



Leadership in Public Spaces:

Virtual energy assessment tools position the public sector for leadership

Virtual technologies are well-suited to help public institutions benchmark energy performance and identify energy efficiency opportunities to exemplify their commitment to fiscal responsibility and sustainability leadership.

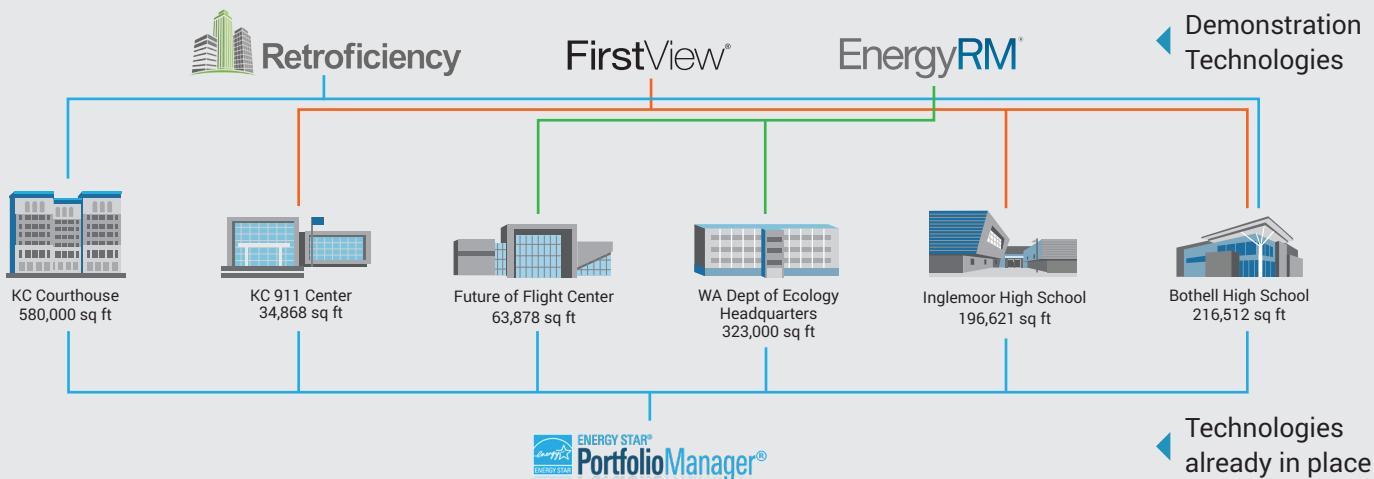
State and local governments and academic institutions have a responsibility to shepherd taxpayer money by efficiently operating their buildings and infrastructure. Public institutions also bear responsibilities that do not always apply to the private sector, such as maintaining public transparency of operations, and measurably reducing their impact on the environment. New technologies offer public entities efficient, easy to use tools to share information and grow their leadership in these initiatives. What's more, real-time monitoring and ongoing tracking capabilities help validate past energy efficiency projects and verify that sound investment decisions were made.

Putting technology to the test

The Smart Buildings Center's (SBC) technology demonstration and validation project researched nearly 70 technologies and reviewed eight during a 30-day deployment across 10 greater Seattle-area buildings. The technologies selected contained a mix of technical capabilities and had the ability to produce results within a short time period. The buildings that were chosen—in the multifamily, portfolio, government, and commercial sectors—already had results from a traditional audit, against which the new technology reports were compared.

For the public sector, the project team selected the following virtual energy assessment technologies to deploy: Retroficiency's Virtual Energy Assessment (VEA), the New Buildings Institute's FirstView, and EnergyRM's DeltaMeter®. The Washington buildings selected were at the Future of Flight Aviation Center in Mukilteo, the King County Courthouse in Seattle, the King County 911 Center in Renton, two high schools in Bothell's Northshore School District, and the Washington State Department of Ecology Headquarters in Lacey.

