ILLINOIS

The Illinois Energy Enterprise

Facilities & Services • University of Illinois at Urbana-Champaign

The University of Illinois at Urbana-Champaign is looking to the future and developing a strategy to meet the evolving energy needs of the campus. After several years of addressing deficiencies in utility production, distribution, and monitoring, the campus is proactively shaping its energy enterprise. The university is uniquely positioned to serve as a large-scale laboratory to test theories and potential technological advancements through collaboration with faculty members, researchers, and industry partners.

The new Energy Management Control Center will provide systems integration to achieve even more cost and energy efficiency. Integrated data and control systems will deliver improved demand and consumption forecasting while helping to identify opportunities for enhanced market-based decisions.

Since FY08, the university has reduced energy consumption by 28%. A reduction of 31.5% is expected by the end of FY13, which would exceed the **Illinois Climate Action Plan** (iCAP) goal of 30% by FY20. Funding from campus, student organizations, and energy conservation grants allow the university to integrate new technologies and streamline the processes of a $100M per year energy business. This business features a wholly-owned utility enterprise consisting of Abbott Power Plant, the main campus electrical substation, natural gas transmission pipeline, Campus Chilled Water System, and associated distribution systems.

Optimizing Our Entire Energy Portfolio

Over the last 10 years, the University of Illinois has reduced energy consumption more rapidly than its peers, vaulting to the top of the Big Ten. Illinois is also first with the least BTUs per square foot among like peer institutions (Sightlines, LLC 2012 survey). These results have been achieved through Retrocommissioning, Energy Service Companies (ESCOs), eDNA energy billing system, lighting retrofits, and a Thermal Energy Storage tank.

Retrocommissioning has improved the operation and maintenance systems of 40 campus buildings with an average 28% energy avoidance.

The $21M **Veterinary Medicine Complex ESCO** project is expected to provide approximately 40% reduction in energy consumption.

A large scale **lighting retrofit project** is upgrading older inefficient fluorescent lighting systems with more efficient fluorescent systems, saving an estimated $1M annually and reducing buildings' electrical use by 40% to 50%.

Facility managers receive real-time energy consumption and cost information through the **eDNA Billing System** and its metering, billing, and reporting components.

A 6.2M gallon **Thermal Energy Storage** tank allows the production of reserved chilled water capacity at night during off-peak hours when electricity costs are normally lower. Further integration between demand, production, and the real-time market can be optimized during unpredicted events (See trend on next page).

Nearly $10M in energy grants have helped to fund these projects. Funding sources include:

- Department of Commerce and Economic Opportunity
- Illinois Clean Energy Community Foundation
- Student Sustainability Committee

continued

The Future of Energy at Illinois

With the newly debuted **Energy Management Control Center**, Utilities & Energy Services (UES) can display and analyze data, coordinate and maintain uniformity on how controls are set up, integrate distribution in all campus control systems, and quickly determine what service is needed and who needs to perform it. The control center provides the capability to resolve some service issues before the customer even knows there is a problem. The center will also help UES evaluate forecast loads respective to market prices and better determine asset allocation for enhanced cost effectiveness. Seven full-time Systems & Controls programmers and two Retrocommissioning teams can better monitor computer-controlled HVAC systems, card access systems, chilled water, and various energy metering systems. It will also enable remote access to controls for Abbott Power Plant, chilled waters plants, and the Thermal Energy Storage tank.

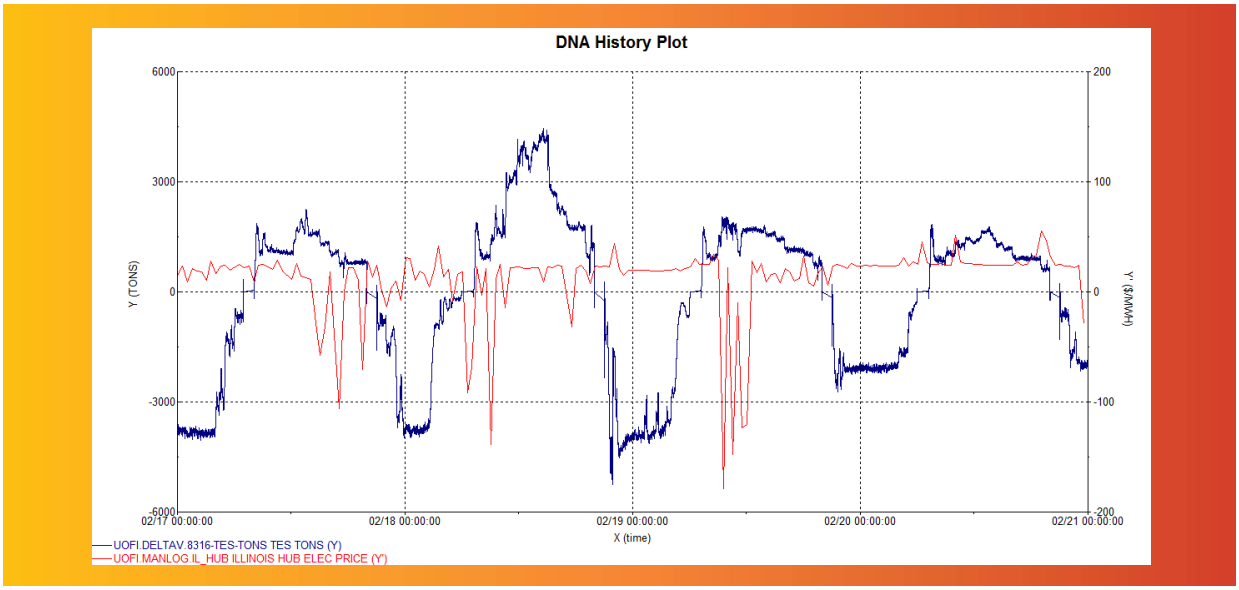
UES is currently developing a **Utilities Master Plan** examining campus energy production and distribution to project future needs. The plan will present options and associated impacts to address the iCAP's targets for a reduction in building energy consumption and greenhouse gas emissions of 40% by 2025, and also seeks to meet the state's Renewable Portfolio Standard of 25% electricity from renewable sources by 2025. It emphasizes solutions for eliminating coal combustion by 2017 and an alternative generation and distribution system for thermal energy on campus. The Utilities Master Plan will evaluate infrastructure requirements to meet future energy needs based on campus input regarding space utilization type and quantity (growth) as well as further investments in conservation.

Research, Education, and Operations

The **Electrical Computer Engineering(ECE) building** project is striving for a net-zero energy design and incorporates contributions of ECE faculty and staff, including the most recent LED and fluorescent lighting advances, heat pumps, active chilled beams, energy conversion systems that maximize new achievements in power electronics, and intelligent systems and interfaces that apply recent breakthroughs in computer technology.

The university's Center for a Sustainable Environment has created a **Sustainability Fellows Program**, designed to engage faculty in specific Facilities & Services initiatives occurring with the existing and future infrastructure on campus. Projects include a solar farm, anaerobic digester, energy dashboard, and green infrastructure.

Conceived and launched by the University of Illinois, **Illinois Ventures** is a top 100 venture capital firm focused on research-derived companies in information technologies, physical sciences, life sciences, and clean technology. Illinois Ventures starts and builds globally competitive businesses based on work conducted at Midwest universities and federal laboratories.



A video on The Illinois Energy Enterprise is available at: **https://uofi.box.com/illinoisenergy**