REPORT TO GOVERNOR M. JODI RELL

On Energy Efficiency Opportunities At State Facilities

Department of Public Utility Control
Office of Consumer Counsel
Energy Conservation Management Board

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I. Executive Summary – Findings and Recommendations

In mid December 2004, the Governor directed the Department of Public Utility Control (DPUC), the Office of Consumer Counsel (OCC), and the Energy Conservation Management Board (ECMB) (collectively the Working Group) to prepare a report on opportunities to reduce electric consumption at state facilities, which, if implemented, would reduce the impact of the recent increase in electric rates on the state budget. In response to that directive, the Working Group presents the following findings and recommendations.

In summary, the State of Connecticut has focused on reducing energy use in state facilities in varying degrees at different points in time. While many of these efforts have yielded significant energy savings, there are considerable opportunities for additional savings that remain untapped. The Working Group believes that many of these energy saving initiatives can be implemented quickly and involve little or no upfront financial investment relative to the savings that can be achieved.

In addition, it does not appear that the state has developed a comprehensive energy efficiency plan for its agencies that would yield sustained energy efficiency and conservation by fostering a culture of energy efficiency throughout state government. Therefore, in order for the state to lead by example, a key goal must be to develop, implement, and sustain just such a plan. If language is crafted that merely repeats earlier efforts, it will again fail to capture and sustain the levels of energy efficiency that are achievable within state government.

Energy efficiency and conservation do not require sacrifice. Rather, by having the State use energy more wisely, it will reduce its costs without impacting personnel or the services they deliver. A simple example is turning off lights and electronic equipment when they are not needed. It is important to recognize investments in energy efficient equipment and buildings return $3 for each $1 spent, thereby providing benefits which far exceed any additional cost. In addition, these investments have a positive impact on economic development in Connecticut.

A. Findings[1]

Energy and Electricity Costs for the State

- ✓ The state spends between $80 and $100 million annually for its energy needs;
- ✓ Electricity represents about 70% of this cost;
- ✓ Based on the increase in the cost of electricity that became effective on January 1, 2005, the state's cost for electricity will increase more than 10%;
- ✓ The cost of electricity will increase further in 2006 because of additional federally imposed costs, such as Locational Installed Capacity (LICAP);
- ✓ Nearly half (45%) of all energy consumed by the state is used at higher education facilities;
- ✓ The vast majority of the remaining energy consumption (greater than 50%) is used by 13 state agencies.

Current Status of Conservation Initiatives

- ✓ Of the total 86 state agencies, six have a formal written energy plan. A few others have an energy plan, but it is not a formal written document, while the remaining agencies would like assistance in developing an energy plan;
- ✓ Efforts have been made since 1979 to reduce energy use in state buildings;
- ✓ While there have been successes since that time, the potential to achieve and sustain maximum energy efficiency has not been realized;
- ✓ Energy efficiency measures undertaken for state of Connecticut properties between 1990 and 2001 included at least $48 million for electricity-related projects, resulting in estimated lifetime savings of 2 billion kWhs worth $153 million in savings. These estimates provide a return of $3.15 for each dollar that was invested;
- ✓ During that same period of time, the state spent $1.6 million for projects involving natural gas, producing estimated lifetime monetary savings of $3 million (and an unspecified amount of energy) and a return of $1.88 for each dollar invested.

Opportunities to Reduce Electric Consumption

- ✓ The current focus on energy-related issues provides the state with an opportunity to take a leadership role in promoting a culture of energy efficiency within the ranks of state government that will hopefully inspire action by the public and business sectors;
- ✓ This report recommends immediate, medium and longer term energy efficiency actions;

[1] These findings are based on reports by the Office of Policy and Management and the Legislative Program Review and Investigation Committee referenced on page 4.

- ✓ The attached Case Study illustrates many types of cost effective strategies that can be implemented rather easily to achieve the recommended goals;
- ✓ Connecticut can lead by example and become a model for energy efficiency at home and throughout the region.

Coordination of Energy Management

- ✓ State-wide, there is no single agency responsible for energy-related decisions;
- ✓ A single point of contact would facilitate the success of an energy efficiency plan.

