Performance Agreement: **Energy Savings for Linden's School District**

State of Michigan
Department of Energy,
Labor & Economic Growth

Bureau of Energy Systems

Rebuild Michigan CASE STUDY

Background

Linden Community Schools serves approximately 3,100 students and covers 50 square miles in southwestern Genesee and northern Livingston Counties. The district began their energy saving plans with a 2002 Rebuild Michigan Introductory Energy Evaluation. Following the evaluation's advice, an engineering firm completed a detailed energy analysis that contained a list of recommendations for energy conservation in the district's five school buildings. In 2004, Linden Community Schools entered into a ten-year Performance Agreement with a controls contractor to implement energy retrofits and provide an annual energy analysis and building inspection.

Actions Taken

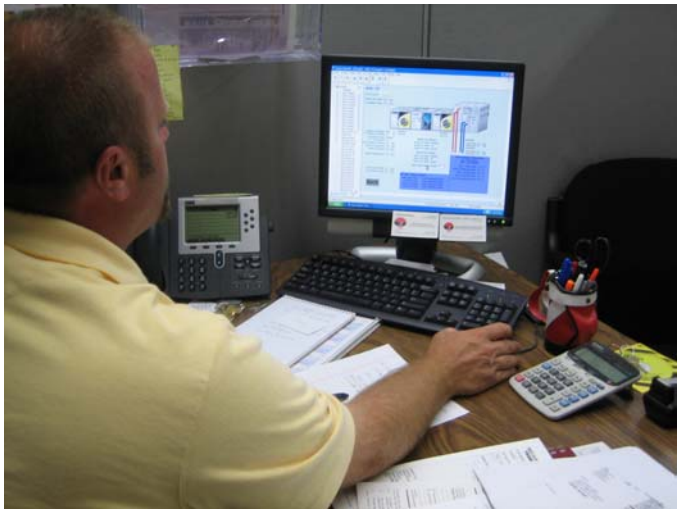
The district initially implemented the items with the shortest payback period. These energy conservation upgrades included:

- Air handling units in the High School were equipped with new high-efficiency motors and variable-speed drives.
- Sixty-two variable air volume (VAV) boxes were replaced to provide better control of environmental air.

Variable-speed drives have been added to air handling systems for increased efficiency.

Case Study prepared by
Kingscott Associates, Inc.
www.kingscott.com

- New lighting fixtures were installed where needed. When the fixtures were still usable, T12 fluorescent lamps and magnetic ballasts were replaced with T8 lamps, electronic ballasts, and polished metal reflectors.
- Existing incandescent light fixtures were relamped with self-ballasted compact fluorescent lamps.
- Occupancy sensors were installed in all classrooms to turn off the lights when rooms are not occupied.
- Exit signs were replaced with low-energy LED type.
- A new building automation system (BAS) was installed.



New building automation system provides control of the HVAC system and aids troubleshooting

To interface with the new BAS, existing HVAC pneumatic controls were replaced with new direct digital controls (DDC). The BAS allows remote control of space temperature and the ability to monitor designated HVAC equipment. It also optimizes start/stop and time-of-day scheduling, facility event scheduling, and temperature reset schedules for hot water, chilled water, and supply air systems. Operator use was made easy with a straight-forward graphic interface and operator training.

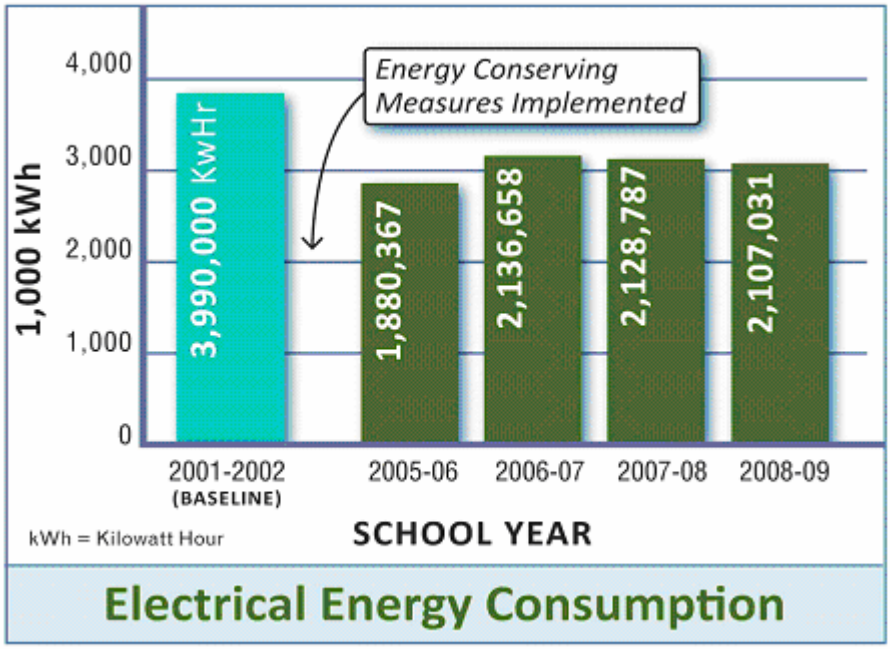


Table 1

The Results

Four years into the energy retrofit Performance Agreement, the verified savings prove that energy conservation measures were a wise investment for Linden Community Schools. The energy conservation measures have yielded a verified savings of almost $950,000 in four years for an original $1,660,000 investment.

