



RAEL

Renewable and Appropriate Energy Laboratory

University of California Berkeley

<http://rael.berkeley.edu/>



Overview: The Renewable and Appropriate Energy Laboratory (RAEL) is a unique research, development, project implementation, and community outreach facility based at the University of California, Berkeley in the Energy and Resources Group and the Department of Nuclear Engineering. RAE focuses on designing, testing, and disseminating renewable and appropriate energy systems. The laboratory's mission is to help these technologies realize their full potential to contribute to environmentally sustainable development in both industrialized and developing nations while also addressing the cultural context and range of potential social impacts of any new technology or resource management system.

Some RAE Research Projects



Virtual Vehicle Company
Unlocking Green Car
Data With Cell Phones

Virtual Vehicle Company: The 'Virtual Plug-in Test Drive' system allows the users to experience a virtual, customized test drive of a Plug-in vehicle using their smart phones or Laptops. Recent research suggests that the citizens' understanding of plug-in vehicles is insufficient to support them in buying these new energy-saving vehicles. While a multi-day test drives will be the ideal means to educate citizens about these vehicles, providing millions of such test drives is impractical. The Virtual Test Drive Project, which has two pilot vehicles already on the road, attempts to overcome this gap.

Carbon Footprint Calculator: The CoolClimate Calculator has been designed to help US households and small businesses evaluate their complete climate footprints, compare their results to similar users, and develop personalized climate action plans to save money and reduce their impact on the climate. Versions of these tools have been adopted by government agencies, non-profit organizations and businesses throughout California and the United States.

<http://coolclimate.berkeley.edu>



Carbon Footprint Program
Climate action planning tools
for households and businesses



SWITCH

Planning low-cost, high-penetration
renewable energy investments

SWITCH: Planning low-cost, high-penetration renewable energy investments through application of the Switch computational model. With Switch (a loose acronym for Solar, Wind, Hydro and Conventional generators and Transmission), one can explore development options for the future electricity grid throughout the United States. The model identifies cost-effective investment decisions for meeting future electricity demand, taking into account the existing grid as well as projections of future fuel costs, technological developments, renewable energy potential, and proposed policies.

Molasses for ethanol: The economic and environmental impacts of a new pathway for the lifecycle greenhouse gas analysis:

Many biofuel standards consider just one feedstock from one supplying country for the production of sugarcane ethanol; fresh mill-pressed cane juice from a Brazilian factory. While cane juice is the dominant feedstock for ethanol in most Brazilian factories, a large number of producers manufacture most of their ethanol from molasses, a low-value co-product of raw sugar. Several producers in these countries have the capacity to export ethanol to California but the GREET model, which is used by most biofuel regulators, does not currently include this production pathway. We develop a modification to GREET to account for this pathway and derive lifecycle greenhouse gas emissions for ethanol manufactured from any combination of molasses and fresh cane juice.



Sugarcane Biofuel
Exploring the potential for
efficient biofuels from sugarcane

Daniel Kammen Founder & Director of RAEL



Daniel M. Kammen is Professor in the Energy and Resources Group Energy and Resources Group (ERG) , Professor of Public Policy in the Goldman School of Public Policy and is Professor of Nuclear Engineering in the Department of Nuclear Engineering at the University of California, Berkeley . He is also the founding Director of the Renewable and Appropriate Energy Laboratory (RAEL).

Dr. Kammen's research interests include: the science, engineering, management, and dissemination of renewable energy systems; health and environmental impacts of energy generation and use; rural resource management, including issues of gender and ethnicity; international R&D policy, climate change; and energy forecasting and risk analysis. Kammen advises the U. S. and Swedish Agencies for International Development, the World Bank, and the Presidents Committee on Science and Technology (PCAST), and is a member of the Intergovernmental Panel on Climate Change (Working Group III and the Special Report on Technology Transfer). Dr. Kammen serves on the technical review board for the GEF (the STAP), is a lead author for the Special Report on Technology Transfer of the Intergovernmental Panel on Climate Change, and advises the World Bank and the American Academy of Arts and Sciences and well as the African Academy of Sciences.

RAEL works with CARES on projects in native communities of California.



Ryan Shelby

PhD student,

Co-Founder of CARES



The Community Assessment of Renewable Energy and Sustainability (CARES) project is a multidisciplinary team of engineers, architects and environmental specialists at the University of California, Berkeley. CARES was founded in 2007 with an Advanced E-Team Grant from the National Collegiate Inventors and Innovators Alliance (NCIIA) to address the disconnect between the creation of sustainability technological innovations by engineers and the needs of the end users.

The mission of CARES is to enable end users to make informed decisions about sustainability and renewable energy technologies by giving them agency during the design, development, and implementation of sustainability best practices renewable energy technologies.

Under the CARES umbrella, faculty and students at the University of California, Berkeley have been able to work on projects that have allowed students to provide services to local communities and further develop their communication and professional skills.

Since March 2008, CARES has partnered with the Pinoleville Pomo Nation, a Native American tribe located in Ukiah, CA, to co-design homes and power systems that utilize sustainability best practices, renewable energy technology, and reflect the long-standing culture of the Pinoleville Pomo Nation.



Josiah Johnston

PhD student in RAEL



Cultural Sustainable Housing
for the Pinoleville Pomo Nation