

Karina Garbesi

Curriculum Vitae

Professor Emerita, Environmental Studies
Department of Anthropology, Geography, and Environmental Studies
California State University, East Bay (CSUEB)
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EDUCATION

- Postdoctoral Fellowship (1993 – 1995) Lawrence Berkeley National Laboratory
- Ph.D., Energy and Resources (1993) University of California, Berkeley (UCB)
- MS, Energy and Resources (1988) University of California, Berkeley
- BA, Physics, High Honors (1986), University of California, Berkeley

CURRENT POSITIONS

- Professor Emerita, [Geography and Environmental Studies](#), CSUEB
- Director of Environmental Studies, CSUEB
- Advisory Board, [We Care Solar](#)

RESEARCH INTERESTS / Expertise

Energy, environment, society, sustainability, and security. Social impact solar.

AWARDS AND DISTINCTIONS

- Principal Investigator, [Climate Empowerment Learning Initiative](#) (National Science Foundation, ITEST Grant) (2021 – 2025)
- CSU Faculty Innovation and Leadership Award ([FILA, 2018-19](#))
- Cal State East Bay Provost's Award for Outstanding Contributor to Community Engagement, April 20, 2017.
- California Higher Education Sustainability Conference, Best Practice Award for Sustainability in Academics: STEM ([CHESC, 2016](#))
- CSUEB Representative to the National Council for Science and the Environment's Council of Environmental Deans and Directors AY14/15, AY 15/16.
- Taylor Technical Talent Award of the Illuminating Engineering Society, 2012
- Switzer Environmental Leadership Grant, 2000/2001
- Distinguished Faculty Mentor, San José State University, 1997
- Alexander Hollaender Distinguished Postdoctoral Fellowship, 1993 - 1995
- Switzer Environmental Fellowship, 1992 - 1993
- Associated Western Universities/Department of Energy Fellowship for Achievements in Science, 1989 - 1992
- Bachelor's Degree conferred with High Honors in Physics and High Distinction in General Scholarship, 1986

- Sigma Pi Sigma Physics Honor Society, 1985
- Cyril Gail Scholarship Academic Excellence Award, 1983

TEACHING AND ADVISING

Courses at CSUEB (6000 level = graduate, <5000 – undergraduate)

ENVT 320	Environmental Resource Analysis
ENVT 330	Environmental Sustainability and Social Justice
ENCT 447	Energy Climate and Society
ENVT 493	Environmental Projects
ENVS 2000	Introduction to Environmental Studies
ENVS 3400	Environmental Resource Analysis
ENVS 3480	Applied Field Studies
ENVT 3898	Cooperative Education
ENVS 3999	Special Issues in Environmental Studies: Social Impact through Sustainable Solar Design
ENVS 4800	Senior Seminar
ENVS 4900	Independent Study
ENVS 4910	Internship in Environmental Studies
ENVT 4320	Energy and Society
GEOG 3000	Sustainable Resource Management
GEOG 3450	Literature and Research Aides
GEOG 6660	Graduate Seminar on Human Impacts on the Natural Environment
GEOG 6750	Graduate Seminar on Environmental Planning
GEOG 6800	Graduate Seminar on Urban and Regional Planning and Development
TED 6999	Special Issues in Teacher Education: Social Impact Solar

Courses at SJSU (200 level = graduate, 100 level = undergraduate)

EnvS 101	Sustaining the Earth—lower division undergraduate
EnvS 133	Alternative Energy Strategies—upper division undergraduate
EnvS 116	Solar Energy Design—upper division undergraduate
EnvS 119	Energy and the Environment—upper division undergraduate
EnvS 184	Independent Reading
EnvS 196	Research Topics in Environmental Science—co-taught with CE and Geology
EnvS 198	Senior Seminar in Environmental Studies
EnvS 199	Senior Thesis in Environmental Studies
EnvS 200	Graduate Methods Seminar
EnvS 297	Graduate Seminar on Research and Proposal Development

(≥200 = graduate courses. ≤199 = undergraduate courses)

Master's Thesis Advising

COMPLETED THESES

- Evangelos Vossos, (August 2011), Optimizing Energy Savings from Direct DC in US Residential Buildings, San Jose State University (SJSU), Principal Advisor.
- Dipti Vaghela, (December 2010), Community Participation in Microhydro Projects in Orrisa, India, SJSU, Principal Advisor.
- Cathy Green, (December 2004) Efficiency's Potential to Reduce San Francisco's Electricity Use and Air Pollution (CSUH (NOW CSUEB), Chair)
- Narinder Bansal, (June 2003) US Low-Income Energy Assistance Programs Before and After Deregulation, Principal Advisor (CSUH (NOW CSUEB), Chair).
- Sharada Thattey. (May 2002) Effectiveness of San Jose's Solar Access Guidelines a Policy Evaluation, SJSU, (SJSU, Principal Advisor).
- John Galloway, (May 2001) Solar Hot Water in California: Policies and Models to Enhance Performance and Market Viability, (UC Berkeley, Principal Advisor).
- Annette Grønlund (May 2000) California Residential Energy Saving Tips (CREST: a GIS-based computer program to make climate-specific energy-efficiency recommendations for home energy use in CA) (SJSU, Principal advisor).
- Lisa Bennett (December 1999) Roles of Municipalities in Watershed Monitoring of Nonpoint Source Pollutants, SJSU, Principal advisor.
- Teri Davis Patane (1999) Hazardous Materials Regulation and Small Business Compliance in Santa Clara County. Dept. of Environmental Studies (SJSU, Principal Advisor).
- JoAnn Baumgartner (1999) Bird and Arthropod Predation of Coddling Moth Species (*Cydia pomonella*) in Apple Orchards. Dept. of Environmental Studies (SJSU).
- Chris Wellise (1999) Effect of Carbamate Pesticide on Cd and Zn Bioaccumulation in a Bivalve. Dept. of Environmental Studie (SJSU).
- Karen Rosen (1998) An Assessment of Potential for Utility-Scale Wind Power Generation in Eritrea. Dept. of Environmental Studies, (SJSU, Chair).
- Jacquie Chu (1998) Social and Environmental Restoration Through Therapeutic Community Gardens. Dept. of Environmental Studies (SJSU, Chair).
- Brandolyn Patterson (1997) Assessment of Selenium Concentrations in Ephemeral Pools at Kestersen Reservoir. Dept. of Environmental Studies (SJSU).
- Christine Hoeflich (1995)--Alternative Fuels for Vehicles: Assessment of Technologies and External Costs. Dept. of Environmental Studies (SJSU).

PROFESSIONAL HISTORY prior to "current"

- Full Professor, Department of Anthropology, Geography and Environmental Studies, Cal State East Bay. (2009 – 2020), Director of the Environmental Studies Program (2009)
- Program Manager, [Energy Efficiency Standards Group](#), Lawrence Berkeley National Laboratory, 2011 - 2014. Managed teams that provided technical support to the U.S. Department on [energy efficiency rulemakings for lighting products](#). Teams wrote the technical support documents for Energy Conservation Standards (ECS) and Test Procedures (TP) including market and technology analyses, energy use analyses, life cycle cost analyses, shipments analyses, and the national impact analyses. Rulemakings include general service fluorescent lamps incandescent reflector lamps

(ECS), ceiling fan light kits (TP and ECS), luminaires (TP), general service lamps (ECS).

- Principle Investigator: *Max Tech and Beyond Design Competition for Ultra-Low Energy Use Appliances and Equipment*. 2011 – 2014. Developed and ran the DOE-supported competition for the Lawrence Berkeley National Laboratory.
<http://maxtechandbeyond.lbl.gov/home>,
http://www1.eere.energy.gov/buildings/technologies/max_tech_design_competition.html.
- Associate Professor, Geography and Environmental Studies, Cal State East Bay. (2003 – 2009), Director of the Environmental Studies Program (2009)
- Assistant Professor, Geography and Environmental Studies, Cal State Hayward (1999 – 2003)
- Assistant Professor, Environmental Studies, San Jose State University (1995 – 1999),
• Graduate Coordinator (AY 97/98, 98/99), • Energy Program Leader, • Chair, SJSU University-wide Environmental Forum (AY 98/99).
- Affiliated Faculty, Energy and Resources Group, and the Renewable and Appropriate Energy Laboratory, University of California, Berkeley (1998 – 2009).
- Research Fellow F93 - S94. Department of Environmental Science, Policy, and Management, University of California, Berkeley, CA, 94270
- Alexander Hollaender Distinguished Postdoctoral Fellow F93 - S95. Lawrence Berkeley Laboratory, Berkeley, CA. Research on contaminant transport through soils and biogeochemical cycling of C from an alpine meadow soil.
- AWU-DOE Graduate Student Fellow S89 - Sm93. Dissertation research: Experimental and theoretical investigation to resolve significant model-measurement discrepancies of radon entry into houses. Development of technique to determine soil air-permeability at variable length scales. Advisors: R.G. Sextro and W.W. Nazaroff.
- Other AWU-DOE supported research: Energy conservation in buildings using urban trees for shading and latent heat loss. Water/energy tradeoffs of urban trees in the arid western US. (with A. Rosenfeld).
- Graduate Student Research Assistant Sm86 - S89. Masters research. Lawrence Berkeley Laboratory, Berkeley, CA. Laboratory and field studies and modeling were used to investigate the gas-phase transport of volatile organic contaminants in the subsurface, and their entry into houses via pressure-driven flow (with R.G. Sextro).
- Graduate Student Research Assistant: F88 - S89. University of California, Berkeley, Energy and Resources Group. Studied the effect of agricultural pesticides and selenium on natural ecosystems in California, and studied the effects of ozone pollution on California's forests and chaparral. Participated in development of appropriate policy responses to protect biodiversity from such threats (with J. Harte).
- Senior Engineering Aid for University of California/California Institute of Technology Keck Telescope Project. 1985 Responsible for data handling and programming for a project studying the optical properties of the near-ground atmosphere at the site of the 10-Meter Telescope (with D. Cudaback).

