

WESTERN COOLING EFFICIENCY CENTER

Vinod Narayanan
Associate Director



A man with a beard and safety glasses, wearing a dark blue Santa Cruz sweatshirt, is smiling and leaning over an open electrical control panel. The panel is filled with various electronic components, including a blue circuit board and several terminal blocks with wires connected. The background shows a workshop environment with a fluorescent light fixture and some equipment.

OUR MISSION

“Accelerate the development and commercialization of efficient heating, cooling, and energy distribution solutions through stakeholder engagement, innovation, R&D, education, and outreach.”

WCEC TEAM

KEY SPONSORS

California Energy Commission
California Utilities
Federal Agencies: DOE, DOD, NASA
Corporate Affiliates

14 concurrent projects

Established April 2007
Part of the Energy Efficiency Center at UC Davis

Mark Modera	Director
Vinod Narayanan	Associate Director
Theresa Pistochni	Engineering Manager

11	Full-time Engineers
1	Behavioral Scientist
3	Graduate Students
6	Undergrad Students
2	Support Staff



WCEC EXPERTISE

Unique Leadership in

- Climate-appropriate cooling technologies
- Laboratory testing

Significant Expertise in

- 3rd party technology evaluation
- Modeling
- Field monitoring of HVAC technologies
- Distribution systems for ventilation and thermal energy
- Test standards development
- Human behavior
- Internet control of HVAC systems



NOTABLE PATENTS

TRACER GAS SYSTEM



New system that allows for accurate airflow measurement over a wide range of operating conditions.

CLOTHES DRYERS



High accuracy automatic shut-off sensors for clothes dryers.

ENVELOPE & PIPELINE SEALING

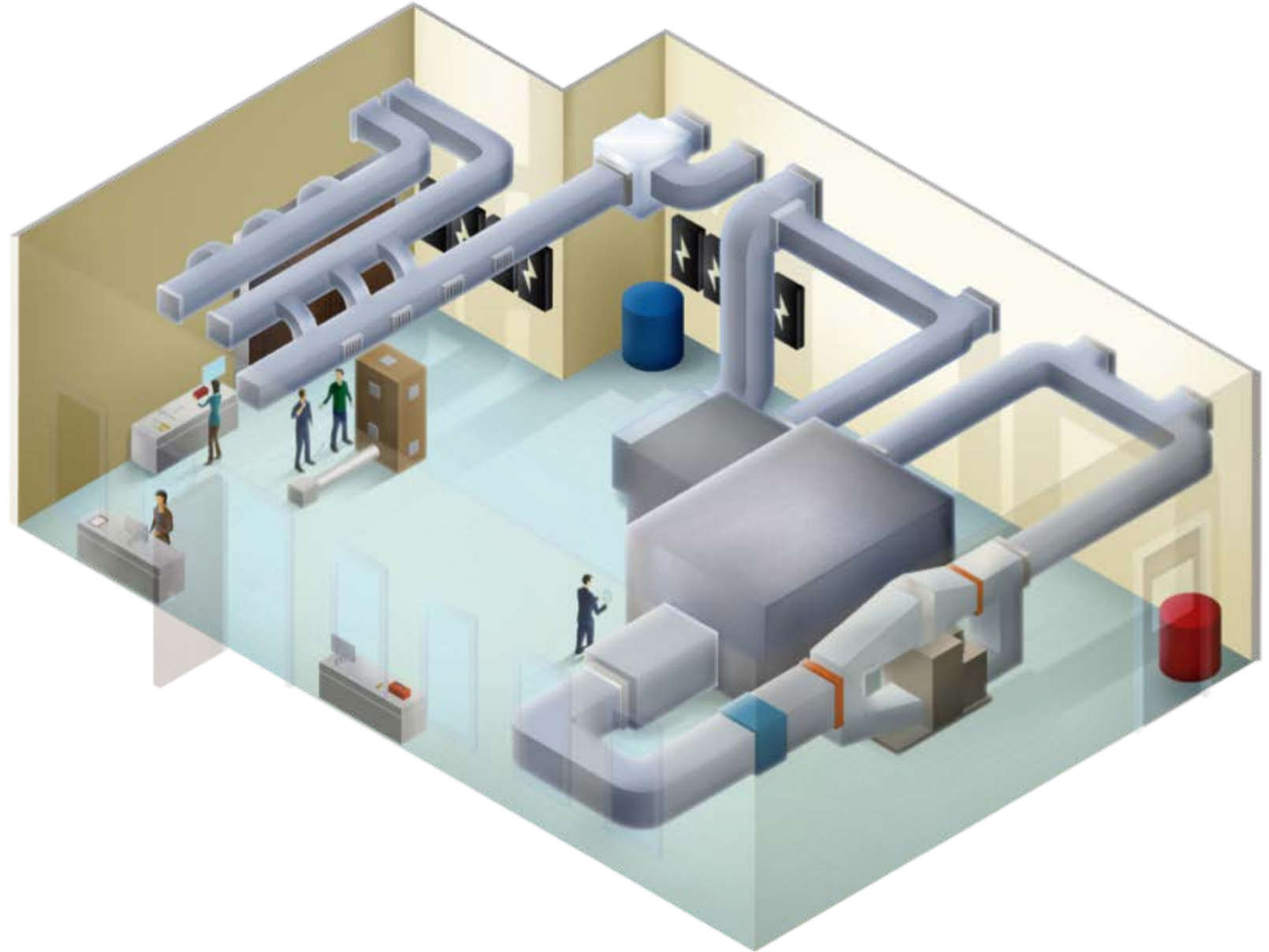


Automatically seal building envelope and low-flow gas pipeline leaks with instant verification of results.

WCEC LABORATORY

Components

- Hot (180°F) and chilled (45°F) water distribution systems
- Two environmental chambers, one with dehumidification
- National Instruments DAQ systems
- Additional experiment areas with outdoor air supplies
- Electricity, natural gas available



WCEC ENVIRONMENTAL CHAMBER



“Hot” Side Chamber

- Temp/humidity control to wide range of climate conditions.
Dehumidification for testing evaporative cooling equipment.
- Airflows up to:
 - **5000cfm** (all climate conditions)
 - **8000cfm** (limited climate conditions)
 - Airflow measurement per ASHRAE 41.2
- High-accuracy chilled mirror dew-point and temperature measurements on inlet and outlet

“Cold” Side Chamber

- Heating/humidification sized for cooling equipment up to 5 tons
- Airflows up to 3500 cfm
- Airflow measurement per ASHRAE 41.2
- High-accuracy chilled mirror dew-point and temperature measurements on inlet and outlet



RECENTLY ADDED EXPERTISE AND FACILITIES

Expertise

- » Advanced heat exchanger design and testing
- » Phase-change heat transfer
- » Solar thermal technologies

Facility

- » Solar Thermal & Energy Enhancement Laboratory (STEEL)



FACILITY UPDATE- STEEL

- ❖ Advanced heat exchangers for primary power & waste heat applications
- ❖ Solar thermal energy utilization
- ❖ Concentrated PV test bed
- ❖ Solar cooling technologies
- ❖ Supercritical CO₂ technology
- ❖ Thermal desalination

200 bar supercritical loop
25 kW solar input @ up to 800 C
165 kW natural gas burner

CASE STUDIES | PRESS ARTICLES
| NEWS | HVAC PRESENTATIONS |
NEWSLETTER | REPORTS |
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