B. Recommendations

Goals

- ✓ Take immediate steps to reduce the state's electric consumption by 10% for 2005, thereby working to hold electric costs at current levels; [2]
- ✓ Set a goal of an additional 5% reduction in electric consumption for 2006 to offset additional increases in the cost of electricity that will likely occur as the result of additional federally imposed costs, such as LICAP;
- ✓ Energy savings goals should be embedded in the energy budget of each agency.

Leadership

- ✓ Lead "from the top" to instill a culture of energy efficiency throughout state government;
- ✓ Promote energy efficiency through Executive Orders, an energy plan and outreach;
- ✓ Recruit all government leaders to promote and sustain a culture of energy efficiency.

Implementation

- ✓ Create a single point of contact for the planning and responsibility of energy efficiency for all state agencies. Create awareness of available C&LM funding and DPW programs among all state agencies;
- ✓ Direct state agency energy contacts to call their respective utility C&LM program administrator to complete an Energy Efficiency Report Card during 2005;
- ✓ Direct state agency contacts to call their respective utility account executive to complete a Most Beneficial Rate Analysis;
- ✓ Examine ways to encourage the use of Public Act 90-130, An Act Establishing a Shared Energy Savings Program, which allows agencies to retain funds earned through reductions to energy-related expenses.

[2] This report focuses on reducing electricity costs in response to Governor Rell's letter. In addition, there are opportunities for the state to reduce other energy costs, including natural gas and oil costs.

II. Introduction and Background

Given the limited timeframe that was provided, the Working Group did not attempt to quantify energy savings based on an inventory of measures, such as lighting fixtures, vending machines, etc. Instead, this report provides recommendations based on information contained in a report that was prepared by the Legislative Program Review and Investigations Committee in October 2002 titled "Energy Management By State Government," a report prepared by the Office of Policy and Management (OPM Report) in early 2004 titled "Energy Management in State Facilities: A New Direction," discussions with staff at OPM and DPW and the collective experience of the Working Group. The OPM Report was based on an energy survey that was sent to all state agencies in late 2003. OPM provided the survey responses to the Working Group. The responses include information that the Working Group had intended to request from each state agency.[3] However, since this information had been submitted to OPM in late 2003, the Working Group concluded that the data was timely and that it was unnecessary to contact state agency heads. In a letter dated January 20, 2005, (attached, see Appendix) the Working Group informed all state agency heads of this decision.

Conservation programs and initiatives attempt to modify the way people and agencies do things, essentially trying to change the choices made in purchasing, maintaining and using equipment and in constructing and remodeling buildings. For example, as conservation and load management initiatives work to transform the retail lighting market, they try to change the behavior (in the form of buying patterns) of customers. Instead of reaching for an incandescent bulb when a replacement light is needed, conservation programs encourage a consumer to purchase a compact fluorescent light (CFL) by offering a discount on the products or otherwise trying to influence customer choice.

The Working Group sought to identify immediate energy savings that may be available to state agencies in order to provide suggestions as to how individual agencies could achieve the recommended 10% reduction in electric consumption in 2005. The Working Group chose Ten Franklin Square in New Britain, as an example for its Case Study. Ten Franklin Square was built in 1995, and as such, is essentially a new building. Even with this, the Working Group identified immediate, low cost, potential energy savings at this location that could reduce electric consumption by about 11%. The Case Study is attached as an Appendix.

[3] The Working Group wishes to acknowledge the cooperation and continuing efforts of OPM and DPW to further the state's energy efficiency efforts and assistance to the Working Group in preparing this report.

III. Summary of the Working Group's Recommendations

Most Beneficial Rate Analysis

- ✓ Each agency should contact its utility account executive to request that a Most Beneficial Rate (MBR) analysis be performed for all agency electric accounts. An MBR is intended to assure that each account is being billed under the rate schedule that provides the lowest overall cost. There is no cost for this analysis.

Create a Single Point of Contact for Energy Efficiency at All State Agencies

- ✓ At present, the responsibility for energy-related decisions at state facilities does not reside with a single agency or group of individuals;
- ✓ The state should centralize the planning and responsibility for energy efficiency at state facilities;
- ✓ Personnel having expertise in the field of energy efficiency are essential to the sustained success of this initiative.