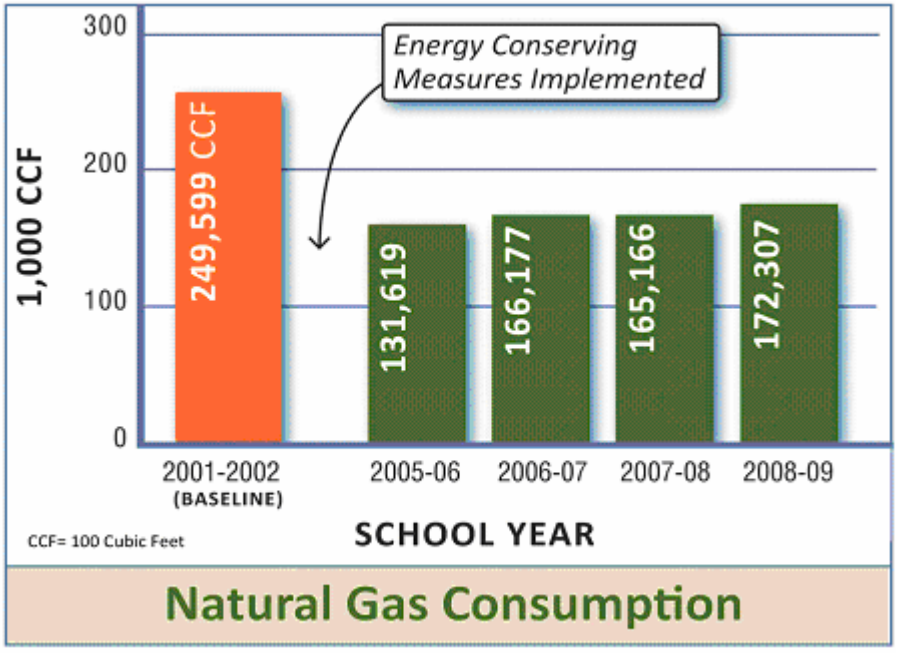


Table 2

Table 1 compares the before and after electric energy usage.

Table 2 compares the before and after natural gas consumption.

Table 3 shows annual dollars saved on electrical and natural gas utility bills.

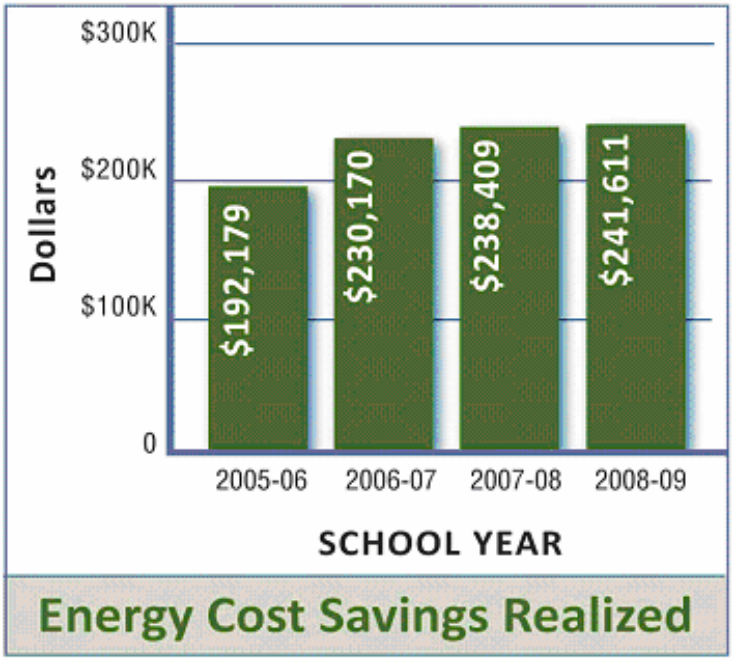


Table 3

"With more than $900,000 saved in four years on our original $1.66 million investment, the energy savings have been real,"
—Greg Vadasz, Director of Operations.

Figures are based on data received from owner or owner's performance contractor. Kingscott does not guarantee accuracy of data.

Funding

The Performance Agreement upgrades and monitoring program were funded by a low interest loan from a local bank.

Conclusion

Mr. Greg Vadasz, Director of Operations, and his staff continue to implement other energy analysis recommendations, not included in the 10-year Performance Agreement, as maintenance upgrade projects. An example of this is: the Central Elementary boilers were replaced during the summer of 2009. The BAS is Mr. Vadasz's *"pride and joy"* and he says the monitoring of HVAC has been a significant aid for maintenance personnel in trouble shooting and solving problems. In the beginning there was some community reluctance to make the investment, and he is now able to point to significant savings that clearly demonstrate the program's benefits.