In California, energy efficiency is considered the number one resource for meeting the state’s energy demand. This policy forum series draws from the latest research to explore opportunities and barriers to meeting state policy targets, such as some of the major challenges to retrofitting existing buildings and ensuring that future construction includes the latest cost-effective efficient technologies for lighting and temperature management.

California’s building and appliance efficiency programs have saved consumers more than $56 billion in electricity and natural gas costs since 1978, averted the need to build 15 large power plants, and stabilized per capita electricity consumption despite rapid economic growth. It is estimated the current standards will save an additional $23 billion by 2013 (CPUC). Most recently, California Governor Jerry Brown signed an Executive Order that directs state agencies and departments to take immediate steps to “green” state buildings, reduce greenhouse gas emissions, and improve energy efficiency. The Governor’s Executive Order calls for the reduction in energy purchases by 20% by 2018 and water use by 20% by 2020 which would save $7 million per year in avoided energy costs and a billion gallons of water. The Executive Order sets a target of zero net energy (ZNE) for 50% of the square footage of existing state-owned buildings by 2025 and ZNE for all new or renovated state buildings beginning design after 2025. Additionally, AB758 requires that the CEC implement a comprehensive energy efficiency program for residential and nonresidential buildings including energy assessments, building benchmarking, cost-effective energy efficiency improvements, and green workforce training.

Energy Efficient Lighting, Heating and Cooling
Energy efficient lighting, heating, and cooling technologies in commercial, municipal and residential buildings offer the potential to dramatically improve efficiency in existing buildings, reduce energy consumption and the associated environmental impacts, improve indoor air quality, and enhance the state’s economy through investment in local building trades and California’s growing clean technology industry. However achieving this potential requires an understanding of the technologies, strategies and policies for overcoming key market barriers for adoption. University research from institutions like UC Davis and others has played a pivotal role in informing and identifying solutions to create and implement more effective energy efficiency policies such as those found in California Title 20 and Title 24.

Lighting accounts for nearly 30 percent of California’s electricity use. Due to continued use of inefficient lighting and the lack of effective controls, much of this energy is wasted. The California Public Utilities Commission has called for a 60 to 80 percent statewide reduction in electrical lighting consumption by 2020 (CA Energy Efficiency Strategic Plan). Research from the UC Davis California Lighting Technology Center (CLTC), which was created to stimulate, facilitate, and accelerate the development and commercialization of energy-efficient lighting technologies is key to meeting these targets.

Heating, Ventilation and Air Conditioning (HVAC) is the largest sector of peak electricity demand, accounting for over 50% of the total peak power used in buildings. The CA Energy Efficiency Strategic Plan calls for an aggressive reduction in peak electricity demand used for cooling. The Western Cooling Efficiency Center (WCEC) at UC Davis works to reduce peak energy demand through a variety of research projects focused on advancing market-ready energy efficient technologies, informing policy, and stake-holder engagement. For example, the WCEC administers the Western Cooling Challenge, a competition that works with manufacturers

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to advance the application of climate appropriate energy efficient technologies. The WCEC is also developing new ways to seal buildings quickly and thoroughly and provides research to improve state building standards.

**Water-Energy Nexus**

At all scales of resource development and use, water and energy systems are intertwined and interdependent. Water is required for the production of energy and energy is required for the treatment, transport and heating of water. In California it is estimated that water systems consume 20% of electricity, 30% of natural gas and 88 million gallons of diesel fuel per year. The aggregate carbon footprint of this energy use is estimated at more than 100 million metric tons of CO2-equivalent greenhouse gases (or roughly 20% of total state emissions). Research from the UC Davis Center for Water-Energy Efficiency (CWEE) is working to identify, develop, and test water-energy efficient technologies and practices; design policies and outreach activities to facilitate market access and penetration of innovative water-energy conservation methods and technologies; and serves as a collaborative hub for research, technology development and policy assessment for university, industry and public partners.

**Zero Net Energy Communities and UC Davis West Village**

Zero net energy (ZNE) for buildings is gaining considerable interest as a strategy to save energy and cut greenhouse gas emissions. A ZNE building is one that uses a combination of improved efficiency and distributed renewable generation to cover 100 percent of its net annual energy use. The California Energy Commission has set goals for ZNE in new homes by 2020 and commercial buildings by 2030 (CEC). The UC Davis West Village is one of the largest planned zero net energy communities in the United States and provides an example for future ZNE developments. To achieve the goal, West Village has implemented aggressive energy efficiency measures and on-site power generation. Energy efficiency measures include solar-reflective roofing, radiant barrier roof sheathing, extra insulation, efficient exterior lighting fixtures, indoor occupancy sensors and “day-lighting” techniques that use 60 percent less energy than standard lighting technology.

The series includes several sessions over two months. Click on the links below to register for upcoming sessions.

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<th>Session</th>
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<tr>
<td>I</td>
<td>Looking Cool and Bright: Informing the state’s efficiency policies on energy efficient lighting</td>
<td>Wed 8/8/2012 11:30a-1:00p</td>
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<td>II</td>
<td>Looking Cool and Bright II: The latest research on cooling and building envelope technologies and strategies</td>
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<td>III</td>
<td>The Next Generation: Opportunities at the water-energy nexus</td>
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<td>IV</td>
<td>West Village and Zero Net Energy Communities: Lessons from the field</td>
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Unless otherwise noted, sessions will all be held at the University of California Center Sacramento (1130 K Street, Room LL3, Sacramento, CA 95814) and lunch will be provided (please RSVP for head-count). For directions and parking information, see: Directions to the UC Center

For further information or questions, please contact Amber Mace (ajmace@ucdavis.edu; 510-326-0685) or Hilary Wilkoff (hwilkoff@ucdavis.edu; 530-752-2635).