Assign the Responsibility for Energy Efficiency to Management at Each Agency

- ✓ At the agency level, while there may be one person who is responsible for the cost of energy, i.e., the billing, there does not appear to be an individual that is responsible for energy efficiency or for enforcement of the State's energy-related policies;
- ✓ Responsibility for energy efficiency should be assigned to a management level position;
- ✓ Attainment of the State's energy goals for its facilities should be embedded in the energy budget of the agency to assure that energy efficiency is sustained.

Instill an Energy Efficiency Ethic Among State Employees

- ✓ Energy efficiency must become a priority within the culture of state government and this effort must take root among senior management. This initiative must start "from the top" with leadership by example;
- ✓ Without the leadership of senior management, it will be difficult to motivate all personnel to participate in this initiative;
- ✓ There are approximately 75,000 bi-weekly state payroll checks issued in Connecticut. A sustained effort to promote energy efficiency among the entire population of state employees could have a beneficial multiplier effect, raising awareness and impacting energy consumption at the households of these individuals;
- ✓ The Working Group believes that there are several cost effective ways to promote this initiative and raise awareness about the importance of energy efficiency, including messages delivered through state payroll envelopes and energy-related messages from the Governor, state agency heads and other government leaders. In addition, an

outreach effort directed at state employees could be delivered by the Consumer Education Outreach Group (CEOP) at the Department of Public Utility Control.

Develop State-Wide Energy Efficiency Standards for Agencies

- ✓ At present, individual agencies can choose whether or not to utilize energy efficiency measures;
- ✓ An energy plan for state buildings should direct that if an energy efficiency measure is deemed appropriate, than all agencies must use the approved standard, unless the agency can demonstrate good cause why it should be exempt from it. This may require an Executive Order or similar enforcement mechanism.

Establish State Energy Goals

- ✓ Previous consumption should be used to measure the success of anticipated energy efficiency efforts at state agencies;
- ✓ Energy related goals for all state agencies/facilities should be established and measured annually. The best way to assure that a goal is being met is through the budget for the cost of this expense. In this way, each agency will need to seek out the measures that will achieve the savings in order to meet its energy budget;
- ✓ Once an agency has reduced its energy consumption, the savings must be sustained. Embedding the savings in the energy budget appears to be the best way to achieve this goal;
- ✓ A goal should be established for state agencies to reduce electric consumption by 10% for 2005 in order to offset the recent increases in electric costs;
- ✓ A goal should be established for state agencies to reduce electric consumption by an additional 5% for 2006 in order to offset additional anticipated rate increases.

Maximize Existing Incentives to be Efficient at State Agencies

- ✓ Under the current system, there does not appear to be an incentive for agencies to be energy efficient;
- ✓ Consider creating a Governor's award or other energy-related recognition for the most energy efficient agency;
- ✓ Increase awareness about Public Act 90-130, An Act Establishing a Shared Energy Savings Program, which allows agencies to retain a portion of the funds earned through energy efficiency.

Load Management Programs

- ✓ At present, state agencies in general reduce their consumption of electricity during periods of high demand based on public appeals to reduce load;

- ✓ The state's potential aggregate load reduction is significant and should be available for participation in load response programs;
- ✓ Real-time energy management systems provide the means to measure and verify reductions in load, thereby allowing the state to participate in load response programs.
- ✓ The state should participate in load response programs to receive the financial benefits available to customers that curtail load.[4]

Energy Plan

- ✓ Establish an Energy Plan for all state agencies and involve upper management and state personnel early in the planning stage of this initiative;[5]
- ✓ An Energy Plan should include an identification of all cost-effective energy reducing strategies, behavioral changes and traditional conservation measures, such as turning off lights and other equipment when the equipment is not in use;
- ✓ An Energy Plan should be divided into three levels of activity:

  Level one: Low cost/no cost measures that can be implemented immediately. An example of level one activity could reflect the attached list of recommendations developed for Ten Franklin Square, New Britain;

  Level two: Medium range targets that may require some time and/or a modest investment to implement;

  Level three: Long term measures that would require the most significant investment. Examples of level three activities would involve such things as combined heat and power systems,[6] lighting retrofits and HVAC replacements/upgrades.