UNIVERSITY SERVICE

CSU System-wide Service

- Organizer: *CCC-CSU Alternative Fuels / Alternative Energy / Sustainability*, Cal State East Bay, August 31, 2007. (See **Conferences and Workshops**, below.)
- Selected Member of the *CSU Sustainability Advisory Committee, Education and Research Subcommittee*, Fall 2007 -- current. To promote sustainability education and policy in the CSU system.
- SJSU Representative to the *California Urban Environmental Research and Education Center*, Grants Management Board, 1999. Evaluated the relative merits of proposals submitted or grants funding.
- Reviewer of proposal for the new *CSU Master of Science in Environmental Science at CSU, Chico*.

Cal State East Bay, Service

- Co-Chair, Climate Action Planning Implementation Taskforce (CAP-IT), AY20/21, AY19/20, and AY18/19.
- Campus Sustainability Committee, Faculty Representative. AY20/21, AY19/20, AY15/16, AY 14/15.
- Tenure and Promotion Committee for History Department, AY19/20.
- Faculty Lead, Sustainability Institutional Learning Outcomes Committee, AY18/19, AY17/18.
- Chair, Senate Ad Hoc Committee on Sustainability: AY19/20 (co-chair), AY18/19, AY17/18, and AY 16/17. I led the founding of this committee.
- Invited Speaker, with Professor Erik Helgren. “Social Impact Solar Program”, Office of Research and Sponsored Programs, ORSP Research Speaker Series, Cal State East Bay, April 17th, 2018.
- Vice Chair, CSUEB Academic Senate. AY17/18. AY 16/17.
- Faculty Support Grant, Reviewer: AY18/19.
- Member: Executive Committee, CSUEB Academic Senate. AY17/18. AY16/17. AY05/06, AY03/04, AY02/03), Interim member S02.
- Chair, CSUEB Climate Action Planning Taskforce, AY17/18, AY16/17, AY15/16. Leading the developing of Cal State East Bay’s Climate Action Plan.
- Faculty in Residence, AY17/18. Leader, Faculty Learning Community for the Sustainability Overlay. Facilitating other faculty in the development of coursework for Sustainability Overlays.
- Secretary, College of Letters, Arts, and Social Sciences (CLASS) Promotion and Tenure Committee, AY16/17. Review and recommendations on 15 tenure and promotion cases.
- Featured Speaker, Rising in the East Campaign Kick-Off, Cal State East Bay, September 24, 2016.
- At-Large Member, CSUEB Academic Senate. AY15/16 – AY16/17.
- Faculty in Residence, AY15/16. Leader, Faculty Learning Community on Community Engagement and Sustainability. The group investigated the potential to

- pursue a campus-community partnership using the Sustainable City Year Program model developed by the University of Oregon. The FLC recommended piloting the program with the City of Hayward, won the approval of CSUEB President Morishita and City Manager Fran David, and agreement to cost share the program in AY16/17.
- **Chair, 2015-2016 Promotion Tenure and Retention Committee, Department of Theater and Dance.**
 - **Represented Cal State East Bay** at the Campus-Community Partnerships for Advancing Sustainability Workshop, which took place July 23, 2015, at the 2015 California Higher Education Sustainability Conference, San Francisco State University.
 - **Represented Cal State East Bay** at the National Council on Science and the Environment's 2015 Summer Meeting of the Council of Environmental Deans and Directors. June 22 – 24, Scripps Institute of Oceanography, San Diego, California.
 - **Faculty Sponsor, Solar Power Club** (a student club of Cal State East Bay's Associated Students, Inc.) AY 15/16.
 - **Member: Philosophy Tenure, Retention, and Promotion Committee** AY 09/10. Addressing cases for tenure, promotion to Associate Professor, promotion to Full Professor, and retention.
 - **CHAIR: Committee on Budget and Resource Allocation, (COBRA):** Fall 2005 – Spring 2010. Committee cofounder and member starting Fall 2003. COBRA is a standing committee of the CSUEB Academic Senate. The committee promotes and constitutes a main element of faculty participation in the budgeting process at CSUEB, it reviews CSUEB budgets and spending, and reports to the Academic Senate. COBRA chair also serves as a member of the Academic Senate, and as a liaison on planning and WASC accreditation proceedings.
 - **Member: University Planning, Assessment, and Budget Committee,** Fall 2007 – Spring 2010. This committee advises the president on university budget matters. The Chair of COBRA automatically serves on this committee.
 - **Member: Layoff Committee,** AY 07/08.
 - **Featured Faculty Speaker** Alumni Cocktail Party in Woodside California, October 4, 2007. Spoke on CSU system-wide efforts to mitigate carbon emissions.
 - **Faculty Hearing Panel** Serving (AY 07/08) as one of two representatives from Geography and Environmental Studies to the Hearing Panel pool for faculty grievance hearings.
 - **CSUEB Sustainability Representative:** To Town Hall Meeting with Shell Oil President, John D. Hofmeister "A Dialog with American's on Energy Security" (JW Marriot Hotel, San Francisco, 10-11-07); President's Luncheon with Senator Ellen Corbett (CSUEB, 9-28-07); To Silicon Valley Leadership Group's *Clean and Green Silicon Valley Projections Meeting* (Santa Clara University, 9-26-07); To Oakland Partnership Green Tech Cluster and its Green Academy (Wendel, Rosen, & Black, Oakland, meetings on-going).
 - **CSUEB Delegate to Access to Excellence Systemwide Summit Meeting,** April 24 - 25, Newport Beach California. Part of an 11-person delegation appointed by CSUEB President Mo Qayoumi to represent CSUEB in this system-wide strategic planning meeting involving the Chancellor, Trustees, administration, and faculty.

- **Member:** *Search Committee for Vice President of Administration and Finance and CFO of CSUEB*, Winter 06/07.
- **Member:** *Chair Search Committee Department of Theater and Dance*, Spring 2007.
- **Faculty Marshal**, *University Commencement* SP 2006, 2005, 2003, 2002, 2001, 2000.
- **Member:** *Strategic Planning Steering Committee*, Appointed by CSUEB President Rees, AY05/06. The Steering Committee guides development of 5-year planning goals and objectives for CSUEB, reports to the president.
- **Member**, *Budget Advisory Committee* AY03/04 – 05/06. Advises the CSUEB President on budget allocations.
- **Initiator of 1 MW CSUEB Solar Electric Facility:** Completed March 2004. Proposed and facilitated installation of photovoltaic array on the CSUEB campus. The largest such facility on any campus in the nation, the one megawatt system is installed on the rooftops of four campus buildings: Meiklejohn, PE, Music and Business, and Art and Education. It covers 76,000 square feet and delivers 30% of the campus's peak electricity demand.
- **Promoter, Green Building Design for Building and Technology Center:** Proposed to the President and VP of Administration and Business Affairs in 2003 that CSUEB's new building be designed according to green building principles, to save the campus on energy operations costs, reduce environmental impacts of the building, and generate enthusiasm among students, alumni, and the community. In 2004, the President committed to using green building design in the new construction, which began in 2005.
- **Member, Science GE Committee** AY03/04. Develop criteria and learning outcomes for lower division and upper division science GE courses.
- **Member, ALSS Election Committee** AY 03/04.
- **Member, Executive Committee of the Academic Senate**, The committee supervises the work of the Academic Senate and Prepares its agenda. Regular Member (AY03/04, 02/03).
- **Member, ALSS Curriculum Subcommittee** (AY 02/03) Review proposed curriculum within the College, report recommendations to the Council of Chairs
- **Chair, ALSS Technology Committee** (AY00/01, 01/02) The committee oversees and develops policy on all technology procurement and services for the School of Arts Letters and Social Sciences. The primary concern in AY00-01 was management of the Schools extensive computer resources, procuring a network servicing contract, hiring a ITS Director, and developing a strategic budget for computing resources.
- **Invited Faculty, Honors Convocation**, invited to present graduating honors students Judy Antone (Environmental Studies) and Denise Populis (Geography) (S02).
- **Invited Faculty, Honors Scholarship Luncheon**, invited faculty member to accompany Denise Populis (S02), Cathy Green (S01).
- **Member, University Information Technology Advisory Committee** (AY00/01, 01/02, 02/03, 03/04)
- **Member, Basic Skills Writing Requirements Appeals Panel.** AY99/00, AY00/01, AY01/02. Reviewed and participated as a panel judge on student appeals to the university writing requirement.

