



The Cleaner Air Partnership

## AT A GLANCE/UC DAVIS AIR QUALITY RESEARCH CENTER

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Anthony Wexler	
<b>Department:</b> The center is an Organized Research Unit, an academic entity established to administer research programs that complement the campus's academic goals. ORUs are collaborative and interdisciplinary and are approved by the Chancellor and UC President. AQRC collaborates with the John Muir Institute of the Environment, Institute for Transportation Studies and others on campus.	
<b>Focus:</b> Pollution research and education at UC Davis focus on urban and regional smog, indoor air quality, global climate change, health and environmental effects, and intermedia transfers. Investigations span both gaseous and particulate forms of air pollution, and employ theoretical, numerical, experimental, and policy approaches.	
<b>Budget/funding:</b> \$10M	<b>Sources:</b> U.S. EPA, CA Air Resources Board, Electric Power Research Institute, air districts, industry, others
<b>Staff:</b> 70 affiliated faculty	<b>Founded:</b> 2002

### SOME MAJOR ACTIVITY AREAS

<p><b>San Joaquin Valley Aerosol Health Effects Center:</b> Researches very small particles that can be inhaled and cause severe respiratory diseases.</p> <ul style="list-style-type: none"> <li>• Collecting air samples</li> <li>• Measuring the health effects of particles via laboratory testing</li> <li>• Understanding how particles affect lung development during childhood</li> <li>• Understanding how particles affect coronary inflammation and disease</li> <li>• Mapping how particles move from the lungs to other organs</li> </ul>
<p><b>Agricultural emissions research</b></p> <ul style="list-style-type: none"> <li>• Reducing air pollution from dairies</li> <li>• Methods to measure and reduce dust pollution</li> </ul>
<p><b>Global climate change research</b></p> <ul style="list-style-type: none"> <li>• Effects of climate variability and change on ozone and soot pollution</li> <li>• Integrated emissions modeling that accounts for population growth and economic growth</li> <li>• Understanding how natural aerosols (like sea salt and dust) affect climate change</li> <li>• How certain particles and aerosols affect cloud formation and cover</li> <li>• How different sources of electricity affect greenhouse emission inventories at large facilities</li> </ul>
<p><b>Aviation Noise and Air Quality Symposium</b></p> <ul style="list-style-type: none"> <li>• Annual forum focused on aviation environmental issues, solutions and understanding</li> </ul>

### FOOD FOR THOUGHT

<ul style="list-style-type: none"> <li>• The San Joaquin Valley has three of the nation's five metro areas with the most polluted air, and one of the highest childhood asthma rates.</li> </ul>
<ul style="list-style-type: none"> <li>• Airborne particles from coal-fired power plants, smelters, dust storms and diesel trucks in China and other Asian countries drift over the ocean to California. The U.S. EPA estimates that on some days nearly 25 percent of the particulate matter in the skies above Los Angeles is from China.</li> </ul>
<ul style="list-style-type: none"> <li>• The UC Davis Air Quality Center is one of the largest concentrations of air quality experts at any university campus in the world.</li> </ul>

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://www.airquality.ucdavis.edu">www.airquality.ucdavis.edu</a>	<b>Phone:</b> (530) 754-6558
<b>Contact:</b> Anthony Wexler	<b>Email:</b> <a href="mailto:aswexler@ucdavis.edu">aswexler@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/**CALIFORNIA BIOMASS COLLABORATIVE**

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Bryan Jenkins	
<b>Department:</b> An affiliated research program with the John Muir Institute of the Environment. Biological and Agricultural Engineering.	
<b>Focus:</b> Enhance the sustainable management and development of biomass in California.	
<b>Budget/funding:</b> \$400K annually	<b>Sources:</b> California Energy Commission, CA Dept. of Water Resources, SMUD, Roseburg Forest Products, CA Dept. of Forestry, UC Davis, CA Integrated Waste Management Board
<b>Staff:</b> 5 affiliated faculty; 4 grad students; 4 staff analysts and engineers, 34 member executive board, 400+ members	<b>Founded:</b> 2003

