Building Analytics Success Story
Central Piedmont Community College

Central Piedmont Community College (CPCC), with a 3.4 million sq. ft. campus, is the largest community college (by physical space) on the East Coast. Though they have a small operations team, CPCC is always looking for streamlined ways to manage building performance. In 2016 they decided to pilot fault detection & diagnostic (FDD) software on two buildings. CPCC was motivated to install FDD software because they wanted automated, real-time HVAC diagnostics to support monitoring-based commissioning (MBCx). They were looking for software that would give them additional "eyes" on the mechanical systems, identify performance issues, and recommend where and how to "turn the wrench" to reduce energy costs and improve comfort.

Given the complexity of mechanical systems and their hidden energy waste, a large number of faults can be detected by the software. CPCC engages two different service providers to help manage the flow of recommendations from the software. CPCC is evaluating different pilot approaches with its two EMIS service providers.

CPCC is using FDD as a way of being proactive about building performance.

- David Valder, Director, Energy & Sustainability

What is FDD?

Fault Detection and Diagnostic (FDD) software identifies buildings with suboptimal performance by analyzing building automation system (BAS) data. FDD is one type of energy management and information system.

FDD Pilot Approaches and Results

CPCC is using a custom FDD dashboard on two buildings, developed by one of their EMIS service providers. The provider reviews the installed FDD software monthly and assesses any identified faults for their impact on utility expenses, equipment life, and occupant comfort. The mechanical system issues with the greatest impact are summarized on a user-friendly

Quick Facts

Location: Charlotte, NC

Building type: Community College

Gross floor area covered by EMIS: 2 million sq. ft.

**Total buildings with EMIS**: 3 (FDD), 64 (EIS)

Energy Information System (EIS) Software: Periscope

FDD Software: SkySpark, by SkyFoundry

EMIS Service Providers: Abundant Power Group and BMI Energy

Smart Energy Analytics Campaign: Recognition for New Installation of FDD System

Central Piedmont Community College was recognized by campaign partners during Smart Cities Week in October 2017, acknowledging its exemplary work to save energy through the use of a newly installed FDD system.
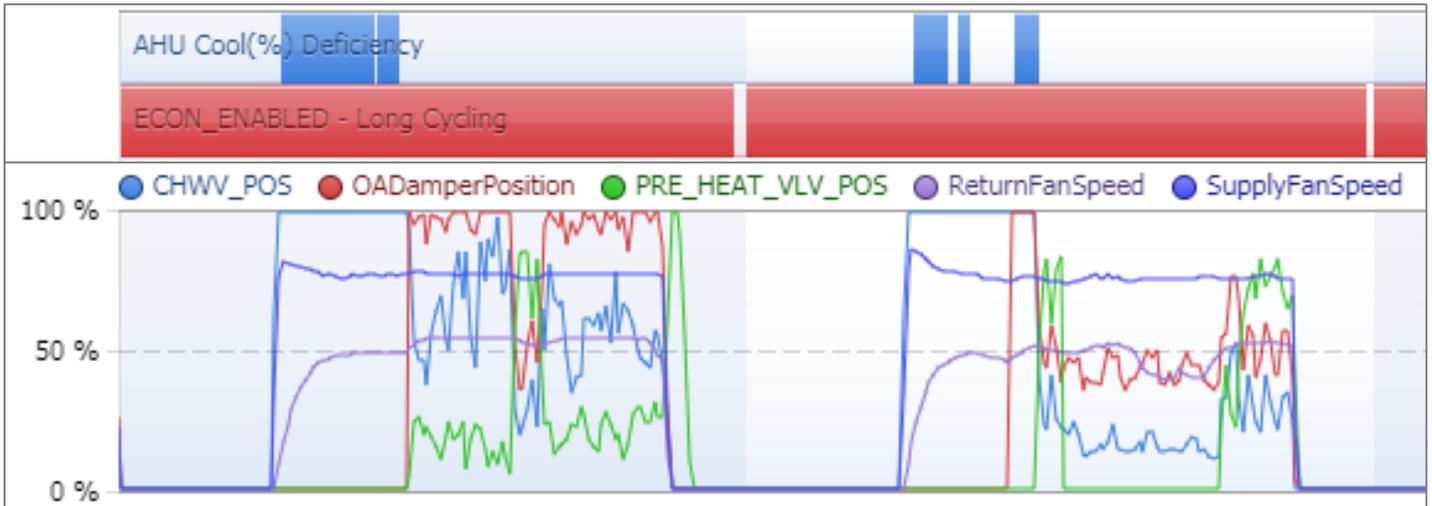
Example of CPCC's FDD software, illustrating a period of time when deficiencies were identified for an air handler cooling valve and economizer operation. Lower chart shows equipment trends to help with fault diagnosis.

dashboard that CPCC operations staff can access online. The dashboard also helps CPCC track whether identified issues are open or resolved.

At the third FDD pilot building, CPCC's other EMIS service provider takes a more hands-on role. The provider firm's engineers spend time on site to gain a deeper upfront understanding of building equipment and operations. Then the provider gives CPCC a monthly report with a list of prioritized faults to be addressed. Once the operations team has reviewed the findings and decided next steps, the EMIS service provider directly implements controls changes.

No matter which EMIS service provider is used, CPCC is finding and resolving similar operational issues. Thus far, the top issues have been fixing variable frequency drive performance and supply air temperature reset sequences on air handling units, and reducing variable air volume (VAV) box minimum airflow setpoints.

Keeping Track of Campus Energy Use
In addition to its FDD software, CPCC installed an Energy Information System (EIS) that staff use to track progress toward mid- and long-term energy saving goals. CPCC has installed whole building electric meters on more than 26 buildings, with a goal to eventually meter every building. With its EIS vendor, CPCC staff is working to ensure that all new meters and communications

hardware connects reliably with the EIS. A user-friendly dashboard under development will be used to communicate with the public and as an educational tool on campus.

I like the collaborative approach taken by our two EMIS service providers. They find the issues, suggest options, and work with us to make sure we're comfortable with the chosen solution
   - David Valder, Director, Energy & Sustainability

Getting Started

CPCC's Director of Energy & Sustainability has some suggestions for anyone looking to install FDD:

■ Decide if you need assistance programming and interpreting FDD software analytics or if you have the resources to do it in-house.
■ If researching EMIS providers, consider whether you want a partner who can also make controls fixes or you want them to focus only on the analytics.
■ If you already have a controls contractor on site, ask what options they have for FDD. They may be able to provide value and reduce start-up time.

Focusing on a limited pilot is a great way to evaluate these different options before a full-scale FDD rollout.

The Smart Energy Analytics Campaign is a public-private sector partnership program focused on commercially available Energy Management and Information Systems (EMIS) and monitoring-based commissioning practices. The campaign couples technical assistance with qualitative and quantitative data collection to inform research, development, and field study priorities. Partnering participants are encouraged to share their progress and may receive national recognition for implementations that demonstrate exemplary practices.