Breaking Down Barriers
Moving Beyond Prescriptive Codes and Standards to Achieve Deep Energy Savings in the Laboratory Environment

Wendell Brase
Associate Chancellor - Sustainability
What Motivated UC Irvine to Challenge Status-Quo?

- A daunting goal
- Accumulated skepticism from value-engineering explanations
  - “Don’t worry about reheat … it’s unavoidable”
  - “Margin of safety”
  - “Standard practice”
  - “Best practice”
  - Heat dissipation program assumptions that went up 10X
  - Seemed that energy waste was tolerated and taken for granted
- Inspiration from several leading engineers and physicists.
Management Performance Improvement Tool
Supported Innovation and Questioning Status-Quo
Leadership Qualities and Behaviors
(6 behaviors, α = .94)

Management Detractors
(6 behaviors, α = .92)

Effective Management Behaviors
(19 behaviors, α = .98)

Workplace Respect Measures
(6 measures, α = .87)

Workplace Cooperation Measures
(9 measures, α = .89)

Effectiveness Measures
(7 measures, α = .90)
Performance Improvement Tool
Measured Organizational Behaviors

- Seeking better methods respected and rewarded
- Can discuss problems without fear of “looking stupid”
- Differences of opinion are discussed openly
- Differences of opinion are resolved using facts rather than power
- Work groups continually improve practices
- Group members share expertise
Performance Improvement Tool
Measured Management Behaviors

• Managers reward initiative
• Managers will try new, potentially better methods
• Managers treat new ideas with respect
• Managers do not make some people look good at others’ expense
• Managers do not discourage bringing up problems
• Managers do not make employees “feel stupid” when they disagree
Example of Testing a Hypothesis

- Observed all bypass dampers open all the time
- This problem exacerbated by reduced air-changes
- Observed all new lab buildings exhaust stack airs speeds 3200-3500 FPM
- Marc Gomez proposed a wind study using tracer gases on completed buildings to measure effect of lower stack airs speeds
Wind Tunnel Study
Exhaust Stacks Extended
Values Embedded in Research University Culture

• Health or safety will not be compromised to save energy
• Evidence-based validation of practices
• Measurement is better than unchallenged “standard practices”
• Challenge “conventional wisdom”
• Form hypothesis, then test it, then stress-test it
Employees, Technical Staff, and Regulators Trusted UC Irvine

- UC Irvine had accident and injury rate \( \sim \frac{1}{2} \) UC average
- Risk assessments completed in every lab
- Lab workers regularly monitored
- Monitoring data shared 100 percent
- Continuous, ongoing monitoring
- When questioned UC Irvine had complete and credible data!
In Summary: Engineering with Attitude!

- 51% Attitude
- 49% Technology
QUESTIONS?

Presented Wednesday, October 23, 2019 at the I2SL Annual Conference, Denver, CO
© 2019 Regents of the University of California

University of California, Irvine