### SOME MAJOR ACTIVITY AREAS

<b>Statewide coordination</b>
<b>Biomass resource inventory and assessment of generation activities</b> <ul style="list-style-type: none"> <li>• Assessments and inventories of available resources</li> <li>• Research on logistics and supply management</li> <li>• Research on methods to increase production</li> <li>• Recommendations</li> </ul>
<b>Technology research, development, demonstration and deployment</b> <ul style="list-style-type: none"> <li>• Research on new and emerging biomass-fueled generation technologies</li> </ul>
<b>Policy issues and implications</b> <ul style="list-style-type: none"> <li>• White papers, futures reports, roadmap for sustainable development of biomass, interaction with state Bioenergy Interagency Working Group, informational briefings</li> </ul>
<b>Standards and facility performance reporting and evaluation</b> <ul style="list-style-type: none"> <li>• Biomass facilities reporting system, including surveys and databases</li> </ul>
<b>Education and training</b> <ul style="list-style-type: none"> <li>• Annual forums and Workshops</li> <li>• Bioenergy short course (first offering 2007)</li> <li>• Publications and reports</li> </ul>

### FOOD FOR THOUGHT

Nearly 100 million tons of biomass is produced annually in California. The primary sources are agriculture, forestry and municipal wastes.
Biomass in the form of paper and cardboard, residual construction wood, waste-wood from demolition, stumps, food waste, and green waste makes up 60% of municipal solid wastes.
Of the total biomass produced each year, 30 to 40 million tons are estimated to be technically feasible to collect and use in producing renewable electricity, fuels, and biobased products. About 30% of this amount could come from agriculture, 40% from forestry, and another 30% recovered from municipal sources.

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://www.biomass.ucdavis.edu">www.biomass.ucdavis.edu</a>	<b>Phone:</b> (530) 752-1421
<b>Contact:</b> Bryan Jenkins, Professor and Executive Director	<b>Email:</b> <a href="mailto:biomass@ucdavis.edu">biomass@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/UC DAVIS ENERGY EFFICIENCY CENTER

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Assoc. Professor Andrew Hargadon	
<b>Department:</b> Graduate School of Management	
<b>Focus:</b> To support the development of energy efficiency solutions and to stimulate the transfer of the technology into the marketplace. Includes both design and use of technologies. <ul style="list-style-type: none"> <li>• Develop an effective technology transfer and commercialization processes</li> <li>• Serve as an information resource for the research, business, and policy communities</li> <li>• Encourage and facilitate research and interdisciplinary collaboration on energy efficiency</li> </ul>	
<b>Budget/funding:</b> Approx. \$3 million annually	<b>Sources:</b> California Clean Energy Fund grant, UC Davis, PG&E Corp., Sempra, SCE
<b>Staff:</b> 3 staff interface with 69 faculty across 23 departments	<b>Founded:</b> March, 2006

### SOME MAJOR ACTIVITY AREAS

<b>Innovation outreach: The EEC works with researchers and entrepreneurs in transportation, buildings, and agriculture to identify, develop, and launch new ventures that advance energy efficiency technologies and practices</b> <ul style="list-style-type: none"> <li>• Developing hardware for efficient lighting systems</li> <li>• Software and hardware for low-energy residential and commercial cooling systems</li> <li>• New food processing technologies that reduce energy and waste water</li> </ul>
<b>Education: Training researchers and practitioners in the commercial aspects of energy efficiency—from technology development to implementation and change management</b> <ul style="list-style-type: none"> <li>• Graduate students from business and engineering work together and with researchers to identify and develop market opportunities for emerging energy efficient technologies and practices</li> <li>• The EEC co-sponsors the Green Technology Entrepreneurship Academy, which brings researchers together with investors, entrepreneurs, and policy makers to promote technology transfer</li> <li>• In conjunction with UC Davis Extension, the EEC is launching a new Energy Mgt certificate to train building and plant energy managers and others in managing EE costs and initiatives</li> </ul>
<b>Market Facilitation</b> <ul style="list-style-type: none"> <li>• The EEC works with public and private partners to bring potential customers together around new energy efficiency technologies (e.g., energy managers from UC.CSU systems; big box retail)</li> <li>• The EEC works with the emerging technology programs of the major utility companies, as well as the state funding programs in energy efficiency to facilitate new ventures advancing EE</li> </ul>

### FOOD FOR THOUGHT

<ul style="list-style-type: none"> <li>• Most buildings experience 30% efficiency gains (energy cost reductions) with minor changes.</li> </ul>
<ul style="list-style-type: none"> <li>• California's commercial and residential buildings consume approx. 73% of the state's electricity.</li> </ul>
<ul style="list-style-type: none"> <li>• California schools spend as much on energy as on textbooks.</li> </ul>