- **California Faculty Association, Hayward Chapter (Faculty Union)** • Chair, Budget Crisis Committee AY 02/03 • Department Representative • Organizer, Budget Crisis Forum, May 2003 • Lobbied Lonnie Hancock, 14th Assembly District Rep. on Behalf of CSU, March 10, 03 • CFA interviewer of 14th Assembly District candidates, December 3, 2001, 2 – 5pm. • AY01/02 CFA teach-in LA CFA system wide meeting AY 01/02. San Francisco Marriot Hotel demonstration • CFA representative at meeting with Senator Liz Figueroa, May 25, 2001, CSUH (NOW CSUEB). • Diehr for PERS Board campaign.

Department Service, Geography & Environmental Studies, CSUEB

- **Environmental Studies Program Director and Advisor**, 2014 – present, 2002 - 2009. Including all responsibilities associated with semester conversion.
- **Tenure Track Faculty Search Committee, Member**, AY19/20, AY18/19.
- **Chair, Sociology RTP Committee**, AY18/19.
- **Member Pioneer Scholarships Department Review Committee**, AY19/20, AY18/19, AY17/18.
- **Range Elevation Committee Chair**, AY18/19, AY05/06, Chair committee conducting departmental evaluation of range elevation candidates.
- **Environmental Science Advisor**, Fall 2002 – Spring 2004.
- **Geography and Environmental Studies Curriculum Coordinator**. Conducted Major Revamp of Environmental Studies Curriculum, coordinating with contributing departments (Fall 2003 – Spring 2005).
- **New Course Development**. Eenvt 3400 (Resource Management), and Eenvt 3480 (Applied Field Study).
- **G&ES Assessment Committee**, AY01/02.
- **California Faculty Association, Department Rep.** AY 00/01, 01/02, 02/03, 04/05, 05/06. Active in numerous special actions including: Meeting with Senator Liz Figueroa, May 25, 2001, CSUH (NOW CSUEB), interviewing state assembly candidates, phone banking to elect Gloria Romero to the state senate, gathering endorsements for George Diehr for CalPERS Board, and participation in meetings and actions in Los Angeles and San Francisco.
- **Environmental Studies Internship Coordinator**, AY 00/01, 01/02.
- **Fall Admissions Day. Department Representative**, Saturday, October 20, 2001.
- **Faculty Participant, Majors/Minors Faire (F01, F00, F99)**. Booth set-up and student advising on the mall. (We won a prize for best booth both times!)
- **Department Webpage Committee, F1999**.

University Service, San Jose State University

- **Chair, SJSU Environmental Forum** AY 98/99. Mission: to coordinate and enhance environmental programs, education, and opportunities at SJSU. Major accomplishments: initiated EF Web site (outreach for all environmental programs on campus); initiated spring speaker series (Prof. Stephen Schneider: Climate Warming: Real Science or Media Hype); faculty workshop on incorporating Environmental

Justice case studies in GE classes; preliminary planning for Environmental Curriculum Faire and Environmental Honors Scholarships.

- **College of Social Science Curriculum Committee**, SJSU (AY 97/97); reviewed proposals for new courses and curriculum changes in the College of Social Science.
- **Environmental Initiative, Research Committee** (AY 94/95), Facilitated environmental research collaborations on campus by developing a data base of all SJSU faculty interested in or conducting environmental research and or projects.
- **SJSU Environmental Forum** (member AY 97/98, chair AY 98/99). Representative of the Department of Environmental Studies in multi-college forum to enhance environmental programs at SJSU.

Department Service, Environmental Studies, SJSU

- **Graduate Coordinator** (S97, AY 97/98, AY 98/99), I managed all aspects of the Environmental Studies Graduate Program, which had between 40 and 50 active students.
- **Advisor for Energy Concentration** BS in Environmental Studies (I designed and manage the Concentration and advice of all of its students);
- **Computer Services Committee** (AY 97/99). I got all ES faculty connected to Internet, oversaw the department web site, and arranged computer system backup and digital scanning for the Department.
- **Equipment Committee** (AY 98/99).
- **Curriculum Committee** (AY 95/96, 96/97, 97/98), I was a major player in the redesign of the Environmental Studies Curriculum (AY 97/98) and in setting standards and developing departmental syllabi for the independent reading course and the senior thesis courses.

PROFESSIONAL SERVICE (see also Invited Talks and Guest Lectures)

- Co-founding member of the Board of Directors of [We Care Solar](#) (WCS) 2010-2020. WCS is an international non-profit providing
- External Reviewer, Environmental Studies Department, Environmental Studies Department, San Jose State University, Site visit, Dec 10 – 11, 2007 with Daniel Press, Chair Environmental Studies, UCSC, Report to AVP Cooper, December 18, 2007.
- Sponsor/Host: Environmental Footprint Curriculum Workshop for K-12 teachers. Liason for Department of Geography and Environmental Studies' sponsorship of curriculum development workshop for K-12 teachers to incorporate ecological footprint concept in classroom teaching. Event was put on by Redefining Progress, an Oakland non-profit and co-sponsored by the US-EPA.
- Proposal review: National Science Foundation, Geography and Regional Science Unit (Environmental Justice)
- Mentor to Switzer Graduate Fellowship Grant recipient Scott Fruin, Doctoral candidate in the Environmental Science and Engineering Program, UCLA.
- Interviewer for Switzer Environmental Fellowship, the San Francisco Foundation, San Francisco, CA: May 2000 and May 1995.
- Women Energy Associates, Board of Directors, 1998.

- Peer review for archival journals: *Environmental Science and Technology*, *Health Physics*, *Soil Science Society of American Journal*
- Book Reviewer for the following publishers
 - Addison and Wesley
 - Analytics Press (Koomey, *Turning Numbers into Knowledge*, 2001)
 - Prentice Hall
 - Rowman and Littlefield
- Peer review for institutional reports:
 - Lawrence Berkeley Laboratory,
 - United States Geological Survey
- International Summer School on Science and World Affairs, Energy and Environment Group. Princeton University, Princeton, NJ. (Sm91, participant), Moscow, USSR (Sm920, participant), and Shanghai, China (Sm93, keynote speaker)
- Conference Organizer: *Star Wars and National Security: A Conference on the Strategic Defense Initiative*, October 9 - October 11, 1986, University of California, Berkeley.

PUBLIC INTEREST CONSULTING

Consulting Projects

- Consultant to the *Environmental Law and Justice Clinic (ELJC)*, *Golden Gate Law School*, (1999 – 2003) Goal: Analysis of means to minimize energy impacts to the San Francisco, Hunter's Point Community. Issues: new transmission and power plant siting proposals, power plant decommissioning, alternative power supply and efficiency options. (See Consulting Reports)
- Expert Witness for the San Francisco Alliance for Environmental Justice, an Intervenor in the Potrero Power Plant Unit 7 licensing case. Testimony delivered to the California Energy Commissioners in administrative court proceedings, on December 9, 2002. California Public Utilities Commission Auditorium, 505 Van Ness Ave, San Francisco. Written and oral testimony and cross-examination addressed issues of how Unit 7 would compare to other alternatives in its effects on the local and statewide transmission and distribution systems.
- Consultant to the *Alameda Center for Environmental Technologies*, Alameda, CA (AY 00/01), Review of energy technologies amenable for technology transfer from the national laboratories and for green business incubation in the context of California's energy crisis.
- Consultant to: *Native American Renewable Energy Education Project (NAREEP)*. Consulted on curriculum development for the NAREEP Tribal College Summer Workshop, July 28 – August 3, 1996 in Berkeley, California, UCB Clark Kerr Campus, developed teaching modules on renewable energy and nuclear energy.

Consulting Reports

- K. Garbesi and E. Bartholomew, *The Potential for Solar Electricity Generation in San Francisco*, A Report to the Environmental Law and Justice Clinic of Golden Gate University Law School, July 1, 2001.