- ✓ Regarding level three activity, the plan should include a building-by-building inventory of all energy consuming equipment. Each building would receive an Energy Efficiency Report Card (see Appendix) for all equipment, providing a simple means of identifying the least efficient measures that are in place. The report card would then be used to identify energy efficiency projects, ranking each based on a cost/benefit analysis or shortest payback. The State would rely on the expertise of the ECMB, the Institute for Sustainable Energy, The Connecticut Light and Power Company, The United Illuminating Company and others to assist in this process. The State would then determine which projects to address within the spending constraints of the state budget and available C&LM funds. The state budget and the energy conservation

[4] It is important to note here that curtailment of load is not the same as conservation. Curtailment is turning off electric power usually during times of excessive power demands on the electric grid. When the power crisis is over, the curtailment is over. There are no ongoing sustainable benefits with curtailment, whereas energy efficiency initiatives which reduce power use by using more efficient equipment, benefit the grid over the lifetime of the equipment.

[5] Review the six energy plans that are presently in place at state agencies and build on the best attributes of these plans.

[6] Combined heat and power systems are discussed in the Appendix, "Experience with Conservation Activities at State Facilities."

fund are limited. Therefore, the Working Group does not advocate a 'saturation' approach to level three activities.

- ✓ Communicate the energy efficiency plan through an outreach effort to educate all state personnel regarding it. Communication state-wide should be sustained through the use of state payroll stuffers and periodic messages from the Governor, state agency heads and other government leaders. At the agency level, e-mail or voice mail messages can be used to deliver this message. Personnel assigned to the CEOP at the DPUC and others, could be trained to educate the state's workforce as well as Connecticut's citizens in general regarding energy efficiency.
- ✓ The use of appropriate and cost effective energy efficiency measures should be required at all agencies. For instance, an individual agency should not be allowed to determine whether to use occupancy sensors in an application that has been deemed appropriate at the state level. To assure ongoing compliance with all energy-related directives, the Working Group believes that energy savings must be embedded in the energy budget for each agency. This should avoid the need for costly and time-consuming periodic reviews regarding the installation or removal of energy efficiency measures.
- ✓ The attached list of energy saving ideas represents a walk-through at Ten Franklin Square, the offices of the DPUC, OCC, and the Connecticut Siting Council. These items are examples of level one activities noted above. The Working Group believes that this type of informal energy audit reveals that there are a number of energy reduction techniques that can be addressed quickly and at a relatively low cost at many state buildings. It is significant to note that Ten Franklin Square was constructed within the last 10 years. Despite the fact that this building is relatively 'new,' significant immediate energy savings are available.

IV. Conclusion

This Report represents a 'first cut' at ways to reduce energy consumption at state facilities. Many actions can be taken immediately while others will require additional planning and effort. The Working Group is committed to assisting the State in finding ways to use energy as efficiently as possible and looks forward to the Governor's advice and support, and that of her staff, on the direction and recommendations presented herein. The Working Group stands ready to submit a subsequent report to Governor Rell regarding longer-term energy efficiency strategies that can be pursued.

Appendix A

Energy Efficiency Opportunities At Ten Franklin Square, New Britain

An Informal Case Study

Prepared by

Department of Public Utility Control
Office of Consumer Counsel
Energy Conservation Management Board

February 1, 2005

I. Executive Summary

The Working Group sought to identify immediate energy savings that may be available to the state in order to provide suggestions as to how individual agencies could achieve the recommended 10% reduction in electric consumption in 2005. The Group chose Ten Franklin Square in New Britain as an example for its Case Study. Ten Franklin Square was built in 1995, and as such, is essentially a new building. Despite this, the Working Group identified immediate, low cost, potential energy savings at this location that could reduce electric consumption by about 11%.

The Working Group used the electric bills for Ten Franklin Square for fiscal years 2000, 2001 and 2002 to calculate the average electric consumption and cost for a recent three-year period.[7] Based on a three-year average annual consumption of 680,785 kWhs, the estimated savings from the measures listed in Table 1 would reduce consumption at this facility by approximately 76,000 kWhs per year, or about 11% of the average. The Working Group then calculated the three-year average cost and increased that rate by 10.3%[8] to estimate the cost savings for each measure at current electric rates. The Working Group notes that additional increases in the cost of providing electricity will likely occur during 2005 and 2006. Therefore, the cost savings for each measure will increase over the next two years.

