pump to cycle properly. The actual setting depends on the facility and is usually determined by trial & error but it should never be set above the actual discharge temperature of the hot water heaters. A more accurate and energy efficient control would be to interface the pump with the BAS.

The hot water to the kitchen dishwasher is supplied by the building hot water heaters at 115℉ and then boosted to 180° during the rinse cycle by a 30 kW electric booster heater. The dishwasher also has a 15 kW electric sump heater that keeps the water hot in the dishwasher. It's questionable whether or not these heaters are turned off at the end of each day. Educating the kitchen staff to be sure these are turned off will produce an instant payback in energy savings. Another option would be to interlock them with the exhaust hood, install a simple timer, or a better option would be to interface them with the BAS.

Methodology

We spent two days in the facility reviewing the operation and the equipment. The first visit was a preliminary review; the second was to obtain more details. The second site visit began with a review of Appendix B, the staff interview form, with one of the maintenance staff. We than walked through the facility, focusing on the mechanical rooms. We inspected all of the equipment in the boiler room, all of the roof top equipment, and all of the greenhouse equipment. The air handling equipment is located in five mechanical rooms so we inspected one typical mechanical room. We spent part of the day reviewing the original design drawings as well as the control drawings. We did not complete a detailed audit of the lighting but did review the fixtures in the building, both the existing and those that have been upgraded.

Energy Usage Analysis & EPA Portfolio Manager Results

Prior to the site visit, electricity and fuel use and cost data were obtained for the facility. This information was used to generate the following summary of energy use and cost which was reviewed during the site visit.

The summary, which is shown on the following two pages, consists of the following elements:

Overall Energy Performance

Overall energy performance is measured by the Energy Use Intensity (EUI) of your facility is listed below in terms of btu per square foot per year for electricity, heating fuel and total energy use. It includes the energy cost in units of $ per square foot per year.

This table is generated from the metered energy use and the building gross area. The EUI is also broken down by energy type, as this is useful in determining where energy savings may be found.

Energy Usage Index & Target Indices

The buildings' current energy efficiency relative to other similar buildings was examined by calculating the use/cost on a square foot per year basis, and comparing this to the ASHRAE guidelines set forth in the Applications Handbook.

Please note that this is a database of similar buildings throughout the country and is not corrected for climate differences. Consequently, it is not unusual for buildings in New York to have higher fuel energy use intensities than those in the ASHRAE data.

The results are presented as:

- Energy Use Intensity (EUI) expressed in kBTU (one thousand btu).
- Benchmark Score indicating the building's percentile rank against the ASHRAE database.
- The buildings' heating slope (expressed in btu/sq.ft./HDD)

Energy Usage Profiles

The energy usage and cost profiles are then presented in graphical format. The graph illustrates the variation in energy use and cost by month throughout the year. Electricity and fuels are converted into units of one million BTU to enable graphing on a common scale.

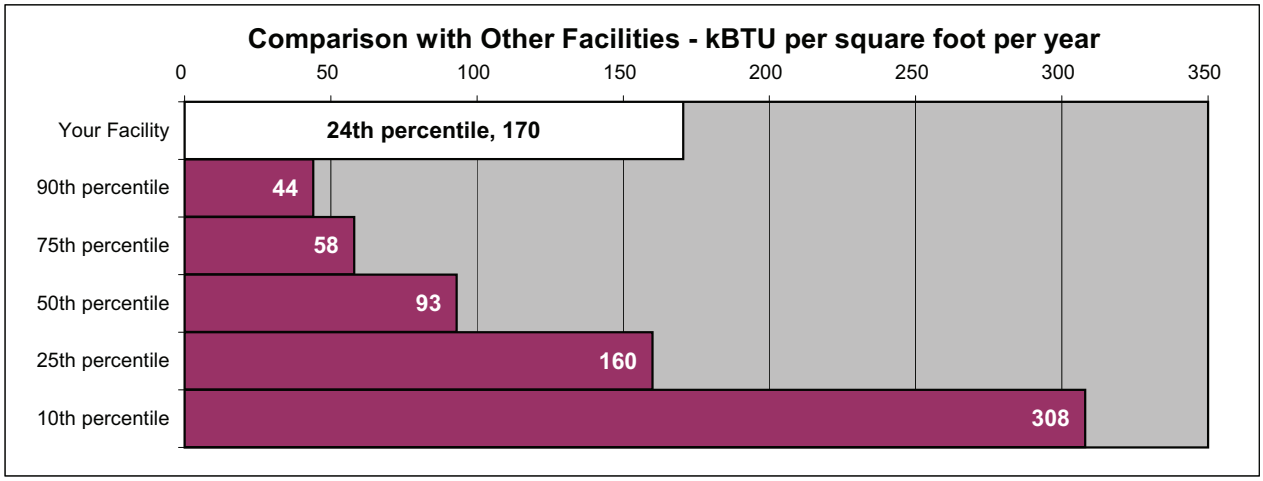
Monthly Energy Use Summary for the Benchmarking Program Site Visit

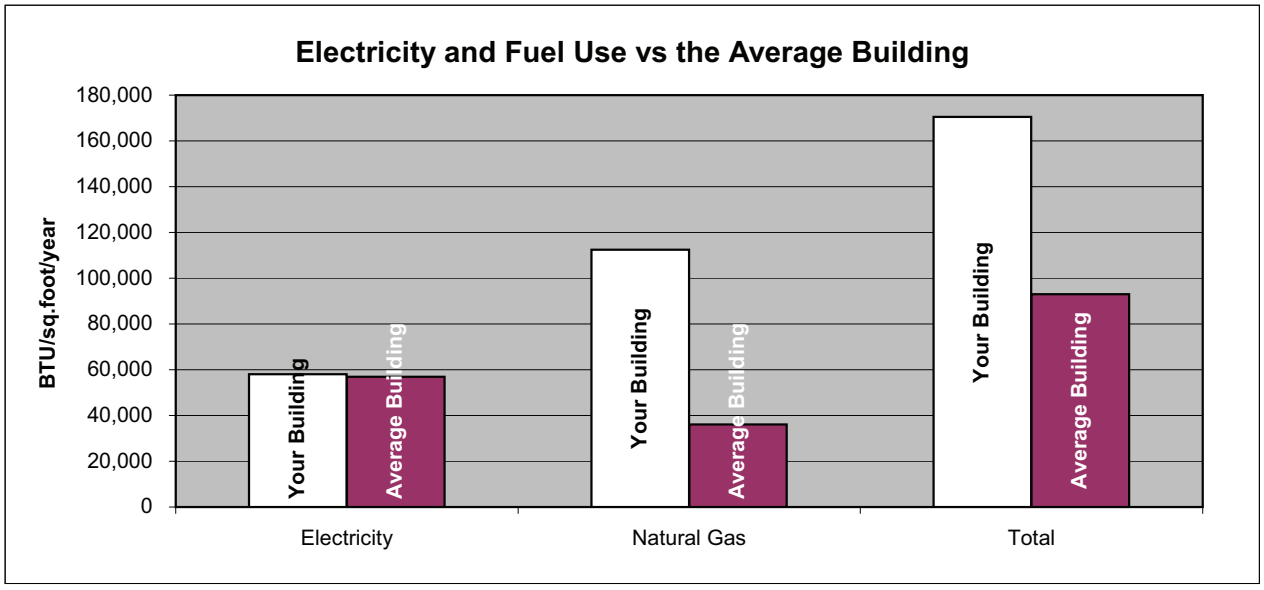
Building: Monroe County Correctional Facility
750 East Henrietta Rd.
Rochester, NY 14623

105,800 square feet conditioned floor area
Building Type: Other public order and safety

	Energy Use		BTU/sq.ft. /year	Energy Cost	$/sq.ft. /year	Average EUI of Similar Buildings
Electricity	1,798,650	kwh	58,006	$ 160,509	$ 1.52	56,980
Natural Gas	11,900	Dth	112,476	$ 96,723	$ 0.91	36,020
		Total	170,482	$ 96,723	$ 2.43	93,000

Energy Use Intensity	**170.5**	**kBTU/sf/year**
Benchmark Score	**24**	**th percentile (higher is better)**
Heating Energy Use	**9.4**	**btu/sf/HDD**





Monthly Energy Use Summary for the Benchmarking Program Site Visit

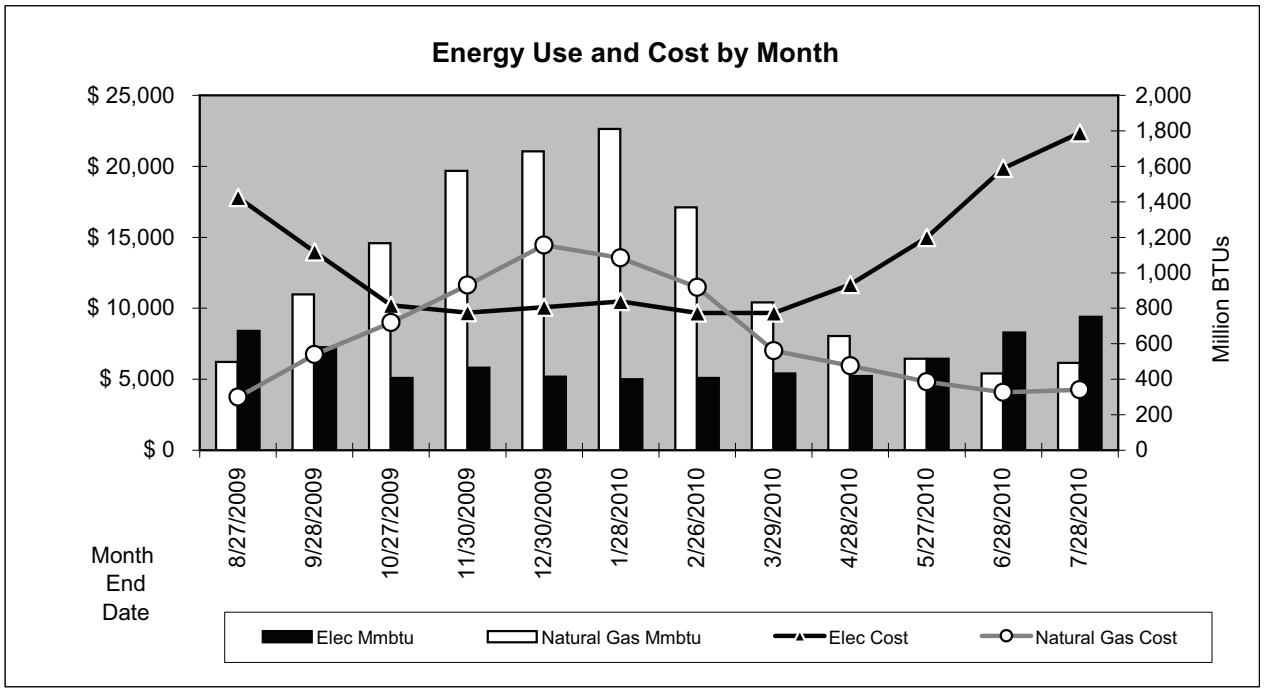
Building: Monroe County Correctional Facility
750 East Henrietta Rd.
Rochester, NY 14623

105,800 square feet conditioned floor area
Building Type: Other public order and safety

	Energy Use		BTU/sq.ft. /year	Energy Cost	$/sq.ft. /year	Average EUI of Similar Buildings
Electricity	1,798,650	kwh	58,006	$ 160,509	$ 1.52	56,980
Natural Gas	11,900	Dth	112,476	$ 96,723	$ 0.91	36,020
		Total	170,482	$ 96,723	$ 2.43	93,000

Energy Use Intensity	**170.5**	**kBTU/sf/year**
Benchmark Score	**24**	**th percentile (higher is better)**
Heating Energy Use	**9.4**	**btu/sf/HDD**

Electricity data from July 28, 2009 to July 28, 2010, a 365 day period.
Natural Gas data from August 29, 2009 to August 27, 2010, a 363 day period.



ENERGY STAR Benchmarking Score

Your facility's energy use and cost data for the baseline year have been entered into the EPA Portfolio Manager website. Using information about your facility, including the local weather data, a Benchmark score has been calculated. Unlike the ASHRAE benchmark discussed above, the EPA Portfolio Manager benchmark is corrected for climate, so your facility should have a higher score that is more accurate.

When compared to other buildings in the Residence Hall/Dormitory sector, your building has a current benchmark score of 19. This means that it is more efficient than 19% of the similar buildings in the EPA database. A benchmark score of 75 or higher earns the Energy Star designation.

Account Access
The Portfolio Manager website may be used to track your energy use month by month going forward. This is a good way to track the impact of your energy conservation efforts and document your successes.

An account has been created for you, which you can access from the following website:

http://www.energystar.gov/

Your account name is:
Your password is:

Directions for working with the Portfolio Manager may be found at:

http://www.energystar.gov/index.cfm?c=evaluate_performance.bus_portfoliomanager_benchmarking

Areas of Opportunity

Energy Conservation Measures

The following Energy Conservation Measures (ECMs) were evaluated for likely energy savings and energy cost reduction:

Temperature Control; Issue #1, 2, & 4

Temperature Setback; Issue #3Control DHW Circulating Pump; Issue #5

Lighting Retrofit; Issue #6

Install Premium Efficiency Motors; Issue #7

Install Variable Speed Drive to Control Heating Pumps; Issue #8

Install Variable Speed Drive to Control AHU-8 Fan Motors; Issue #9

Vary Exhaust Hood Flow Based on Cooking Activity; #10

Replace Old Refrigerator; Issue #11

Convert Booster Heater from Electricity to Natural Gas; Issue #12

Replace Steam Boilers with Condensing Hot Water Boilers; Issue #13

The pages that follow present a narrative discussion of each measure, followed by energy calculations for the measure.

TEMPERATURE CONTROL **Issue #1, 2, & 4**

Concept:

The current technology in Direct Digital Control (DDC) systems offer many advantages over their predecessors; DDC, pneumatic, or electro-mechanical. Today's facility manager must contend with rising operational costs and reduced personnel that put pressure on them to increase automation. DDC systems today offer much more than temperature control. They provide tools for the users document operational procedures as well as budget future costs.

Application:

The staff at the Monroe County Correctional Facility have reported numerous comfort complaints including too cold during the cooling season and too warm during the heating season. Upgrading the existing DDC system will allow the heating and cooling systems to provide more precise control of the environment. Energy, and therefore cost, can be saved by reducing the temperature swings in the building. Maintenance can be saved by implementing data collection through DDC trending and analysis.

