wegowise

Building Upgrade Case Studies

These case studies highlight three WegoWise users who utilized energy monitoring best practices to analyze their buildings and identify underperforming properties. Based on energy use analysis, they implemented the appropriate upgrades and used WegoWise to track and analyze the results.

1. 50% Energy Savings from a Multifamily CoGen Retrofit

2. Water Conservation Best Practices

3. A Cost Analysis of a Boiler Upgrade Project

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50% Energy Savings from a Multifamily CoGen Retrofit-- A Case Study of the Worcester Housing Authority

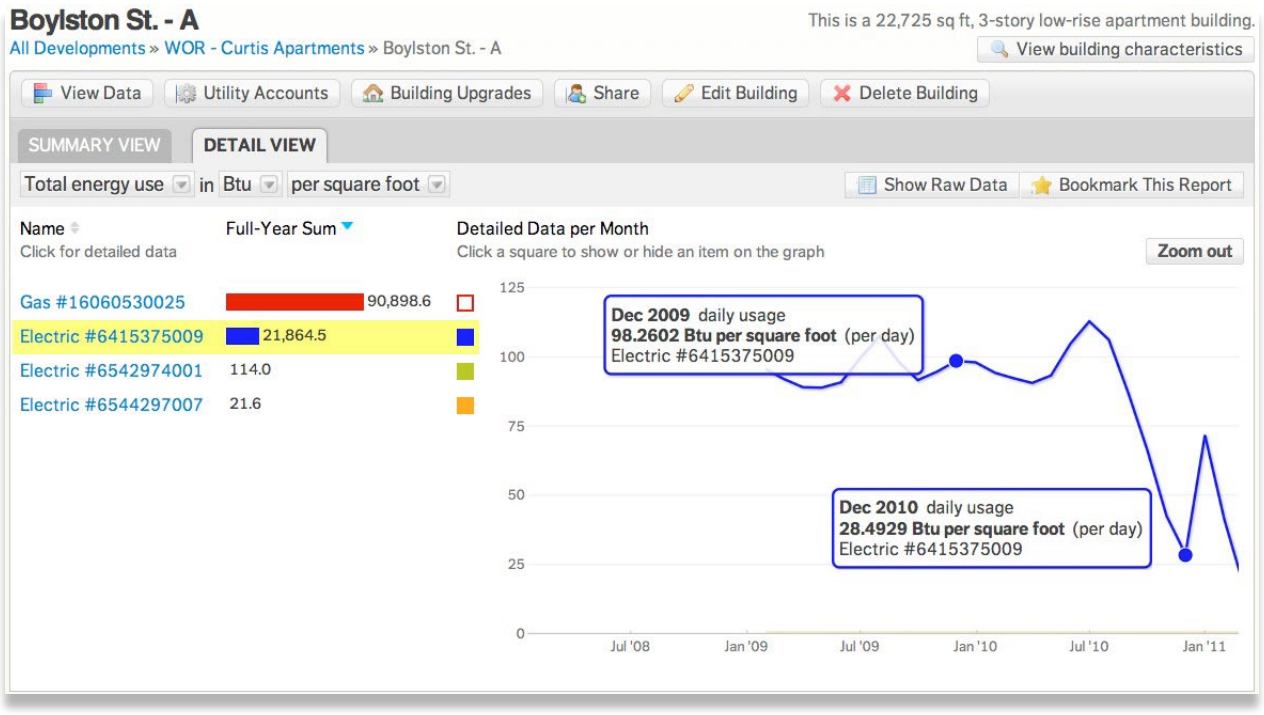
by Nate Brevard, Project Specialist at WegoWise, Inc

In late 2010, the Worcester Housing Authority in Massachusetts made some big changes.