The following table summarizes the low cost potential savings strategies that were identified. The list does not include savings from capital projects, such as lighting retrofits or from the HVAC system, i.e., level three type activities. However, the potential savings from a lighting retrofit is discussed at the end of this document. As Table 1 shows, there are a number of strategies that can be implemented and that can immediately reduce electric consumption at Ten Franklin Square. Each of these measures is explained below.

It is important to mention that while the report focuses on the potential to reduce consumption, (i.e., kWhs), that many of the measures will reduce peak electric system demand. The Working Group acknowledges that the reduction to system demand from one building will be modest. However, when viewed in the aggregate, the total population of state buildings provides the potential to sustain a significant reduction to peak electric system demand.

[7] The time period chosen for determining average consumption was prior to the real-time energy management pilot that began in early 2003.

[8] 10.3% reflects the average increase in electric rates for CL&P that became effective on January 1, 2005.

II. Summary of Savings

Table 1

Potential Savings at Ten Franklin Square

Measure	Projected Annual Savings (kWhs)	% of Total Estimated Energy Savings	Total Annual Savings to State [1]
Real-Time Energy Management [2]	38,805	51%	$2,363
Sleep Mode on 125 Computers	25,000	33%	$3,045
Eliminate One Vending Machine	3,750	5%	$457
Correct existing occupancy sensors	300	0.4%	$37
Install occupancy sensors in these locations			
First Floor Lunch Room	799	1%	$97
First Floor Lockers & Restrooms	799	1%	$97
Asst. Attorney General File Room	399	0.5%	$49
Replace incandescent bulbs with CFLs in the following areas:			
Elevator	674	1%	$82
Second Floor Hall	2480	3%	$302
Commissioner's Suite	1092	1%	$133
Commissioner's Conference Room	78	0.1%	$10
Adjudication Conference Room	78	0.1%	$10
Plug Load			
125 Workstations @ 20 kWhs per station	2500	3%	$305
Total Savings	**76,754**	**100%**	**$6,985**

1 Savings based on a cost per kWh for 2005 of 12.18 cents per kWh (2004 avg. cost increased by 10.3%).

2 Total savings from this measure equal $4,726. Savings to the State assumes that the vendor is paid one-half the savings.

III. Energy Saving Measures

A. Real-Time Energy Management System

The offices at Ten Franklin Square participated in a pilot study for a real-time energy management strategy (Real-Time Pilot) in 2003 and 2004. The strategy that was tested utilizes a wireless communication system to monitor and control lighting and vending machine loads. The Real-Time Pilot showed average annual energy savings of approximately 39,000 kWhs, or about 5.7% of the total energy used at this location and a reduction in peak load of 12.2 kW or about 6% of peak demand.[9] These savings reduced the electric bill at Ten Franklin Square by approximately $4,700 per year.[10]

[9] The Working Group notes that there are a number of energy management strategies available in the market and although the real-time system resulted in savings at Ten Franklin Square, this type of system may not work in every State building. In addition, savings may vary from those shown in this report.

[10] The above table shows a savings to the state of $2,363, or about one-half of the projected total dollar savings. This reflects the assumption that the cost of this energy-management strategy

The system that was piloted is a third party, turnkey approach to energy management. The vendor provides direct management and oversight of all energy savings. Therefore, the entire cost of the program may be paid from the savings that are achieved, i.e., a 'shared savings' arrangement. Although the dollar savings are shared, a third party system may be more advantageous in providing sustained energy savings when compared with other available energy management systems, some that are in place at state agencies at present. For instance, systems that require onsite control can be overridden or reprogrammed In addition, turnover in personnel requires retraining, and there is no assurance that the training will occur. Under a third party approach, the vendor has a direct financial incentive to maximize savings for the customers since it is paid based on the savings.

A significant feature of a real-time system is the ability to control loads in real time, notably during periods of peak demand. For example, the real-time system reduces lighting loads on an average, day-to-day basis. However, this system can react to the need to reduce load during periods of peak demand and further reduce lighting loads remotely, essentially at the touch of a button. Another example of the benefits of a real-time system involves vending machines. The state currently uses a management technique to reduce the energy consumed by vending machines.[11] The present system monitors the temperature and traffic at individual vending machines and reduces energy consumption when traffic (i.e., sales) is low, or when the temperature of the product is within a pre-determined range. However, based on these parameters, vending machine load is likely not curtailed during peak hours of the day when the traffic at vending machines is greatest.

