



SOLUTION AT A GLANCE: STANFORD UNIVERSITY'S ENERGY AND CLIMATE PLAN

SECTOR

Education

TOOL TYPE

Energy Management Guides

BUILDING TYPE

College or university

BUILDING SIZE

10-25 million square feet

SUMMARY

Stanford University's Energy and Climate Plan immediately reduces campus GHG emissions by 68 percent and potable water use by 15 percent while opening a path to full energy sustainability over time through greening the campus electricity supply.

OVERVIEW

The goal of Stanford University's long-range energy and climate plan is to strike a balance between the critical needs of climate action and energy production and the requirements inherent in operating a large university. The Department of Sustainability and Energy Management led a collaborative plan development process that included a peer-review, resulting in a three-pronged approach: energy efficiency in existing buildings, energy efficiency in new building design, and decarbonization of energy supply.

Solution

The Energy and Climate Plan was designed with the vision of applying Stanford's intellectual and financial resources to provide leadership in climate change solutions through a long-term, holistic, and flexible approach. It highlighted and built upon existing energy efficiency guidelines and retrofit programs and introduced a completely new approach to energy supply.

Changes to Stanford's energy supply are a major focus of the Energy and Climate Plan. Analysis found that the 1987-vintage natural gas-powered cogeneration facility that provided electricity and heat to the campus was producing 90% of Stanford's GHG emissions and reaching the end of its useful life. The plan evaluated the life-cycle cost, GHG impact, and water reduction potential of nine different energy supply systems. During the evaluation, it was discovered that there is significant simultaneous overlap between the campus' heating and cooling demand--70% of the waste heat from the chilled water system could be reused to meet 93% of campus heating loads. The final analysis found the energy system that was largely powered by renewable electricity and used heat recovery to provide hot water to the campus had the lowest life-cycle cost, greatest GHG emissions reductions, and largest water savings. This innovative approach would be the first district-level heat-recovery facility in the world and would be named SESI—Stanford Energy System Innovations.

The plan integrated input from all stakeholders on campus, while maintaining steady communication with Stanford leadership: the Executive Cabinet and the Board of Trustees. Two different faculty advisement committees actively participated during the inception phase of the project. A report was prepared in 2008 and presented to the university administration for initial review. Subsequent reviews with more detailed analysis were held with the Board of Trustees in 2009, 2010 and throughout 2011. In December 2011, Stanford's Board of Trustees gave concept approval to the \$485 million SESI project. In total, over the entire course of SESI planning and implementation, more than 25 faculty members and 100 students were involved through student groups and departmental queries.

Outcome

The solutions provided by the Energy and Climate Plan not only represent the most economical energy options, but also immediately reduce campus GHG emissions by 68 percent and potable water use by 15 percent while opening a path to full energy sustainability over time through greening the campus electricity supply. Serving as a blueprint for implementation, this plan demonstrates long-term cost effectiveness and sustainable natural resource use; guides development of critical campus infrastructure; and reduces economic and regulatory risks to Stanford's long-term energy supply. It provides a vision for the campus' energy future while maintaining flexibility through a comprehensive, long-term approach to the challenge of reducing campus emissions. The dramatic emissions reductions resulting from this plan are notable as they come against the headwinds of campus growth, and without relying on market carbon instruments.

Now that the full impact of SESI has been achieved, Stanford is updating its plan to incorporate its newly announced 80% emissions reduction goal and describe a path to being completely carbon free.