Savings and Energy Benefits

Implementation Cost:	$ 75,000	=	16.8 year payback
Annual Energy Savings	$ 4,455		

CALCULATIONS FOR IMPROVED TEMPERATURE CONTROL & SETBACK

Client:	Monroe County Correctional Facility	Type:	**Natural Gas**	
Address:	750 East Henrietta Rd.	Units:	**Dth**	
		Unit cost:	**$ 8.128**	/Dth
Cooling EER:	**10.4**	Heat Content of Fuel	**1,000,000**	Btu/Dth
		Combustion Efficiency:	**80.0%**	

DATA:

Percentage of Building to be Setback: **52%**

	Current		Proposed		
	Occupied	Unoccupied	Occupied	Unoccupied	
Heating T Set point:	**74**	**74**	**70**	**70**	degrees F
Cooling T Set point:	**70**	**70**	**74**	**74**	degrees F
Q internal gains:	**384,550**	**300,268**	384,550	300,268	Btuh
BLC:	**16,960**	**16,960**	16,960	16,960	Btuh/degree F
Heating T Balance:	51.3	56.3	47.3	52.3	degrees F
Cooling T Balance:	47.3	52.3	51.3	56.3	

T Balance = T Set point - (Q internal gains / BLC)

BIN Data: Rochester, NY, Oct 1 - Apr 30, Adjusted for 98 occ. Hours/week

Occupied period = 98 hours/week

Existing Set points:	**Heating 74 Day / 74 Night**		**Cooling 70 Day / 70 Night**	
	Accum Hours	Average O.A. Temp below T Balance	Accum Hours	Average O.A. Temp above T Balance
Occupied	**2,215**	**32.5**	**3,039**	**63.9**
Unoccupied	**1,923**	**32.2**	**1,707**	**66.1**

Occupied period = **98** hours/week

Proposed Set points:	**Heating 70 Day / 70 Night**		**Cooling 74 Day / 74 Night**	
	Accum Hours	Average O.A. Temp below T Balance	Accum Hours	Average O.A. Temp below T Balance
Occupied	**1,967**	**30.7**	**2,672**	**66.2**
Unoccupied Weekends	**1,811**	**30.9**	**1,473**	**68.2**

CALCULATIONS:

Heat Loss = BLC x Accum Hours x (T Balance - T Avg O.A. below T Balance)
Energy Cost = (Heat Loss / Conversion Factor) x (Unit cost / Efficiency)

Winter	Heat Heat Loss (Btu/year)	Fuel Used (Dth/year)	Cooling Heat Gains (Btu/year)	Electricity Used (kwh/year)
Occupied Consumption:	705,310,000	882	(856,354,000)	82,342
Unoccupied Consumption:	786,248,000	983	(399,221,000)	38,387
Present Annual Consumption:	**1,491,558,000**	**1,864**	**(1,255,575,000)**	120,728

Winter	Heat Loss (Btu/year)	Fuel Used (Dth/year)	Heat Loss (Btu/year)	Electricity (kwh/year)
Occupied Consumption:	555,791,000	695	(673,979,000)	64,806
Unoccupied Consumption:	656,179,000	820	(298,478,000)	28,700
Proposed Annual Consumption:	**1,211,970,000**	**1,515**	**(972,457,000)**	93,505
Annual Savings:	**279,588,000**	**349**	**(283,118,000)**	**27,223**
		$ 2,841 Heating		**$ 1,614** Cooling

IMPLEMENTATION COST & PAYBACK PERIOD:

Item	Material & Labor (Unit cost)	Quantity	Total	
Upgrade DDC	**$ 500**	**150**	$ 75,000	
		Implementation Cost:	**$ 75,000**	**= 16.8 year payback**
		Annual Savings	**$4,455**	

NIGHT TEMPERATURE SETBACK Issue #3

Concept:

The practice of maintaining comfort temperatures for 168 hours a week in the building when it is only occupied for 98 hours a week uses much more energy than is necessary. Space temperatures can be automatically lowered by installing programmable thermostats.

These thermostats can automatically raise the space temperature to occupied setpoints at preprogrammed times. Some thermostats can anticipate how long it will take to reach the occupied temperature and have the space at the desired temperature by the time people arrive.

Programmable thermostats are available in 5-2, 5-1-1 and full 7 day models. 5-2 models permit one schedule to be defined for Monday through Friday and another schedule to be defined for weekends. 5-1-1 models are similar but permit separate schedules to be defined for Saturday and Sunday. 7 day models permit separate schedules to be defined for each day of the week. Be sure to select a model that can be programmed to meet your schedule.

Application:

Replace 3 manual thermostats in your facility with new programmable thermostats. The night setback temperature is presently set at 72 ℉. The calculations are based on changing the unoccupied temperature to 62 ℉ for 56 hours per we ek.

Energy Savings and Benefits:

Implementation Cost:	$ 600	= 0.2 year payback
Annual Energy Savings:	$ 3,187	

CALCULATIONS FOR NIGHT TEMPERATURE SETBACK

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

Type:	**Natural Gas**	
Units:	**Dth**	
Unit cost:	**$ 8.128**	/Dth
Heat Content of Fuel	**1,000,000**	Btu/Dth
Combustion Efficiency:	**80%**	

DATA:

Thermostat Type **manual**

Percentage of Building to be Setback: **48%** (Greenhouse)

	Present Unoccupied	Proposed Unoccupied	
T Setpoint:	72	**62**	degrees F
Q internal gains:	277,171	277,171	Btuh
BLC:	20,745	20,745	Btuh/degree F
T Balance:	58.6	48.6	degrees F

T Balance = T Setpoint - (Q internal gains / BLC)

BIN Data: Rochester, NY, Oct 1 - Apr 30, Adjusted for 98 occ. Hours/week

Number of occupied days: **7**
Hours per week to be setback: **56**

	T Setpoint	T Balance	Accum Hours	Average O.A. Temp below T Balance
Present Setback	72	58.6	1,610	33.3
Proposed Setback	62	48.6	1,449	30.9

CALCULATIONS:

Heat Loss = BLC x Accum Hours x (T Balance - T Avg O.A. below T Balance)
Energy Cost = (Heat Loss / Conversion Factor) x (Unit cost / Efficiency)

Winter	Heat Loss (Btu/year)	Fuel Use (Dth/year)	Energy Costs ($/year)
Present Unoccupied	845,905,000	1,057	$ 8,594
Proposed Unoccupied	532,202,000	665	$ 5,407
Annual Savings:	313,703,000	392	$ 3,187

IMPLEMENTATION COST & PAYBACK PERIOD:

Item	Materials Labor $	Quantity	Total
Programmable thermostat	**$ 200**	**3**	$ 600
	$ 0	**0**	$ 0
		Implementation Cost:	**$ 600**
		Annual Energy	**$ 3,187**

= 0.2 year payback

CONTROL DHW CIRCULATING PUMP Issue #5

Concept:

Some domestic hot water heaters have a pump that circulates hot water to the furthest fixtures in the building. Sometimes these pumps are left to operate 24 hours per day. This type of operation increases the heat lost to the surrounding area as well as increases the energy consumption.

Application:

Adjust the aquastat on the hot water return line in the Correctional Facility boiler room to turn the pump off when it is no longer necessary to operate.

Energy Savings and Benefits:

Implementation Cost:	$ 0	=	0	year payback
Annual Energy Savings:	$ 298			

Energy calculations on the following page utilize the following equations:

Energy Required for DHW Consumption = (Gal/ person) x No. persons. x Days use x delta T x 8.33 BTU/gallon/deg.)
Energy Required for Tank Losses = U Factor x Surface Area x Hrs Tank is Hot x (Water Temp - Ambient Temp)
Energy Required for Recirculation Losses are estimated as a percentage of the water heater's output capacity in BTUH
Energy Required for Boiler Losses are estimated as a percentage of the boiler's output capacity in BTUH

Annual Fuel Consumption =
Present = (Sum of Energy Required) / Present Efficiency / Present Fuel Conversion Factor
Proposed = (Sum of Energy Required)/Proposed Efficiency/Proposed Fuel Conversion Factor

Average kW Demand = (Sum of Energy Required) / Hrs of Use / Days of Use / 3412
Net kW Demand = Average kW Demand x Demand Diversity

CALCULATIONS FOR CONTROLLING DWH RECIRCULATION PUMP

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

INPUT DATA:

	Present Fuel		Proposed Fuel		
Fuel:	**Natural Gas**		**Natural Gas**		
Units:	Dth		Dth		
Fuel Cost:	$ 8.13	per Dth	$ 8.13	per Dth	
Fuel Conversion Factor:	1,000,000	Btu per Dth	1,000,000	Btu per Dth	
kW Demand cost:	$ 0.00	per kW	$ 0.00	per kW	
Average kW demand:	**0.0**	kW	**0.0**	kW	
Demand Diversity:	**33%**		**33%**		
Net kW Demand Savings:	-	kW per month	-	kW per month	
Months of demand:	**12**	per year	**0**	per year	
Annual DHW Consumption:	Present		Proposed		
Hot Water Usage:	**20.0**	Gallons/Person	**20.0**	Gallons/Person	
Number of persons:	**460**	(estimate)	**460**	(estimate)	
Days of Usage:	**365**	per year	**365**	per year	
Hours of Usage per Day:	**20**	hours	**20**	hours	
Average inlet water Temp:	**50**	degrees F	**50**	degrees F	
Average hot water temp:	**115**	degrees F	**115**	degrees F	
Storage Tank Losses:	Present Tank		Proposed Tank		
Tank U factor:	**0.15**	Btu/SF/Hour	**0.15**	Btu/SF/Hour	
Height of Tank:	**30.0**	inches	**30.0**	inches	
Diameter of Tank:	**12.0**	inches	**12.0**	inches	
	10	gallons/tank	10	gallons/tank	
# of Tanks	**1**	Qty.	**1**	Qty.	
Hours Tank is Hot:	**8,760**	Hours	**8,760**		
Water Temperature:	**115**	Deg. F.	**115**		
Ambient Temperature:	**65**	Deg. F.	**65**		
Recirculation Losses:	**1.0%**	of boiler capacity =	16,744	BTUh	
	8,760	hours/year	7,008	hours/year	**80%**
Boiler Jacket & Flue Losses:					
Burner Input	**2,093,000**	BTUH	**2,093,000**	BTUH	
Efficiency:	**80.0%**		**80.0%**		
Boiler Output Capacity	1,674,400	BTU output	1,674,400	BTU output	
Jacket & Flue Losses:	**0.5%**	of boiler capacity	**0.5%**	of boiler capacity	
Boiler is Hot:	**8,760**	hours/year	**8,760**	hours/year	**100%**

CALCULATIONS:

	Present		Proposed	
Consumption Energy:	1,818,189,100	BTU output rqd/yr	1,818,189,100	BTU output rqd/yr
Tank Energy Losses:	617,855	BTU/year	617,855	BTU/year
Recirculation Losses:	146,677,440	BTU/year	117,341,952	BTU/year
Boiler Jacket Losses:	73,338,720	BTU/year	73,338,720	BTU/year
Output BTU/Year	2,038,823,115		2,009,487,627	
Annual Fuel Consumption	2,549	Dth	2,512	Dth
Demand	0	billed kW /yr.	0	kW
Annual Fuel Cost	$ 20,714		$ 20,416	
Annual Savings:	**37**	**Dth**	**$ 298**	**per year**
	0			
	0	billed kW /yr.		

IMPLEMENTATION COST & PAYBACK PERIOD:

Implementation Cost:	**$ 0**	**= 0**	**year payback**
Annual Energy Savings :	**$ 298**		

LIGHTING RETROFIT

Issue #6

Introduction

Lighting usually represents a major portion of a facility's electricity use, and given the continuous hours of use, normally contributes to the peak electric demand each month. Taking steps to improve the efficiency of your lighting will reduce both the total electric energy used and reduce the peak electric demand. Lighting retrofit projects often improve the facility aesthetically by providing brighter, whiter light and operating more quietly than the old lighting systems.

This can be accomplished by a variety of approaches, which are described below. Energy calculations may be found following the lighting ECM descriptions.

INSTALL T-8 LAMPS AND ELECTRONIC BALLASTS

Concept:

Historically, fluorescent fixtures have used T-12 lamps (tubes) and electromagnetic ballasts. Ballasts are devices that provide the necessary starting and operating conditions of voltage and current used by fluorescent lamps. Fixtures with electromagnetic ballasts consume between 107% and 115% of the total connected lamp wattage.

New lighting fixtures generally use T-8 lamps and electronic ballasts to provide the same light level while using about one-third less energy. Electronic ballasts operate fluorescent lamps at higher frequencies (20,000 Hz versus 60 Hz for magnetic ballasts) and usually consume 10% less energy than the nominal lamp wattage. Electronic ballasts are available in normal light output (NLO), reduced light output and high light output (RLO, HLO), so it is possible to increase or reduce light levels when changing out ballasts and lamps.

Application:

Your existing fluorescent light fixtures should be retrofitted with T-8 lamps and electronic ballasts to save energy while maintaining or improving light levels. The calculation tables below illustrate which fixtures should be retrofitted or replaced, and where they are located within the building.

The T-8 lamps and electronic ballasts must be high-performance and must meet the CEE specifications to qualify for NYSERDA incentives. The Consortium for Energy Efficiency (CEE) maintains specifications and a list for High Performance and Reduced Wattage T-8 lamps and ballasts. The list is updated frequently and is available at http://www.cee1.org/com/com-lt/com-lt-main.php3.

CALCULATIONS FOR LIGHTING RETROFIT

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

Type: **Electricity**
Units: **kwh**
Unit cost: **$ 0.059** /kwh
kW demand **$ 12.21**

Months of demand savings:
12 months/year for Interior Lighting
5 months/year for Exterior Lighting

Existing Interior Lighting Systems							**Recommended Lighting Controls**		**Recommended Interior Lighting Efficiency Improvements**						
Area	Qty	Type	Lamps /fixt	Hours/ year	Watts /Fixt	Present kwh/year	Type	% Reduction	Qty	Type	Lamps /fixt	Hours/ year	Watts /Fixt	Proposed kwh/year	ECM Type
Original Building	350	4' 40w T12 Std. Mag. bal.	2	5,096	94	167,658	No Change	0%	350	4' 32w T8 Elec. bal. CEE	2	5,096	55	98,098	**Relamp/reballast**
				32.9	kW	167,658	kwh					19.3	kW	98,098	kwh
										Savings from Controls				0	kwh
										Savings from Efficiency		13.7	kW	69,560	kwh
										Interior Lighting Savings		**13.7**	**kW**	**69,560**	**kwh**
										Estimated Cost Interior Lighting				$ 21,875	

Note: bal. = ballast, EE = energy efficient, STD = standard efficiency, mag. = magnetic, Elec. = electronic, CFL = compact fluorescent lamp

PAYBACK PERIOD:

Implementation Cost:	$ 21,875	= 3.6 year payback
Annual Energy Savings (kWh +	$ 6,124	

INSTALL PREMIUM EFFICIENCY MOTORS Issue #7

Concept:

Operating expenses can be reduced by replacing standard efficiency motors with premium efficiency motors. Premium efficiency motors experience lower losses than standard or high efficiency motors through the use of higher quality materials and larger conductors. Larger motors with long operating hours will have the highest potential for energy savings.

Application:

Replace the hot water pump, chilled water pump, and air handling unit motors with premium efficiency motors.

There may be other standard efficiency motors that are in operation a limited amount of hours annually. These motors should be replaced with premium efficiency motors when they fail.

