

Case Study

Enterprise Coworking

simuwatt Identifies Energy Savings at a Low Cost



SUMMARY

Focus Property Group, a sustainably-minded property investor and developer, utilized simuwatt® Pro to perform ASHRAE Level I & Level II¹ energy assessments of their 66,000 sq.ft. coworking facility - Enterprise. Retrofitted in 2016, Focus earned Certifiably Green Denver's "Certificate of Environmental Excellence" through energy efficient upgrades, installation of a photovoltaic system, and electric vehicle (EV) charging stations. The goal of the assessment was to understand expected performance post-retrofit, identify improvements to address tenant comfort issues, and analyze the cost savings simuwatt can provide to the assessment process.

With simuwatt Pro, improvement measures were identified to reduce energy by up to 10% in a fraction of the time of traditional assessments. Analysis of these improvements was enabled using simuwatt Pro's advanced energy model automation that streamlines building information collected on-site into energy models ready for analysis. This captured building data will be reused by Focus Property Group to centralize building energy asset and operation information, plan CAPEX and OPEX improvements, and to track performance.



simuwatt reduced building data collection time by 34% through an industry standard approach, tablet access with camera integration, team collaboration tools including data merge, and access to a library of recommendations. Paired with flexible customization solutions, simuwatt was tailored for the preliminary assessment then followed by a more in-depth Level II team approach. simuwatt Pro dramatically reduced energy model setup by 90% with advanced energy model automation. Report generation reduced document assembly by 43%. simuwatt enabled more accurate data collection and analysis, reduced labor costs in the field, expedited reports, and provided reusable data for repeat assessments or energy management throughout the building lifecycle.

¹ "Procedures for Commercial Building Energy Audits", American Society of Heating, Refrigerating and Air-Conditioning Engineers (ASHRAE), 2011.

ASSESSMENT AT ENTERPRISE

OVERVIEW

ASHRAE Level I & II assessments were performed at Enterprise, a Denver multi-tenant co-working office space provider, owned by Focus Property Group, to identify improvement measures and capture savings using simuwatt. The facility houses 200 tenants across 66,000 square feet on three levels. A deep retrofit of the facility that was completed in 2016 included a photovoltaic system and electric vehicle (EV) charging stations, earned Enterprise a Certifiably Green Denver Certificate of Environmental Excellence.



Josh Fine, VP & General Counsel of Focus Property Group reviews improvement opportunities.

RAPID DATA COLLECTION

A preliminary, Level I assessment was performed to identify potential glaring issues and the supporting systems using simuwatt. simuwatt was configured prior to the walkthrough with basic site details, customized for a focused preliminary assessment, and then synced to an iPad for use offline at the site. The effort required one assessor 35 minutes from start to finish to record the major mechanical systems, take photographs with the built-in camera, and perform a quick walkthrough of the building. The resulting data could be exported from simuwatt to Microsoft Excel, or in our case, used as a starting point for a more in-depth Level II audit.

The Level II assessment surveyed all 143 spaces and 35 thermal zones within the facility, the building automation system, rooftop units, lighting systems, domestic hot water, water fixtures and the envelope. The efforts were divided between four assessors with varying building



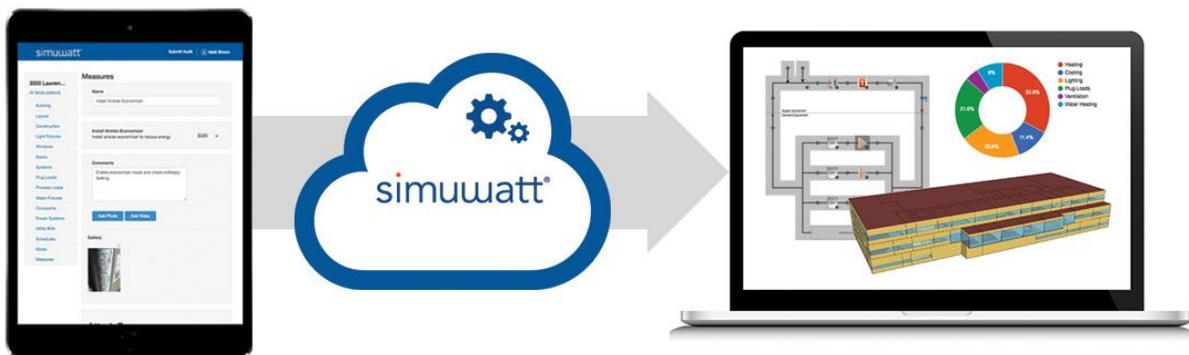
simuwatt in the field at Enterprise.

knowledge to reduce total site time, effectively utilize resources and increase accuracy. Each member was assigned a discipline including mechanical, envelope, lighting, and water. Individual tasks aligned with custom templates specific to their part of the audit allowing for distinct assignment of activities, standardized data collection, and to ensure accuracy of this data. Prior to the site visit, information from building plans were entered to focus site time on validation and energy/cost saving measure recommendations. The resulting data and photographs gathered from each member were merged into a single building data set in minutes.