The real-time system allows the vendor to control the energy consumption at each machine 24 hours per day, thereby controlling peak demands at each location. This feature may allow the state to participate in load response programs which provide revenues to program participants.

The Real-Time Pilot was conducted as a stand-alone project. There were no other conservation measures installed during the study and there was no other effort to promote conservation among the building's occupants. As such, the estimated savings in this report are based on the current condition of the lighting and vending equipment at this location. The Working Group is aware that a portion of the estimated savings from a real-time management system will not be achieved if other conservation measures are applied. For example, because the Real-Time Pilot controlled three vending machines, the elimination of one vending machine would reduce the estimated potential savings from the real-time system. However, the Working Group believes that the potential to

involves a 'shared savings' arrangement and that one-half of the savings would flow to the vendor.

[11] The load associated with a vending machine is significant, in excess of 4 kW.

'double-count' some savings within this report does not significantly impact the estimated savings for the real-time energy management strategy.

B. Sleep Mode on Computers

At present, the computers at Ten Franklin Square do not 'power down' during periods of inactivity. There are as many as 160 employees/computers at this location. The Working Group chose to base its savings on 125 employees to be conservative in its estimate. Based on estimated annual savings of 200 kWhs per computer, the Working Group believes that annual electric consumption could be reduced by 25,000 kWhs or approximately $3,045 if the 'sleep' function for all computers was enabled.

The Working Group believes that this measure has tremendous potential for all state computers that are not presently set to power down during periods of inactivity.

C. Vending Machines

A soft drink vending machine uses approximately 3,750 kWhs per year. At an average cost of 12.2 cents per kWh, (the average cost for Ten Franklin Square for 2005) the annual electric cost for each machine is about $460. The value (profit) of each vending machine should be evaluated to determine if opportunities exist to eliminate vending machines. The state may wish to consider recovering the cost to operate each machine from the company whose product is being sold.

There are two soft drink vending machines located in the first floor break area and each dispenses Coca-Cola. One machine dispenses 12-ounce cans and the other dispenses 20 ounce bottles. The Working Group believes that one of these machines can be eliminated and estimates the annual energy savings at 3,750 kWhs, or approximately $460 per year.

The Working Group is aware that the decision to remove vending machines may impact other state agencies and is a decision that may not be based on energy conservation alone. The Working Group simply wishes to point out the potential savings associated with this measure.

D. Existing Occupancy Sensors

The majority of existing occupancy sensors have manual override switches. A survey of these switches finds that room occupants regularly place each switch in an override position, eliminating the potential energy savings from these devices.

The Working Group believes that occupancy sensors with a manual override feature should be replaced with switches that do not allow room occupants to tamper with these devices. The Group believes that each 'corrected' switch will reduce electric

consumption by at least 20 kWhs per years. We have included an estimate of savings based on correcting 15 switches for a total of 300 kWhs per year, or approximately $37.

E. New Occupancy Sensors – First Floor Lunch/Break Area

The first floor lunch area was originally intended to be used as a file storage area. As such, the light switch for the room was located in the hallway, outside this area. When the room was converted to a lunch area, the switch was not relocated. As a result, while occupancy is limited, the lights in this area are generally left on for the entire day.

The Working Group believes that the light switch should be relocated to inside this room and that the switch should be replaced with an occupancy sensor. The Working Group estimates that this measure would reduce annual electric consumption by about 800 kWhs, saving approximately $97 per year.

F. New Occupancy Sensors - First Floor Lockers and Restrooms

There are locker areas located adjacent to the men's and women's restrooms on the first floor. Each locker room and restroom is equipped with an individual light switch, a total of four switches. The lights in these areas are generally left on throughout the day.

The Working Group believes that the light switches in these areas should be replaced with occupancy sensors. The Working Group estimates that the installation of four occupancy sensors in these areas would reduce annual electric consumption by about 800 kWhs, saving approximately $97 per year.

G. New Occupancy Sensors - Assistant Attorney General - File Room

A larger office located in the Assistant Attorney General's area was converted (split) into a smaller office and a storage area. However, the lighting for the original office was not rewired. As a result, the lights in the storage area operate throughout the day.