Energy Savings and Benefits:

Implementation Cost:	$ 14,580	= 4.9	years payback
Annual Energy Savings:	$ 2,956		

CALCULATIONS FOR PREMIUM EFFICIENCY MOTORS

Client: **Monroe County Correctional Facility**
Address: **750 East Henrietta Rd.**

DATA AND CALCULATIONS:

kWh:	$ 0.059	per kWh
Demand:	$ 12.21	per kW

Formula:

Demand kW = (Qty x HP x 0.746 kW/HP x % Load) / % Efficiency
Annual kWh = Demand kW x Annual Hours
Demand $ Savings = (Present kW - New kW) x months of demand x Monthly demand charge
kWh $ Savings = (Present kWh - New kWh) x Cost per kWh

Description	Motor HP	Motor Qty	% Load	% Efficiencies Existing	% Efficiencies New	Annual Hours	Months of Demand
HWP-1	**10**	**1**	75%	85.0%	**91.7%**	**4,380**	**12**
HWP-2	**10**	**1**	75%	85.0%	**91.7%**	**4,380**	**0**
CHWP-1	**10**	**1**	75%	85.0%	**91.7%**	**1,320**	**12**
CHWP-2	**10**	**1**	75%	85.0%	**91.7%**	**1,320**	**0**
AHU-1, 5, MA-1	**3**	**3**	75%	79.9%	**89.5%**	**8,760**	**12**
AHU-2, 9	**7 1/2**	**2**	75%	83.8%	**91.7%**	**8,760**	**12**
AHU-3	**20**	**1**	75%	87.5%	**93.0%**	**8,760**	**12**
AHU-4, 6, 7, 8, 10, 11	**5**	**6**	75%	83.1%	**89.5%**	**8,760**	**12**

Description	Demand kW Present	Demand kW New	Annual kWh Present	Annual kWh New	Motor Type	$ Savings Total	Cost $
HWP-1	6.58	6.10	28,831	26,724		$ 195	**$ 1,050**
HWP-2	6.58	6.10	28,831	26,724		$ 125	**$ 1,050**
CHWP-1	6.58	6.10	8,689	8,054		$ 108	**$ 1,050**
CHWP-2	6.58	6.10	8,689	8,054		$ 38	**$ 1,050**
AHU-1, 5, MA-1	6.30	5.63	55,208	49,286		$ 450	**$ 2,040**
AHU-2, 9	10.01	9.15	87,731	80,173		$ 575	**$ 1,990**
AHU-3	12.79	12.03	112,028	105,403		$ 504	**$ 2,000**
AHU-4, 6, 7, 8, 10, 11	20.20	18.75	176,939	164,287		$ 962	**$ 4,350**
	75.6	70.0	506,944	468,704		$ 2,956	$ 14,580

ODP = open drip-proof
TEFC = totally enclosed fan-cooled

Peak KW Demand Savings:	5.7	kW	
Annual KW Demand Savings:	56.4	kW	$ 689
Annual kWh Savings:	38,240	kWh	$ 2,267
Total:			$ 2,956

IMPLEMENTATION COST AND PAYBACK PERIOD:

Implementation Cost	$14,580	= 4.9 years payback
Annual Energy Savings	$2,956	

INSTALL VARIABLE SPEED DRIVE TO CONTROL HOT WATER PUMP

Issue #8

Concept:

Pump systems are designed to meet peak conditions that usually occur for only a small number of hours per year. During periods when loads are less than the peak condition, it is often possible to reduce pump speed to save energy. Closed systems (hot water and chilled water, for example) are good candidates for variable speed pump control because a large portion of the design head is required to meet piping friction losses, which decrease as the pump flow decreases. Open systems are usually less attractive candidates for VSD control since there is a minimum lift which must be accomplished, regardless of flow, which limits the range of pump speed modulation that is possible.

Application:

Consider installing a variable frequency drive to control the hot water pumps. The calculations assume a minimum flow of 140 gpm will be maintained.

Energy Savings and Benefits:

Implementation Cost:	$ 6,000	5.6 year payback
Annual Energy Savings:	$ 1,065	

Implementation Cost

	Material	Labor	Qty.	Total
10 HP variable frequency drive	**$ 2,000**	**$ 1,000**	**2**	$ 6,000
controls and valves	**$ 0**	**$ 0**	2	$ 0
Totals:				$ 6,000

CALCULATIONS FOR VARIABLE SPEED DRIVE ON HOT WATER PUMPS

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

$ 0.059 per kWh

Pump Type **Hot Water**
OA Lockout Temp: **70** ℉

	Existing	Proposed	
Motor Efficiency:	**85.6%**	**91.7%**	
Minimum Flow:	**280**	**140**	GPM = 50% of GPMdes.
VSD Efficiency:		**97%**	
Pump Efficiency:		**75.0%**	

Design Conditions:
280 GPMdes
20 ft head minimum (Fixed Minimum Head)
55 pipe losses (Variable Head)
75 ft Total Head (TH)
7.1 BHP des

Periods:	Flow Increment:
Occupied	**5%**
Unocc.	**5%**

Forumulae:
FMH = Fixed Minimum Head
H2 = FMH + ((TH - FMH) x ((GPM2/GPMdes)^2))
BHP = (GPM2x H2) / (3960 x pump efficiency)
kW = BHP x 0.746 kW / Motor Eff / VFD Eff

Bin Data Based on:

Bin Temp	Occupied Hours	Percent Flow	Occupied GPM2	Occupied Head H2	New BHP	% Speed Occupied	Occupied kW Present	Occupied kW Proposed	Occupied kWh Present	Occupied kWh Proposed
(2.5)	**-**	**100%**	**280**	75.0	7.1	**100%**	0.0	5.9	-	-
2.5	**4.0**	**95%**	**266**	69.6	6.2	**96%**	6.2	5.2	25	21
7.5	**28.0**	**90%**	**253**	64.8	5.5	**93%**	6.2	4.6	173	129
12.5	**40.0**	**86%**	**240**	60.4	4.9	**90%**	6.2	4.1	247	164
17.5	**109.0**	**81%**	**228**	56.5	4.3	**87%**	6.2	3.6	672	397
22.5	**72.0**	**77%**	**217**	52.9	3.9	**84%**	6.2	3.2	444	233
27.5	**104.0**	**74%**	**206**	49.7	3.4	**81%**	6.2	2.9	642	301
32.5	**149.0**	**70%**	**196**	46.8	3.1	**79%**	6.2	2.6	919	385
37.5	**227.0**	**66%**	**186**	44.2	2.8	**77%**	6.2	2.3	1,400	526
42.5	**170.0**	**63%**	**176**	41.8	2.5	**75%**	6.2	2.1	1,049	355
47.5	**114.0**	**60%**	**168**	39.7	2.2	**73%**	6.2	1.9	703	214
52.5	**90.0**	**57%**	**159**	37.8	2.0	**71%**	6.2	1.7	555	153
57.5	**80.0**	**54%**	**151**	36.1	1.8	**69%**	6.2	1.5	493	123
62.5	**61.0**	**51%**	**144**	34.5	1.7	**68%**	6.2	1.4	376	85
67.5	**31.0**	**50%**	**140**	33.8	1.6	**67%**	6.2	1.3	191	41
72.5	**35.0**	**0%**	**-**	20.0	-	**0%**	6.2	0.0	-	-
77.5	**22.0**	**0%**	**-**	20.0	-	**0%**	6.2	0.0	-	-
82.5	**14.0**	**0%**	**-**	20.0	-	**0%**	6.2	0.0	-	-
87.5	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
92.5	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
-	**-**	**50%**	**140**	33.8	1.6	**67%**	0.0	1.3	-	-
-	**-**	**50%**	**140**	33.8	1.6	**67%**	0.0	1.3	-	-
	1,350							Occupied	7,890	3,128

Bin Temp	Unocc. Hours	Percent Flow	Unocc. GPM2	Unocc. Head H2	New BHP	% Speed Unocc.	Unocc. kW Present	Unocc. kW Proposed	Unocc. kWh Present	Unocc. kWh Proposed
(2.5)	**11.0**	**100%**	**280**	75.0	7.1	**100%**	6.2	5.9	68	65
2.5	**50.0**	**95%**	**266**	69.6	6.2	**96%**	6.2	5.2	308	262
7.5	**75.0**	**90%**	**253**	64.8	5.5	**93%**	6.2	4.6	463	347
12.5	**176.0**	**86%**	**240**	60.4	4.9	**90%**	6.2	4.1	1,086	721
17.5	**343.0**	**81%**	**228**	56.5	4.3	**87%**	6.2	3.6	2,116	1,248
22.5	**232.0**	**77%**	**217**	52.9	3.9	**84%**	6.2	3.2	1,431	751
27.5	**364.0**	**74%**	**206**	49.7	3.4	**81%**	6.2	2.9	2,245	1,052
32.5	**587.0**	**70%**	**196**	46.8	3.1	**79%**	6.2	2.6	3,621	1,518
37.5	**692.0**	**66%**	**186**	44.2	2.8	**77%**	6.2	2.3	4,269	1,605
42.5	**333.0**	**63%**	**176**	41.8	2.5	**75%**	6.2	2.1	2,054	694
47.5	**320.0**	**60%**	**168**	39.7	2.2	**73%**	6.2	1.9	1,974	602
52.5	**196.0**	**57%**	**159**	37.8	2.0	**71%**	6.2	1.7	1,209	333
57.5	**158.0**	**54%**	**151**	36.1	1.8	**69%**	6.2	1.5	975	243
62.5	**113.0**	**51%**	**144**	34.5	1.7	**68%**	6.2	1.4	697	158
67.5	**60.0**	**50%**	**140**	33.8	1.6	**67%**	6.2	1.3	370	80
72.5	**23.0**	**0%**	**-**	20.0	-	**0%**	6.2	0.0	-	-
77.5	**5.0**	**0%**	**-**	20.0	-	**0%**	6.2	0.0	-	-
82.5	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
87.5	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
92.5	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
-	**-**	**50%**	**140**	33.8	1.6	**67%**	0.0	1.3	-	-
-	**-**	**50%**	**140**	33.8	1.6	**67%**	0.0	1.3	-	-
	3,738							Unocc.	22,886	9,679
	5,088							Totals	30,776	12,807

Savings 17,969 kwh

Implementation Cost:	$ 6,000	5.6 year payback
Annual Energy Savings:	$ 1,065	

REPLACE INLET GUIDE VANES WITH VARIABLE FREQUENCY DRIVE Issue #9

Concept:

Air handling units that supply variable air volume (VAV) boxes have built in controls to prevent the unit from supplying more air than the system demands. Excessive air supply increases the spatic pressure on the boxes and prevents them from working properly. Some of these units run at a constant speed throughout the day and modulate a set of guide vanes on the inlet of the fan. These vanes reduce the volume of air entering the units and therefore control the static pressure. Another option is to control the speed of the fan with a variable frequence drive. Slowing down the fan during low demand periods saves electrical energy used to run the fan.

Application:

Air handling unit #8 serves a series of VAV boxes and is operated at a constant speed with guide vanes to control the static pressure at the boxes. The guide vanes will be fastened open and a VFD will be installed to control the speed of the motor based on system static pressure. A VFD will be installed on both the supply and return fan.

Savings and Energy Benefits

Implementation Cost:	$ 4,150	= 5.7 years payback
Annual Energy Savings	$ 723	

CALCULATIONS TO REPLACE INLET GUIDE VANES WITH VFD

Client:	**Monroe County Correctional Facility**	Type:	**Electric**
Address:	**750 East Henrietta Rd.**	Units:	**kWh**
		Energy cost:	**$ 0.089** / kWh

DATA:

Unit #:	**AHU-8**	
Supply Fan HP	**5**	
Return Fan HP	**5**	
Motor Loading	**80%**	at 100% flow
Existing Motor eff.	**85%**	
	7.0	kW
Fan Operates	**8,760**	hours per year

CALCULATIONS:

Flow Requirements % of Air Flow	% of Hours	Present Inlet vanes % kW	Proposed V.F.D. % kW	Present Inlet vanes kwh/yr.	Proposed V.F.D. kwh/yr.
100%	**20%**	100%	100%	12,301	12,301
90%	**10%**	87%	83%	5,350	5,105
80%	**10%**	77%	68%	4,710	4,182
70%	**10%**	68%	55%	4,211	3,383
60%	**20%**	62%	44%	7,672	5,412
50%	**30%**	58%	35%	10,702	6,458
	100%			44,946	36,842

kWh Present=(((B.H.P. * 0.746 /motor efficiency) * % input power requirements for inlet vanes)* hours of operation)

kWh Proposed=(((B.H.P. * 0.746 /motor efficiency) * % input power requirements for V.F.D.)* hours of operation)

Savings = ((Existing kWh - New kWh) * kWh Unit cost)

	kWh Usage	Total Cost
Present Cost	44,946	$ 4,011
Proposed Cost	36,842	$ 3,288
Annual Savings:	8,104	$ 723
Cost to Implement	**$ 4,150**	= 5.7 year simple payback period
Annual Energy Savings	$ 723	

VARY EXHAUST HOOD FLOW BASED ON COOKING ACTIVITY **Issue #10**

Concept:

The kitchen exhaust hood fans run at a constant speed throughout the day. The speed of the fan can be varied based on the amount of heat and smoke generated, which depends on the how much cooking is going on. Slowing down the exhaust fan during slow periods not only saves electrical energy used to run the fan but also the thermal energy used to heat the air that is exhausted unnecessarily.

Application:

The proposed system will have a variable frequency drive that controls the speed of the exhaust fan. Using a microprocessor and sensors, this system will reduce both fan energy and conditioning air energy. After the proposed retrofit is done, the fans will operate at a preset minimum speed during idle periods once the operator presses the light and fan buttons on the keypad in the morning. The operator then turns on the cooking appliances, and the resulting heat load causes the fan speeds to increase proportionately with the exhaust air temperature. Upon the detection of smoke/vapors inside the hood, the fans ramp up to 100% speed to ensure proper capture performance (and compliance with national and local codes).