- C. Green and K. Garbesi, The Potential to Reduce The City of San Francisco’s Electricity Demand through Implementation of Commercially Available Energy Efficient Technologies, A Report to the Environmental Law and Justice Clinic of Golden Gate University Law School, July 1, 2001.
- K. Garbesi, Comments on the San Francisco Peninsula Long-Term Electric Transmission Technical Study (2004 – 2009): DRAFT FINAL REPORT, Prepared for the Environmental Law and Justice Clinic of Golden Gate University Law School on Behalf of the Southeast Alliance for Environmental Justice, October 7, 2000.
- K. Garbesi, Comments by Professor Karina Garbesi on the CEC Preliminary Staff Assessment (PSA) of the Potrero Unit 7 Project, Project Alternatives Section. Comments presented to Professor Alan Ramo, Environmental Law and Justice Clinic, Golden Gate University Law School. June 2, 2001.
- ELJC, Data Requests to Southern Energy (now Mirant), Potrero Power Plant Unit 7 Project, Golden Gate University Law School, Environmental Law and Justice Clinic. (00-AF C-4). I coordinated the development of and was the lead author on the data requests. 27 pp.

COMMUNITY SERVICE

- Board of Directors, We Care Solar: 2010 – 2020. Co-founding member of the Board, served as Treasurer, Vice President, and Secretary in various years. We Care Solar is now a fully mature, high-profile non-profit operating internationally, having won [numerous prestigious awards](#) including among many others the United Nations Golden Citizen Award (2011) the United Nations DESA Powering the Future We Want Award (2015), and Global Innovations Exchanges Award for Science, Technology, and Innovation for Sustainable Development Goals (2019), and TIME’s 100 Best Invention Awards (2019).
- Leader, Social Impact Solar Program:
- Lead and Instructor, Teacher Professional Development Workshop, for Hayward Promise Neighborhood Middle School and High School Teachers. “Solar Suitcase Training Workshops”: Teaching middle school teachers from local low-income schools about solar power and related STEM concepts by building actual off-grid solar electric systems designed for use in schools and orphanages in the developing world. In preparation for having CSUEB students TA in Solar Suitcase building workshops in the teachers’ classrooms. Oct. 3 and 17, 2016. Aug. 17 – 18, 2015.
- Member of the Board of Directors, WECARE Solar. 2011- present. We Care Solar provides education and charitable assistance to doctors and other health care providers in developing countries, by promoting solar-powered solutions to improve medical services for underserved mothers, infants and their families. <http://www.wecaresolar.org>
- Cal State East Bay Representative to the Clean and Green Silicon Valley Projections Meeting. September 26, 2007, Santa Clara University.
- Cal State East Bay Representative to the Oakland Partnership, Green Technology Cluster. The Partnership is a “public-private collaboration for the economic development of Oakland and its region, which involves representatives from government, business, education, labor and the community”. 2007, 2008.

- Volunteer: October 2005. Rehabilitation of Berkeley low-income apartments for Katrina relief victims. A collaborative project of the City of Berkeley, Prospect Sierra School, and two non-profits: Rebuilding Together Albany-Berkeley-Emeryville and Affordable Housing Associates.
- Kensington Fire Protection District (KFPD) Board of Directors: 2001. The District is the lead agency for the prevention and suppression of fire and for emergency preparedness and medical response. Key issues of interest to me include ecological vegetation management and fire-safety at the urban/wildland interface.
- Kensington Emergency Preparedness Council: I represented KFPD on the Council.
- Kensington Hilltop Elementary School •Member (1999 - 2002) PTA, KEF, Dad's Club.
 - Guest Lecture/Fieldtrip for 2nd Graders (Rms 9 & 4), "Weather Data and Weather Stations: How Scientists Use Them"October 29, 2001
 - Delivered a Solar Energy Lecture to Room 20 Classroom (June 13, 2001), see Talks
 - Active member of the Dad's club for which I have volunteered numerous hours doing seismic retrofits.
 - Organizer (F99) PM Kindergarten Spanish program (AY99/00).
 - Science Fair judge (AY 00/01, 02/02)
 - Organizer and donator of guest lecture delivered to three first grade classrooms: The Ecological Importance of Bats, delivered by Maggie Hooper, director of Nightflight and the Bat Conservation Fund, Berkeley, CA (May 31, 2001).
 - Carnival volunteer (AY 22/00, 00/01, 01/02)
 - Garden Party Fund Raiser volunteer (AY 22/00, 00/01, 01/02)
 - Organizer and chef for Duxbury Reel Tidepool visit (May 29, 2001).
- City of San Jose, Comments submitted to the Environmental Services Division regarding establishment of rules for city-aggregated greenpower purchases. In preparation for Renewable Energy Programs Workshop, January 28, 1999.
- City of San Jose, Invited Juror. Jury Process for Local Government Electricity Restructuring Projects. Provided advice to the City of San José on its selection of potential energy programs through which it might pursue in the restructured electricity market. September 22, 1998, Hayes Conference Center, San José.
- Supervisor of summer research of high-school teacher research assistant Sm92 Sharon Tannenbaum, Lawrence Berkeley Laboratory TRAC Project. Research on modeling and interpretation of radon transport in soils.
- Teacher, California Invitational Chemathon: April 27, 1991; Demonstrations and lectures on the source, exposures, and health risk of indoor 222-Rn to California high school students.
- Principal Author and Organizer: *Petition and Letter to Congress from Scientists and Energy Professionals Concerning the National Energy Strategy*. Used in US Congressional testimony by Rep. George Miller, Congressional Record, Sept. 26, 1991. Adopted by the Union of Concerned Scientists in support an Alternative National Energy Strategy.
- Expert Witness: May 10, 1989; Gave testimony before the Natural Resources Committee of the California Assembly in support of AB348, the California Reforestation and Urban Forestry Act of 1990.
- Expert Witness: April 3, 1989; Gave testimony before the Ways and Means Committee of the California Assembly in support of AB348, the California Reforestation and Urban Forestry Act of 1990.

MANAGEMENT: CONTRACTS and GRANTS

From January 2010 – May 2014 I served as an acting program manager and principle investigator at Lawrence Berkeley National Laboratory managing the following energy research programs under contract and on professional leave from CSUEB.

- Pioneers for Sustainable Communities, (\$150k AY 16/17, estimated) Principle Investigator and Project Lead for this university-community partnership program, modeled on the University of Oregon's *Sustainable City Year Program*. In AY16/17 CSUEB is partnering with the City of Hayward on 5 city sustainability projects involving 15 courses. Co-PI, Craig Derksen.
- Social Impact Solar Program, (~50k/yr AY 15/16, and 16/17) Principle Investigator. In this program we teach CSUEB students, local-area middle and high school teachers, and their students about energy poverty alleviation, social entrepreneurship, solar energy and related STEM concepts, using a multi-level curriculum focused on building actual, rugged, off-grid solar electric systems (We Share Solar Suitcases) that are destined for use in energy-deficient schools and orphanages in the developing world and for community engagement in disaster preparedness locally. In this program CSUEB students mentor low-income middle school students in Hayward Promise Neighborhood Schools by TA in Solar Suitcase building workshops. Support from Pacific Gas and Electric Company, private donors, and University funds.
- Federal Energy Conservation Standards and Test Procedures. FY2011-2014. (\$1M-\$3M/yr). As an acting program manager, I lead teams in the development of analyses, test procedures, and documentation in support of energy efficiency standards for lighting products. My rulemakings included [general service fluorescent lamps incandescent reflector lamps \(ECS\)](#), [ceiling fan light kits \(TP and ECS\)](#), [luminaires \(TP\)](#), and [general service lamps \(ECS\)](#). In that role I participated in the leadership of the [Energy Efficiency Standards Group](#), served as the conduit to US Department of Energy Management, lead the presentation of our analyses at Public Meetings at DOE headquarters in Washington DC, and mentored the professional development of our interdisciplinary teams of physics, engineers, economists, and energy analysts.
- Direct DC Power Systems for Efficiency and Renewable Energy Integration, with a Residential and Small Commercial Focus. FY2010 (\$400k, Co-Lead). Investigation of the energy savings potential that could result from using direct current (DC) from photovoltaic (solar electric) systems directly in its DC form in residential and small commercial buildings. Funded by the U.S. Department of Energy, Building Technologies Office, Residential Buildings Integration R&D, Building America Program.
- Max Tech and Beyond: Defining technology options, cost curves, and technical innovations for ultra-high efficiency appliances and energy service systems. FY2010 (\$600k, Project Lead). Developed a catalog of energy savings potentials of equipment in the residential, commercial, and industrial sectors. Developed price learning cost curves and the method for incorporating price learning in the economic analysis for federal energy conservation standards. Funded by the U.S. Department of Energy, Building Technologies Office, Emerging Technologies, Appliances and Emerging Technologies R&D.
- LBNL Impact Analysis: Monitoring and Modeling of EE Market Indicators and Technology Adoption, Principle Investigator. FY 2014 (\$350K – Principle

Investigator). I provide oversight of this project which is largely the responsibility of the project co-PI, Robert Van Buskirk. Funded by the U.S. Department of Energy's Building Technologies Office.

