



# Blum Center *for* Developing Economies

April 2012

## The Growth of Green Innovation

*By Brittany Schell*

Since it was established in 2006, the Blum Center has supported green innovation at UC Berkeley and around the world. Both the Big Ideas@Berkeley student competition and various faculty-led initiatives have produced projects that simultaneously improve the lives of individuals and benefit the environment.

Since the first Earth Day was celebrated on April 22, 1970, the modern environmental movement has taken shape. Over the past four decades, ideas about conservation, energy efficiency, and sustainability have come to the forefront of innovation.

In honor of Earth Day 2012, the Blum Center recognizes the vast array of green ideas that have been realized at UC Berkeley over the years, with the support of the center and other partners—from energy efficient stoves in Darfur, Tanzania and Ghana to a local bike share program, to solar energy projects and a proposal to “green” Berkeley’s campus.

This year, we have a whole new group of student contestants for Big Ideas@Berkeley. The contest winners will be announced on May 1, so stay tuned. For more information on this or any of the projects listed to the right, visit our website: <http://blumcenter.berkeley.edu>

The Lumina Project	2006
Cookstoves and Climate Change	
Darfur Stoves	
Urban Waste to Energy	
The Concrete Garden Project	
Mitigation of Water Scarcity in Agriculture	2007
Cost-Effective Production of Biofuels	
Green Cement	
Urban Eco Blocks	
Biofueled Future for Central America	
Guatemala Solar Hot Water Heater	2008
Berkeley Green Campus Program	
Fabric Recycling for Alameda County	
Deep Sea Energy Generation	
Reducing Residential Energy Consumption	
The Green Bike Share Project	2009
SMART Light	
Tanzania Cookstoves	
Ghana Cookstoves	
WE CARE Solar	
Berkeley Green Home	2010
CARES: Renewable Energy and Sustainability	
Squash and Vine	
Coal Power and Reversing Climate	
Sunlight to Electricity	
Mobile Energy Savings System	2011
Zaakta	
Monte Verde Solar	
INSTAR	
DC Microgrids	
Bottle Recycling Project	2012
Gram Power	

## LUMINA: Enlightened Design for Brighter Outcomes

By Javier Kordi

When set on fire, a sandal made of discarded tire rubber emits eight hours of low grade, dirty light. Although unconventional, in Southern Kenya—where a lack of grid electricity and shortages of kerosene, batteries, and wood cause people to burn whatever is at hand—such extreme measures are not uncommon. One interviewee reported burning about six sandals every year.

Nearly two centuries after Thomas Edison proclaimed that “We will make electricity so cheap that only the rich will burn candles”, 1.6 billion people continue to suffer from ‘light poverty’—more than the entire population of the world at the time of Edison’s breakthrough. Having to rely primarily on kerosene—and an odd mix of other sources, including candles, fish oil, yak butter, twigs, diesel fuel, and even footwear—people are constantly exposed to dangerous fumes and fire hazards which contribute to a panoply of health problems and climate change. In 1995, after witnessing the darkness of rural India, scientist Evan Mills set out to create the LUMINA Project—

an initiative based at Lawrence Berkeley National Laboratory committed to combating the light poverty of the developing world. After a decade of laying the groundwork on a shoestring, an investment by the Rosenfeld Fund for Sustainable Development at Blum Center in 2007 helped the organization to pick up momentum. Today, LBNL and Humboldt State University scientists and engineers are deploying systems based on white light-emitting diodes (WLEDs) and conducting important market research and field tests—in collaboration with product manufacturers—striving to deliver the promise of sustainability, durability, and affordability. Many students at both universities have been involved.

LEDs are by no means a new technology, but before LUMINA, no systems were in place to consistently test the quality of small off-grid lighting systems. When some lighting manufacturers began introducing low-quality products into the market, LUMINA was ready. With lifespans as low as a

few weeks, the only notable outcome produced by low-quality devices was disappointment. Product testing work done previously by LUMINA quickly revealed the consequences of bad design and the potential for better outcomes. ‘Lighting Africa’, an initiative of the World Bank and of other partners inspired by LUMINA, created a system based on LUMINA’s work to test and certify new products. Inspired by a report commissioned from LUMINA in 2011, the U.N.’s Clean Development Mechanism passed a new methodology for combating light poverty while enabling carbon emissions reductions achieved by new technologies to be valued and traded through the Clean Development Mechanism. Titled “AMS-III-AR”, this international framework sets industry standards for off-grid lighting products receiving carbon-trading credits. These regulations are harmonized with the Lighting Africa standards. Additional “points” are received by products that perform even better.

