

Aircuity case study

University of California, Irvine

Significant Energy Savings through Smart Lab Design and Demand Control Ventilation

THE UNIVERSITY OF CALIFORNIA, IRVINE IS ONE OF ten campuses that are a part of the University of California System and is home to over 28,000 students, 1,100 faculty and 9,000 staff members. UC Irvine is among the fastest growing UC campuses and is consistently ranked among the nation's best universities. Offering a total of 80 undergraduate



Sue and Bill Gross Hall - A CIRM Institute

majors and 64 undergraduate minors, recent additions to UC Irvine's academic and professional programs continue to grow with the addition of programs in law, public health, pharmaceutical sciences and nursing science.

LEADING THE WAY IN LAB ENERGY REDUCTION

In the last several years UC Irvine has become a leader in reducing campus energy use and has developed best practices to dramatically reduce energy consumption in science and laboratory facilities. These spaces are known to be the most the most energy intensive on any college campus. The university has won numerous awards for its work

and is continuously beating energy goals. In 2011 their energy saving initiative, Smart Labs, received an Effective and Innovative Practices Award from the Association of Physical Plant Administrators of Universities and Colleges. Following that award, UC Irvine earned two more in 2013. The university received California's highest environmental honor, the Governor's Environmental & Economic Leadership Award, for the second time in 5 years and the university also won the S-Labs International Ops prize. In May of 2014 UC Irvine was honored by the White House for their dramatic energy reductions as part of the Better Buildings Challenge. The university had set a goal to reduce energy use 20% by 2020 within the 7 million square feet of building space they committed to the challenge. Not only did UC Irvine reduce energy use by 23%, but they achieved this reduction 6 years ahead of their plan. Pleased but not content with

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**Matt Gudorf, Campus Energy Manager
University of California, Irvine**

this initial success, the school immediately doubled the goal and is now targeting a total energy reduction of 40% by 2020.

To cap off the year, UC Irvine received the Institutional Energy Management of the Year Award at the 37th World Energy Engineering Congress in Washington, DC. The award was earned based on their successes in campus energy reduction to date.

The University of California, Irvine is a signatory of the American College and University Presidents' Climate Commitment. UC Irvine's president pledged carbon neutrality by 2050, with several energy reduction milestones along the way. The university also established the goal of beating California's Energy Code, Title 24, by 50%. Overall the Smart Labs design is helping the university save over two million dollars annually.

AN INNOVATIVE LAB DESIGN

Laboratories consume nearly two thirds of the total energy used on a college campus, making them prime targets for energy efficiency measures. UC Irvine engineers worked together to create the award winning Smart Lab design to significantly and safely reduce energy use in their laboratory buildings. "Our goal was to find the sweet spot where we maximized energy savings without compromising safety", states Marc Gomez, assistant vice chancellor facilities management/environmental health & safety.

UC Irvine was already receiving considerable energy savings through previous installations of Aircuity's centralized demand control ventilation system, therefore it became one of the core components of the Smart Lab design. Aircuity continually senses and analyzes laboratory environments and provides ventilation inputs to adjust the air changes per hour (ACH) in those facilities as needed, moving away from a model of constant or fixed ventilation rates. Aircuity's analytics provides UC Irvine with the ability to monitor multiple locations around campus and aids in continuous commissioning, troubleshooting issues within the space and analyzing energy drivers to achieve maximum energy savings.

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SMART LABS ACROSS CAMPUS

In 2010 the \$80 million, 100,000 square foot stem cell research lab, Sue and Bill Gross Hall: A CIRM Institute, was completed. The Smart Lab design was incorporated into the lab with spectacular results. Not only did the building achieve LEED® Platinum certification, but it also became the first facility to outperform the California energy efficiency code by 50.4%. Although there are multiple design parameters that make up a Smart Lab, Aircuity delivered 50% of UC Irvine's total savings. Based on the resounding success in Gross Hall, the University of California, Irvine rolled out the Smart Lab design to more than a dozen lab buildings on campus. These buildings all saw significant energy savings as well and yielded an average kWh savings of 57%, creating a new best practice for energy efficient laboratory design. Through implementing the Smart Labs program UC Irvine is saving 16,831,150 kWh and 693,720 therms annually, which translates to \$2,308,372 per year in utility savings.

	Before "Smart Lab" Retrofit			After "Smart Lab" Retrofit		
Laboratory Building	Estimated Average ACH	VAV or CV	Was more efficient than code?	kWh Savings	Therm Savings	Total Savings
Croul Hall	6.6	VAV	~20%	48%	62%	50%
McGaugh Hall	9.4	CV	NO	57%	66%	59%
Reines Hall	11.3	CV	NO	67%	77%	69%
Natural Sciences 2	9.1	VAV	~20%	48%	62%	50%
Biological Sciences 3	9.0	VAV	~30%	45%	81%	53%
CALIT2	6.0	VAV	~20%	46%	78%	58%
Gillespie Neurosciences	6.8	CV	~20%	58%	81%	70%
Sprague Hall	7.2	VAV	~20%	71%	83%	75%
Hewitt Hall	8.7	VAV	~20%	58%	77%	62%
Engineering 3	8.0	VAV	~30%	59%	78%	69%
Averages	8.2	VAV	~20%	57%	72%	61%

