

# Building Analytics Success Story

## University of California, Davis

UC Davis has a long-standing commitment to energy efficiency and building analytics – and it shows. As an early adopter of energy management and information systems (EMIS) they have had almost a decade of continuously improving the quality of their data, skills, and tools to reap significant savings. The campus energy team has now moved to a new level with campus-wide occupant engagement dashboards and a fault detection & diagnostics (FDD) pilot.

### Fault Detection & Diagnostics Pilot

UC Davis has chosen two buildings as a pilot for SkySpark fault detection and diagnostics (FDD) software. Having already improved performance through existing building commissioning (EBCx) and a review of building automation system (BAS) controls, FDD software preserves those savings and enables deeper analysis with continuous monitoring.

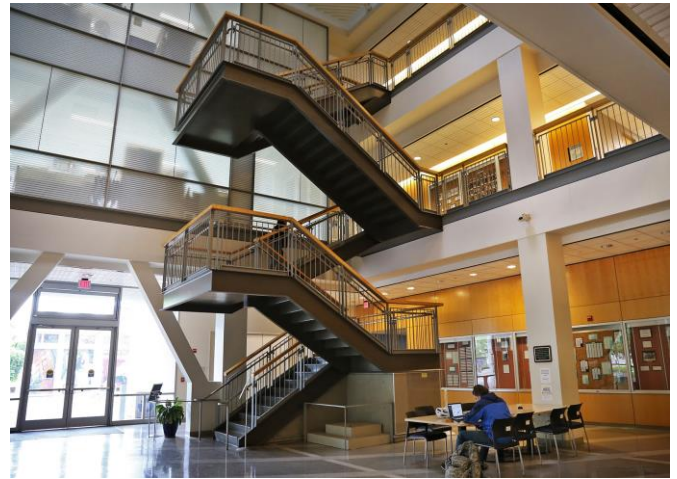
#### What is FDD?

Fault Detection and Diagnostic (FDD) software identifies building systems with suboptimal performance. FDD is a type of energy management and information system (EMIS) that analyzes BAS data.

The types of optimization opportunities uncovered by the FDD software to date include:

- Temperature sensor failure
- Valves cycling on/off unnecessarily
- Smoke dampers stuck closed
- HVAC operation not matched to occupancy

The two pilot buildings have reaped 22% and 24% savings through the combined EBCx/FDD efforts.



*We use FDD to look for sensor values that are constant. We've found significant savings related to failed sensors*

