



ENERGY GENERATION, PURCHASING & DISTRIBUTION

Energy is by far the largest contributor to the campus' emissions inventory. The iCAP focuses on a detailed strategy of building energy conservation, de-carbonizing generation systems, and the addition of renewable energy sources. This "conserve-and-load" approach is achievable, affordable, and implementable. The 2015 iCAP calls for a reduction in building energy use of 30 percent by FY20.

Progress on efforts to de-carbonize our energy generation systems is monitored by the Energy Generation, Purchasing and Distribution (EGEN) SWATeam.

OBJECTIVES

3.1. The EGEN SWATeam, in collaboration with Facilities & Services and topical consultation groups, will lead an exploration of options for 100% clean campus energy during FY16, and submit recommendations through campus sustainability process.

Status:
In progress

- **COMPLETE:** A 200 kW biomass boiler was commissioned at the Energy Farm in June 2017. This system will provide all of the heat for the greenhouse at the Energy Farm, replacing the current propane energy source. Future expansion will look at additional buildings on the Energy Farm that use excess capacity of the biomass boiler system during off-peak heating periods.
- A team at the Illinois State Geological Survey led by Yu-Feng Forrest Lin has been conducting a geothermal study on campus, including high resolution subsurface temperature profiling and geothermal property analysis. The team drilled 330 feet and installed a geothermal loop and fiberoptic cables at the Geothermal Research Station in the Energy Farm. Results will help determine the costs and efficiency of geothermal exchange on campus.
- A DOE-funded research project on utilizing heated fluid from deep aquifers on campus has been started in Oct. 1, 2017. This feasibility study led by Lin will determine if there are opportunities for harvesting the heat from the subsurface fluid to serve multiple buildings on campus (e.g., Energy Farm) and similar applications (e.g., military bases).

3.3. Expand purchases of clean energy. By FY20, obtain at least 120,000 MWh per year and by FY25 at least 140,000 MWh per year from low-carbon energy sources.

Status:
In progress

- A request was submitted to allow longer-term contracts for the purchase of renewable power. iSEE is reviewing this request with campus legal counsel to determine what options exist and potential next steps.
- **COMPLETE:** A power purchase agreement (PPA) has been executed for the purchase of ~25,000 MWh of wind power annually for 10 years.
- **COMPLETE:** Total purchase of wind power in FY17 (began in November 2016) was 19,856 MWh.

3.2. Expand on-campus solar energy production. By FY20, produce at least 12,500 MWh/year, and by FY25 at least 25,000 MWh/year, from solar installations on campus property.

