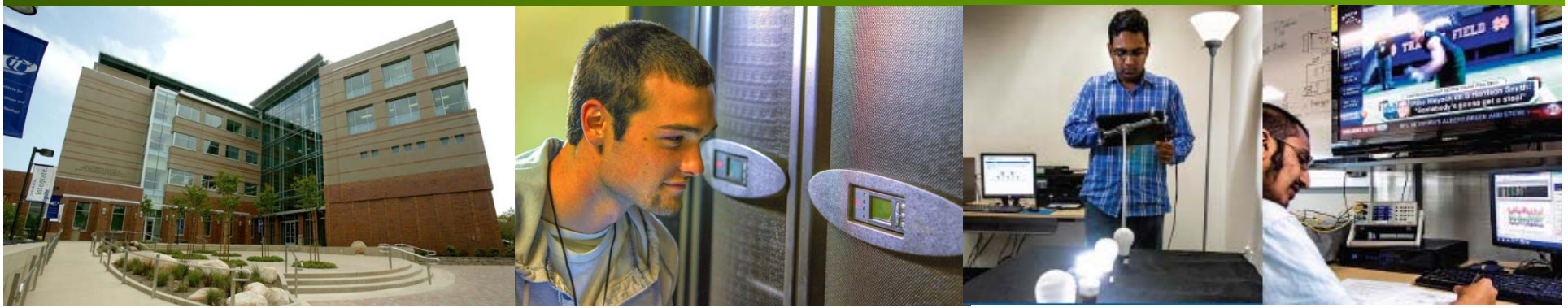
California Plug Load Research Center (CalPlug): Research and New Roads Ahead



Michael J. Klopfer, PhD

California Plug Load Research Center

California Institute for Telecommunications and Information Technology

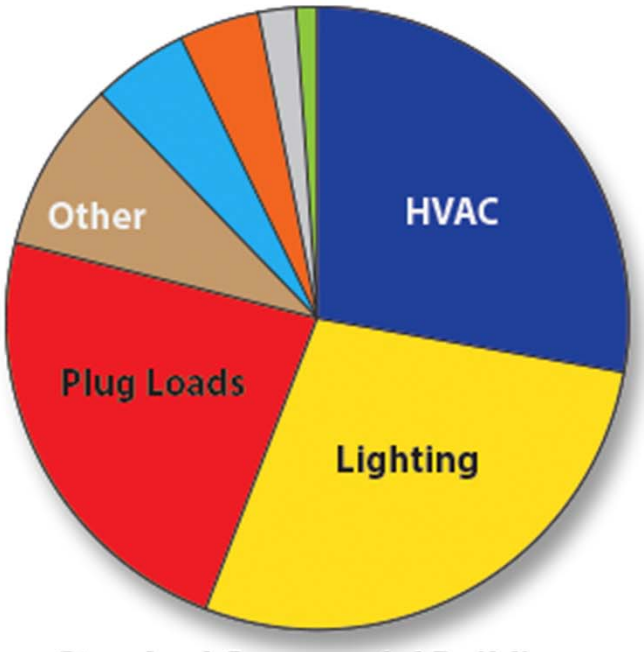
October 29, 2015

www.calplug.org

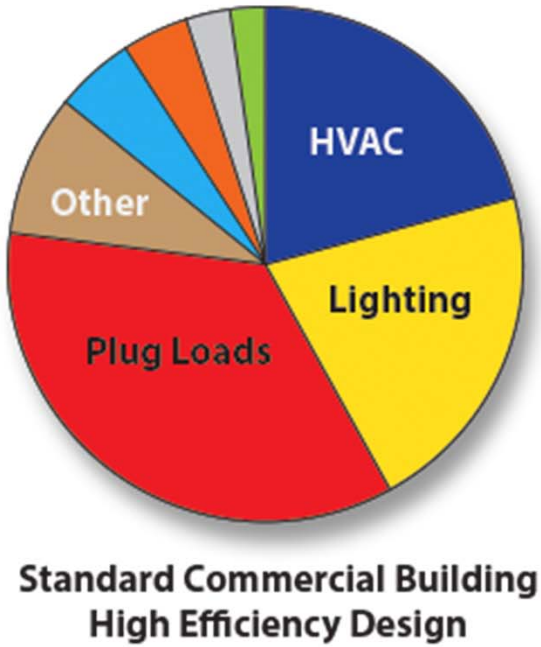
CalPlug: Structure

- 8000 sq. ft. facility
- University based, nonprofit
- 40+ staff Core faculty and student researchers
- Corporate Memberships, Grant support, contract project support, university support
- Government/Industry advisory board