*- Sam Cole, Energy Project Engineer*

#### Quick Facts

**Location:** Davis, California

**Building type:** Classrooms, Labs, Offices, Assembly Spaces

**Gross floor area with EMIS:** 8 million square feet

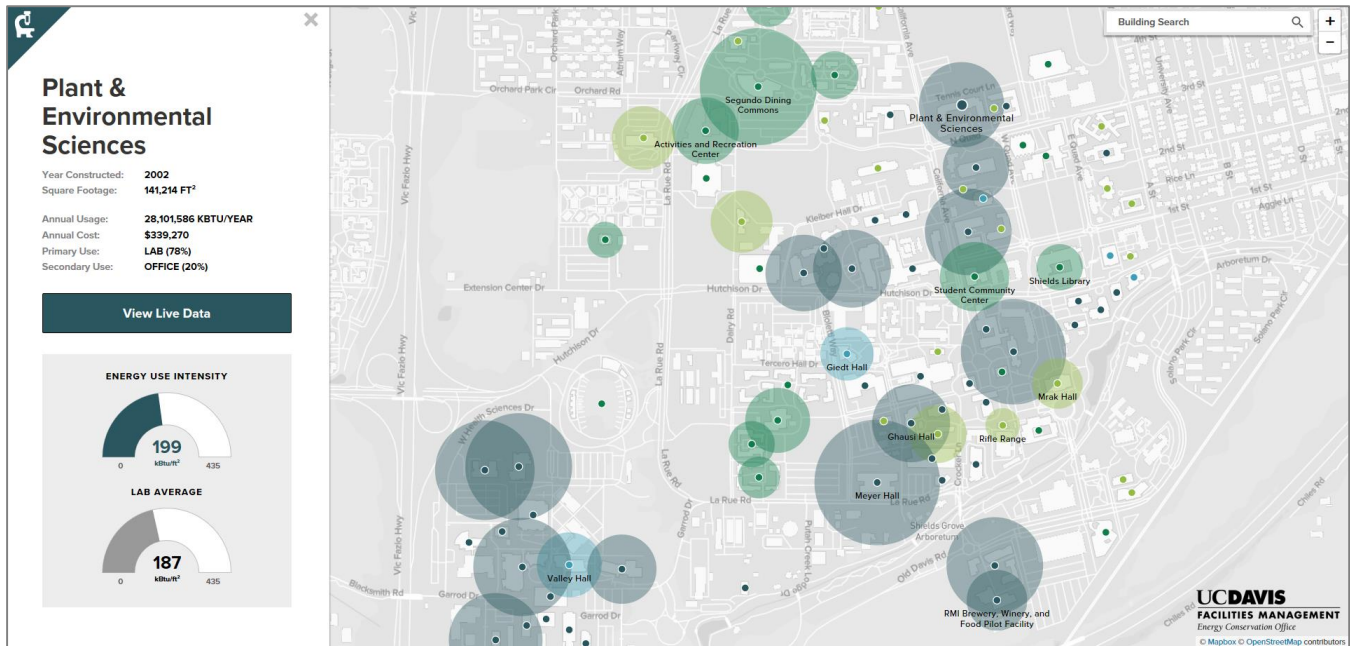
**FDD Tools:** SkySpark

**EIS tools (developed in-house):** Campus Energy Education Dashboard (CEED), and TherMOOstat occupant feedback dashboard/app

**Energy Savings:** 22% and 24% (pilot buildings)

### Smart Energy Analytics Campaign: Recognition for Innovation in the Use of EMIS

University of California Davis received national recognition from the U.S. Department of Energy's Smart Energy Analytics Campaign in 2017, acknowledging their exemplary work to save energy through the use of EMIS.



UC Davis developed the public Campus Energy Education Dashboard (CEED) to raise awareness (Source: UC Davis)

## Occupant Engagement Dashboards

In 2014 UC Davis developed a comprehensive web-based energy information system (EIS) to support campus-wide occupant engagement. The Campus Energy Education Dashboard (CEED) incorporates user-friendly graphics showing energy and water usage data for over 100 buildings, not only raising awareness of building usage but also supporting conservation competitions among occupants of different buildings.

The EIS is crucial both as a communication tool and also as a means to track and report on energy savings over time.

## In the Comfort Zone?

Alongside the web-based EIS UC Davis also developed an engagement tool called TherMOOstat. Using a web-based interface occupants of any building can flag comfort conditions on a on a 5-point scale from hot to cold. This tool not only allows facility staff to respond to individual issues but also to track which buildings have persistent issues worthy of deeper analysis.

To date over 6,200 users have submitted feedback via TherMOOstat, with hundreds of new users being added every month.

*People can't act on energy use if they don't know how much they use and how it's changing over days, seasons, years, etc. Our EIS does this for both the campus community and for our team*  
 - Kiernan Salmon, EIS Project Developer

UC Davis has invested significant effort in ensuring access to reliable, accurate data from their campus meters and BAS. Aside from public-facing energy dashboards, accurate energy data is also being used to develop energy models that take weather variation into account. Weather-normalized energy models are being used for measurement & verification, demonstrating the benefits of UC Davis' energy improvement projects and giving campus leadership the confidence to support further project investment.

**The Smart Energy Analytics Campaign is led by the U.S. Department of Energy to support commercial building owners in adopting energy management and information systems (EMIS).** The program provides technical assistance, recognition opportunities, and a chance to network with industry-leading peers. Whether you have an established EMIS or are in the early stage of considering EMIS, the Smart Energy Analytics Campaign will support your move to the next level. [Learn more at smart-energy-analytics.org](https://www.smart-energy-analytics.org)