Energy Savings and Benefits:

Implementation Cost:	$ 18,000	4.9 year payback
Annual Energy Savings:	$ 3,707	

HOOD FLOW BASED ON COOKING ACTIVITY

Client: **Monroe County Correctional Facility**
Address: **750 East Henrietta Rd.**

DATA:

	Occupied	Unoccupied	
T Setpoint:	**72**	**72**	degrees F
Q internal gains:	**739,519**	**577,439**	Btuh
BLC:	**32,615**	**32,615**	Btuh/degree
T Balance:	49.3	54.3	degrees F

T Balance = T Setpoint - (Q internal gains / BLC)

CONVERSION FACTORS		
Gas	103,000	Btu/ccf
Oil	140,000	Btu/gallon
Electric	3,412	Btu/kwh
CF2	1.085	Btu/hr-deg F-cfm

Fuel Information

Type:	**Natural Gas**		**Electricity**	
Units:	**Dth**			
Unit cost:	**$ 8.128**	/Dth	**$ 0.059**	/kWh
CF1:	**1,000,000**	Btu/Dth	**3,412**	/kW
Efficiency:	**80%**			

Ventilation Information

	System 1		System 2		
Tag:	**Hood 1**	**Make-up 1**	**Hood 2**	**Make-up 2**	
Existing Exhaust Air Flow:	**6,250**	**0**	**0**		
Proposed Minimum Air Flow:	**1,563**	**0**	**0**		
Proposed Average Air Flow:	47.5%	for all units based on Flow Profile defined below			
# Units	**1**	**1**	**1**	**1**	**Totals**
Existing OA Flow:	6,250	0	0		**6,250**
Proposed OA Flow:	2,969	0	0		**2,969**
Net Change in OA:	3,281	0	0		**3,281**

Bin Data is based on	**98**	occupied hours per week		
Equipment will Ventilate	**98**	occupied hours per week	**100%**	of Occupied Bin Hours
		and	**0%**	of Unoccupied Bin Hours

BIN Data: Rochester, NY, Oct 1 - Apr 30, Adjusted for 98 occ. Hours/week

Winter	T Setpoint	T Balance	Accum Hours	Average O.A. Temp below T Balance	Temp Difference Set- Avg OAT)
Occupied	72	49.3	**2,215**	**32.5**	39.5
Unoccupied	72	54.3	**1,923**	**34.2**	37.8

Motor Information

	Hood 1	Make-up 1	Hood 2	Make-up 2	
Motor HP:	**5**	**1**	**1**	**1**	HP
Loading:	**60%**	**60%**	**60%**	**60%**	
High Efficiency Motor?	**N**	**N**	**N**	**N**	
Efficiency	83.1%	88.5%	76.5%	76.5%	
Motor kW each	2.7	0.5	0.6	0.6	
Annual Operating Hours:	**5,096**	**0**	**0**	**0**	hrs./yr.
Existing Motor kWh:	13,724	0	0	0	kWh

VSD Information

	% of Hours	Flow Profile	hours	hours	hours	hours	
1	**60%**	**25%**	3,058	0	0	0	
2	**10%**	**50%**	510	0	0	0	
3	**10%**	**75%**	510	0	0	0	
4	**20%**	**100%**	1,019	0	0	0	
		Flow Profile	kWh	kWh	kWh	kWh	
1		25%	531	0	0	0	
2		50%	354	0	0	0	
3		75%	796	0	0	0	
4		100%	2,830	0	0	0	
		Proposed Motor kWh:	4,510	0	0	0	kWh
		kWh Savings:	9,214	0	0	0	kWh

CALCULATIONS:

Energy Usage = (CFM Present - CFM Proposed) x Accumulated Hours x Duty Cycle x Temp Diff x CF2
Energy Cost = (Energy Usage / CF1) x (Unit cost / Efficiency)

kW VSD = (% Flow) ^2 x Motor kW / 97%VSD Efficiency
kWh = kW x Hours

Thermal			Electric	
Base Load	592,516,541	(Btu/year)	13,724	/kWh
	741	Dth		

	Thermal Energy			Electric Energy		
Winter	Energy Savings (Btu/year)	Fuel Savings (Dth/year)	Fuel Savings ($/year)	Demand Savings kW/year	Energy Savings kWh/year	Electric Savings ($/year)
Occupied	311,071,184	389	$ 3,160	n/a		
Unoccupied	0	0	$ 0	n/a		
Annual Savings:	311,071,184	389	$ 3,160	0	9,214	$ 546
		Total Energy Savings	**$ 3,707**			

Implementation Cost

	Material	Labor	Qty.	Total
Melink Controls and Drive	**$ 15,000**	**$ 0**	**1**	$ 15,000
Electrical Installation	**$ 500**	**$ 2,500**	1	$ 3,000
				$ 18,000

REPLACE OLD REFRIGERATOR Issue #11

Concept:

ENERGY STAR qualified refrigerator models use at least 20% less energy than required by current federal standards and 40% less energy than the conventional models sold in 2001. Refrigerators manufactured prior to 1993 can be expected to use twice as much energy as current Energy Star labeled refrigerators.

New 18 cubic foot refrigerators should use less than 378 kWh per year, although energy use will vary with size (cubic feet) and configuration (top freezer, side-by-side, etc.). Visit the Energy Star website to find a list of all refrigerator models that meet current Energy Star requirements: http://downloads.energystar.gov/bi/qplist/refrigerators.xls or http://www.energystar.gov/index.cfm?fuseaction=find_a_product.

Application:

Replace the existing refrigerator with an Energy Star Labeled refrigerator. All ENERGY STAR full size refrigerators greater than 7.75 cubic feet must be at least 20% more efficient than minimum federal government standard NAECA (National Appliance Energy Conservation Act)

The old refrigerators should be destroyed according to all applicable regulations. The old R-12 or R134a refrigerant must be properly disposed of in accordance with the EPA Clean Air Act and all other applicable regulations. Be sure that you receive a certificate from the entity doing the destruction that this has been done.

Energy Savings and Benefits:

Implementation Cost:	$ 540	= 8.4 year payback
Annual Energy Savings:	$ 65	

CALCULATIONS FOR REPLACING OLD REFRIGERATION UNITS

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

Type:	**Electricity**	
Units:	**kwh**	
Unit cost:	**$ 0.059**	/kwh
kW demand	**$ 12.21**	
months /yr. demand	**12**	

INPUT DATA:

Qty	Description	cu.ft.	kwh per year Present	Proposed	Savings
1	**Refrigerator**	**14**	**1,444**	**355**	1,089
0	**Freezer**				0
					0
					0
					0
					1,089

CALCULATIONS:

	Annual Fuel Consumption		Annual Fuel Cost	
Present:	1,444	kwh	$ 86	
Proposed:	355	kwh	$ 21	
Annual Savings:	1,089	kwh	$ 65	per year

IMPLEMENTATION COST:

Cu.Ft.	Description	Qty	Material	Labor	Total
14.21	Refrigerator	1	**$ 540**	**$ 0**	$ 540
	Freezer	0	**$ 0**	**$ 0**	$ 0
		0	**$ 0**	**$ 0**	$ 0
		0	**$ 0**	**$ 0**	$ 0
		0	**$ 0**	**$ 0**	$ 0
	Totals:	1			$ 540

PAYBACK:

Implementation Cost	$ 540	= 8.4 year payback
Annual Energy Savings	$ 65	

CONVERT BOOSTER HEATER FROM ELECTRICITY TO NATURAL GAS

Issue #12

Concept:

Electricity is usually a more expensive source of energy than natural gas. Overall energy costs may be reduced by replacing the booster heater with natural gas booster heater.

Application:

Utilizing a gas booster heater in the kitchen to supply sanitizing water to the dishwashing machine can offer increased energy cost savings. High efficiency gas booster heaters can take the pressure off standard hot water heaters with the use of improved heat exchangers and solid state thermostats, which transfer a greater percentage of heat generated by the burners into the water.

Energy Savings and Benefits:

Implementation Cost:	$ 8,850	= 3.3 year payback
Annual Energy Savings:	$ 2,671	

CONVERT BOOSTER HEATER FROM ELECTRICITY TO NATURAL GAS

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

INPUT DATA:

	Present Fuel		Proposed Fuel	
Fuel:	**Electricity**		**Natural Gas**	
Units:	**kwh**		**Dth**	
Fuel Cost:	**$ 0.059**	per kwh	**$ 8.128**	per Dth
Fuel Conversion Factor:	**3,412**	Btu per kwh	**1,000,000**	Btu per Dth
Efficiency:	**100%**		**90%**	
Electric Demand	$ 12.21	/ kW		
Months of Demand	**12**			

Present Annual Fuel Consumption (kWh) =
(Gallons/) x No. s. x Days usage x Temp difference x Conversion factor 1)
/ Present Efficiency / Conversion factor 2

Thermal Load to be Converted:	**Booster Heater**	
Present Annual Fuel Consumption:	**42,345**	kwh
est = 33% of nameplate	**10.0**	kW / month

CALCULATIONS:

Proposed Annual Fuel Consumption =
{(Present Annual Fuel Consumption x Present Efficiency) / Proposed Efficiency)} x
(Present Fuel Conversion Factor / Proposed Fuel Conversion Factor)

Electricity Fuel Cost = Annual Fuel Consumption x $ / kwh
Natural Gas Fuel Cost = Annual Fuel Consumption x $ / Dth

	Annual Fuel Consumption		Annual Fuel Cost	
Present:	42,345	kwh	$ 2,511	
	10.0	kW	$ 1,465	
Proposed:	161	Dth	$ 1,305	
Annual Savings:			$ 2,671	per year

Annual Energy Savings:

Present Energy Usage:	144,481,140	Btu per year
Proposed Energy Usage:	160,534,600	Btu per year
Annual Energy Savings:	(16,053,460)	Btu per year

IMPLEMENTATION COST:

	Material	Labor	Total
Booster Heater	**$ 5,200**	**$ 600**	$ 5,800
Venting	**$ 750**	**$ 600**	$ 1,350
Gas Piping	**$ 500**	**$ 1,200**	$ 1,700
Totals:			$ 8,850

PAYBACK:

Implementation Cost	$ 8,850	= 3.3 year payback
Annual Energy Savings	$ 2,671	

INSTALL MORE EFFICIENT BOILERS

Issue #13

Concept:

Boiler efficiency is determined by a number of factors which vary with each boiler design. The efficiency of the boiler heat exchanger, jacket heat loss, flue losses, and boiler sizing relative to the heating load combine to determine how efficiently a boiler will operate in a given application. The higher the boiler water/steam temperature the greater the losses. Low pressure steam boilers generally maintain a minimum of 212°F up to 250℉. Hot water boilers will maintain as low as 100℉ up to 180℉.

Application:

The vertical fire tube steam boilers in service maintain 8 psi of steam pressure (235℉) all year to p rovide heat and domestic hot water to the building. Fuel costs can be reduced by replacing the steam boilers with high efficiency hot water boilers, fitted with modulating power burners. Perform complete load sizing calculations for the building, prior to selecting replacement equipment, using standard methods. Size new equipment according to the load calculations and not according to the size of the equipment scheduled for removal.

The new boilers will have higher heat transfer efficiency and experience lower jacket and flue losses. Operating efficiency will improve by resettting the boiler temperature based on the outdoor temperature and operating the boiler in a condensing mode as much of the season as possible.

Because the steam boilers provide domestic hot water also, additional savings would be obtained by converting to hot water condensing boilers.

Energy Savings and Benefits:

Implementation Cost:	$ 80,500	= 7.4 year payback
Annual Energy Savings:	$ 10,839	

CALCULATIONS FOR IMPROVING BOILER PLANT EFFICIENCY

Client:	Monroe County Correctional Facility	Type:	**Natural Gas**
Address:	750 East Henrietta Rd.	Units:	**Dth**
		Unit cost:	**$ 8.128** /Dth
		Heat Content of Fuel	**1,000,000** Btu/Dth

INPUT DATA:

Present Annual Fuel Consumption:

Present DHW Fuel Use:	2,549	
Present Heating Fuel Use:	6,716	Dth
% of Bldg. Heated by Boiler:	**51%**	
Present Boiler Fuel Use:	**5,974**	**Dth**

BIN Data

1,107	Occ Hours below 55°
3,379	Unocc Hours below 55°
4,486	hours/year

Adjustments for Other Measures:

Fuel Savings	
	Dth
	Dth
	Dth
	Dth
	Dth
0	Dth

4,161	MMBtu Useful Heat Output (present)
0	MMBTU Saved Other Measures (at Old CE)
4,161	MMBTU Req'd from New Boilers

105,800 sq.ft. served by boilers

	Present Boilers			Proposed		
	Fulton 1	**Fulton 2**		**Aerco 1**	**Aerco 2**	
% of Boiler Fuel Use	**50%**	**50%**		**50%**	**50%**	of useful output
5974 =	**2,987**	**2,987**	**Dth**			
Boiler Firing Rate	**2,093**	**2,093**	MBH Input	**2,000**	**2,000**	MBH Input
Combustion Efficiency	**80.0%**	**80.0%**		**91.0%**	**91.0%**	
Combustion Tested?	**No**	**No**				
Avg.Firing rate is =	**50%**	**50%**		**50%**	**50%**	= Avg. Firing Rate
Boiler Capacity	**1,674**	**1,674**	MBH Output	**1,820**	**1,820**	MBH Output
Jacket Losses	**1.50%**	**1.50%**	of capacity	**0.25%**	**0.25%**	of capacity
Hours/ Yr. Unit is Hot	**8,760**	**8,760**	hrs.	**8,760**	**2,243**	hrs.
Off-Cycle Flue Losses	**0.90%**	**0.90%**	of capacity	**0.10%**	**0.10%**	of capacity
Off-Cycle Hours/Year	5,906	5,906	hrs.	6,417	(54)	hrs.
Jacket Losses	220	220	MMBTU/yr.	40	10	MMBTU/yr.
Off-Cycle Flue Losses	89	89	MMBTU/yr.	12	(0)	MMBTU/yr.
Useful Heat Output	2,080	2,080	MMBTU/yr.	2,080	2,080	MMBTU/yr.
	4,161	MMBTU/yr.		4,161	MMBTU/yr.	
	40	btu input/sq.ft.		38	btu input/sq.ft.	
	0.70	AFUE		2,343	2,297	Dth

CALCULATIONS:

Off-Cycle Flue Losses = Boiler MBH Output x 1000 x % Off-Cycle Flue Losses x Hrs Off-Cycle per Year / 1,000,000

Jacket Losses = Boiler MBH Output x 1000 x % Jacket Losses x Hrs Hot per Year / 1,000,000

Useful Heat Output = Htg Fuel Use x BTU per Unit x Present Efficiency / 1,000,000 - Off Cycle Losses - Jacket Losses

Proposed Annual Fuel Consumption =

(Proposed Off-Cycle & Jacket Losses + Useful Heat Output) / Proposed Efficiency x 1,000,000 / BTU per Unit

	Annual Fuel Consumption (Dth)	Annual Cost
Present:	5,974	$ 48,554
- Fuel Saved by Other FIMs	0	$ 0
Proposed:	4,640	$ 37,715
Annual Savings:	**1,334**	**$ 10,839**
Cost to Implement		**$ 80,500** = 7.4 year payback

INSTALL VARIABLE SPEED DRIVE TO CONTROL CHILLED WATER PUMP

Concept:

Pump systems are designed to meet peak conditions that usually occur for only a small number of hours per year. During periods when loads are less than the peak condition, it is often possible to reduce pump speed to save energy. Closed systems (hot water and chilled water, for example) are good candidates for variable speed pump control because a large portion of the design head is required to meet piping friction losses, which decrease as the pump flow decreases. Open systems are usually less attractive candidates for VSD control since there is a minimum lift which must be accomplished, regardless of flow, which limits the range of pump speed modulation that is possible.

Application:

Consider installing a variable frequency drive to control the chilled water pumps. The calculations assume a minimum flow of 140 gpm will be maintained.