Technology deployments

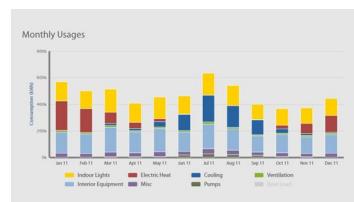


Featured technologies for public buildings

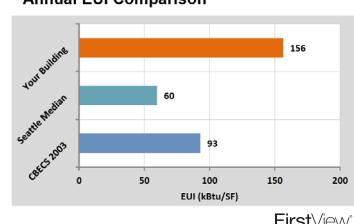
■ **Retroficiency's Virtual Energy Assessment (VEA)** leverages an extensive database of commercial building models and an analysis of 15-minute interval data to identify savings opportunities for its clients on a large scale and provides a one-time, visually-rich assessment report on each building. Companion products that offer ongoing monitoring and savings verification were not part of the SBC demonstration project.

■ **New Buildings Institute's FirstView** extracts targeted energy performance information from basic resources like monthly energy bills and building characteristics. This online resource produces one-time individual building and portfolio reports that disaggregate energy use into end-use categories, thus giving targeted indications where improvement opportunities may exist. FirstView also compares performance against similar buildings and portfolios regionally or nationally.

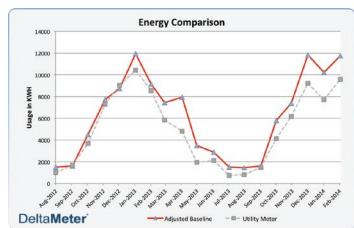
■ **EnergyRM's DeltaMeter** is a whole-building energy efficiency tool that uses monthly energy data to analyze energy performance over the lifetime of a building or portfolio of buildings. The DeltaMeter presents various views of the data, including the view from NBI's FirstView tool, which was developed as part of DeltaMeter. In the SBC project, only the building management metering and dashboard function for building performance were tested.



Retroficiency's VEA



FirstView



DeltaMeter®

DeltaMeter showcases the value of energy efficiency improvements

"When I observed that current energy use at the Future of Flight Aviation Center was lower than our historic baseline, it confirmed that recent investments in energy efficient equipment upgrades had paid off. We've never had insight with that level of detail and normalization before. Our building management team will be very excited to hear they outperformed expectations. The DeltaMeter report will be a great tool to use and share our success and generate enthusiasm among our leadership and engineering teams for implementing more improvements."

Garrison Marr, Energy and Resource Conservation Specialist, Snohomish County

By comparing energy consumption against this dynamic baseline, the DeltaMeter allows building operators to see the exact energy and financial impacts of specific changes and know whether they hit the mark on predicted energy savings.

In the future, Garrison said, a technology such as EnergyRM's DeltaMeter could be useful to test the success of their latest energy efficiency improvement project—installing de-stratification fans in the hangers to keep air moving for more efficient heating and cooling. Calculating potential savings from ceiling fans is not straightforward, but DeltaMeter could certainly help by trending building heating and cooling energy use and validating the efficiency improvement.



DeltaMeter® Monthly Reporting Graphic

EnergyRM's DeltaMeter uniquely offers tracking of specific operational and capital changes made to a building—operational and capital—and how they affect energy use and expenses. This "virtual metering" is followed by building operators on a graphically-rich online dashboard.

Honing in on energy-saving opportunities with confidence

"The VEA tool makes better sense of our energy data, providing intrinsic value for decision making. Even though it doesn't provide fully-scoped energy conservation measures without additional efforts, the industry should greatly value tools like this."

Ben Rupert, Energy Manager at King County

Ben Rupert, an energy manager with King County, found that Retroficiency's Virtual Energy Assessment (VEA) identified many of the same operational and retrofit opportunities for energy savings at the King County Courthouse that he had uncovered through in-house analysis and inspection, showing that these tools can be accurate and effective for identifying energy efficiency opportunities to investigate further. He also said that the validation provided

by an outside, impartial tool such as Retroficiency—and the rich visuals included in the reports—can increase leadership's level of confidence in financial decision making and help them communicate with operations staff about the importance of making changes.