A series of market trials conducted in Africa by LUMINA have proved promising—people are eager to purchase solar-powered LEDs and showed high levels of satisfaction with their quality-assured new lights (the latest trials in Kenya are documented in LUMINA’s Project Technical Report #6). Following the World Bank’s lead, U.S. Energy Secretary Steven Chu launched an initiative on off-grid lighting at the Copenhagen climate conference, and is now supporting LUMINA’s work.

With this new technology and framework, the prospect for growth is immense. In 2010, Evan and colleagues conducted a field trial using LEDs in poultry production (where kerosene is the norm). Lighting a large chicken coop (3000 chickens!) with LEDs instead of kerosene cut operating costs dramatically and created a safer environment for farmers and chickens. This year, Berkeley students Tim Gengnagel and Phillipp Wolburg are in Tanzania working with fishermen

on Lake Victoria. Every night, about 22,000 fishermen take to the lake with kerosene pressure lamps to attract their catch. In recent years, yields have been plummeting due to climate change and pollution. These night-fishermen spend up to a dollar a day per lantern on kerosene—a huge amount of their income. LEDs could change the economic equation dramatically, and fishermen have indeed been happy with the LED prototypes brought to them by LUMINA.

Nearly two decades in the making, LUMINA has broken new ground in the fight against light poverty. With continued support, the organization and its partners may one day bring light to all. For more information, such as updates, project reports, and photographs, visit the project’s website at: [www.light.lbl.gov](http://www.light.lbl.gov) or Evan’s blog at: [www.offgridlighting.posterous.com](http://www.offgridlighting.posterous.com).

**Blum Center Events**  
*Spring 2012*

**April 28**  
**Global Poverty: Challenges and Hopes in the New Millennium**

*Duimelle 145*

**May 1**  
**Big Ideas @ Berkeley Awards Ceremony**

*B100 Blum Hall (Plaza Level)*

**May 14**  
**Global Poverty and Practice Minor Commencement Ceremony**

*Sibley Auditorium*

Photo credit: Evan Mills; LUMINA Project



## CalCAP: Taking UC Berkeley Back to the 90s

By Luis Flores

UC Berkeley is traveling back in time. The campus is on track to reduce its carbon footprint to 1990 levels in two years, with the long-term goal of achieving carbon neutrality. The drive to accomplish this began in 2005 when

a group of graduates, undergraduates and faculty members drafted a letter to the administration seeking to place a cap on campus carbon emissions. The administration replied with a challenge: to put together a practical, measurable feasibility plan.

The result was CalCAP, UC Berkeley's Climate Action Partnership, a student-led initiative that took up the daunting task of calculating all of the University's emissions and drafting recommendations to the administration.

"No university at the time had tried to inventory what its carbon emission was at that point," explained Scott Zimmerman, a graduate of Boalt Law School who helped develop CalCAP during his time as a graduate student. "It just made sense that we would try to tap into what is going on in the labs and use the campus as a testing bed for those ideas."

After taking first prize at the first Big Ideas@Berkeley contest, CalCAP gathered a group of eight students to comprehensively measure the campus carbon footprint. Considering everything from faculty and staff commutes, fugitive emissions of refrigeration, and even students' air travel, the resulting feasibility study of 2007 convinced the administration to accept CalCAP's proposed targets.

Former CalCAP project manager, Fahmida Ahmed believes the group's success is due to the genuine passion of the students involved. For students, it was very personal.

"It was important for it to be home-grown," noted Fahmida, who now works as the Associate Director of Stanford's Office of Sustainability. "We wanted our institution as a whole to look within and understand where we are and where we want to go from there."

