

Collaboration Leads to State-of-the-Art Energy Auditing Tool

More Efficient, Investment-Grade Audits for 75% Less

Industry conducts thousands of building energy audits—and the methodology often varies widely. NREL experts quickly realized that the lack of standardized data collection and auditing processes was leading to inaccurate and inconsistent results, especially when comparing results across a spectrum of building types in a given portfolio, such as in federal agencies.

To address this, they sought a collaborative solution that would provide building energy managers, facilities managers, and others with standardized data, processes, and expert analysis, leading to more comprehensive audits and ultimately improving building efficiencies and reducing both auditing and overall building energy costs.

To start, NREL tapped in to the work it was already conducting with local software developer concept3D to develop the Building Component Library (BCL)—an online repository of energy data on individual building components or energy conservation measures that can be used to create building energy models using NREL’s OpenStudio and EnergyPlus tools, with data broken down into separate components that represent parts of a building.

“After identifying the need for standardized auditing processes and data management, we realized we could combine the lab’s commercial building energy analysis capabilities and auditing methodologies with concept3D’s software development expertise, including the BCL and their 3D geometry capture software, to provide investment-grade level 3 audits much faster and at a reduced cost when compared to traditional methods,” said NREL’s Larry Brackney.

Collaboration in Action

A truly collaborative effort, the simuwatt Audit tool integrates four proven components to streamline the auditing process, enabling smaller teams to conduct more efficient audits while reducing costs. The four proven components include:

- The BCL data repository
- NREL’s energy auditing methodology, which includes workflow processes for conducting an audit and gathering/reporting data
- NREL’s OpenStudio platform, which uses the data collected during the audit along with the BCL to automatically produce a whole-building energy model and analysis
- concept3D’s geometry capture software, which innovatively allows users to draw a 3D building as they walk through it or from architectural blueprints. concept3D also provides the central database to store collected data for future use.

simuwatt PV Aims to Reduce Installation Soft Costs

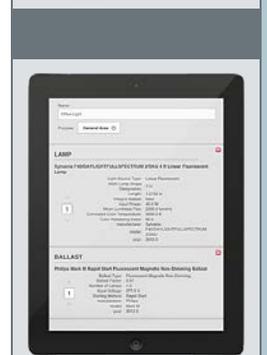
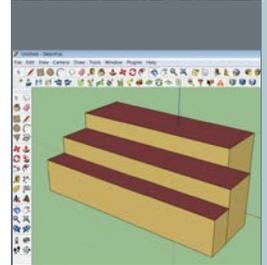
When the U.S. Department of Energy’s SunShot Initiative requested proposals for ways to reduce solar soft costs concept3D saw a natural progression to add solar pieces to the simuwatt tool.

Collaborating with NREL again, the team developed a proposal to develop and commercialize simuwatt PV, which will streamline the marketing process, sales call, site visit, bid preparation, and preliminary system design to a single visit.

simuwatt PV operates seamlessly within the auditing workflow by leveraging the same platform as simuwatt Audit and auto-generating 3D design and analysis—making it easy for an auditor to find cost benefits of solar installations while conducting a whole-building audit or providing the option to conduct only a solar assessment.

The tool also provides accurate estimates of hourly electricity use within the building, reducing the PV system design and layout time for the selected solar installer, improving the accuracy of the shading projections/energy production estimates, simplifying the process of laying out PV panels, and reducing the time required to move through the permitting process. Focused primarily on the commercial rooftop market, simuwatt PV aims to reduce PV system installation soft costs by up to \$0.30 per DC Watt.

Currently, simuwatt PV is in the hands of commercial PV system installers in California, Colorado, and Ohio, who are testing the tool and providing feedback to NREL and concept3D. concept3D plans for the application to be ready for full release by fall 2013.



Get More Information On:

- **Building Component Library:** <http://developer.nrel.gov/doc/building-component-library>
- **OpenStudio:** <https://openstudio.nrel.gov/>
- **simuwatt:** <http://simuwatt.com/>

Combining all these capabilities, the simuwatt Audit tool provides rigorous energy analysis for potential measures and automated reporting of recommendations.

Demonstrations with the Department of Defense

As timing would have it, the U.S. Department of Defense's (DOD's) Environmental Security Technology Certification Program (ESTCP), which conducts formal demonstrations at DOD facilities and sites in operational settings to document and validate improved performance and cost savings, sent out a solicitation that expanded these efforts to include software tool development and demonstration. What's more, the Energy Independence and Security Act of 2007 mandates that 25% of all federal buildings be audited each year—and DOD has the highest square footage to audit of any federal agency.

NREL and concept3D combined efforts to create a winning proposal for the DOD ESTCP, in which NREL and concept3D would work with DOD to demonstrate simuwatt Audit in action and further refine it based on field testing at DOD sites. By winning the award, NREL and concept3D were able to fund the complete integration of all the pieces necessary to demonstrate simuwatt Audit.

Demonstrations at DOD installations will begin at the following locations in August 2013 and end in December 2013:

- Naval Support Activity Monterey, Monterey, California
- Air Force Academy, Colorado Springs, Colorado
- Tyndall Air Force Base, Panama City, Florida
- U.S. Military Academy, West Point, New York
- U.S. Army Fort Jackson, Columbia, South Carolina

simuwatt Audit

Using NREL's advanced energy modeling framework and building energy audit processes, collaboration tools, in-app media, and concept3D's geometric capture software, combined with real-time connections to large sets of standardized data, the simuwatt Audit tablet-based application performs building energy audits faster than traditional methods.

By integrating the NREL Building Component Library, utility rates, weather information, and energy conservation measures, the tool provides investment-grade audits that cost 75% less than traditional audits and stores the data in a consistent and reusable format.

- Naval Facilities Engineering Command Southeast, Panama City, Florida.

concept3D, which holds an exclusive license to commercialize NREL's audit framework and a pending patent, will also work with commercial energy auditors, building managers, and facilities managers to conduct additional demonstrations of simuwatt Audit.

"What's been great for us is that we've gotten to serve as a commercial partner of sorts for NREL," said Oliver Davis, CEO and co-founder of concept3D. "We've been able to combine NREL's analysis and auditing expertise with our geometry capture and other software development tools to create a mobile application that will change the industry."

Other Potential Uses for simuwatt Audit

Because the data collected from each audit will be housed in a central database, auditors won't have to start from scratch each time they begin a new audit. What's more, the potential to aggregate the data collected during audits would enable portfolio-level analysis that can produce economies of scale for retrofits. Centralized data aggregation also creates opportunities to integrate audit data into asset and maintenance tracking systems.

NREL's deployment and market transformation activities encompass the laboratory's full range of technologies, which span the energy efficiency and renewable energy spectrum. NREL staff members educate partners on how they can advance sustainable energy applications and also provide clients with best practices for reducing barriers to innovation and market transformation.

NREL's mission is to be the leader in technology innovation and to advance renewable energy efforts around the world. Let NREL help propel your organization toward a more sustainable energy future.

For more information about NREL's deployment and market transformation activities, see our website at www.nrel.gov/tech_deployment.

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