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://www.eec.ucdavis.edu">www.eec.ucdavis.edu</a>	<b>Phone:</b> (530) 752-8197
<b>Contact:</b> Ben Finkelor, Program Manager	<b>Email:</b> <a href="mailto:bmfinkelor@ucdavis.edu">bmfinkelor@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/UC DAVIS ENVIRONMENTAL JUSTICE PROJECT

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Julie Sze, Director; Jonathan London, Senior Researcher	
<b>Department:</b> A collaborative interdisciplinary research center under the John Muir Institute of the Environment	
<b>Focus:</b> To encourage and develop interdisciplinary and applied research on environmental justice, especially in the Central Valley. The UC Davis Environmental Justice Project (EJP) defines environmental justice broadly, to encompass environmental issues as they pertain to race, as well as to class and gender.	
<b>Budget/funding:</b> \$150,000 annually	<b>Sources:</b> Private foundations, campus sources
<b>Staff:</b> 2 staff, 2 graduate students; faculty interest group	<b>Founded:</b> 2006

### SOME MAJOR ACTIVITY AREAS

<p><b>Help build campus and community partnerships on environmental justice utilizing existing campus programs and partnerships.</b></p> <ul style="list-style-type: none"> <li>• Help disenfranchised communities speak for themselves, via participatory research</li> <li>• Build relationships with Central Valley communities working on a wide range of issues that have environmental equity and justice components (water quality, air quality, facility siting, land use)</li> <li>• The EJP is a member of the Community University Research and Action for Justice (CURAJ) which also includes Center for Race, Poverty and the Environment, California Rural Legal Assistance Foundation, Latino Issues Forum, Youth In Focus, Boalt Hall School of Law Center for Social Justice, UC Merced, UC Sacramento Center, and UC Davis</li> </ul>
<p><b>Advance policy analyses</b> that promote environmental justice and community perspectives on particular environmental, environmental health, and regional planning issues</p>
<p><b>Encourage student (undergraduate and graduate) and faculty research on environmental justice and environmental equity issues.</b> Conducting an environmental justice research inventory, presenting an EJ speaker series, developing a web-based research matching system, library of EJ materials</p>

### FOOD FOR THOUGHT

<p>Environmental justice is a social movement and a field of study that seeks to understand and respond to inequities in the distribution of environmental risks and in access to and participation in environmental policy and decision-making.</p>
<p>California is at the forefront among states in environmental justice policy. This includes the California Environmental Protection Agency's (Cal/EPA) "Environmental Justice Action Plan" (EJ Action Plan), the California Environmental Justice Advisory Group (CEJAC), and the Intergovernmental Work Group on EJ.</p>
<p>Community-based efforts to address air quality in an EJ perspective include: Central Valley Air Quality (CVAQ) Coalition (<a href="http://www.calcleanair.org">http://www.calcleanair.org</a>) and the publication New Voices for Change: Environmental Health Issues in Latino Communities of the San Joaquin Valley (LIF 2004).</p>

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://www.ej.ucdavis.edu">www.ej.ucdavis.edu</a>	<b>Phone:</b> (530) 752-5643/ (530)-752-2733
<b>Contact:</b> Julie Sze / Jonathan London	<b>Email:</b> <a href="mailto:jsze@ucdavis.edu">jsze@ucdavis.edu</a> / <a href="mailto:jlondon@ucdavis.edu">jlondon@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/UC DAVIS INSTITUTE OF TRANSPORTATION STUDIES (ITS)

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Daniel Sperling	
<b>Department:</b> The Institute is an Organized Research Unit (ORU), an academic entity established to administer research programs that complement the campus's academic goals. ITS-Davis hosts a federally-designated center for transportation research and education and a state-funded plug-in hybrid vehicle center.	
<b>Focus:</b> "Transportation is a goldmine for researchers. Even the simplest assertion, "More is better," is cloaked in controversy. Indeed, that particular controversy motivates much of our research and much of the funding we receive. Some of us seek to maximize benefits — to enhance mobility and accessibility — while others focus on minimizing harms to physical, natural, and social environments. And many of us seek to do both!" <i>Daniel Sperling</i>	
<b>Budget/funding:</b> \$4-5 million annually	<b>Sources:</b> Private industry, government, foundations, individuals, academic and research institutions
<b>Staff:</b> 60+ affiliated faculty; 80+ students	<b>Founded:</b> 1991