The combined effort resulted in a 34% savings over the traditional data collection approach.

IMPROVING COMFORT THROUGH ENERGY MODELS

While the building has recently undergone a deep retrofit and contains a number of energy efficiency upgrades, Enterprise staff had collected a number of reports that offices temperatures were often uncomfortable. While traditional engineering analysis is often sufficient for calculating rough savings estimates for many energy conservation measures (ECMs), analyzing thermal comfort involves calculations not easily modeled in a spreadsheet. Building energy simulation models, which rely on a physics based calculation engine, are well suited for these kinds of analysis but require expert knowledge and are time consuming.



simuwatt Pro's intelligent energy model exports to OpenStudio and EnergyPlus reduced model setup time by 90% without expert modeling knowledge. This included automated setup of building data collected, geometry generation, and intelligence to fill in gaps with information from industry standards developed by ASHRAE, the California Energy Commission (CEC), the U.S. Department of Energy and others. The process within OpenStudio was straightforward:

add weather files, check that zones are correctly assigned to the appropriate air loop and run the model.

ANALYZING IMPROVEMENT OPPORTUNITIES

Using OpenStudio to perform building energy model simulations, energy conservation measures (ECMs) identified during the assessment were analyzed for impact. The facility was modeled at full occupancy to reflect typical operation of the facility in the future considering the recent retrofit. The baseline simulation illustrated that the facility is already very energy efficient. The baseline did identify thermal zones on the eastern side of the ground and basement floors that experienced a number of comfort issues - too cold or too hot - which corresponded to areas in the facility that the staff has identified as often being uncomfortable.

A summary of energy efficiency measures and packages of multiple measures can be found in the following table. The energy model enabled the analysis of interactions between energy efficiency measures in packages to understand positive or negative impacts on performance. The "Recommended Package" provided the most energy savings by reducing unmet hours in eastern zones and improving thermal comfort for tenants.

Measure	Description	Estimated Energy Savings
Enable Economizer Control	Enable economizers on air handling units. Eliminates cooling during the heating season and reduces comfort complaints.	1.6%
Increase Data Center Setpoint Temperature	Increase small data center setpoint temperature to ASHRAE design guidelines.	0.1%
Add Demand Controlled Ventilation (DCV)	Add DCV to variable use spaces. Reduce unnecessary conditioning and decrease comfort complaints.	8.1%
Recommended Package	Enable Economizer Control, Add DCV, Increase Data Center Setpoint	10.4%

Enable Economizer Control

Interestingly, economizer control has been disabled for all 8 air handling units (AHUs) in the facility. Enabling economizer mode found some small energy savings by eliminating cooling during the heating season. Additionally, the measure reduced unmet hours throughout the problematic east zones on the ground floor, eliminating unmet hours in some zones while reducing the number of hours in the most problematic zone by about 30%.

Increase Data Center Setpoint Temperature

The IT room in the basement of the facility contained several servers and switch gear. The room was conditioned by a small CRAC unit with the setpoint set to 65F. Contrary to popular

belief, ASHRAE design guides for data centers report that data centers can be safely maintained at 80F², which allows for significant economizer opportunity.

Add Demand Controlled Ventilation (DCV)

Since the facility is a coworking office and has a large number of variably occupied spaces (conference rooms, open offices), DCV has the potential to account for periods of time when many spaces are underused. The measure resulted in an 8.1% reduction in energy consumption and reduced the number of unmet hours in the eastern ground floor zones by about the same amount as enabling economizer control.

Recommended Package

By packaging several measures together we can take advantage of synergies that increase savings beyond that of the individual measures. Enabling economizers and installing DCV capabilities work to decrease energy consumption by providing free cooling and limiting the amount of time spent conditioning unused spaces, while increasing the data center setpoint brings it in line with ASHRAE recommendations and reduces air conditioning expenses for a largely unused space. Enabling economizer control has the additional benefit of reducing comfort problems by increasing ventilation and limiting overcooling of spaces.

REDUCING REPORTING TIME

In addition to exports for analytical purposes, an editable inventory and operation report was instantly output to Microsoft Word for use as a standalone facility report and for inclusion in an audit report. The generation of this report for Enterprise saved 43% on the time to organize information and photographs and assemble them into a document.

CONCLUSIONS

With simuwatt, Focus Property Group identified improvements to reduce energy by up to 10% using a reliable analysis approach, and captured living building data to be reused to centralize building energy asset and operation information, plan CAPEX and OPEX improvements, and to track performance over time.

simuwatt's suite of solutions reduced building data collection by 34%, energy model setup by 90%, and reporting by 43%. simuwatt enabled more accurate data collection and analysis, reduced labor costs in the field, expedited reports, and provided reusable data for repeat assessments or energy management throughout the building lifecycle.

Improve your process today with simuwatt. Contact us - inquiries@simuwatt.com

² Steinbrecher, Robin A., and Roger Schmidt. "Data Center Environments: ASHRAE's Evolving Thermal Guidelines." ASHRAE Journal, vol. 53, no. 12, 2011, pp. 42.