- Support for MCC-Ghana Compact II, Co-Principle Investigator: FY 2013/2014 The Millenium Challenge Corporation is pursuing a second compact with the government of Ghana to address problems of inadequate and unreliable power supply. To support the compact, the MCC has an Inter-Agency Agreement with the U.S.DOE to assist MCC in conducting due diligence on specific proposed energy projects and policy reforms, focusing on load management, energy efficiency policy & green building initiatives including retrofit of government buildings. DOE has contracted LBNL to provide that work under a Task Order under the Agreement. Dr. Robert Van Buskirk is the Principle Investigator on that work, which assesses, recommends, and evaluates relevant energy sector investments. I am a Co-PI on the project. (\$182k)
- Energy Efficiency (EE) Technology Innovation Acceleration by Linking Deployment Programs to Adoption and Monitoring with Top-down Empirical Impact Analysis. FY 2013 (\$350 – Principle Investigator). Funded by the U.S. Department of Energy's Building Technologies Office.
- Ultra Low Energy Use Appliances Development of Prototype Specifications: FY 2011 (\$250k).

Other research management:

- Environmental Finance Center, EPA Region 9. AY05/06, 06/07. Grant funds used to operate the Finance Center in support of green business in the region. Activities include organization of California Chemical Policy Symposium, environmental product and behaviors placement on prime time television, toxic waste reduction on tribal lands.
- Pollution Prevention Grant, USEPA. AY05/06, 06/07. Purpose of Grant us to reduce toxics exposures from products used in beauty salons.
- Switzer Environmental Leadership Grant, 2000/2001. To support consulting work to the ELJC, see Consulting, above.
- Probational Faculty Professional Activities Grant, 2000/2001, School of Arts, Letters, and Social Sciences, CSUH (NOW CSUEB).
- RSCA Mini Grant From CSU Hayward. For "System Performance and Economics of Net-Metered Solar Electric Systems in the SF Bay Area", 1999 – 2000.
- College of Social Science Foundation Research Grant. San Jose State University Foundation research support for the project: "Investigation of the Potential for City-Community Collaboration to Enhance Renewable Energy in the Restructured Electricity Market", 1998 – 1999.
- University of California Sustainable Agriculture Research and Education Program, Oct. 95 – Dec. 96, Support for graduate student J. Chu thesis: "Social and Environmental Restoration through Urban Therapeutic Gardens", I am the Project Director.
- Environmental Initiative Grant F96, SJSU Inter-college collaborative. Award for 20% time to formulate research proposal for interdisciplinary environment research.
- CSU Award for Research, Summer 96, Awarded two months of summer salary by the California State University for research on the project: "Wind Energy Resource Assessment for Eritrea, Africa".

- Professional Development Grant, Sp96 San Jose State University Lottery Fund support for the project: "Wind Energy Resource Assessment for Eritrea, Africa".
- Affirmative Action Faculty Development Grant, Sp96 reduced course load for S96 to conduct research, plus research funds, San Jose State University Foundation research support for the project: "Wind Energy Resource Assessment for Eritrea, Africa".
- College of Social Science Foundation Research Grant, 11/95 – 11/96. San Jose State University Foundation research support for the project: "Wind Energy Resource Assessment for Eritrea, Africa".
- Grant to Faculty for Graduate Student Stipend, 11/95 – 11/96. San Jose State University Foundation grant to support Environmental Studies graduate student, Karen Kello, for research assistance on the project: "Wind Energy Resource Assessment for Eritrea, Africa".
- Kearny Foundation of Soil Science Grant, F93 - F94. The Structure of Soil Heterogeneity and its Effect on Bulk Flow of Gas-Phase Contaminants Through Soil: A Study of the Scale Dependence of Soil Permeability to Air and its Causes. With J. Harte.

PUBLICATIONS

Articles in Peer-Reviewed Journals

- V. Vossos, K. Garbesi, and H. Shen. (2014) "Energy Savings from Direct DC in U.S. Residential Buildings." *Energy and Buildings*, 68(2014) 223-231. Available online: <http://www.sciencedirect.com/science/article/pii/S0378778813005720>
- L-B. Desroches, K. Garbesi, C. Kantner, R.D. Van Buskirk, and H-C. Yang. (2013) "Incorporating Experience Curves in Appliance Standards Analysis." *Energy Policy* 52 (2013): 402-416. Available online: <http://www.sciencedirect.com/science/article/pii/S0301421512008488>
- Williams, Alison A., Barbara A. Atkinson, Karina Garbesi, Erik Page, and Francis M. Rubinstein. (2012): "Lighting Controls in Commercial Buildings." *The Journal of the Illuminating Engineering Society of North America*. Vol. 8. 2012. Available online: http://www.ies.org/leukos/samples/1_Jan12.pdf. This article won the 2012 Taylor Technical Talent Award of the Illuminating Engineering Society <http://www.ies.org/programs/a-taylor.cfm>.
- K. Garbesi, A.L. Robinson, R.G. Sextro, and W.W. Nazaroff (1999) "Radon Entry into Houses: The Importance of Scale-Dependent Permeability", *Health Physics*, **77**(2): 183 – 191.
- K. Rosen, R. Van Buskirk, and K. Garbesi (1999) "Wind Energy Potential of Coastal Eritrea: An Analysis of Sparse Wind Data", *Solar Energy*, **66:3**, 201-213.
- K. Garbesi and T. Patane (1999) "Improving Hazardous Materials Handling Compliance through Education: A Silicon Valley Case Study", *EM Magazine*, September, 13 –17.
- R. Van Buskirk, K. Garbesi, K. Rosen (1998) "Wind Resource Assessment of Eritrea, Africa: Preliminary Results and Status", *Journal of Wind Engineering and Industrial Aerodynamics*, **74–76**, 365–374.

- K. Garbesi, R.G. Sextro, A.L. Robinson, J.D. Wooley, J.A. Owens, and W.W. Nazaroff (1996) "Scale dependence of soil permeability to air: Measurement method and field investigation", *Water Resources Research*, **32**, 547-560.
- K. Garbesi, R.G. Sextro, W.J. Fisk, M.P. Modera, and K.L. Revzan (1993) "Soil-Gas Entry into an Experimental Basement: Model-Measurement Comparisons and Seasonal Effects," *Environmental Science and Technology*, **27**, 466-473.
- A.T. Hodgson, K. Garbesi, R.G. Sextro and J.M. Daisey (1992) "Transport of Volatile Organic Compounds from Soil into a Residential Basement," *Journal of the Air and Waste Management Association*, **43**, 277-283.
- K. Garbesi and R.G. Sextro (1989) "Modeling and Field Evidence of Pressure-Driven Entry of Soil Gas into a House Through Permeable Below-Grade Walls," *Environmental Science and Technology*, **23**, 1481-1487.

Encyclopedia Article

- K. Garbesi, 'The Implications of Global Warming for Energy Production and Consumption,' in 'Theme 1.4. Natural Resource System Challenge II: Climate Change, Human Systems, and Policy' (Ed. A. Yotova)', in *Encyclopedia of Life Support Systems*, EOLSS Publishers Co, Oxford, UK, 2002." INVITED article.

Papers in Conference Proceedings

- L. Desroches, K. Garbesi, H. Yang, M. Ganeshalingam, C. Kantner, R. Van Buskirk, "Trends in the cost of efficiency for appliances and consumer electronics" Proceedings of the European Council for an Energy Efficient Economy (ECEEE) 2013 Summer Study on Energy Efficiency, Toulon/Hyères, France. LBNL-6250E.
- K. Garbesi, K. Rosen, R. Van Buskirk, "Wind Power in Eritrea, Africa: A Preliminary Resource Assessment", In: *Proceedings of the American Wind Energy Association: Wind Power 1997*, Austin, Texas, June 15 - 18, 1997.
- R. Van Buskirk, K. Garbesi, and K. Rosen, "Wind Resource Assessment of Eritrea, Africa: Preliminary Results and Status", In: *Proceedings of the 2nd European & African Conference on Wind Engineering, Vol. 1*, Ed. Giovanni Solari, Genova, Italy, June 22 - 26, 1997.
- K. Garbesi, J.A. Owens, and J. Harte, "A Study of the Scale Dependence of Soil Permeability to Air", In: *Reactions of Pollutants in Soil Systems*, Kearney Foundation of Soil Science 1993 - 1994 Annual Report, 269-285. Presented at the Kearney Foundation Conference, Berkeley, California, September 8 - 9, 1994.
- K. Garbesi, R.G. Sextro, W.F. Fisk, and W.W. Nazaroff, "Toward Resolving the Model Measurement Discrepancy of Radon Entry into Houses: A Study of the Scale Dependence of Soil Permeability to Air," In: *Indoor Air '93, Vol. 4: Particles, Microbes, Radon*, 4, Kalliokowski, P., Jantunen, M. and Seppänen, O., Ed. Indoor Air '93: Helsinki, 1993, 575 - 580.
- A.L. Robinson, R.G. Sextro, W.J. Fisk, K. Garbesi, J. Wooley, and H.A. Wollenberg, "A study of the Influence of Gravel Subslab Layer on Radon Entry Rate Using Two Basement Structures," In: *Indoor Air '93, Vol. 4: Particles, Microbes, Radon*, 4,

- Kalliokowski, P., Jantunen, M. and Seppänen, O., Ed. *Indoor Air '93*: Helsinki, 1993, 651 – 653.
- A.T. Hodgson, K. Garbesi, R.G. Sextro, and J.M. Daisey, "Transport of Volatile Organic Compounds from Soil into a Residential Basement," Paper no 88-95B.1 in: *Proceedings of the 81st Annual Meeting of the Air Pollution Control Association*, APCA, Pittsburgh, PA, 1988.

