Cherry Hill Energy Audit Summary

Recommendations completed and/or are in the pipeline

TOWN HALL

Lighting Replacements
A comprehensive fixture survey was conducted of the entire building. Each switch and circuit was identified, and the number of fixtures, locations, and existing wattage established. The majority of lighting consists of fluorescent 34 watt T-12 lamps. The existing base case lighting energy consumption was calculated and compared to the proposed lighting replacements. Existing exit signs presently utilize high efficiency LED technology and most original incandescent lighting has been replaced with energy efficient compact fluorescent fixtures.

Install Occupancy Sensors
It is proposed that occupancy sensors be installed in selected rooms to turn off lights when the area is unoccupied which will save electricity, and indirectly decrease energy usage by reduced cooling loads. A lighting survey was conducted of all fixtures to determine the average time lights are presently on in the spaces, and analysis performed to determine the benefits of utilizing occupancy sensors to turn off lighting while the space is unoccupied. Occupancy sensors were not considered in mechanical areas due to safety concerns. Other areas were also not considered due to the proposed location of the occupancy sensor. If a sensor does not have a clear view of the room, it may darken even with people in the space creating an unsafe condition. Low use areas were also not considered due to the long payback of a sensor installation. The sensors could be mounted in place of the existing switches, on the ceiling, or directly on the light fixtures.

Lighting Replacements with Occupancy Sensors
This measure is a combination of ECMs 1and 2 to allow for maximum energy and demand reduction. Due to interactive effects, the energy and cost savings for occupancy sensors and lighting upgrades are not cumulative.

Install DDC System with Night Setback
The existing thermostats are analog and, therefore, not programmable. Based on discussions with the facility maintenance staff, several thermostats are not calibrated properly and/or do not function correctly.
Installation of a direct digital control (DDC) system with programmable occupied/unoccupied period will allow each area to be conditioned only when necessary. The programmable system also has the ability to “learn” how an area responds to heating and cooling demands and optimize the control sequences to minimum the energy usage without sacrificing occupant comfort.

ECM-6 VAV Conversion
The HVAC system serving the original portion of the building is comprised of a constant volume rooftop air handler, packaged terminal air conditioners, perimeter fin tube radiation, and hot water unit heaters. The police station portion of the facility, which was constructed in the mid 1990s, is conditioned by a variable air volume (VAV) HVAC system. VAV systems are comprised of a central air handler, duct distribution system, and variable air volume terminal units (or boxes). Individual zone control is provided by the VAV boxes. The air handler provides air at a temperature of 55°F to each VAV box at a minimum

airflow rate to meet the ventilation requirements of the individual zones. As the cooling demand of an individual zone increases, the associated VAV box modulates to allow more air to the zone up to the maximum flow rate of the box. On a call for heating, the VAV box reduces the airflow back to the minimum position; and if the heating demand still exists, a hot water control valve is modulated to provide heating hot water to a heating coil located within the associated VAV box. The HVAC controls use a static duct pressure sensor located within the duct distribution system to vary the airflow delivery by the air handler in response to the modulation of the system airflow by the individual VAV boxes. This type of system provides energy savings over a constant volume air handling system by utilizing the minimum quantity of air necessary to meet the code-required ventilation rates, and the heating and cooling demands of the individual spaces. This ECM proposes to replace the existing HVAC systems within the building with a VAV system designed to serve the entire facility.

Solar
The municipal building was evaluated for the potential to install rooftop photovoltaic (PV) solar panels for power generation. Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. A structural analysis would be required to determine if the roof framing could support a cell array.

DPW:

CFL lamps
The existing lighting inventory contained a total of 15 inefficient incandescent and halogen lamps. SWA recommends that each lamp is replaced with a more efficient, Compact Fluorescent Lamp (CFL).

Programmable Thermostats in Garage
The garage area is the largest user of heat in the DPW building and contains 12 gas fired unit heaters which are controlled from manual thermostats. The temperature is continuously maintained at 72 deg F throughout the winter. There is no temperature setback to reduce energy consumption during unoccupied periods of time, such as evenings and weekends. Programmable thermostats offer an easy way to save energy by turning the thermostat back to 52 deg F during weekends and after hours on weekdays – this is called setback. SWA recommends installing 12 programmable thermostats, one for each of the unit heaters.

LED Exit Signs
The building contains five incandescent exit signs. SWA recommends replacing these exit signs with newer, more efficient LED models. Exit signs present a good opportunity for savings since they are operated 24 hours per day.

T12 toT8 Retrofit Kits
The existing lighting inventory contained one hundred and twenty-one inefficient T12 fluorescent fixtures with magnetic ballasts. SWA recommends replacing each existing fixture with more efficient T8 fluorescent fixtures with electronic ballasts through retrofit kits. Retrofitted T8 fixtures with electronic ballasts provide equivalent or better light output while reducing energy consumption by 30% when compared to a T12 fixture with magnetic ballast.

Occupancy Sensors

The building contains four areas that could benefit from the installation of four occupancy sensors. These areas consisted of various offices that are used sporadically throughout the day and could show energy savings by having the lights turn off after a period of no occupancy. Typically, occupancy sensors have an adjustable time delay that shuts down the lights automatically if no motion is detected within a set time period. Advanced micro-phonic lighting sensors include sound detection as a means to controlling lighting operation.

T8 Fluorescent Fixtures
The existing lighting inventory contained thirty inefficient T12 fluorescent fixtures with magnetic ballasts. SWA recommends replacing each existing fixture with more efficient T8 fluorescent fixtures with electronic ballasts. T8 fixtures with electronic ballasts provide equivalent or better light output while reducing energy consumption by 30% when compared to a T12 fixture with magnetic ballast.

Solar
Present technology incorporates the use of solar cell arrays that produce direct current (DC) electricity. This DC current is converted to alternating current (AC) with the use of an electrical device known as an inverter. The building's roof has sufficient room to install a large solar cell array. A structural analysis would be required to determine if the roof framing could support a cell array.

LIBRARY

CFL Lamps
The existing lighting inventory contained a total of 121 inefficient incandescent and halogen lamps. SWA recommends that each lamp is replaced with a more efficient, Compact Fluorescent Lamp (CFL). CFLs are capable of providing equivalent or better light output while using less power.

Occupancy Sensors
The building contains thirteen areas that could benefit from the installation of twenty occupancy sensors. These areas consisted of various meeting rooms and offices that are used sporadically throughout the day and could show energy savings by having the lights turn off after a period of no occupancy. Typically, occupancy sensors have an adjustable time delay that shuts down the lights automatically if no motion is detected within a set time period. Advanced micro-phonic lighting sensors include sound detection as a means to controlling lighting operation.

Bi-Level Lighting Fixtures
The court house contains 12 wall-mounted stairwell circline fluorescent lighting fixtures that are operated 24 hours per day. New technology called bi-level lighting, combines fluorescent lighting fixtures with an occupancy sensor. These efficient light fixtures operate at a minimal light level in order to meet code and safety requirements and power up to a higher level when any motion is detected in the stairwells. The library would be an appropriate application for these fixtures since the stairwells are rarely used.

Metal Halide Fixtures
The existing lighting inventory contained seventeen inefficient high pressure sodium fixtures. SWA recommends replacing them with more efficient, Pulse Start Metal Halide fixtures with electronic ballasts. Pulse Start Metal Halide fixtures with electronic ballasts provide equivalent or better light output while reducing energy consumption by 30% when compared to metal halide or high pressure sodium fixtures.