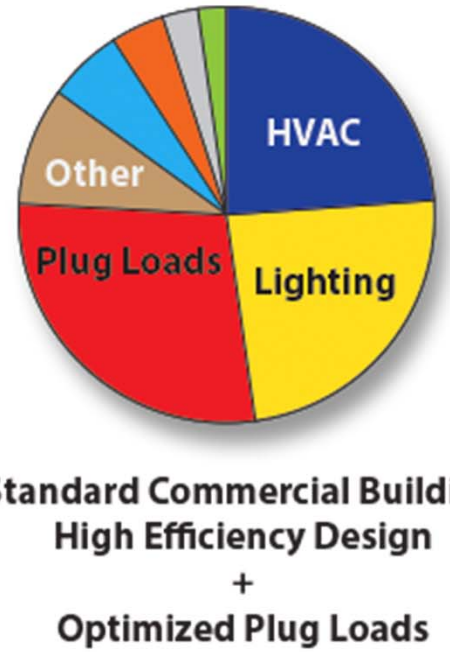
Why investigate plug loads?



Standard Commercial Building



Standard Commercial Building
High Efficiency Design
~50% Below Standard



Standard Commercial Building
High Efficiency Design
+
Optimized Plug Loads
~60% Below Standard

Integrated Design Associates (IDeAs), San Jose, Ca, 2014

How can we make a difference?

Research topics of interest

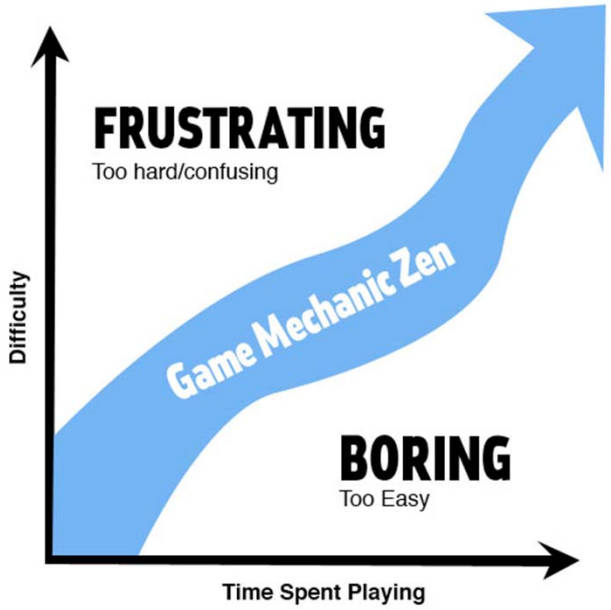
- Connected devices [Internet of Things (IoT)] in energy management strategies
  - Connected appliance controls
  - Electric Vehicle (EV) charge scheduling

- Cognitive computing
  - Sensor data fusion
  - User behavior prediction

Educational Outreach

Can we gamify energy savings?