Conferences and Workshops

Workshops Organized

- Organizer and Moderator, *CSU Climate Action Planning Workshop*, This Way to Sustainability Conference, Chico State University, 10am – 4pm, November 6, 2009. Brought together about 40 faculty, staff, and students from across the CSU system and the Chancellor's office to collaborate on climate action planning system-wide. Students from my ENVT 3480 (Applied Field Studies) class summarized the current status of campus climate action planning statewide. The participants reached a series of agreements on recommended approaches to climate action planning at the CSU.
- Organizer and Moderator, *Forging California's Path to Zero Net Energy*, an invited workshop at the American Association for the Advancement of Science, Pacific Division Annual Meeting, San Francisco State University, August 19, 2009. Brought together, two University of California Chancellors (Blumethal UCSC and Wang UCM) and 2 California State University Presidents (Harrison CSMB and Qayoumi CSUEB) and national energy experts to collaborate in addressing the State's zero energy buildings goals. Agreements reached included among others UC/CSU collaboration in addressing the legislature on relevant legislation (eg. On feed-in tariffs).
- Co-Organizer and Host of the *CCC-CSU Collaborative NSF Planning Grant Meeting on Alternative Fuels / Alternative Energy / Sustainability*, Cal State East Bay, August 31, 2007. The meeting, co-organized by the Chancellors' Offices of the California Community Colleges and the CSU, involving 40 participants, had two goals: to promote collaboration across the two systems to greatly strengthen and integrate sustainability education across the two systems, and more specifically to brainstorm the development of an NSF Advanced Technology Education Planning Grant to begin this process. CSUEB's Office of Academic Programs and Graduate Studies organized campus logistics for the event including a 'sustainable' organic, vegetarian, lunch featuring locally grown produce. In addition to hosting the meeting, I conducted a solar tour of East Bay's 1 MW photovoltaic energy system for workshop participants along with Facilities Engineering Manager, Michael Tadevich.

Special Sessions Organized

- K. Garbesi (Chair), *Renewable Energy Developments in California, Paper Session*, American Association of Geographers 2007 Annual Meeting, Hyatt Regency, San Francisco. April 19, 2007. Session organizer and chair with invited speakers John Galloway Senior Energy Analyst, the Union of Concerned Scientists, Nancy Rader, Executive Director of the California Wind Energy Association, and Dan Lieberman, Co-Director of Clean Energy Policy Design and Implementation, Center for Resource Solutions

- K. Garbesi (Chair), *Renewable Energy Developments in California, Panel*, American Association of Geographers 2007 Annual Meeting, Hyatt Regency, San Francisco. April 19, 2007. Organizer and chair of panel discussion.

Public Meeting Presentations

- B. Gerke, K. Garbesi *et al.*, *Preliminary Analysis for General Service Fluorescent Lamps and Incandescent Reflector Lamps (IRLs)*, Washington D.C., Forrester Building, Room 8E-089 1000 Independence Avenue SW., April 9, 2013. <http://www.regulations.gov/#!documentDetail;D=EERE-2011-BT-STD-0006-0028>
- K. Garbesi *et al.*, *Energy Conservation Standards for Ceiling Fans and Ceiling Fan Light Kits: Framework Public Meeting*, Presented the framework for CFLK energy conservation standards rulemaking as a representative of the U.S. Department of Energy to industry stakeholders and public advocates. Washington D.C., Forrester Building, Room 8E-089 1000 Independence Avenue SW., Washington D.C., March 22, 2013. <http://www.regulations.gov/#!documentDetail;D=EERE-2012-BT-STD-0045-0005>

Conference Papers, Presentations, and Panels

- Harris, E., Hayes, K., Nolan, E., Gibson, A., Bueno, A., Korb, M., Riaz, A., & Garbesi, K. (2023, December 11). In the face of an uncertain climate future, what knowledge, skills, and orientations do students need? A co-designed framework for climate justice learning outcomes. American Geophysical Union (AGU) Conference, San Francisco, CA, United States.
- Hayes, K., Nolan, E., Garbesi, K., & Harris, E. (2022). *How do we facilitate multi-disciplinary, school wide approaches to climate justice education?* North American Association for Environmental Education (NAAEE) 2022 Annual Conference. Tucson, AZ.
- K. Garbesi, Special Session – Invited, “Driving Extreme Efficiency to Market: Max Tech and Beyond Design Competition for Ultra-Low-Energy-Use Appliances and Equipment,” In the Special Session on Extreme Efficiency, American Physical Society Meeting Savanna, Georgia, April 5 – 8, 2014. <http://meetings.aps.org/Meeting/APR14/Session/E17.2>
- Rich Brown, Louis-Benoit Desroches, Karina Garbesi and Alan Meier, “Achieving Extreme Efficiency: How to get the job done when energy is extremely expensive and scarce,” Presented at the 2012 ACEEE Summer Study on Energy Efficiency in Buildings, Asilomar, CA, June 2012. Published the Proceedings of the 2012 ACEEE Summer Study on Energy Efficiency in Buildings, in Asilomar, CA. August 2012
- K. Garbesi, L. Desroches, C. Bolduc, G. Burch, G. Hosseinzadeh, S. Saltiel, “Max Tech Appliance Design: The Potential for Maximizing U.S. Energy Savings through Standards”, Presented at the 6th International Conference on Energy Efficiency in Domestic Appliances and Lighting, Copenhagen, Denmark. May 24 – 26, 2011. Lawrence Berkeley National Laboratory Report LBNL-4608E.
- K. Garbesi, V. Vossos, G. Burch, T. Lai, H. Shen, “Optimizing Energy Savings from Direct DC in Residential Buildings”, Invited Presentation. Green Building Power

- Forum, 2011. San Jose, California. January 25, 2011. Lawrence Berkeley National Laboratory Report, LBNL-5193E.
- K. Garbesi, “Recent Regulation Spurring Renewable Energy Use in California,” In *Renewable Energy Developments in California, Paper Session*, Special Session of the American Association of Geographers 2007 Annual Meeting, Hyatt Regency, San Francisco. April 19, 2007.
 - K. Garbesi, et al., “Are Rail-Sited Transit-Oriented-Developments in the San Francisco Bay Area Achieving Sustainable Cities Goals?” Paper in Special Session: *From theory to practice: Can new planned development be sustainable?*, Association of Geographers 2007 Annual Meeting, Hyatt Regency, San Francisco, April 21, 2007.
 - K. Johnson and K. Garbesi, *Energy Efficiency in San Francisco’s Green Business Program*, Association of Geographers 2007 Annual Meeting, Hyatt Regency, San Francisco, Accepted for Spring 2007. Presentation of naster’s research of CSUEB Geography student advisee.
 - K. Garbesi (panelist) “An Inconvenient Truth @ CSUEB”, panelist and faculty helper in organizing a student-lead showing of Al Gore’s Film “An Inconvenient Truth”. Main organizers were the student Hayward Environmental Awareness Team. Other faculty panelists included S. Stine (Geography and Environmental Studies, C. Collins (Political Science), E. Wildey (Biology), and J. Seitz (Geology). January 30th, CSUEB.
 - K. Garbesi and A. Ramo, Invited Talk, “Deregulation, Crisis, and the Public Interest: California’s Slippery Slope”, Association of American Geographers Annual Meeting, 2002, Los Angeles, March 10 – 23, Los Angeles.
 - K. Garbesi, Invited Panelist, “What Happened to the California Energy Crisis?”, Association of American Geographers Annual Meeting, 2002, Los Angeles, March 10 – 23, Los Angeles.
 - K. Garbesi, Special Session – Invited, “Energy Options in a Warming World: A Clear Imperative” Presented at the 97th Annual Meeting of the Association of American Geographers, Energy and Environment Specialty Group. February 27th – March 3, 2001, New York, New York.
 - K. Garbesi, Special Session – Invited, “Women in Solar Energy: Overcoming the Barriers”, American Solar Energy Society’s Year 2000 Conference, Madison, Wisconsin, June 20, 2000, 10:30 am.
 - K. Garbesi, J.A. Owens, R.G. Sextro, A.L. Robinson, and W.W. Nazaroff, "Scale Dependence of Soil Permeability to Air: Technique, Field Measurements and Implications", presented at the American Geophysical Union Fall Meeting, San Francisco, December 1995. EOS **76**(46): F205, 1995.
 - K. Garbesi, R.G. Sextro, and W.W. Nazaroff, “Soil Physics Study to Explain Large Model-Measurement Discrepancies of Radon Entry into Houses”, presented at the American Geophysical Union Fall Meeting, San Francisco, December 1993. EOS **74**(43): 261-262, 1993.
 - K. Garbesi, R.G. Sextro, and W.W. Nazaroff, “A Field Study of the Scale Dependence of Soil Permeability to Air”, presented at the American Geophysical Union, Spring Meeting, Baltimore, May 1993. EOS, **74**(16): 142, 1993.