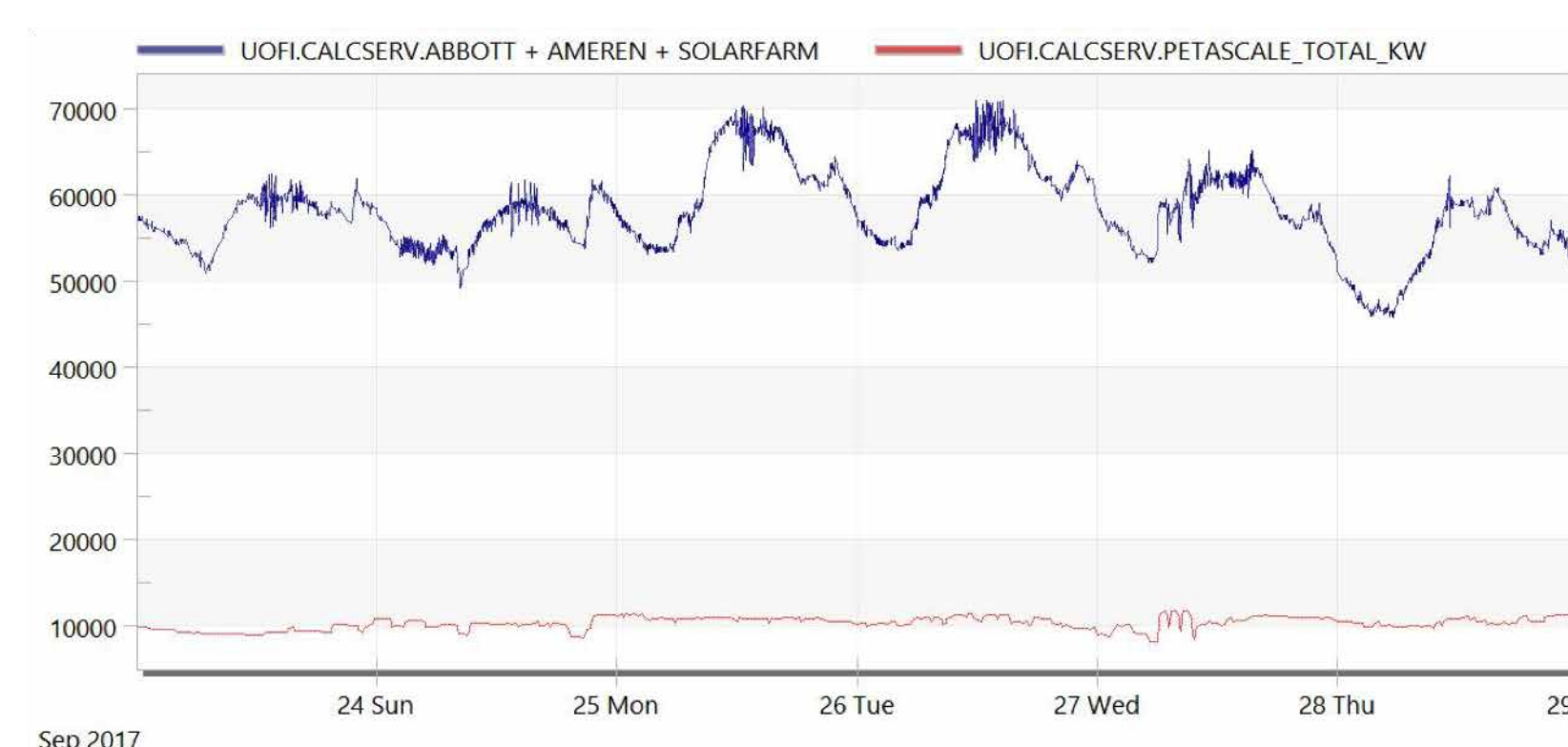
Status:
In progress

- **COMPLETE:** Solar farm was put into operation in December 2015.
- **COMPLETE:** Total generation for on-campus solar in FY16 was 3,971 MWh/year and 7,084 MWh/year in FY17. Total generation from the solar farm through September 2017 is 11,175 MWh.
- **COMPLETE:** Additional existing installations include Building Research Council (15 kW), Business Instructional Facility (33 kW), and Wassaja Hall (33kW).
- Projects in progress including a 300 kW system on top of ECE building (installation planned by May 2018) and a 1.2 MW system on North Campus Parking Deck (funding needs to be secured).
- A recommendation to require all new buildings on campus to include a solar array covering the majority of rooftop surface area was submitted to the iCAP Working Group in February 2017.
- A recommendation to start a project to expand the existing Solar Farm or install a larger farm in a new location was submitted to the iCAP Working Group in April 2017.