Energy Savings and Benefits:

Implementation Cost:	$ 12,600	14.8 year payback
Annual Energy Savings:	$ 849	

Implementation Cost

	Material	Labor	Qty.	Total
10 HP variable frequency drive	**$ 2,000**	**$ 1,000**	**2**	$ 6,000
controls and valves	**$ 300**	**$ 250**	12	$ 6,600
Totals:				$ 12,600

CALCULATIONS FOR VARIABLE SPEED DRIVE ON CHILLED WATER PUMPS

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

$ 0.059 per kWh

Pump Type **Chilled Water**
OA Lockout Temp: **55** ℉

	Existing	Proposed	
Motor Efficiency:	**85.6%**	**91.7%**	
Minimum Flow:	**270**	**140**	GPM = 52% of GPMdes.
VSD Efficiency:		**97%**	
Pump Efficiency:		**75.0%**	

Design Conditions:

270	GPMdes
20	ft head minimum (Fixed Minimum Head)
55	pipe losses (Variable Head)
75	ft Total Head (TH)
6.8	BHP des

Periods:	Flow Increment:
Occupied	**8%**
Unocc.	**8%**

Forumulae:
FMH = Fixed Minimum Head
H2 = FMH + ((TH - FMH) x ((GPM2/GPMdes)^2))
BHP = (GPM2x H2) / (3960 x pump efficiency)
kW = BHP x 0.746 kW / Motor Eff / VFD Eff

Bin Data Based on:

Bin Temp	Occupied Hours	Percent Flow	Occupied GPM2	Occupied Head H2	New BHP	% Speed Occupied	Occupied kW Present	Occupied kW Proposed	Occupied kWh Present	Occupied kWh Proposed
(2.5)	**-**	**0%**	**-**	20.0	-	**0%**	0.0	0.0	-	-
2.5	**4.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
7.5	**28.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
12.5	**40.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
17.5	**109.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
22.5	**72.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
27.5	**104.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
32.5	**152.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
37.5	**237.7**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
42.5	**190.4**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
47.5	**168.4**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
52.5	**168.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
57.5	**196.8**	**52%**	**140**	34.8	1.6	**68%**	5.9	1.4	1,171	271
62.5	**257.3**	**56%**	**151**	37.1	1.9	**70%**	5.9	1.6	1,531	406
67.5	**170.3**	**61%**	**164**	40.2	2.2	**73%**	5.9	1.9	1,013	317
72.5	**185.8**	**66%**	**178**	43.9	2.6	**76%**	5.9	2.2	1,105	410
77.5	**132.6**	**72%**	**193**	48.2	3.1	**80%**	5.9	2.6	789	349
82.5	**83.9**	**78%**	**210**	53.3	3.8	**84%**	5.9	3.2	499	266
87.5	**25.7**	**85%**	**229**	59.4	4.6	**89%**	5.9	3.8	153	99
92.5	**6.2**	**92%**	**248**	66.6	5.6	**94%**	5.9	4.7	37	29
-	**-**	**100%**	**270**	75.0	6.8	**100%**	0.0	5.7	-	-
-	**-**	**100%**	**270**	75.0	6.8	**100%**	0.0	5.7	-	-
	2,334						Occupied		6,297	2,146

Bin	Unocc.	Percent	Unocc.		New	% Speed	Unocc. kW		Unocc. kWh	
Temp	Hours	Flow	GPM2	Head H2	BHP	Unocc.	Present	Proposed	Present	Proposed
(2.5)	**11.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
2.5	**50.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
7.5	**75.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
12.5	**176.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
17.5	**343.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
22.5	**232.0**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
27.5	**365.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
32.5	**596.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
37.5	**721.3**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
42.5	**388.6**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
47.5	**468.6**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
52.5	**410.5**	**0%**	**-**	20.0	-	**0%**	5.9	0.0	-	-
57.5	**477.2**	**52%**	**140**	34.8	1.6	**68%**	5.9	1.4	2,839	656
62.5	**649.7**	**56%**	**151**	37.1	1.9	**70%**	5.9	1.6	3,864	1,026
67.5	**440.7**	**61%**	**164**	40.2	2.2	**73%**	5.9	1.9	2,622	820
72.5	**435.2**	**66%**	**178**	43.9	2.6	**76%**	5.9	2.2	2,589	960
77.5	**307.4**	**72%**	**193**	48.2	3.1	**80%**	5.9	2.6	1,828	810
82.5	**191.1**	**78%**	**210**	53.3	3.8	**84%**	5.9	3.2	1,137	605
87.5	**70.3**	**85%**	**229**	59.4	4.6	**89%**	5.9	3.8	418	269
92.5	**16.8**	**92%**	**248**	66.6	5.6	**94%**	5.9	4.7	100	79
-	**-**	**100%**	**270**	75.0	6.8	**100%**	0.0	5.7	-	-
-	**-**	**100%**	**270**	75.0	6.8	**100%**	0.0	5.7	-	-
	6,426						Unocc.		15,397	5,224
	8,760						Total		21,694	7,370

Savings 14,324 kwh

Implementation Cost:	$ 12,600	14.8	year payback
Annual Energy Savings:	$ 849		

RECOVER HEAT FROM BUILDING EXHAUST

Concept:

A heat recovery unit transfers heat (and moisture in some cases) from the exhaust air stream over to the supply air stream, thus reducing the heat loss due to ventilation, and reducing the need to condition the cold supply air. Conversely, in hot and humid outdoor conditions, a heat recovery unit can keep heat (some units also moisture) outside, thus reducing air conditioning costs.
With a run-around or air-fluid-air heat recovery system, heat is transferred in a hydronic coil from the exhaust air to a circulating fluid. The fluid is circulated to the hydronic coil in the makeup air where the heat is transferred to the supply air.

Application:

There are 5 mechanical rooms in the building, each containing two air handling units and two exhaust fans. The equipment operates 24 hours a day to provide fresh air and exhaust to the respective spaces. The proposed measure is based on installing run around heat recovery coils in one mechanical room, B21.

Energy Savings and Benefits:

Implementation Cost:	$ 40,200	15.5	year payback
Annual Energy Savings:	$ 2,592		

Implementation Cost

	Material	Labor	Qty.	Total
Run around heat recovery system for (1) MER	**$ 20,000**	**$ 20,200**	**1**	$ 40,200
	$ 0	**$ 0**	1	$ 0
Totals:				$ 40,200

PROPOSED RUN-AROUND HEAT RECOVERY SYSTEM

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

INPUT DATA:

Exhaust Operating Hours: **168** hours per week during the Heating Season
% of time operating: 100%

AHU Discharge Air Temperature: **70** ℉

Proposed Heat Recovery Efficiency: **58%**
Additional Fan Static Pressure: **0.50** inches w.c.
Fan Efficiency: **60%**

	Outdoor Air	Exhaust Air	
	CFM	CFM	Temp
Air Flows:	**2,100**	**3,570**	**73**
Motor Efficiency:	**89.4%**	**86.5%**	

Type: **Natural Gas**
Units: **Dth**
Unit cost: **$ 8.128** per Dth
Heat Content of Fuel **1,000,000** Btu per Dth
Combustion Efficiency: **80%**

Electricity Cost
Fuel Cost: $ 0.059 per kwh
$ 12.21 $/kW
Cooling Energy Use: **1.15** kw per ton

Heat recovery system is not used if outdoor air temperature
a) is within **2** degrees of discharge air setpoint or
b) is above **100** degrees

Additional Electrical Power Required:

Fans
Supply air: 0.28 HP
Exhaust air: 0.47 HP

Pump Data
1 GPM
45 ft. head
55% Pump eff.
0.01 BHP
90.0% Motor Eff.
0.01 kW

Bin Data for **ROCHESTER**

Bin Data		Req'd	Make-up Air Unit Operating Costs - Present				Heat Recovery Unit		Future Operating Costs - w/ Heat Recovery Unit				Add'l. Energy		Savings		
			Energy Required		Heating	Cooling	Potential	Actual			Heating	Cooling	Fan	Pump			
Temp.	Hours	SAT	Btuh	Btu/yr	Dth	kwh	ΔT	LAT	Btuh	Btu/yr	Dth	kwh	kwh	kwh	Positive	Negative	Total
(2.5)	**11.0**	**70**	165,191	1,817,104	2	0	43.8	41.3	65,416	719,573	1	0	7	0	$ 11	$ 0	$ 11
2.5	**54.0**	**70**	153,799	8,305,133	10	0	40.9	43.4	60,631	3,274,068	4	0	34	1	$ 49	$ 0	$ 49
7.5	**103.0**	**70**	142,406	14,667,844	18	0	38.0	45.5	55,846	5,752,142	7	0	65	1	$ 87	$ 0	$ 87
12.5	**216.0**	**70**	131,014	28,298,970	35	0	35.1	47.6	51,061	11,029,216	14	0	137	2	$ 167	$ 0	$ 167
17.5	**452.0**	**70**	119,621	54,068,805	68	0	32.2	49.7	46,276	20,916,903	26	0	286	5	$ 320	$ 0	$ 320
22.5	**304.0**	**70**	108,229	32,901,540	41	0	29.3	51.8	41,491	12,613,411	16	0	193	3	$ 195	$ 0	$ 195
27.5	**470.0**	**70**	96,836	45,513,038	57	0	26.4	53.9	36,707	17,252,118	22	0	298	5	$ 269	$ 0	$ 269
32.5	**749.0**	**70**	85,444	63,997,369	80	0	23.5	56.0	31,922	23,909,417	30	0	474	9	$ 379	$ 0	$ 379
37.5	**959.0**	**70**	74,051	71,015,149	89	0	20.6	58.1	27,137	26,024,321	33	0	607	11	$ 420	$ 0	$ 420
42.5	**579.0**	**70**	62,659	36,279,416	45	0	17.7	60.2	22,352	12,941,857	16	0	367	7	$ 215	$ 0	$ 215
47.5	**637.0**	**70**	51,266	32,656,601	41	0	14.8	62.3	17,567	11,190,329	14	0	403	7	$ 194	$ 0	$ 194
52.5	**579.0**	**70**	39,874	23,086,901	29	0	11.9	64.4	12,782	7,401,001	9	0	367	7	$ 137	$ 0	$ 137
57.5	**674.0**	**70**	28,481	19,196,363	24	0	9.0	66.5	7,998	5,390,339	7	0	427	8	$ 114	$ 0	$ 114
62.5	**907.0**	**70**	17,089	15,499,496	19	0	6.1	68.6	3,213	2,913,905	4	0	575	10	$ 93	$ 0	$ 93
67.5	**611.0**	**70**	5,696	3,480,409	4	0	3.2	70.0	0	0	0	0	387	7	$ 12	$ 0	$ 12
72.5	**621.0**	**70**	(5,696)	(3,537,371)	0	339	(2.5)	70.0	0	0	0	0	393	7	$ 0	($ 4)	($ 4)
77.5	**440.0**	**70**	(17,089)	(7,519,050)	0	721	(2.6)	74.9	(11,142)	(4,902,421)	0	470	279	5	$ 0	($ 2)	($ 2)
82.5	**275.0**	**70**	(28,481)	(7,832,344)	0	751	(5.5)	77.0	(15,927)	(4,379,847)	0	420	174	3	$ 9	$ 0	$ 9
87.5	**96.0**	**70**	(39,874)	(3,827,880)	0	367	(8.4)	79.1	(20,712)	(1,988,310)	0	191	61	1	$ 7	$ 0	$ 7
92.5	**23.0**	**70**	(51,266)	(1,179,124)	0	113	(11.3)	81.2	(25,496)	(586,418)	0	56	15	0	$ 2	$ 0	$ 2
	8,760	Total Hours			563	2,290					202	1,136	5,549	101	$ 2,680	($ 6)	$ 2,674

	Dths	Heat $	kwh	kW/year	Elec $	Total $
Present Heating & Cooling Cost:	563	$ 4,580	2,290		$ 136	$ 4,716
Proposed Heating & Cooling Cost:	202	$ 1,639	1,136		$ 67	$ 1,706
Annual Thermal Savings:	362	$ 2,941	1,154		$ 68	$ 3,009
Additional Fan Electricity			(5,549)		($ 329)	($ 329)
Additional Pump Electricity			101		$ 6	$ 6
Additional Demand Costs				(7.7)	($ 94)	($ 94)
Annual Net Savings:	**362**	**$ 2,941**	**(4,295) kwh**		**($ 348)**	**$ 2,592**

CHILLER REPLACEMENT

Concept:

Air conditioning units that are over 10 years old are not very efficient. Newer models are rated with an Energy Efficiency Ratio, commonly called EER. The higher the EER, the more efficient the unit. SEER is the Seasonal Energy Efficiency Ratio, which indicates the average EER over the course of a cooling season. The SEER will be higher than the EER for a given piece of equipment, so be sure to compare products using the same measurements.

The energy savings of a new air conditioning system is often not enough to warrant the purchase of a new unit. However, if the air conditioner requires repair or needs replacement for another reason, the highest EER rated equipment should be purchased.

Application:

The existing air cooled liquid chillers have an EER of approximately 10.4. New water cooled chillers have an EER of 16.2. Replacing the existing chillers with water-cooled chillers would require the installation of cooling towers, condenser water pumps, etc. Given the relatively short cooling season in this area, this change is difficult to justify based on energy savings alone.

Energy Savings and Benefits:

Implementation Cost:	$ 120,000	= 33.2	year payback
Annual Energy Savings:	$ 3,619		

CALCULATIONS FOR CHILLER REPLACEMENT

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.

Type: **Electricity**
Units: **kwh**
Unit cost: **$ 0.059** /kwh
kW demand $ 12.21
months /yr. demand **6**
Demand Diversity: 40%

Improve Air Conditioning EER

	Unit	Cooling Capacity Btu/hour	No Units	Equivalent Full Load Hours	EER Present	EER Proposed	kWh / year Present	kWh / year Proposed	Savings kwh	Savings kW
1	**York**	**1,008,000**	**1**	**1,320**	**10.4**	**16.2**	127,570	82,133	45,437	34.42
2					**8.0**	**8.0**	0	0	0	0.00
3					**8.0**	**8.0**	0	0	0	0.00
4					**8.0**	**8.0**	0	0	0	0.00
5					**8.0**	**8.0**	0	0	0	0.00
6					**8.0**	**8.0**	0	0	0	0.00
	Totals	1,008,000	1				127,570	82,133	45,437	34.4
		84	tons total					Energy Savings	45,437	
								Demand Savings	13.8	kw/mo.
								Billed Demand Savings	75.7	kw/yr.

