

Lighting Road Trip

The Educational Focus at California's Energy & Lighting Technology Centers

It is an understatement to say that California is unique in many ways. The concentration of facilities offering lighting education is extraordinary. The quality of the facilities and staff are exceptional. In this article we will explore these centers and the benefits provided to attendees and to the welfare of their state.

Stan Walerczyk told me that I should see what was happening at the California Energy Centers. He described to me the classes and tools that have been developed to teach lighting. We talked about their ultimate goal of helping to conserve the state's energy supply through education. Once the fundamentals are taught and understood a foundation exists that equips the attendees to make informed decisions on design options and progressive technology. Comparing lighting systems requires an understanding of the principles inherent in each and the trade-offs involved in selecting one alternative over another. Most of these centers teach the fundamentals and can educate on the advantages and disadvantages of energy efficient lighting options.

Six key centers were identified:

- California Center for Sustainable Energy
- California Technology and Application Center
- Agricultural Technology and Application Center
- California Lighting and Technology Center
- Sacramento Municipal Utility District
- Pacific Energy Center

This is an incomplete list as other centers with similar purpose are operating in California but these six represent the largest facilities. They also exemplify a consistency in nature and intent applicable to all.

California Center for Sustainable Energy

<http://energycenter.org/>

Located in San Diego this center offers free lighting workshops targeting architects, designers, engineers, contractors, developers and building owners. One large room full of various demonstration tools focused on energy savings along with training rooms and a resource library are integral to this facility.

California Technology Application Center

www.sce.com/energycenters

Business or nonprofit organizations can “see, hear, touch, and learn about the latest energy-efficient technologies at Southern California Edison's CTAC in Irwindale, California”. The center features demonstrations, training seminars, and special events. CTAC houses eight technology centers showcasing energy solutions, a theatre-style conference center, and classrooms. On the same campus is the Southern California

Lighting Technology Center (SCLTC). It houses Southern California Edison's Design and Engineering Services group who conduct lighting studies with both lab and field components. I met with Kathleen Peake at the CTAC. Kathleen is a knowledgeable lighting professional. In addition to operating her own lighting education company she works as a consultant and guest educator at the CTAC. Kathleen showed me how the comprehensive training rooms are used at CTAC and we toured the SCLTC discussing the ongoing research and capabilities with the staff. A model kitchen compares lamp options, an integrating sphere tests lamp CCT and CRI and a heliodon with a "virtual sun" tests daylight design performance on scale models of new building being designed. The combined capabilities of these facilities provides ongoing education, product research and development as well as solutions to design challenges relating to energy efficiency.

Agricultural Technology Application Center (AGTAC)

www.sce.com/energycenters

Ken Rebensdorf is the Manager of AGTAC Customer Service. He has an amazing grasp of the diverse methods of energy and water conservation demonstrated at his facility. Ken has designed and is testing solar lighting with integral dampers operated by the lighting control system. Exterior streetlight options are on display in a variety of types with an emphasis on optimizing efficiency. The indoor Lighting Products Center houses more than 150 lamp and control options to teach and compare color and lighting efficiency for homes, offices and industrial tasks. Located in Tulare, CA, an agricultural community between Bakersfield and Fresno, the center hosts classes, local events and even shared training with other utilities. Ken is passionate about serving his community through his facility. In addition to lighting he and his staff train on window glazing, ground source heat pumps, compressed air technology and an outdoor pumping technology station. The outdoor demonstration grounds feature 3.5 acres of lighting, irrigation systems, pumping, motor technologies and more. This has developed with community support and in response to the need for improving efficiency in the technologies this agricultural area uses.

California Lighting and Technology Center (CLTC) Davis, CA

<http://cltc.ucdavis.edu/>

Dr. Michael Siminovich is well known in the lighting industry pioneering energy efficient lighting research. Along with a talented team at the CLTC he is developing products that will change lighting design. A critical component of the development process is the involvement of manufacturers ideally from the onset to validate the marketability of the product and to assist penetration into the marketplace. Products created in isolation often prove to not be saleable. On the day of my visit Michael introduced me to Konstantinos "Kostas" Papamichael, associate Director of the CLTC, who has been working on simplifying daylight harvesting. Specifiers have complained about the complexity and reliability of existing systems. The prototypes being tested address the challenge with a fresh approach and a promising simplicity that could accelerate acceptance of energy saving daylighting applications. Michael and Kostas are gifted communicators who educate about the need for their research and the products they are developing. The vision of partnering their team with manufacturers and end

users guarantees products that will impact the market and positively affect the energy crisis.

Sacramento Municipal Utility District (SMUD) Energy & Technology Center (E&TC) <http://www.smud.org/education-safety/index.html>

The E&TC has a strong lighting emphasis including teaching K-12 educators how to integrate energy education into their existing curriculum. The facility has many lighting displays demonstrating color, energy use, LED's and technology comparisons. A daylighting room with a heliodon simulates daylighting applications. Connie Samla, staff Lighting Specialist, showed me the displays along with the extensive lending library where users can check out books for more in-depth information. Classes on lighting quality and sustainability, energy savings, merchandising with efficient lighting and how to evaluate lighting systems among others are offered this year.

Pacific Gas & Electric's Pacific Energy Center – San Francisco

<http://www.pge.com/pec/>

For 15 years the staff of the Pacific Energy Center has provided facility managers, architects, engineers and design professionals technical education, design tools, information and advice on how to create energy-efficient buildings. Over 125 free courses are offered annually on lighting, HVAC, high performance building envelope design, and building performance measurement at the center and other Northern California locations. The staff of 20 is under the leadership of Gary Shushner. I met with Gary and with Halley Fitzpatrick, Lighting Programs Coordinator. Halley teaches some of the classes in the center and explained how he works the large lighting training room with it's excellent and innovative displays. The tool lending library offers free loans of performance measurement equipment. An online catalog and e-library along with books, journals, videos and electronic documents are also available.

For over 20 years I was involved with lighting design, specifications, product sales and energy audits. For the past decade I have been teaching about these subjects. Energy has evolved to be the dominant issue since 2003 when electricity rates and energy costs started their unprecedented rise. I have conducted workshops and presentations throughout the US, Israel and Asia about how the energy crisis will impact our industry. Attendees often indicate that this information is a revelation to them and that they were unaware of the impending radical shifts in lighting design, legislation, standards and products. Evidence is clear now but we are far from the tipping point. A forum at MIT concluded that the top two problems facing humanity in the next 50 years will be energy and water. Lighting consumes more energy than any other appliance in commercial applications and is a significant part of the energy cost in any application. Only in California have I seen such consistently elevated awareness, programs to accelerate change and the will to initiate and participate in energy conservation measures.

The easy availability and high quality of free energy education is having an effect. Over 20,000 Californians attend classes at these centers annually. California's building efficiency standards which include those for energy efficient appliances, have saved California more than \$36 billion in electricity and natural gas costs since 1978. By 2013,

it is estimated Title 24 standards will save an additional \$43 billion. One question that I asked of the directors of the centers was why California's per capita energy consumption since 1974 has been held to growth rates that are less than half of the national average. Responses included the parallel with the inception of Title 24 legislation and the beginning of the educational programs to raise awareness of the need for energy conservation. There is a synergy from both and this is yet another illustration of California's uniqueness. What has been established with these lighting centers and State lighting legislation serves as a successful model for the nation and our industry.