Theses and Dissertation

- K. Garbesi, "Toward Resolving Model-Measurement Discrepancies of Radon Entry into Houses", Doctoral Dissertation University of California, Berkeley, December 1993. Also published as: Report No. LBL-34244 Rev., Lawrence Berkeley Laboratory, Berkeley, CA, October 1994, 169 pages.
- K. Garbesi, "Experiments and Modeling of the Soil-Gas Transport of Volatile Organic Compounds Into a Residential Basement," MS Thesis, University of California, Berkeley, May 1988. Also published as: Report No. LBL-25519, revised, Lawrence Berkeley Laboratory, Berkeley, CA. 1988, 97 pages.
- K. Garbesi, "Lunar Occultation Observation of SAO-079170", Physics Honors Thesis, University of California, Berkeley, May 7, 1986.

Book Sections

- K Garbesi, Brian F.Gerke, Andrea L. Alstone, Barbara Atkinson, Alex J. Valenti, and Vagelis Vossos, "Energy-Efficient Lighting Technologies and Their Applications in the Residential and Commercial Sectors", Chapter 25 in *Energy Efficiency and Renewable Energy Handbook, Second Edition*" Edited by D. Yogi Goswami and Frank Kreith. CRC Press. 2016, pp 629 – 659.
- K. Garbesi, "Estimating Water Use by Various Landscape Scenarios", *Cooling Our Communities: A Guidebook and Tree Planting and Light-Colored Surfacing*, US Environmental Protection Agency Report, 22-2001, January 1992, 157 – 172.
- J. Arey, R. Atkinson, K. Garbesi, and B. Nordman, "Implementation Issues: Water Use, Landfills, and Smog," In *Cooling Our Communities: A Guidebook and Tree Planting and Light-Colored Surfacing*, US Environmental Protection Agency Report, 22-2001, January 1992, 53 – 62.



Technical Support Documents

The following rulemaking related documents are all anonymously authored. The TSDs have many contributing authors.

- C. Kantner and K. Garbesi (Program Managers and contributing authors) *et al.*, *Energy Conservation Standards Rulemaking Framework Documents for Ceiling Fans and Ceiling Fan Light Kits*, March 8, 2013.
<http://www.regulations.gov/#!documentDetail;D=EERE-2012-BT-STD-0045-0001>
- K. Garbesi (Acting Program Manager) *et al.*, *Energy Conservation Standards Rulemaking Preliminary Analysis Technical Support Document for General Service Fluorescent Lamps and Incandescent Reflector Lamps*. Chapters 9, 10, 13, 14, 15, 16, and 17. Shipments Analysis, National Impact Analysis, Employment Impact Analysis, Utility Impact Analysis, Emissions Analysis, Monetization of Emissions Reduction Benefits, Regulatory Impact Analysis. February 28, 2013.
<http://www.regulations.gov/#!documentDetail;D=EERE-2011-BT-STD-0006-002>
- K. Garbesi, *Using the Experience Curve Approach for Appliance Price Learning*, Methods documentation for the U.S. Department of Energy Appliance Standards Program. February 2011.

http://www1.eere.energy.gov/buildings/appliance_standards/pdfs/experience_curve_appliance_price_forecasting_3-16-11.pdf

Research Reports

- K Garbesi, J. Buckholz, B. Meleg, *Cal State East Bay Climate Action Plan 2018*, April 30, 2018. 113 pages. ([online](#))
- Buckholz, J. and K. Garbesi, *Academic Year 2013/2014 Greenhouse Gas Inventory*. California State University, East Bay, December 15, 2015.
- Kantner, C.L.S; S.J. Young, S.M. Donovan and K. Garbesi, *Ceiling Fan and Ceiling Fan Light Kit Use in the U.S. Results of a Survey on Amazon Mechanical Turk*, Lawrence Berkeley National Laboratory, LBNL-6332E, July 2013.
- A. Williams, B. Atkinson, K. Garbesi, and F. Rubinstein. [Quantifying National Energy Savings Potential of Lighting Controls in Commercial Buildings](#). Lawrence Berkeley National Laboratory, LBNL-5895E, 2012.  [PDF](#) (280.08 KB)
- A. Williams, B. Atkinson, K. Garbesi, F. Rubinstein, and E. Page. [A Meta-Analysis of Energy Savings from Lighting Controls in Commercial Buildings](#) Lawrence Berkeley National Laboratory, *LBNL-5095E.*, 2011.  [PDF](#) (1.13 MB)
- K. Garbesi, V. Vossos, A. Sanstad, and G. Burch, *Modeling and Forecast of Direct DC Energy Systems*, Lawrence Berkeley National Laboratory, Produced for the U.S. Department of Energy, Building Technology Program. June 20, 2011.
- K. Garbesi, V. Vossos, and H. Shen, [Catalog of DC Appliances and Power Systems](#). Lawrence Berkeley National Laboratory, LBNL-5364E. June 20, 2011. Produced for the U.S. Department of Energy, Building Technology Program.
- L. Desroches, K. Garbesi, C. Kantner, R. VanBuskirk, and H. Yang, [Incorporating Experience Curves in Appliance Standards Analysis](#). Lawrence Berkeley National Laboratory, 2011.
- L. Desroches and K. Garbesi, *Max Tech and Beyond, Maximizing Appliance and Equipment Efficiency by Design*, Lawrence Berkeley National Laboratory, Produced for the U.S. Department of Energy, Building Technology Program. June 20, 2011.
- C. Sellars and K. Garbesi, Max Tech Motors. Appendix A in: L. Desroches and K. Garbesi, *Max Tech and Beyond, Maximizing Appliance and Equipment Efficiency by Design*, Lawrence Berkeley National Laboratory, Produced for the U.S. Department of Energy, Building Technology Program. June 20, 2011.
- J. Beck and K. Garbesi, Max Tech Consumer Electronics. Appendix B in: L. Desroches and K. Garbesi, *Max Tech and Beyond, Maximizing Appliance and Equipment Efficiency by Design*, Lawrence Berkeley National Laboratory, Produced for the U.S. Department of Energy, Building Technology Program. June 20, 2011.
- K. Garbesi, K. Kello, and R. Van Buskirk, *Preliminary Wind Energy Resources Assessment for Eritrea*, a Report to the Eritrean Department of Energy, July, 1996.
- G., L. Myer, P. Persoff, S. Finsterle, J. Apps, D. Vasco, S. Muller, P. Yen, P. Williams, K. Garbesi, J. Owens, and K. Pruess. *First-Level Field Demonstration of Subsurface Barrier Technology Using Viscous Fluid*, Lawrence Berkeley National Laboratory, Berkeley, CA, LBL-37520, 1995, ~250 pages.

