



Michigan Federal Facilities

Saving Energy Projects

State Energy Office Energy Audit leads to \$115,167 in Energy Improvements at the General Services Administration Theodore Levin U.S. Courthouse

State of Michigan & Federal Energy Management Program (MI-FEMP) Energy Initiative¹

MI-FEMP Preliminary Energy Audit Results

The Levin Federal Courthouse is a multi-story, 605,285 square foot, masonry building that was constructed in 1934 in Detroit. In 1999, the MI-FEMP Initiative completed an energy use analysis to gauge this building's energy consumption for the previous 12-month period. The total energy bill for that period was \$629,842 with electricity accounting for more than 70% or \$457,832 of the bill. The initial audit identified many energy efficiency opportunities such as reducing electric loads by upgrading fan and pump motors to premium-efficiency models and optimizing chiller plant operation. Other opportunities were installing demand limit controls, reducing lighting use and improving cooling tower efficiency. Also, energy use reduction could be achieved by replacing disintegrated ductwork. The initial energy audit recommendations presented this facility with significant cost saving potential while suggesting many ways to improve building energy-using equipment and to increase occupant comfort.

Energy Efficiency Measures Implemented at the Levin Courthouse

The Levin U.S. Courthouse energy efficiency retrofits were installed at a cost of \$115,167 with annual savings of \$26,757 providing a payback of 4.3 years.

New Faucet Aerators

Of the average 70,000 cubic feet of water used per month at the Levin Courthouse, 20,000 cubic feet is considered hot water usage and the rest is for drinking and flushing. The current faucets use 3.5 gallons per minute. The proposed new faucets with a 1-gallon per minute aerator will reduce facility water usage and steam heat usage by 14,400 cubic feet and save \$316 per month.

Total investment = \$29,000; annual savings = \$7,980; payback = 3.6 years

Retrofit of exit and bath lamps with LED

Due to the unique nature of the existing exit lighting and matching men's/ladies room fixtures in the main corridors, an additional cost for new exit lenses was needed. The re-engineered estimated for replacing 60 exit signs @ 40 watts each with 60 signs @ 2 watts each resulted in annual savings of \$1,798.

Total investment = \$2,990; annual savings = \$1,789; payback = 1.7 years

The restrooms exit sign retrofit resulted in the replacement of 24 signs with 2-watt models generating annual savings of \$719.

Total investment = \$1,532; annual savings = \$719; payback = 2.1 years

Occupancy Sensors for Men's and Ladies restrooms

The 21 restrooms fitted with the new LED signs have a total of 13.6 kW. All but one of these restrooms is located on outside walls with natural window lighting. Occupancy sensors with demand control will provide annual savings of \$3,278.

Total investment = \$16,888; annual savings = \$3,278; payback = 5.2 years

Replace low/high efficiency motors with premium efficiency

Currently, burned-out motors in facilities are rewound. Premium efficiency motors should be purchased instead for all motors under 20 hp that burn out.

Though a cost premium has to be paid for premium efficiency motors, the energy savings over the life of the motor will more than pay for this cost premium. Premium efficiency motors can save a substantial amount of electricity at a facility. Rewound motors are typically less efficient than original motors because of the harsh baking process used to remove the windings. Each time a motor is rewound, efficiency can drop up to 5%. Therefore, if a motor has been rewound more than once, even greater savings for energy efficient motors are attained relative to rewound motors. A thorough investigation of motors at the Levin U.S. Courthouse resulted in the replacement of over 20 motors.

Total investment = \$36,357; annual savings = \$5,440; payback = 6.7 years

Install new software on the Andover energy management system

The energy management system did not have the ability to change certain set points and schedule without facility staff having to call outside contractors for assistance. In addition, the system's method of optimizing morning start-up was not functioning nor was it accessible to the building maintenance staff. Purchasing a software upgrade greatly enhance the productivity of the maintenance staff and now provide increased energy savings by optimizing the start times of the equipment.

Total investment = \$15,400; annual savings = \$4,752; payback = 3.2 years

Install new remote control (radio frequency) relays for load shedding and after-hours energy savings of equipment not accessible via control wiring

Water coolers were the object of this energy management opportunity. The water coolers have the ability to operate 24 hours per day if called to do so by the system thermostat. By installing a simple radio controlled relay for start/stop and demand control operations, energy savings was achieved with annual demand charge savings of \$2,124 and energy savings of \$675. A total of 41 receivers and 10 transmitters were installed.

Total investment = \$13,000; annual savings = \$2,799; payback = 4.6 years

¹MI-FEMP, was a cooperative initiative between the State of Michigan Energy Office and the Federal Energy Management Program that began in July 1997 and operated through September 1999. MI-FEMP provided 36 federal facilities in Michigan with services to help them improve building energy and water efficiency including:

- Utility bill analyses
- Walk-thru energy and water conservation audits
- Follow up visits to present audit results and information about FEMP project implementation services, specifically, performance contracting
- Technical assistance and training for federal building operators and managers

MI-FEMP sought to increase energy and water efficiency in MI federal facilities by assisting facility personnel to identify opportunities and to build management support for equipment upgrades and maintenance projects. The initiative also sought to connect facility managers with the U.S. Department of Energy/Midwest FEMP team, which could help to implement larger sized projects.

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