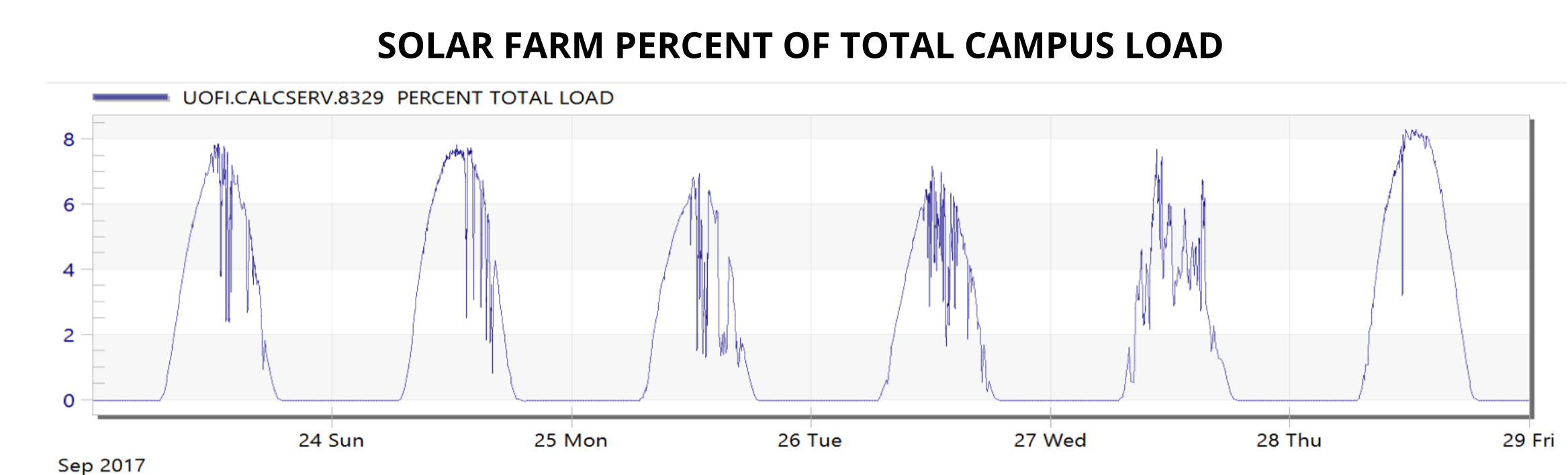
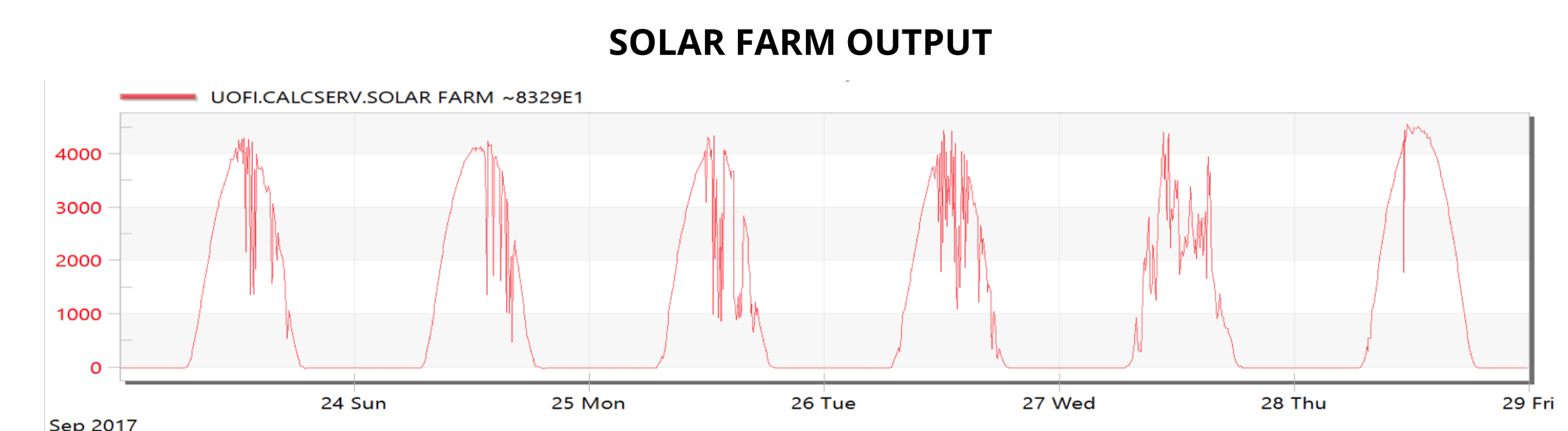
3.4. Offset all emissions from the National Petascale Computing Facility (and other successor facilities) by FY18.

Status:
In progress

- A recommendation was submitted to the iCAP Working Group in February 2017 to continue discussions with the Vice Chancellor for Research and NCSA about planning a budget to procure offsets for Petascale emissions. iSEE (Ximing Cai) is reviewing this objective with NCSA.
- Graph depicting total campus electric demand (in blue), and total Petascale electric demand (in red).



SOLAR FARM PERFORMANCE



TEAM MEMBERS



ACKNOWLEDGEMENTS

The EGEN SWATeam would like to recognize past members Jack Morrissey, Catherine Yee, John Flanagan and professor Scott Willenbrock for their participation on our committee.