Stanford University upgrades to district energy system

Bold solution creates economic and sustainable gains

For more than three decades, Stanford University has played a leading role in the pursuit of minimized environmental footprint derived from campus activities. The institution has stringent building standards and separate energy metering in all facilities – along with investment in water conservation, renewable energy and sustainable on-campus commuting.

Bold solution creates economic and sustainable gains

Since 1987, their energy has been produced in a cogeneration plant fuelled with natural gas and using steam as heat transfer medium. Waste heat from the combustion process produced electricity, while most of the heat generated from the cooling processes evaporated into the atmosphere.

The Sustainability and Energy Management Department wanted to recover the waste energy to meet the campus heating needs too. This goal was timed just as the steam turbines were approaching the end of their life cycle and plant owner contract was expiring. It was the perfect time to redesign the 1987 system for new sustainability goals.

The key elements of the new system

- New Central Energy Facility (CEF) including a heat recovery plant
- Direct and continuous access to the California electricity market
- Conversion of the thermal distribution system from steam to hot water
- Extensive hot water pipe system (19.8 miles)
- New electrical substation
- Advanced, patented control system developed at Stanford
- Thermal energy storage

Big results

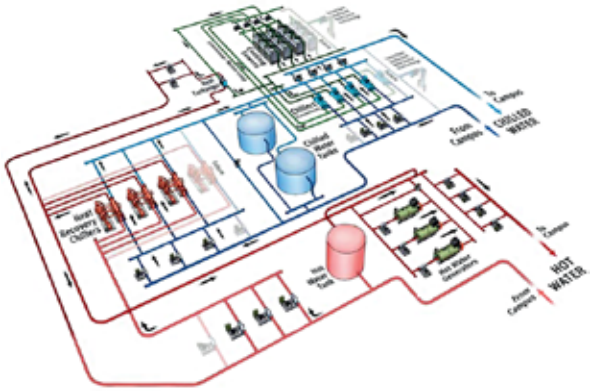
- 50% reduction in CO_2 emissions the first year
- 18% reduction in water usage the first year
- $300 million savings projected by 2050

Sustainability goals prompted the right time to redesign

The Stanford team researched solutions for more than four years to find the best equipment suppliers. Since Scandinavian countries have an impressive record when it comes to district energy systems, Alfa Laval was selected for unmatched global heat transfer experience.

The Alfa Laval team worked to review the preliminary plan and 3D model and explained how the heat exchanger system would integrate with the existing building system. From design to installation and troubleshooting, Alfa Laval partnered with the University's contractors and internal team to ensure the project stayed on schedule.

Stanford University made the leap from 30 years of combined heat and power production by natural gas to an Alfa Laval solution of combined heat and cooling process based on electricity.



SESI Central Energy Facility 3D Process Schematic

Fast facts – Stanford University

The customer – Stanford University was founded in 1885 and has more than 17,000 students on an 8,648-acre campus in the center of the San Francisco peninsula. It features roughly 630 buildings, 1,194 faculty houses and another 2,145 units for faculty and staff, 140 retail stores and 150 companies in the Research Park.

The challenge – Integration of heat exchangers with a new, first-of-its-kind campus heating system, along with start-up assistance and troubleshooting. Flexible interaction with a constantly evolving customized project scheme.

The solution – High degree of technological flexibility thanks to the modular structure of the Alfa Laval system. Continuous on-site presence and communication with all people involved.

Benefits – Alfa Laval has been a leader in heat exchange technology since 1933. The customer was impressed with Alfa Laval's design understanding as well as troubleshooting expertise and responsiveness.

Energy savings
USD 8.5 million annually

Emissions reductions
50% annually

Resource savings

How to contact Alfa Laval

Up-to-date Alfa Laval contact details for all countries are always available on our website at www.alfalaval.com

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