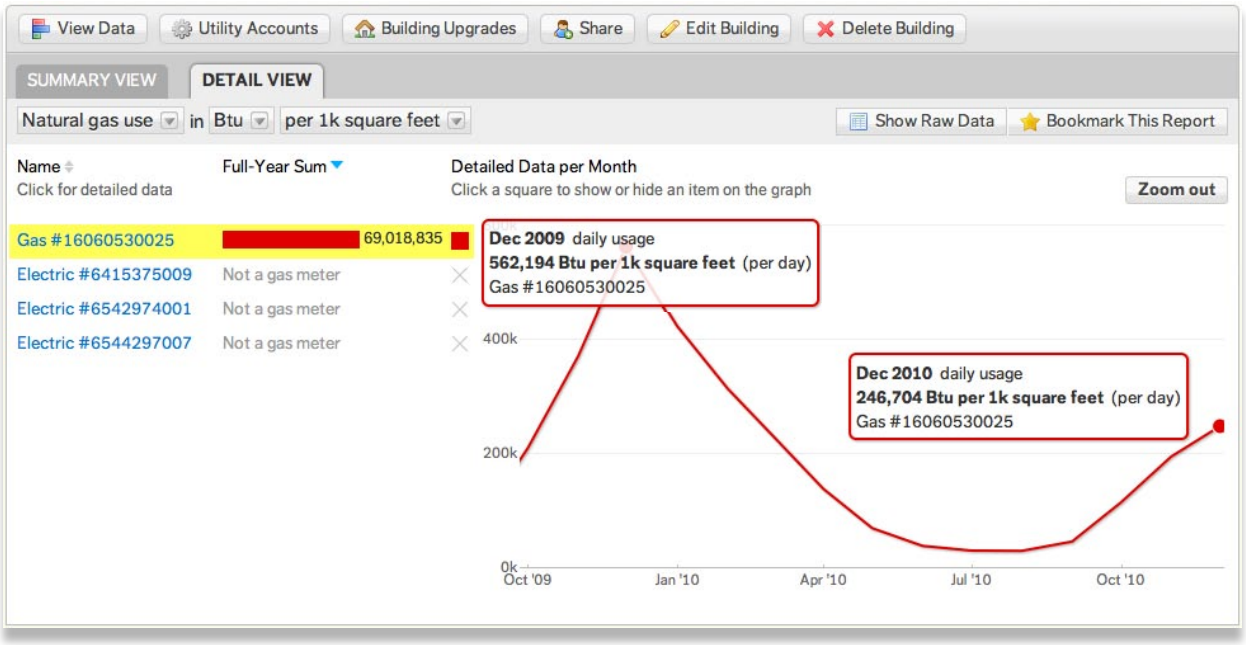
Identifying the problem:
Energy managers at the Worcester Housing Authority analyzed their portfolio to identify which of their buildings were wasting the most energy. They were then able to focus investments in energy efficiency improvements in the buildings that would yield the most energy and cost savings. Curtis Apartments, a low income development built in 1950 with 11 buildings and 355 apartments, was selected.

Investing:
The housing authority chose to replace the old boilers in Curtis with new, high efficiency condensing boilers. Additionally, in order to improve both electric and heating efficiency simultaneously, they chose to install a mini cogeneration system. Cogeneration (also known as combined heating and power or CHP) is a process that creates usable heat for space heating from the waste heat produced by electricity generation.

Results:
This graph from Worcester Housing Authority's WegoWise account shows 71% decrease in electricity usage on the main electric meter when we compare December 2009 to December 2010:



A 56% decrease in gas usage was also achieved.



Want to learn more about tracking and benchmarking?
Download our fact sheet at blog.wegowise.com.

Water Conservation Best Practices

by Dan Teague, Business Development at WegoWise, Inc

At WegoWise we often look at water performance in multifamily buildings and highlight the deep savings opportunities around water conservation. We found a great example of this with a progressive building owner who took the time to figure out which of their buildings were performing poorly, got a water audit and then promptly implemented the recommendations from the audit.