The Working Group believes that the lights in this area should be rewired to accommodate an occupancy sensor for the storage area and believes that this measure would reduce annual electric consumption by about 400 kWhs, saving approximately $49 per year.

H. New Occupancy Sensors - First and second floor offices

Many of the offices located throughout the building are not equipped with occupancy sensors. The Working Group believes that occupancy sensors should be installed in all offices where feasible.

Although the Working Group believes that there are potential savings from this measure, we have not included an estimate in the above table.

I. Lighting - Second floor hallway

There are fifteen, 65-watt incandescent recessed floodlights illuminating a hallway on the second floor. The Group estimates that these lights operate 12 hours per day, five days per week. These lights were intended to illuminate artwork at this location. However, artwork has not been in place for several years. There is an identical hallway located one floor below that is illuminated by six, 30-watt pin-based recessed fluorescent fixtures.

The Working Group believes that the 15 existing fixtures should be replaced with six pin-based recessed fluorescent fixtures. The Working Group estimates that this measure would reduce annual electric consumption by 2,480 kWhs, saving approximately $302 per year.

J. Lighting - Commissioners' suite

There are six 100-watt dimmable incandescent spotlights above the entrance area to the Commissioners' suite.

The Working Group recommends that these fixtures be replaced with fluorescent fixtures and that the dimming capability be eliminated. The Working Group estimates that this measure will reduce annual electric consumption by 1,569 kWhs, saving approximately $190 per year.

K. Lighting - Commissioner and Adjudication Conference Rooms

There are four 100-watt dimmable incandescent fixtures in each of these locations. These lights may be intended to provide low lighting for viewing videos or other presentations.

If these lights are not needed for low lighting, the Working Group recommends that these fixtures be replaced with fluorescent fixtures and that the dimming capability be eliminated. The Working Group estimates that this measure will reduce annual electric consumption by 156 kWhs, saving approximately $20 per year.

L. Plug Load

For purposes of this report, "plug load" refers to the use of electric equipment at individual workstations. Energy is consumed by items that are left on within workstations or cubicles during periods when an employee is away for extended periods of time or at the end of the workday. These items include task lights, radios, space heaters, etc.

This consumption should be addressed to determine the potential for available savings. In addition to energy savings, there may be some safety-related benefits to addressing plug load. For example, some employees use electric space heaters to provide additional warmth. These appliances are usually located below a desk and may at times be inadvertently left on overnight, creating a potential fire hazard. Plug load controls would curtail this use after a period of inactivity within a workstation.

Within the population of an agency, there is likely a mix of personnel that have little or no plug load and those that drive higher amounts of this consumption. For this reason, the Working Group estimated the potential to reduce electric consumption based on an average of 20 kWhs per year per workstation. Based on this average, and a population of 125 at Ten Franklin Square, the Working Group estimates that total consumption can be reduced by 2,500 kWhs, saving approximately $305 per year. As noted above, the Working Group based its estimated savings on 125 employees to be conservative.

The Working Group would like to point out the consumption and cost associated with items that are becoming common in the workplace. The cost to operate these items is based on 12.2 cents per kWh, the average cost of electricity at Ten Franklin Square.

- ✓ A personal refrigerator uses about 300 kWhs per year and costs about $37 to operate.
- ✓ A personal water dispenser (cold water only) uses about 150 kWhs per year and costs about $19 to operate.
- ✓ If the water dispenser provides hot water as well, the consumption and cost doubles to 300 kWhs and $37.

M. Lighting Retrofits – Longer Term Measure

As noted above, Ten Franklin Square is less than ten years old. However, lighting standards have changed since the building was constructed. The Working Group sought to examine whether there are savings available from measures such as lighting retrofits, even in a relatively new building.

The current ASHRAE lighting standard for commercial applications is 1.1 watts/sq.ft.[12] Based on this standard, the Working Group examined the amount of lighting that is currently provided in five areas at Ten Franklin Square.[13] As the following table shows,

[12] State building codes generally follow (i.e., adopt by reference) the ASHRAE standards.

[13] The Working Group notes that our analysis reflects a quick overview of a measure that should be addressed by the State. This analysis is not intended to replace the comprehensive engineering evaluations that are undertaken when examining lighting retrofits.