


# Environment

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Gardener's Supply Co. in Burlington achieved significant energy savings right away by upgrading light fixtures in one of their distribution centers and optimizing temperature ranges and fan settings. The new lighting system paid for itself in about 8 months instead of the projected 25 months.

Photo courtesy Kilowatt Technologies

## Tune in, turn off, reduce costs

### Energy detectives ferret out simple, power-saving fixes

By Joshua Brown  
Correspondent

*"Normally people save energy by buying more energy-efficient equipment. But it's more cost-efficient to turn stuff off."* — Paul Grover, founder, Kilowatt Technologies.

Something strange is happening at the Barre Town School. In the boiler room, unit No. 2 is off. The water coming out of it is a cool 74 degrees. But the water returning is 108 degrees. Boilers 1 and 4 are the same: cool water out, hot water coming back. Wait a minute, these boilers are off, and isn't a boiler supposed to deliver heat, not collect it?

"This is the villain," says Paul Grover, pointing to a blue metal box with a pair of large white pipes running up to the ceiling. "No. 3 is supposed to be just providing domestic hot water, but it's bleeding into the whole heating system." A valve, probably in one of the pipes overhead, has failed or been

installed backward.

It's a simple enough problem to fix. A valve repair should cost about \$2,500.

But it's not a simple problem to find. No one knew about this until Grover and his partner Steve Antinozzi showed up. They're owners of Kilowatt Technologies, a three-man company in Shelburne. "We produce software and services that reduce energy consumption and greenhouse gas emissions in large commercial buildings," says Grover.

Think of them as energy detectives. The school has a sophisticated building automation system (a "BAS" in energy-speak) that controls the settings on numerous thermostats, fan motors, lights, valve switches and the like. But these machines are often misprogrammed, misunderstood or "just plain screwed up," says Grover. "In this building alone there are 350 automatic data points." Large office buildings often have

more than 3,000 variables to be managed, he says.

Though BAS systems are intended to save money and energy by turning machines off when they're not needed, at least one study shows that they can cost institutions more money "because people don't know how to use them or what the machine is telling them," Grover says.

### First, analyze the entire system

That's where Kilowatt Technologies steps in. At Barre Town School, Grover and Antinozzi collected data from the BAS and then ran it through a computer program back in Shelburne. The program tracks trends over time and then starts looking for "weird patterns

and problems," Grover explains — like boiler water coming back hotter than it went out.

Antinozzi peers up at a complex juncture of brass valves and plastic fittings. "That's an extremely costly problem," he says. Since the hot water continuously pumps around the school even as the air conditioning kicks in for the summertime, the two systems are fighting each other. This may have been going on for years. "At the rates they're paying, it cost them about \$900 in May on top of their regular bill," says Antinozzi, and with the hot weather just beginning "it's going to get a lot worse fast. It'll easily be double that in a month if they don't fix it."

Both the school and Kilowatt have a stake in getting it fixed. The school obviously would like to cut down on its bills, and Kilowatt gets paid only if

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# Reduce

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it can reduce the school's overall electricity use. As of May, seven months into their contract, Kilawatt has saved the school more than \$10,000, a nearly 14 percent cost reduction over previous years. In addition, Kilawatt's work dropped the school's output of climate-warming carbon dioxide by 16 percent or about 90,000 pounds.

## New equipment comes only after good practices

The analyzer program they used to discover the boiler problem is one of several pieces of specialized software that Antinozzi wrote. "And, yes, it's proprietary," Grover says. These programs form a cornerstone of Kilawatt's straightforward approach to helping its clients save energy. "The place to start is by turning off stuff that doesn't need to be on," comments Grover.

"A lot of companies in the energy-efficiency business are really just trying to sell you a piece of equipment. Some guy walks in the door saying, 'want to buy some lights?'" Grover says. But Kilawatt places equipment replacement second on the to-do list. First, improve "operational efficiency," he says. "You can get big savings just by getting the equipment in your building working together."

And commercial buildings account for a major portion of the total U.S. energy diet: They eat 18 percent of the energy consumed in the country. In a typical office building, 30 percent of operating costs go to energy, "the largest single category of controllable costs," according to the U.S. Department of Energy.

"Many people want to save money and reduce their carbon footprint, which is great. So they look around and say 'let's get new computer screens,' or 'I hear old boilers are inefficient, let's get a new one.' But we begin by looking at the whole building and the utility rates and bills — and then figuring out the most efficient strategies for saving," explains Grover.

That's one of the main reasons some large companies are starting to inquire about Kilawatt, including General Electric, Goldman Sachs, and a few municipalities. Instead of the typical payback period for energy-efficiency investments of "two to 12 years," says Grover, Kilawatt promises a "cash-positive proposition," where immediate savings cover Kilawatt's fees.

In other words, the company takes a customer's utility bills from the past two years, averages them, and establishes a baseline of electricity costs and estimated carbon dioxide emissions. The next task is to search out ways to lower these numbers, whether by sleuthing around the building with a light meter — "a lot of rooms are lit up bright enough to do heart surgery," Grover says — peering at thermostats, or looking for stuck fans. This work is informed by

data collected in the BAS and analyzed in one of Kilawatt's programs.

"We were quite pleased with the results," says Robert Mason, chief operations officer for the Chittenden South Supervisory Union that contracted with Kilawatt several years ago. "Grover's approach was as much about how we behave — turning off computers and that kind of thing — as it was about replacing equipment. In every school, we met our goals for energy savings."

Gardener's Supply Co. in Burlington also reported positive results with Kilawatt. For them, upgrading light fixtures in one of their distribution centers as well as "tightening up temperature ranges and fan settings," yielded savings of "over 5 percent right away," reports Bob Dillenbeck, a facilities manager for the gardening store.

Though the company Grover founded has been around for seven years, "right now we're on the edge; we've been struggling," Grover says. This is partly because there are so few large buildings in Vermont that Kilawatt now needs to look farther afield for work.

"We're about to sign some new contracts," he explains, under a revised business plan that aims to use the Internet more, an approach that will allow companies anywhere in the world to use Kilawatt's services. For \$600, Kilawatt will analyze a company's utility bills and BAS data — and then provide a report. An additional \$99 per month covers ongoing monitoring.

## Barre principal learns when to ask for help

In the office of Dr. Ted Rikken, a principal at Barre, Grover is reviewing an assessment of the school's progress and explaining the boiler valve problem. As they look over the graphs of dollars and carbon dioxide, Rikken describes a lesson helping youngsters understand that the carbon in wood comes from the atmosphere. He wants his students to understand high-level ideas like the global carbon cycle.

And Rikken also understands the persistent, sometimes inglorious efforts needed to root out and solve basic problems close to home. His students recycle juice boxes and compost food scraps. The school's boilers burn wood chips from 88 acres of adjacent woodlot. He's exploring rooftop solar panels. But some problems, he says, like managing asbestos or troubleshooting a complex energy system, are too complicated to be done in-house.

That's why he and his school board's facilities committee contracted with Kilawatt.

"This is very important work that many schools can't do themselves," Rikken says.

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