# Small Building Controls Maintenance Success Story

#### University of California Davis

In 2019, the UC Davis Energy and Maintenance Team set out to improve the maintenance workflow of the hundreds of small and medium buildings around campus. This initiative replaced traditional stand-alone thermostats with an internet-connected network of thermostats which allowed for centralized data monitoring, control, and troubleshooting through remote interfaces.

#### Remote Visibility & Automated System Alerts

Prior to this initiative, comfort calls often required one or more site visits by maintenance staff in order to troubleshoot and resolve issues. By installing web-enabled thermostats to create a centralized control system, maintenance technicians are now alerted of potential problems prior to receiving comfort complaints. For example, in the graphic below, the maintenance technician was alerted that the space temperature was below the heat setting. The technician was then able to remotely reset the ignition module to enable the unit to start heating and get the space back up to a comfortable temperature.



Setting System Heat > Fan Front Keypad UNLOCKED  $\odot$ Schedule ON 0 **Events Calendar** 0 Vacation Set Times OFF **History Graphs** Mobile app allows for remote scheduling and setpoint changes

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SPACE SATISFIED

Heat

"With this project, we know when a unit has an issue before occupants even call in a complaint, and we can look at operating data on the platform to prepare our field work and resolve issues more quickly."

Nico Fauchier-Magnan,

UC Davis Energy Engineer Supervisor

Figure depicting how maintenance technicians can be alerted of issues before receiving comfort complaints.

The centralized control system tracks equipment sensor data and automatically alerts the maintenance team to abnormalities that indicate issues such as loss of refrigerant charge, failures in furnace ignition valves, compressors, or economizers. Maintenance teams can access live and historical sensor data from HVAC equipment as well as adjust temperature setpoints and change building scheduling remotely, all through a mobile app. The workflow comparison on the next page shows how the maintenance process has been simplified and improved through the addition of networked controls.



72°

## **Transforming Maintenance Workflow**

Stand-alone Thermostats		Networked Thermostats
1. Issue	e Ar	ises
Occupants present in the building notice temperature issues and contact facilities to put in a maintenance request. Incomplete or incorrect explanation of the issue may be offered.		Deviations from space temperature setpoints cause an alarm and designated maintenance technicians are automatically alerted via the mobile app.
2. Maintenance Scheduled		
Maintenance technician is scheduled to visit the site and brings tools to cover a myriad of potential issues. Technician must refer to zone maps and mechanical drawings to locate malfunctioning HVAC equipment.		After reviewing the fault and corresponding data on their phone, technician has an understanding of location and type of reported fault.
3. Maintenance Occurs		
Insufficient tools may have been brought to the site and another truck roll is scheduled. Issue appears to be resolved after second site visit, but technician must wait for occupants to verify.		Technician resolves the fault remotely or goes on site with the tools they believe will best fix the identified fault. Successful maintenance confirmed remotely through system trend data.

The workflow comparison above shows the previous maintenance process with stand-alone thermostats (left) and the new and improved process after the install of networked thermostats

### Improved Maintenance Drives Expansion

While energy savings was a major motivator for the initial small building controls pilot, the sweeping improvements to maintenance processes became the stronger driver for expansion to all small building types throughout UC Davis' portfolio.

Improved scheduling and energy savings are still a primary goal, but operational visibility and insights are invaluable to the maintenance team and also benefit occupants.

UC Davis' maintenance teams now spend less time troubleshooting and reduce the number of potentially disruptive site visits, leading to more comfortable and efficient spaces.

## **Quick Facts**

Controls Provider:	Pelican
Project Location:	UC Davis
Building Type:	Office, childcare center, lab
Average	
Building Size:	5,000 ft <sup>2</sup>
Building Size: Total buildings with controls solution:	5,000 ft <sup>2</sup> 101

The Smarter Small Buildings Campaign is a program sponsored by the US Department of Energy to promote the implementation of enhanced controls and monitoring for small and medium commercial buildings. The Campaign accelerates improved HVAC to advance comfort and savings for through technical assistance, best practice resources, and peer exchange. Find out more at <u>SmarterSmallBuildings.Ibl.gov</u>