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Looking Cool and Bright II:
Cooling and building envelope technologies and strategies
in partnership with:

WCEC

Description: Heating, Ventilation, and Air-Conditioning (HVAC) is the largest sector of peak electricity demand, consuming over 50% of the total peak power used in built environments. The CA Energy Efficiency Strategic Plan calls for an aggressive reduction in peak electricity demand used for cooling. The Western Cooling Efficiency Center (WCEC) at UC Davis works to reduce peak energy demand through a variety of research projects focused on advancing market-ready energy efficient technologies, informing policy, and stakeholder outreach.

This policy forum will ask the following key questions:

1. What are the latest cooling and building envelope technologies and strategies and what do they imply for the next round of building and appliance standards as well as large-scale retrofit programs and AB758 implementation?
2. What are the latest indirect cooling technologies (costs/benefits)? How to properly value water in indirect evaporative cooling systems?
3. How do we properly value peak load reductions from cooling technologies?
4. What are appropriate methods for validating industry claims on new technologies?

Speakers and panelists:

**Anthony Eggert (Moderator)** is the executive director of the UC Davis Policy Institute for Energy, Environment and the Economy which is dedicated to leveraging university expertise to inform better policy. From 2007 through 2012 Eggert served as an appointee of Governors’ Brown and Schwarzenegger in several senior policy positions overseeing clean energy and environmental policy development for California including Science and Technology Policy Advisor to the Chair of the Air Resources Board, Commissioner for the California Energy Commission, and Deputy Secretary for Energy Policy of the California Environmental Protection Agency. Prior positions include advising the University of California on federal energy and climate policy, directing research on low-carbon fuels and vehicles at UC Davis' Institute of Transportation Studies, and as an engineer and then manager for Ford Motor Company.

**Mark Modera** is the Director of the UC Davis Western Cooling Efficiency Center (WCEC), Sempra Energy chair in energy efficiency, professor in Civil and Environmental Engineering, and an Associate Director of the campus’ Energy Efficiency Center. He joined the WCEC Carrier Corp., where he was a Vice-President, and from Lawrence Berkeley National Laboratory (LBNL). Modera was a Principal Investigator at LBNL on many research projects, and developed a new research program focused on thermal energy distribution in buildings. While at LBNL, He developed an aerosol-based duct sealing process, and he subsequently established Aeroseal, Inc. to commercialize the technology. Aeroseal’s technical success and market promise became recognized by Carrier, who bought the business in 2001 and retained Modera to help manage it.

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**Dr. Kristin Heinemeier** is a Principal Engineer with UC Davis’ Western Cooling Efficiency Center. She is responsible for projects related to operations-phase energy efficiency in HVAC, as well as Human Behavior and its impacts on HVAC performance. Kristin has a PhD in Building Science from UC Berkeley, and a Bachelors degree and PE in Mechanical Engineering. She has formerly worked for PECI, Texas A&M, Honeywell, and Lawrence Berkeley National Laboratory. She is chair of ASHRAE’s Standards Project Committee on Method of Test for FDD in Packaged Rooftop HVAC Equipment, and a former chair of the Western HVAC Performance Alliance’s Compliance Committee.

**Richard Bourne** is Vice-President of Integrated Comfort, Inc. (ICI). ICI produces cooling efficiency products for buildings, including DualCool, an accessory for air-cooled rooftop cooling units. Dick’s education included a degree from Amherst College and mechanical engineering degrees from West Virginia and Stanford. After 3 years engineering modular housing systems and then 7 years teaching construction management at the University of Nebraska, Dick formed a proprietorship in 1979 that grew to become Davis Energy Group (DEG) in 1981. As founding president, Dick led DEG’s product development efforts. After 25 years with DEG, Dick joined UC Davis in 2006 to form the Western Cooling Efficiency Center. He retired from UCD in 2009 and joined ICI to focus on strengthening the DualCool market opportunity.

**Chris Scruton** has worked for the last eleven years within the Public Interest Energy Research program at the California Energy Commission (CEC), working to advance the state of building energy efficiency. Chris previously worked for Johnson Controls laying out, programming and commissioning control systems for large facility heating, air conditioning and fire alarm systems. He later worked four years at Shriner’s Hospital in Sacramento optimizing the facility for performance and energy efficiency. Chris earned a bachelor’s degree in Mechanical Engineering from Sacramento State University.

**Sponsored by Wells Fargo**

Wells Fargo & Company (NYSE: WFC) is a nationwide, diversified, community-based financial services company with $1.3 trillion in assets. Founded in 1852 and headquartered in San Francisco, Wells Fargo provides banking, insurance, investments, mortgage, and consumer and commercial finance through more than 9,000 stores, 12,000 ATMs, the Internet (wellsfargo.com), and has offices in more than 35 countries to support the bank’s customers who conduct business in the global economy. With approximately 265,000 full-time equivalent team members, Wells Fargo serves one in three households in United States. Wells Fargo & Company was ranked No. 26 on Fortune’s 2012 rankings of America’s largest corporations. Wells Fargo’s vision is to satisfy all our customers’ financial needs and help them succeed financially.

In 2012, Wells Fargo officially joined as a member of the UC Davis Energy Efficiency Center working together to accelerate the development and commercialization of energy efficiency technologies.

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