CALCULATIONS:

kWh /year = Cooling Capacity x (1 / EER) x (Equivalent Full Load Hours / yr) x (1 kW /1000 watts) x No. Units

Add or Repair Economizer Controls

Present Low Limit for Cooling **65** deg. OA temp. 1,316 Accum Hours O.A. Temp Above Temp.
Proposed Low Limit for Cooling **65** deg. OA temp. 1,316 Accum Hours O.A. Temp Above Temp.
Typical AC duty cycle is **20%** of occupied hours between 65 and 65 deg. OA Temp. (average)

	Unit	Capacity in Btuh	Qty. to Improve	EER	Current kwh	Proposed kwh	Savings kwh
1	York	1,008,000	**0**	16.20	0	0	0
2		0	**0**	8.00	0	0	0
3		0	**0**	8.00	0	0	0
4		0	**0**	8.00	0	0	0
5		0	**0**	8.00	0	0	0
6		0	**0**	8.00	0	0	0
			0		0	0	0

CALCULATIONS:

Present annual fuel consumption (KWH) =
Cooling Capacity / EER x (Current Accum. Hours/yr) x Duty Cycle x (1 kW / 1000 watts) x No. Units
Proposed annual fuel consumption(KWH) =
Cooling Capacity / EER x (Proposed Accum. Hours/yr) x Duty Cycle x (1 kW / 1000 watts) x No. Units

SAVINGS	kwh	kW/mo.	$ Savings
Improve EER	45,437	13.77	$ 3,619
Economizer	0		$ 0
	45,437		$ 3,619

IMPLEMENTATION COST:

	Quantity	$/Unit	Total
Improve EER	**1**	**$ 120,000**	$ 120,000
Economizer	**0**	**$ 0**	$ 0

Implementation Cost: $ 120,000 = 33.2 year payback

Annual Energy Savings: $ 3,619

Appendix C – Current Facility Requirement Document

Location (Floors)	AHU	Occupancy	Occupied Setpoint	Unoccupied Setpoint	Filtration	Design CFM	Outside Air CFM	CO2 Monitoring Schedule	Schedule M-F	Schedule Sat-Sun	Schedule Holidays	Humidity control / monitoring	Duct Static Pressure
N-E Support	AHU-1	24/7	68-72	N/A	Yes	2,700	560	N/A	24/7	24/7	N/A	N/A	.8 - 1.4
Male East	AHU-2	24/7	68-72	N/A	Yes	7,300	1,200	N/A	24/7	24/7	N/A	N/A	
Enterance	AHU-3	24/7	68-72	N/A	Yes	11,300	2,100	N/A	24/7	24/7	N/A	N/A	.8 - 1.4
Male West	AHU-4	24/7	68-72	N/A	Yes	5,600	1,200	N/A	24/7	24/7	N/A	N/A	
N-W Support	AHU-5	24/7	68-72	N/A	Yes	4,250	700	N/A	24/7	24/7	N/A	N/A	.8 - 1.4
Female	AHU-6	24/7	68-72	N/A	Yes	5,800	1,200	N/A	24/7	24/7	N/A	N/A	
Kitchen	AHU-7	24/7	68-72	N/A	Yes	4,800	1,150	N/A	24/7	24/7	N/A	N/A	
S-W Support	AHU-8	24/7	68-72	N/A	Yes	3,400	850	N/A	24/7	24/7	N/A	N/A	.8 - 1.4
Work Release-E	AHU-9	24/7	68-72	N/A	Yes	7,050	1,100	N/A	24/7	24/7	N/A	N/A	
Multi-Purpose	AHU-10	24/7	68-72	N/A	Yes	5,350	750	N/A	24/7	24/7	N/A	N/A	
Work Release-W	AHU-11	24/7	68-72	N/A	Yes	5,700	900	N/A	24/7	24/7	N/A	N/A	
Kitchen Hood Supply	MA-1	4 AM : 6 PM			Yes	6,830	6,830						

Chilled Water Plant	
Operating Schedule	Apr. 15 through Sep. 30
Peak Cooling Capacity (Tons)	168
Peak CHW Circulation Rate (gpm)	280
Chilled Water (gpm/ton)	1.67
Chilled Water Supply Temp (℉)	45
Condenser Water Flow (gpm)	N/A
Condenser Water Inlet Temp (℉)	N/A
Cooling Tower Evaporation Rate (gpm)	N/A
Winter Chiller Use (tons)	0
Summer Chiller Use (tons)	

Boiler Plant	
Operating Schedule	24/7/365
Peak Heating Capacity (MBTU)	2,646
Steam Pressure	8 PSI
Hot Water Supply Temp (℉)	160
Winter Boiler Use	Heating/Domestic Hot Water
Summer Boiler Use	Domestic Hot Water
Boiler Efficiency	80%
Makeup Rate	?
Boiler Exhaust Temp	?
Process Hot Water Usage	N/A

Appendix D – Issues Database

Issue #	Component	Issue Type *	Area	Issue	Effect	Recommended Corrective Action	Benefit
1	Controls	IEQ	Facility	Unit ventilation	Not consistant, excessive or not enough	Retro-commissioning of all dampers/economizers	IDA Quality/energy conservation
2	Controls	Energy	Facility	Temperature Control	Temperature swings	Replace pneumatic controls with DDC	Tighter control, less over heating/cooling
3	Controls	Energy	Greenhouse	Temperature Setback	Energy Waste	Install night setback thermostats to lower the space temperature at night.	Energy Conservation
4	RTU's	Operations	Roof Top	Maintenance	Lack of ventilation	Retro-commissioning of all dampers/economizers	IDA Quality/energy conservation
5	DHW Circ Pump	Energy	Boiler Room	Maintenance	Energy Waste	Adjust temperature setting on aquastat	Energy Conservation
6	Lighting	Energy	Facility	Inefficient/obsolete lighting	Energy Waste	Retrofit/replace T-12 Light fixtures	Energy Conservation
7	Motors	Energy	Facility	Inefficient motors	Energy Waste	Replace standard efficiency motors with premium efficiency	Energy Conservation
8	Heating pumps	Energy	Facility	Fixed Speed	Energy Waste	Install VFD to control motor speed based on demand	Energy Conservation
9	AHU Motors	Energy	AHU-8	Fixed Speed	Energy Waste	Install VFD to control motor speed based on demand	Energy Conservation
10	Kitchen Exhaust	Energy	Kitchen	Fixed Speed	Energy Waste	Install VFD to control exhaust fan based on demand	Energy Conservation
11	Refrigerator	Energy	Break Room	Inefficient Refrigerator	Energy Waste	Replace the existing refrigerator with an Energy Star Rated Model	Energy Conservation
12	Booster Heater	Energy	Kitchen	Electric Booster Heater	Energy Waste	Replace the existing electric booster heater with a gas fired model	Energy Conservation
13	Boilers	Energy	Heating and Domestic Hot Water	Steam Boiler serves only Hot Water Loads	Energy Waste	Replace steam boilers with condensing hot water boilers	Higher thermal efficiency, reduced standby losses

* Energy Related (Energy), Operations Related (Operations) and/or Indoor Environmental Quality Related (IEQ)

Energy Conservation Opportunities

The following list of Energy Conservation Opportunities (ECOs) represent measures with more significant implementation costs that should be evaluated further prior to implementation. These ECOs may make sense to include in your long-term capital plans.

1. Install VFD to Control Chilled Water Pumps - Pump systems are designed to meet peak conditions that usually occur for only a small number of hours per year. During periods when loads are less than the peak condition, it is often possible to reduce pump speed to save energy. Closed systems (hot water and chilled water, for example) are good candidates for variable speed pump control because a large portion of the design head is required to meet piping friction losses, which decrease as the pump flow decreases. Installing VFD's on the chilled water pumps at the Monroe County Correctional Facility will require some modifications to the system design. Three-way control valves at the air handling units will need to be replaced with two way valves and the near piping at the chillers will require conversion to injection pumping. This application will fit well with ECO # 4 below. Estimating an improvement cost of $12,600 and an annual energy savings of $843 offers a simple payback of just less than 15 years.

2. Air-to-Air Heat Recovery - A heat recovery unit transfers heat (and moisture in some cases) from the exhaust air stream over to the supply air stream, thus reducing the heat loss due to ventilation, and reducing the need to condition the cold supply air. Conversely, in hot and humid outdoor conditions, a heat recovery unit can keep heat (some units also moisture) outside, thus reducing air conditioning costs. With a run-around or air-fluid-air heat recovery system, heat is transferred in a hydronic coil from the exhaust air to a circulating fluid. The fluid is circulated to the hydronic coil in the makeup air where the heat is transferred to the supply air. There are 5 mechanical rooms in the building, each containing two air handling units and two exhaust fans. The equipment operates 24 hours a day to provide fresh air and exhaust to the respective spaces. The proposed ECO is based on installing run around heat recovery coils in one (1) mechanical room; E-205. The cost of this measure would be about $40,000; the savings that can be realized will be just over $2,500 per year providing a simple payback of 20 years.

3. Chiller Replacement - Air conditioning units that are over 10 years old are not very efficient. Newer models are rated with an Energy Efficiency Ratio, commonly called EER. The higher the EER, the more efficient the unit. SEER is the Seasonal Energy Efficiency Ratio, which indicates the average EER over the course of a cooling season. The energy savings of a new air conditioning system is often not enough to warrant the purchase of a new unit. However, if the air conditioner requires repair or needs replacement for another reason, the highest EER rated equipment should be purchased. The existing air cooled liquid chillers have an EER of approximately 10.4. New water cooled chillers have an EER of 16.2. Replacing the existing chillers would produce an annual savings of about $4,055. With an installed cost of about $120,000 the simple payback would be almost 30 years.

4. Energy Star Laundry Equipment - The clothes washers that are being used in the laundries are not Energy Star rated. Energy Star clothes washers are more efficient than standard efficiency washers and can offer a significant amount of energy savings. The Monroe Co. Correctional Facility has evaluated this opportunity in the past and deemed it not cost effective. The clothes washers and dryers are subjected to such high use that their life expectancy is very short. Energy Star appliances required replacement before they obtained a return on their investment.

Summary of Energy Savings Potential and Recommended Next Steps

Based on our evaluation of your facility and its operation, we believe there is potential for significant reductions in energy use and cost.

Your first priority should be to complete a thorough study of the existing systems to determine any and all deficiencies. The study should include; checking and testing of all control system components, evaluating the operation and condition of the air handling units and exhaust fans, and confirming the control system sequence of operation matches the system design. This can be accomplished through retro-commissioning and will identify the deficiencies in the systems that are causing excessive energy consumption. These deficiencies may include, excessive ventilation, no ventilation, excessive equipment run time, equipment cycling, and excessive temperature swings.

Secondly a detailed lighting audit should be completed to determine the actual fixture type and count. The audit can also identify the light levels in the spaces which will offer additional energy savings if the lighting can be reduced. The opportunity for lighting controls can also be evaluated during this audit. The detailed lighting audit will provide the facility with which fixtures can be retrofitted, which should be replaced, which should be controlled, and which should be removed. The final outcome of the audit will be the most cost effective upgrade that offers the greatest energy savings.

The next step would be to complete a motor study. This study would identity all of the electric motors in the facility and record the name plate data as well as the load data for each. This information will determine the efficiency of the existing motors and the potential savings associated with replacing them with premium efficiency motors. In addition to the energy saving aspect this study will provide the maintenance staff with a detailed list of all the motors for future maintenance.

The more capital intensive projects should be evaluated to determine their viability at this time. The chillers are original to the building and have already required a significant amount of investment. Replacing the air cooled liquid chillers to water cooled will offer a substantial energy savings, improved reliability, and reduced maintenance costs.

The boiler replacement should also be considered at this time. If the steam boilers are replaced with hot water condensing boilers that serve both the heating system and the domestic hot water, and the control system is upgraded as well, the opportunity for additional energy savings is magnified. Because the majority of the heating load is with the air handling units, a sophisticated control system can insure that the hot water return temperature keeps the boilers in the condensing mode all year. This sequence will offer the most energy savings over condensing boilers in a conventional system.

NYSERDA Funding
NYSERDA has programs available to support more detailed evaluation of ECMs and ECO through its FlexTech Program.

The Existing Facilities Program (PON 1219) offers incentives for a variety of energy projects including Pre-Qualified Measures and Performance-Based Incentives for gas and electric efficiency projects. Please contact your NYSERDA Project Manager for further details and program eligibility. Information and applications to this program can also be found at

www.nyserda.org/programs/Existing_Facilities.

Appendices

Appendix A - Application

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Appendix A – FlexTech Benchmarking Application

Applicant Information

Applicant/Company Name MONROE COUNTY DEPT. OF ENVIRONMENTAL SERVICES	Contact Name DON IRVINE
Relation to Facility OWNER	Contact Title DES OPERATION MANAGER
Address 1 50 WEST MAIN STREET	Phone and Fax (585) 760-7535 / (585) 753-7503
Address 2	E-mail Address dirvine@monroecounty.gov
City, State and Zip Code ROCHESTER, NY 14614-1228	Federal ID # or Social Security #

Facility Information
(For multiple facilities, please attach a spreadsheet containing all facility information for each site.)

Facility Name MONROE COUNTY CORRECTIONAL FACILITY	Contact Name
Address 1 750 EAST HENRIETTA RD.	Contact Title
Address 2	Phone and Fax
City, State and Zip Code ROCHESTER, NY 14623	E-mail Address
Building Manager (if not Contact)	Bld. Mngr. Phone
Facility Sector: □ Commercial Office □ Agriculture □ Healthcare □ Industrial □ Commercial Retail □ Hospitality □ Not-for-profit □ K-12 School □ Government □ College/University □ Other	
Number of Employees	Current Energy Management Program? (Y/N)
Date of Construction	Size (square feet) 96,500

Utility Information
(For multiple facilities, please attach a spreadsheet containing utility information for each site.)

Electric Distribution Provider	ROCHESTER GAS & ELECTRIC
Electricity	Annual $: 160,509 Annual kWh: 1,798,650 Peak Summer kW: 473
Electric Utility Account Number	2001-2984-108

Monroe County - Correctional Facility
FlexTech Benchmarking - FB#00129

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Electric Utility Service Classification	
Is the Applicant Facility in a Negotiated Rate Class?	☐ Yes ☒ No
Is the facility contributing to the System Benefits Charge (SBC) Program through their Electric Utility?	☒ Yes ☐ No
Natural Gas Utility (List Company Name)	ROCHESTER GAS & ELECTRIC
Natural Gas	Annual $: 96,723 Annual Therms: 119,000
Natural Gas Account Number	2001-2984-017
Natural Gas Utility Service Classification	
Is the facility contributing to the System Benefits Charge (SBC) Program through their Natural Gas Utility?	☐ Yes ☐ No
Fuel Oil	Annual $: Annual Gal.:
Other Significant Energy	Annual $: Describe:
Total Energy Cost	Annual $: 257,232

Monroe County - Correctional Facility
FlexTech Benchmarking - FB#00129

Appendix B – Interview Questionnaire

Appendix B – Building Staff Interview

BUILDING BACKGROUND

Name of Institution Monroe Co. Correctional Fac	Address 750 E. Henrietta Rd
Owner, if other than Institution Monroe Co.	Address
Name of Building Monroe Co. Correctional Facility	Building #
Address (Street or P.O. Box) 750 E. Henrietta Rd	City, State, Zip Rochester, NY 14623
Date of Audit: August 23, 2011	
Building Manager (administrator responsible for bldg.)	Bldg. Mgr.'s Phone
Energy Management Coordinator (EMC) or Monitor Bob DeCramer	EMC's Phone
Person Completing this Audit J. Short CJ Brown Energy PC	Phone (716) 565-9190

Is the building occupied by the Owner?	☒ Yes ☐ No
Does the Owner have / occupy additional buildings?	☒ Yes ☐ No
Is Owner responsible for all operating expenses?	☒ Yes ☐ No
Does Owner operate major tenant leases in 20% or more of the building space?	☐ Yes ☒ No
Has Owner participated in other utility efficiency programs and / or services?	☐ Yes ☐ No
Does Owner have an energy efficiency, sustainability or environmental impact mission statement or policy?	☐ Yes ☒ No
Who should Owner point of contact be for all communications, decision making and moving of internal decisions forward?	