The New Buildings Institute's FirstView offered a solid visual representation of an often complex picture of energy usage for the two King County buildings where it was tested through a less in-depth analysis than DeltaMeter or VEA. Using only basic monthly data and building characteristics, FirstView brings clarity to complex building information and allows less technical staff at public agencies to leapfrog early parts of a standard energy use analysis. Ultimately, tools like FirstView enable operations staff and decision makers to quickly access and organize information about the buildings in their portfolios, and move on to capital planning, project development, and implementation.

The screenshot shows the Retroficiency software interface. At the top, there are tabs for PORTFOLIO, REPORT (which is selected), and SEARCH. Below the tabs, there are three main sections: 'Savings Potential' (with a dropdown arrow), 'Current Snapshot' (with a dropdown arrow), and 'Recommendations' (with a dropdown arrow). The 'Current Snapshot' section is currently active. It displays an HVAC analysis for two buildings. For each building, there is a blue house-shaped icon with a percentage and some text. For the first building, the icons show 5% and '\$627,276 kWh \$131,728 Annual Savings'. For the second building, the icons show 5% and '322 tons CO2 reduction'. Below these icons, there are 'Details' sections with more information. The first section, '1. Building is both heating and cooling at same time', includes a 'Savings Potential' icon (blue bar with white bar) and a 'Payback Period' icon (circle with L-shape). The second section, '2. Building is active longer than necessary', also includes these two icons. To the right of the 'Payback Period' icons, there are 'Details' boxes with specific data: 'Analysis indicates that there are extended periods of simultaneous heating and cooling occurring within the building.' and 'Simultaneous heating and cooling in this building occurs between ... 52 °F and 57 °F'. Another 'Details' box for the second section states: 'Building appears to become active 06:00 while occupants arrive at 08:30 and shuts down at 22:15 while occupants leave at 18:15. Extended operations -- Before occupancy: 2.5 hours After occupancy: 4 hours.'



Technology supports efficiency and transparency in the public sector

The SBC technology demonstration and validation project clarified what virtual energy assessment technology can and cannot do to maximize both technical and human resources and improve energy efficiency in buildings. While these new technologies cannot replace in-depth site audits, they can save time and money upfront by



accessing and organizing data, conducting initial analyses, and identifying where to focus next-step energy-saving investigations.

Technology also provides reports that are ideal for engaging building staff, occupants, and financial decision makers in energy conservation planning and implementation. Over time, these new technologies will continue to get better at proactively managing building performance and validating the success of energy efficiency projects.

In the case of public sector buildings and portfolios, new technologies can help local and regional governments continue to implement and showcase increasingly effective energy conservation strategies and policies while helping to validate that taxpayer money was spent wisely.

For more information



www.smartbuildingscenter.org

For guidance on how to identify the best virtual energy assessment tools for you, please see the Technology Quick Guide on the SBC website, along with other project resources including a Market Snapshot analysis and case studies for multifamily buildings, portfolios, and commercial buildings.

Retroficiency VEA:

www.retroficiency.com

New Buildings Institute FirstView:

www.newbuildings.org/firstview

EnergyRM's DeltaMeter:

www.en-rm.com/

Technology capabilities



Baseline Benchmark Disaggregation Opportunity identification Portfolio management Reporting and Engagement Savings verification Monitoring



Baseline Benchmark Disaggregation Opportunity identification Reporting and Engagement Portfolio management



Baseline Benchmark Dashboard Disaggregation Monitoring Opportunity identification Portfolio management
Project tracking and management Reporting and Engagement Savings verification



Baseline Benchmark Data acquisition Monitoring Portfolio management Reporting and Engagement