

FREQUENTLY ASKED QUESTIONS: STANFORD ENERGY SYSTEM INNOVATIONS (SESI) PROGRAM



1. What is the SESI program?

Answer: SESI stands for Stanford Energy System Innovations. The SESI program is a new university sustainability program designed to meet the energy needs of Stanford campus through 2050 with flexibility and innovation. It is a key component of the university's Energy and Climate Plan and represents a significant transformation of the university from 100 percent fossil-fuel-based cogeneration to a more efficient, electrically-powered heat recovery system.

2. What are the major elements of the SESI program?

Answer: SESI includes the following elements:

- An innovative new Central Energy Facility (CEF) that utilizes heat recovery and thermal storage to maximize efficiency in the university's heating and cooling systems. Located on the west side of campus, the new CEF frees up core campus land for new academic buildings after demolition of the existing cogeneration plant.
- A new electrical substation located next to the new CEF that provides new capacity and Direct Access to the grid.
- A new hot water distribution system that replaced the steam system and involved installing more than 20 miles of pipes across campus.
- Updates to the mechanical systems of 155 buildings to receive hot water instead of steam for heating and hot water services.

3. Where is the new CEF located? Is it open to the public?

Answer: The new CEF is located near the Searsville Lot at 506 Oak Road, which connects to Campus Drive West via Stock Farm Road and Welch Road. The exterior and courtyard of the CEF are open to the public. The facility was designed to be a learning center and many key components are visible from the exterior, including the heat recovery chillers and the thermal storage towers. Signage throughout these spaces provide an opportunity for a self-guided tour.

4. How can I see more of the new Central Energy Facility?

Answer: Tours will be offered on a bi-weekly basis, and visitors can opt for a general or more technical experience. To book a tour, visit <http://sustainable.stanford.edu>. For high-resolution photographs of the Central Energy Facility, please visit <http://newsphotos.stanford.edu/sesi/>

5. What is the environmental impact?

Answer: SESI will reduce Stanford's greenhouse gas emissions by 68%

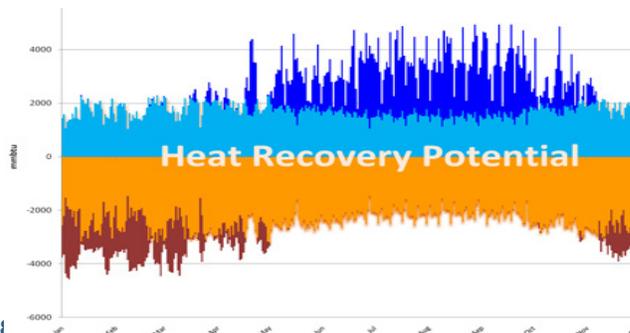
from 2013 levels. 50% of that reduction will come from increased efficiencies of the CEF and steam-to-hot-water conversion, and another 18% percent will come from procuring electricity from renewable sources, including solar, wind and geothermal. At the same time, the new CEF will reduce Stanford's potable water consumption by 15%. Instead of using cooling towers that rely on water to evaporate waste heat, the heat-recovery chillers capture it for reuse.

6. How much did this initiative cost? Will there be savings?

Answer: The investment for the projects included in the SESI program is \$485 million, which was in the middle of the range of capital cost options necessary to replace the aging cogeneration plant. SESI provides the lowest lifecycle cost and environmental impact of all the options, and will save the university more than \$420 million over time.

7. What is Heat Recovery and how does it work?

Answer: Heat Recovery extracts excess heat from chilled water used for cooling and recycles it to meet concurrent heating needs. Stanford's many varied pursuits, from cutting-edge research to olympic-level athletic facilities, result in a 70% real-time overlap of heating and cooling demands on campus. The new heat recovery system collects waste heat from buildings via a chilled-water loop and captures it at the Central Energy Facility (CEF) for reuse, eliminating the need for cooling towers to discharge the heat. Instead, the heat recovery chillers move the waste heat collected from the chilled-water loop to a new hot-water loop that then distributes heat to buildings.



The simultaneous overlap of annual heating and cooling demand on campus

Answer: The old combined heat and power plant has been decommissioned and the site will be cleared to make space for new academic buildings.

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