

Fast Facts

Description:

SPU's campus-wide commissioning program takes a holistic approach to energy management

This effort addressed 25 of 95 buildings in the portfolio.

Project Owner:

Seattle Pacific University

Completed: 2015

Objective:

Use Cx program to support SPU's Climate Action Plan to become climate neutral by 2036

Results

Capital improvement recommendations and maintenance items identified will help SPU achieve its 20% natural gas reduction target

USING RETRO-COMMISSIONING TO TACKLE A CAMPUS CARBON FOOTPRINT AT SPU



Seattle Pacific University is a private college campus with more than 4,000 undergraduate and graduate students, located in the heart of Seattle, Washington. As a Christian university, SPU considers sustainability to be both an environmental and social justice issue, and has long considered responsible resource use part of its mission.

In 2008 SPU's ninth President, Philip W. Eaton, signed the American College and University Presidents' Climate Commitment, pledging to pursue carbon neutrality. By 2010, university leadership formally adopted an ambitious climate action plan with a long-term goal to become climate neutral by 2036.

"SPU has increased our push toward environmental stewardship in recent years," said Bethany Davis, sustainability coordinator at SPU. "With a goal of becoming climate neutral by 2036, sustainability is a priority, and every step to address energy saving gets us closer to this goal."

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Dev DuRuz, Commissioning Agent, Paladino

Through a carbon footprint analysis, SPU found that its most significant source of direct greenhouse gas emissions was through natural gas use in its facilities. So the university set a short-term goal to reduce natural gas use by 20%.

How do you know how a building is *really* performing?

Building commissioning is typically implemented during construction, and is the process of verifying that the building and its systems are constructed, installed and operating as intended. When applied to an existing building, this process is called retro-commissioning, or retro-Cx. SPU needed insight into their existing buildings, so they enlisted an outside consultant, Paladino and Company, to conduct energy analysis and retro-commissioning for 25 campus buildings out of its 95-building portfolio.

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Typically, the retro-Cx process is applied building-by-building and includes a thorough audit of the building systems, interviews with operations staff and occupants, and the creation of targeted facility improvement measures. With 25 buildings selected for the retro-Cx program however, SPU needed a faster and more cost effective approach.

Bringing it all together

Like many campuses, SPU’s building portfolio represents a diverse mix of ages, condition, use types and construction methods. A campus-wide commissioning approach was implemented to take advantage of common building characteristics and practices of the operations team, while allowing SPU to address building-specific challenges.

The effort required the input of SPU’s utility providers, students and staff who occupy the buildings, and facility staff who manage the buildings. To begin, SPU and Paladino commissioning agents conducted occupant comfort surveys, reviewed building documentation, and conducted walk-throughs to evaluate the portfolio.

The Paladino team then grouped buildings by program – such as residential, office, or classroom – and then established a mean energy use intensity (EUI) for each building type, based on utility data and information from the building management system. By establishing a mean EUI and plan for each program, the team could identify outliers and determine strategies to reduce the EUI to the target for each building type group.

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Dave Church, Assistant VP for Facility Management, SPU



Unlock data to manage energy in Real Time

Through a partnership with Seattle’s [Smart Buildings Center](#), SPU piloted [Buildpulse](#), a smart sensor energy monitoring and management system. Buildpulse helps building owners and operators unlock the data in their building automation and control systems. It uses more than 60 sets of automated rules that run across normalized building automation systems (BAS) data to identify and report energy saving and operational improvement opportunities.

Leveraging the existing smart sensors and submeters installed previously at the SPU campus, the Buildpulse hardware captures system and building level performance data real-time with a granularity down to 15 seconds for all buildings. This data is then sent automatically to an online dashboard, providing real time visibility into the portfolio’s performance and ultimately streamlining the benchmarking process. In addition to system performance, Buildpulse captures utility consumption data from installed submeters and presents real-time EUI information.

While tracked separately at SPU, the Buildpulse dashboard can track other sustainability metrics such as water consumption, carbon emissions, waste/recycling, ENERGY STAR, and utility data, and can be used to illustrate the progress being made against a university’s climate action plan.

Hidden opportunities are revealed

Once the mean EUI for each program was established, the team identified which buildings in each group were performing well and which needed to boost performance. A set of possible strategies linked directly to energy and carbon reduction impacts were established for each building to rectify issues.

Per a pre-determined plan, site commissioning was conducted targeting the strategy to ensure data integrity. Using Buildpulse to supplement commissioning practices across the portfolio, the team was able to detect several energy wasting issues. For example, SPU’s Alexander Hall, a historic 11,100 SF building constructed in 1893 and undergoing renovations, was the first building where Buildpulse was deployed. Through the collection of the building’s HVAC point data, Buildpulse’s automated reporting identified units

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running 24 hours versus the intended BAS scheduled 8 a.m. - 6 p.m. for its variable refrigerant flow system (VRF).

A commissioning engineer supervised corrective action and confirmed that after the gateway was re-programmed, the VRF units were enabled in the occupied mode from 8 a.m. - 6 p.m. as specified.

“The Buildpulse technology supported the discovery of this programming error, and did it faster than through typical means.” said DuRuz.

Buildpulse was also used to monitor a natural gas-fired central boiler system that serves four SPU buildings. Six additional energy saving opportunities, including detection of issues with the duct heater and loop pumps were identified through a review of the data by a Cx engineer using Buildpulse as a supplementary tool.

Simple changes deliver big value

Optimizing set points and maintaining operation schedule reduced building energy use and operational costs significantly. By detecting these issues, energy savings generally exceeded retro-Cx costs by a factor of five. When factoring in labor costs, an estimated \$15,000 was saved as opposed to the traditional retro-Cx engineering and sub-contractor coordination process.

Simple changes, such as setting back the temperature in unoccupied space by 10° to 15° for 8 hours, can save SPU 5% to 15% per year on a heating bill - or as much as 1% for each degree.

“Conserving energy is a no-brainer. It’s our obligation as an institution, as citizens, and as responsible operators of a university,” said Dave Church, assistant vice president for facility management at SPU. “The results of this effort affirmed that conservation can have a major impact without causing major disruption. We look forward to taking this same smart approach to sustainability further in the coming year.”

Overall, the capital improvement recommendations and maintenance items identified will help SPU achieve its 20% natural gas reduction target.

About Paladino

Paladino is an industry-leading green building consulting firm providing sustainability expertise over a wide range of building and business issues. We work with high aspiration organizations of all sizes to develop advanced green building strategies for new and existing construction.

A pioneer of the green building movement, Paladino’s esteemed clients include ConAgra Foods, Starbucks, PNC Financial Services, Microsoft, Verizon Wireless, Corporate Office Properties Trust and more. At Paladino, we help our clients create business value by optimizing human, environmental and financial performance. Our technical approaches center on the unique concept of abundance as a driving force for organizational transformation.

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