### SOME MAJOR ACTIVITY AREAS

<p><b>Travel behavior and transportation systems modeling</b></p> <ul style="list-style-type: none"> <li>• Research on telework, telecommunications and travel</li> <li>• Research on attitudes toward vehicle purchases, travel behavior and mobility</li> <li>• Research on future demand for conventional and alternative-fuel vehicles</li> <li>• Research on security of transport systems</li> <li>• Theory and practice of traffic engineering</li> </ul>
<p><b>Environmental vehicle technologies</b></p> <ul style="list-style-type: none"> <li>• Feasibility analysis and planning for hydrogen, biofuel, and electric vehicle systems</li> <li>• Hydrogen fuel cell demonstration and research</li> <li>• Analysis and design of more efficient vehicles</li> </ul>
<p><b>Climate change, air quality and other environmental impacts</b></p> <ul style="list-style-type: none"> <li>• Analysis of auto industry and consumer responses to regulatory and technological change</li> <li>• Analysis and design of more efficient vehicles</li> <li>• Research on regional distribution of particle or soot pollution</li> <li>• Design of low carbon fuel standard</li> <li>• Studies of transportation and energy in China</li> </ul>

### FOOD FOR THOUGHT

<p>"Plug-in" hybrids can be recharged from a domestic power supply, allowing the vehicle to be powered by cheap off-peak electricity. This reduces fuel consumption and emissions and allows the vehicle to run exclusively on electric power for most short trips around town.</p>
<p>ITS researchers worked with Freightliner Corporation to study the potential benefits of fuel cells as auxiliary power units in trucks. While vehicles powered entirely by fuel cells are some years away, auxiliary power units could be an early application of the technology.</p>
<p>UC Davis has two hydrogen-powered Toyota SUVs and a new transit bus powered by a blend of hydrogen and natural gas.</p>

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://www.its.ucdavis.edu">www.its.ucdavis.edu</a>	<b>Phone:</b> (530) 752-6548
<b>Contact:</b> Stacey Mello, Events/Outreach Coordinator	<b>Email:</b> <a href="mailto:smello@ucdavis.edu">smello@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/UC DAVIS JOHN MUIR INSTITUTE OF THE ENVIRONMENT

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

### THE BASICS

<b>Director:</b> Deb Niemeier	
<b>Department:</b> Office of Research. The institute is an <i>enhanced</i> Organized Research Unit, established to administer collaborative and interdisciplinary research programs and vested with interdisciplinary academic program responsibilities. As Associate Vice Chancellor, the Director of the John Muir is also charged with coordination of cross-campus interdisciplinary activities on the environment.	
<b>Focus:</b> To strengthen the scientific foundation for environmental decision making by supporting innovative interdisciplinary research, teaching and outreach activities that respond to real-world environmental challenges.	
<b>Budget/funding:</b> \$16-\$26 million annually	<b>Sources:</b> Federal, state, regional and local governments; business, foundation, and private grants, gifts; UC Davis
<b>Staff:</b> 24 core and program staff, 22 technical and research staff, and 116 affiliated faculty	<b>Founded:</b> 1997

### SOME MAJOR ACTIVITY AREAS

<p><b>Policy – Scientific discovery and solutions for pressing environmental challenges. Our faculty regularly</b></p> <ul style="list-style-type: none"> <li>• conduct white paper policy analyses examining issues ranging from alternatives for Delta management, transportation infrastructure, farm worker housing, and climate change.”</li> <li>• collaborate with agencies, NGOs, consultants, academic researchers, and others to develop and apply natural resource models.</li> <li>• train a new generation of interdisciplinary environmental policy and management professionals.</li> </ul>
<p><b>Partnerships – Working with communities for sustainable, affordable solutions. Our programs include</b></p> <ul style="list-style-type: none"> <li>• providing technical assistance to help small, public water systems comply with minimum drinking water regulations, increasing the availability of safe water for all Californians.</li> <li>• facilitating place-based learning and greater access to resources and expertise as graduate students work directly with people in a community to solve local environmental challenges.</li> <li>• stewardship of natural reserves, holding in trust and carefully studying unique ecosystems, providing access to those protected places and the knowledge we’ve gleaned from them.</li> </ul>
<p><b>Research – Seeking answers to real-world questions. Our faculty continue to discover through</b></p> <ul style="list-style-type: none"> <li>• five decades of research on Lake Tahoe, finding collaborative solutions for protecting this national treasure in the midst of the local population and recreational use of the region.</li> <li>• examining the relationships between agricultural, occupational, and community environments and human health.</li> <li>• investigating environmental justice issues as they pertain to race, as well as to class and gender.</li> </ul>