GENERAL OVERVIEW

Are capital upgrades planned within next three years?	☒ Yes ☐ No
Any obvious CO/CO_2 Ventilation projects (libraries, garages, cafeterias)?	☐ Yes ☒ No
Any obvious lighting upgrades?	☒ Yes ☐ No
Is the HVAC equipment accessible for field testing?	☒ Yes ☐ No
Mechanical equipment nearing the end of its useful life?	☒ Yes ☐ No
Are VFDs installed on major equipment?	☐ Yes ☒ No

OPERATIONS STAFF

What are the working hours for the Ops Staff? M-W-F 7AM - 3PM General Maint.	
Who Does Maintenance? Monroe Co Maintenance Staff	
Does facility use Preventative Maintenance Program?	☐ Yes ☒ No
How are repairs conducted (in house, contractors, etc.)? Both in house + Outside Contractors	

CONTROLS REVIEW

Are reset schedules utilized?	☒ Yes ☐ No
Does the BMS cover the entire facility?	☐ Yes ☒ No
Is there more than one BMS system?	☐ Yes ☒ No
Can the BMS trend data?	☒ Yes ☐ No
Are local controls prevalent within the system?	☒ Yes ☐ No
Does the BMS report alarms from the field?	☒ Yes ☐ No
How are alarms reported and do field technicians respond to these? readouts	☒ Yes ☐ No
Does the master computer have sufficient capacity to store trend data?	☐ Yes ☒ No
Can operators identify units in manual bypass operation from the BMS? Some	☐ Yes ☐ No
Does the controls system representative have a contract? If so, what type? Which vendor? No contracts	
Generally, how often is the control system provider consulted, and for what reason(s)? 6 Times / year Fix after it crashes	
How often are control sensors checked and calibrated (temperature, pressure, flow)? Daily, when possible	
Have the temperature sensors controlling variables in a control loop been calibrated within the last two years? Some	☐ Yes ☐ No
How many control system upgrades have been performed? 2 or 3	obsolete
Do you use trends?	☒ Yes ☐ No
Are trends set up for troubleshooting?	☒ Yes ☐ No
Are system screens comprehensive and cover multiple monitoring points?	☒ Yes ☐ No
Does a review of system screens identify any problems with the system?	☒ Yes ☐ No
Will this project require the use of local trends?	☐ Yes ☐ No
Which operating parameters modified by building operators?	✓ Setpoints ✓ Operating schedules ✓ Trends __ Control algorithms __ Others (please list)

Please list any additional notes, comments, and observations.

OPERATIONS HISTORY

Does your heating or cooling system have the capacity to meet the load during peak periods? If not, what do you do during these periods? Yes, 100% redundant, Lead / Lag

Do you feel any HVAC equipment is oversized / undersized? If so, how do you compensate? Eauipment is adequate
Is the building mechanical equipment scheduled to start up simultaneously, or is the startup staged? Staged Startup
What HVAC adjustments do you make to unoccupied areas or spaces (turn off HVAC, adjust thermostat to minimum heating and cooling, close off diffuser, etc.)? Turn on / off HVAC, Adjust thermostats
Do you feel the building is well balanced? If not, how do you compensate? yes
Do you receive comfort complaints? If so, please explain the nature of the complaints? What areas do the complaints come from? yes Hot / cold / Humidity All Areas
What are some recent energy conservation measures that have been implemented? Were they implemented successfully? Are there any energy conservation measures that you think should be implemented? None
Additional topics discussed: Many complaints for temperature / Comfort
Additional topics discussed: Pneumatic Control Air dryer failed, filled the system with moisture, thermostats are being replaced.

Appendix C – Current Facility Requirements

Appendix D – Issues Database

Appendix E – Master List of ECMs

Appendix E - Master List of ECMs

Monroe County Correctional Facility

Issue #	ECM Description	ECM Status [1]	Fuel Type Saved	Energy Savings kWh Year	kW Month	MMBtu Year	Annual Dollars Saved	Estimated Implementation Cost	Simple Payback Period
1,2,4	Temperature Control	R	Electricity	27,223	0.0	349.5	$ 4,455	$ 75,000	16.8
3	Night Temperature Setback	R	Natural Gas	0	0.0	392.1	$ 3,187	$ 600	0.2
5	Control Dhw Circulating Pump	R	Natural Gas	0	0.0	36.7	$ 298	$ 0	0.0
6	Lighting Retrofit	R	Electricity	69,560	13.7	0.0	$ 6,124	$ 21,875	3.6
7	Install Premium Efficiency Motors	R	Electricity	38,240	5.7	0.0	$ 2,956	$ 14,580	4.9
8	Install Variable Speed Drive To Control Hot Water Pump	R	Electricity	17,969	0.0	0.0	$ 1,065	$ 6,000	5.6
9	Replace Inlet Guide Vanes With Variable Frequency Drive	R	Electricity	8,104	0.0	0.0	$ 723	$ 4,150	5.7
10	Vary Exhaust Hood Flow Based On Cooking Activity	R	Electricity	9,214	0.0	388.8	$ 3,707	$ 18,000	4.9
11	Replace Old Refrigerator	R	Electricity	1,089	0.0	0.0	$ 65	$ 540	8.4
12	Convert Booster Heater From Electricity To Natural Gas	R	Electricity	42,345	10.0	(160.5)	$ 2,671	$ 8,850	3.3
13	Install More Efficient Boilers	R	Natural Gas	0	0.0	1,333.5	$ 10,839	$ 80,500	7.4
ECO	Install Variable Speed Drive To Control Chilled Water Pump	RS	Electricity	14,324	0.0	0.0	$ 849	$ 12,600	14.8
ECO	Recover Heat From Building Exhaust	RS	Electricity	(4,295)	0.0	361.8	$ 2,592	$ 40,200	15.5
ECO	Chiller Replacement	RS	Electricity	45,437	13.8	0.0	$ 3,619	$ 120,000	33.2
	Totals	I ECMs & ECOs		269,212	43.1	2,701.9	$ 43,150	$ 402,895	9.3
		Issues 1-13 only		213,745	29.3	2,340.1	$ 36,090	$ 230,095	6.4

[1] For Status, R = Recommended; I = Implemented; NR = Not Recommended; RS = Further Study Required

EPA Portfolio Manager Statement of Energy Performance

The Statement of Energy Performance and Data Checklist provide a comparative view of your facility's energy performance and environmental impact for the selected 12-month period.

The Statement of Energy Performance consists of the following elements:

- Data Checklist -provides a summary of a property's physical and operating characteristics, as well as its total energy consumption.
- Facility Summary
- Energy Star Score

The Statement of Energy Performance is followed by the EPA Portfolio Manager electronic confirmation receipt demonstrating account has been shared with the NYSERDA Master Account.

STATEMENT OF ENERGY PERFORMANCE
Monroe County Corrections Facility

Building ID: 2877841
For 12-month Period Ending: July 31, 2011[1]
Date SEP becomes ineligible: N/A

Date SEP Generated: October 14, 2011

Facility
Monroe County Corrections Facility
750 East Henrietta Road
Rochester, NY 14623

Facility Owner
Monroe County
50 West Main St. City Place
Rochester, NY 14623

Primary Contact for this Facility
Donald Irvine
50 West Main St. City Place
Rochester, NY 14623

Year Built: 1990
Gross Floor Area (ft²): 105,800

Energy Performance Rating[2] (1-100) 19

Site Energy Use Summary[3]	
Electricity - Grid Purchase(kBtu)	5,905,636
Natural Gas (kBtu)[4]	12,368,391
Total Energy (kBtu)	18,274,027

Energy Intensity[5]	
Site (kBtu/ft²/yr)	173
Source (kBtu/ft²/yr)	309

Emissions (based on site energy use)	
Greenhouse Gas Emissions ($MtCO_2e$/year)	1,195

Electric Distribution Utility
Rochester Gas & Electric Corp [Iberdrola SA]

National Average Comparison	
National Average Site EUI	118
National Average Source EUI	211
% Difference from National Average Source EUI	47%
Building Type	Residence Hall/Dormitory

Stamp of Certifying Professional

Based on the conditions observed at the time of my visit to this building, I certify that the information contained within this statement is accurate.

Meets Industry Standards[6] **for Indoor Environmental Conditions:**

Ventilation for Acceptable Indoor Air Quality	**N/A**
Acceptable Thermal Environmental Conditions	**N/A**
Adequate Illumination	**N/A**

Certifying Professional
N/A

Notes:
1. Application for the ENERGY STAR must be submitted to EPA within 4 months of the Period Ending date. Award of the ENERGY STAR is not final until approval is received from EPA.
2. The EPA Energy Performance Rating is based on total source energy. A rating of 75 is the minimum to be eligible for the ENERGY STAR.
3. Values represent energy consumption, annualized to a 12-month period.
4. Values represent energy intensity, annualized to a 12-month period.
5. Based on Meeting ASHRAE Standard 62 for ventilation for acceptable indoor air quality, ASHRAE Standard 55 for thermal comfort, and IESNA Lighting Handbook for lighting quality.

The government estimates the average time needed to fill out this form is 6 hours (includes the time for entering energy data, Licensed Professional facility inspection, and notarizing the SEP) and welcomes suggestions for reducing this level of effort. Send comments (referencing OMB control number) to the Director, Collection Strategies Division, U.S., EPA (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460.

ENERGY STAR® Data Checklist for Commercial Buildings

In order for a building to qualify for the ENERGY STAR, a Professional Engineer (PE) or a Registered Architect (RA) must validate the accuracy of the data underlying the building's energy performance rating. This checklist is designed to provide an at-a-glance summary of a property's physical and operating characteristics, as well as its total energy consumption, to assist the PE or RA in double-checking the information that the building owner or operator has entered into Portfolio Manager.

Please complete and sign this checklist and include it with the stamped, signed Statement of Energy Performance.
NOTE: You must check each box to indicate that each value is correct, OR include a note.

CRITERION	VALUE AS ENTERED IN PORTFOLIO MANAGER	VERIFICATION QUESTIONS	NOTES	☑
Building Name	Monroe County Corrections Facility	Is this the official building name to be displayed in the ENERGY STAR Registry of Labeled Buildings?		☐
Type	Residence Hall/Dormitory	Is this an accurate description of the space in question?		☐
Location	750 East Henrietta Road, Rochester, NY 14623	Is this address accurate and complete? Correct weather normalization requires an accurate zip code.		☐
Single Structure	Single Facility	Does this SEP represent a single structure? SEPs cannot be submitted for multiple-building campuses (with the exception of acute care or children's hospitals) nor can they be submitted as representing only a portion of a building		☐
Monroe County Corrections Facility (Residence Hall/Dormitory)				
CRITERION	**VALUE AS ENTERED IN PORTFOLIO MANAGER**	**VERIFICATION QUESTIONS**	**NOTES**	☑
Gross Floor Area	105,800 Sq. Ft.	Does this square footage include all supporting functions such as kitchens and break rooms used by staff, storage areas, administrative areas, elevators, stairwells, atria, vent shafts, etc. Also note that existing atriums should only include the base floor area that it occupies. Interstitial (plenum) space between floors should not be included in the total. Finally gross floor area is not the same as leasable space. Leasable space is a subset of gross floor area.		☐
Number of Rooms	146	Is this the total number of lodging rooms available in the Residence Hall/Dormitory? This count includes occupied rooms, non-occupied rooms, rooms in the process of being renovated, and permanent house use. On average there are 2.5 lodging rooms per 1,000 square feet of gross building floor area. Thus, a 100,000 square foot residence hall/dormitory building, for example, contains 250 rooms on average.		☐
Percent Cooled	80 %	Is this the percentage of the total floor space within the facility that is served by mechanical cooling equipment?		☐
Percent Heated	100 %	Is this the percentage of the total floor space within the facility that is served by mechanical heating equipment?		☐
Dorm Computer Lab	No(Optional)	Does this Residence Hall/Dormitory contain a computer lab? This is defined as a space specifically designed and equipped with at least 10 personal computers and associated peripherals such as printers for the use of the occupants.		☐
Dorm Dining Hall	No(Optional)	Does this Residence Hall/Dormitory also contain a dining hall within the building? This is a space specifically dedicated to food preparation such as a bakery, lunch counter, restaurant, or other food service activity. This does not include student or occupant lounges or galleys that have food preparation equipment and/or vending machines.		☐

ENERGY STAR® Data Checklist for Commercial Buildings

Energy Consumption

Power Generation Plant or Distribution Utility: Rochester Gas & Electric Corp [Iberdrola SA]

Fuel Type: Electricity

Meter: Electric Meter (kWh (thousand Watt-hours))
Space(s): Monroe County Corrections Facility
Generation Method: Grid Purchase

Start Date	End Date	Energy Use (kWh (thousand Watt-hours))
06/28/2011	07/27/2011	194,250.00
05/27/2011	06/27/2011	151,200.00
04/28/2011	05/26/2011	122,850.00
03/29/2011	04/27/2011	127,050.00
02/26/2011	03/28/2011	119,700.00
01/28/2011	02/25/2011	117,600.00
12/30/2010	01/27/2011	121,800.00
11/30/2010	12/29/2010	136,500.00
10/27/2010	11/29/2010	119,700.00
09/28/2010	10/26/2010	170,100.00
08/27/2010	09/27/2010	197,400.00
Electric Meter Consumption (kWh (thousand Watt-hours))		**1,578,150.00**
Electric Meter Consumption (kBtu (thousand Btu))		**5,384,647.80**
Total Electricity (Grid Purchase) Consumption (kBtu (thousand Btu))		**5,384,647.80**
Is this the total Electricity (Grid Purchase) consumption at this building including all Electricity meters?		☐

Fuel Type: Natural Gas

Meter: Gas Meter (therms)
Space(s): Monroe County Corrections Facility

Start Date	End Date	Energy Use (therms)
06/27/2011	07/26/2011	4,320.00
05/27/2011	06/26/2011	5,160.00
04/27/2011	05/26/2011	6,440.00
03/27/2011	04/26/2011	8,340.00
02/27/2011	03/26/2011	13,680.00
01/27/2011	02/26/2011	18,110.00
12/27/2010	01/26/2011	16,840.00
11/27/2010	12/26/2010	15,750.00
10/27/2010	11/26/2010	11,670.00
09/27/2010	10/26/2010	8,790.00
08/27/2010	09/26/2010	4,980.00

Gas Meter Consumption (therms)	**114,080.00**
Gas Meter Consumption (kBtu (thousand Btu))	**11,408,000.00**
Total Natural Gas Consumption (kBtu (thousand Btu))	**11,408,000.00**
Is this the total Natural Gas consumption at this building including all Natural Gas meters?	☐

Additional Fuels	
Do the fuel consumption totals shown above represent the total energy use of this building? Please confirm there are no additional fuels (district energy, generator fuel oil) used in this facility.	☐

On-Site Solar and Wind Energy	
Do the fuel consumption totals shown above include all on-site solar and/or wind power located at your facility? Please confirm that no on-site solar or wind installations have been omitted from this list. All on-site systems must be reported.	☐

Certifying Professional

(When applying for the ENERGY STAR, the Certifying Professional must be the same PE or RA that signed and stamped the SEP.)