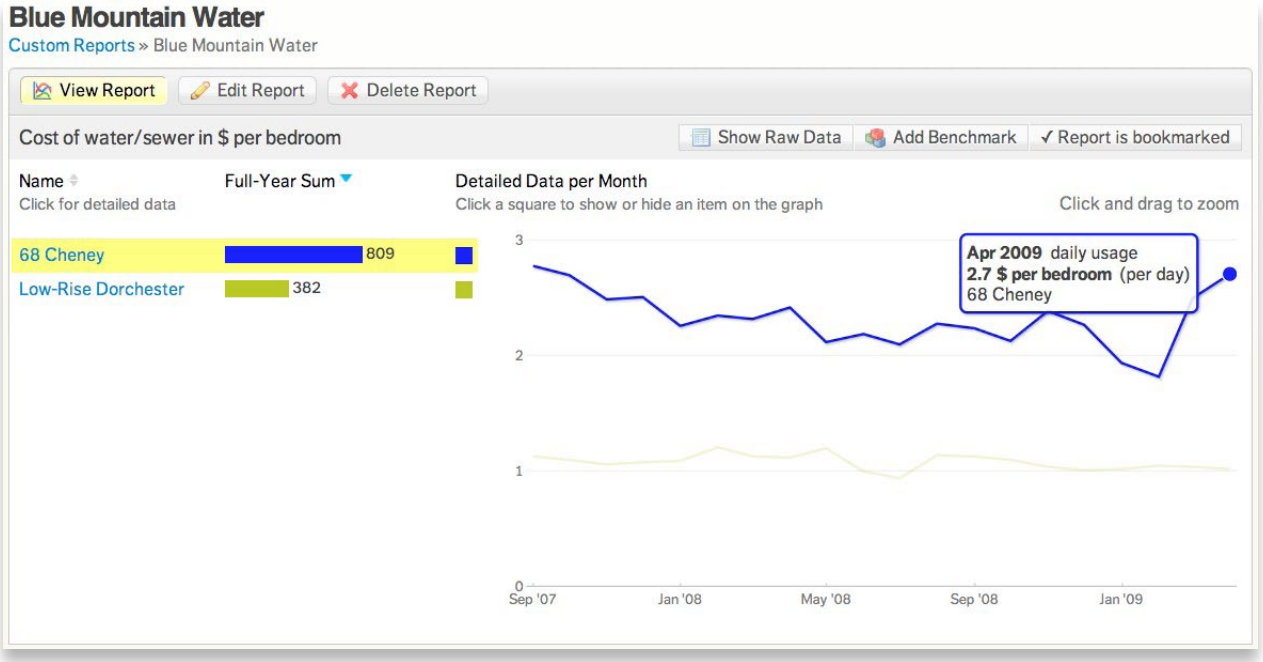
United Housing:

In winter of 2009, United Housing Management LLC asked WegoWise and New Ecology to look into their Blue Mountain development and identify opportunities for energy and water efficiency work. An analysis of the development identified many problem areas, but the 68 Cheney Street building proved to be a particularly problematic water hog.

68 Cheney St. is a 12,000 square foot three-story masonry walk-up in Dorchester, Mass. built around 1920.

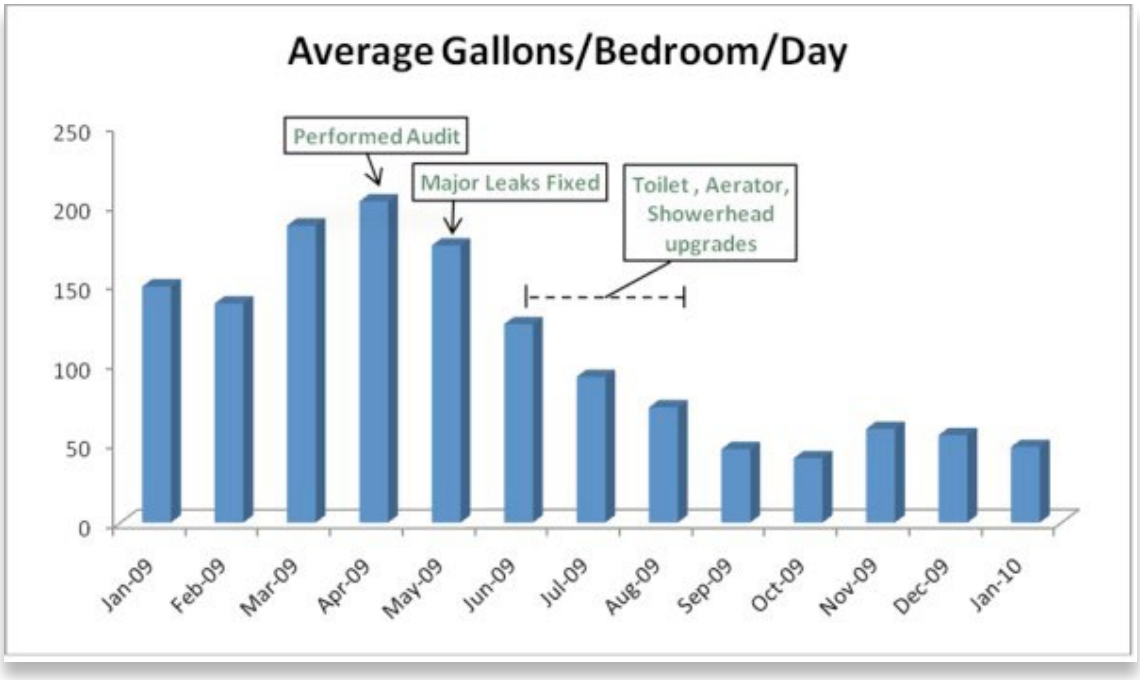
Analysis and Identification:

The graph below shows how much water 68 Cheney was using compared to similar low-rise apartment buildings in Dorchester. The green line represents the median usage from 80 low rise apartment buildings in the same neighborhood. The blue line is 68 Cheney's water usage.



The graph shows that in April 2009 68 Cheney used 202 Gallons/Bedroom/Day (GBD), far above where efficient buildings perform and nearly 100 GBD above similar buildings in Dorchester. The opportunity for large water and cost savings was apparent.

Audit and Upgrade:
New Ecology performed an on-site water audit and identified malfunctioning flapper valves in toilets, leaky aerators and high-usage shower heads. Their audit report suggested replacing the toilets and installing low-flow faucets and shower heads. The upgrades cost United Housing about $2,000 dollars and showed immediate results.



United Housing continues to monitor water use in 68 Cheney and has been saving nearly $1,200/month as a result of their water conservation work. They have since expanded on the efforts at 68 Cheney and implemented the same retrofits in other buildings in the Blue Mountain development.

By analyzing usage data, identifying the worst performing building, following through on audit recommendations and continuing to monitor the payback on their investments, United Housing is greatly benefitting from following water conservation best practices.

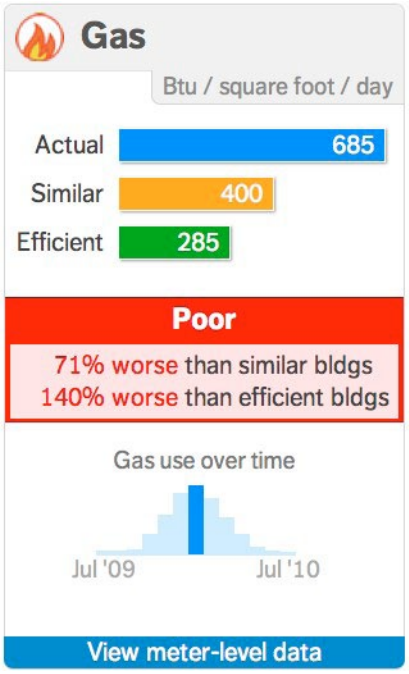
A Cost Analysis of a Boiler Upgrade Project

by Lily Perkins-High, Project Specialist at WegoWise, Inc

Particularly in heating climates like in the Northeast, upgrades to a building's heating system can result in substantial energy savings. This case study outlines another boiler replacement success story, and explains some of the reasons why you may or may not see savings from a boiler replacement on your project. We've been asked not to disclose the building name or any identifying characteristics for this project. However, we have included helpful general building information.

This building is a low-rise apartment building that's about 20 years old, with around 30 apartment units. It uses gas fuel for heat and domestic hot water and is located in the Northeast.

In January 2010 this building's gas usage was 71% worse than similar buildings.



To reduce this number, the building owner targeted the building's heating system, opting for a boiler replacement.

After an energy audit, here's what they added:

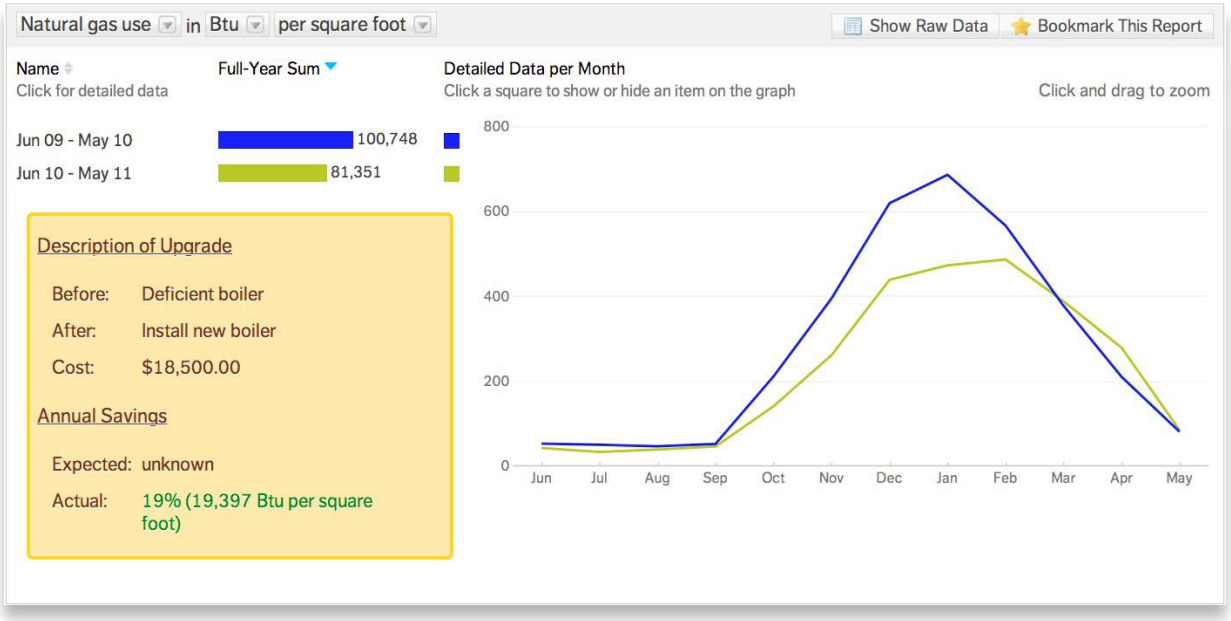
- 299,000 BTU Elite Heating Boiler (a modulating condensing boiler)
- circulator pumps
- combination fast fill backflow
- spiral vent air eliminator
- expansion tank
- isolator circulator flanges
- new electrical and gas piping

The total cost of the project was $18,500.

Note: The boiler covered only space heating, a separate gas hot water heater produced domestic hot water and this equipment was not replaced

What happened?

One year later, this building's natural gas usage has been reduced by 23% (weather normalized) and January gas bills were cut from $63.73 to $43.23. Over the course of the first heating season, the owner has saved $2,095. This translates to a payback time of around ten years.



So, why are boiler upgrades so successful? And why isn't everyone replacing their old boilers?

It's important to note that not every boiler upgrade is actually this successful. We're detailing some of the best, most exciting examples of retrofits we're seeing. For those upgrades that are successful, there are a few likely explanations:

- In many heating systems, the efficiency of the boiler is the most critical component of the efficiency of the entire heating system. Other retrofits, like replacing a drafty window have an effect on heating demand, but savings are often less dramatic than those seen by installing more efficient equipment as it is an indirect reduction on heating energy use.

- During a boiler upgrade, you are likely to save roughly the difference in efficiencies between your old and new boiler, because you're able to convert more of your fuel to usable heat. If you're upgrading to a boiler that is 20% more efficient, you will likely reduce fuel use by about 20%, and this doesn't even include the savings from better pumps or more efficient controls.

- According to Energy Star, compared to furnace replacements, "typically there are more opportunities to improve the efficiency of boiler systems due to their more complicated nature, as compared to furnaces." Not to say that furnace replacements can't also save you money.

Even with these results your boiler replacement might not pay for itself. Despite the 23% energy savings in this case study, the payback time was ten years. Payback time is affected by many variables including fuel costs, which can change over time, and the baseline equipment you are upgrading from. If the original boiler had been slightly more efficient or the cost of fuel was lower, payback time could have been extended beyond the life of the boiler.

Interested in learning more?
Visit blog.wegowise.com for more case study write-ups and the lastest energy efficiency news.

How does wegowise work?

WegoWise is an online tool for monitoring and analyzing the water and energy use of multifamily and single family homes. WegoWise conducts advanced analysis of your buildings' physical characteristics and utility usage to produce attractive and informative visualizations that show you the performance of your entire portfolio. Whether you want to compare all of your buildings at once, or drill down to specific meters, WegoWise provides you with actionable information to save you time and money.

To get started, users provide very basic information about their buildings and utility accounts, and the rest happens automatically. Every month, WegoWise downloads current energy and water use data directly from your utility company and presents that information in a way that allows you to easily see trends and patterns in your usage.