Seeded from a modest award from Big Ideas, CalCAP has grown immensely. The organization has gone on to inspire other UC campuses to adopt similar emission targets. Yet even with the added responsibilities, students have continued to play an active role in the initiative. Every year, graduate students enrolled in the Sustainability in Action: CalCAP course conduct extensive greenhouse gas emission inventories in order to evaluate the campus' progress toward its sustainability goals. The latest study found that the UC Berkeley campus is currently exceeding the 2014 target by 42,000 metric tons of carbon emissions.

In addition to policy suggestions, like the switch from coal to natural gas power, CalCAP is actively engaged in developing sustainable habits in the everyday lives of students. On their website, an interactive feature allows students to calculate the carbon impact of their air travel. Moreover, the just-released MyEnergy at Berkeley dashboard, a collaboration between numerous campus organizations, allows students to track energy consumption in 57 buildings on campus day by day, constantly reminding students of the environmental impact.

Environmental initiatives often struggle to garner support for goals that are marginal and difficult to see. But CalCAP's interdisciplinary approach that strives to consider all stakeholders has ensured widespread support of its carefully chosen reduction targets. While the research of accomplished scientists on campus provides the resources for environmental progress, CalCAP shows that it often takes the drive and passion of students to push for measurable reform.



## Anthropological Insights on Poverty in Development Engineering

By Brittany Schell

The importance of anthropology in poverty alleviation and development work was showcased at a March 8 panel discussion hosted by the Blum Center for Developing Economies, where speakers highlighted how anthropology can help us understand economics, policy and the alarming rates of poverty that persist in the world.

The discussion, "Anthropological Insights on Poverty in Developing Economies," was moderated by Richard C. Blum, founder of the Blum Center, and featured four female panelists in honor of International Women's Day.

"If you want to understand the world, simply plugging numbers into a spreadsheet isn't enough," said panelist Gillian Tett, U.S. managing editor of The Financial Times of London.

Tett, who has a Ph.D. in anthropology, talked about the role of anthropological analysis in economic discussion and policy creation. Her recent book, *Fool's Gold: How Unrestrained Greed Corrupted a Dream, Shattered Global Markets and Unleashed a Catastrophe*, focuses on the connection between social behavior and economics.

"A silver lining to the cloud of the economic crisis is that it has indeed forced a new level of interdisciplinary discussion," Tett said. "Interdisciplinary work is key for innovation and creativity in human endeavor."

Laura Tyson, an economics professor at UC Berkeley and Chair of the Blum Center Board of Trustees, also talked about the power of interdisciplinary approaches in searching for innovative solutions to global poverty.

"People are now coming together, bringing serious psychological and anthropological lenses on what happened," Tyson said, referring to the economic crisis.

There is a growing interest among her business students, Tyson said, around the idea of creating for-profit business ventures that will bring value to communities—more than just the products or services provided. Her students want to create business models that "understand the actual needs of the population we are trying to serve," she said.



Panelists, Laura Tyson, Gillian Tett, Aihwa Ong, and Clare Talwalker with Blum Center Founder and event moderator Richard C. Blum.

Aihwa Ong, a UC Berkeley anthropology professor, said anthropologists are observing and trying to understand how things work in the constantly changing conditions of globalization,

and so are hesitant to make big claims about solutions to poverty.

"We have to think of culture not as fixed blueprints of society," Ong said. "Culture is not written in stone, but rather is a dynamic system of beliefs and practices."

All four panelists agreed that, as teachers, they have an opportunity to show students an anthropological means of looking at problems like poverty, hunger, clean water, and other issues faced by people in developing nations, to help build sustainable solutions that work for the local community.

Clare Talwalker, vice chair of the Global Poverty and Practice minor at UC Berkeley, said she teaches her students that poverty alleviation is about listening and learning, which is where the field of anthropology becomes so important.

"The work of alleviating poverty and inequality begins by focusing on actual relationships that are formed on the ground," she said.

Talwalker emphasized that teachers have the responsibility and opportunity to guide future employees of NGOs and multinationals.

"Students can be powerful agents of change," she said. "Our students are the aid workers of the future."

Photo Credit: Brittany Schell

## The Course that Innovates for the Public Good

By Luis Flores

On a rainy Wednesday evening, 23 UC Berkeley students from a broad range of disciplines gathered for class in a seminar room in the imposing University Hall—each taking a seat around a mysterious “Hello Kitty” stuffed doll. After a few minutes, the table was filled with seemingly unrelated products: cartoon toothpaste and toothbrush sets, a doggy-bag dispenser and a manicure set.