Name: _____ Date: _____

Signature: _____

Signature is required when applying for the ENERGY STAR.

FOR YOUR RECORDS ONLY. DO NOT SUBMIT TO EPA.

Please keep this Facility Summary for your own records; do not submit it to EPA. Only the Statement of Energy Performance (SEP), Data Checklist and Letter of Agreement need to be submitted to EPA when applying for the ENERGY STAR.

Facility
Monroe County Corrections Facility
750 East Henrietta Road
Rochester, NY 14623

Facility Owner
Monroe County
50 West Main St. City Place
Rochester, NY 14623

Primary Contact for this Facility
Donald Irvine
50 West Main St. City Place
Rochester, NY 14623

General Information

Monroe County Corrections Facility	
Gross Floor Area Excluding Parking: (ft^2)	105,800
Year Built	1990
For 12-month Evaluation Period Ending Date:	July 31, 2011

Facility Space Use Summary

Monroe County Corrections Facility	
Space Type	Residence Hall/Dormitory
Gross Floor Area(ft^2)	105,800
Number of Rooms	146
Percent Cooled	80
Percent Heated	100
Dorm Computer Lab[o]	N
Dorm Dining Hall[o]	N

Energy Performance Comparison

	Evaluation Periods		Comparisons		
Performance Metrics	**Current** (Ending Date 07/31/2011)	**Baseline** (Ending Date 07/31/2011)	**Rating of 75**	**Target**	**National Average**
Energy Performance Rating	19	19	75	N/A	50
Energy Intensity					
Site (kBtu/ft^2)	173	173	86	N/A	118
Source (kBtu/ft^2)	309	309	153	N/A	211
Energy Cost					
$/year	$ 234,271.14	$ 234,271.14	$ 116,009.79	N/A	$ 159,644.01
$/$ft^2$/year	$ 2.21	$ 2.21	$ 1.09	N/A	$ 1.51
Greenhouse Gas Emissions					
$MtCO_2e$/year	1,195	1,195	592	N/A	814
$kgCO_2e/ft^2$/year	11	11	5	N/A	8

More than 50% of your building is defined as Residence Hall/Dormitory. Please note that your rating accounts for all of the spaces listed. The National Average column presents energy performance data your building would have if your building had an average rating of 50.

Notes:
o - This attribute is optional.
d - A default value has been supplied by Portfolio Manager.

Statement of Energy Performance

2011

Monroe County Corrections Facility
750 East Henrietta Road
Rochester, NY 14623

Portfolio Manager Building ID: 2877841

The energy use of this building has been measured and compared to other similar buildings using the Environmental Protection Agency's (EPA's) Energy Performance Scale of 1–100, with 1 being the least energy efficient and 100 the most energy efficient. For more information, visit energystar.gov/benchmark.

This building's score

19

1	50	100
Least Efficient	Average	Most Efficient

This building uses 309 kBtu per square foot per year.*

*Based on source energy intensity for the 12 month period ending July 2011

Buildings with a score of 75 or higher may qualify for EPA's ENERGY STAR.

I certify that the information contained within this statement is accurate and in accordance with U.S. Environmental Protection Agency's measurement standards, found at energystar.gov

Date of certification

EPA United States Environmental Protection Agency

Date Generated: 10/14/2011

Energy Use and Cost Analysis by Energy Type

ELECTRICITY CONSUMPTION AND COST ANALYSIS

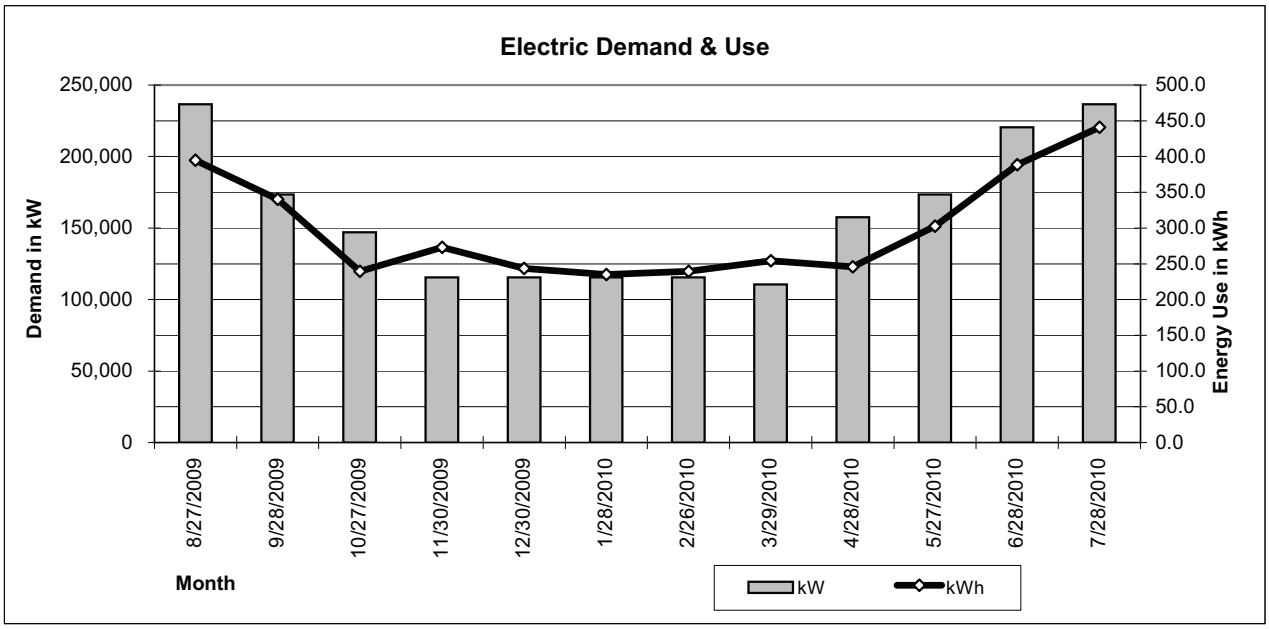
Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.
Gross Area: 105,800 sq. ft.
58,006 Btu/SF/Yr
4.5 watts/s.f.

Utility: **RG&E**
Account # **2001-2984-108**
Rate: **SC8 Primary**
Meter Charge: **$ 587.00** / month
Demand Charge: **$ 12.21** / kW
Supplier:
Supplier Acct. #
Taxes: **0.00000%**

Month Ending	Days	Usage Energy kWh	Usage Demand kW	RG&E Charges Supply Cost	RG&E Charges Utility Costs	Total Electric Cost	Demand Cost	Energy $/kWh	Load Factor
7/28/2010	**30**	**220,500**	**473.0**	**$ 0**	**$ 22,368**	**$ 22,368**	$ 5,775	$ 0.073	0.65
6/28/2010	**30**	**194,250**	**441.0**	**$ 0**	**$ 19,867**	**$ 19,867**	$ 5,385	$ 0.072	0.61
5/27/2010	**32**	**151,200**	**347.0**	**$ 0**	**$ 14,994**	**$ 14,994**	$ 4,237	$ 0.067	0.57
4/28/2010	**29**	**122,850**	**315.0**	**$ 0**	**$ 11,676**	**$ 11,676**	$ 3,846	$ 0.059	0.56
3/29/2010	**30**	**127,050**	**221.0**	**$ 0**	**$ 9,676**	**$ 9,676**	$ 2,698	$ 0.050	0.80
2/26/2010	**31**	**119,700**	**231.0**	**$ 0**	**$ 9,673**	**$ 9,673**	$ 2,821	$ 0.052	0.70
1/28/2010	**29**	**117,600**	**231.0**	**$ 0**	**$ 10,484**	**$ 10,484**	$ 2,821	$ 0.060	0.73
12/30/2009	**29**	**121,800**	**231.0**	**$ 0**	**$ 10,083**	**$ 10,083**	$ 2,821	$ 0.055	0.76
11/30/2009	**30**	**136,500**	**231.0**	**$ 0**	**$ 9,695**	**$ 9,695**	$ 2,821	$ 0.046	0.82
10/27/2009	**34**	**119,700**	**294.0**	**$ 0**	**$ 10,206**	**$ 10,206**	$ 3,590	$ 0.050	0.50
9/28/2009	**29**	**170,100**	**347.0**	**$ 0**	**$ 13,969**	**$ 13,969**	$ 4,237	$ 0.054	0.70
8/27/2009	**32**	**197,400**	**473.0**	**$ 0**	**$ 17,819**	**$ 17,819**	$ 5,775	$ 0.058	0.54
	365	**1,798,650**	**3,835**	**$ 0**	**$ 160,509**	**$ 160,509**	$ 46,825	$ 0.059	0.64

Annual Energy: **1,798,650 kWh / year** **$ 160,509 /year**
Peak Demand: **473 kW Peak**
Average Demand: **320 kW**

Unit Costs
Demand **$ 12.21 $/kW**
Energy **$ 0.059 $/kWh Incremental**
Blended **$ 0.089 $/kWh Blended**



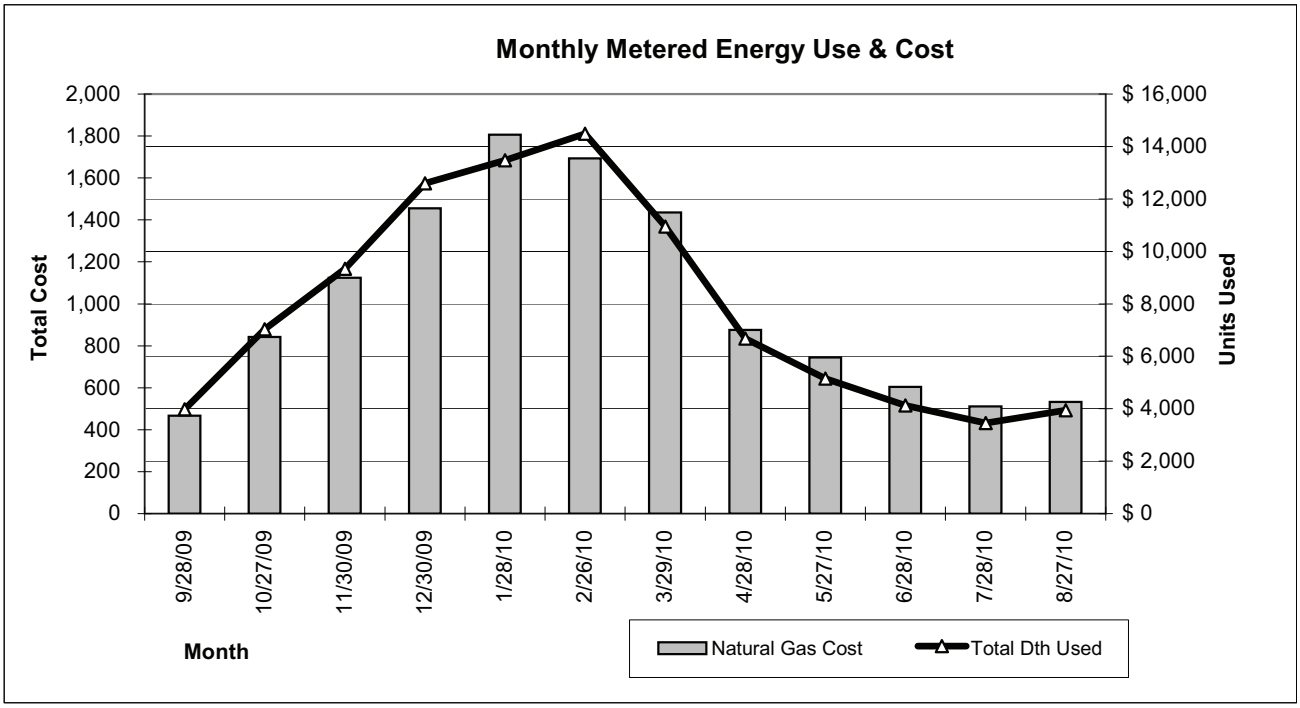
NATURAL GAS CONSUMPTION AND COST ANALYSIS

Client: Monroe County Correctional Facility
Address: 750 East Henrietta Rd.
Gross Area: 105,800 sq. ft.
112,476 Btu/SF/Yr

Utility: **Rochester Gas & Electric**
Account # **2001-2984-017**
Rate:
Billing unit: **Dth**
BTU/Unit: **1,000,000**
Meter Charge: / month
Supplier:

Natural Gas
Use & Cost Summary:

Month Ending	# Days	Utility Charges Dths	Utility Charges Cost	Supplier Charges Dths	Supplier Charges Cost	Total Dth Used	Total Natural Gas Cost	Incremental $/Dth
8/27/10	**30**	**492**	$ 4,264		**$ 0**	492	**$ 4,264**	$ 8.67
7/28/10	**30**	**432**	$ 4,088		**$ 0**	432	**$ 4,088**	$ 9.46
6/28/10	**30**	**516**	$ 4,832		**$ 0**	516	**$ 4,832**	$ 9.36
5/27/10	**32**	**644**	$ 5,958		**$ 0**	644	**$ 5,958**	$ 9.25
4/28/10	**29**	**834**	$ 7,004		**$ 0**	834	**$ 7,004**	$ 8.40
3/29/10	**30**	**1,368**	$ 11,481		**$ 0**	1,368	**$ 11,481**	$ 8.39
2/26/10	**31**	**1,811**	$ 13,544		**$ 0**	1,811	**$ 13,544**	$ 7.48
1/28/10	**29**	**1,684**	$ 14,448		**$ 0**	1,684	**$ 14,448**	$ 8.58
12/30/09	**29**	**1,575**	$ 11,638		**$ 0**	1,575	**$ 11,638**	$ 7.39
11/30/09	**30**	**1,167**	$ 8,989		**$ 0**	1,167	**$ 8,989**	$ 7.70
10/27/09	**34**	**879**	$ 6,738		**$ 0**	879	**$ 6,738**	$ 7.67
9/28/09	**29**	**498**	$ 3,739		**$ 0**	498	**$ 3,739**	$ 7.51
	363	**11,900**	**$ 96,723**	**0**	**$ 0**	**11,900**	**$ 96,723**	$ 8.13

NOTE: Italicized entries are estimated.

Annual Natural Gas Cost	**$ 96,723**	**/year**
Annual Natural Gas Consumption	**11,900**	**Dth**
Average Unit Cost per Dth:	**$ 8.128**