### FOOD FOR THOUGHT

<ul style="list-style-type: none"> <li>• At the Golden Gate, the sea level has risen 7 inches in the past 100 years, with a predicted sea level rise of up to 36 inches by 2100. Climate change will create problems for low-lying towns, roads and airports all around the Bay Area, as well as stressing fragile Delta levees.</li> </ul>
<ul style="list-style-type: none"> <li>• In California, water systems have to meet 80 state and federal limits on contaminants, making the cost of testing, installing and maintaining the equipment unaffordable for small suppliers.</li> </ul>
<ul style="list-style-type: none"> <li>• Reduction of pollution by realistic amounts in the Tahoe Basin will not only maintain Lake Tahoe’s world-famous clarity, but also can restore it to 1970 levels.</li> </ul>

### HOW TO LEARN MORE

<b>Website:</b> <a href="http://johnmuir.ucdavis.edu">johnmuir.ucdavis.edu</a>	<b>Phone:</b> (530) 752-5643
<b>Contact:</b> Deb Niemeier, Director; Cheryl Smith, Assistant Director	<b>Email:</b> <a href="mailto:jmie@ucdavis.edu">jmie@ucdavis.edu</a>



The Cleaner Air Partnership

## AT A GLANCE/UNIVERSITY TRANSPORTATION CENTER (UTC)

### AT ITS-DAVIS

*Air Quality, Clean Energy and UC Davis: Cleaner Air Partnership Luncheon 2.23.2007*

#### THE BASICS

<b>Director:</b> Susan Handy	
<b>Department:</b> UC Davis was designated a federal Tier II University Transportation Center in SAFETEA-LU, the transportation authorization bill signed in 2005. The UTC is administered through ITS-Davis. The U.S. Department of Transportation approved the Strategic Plan for the UTC in December 2006. The California Department of Transportation is providing the required match for the federal funds.	
<b>Focus:</b> The theme of the UTC is sustainable transportation, defined as an approach to transportation that meets the needs of all segments of society while minimizing environmental, societal, and economic costs. The UTC supports a wide variety of activities, each of which integrates research, education, and technology transfer.	
<b>Budget/funding:</b> \$1M annually	<b>Sources:</b> US Department of Transportation, California Department of Transportation
<b>Staff:</b> 60+ affiliated faculty; 80+ students	<b>Founded:</b> 2006

#### SOME MAJOR ACTIVITY AREAS

<p><b>Regional Transportation Planning</b></p> <ul style="list-style-type: none"> <li>• Research on the impact of smart growth policies on travel behavior</li> <li>• Development of advanced traffic operations for managing congestion</li> <li>• Integrated transportation and land use forecasting models</li> </ul>
<p><b>Environmental Planning and Review</b></p> <ul style="list-style-type: none"> <li>• Addressing environmental justice concerns in environmental review for transportation projects</li> <li>• Integrated analysis of road systems and ecosystems</li> <li>• Advanced information tools for incorporating environmental concerns into planning</li> </ul>
<p><b>Energy Policy</b></p> <ul style="list-style-type: none"> <li>• Understanding and predicting consumer vehicle choice</li> <li>• Systems analysis of alternative fuel pathways</li> <li>• Tools for optimizing energy infrastructure location</li> </ul>

#### FOOD FOR THOUGHT

In the US, vehicle-miles-traveled is growing faster than the population and reached nearly 10,000 miles per capita in 2000. An ITS researcher estimates the total environmental costs of motor vehicle use in the US at approximately \$100 billion per year.
ITS researchers have recently shown that neighborhood design influences both vehicle-miles-traveled and frequency of walking for individuals after accounting for their attitudes and preferences. This evidence supports the use of smart growth policies as a strategy for reducing greenhouse gas emissions – and for increasing physical activity.
Work underway on a UTC-funded project will produce a model to more realistically evaluate the implications of a dynamic congestion pricing scheme, in which road users pay a fee tied to the cost of the congestion they are creating.

#### HOW TO LEARN MORE

<b>Website:</b> <a href="http://utc.ucdavis.edu">utc.ucdavis.edu</a>	<b>Phone:</b> (530) 752-6548
<b>Contact:</b> Stacey Mello, Events/Outreach Coordinator	<b>Email:</b> <a href="mailto:smello@ucdavis.edu">smello@ucdavis.edu</a>