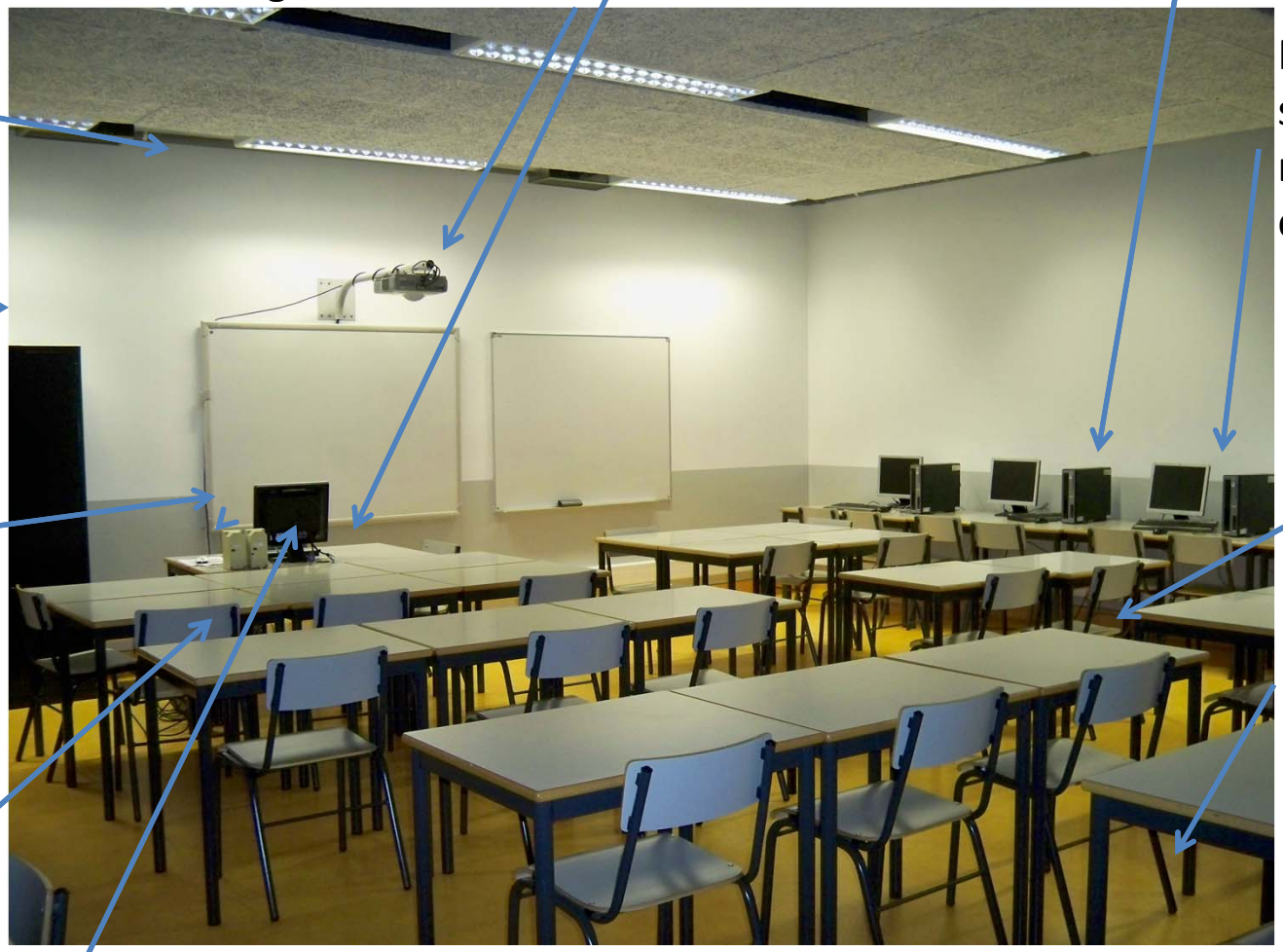
Energy-Champion: an elementary and middle school classroom v. classroom energy saving challenge



Michael Wu, 2012

Studies indicate that providing households with contextualized feedback and targeted energy-saving tips holds the potential for large scale energy savings, in the range of 4-12% (Ehrhardt-Martinez et al 2010).

Educational Outreach



Industrial Engagement Research

- Partnership with Southern California Edison
  - Look Ahead – Future development of codes and standards
  - SIMHome – The connected home of the future
  - The Energy Channel – Using the TV as a portal for energy savings
  - Roadmap – Future challenges and opportunities in plug-load energy savings
- Product energy savings research and testing
  - Advanced Power Strip - Tier 2 (APS2)
  - Powering the ecosystem of connected devices (hubs, smart bulbs, and phantom power)

Industrial Engagement Research

- Development of a Qualified Product List (QPL) for PG&E for APS2 devices

- Photonics testing for bulbs and signs for luminosity as related to energy efficiency, what can IoT provide the sign industry?

Conclusions

- Research on plug loads is a relevant (and complicated) target for improving energy efficiency
- CalPlug is growing it its research scope and focus
- CalPlug is engaged in community and educational outreach
- CalPlug is firmly engaged in providing industrially relevant research from a neutral academic environment

Conclusions

Thank You!

Conclusions

Questions?

Reminder: many introduced topics will be discussed in-depth during the following sessions