The lesson of the week was the potential of “bundling” products and services in public health. Creatively integrated with a colorful first-aid kit, the “Hello Kitty” emergency stuffed doll illustrated a way to incentivize the adoption of responsible health practices using cultural tastes. It is no surprise that a course focused



on developing innovative solutions is taught creatively as well. Often described as one of the most innovative courses on campus, Designing Innovative Public Health Solutions, a course sponsored by Blum Center, gives students an invaluable opportunity to engage with real clients in developing cutting edge solutions to real public health problems. “There are a lot of opportunities to do things much better,” explained course instructor Jaspal Sandhu, who holds degrees from MIT and UC Berkeley.

He said the course was designed to address a “need for applied skills” in approaches to public health. The course imparts the innovative approach of understanding problems, not from a theoretical perspective, but from the

perspective of practitioners and recipients of public health. “We often design a good fix to the wrong problem,” lamented Jaspal.

Andrea Spillmann, who recently received her MPH, was among the first group of students to enroll in Jaspal’s course. “Most of our other courses teach you what’s been done and why and how,” Andrea remarked, “either teaching you how to replicate that or why you should not replicate that.” While Andrea finds those skill sets helpful, the course on Designing Innovative Public Health Solutions helped her critically approach the root of problems and to reframe both problems and solutions in unconventional ways. Andrea’s project reflects this critical approach.

Working with Tal Amiel, an MPP candidate, Andrea began working with Tekla Labs to develop cheaply and readily available blueprints for lab equipment in Nicaragua. However, after traveling to Nicaragua for a pilot program, Andrea and Tal noticed problems overlooked by their clients. “We noticed a drawer full of pipettes, unused because no one knew how to calibrate them,” recounted Andrea. It became apparent that health labs in Nicaragua did not need more equipment but needed to maintain and fix the equipment they already had.

Andrea and Tal then redirected their efforts at a more pressing problem, proposing the development of videos, plans, and a hotline to connect labs in Nicaragua with experts elsewhere who

could give them advice on how to maintain equipment.

This semester in Jaspal’s class, students are working in groups on seven different projects, ranging from the development of a prototype investment module for drinking water franchises in rural Mexico to an initiative to increase MediCal enrollment in California’s Santa Clara Valley.

Taking about an hour of the three-hour class, guest lecturers who are innovators in different industries introduce students to different fields.

Guests have included Chris McCarthy, a Kaiser Permanente innovation specialist who is behind the popular KP MedRite sash—which reduces medical errors in hospitals by creating “no-interruption” wear to minimize distractions in the administering of medication.

Another inspiring lecture by a New York Times author showed the success for channeling youth rebellion away from smoking. By showing how tobacco companies work to manipulate the youth, a pioneering campaign to promote youth rebellion against tobacco companies became



Course co-instructor Ash Hosang, lecturer of Community Health and Human Development, advises students on their projects.

highly effective in reducing teenage smoking.

If the past is any indicator, students will continue to be drawn to the course, which “turns traditional analysis completely inside out,” as Ruco Van Der Merwe, a current student in

the course, explained. Perhaps just as important, the course will help develop a new community of professional practitioners in public health who are unafraid to critically engage with traditional paradigms and who are poised to innovate for the public good.

**“It was clear last year and it was clear again this year that there is a demand for applied skills... each year we have had to turn away students...”**

-Jaspal Sandhu



During spring break, Global Poverty and Practice students were well represented at the Clinton Global Initiative—a conference held at the George Washington University in D.C. The annual conference brings together students who have made a “Commitment to Action” in addressing a pressing challenge locally or globally. This year, the work of former GPP student Lauren Herman was featured in a brief video. Lauren made a Commitment last year to work towards improving the financial literacy and consumer awareness among Kenyan microfinance borrowers. To accomplish this, she collaborated with local advocacy groups and borrowers to create a consumer education manual. True to her Commitment, 1000 copies of the manual will be distributed to the Kenyan community this May.

Photo Credit: Blum Center



Photo Credit: Jaspal Sandhu

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