- K. Garbesi, R.G. Sextro, A.L. Robinson, J.D. Wooley, J.A. Owens, and W.W. Nazaroff, Scale Dependence of Soil Permeability to Air: Measurement Method and Field Investigation, Report No. LBL-35369, Lawrence Berkeley Laboratory, Berkeley, CA, November 1995, 51 Pages.
- K. Garbesi, R.G. Sextro, and W.W. Nazaroff, A Dynamic Technique for Measuring Soil Permeability to Air Over Variable Length Scales, Report No. LBL-322723 Rev. Lawrence Berkeley Laboratory, Berkeley, CA, January 1994, 27 pages.
- K. Garbesi, R.G. Sextro, W.J. Fisk, M.P. Modera, and K.L. Revzan, Soil Gas Entry Into an Experimental Basement: Model-Measurement Comparisons and Seasonal Effects, Report No. LBL-31873, Lawrence Berkeley Laboratory, Berkeley, CA, March 1992, 26 pages.
- K. Garbesi, R.G. Sextro, W.J. Fisk, and W.W. Nazaroff, Toward Resolving the Model-Measurement Discrepancy of Radon Entry Into Houses: A Study of the Scale Dependence of Soil Permeability, Report No. LBL-33522, Lawrence Berkeley Laboratory, Berkeley, CA, January 1993, 6 pages.
- W.J. Fisk, M.P. Modera, R.G. Sextro, K. Garbesi, H.A. Wollenberg, T.N. Narasimhan, T. Nuzum, and Y.W. Tsang, "Radon Entry into Basements: Approach, Experimental Structures, and Instrumentation of the Small Structures Research Project," Report No. LBL-31864, Lawrence Berkeley Laboratory, Berkeley, CA, February 1992, 21 pages.
- K. Garbesi, "Threats from Pesticide Use", Appendix C In *In Our Own Hands: A Strategy for Conserving Biological Diversity in California* by D.B. Jensen, M. Torn, and J. Harte, California Policy Seminar Research Report, 1990, C1-C13.
- K. Garbesi, "Tropospheric Ozone Pollution in CA: Effects on Forests and Chaparral", Appendix B In *In Our Own Hands: A Strategy for Conserving Biological Diversity in California* by D.B. Jensen, M. Torn, and J. Harte, California Policy Seminar Research Report, 1990, B1-B6.
- K. Garbesi, "The Selenium Problem in California: An Overview", Appendix A In *In Our Own Hands: A Strategy for Conserving Biological Diversity in California* by D.B. Jensen, M. Torn, and J. Harte, California Policy Seminar Research Report, 1990, A1-A6.
- K. Garbesi and R.G. Sextro, Modeling and Field Evidence of Pressure-Driven Entry of Soil Gas Into a House through Permeable Below-Grade Walls, Report No. LBL-26980, Lawrence Berkeley Laboratory, Berkeley, CA. March 1989.
- A.T. Hodgson, K. Garbesi, R.G. Sextro, and J.M. Daisey, "Evaluation of Soil-Gas Transport of Organic Chemicals into Residential Buildings," Report No. LBL-25465, Lawrence Berkeley Laboratory, Berkeley, CA. 1988, 90 pages.

Edited Volume

- K. Garbesi, H. Akbari, and P. Martien (Editors) *Controlling Summer Heat Islands*, The Proceedings of the Workshop on Saving Energy and Reducing Atmospheric Pollution by Controlling Summer Heat Islands, February 23-24, 1989, University of California, Berkeley, CA. Report No. LBL-27872, Lawrence Berkeley Laboratory, Berkeley, 1989, 351 pages.

Webinars

- K. Garbesi (Convenor and Co-host) *National Webinar: Max Tech and Beyond Design Competition of Ultra-Low-Energy-Use Appliances and Equipment*, May 16 and May 29, 2014. Ten faculty-lead student design teams at U.S. Universities presented the results of their prototype development and testing to judges from the U.S. Department of Energy, private, and government sectors.
- K. Garbesi (Convenor and Co-host) *National Webinar: Max Tech and Beyond Design Competition of Ultra-Low-Energy-Use Appliances and Equipment*, May 23, 2013. Nine faculty-lead student design teams at U.S. Universities presented the results of their prototype development and testing to judges from the U.S. Department of Energy, private, and government sectors.
- K. Garbesi (Convenor and Co-host) *National Webinar: Max Tech and Beyond Design Competition of Ultra-Low-Energy-Use Appliances and Equipment*, May 23, 2012. Nine faculty-lead student design teams at U.S. Universities presented the results of their prototype development and testing to judges from the U.S. Department of Energy, private, and government sectors.
- K. Garbesi (Convenor) *Direct-DC Power Systems for Efficiency and Renewable Energy Integration: National Webinar*, Thursday November 3, 2011, 1:00–3:00pm Eastern Time. Overview: Viability of using direct current (DC) generated by on-site renewable energy (RE) systems directly in its DC form to supply DC loads in residential and small commercial buildings. (1) The Role of DC in the Future Building Electric Power System, (2) The Energy Savings Potential of Direct DC, and (3) DC Power Standards and the Emerging Market. Geared toward building industry professionals, and energy and IT managers in critical facilities and data centers. Speakers Chris Marnay (LBNL), Vagelis Vossos (LBNL), Paul Savage (EMerge Alliance™, Nextek Power Systems)

Web Curriculum

- **K. Garbesi. Assessing Energy’s Footprint and Carbon Emissions: A Free University Web-Course Module.** I created this web course to university students and professionals in the resource management fields to assess carbon emissions from energy use and energy’s associated ecological footprint. The site is unique in that it teaches the concepts based on the underlying scientific principles and includes interactive calculators to help test the user’s understanding. Many governments have begun to assess ecological footprints as It is offered free as a stand alone tutorial on the web site of Redefining Progress, an Oakland non-profit dedicated to environmental improvement and social justice. <http://www.redefiningprogress.org/energyfootprint/>

Published Newsletters and Letters to Editors

- K. Garbesi, “Dig inside coastal panel,” San Francisco Chronicle, August 31, 2006.
- K. Garbesi, “Watson’s November 18 Open Forum piece green-washes the Bush administration’s disastrous history of public lands management...”, San Francisco Chronicle, December 5, 2004.

- K. Garbesi, “Nuclear Not an Option,” Commentary in *The Pioneer*, April 19, 2001, page 4.
- K. Garbesi, “Cesar Chavez a Unifier,” Commentary in *The Pioneer*, March 29, 2001, page 4.
- K. Garbesi, “California’s Restructured Electricity Market: An Example Not to Follow”, Invited Submission to the Switzer Fellowship Newsletter, 6(2): (web page distribution, <http://www.switzernetwork.org>, 3 pages), 1998.

INVITED TALKS & Guest Lectures (See also Conference Talks)

(see also Conference Presentations and Professional Service)

- Invited Panelist: BEREC Energy Summit. Empowering the Energy Transition Through DEI. Mary Ann Piette (Moderator), Karina Garbesi, Jose Perez, Neha Bazaj (Speakers). April 11, 2022. UC Berkeley, Pauley Ballroom.
- Invited Panelist: **Columbia World Projects Forum** on Access to Energy, Feb 19th and 20th, 2018. Columbia University, New York. Monday, February 19th: Dinner at the residence of President Lee C. Bollinger, 6:30pm - 60 Morningside Drive, New York, NY 10027. Tuesday, February 20th: forum 9:30am – 6:30pm at Faculty House - 64 Morningside Dr, New York, NY 10027. This inaugural high-level forum brought together individuals from governments, nongovernmental organizations, and the private sector, who are tackle major global challenges, to advise Columbia University President, Lee Bollinger, and his senior staff and faculty on how they might most effectively engage in improving global access to energy. I attended as a senior member of the Board of Directors of We Care Solar.
- Invited Speaker / Workshop Leader: “Social Impact Solar Entrepreneurship”, Social Innovation Track. *Innovate East Bay 2017*: February 25, 2017. Cal State East Bay.
- Invited Speaker: Social Impact through Sustainable Solar Design: Much More than a Course. California Higher Education Sustainability Conference (CHESC), June 27th, 2016, California State University, Fullerton, California. Project awarded the CHESC Best Practice Award for Sustainability in Academics, STEM.
- Panelist: CSUEB President Morishita’s Signing of the American College and University President’s Climate Commitment. My talk addressed approaches to mitigate climate disruption. CSUEB, January 26, 2014.
- Invited Lecture for the Osher Institute for Lifelong Learning: Climate Change and Nuclear Power: Exploring the Implications, CSUEB Concord Campus, March 22, 2010.
- Guest Lecture in Environmental Science at UCB: “Deregulation, Crisis, and the Public Interest: California’s Slippery Slope”, for Environmental Science 98/198, 182 Dwinelle Hall, UC Berkeley Campus, March 6, 2002.
- Guest Lecture, Physics, CSUH (Now CSUEB): “Solar Energy from Low-Cost Low-Tech to High-Tech Grid Connect”, For Kris Wedding’s Energy Class, February 27, 2002.
- Guest Lectures, Geography & Environmental Studies, CSUH (Now CSUEB): ‘Wind Power in California’ Lead field trips at Altamont Pass Wind Farm for Professor David Larson’s Geog 4300, Environmental Field Class. June 2001. May 17, 2002.

- Invited Talk, PV Solar Alliance, Industry Forum: “The Potential for Solar Electricity Generation in San Francisco”, California PV Alliance Solar Forum, December 14, 2001, Pacific Energy Center, San Francisco, 2:00 – 2:30.
- Invited Laboratory Talk at UCB: “Electricity Deregulation in California—The Erosion of Public Goods”, November 7, 2001. 12:00 – 1:30. Renewable and Appropriate Energy Laboratory, UC Berkeley.
- Guest Lecture/Demo at Hilltop School: “Solar Energy for Heating, Cooking and Electricity”, A guest lecture/demonstration to first graders at Kensington Hilltop School on solar energy, how it works, and what it can be used for. The lecture also taught the fundamentals of electricity. The kids hooked up solar electric (PV) panels and oriented them for optimal water pumping efficiency. We also made cookies in a solar cooker (a big hit!) and saw how sunlight heats up water bags laying on black surfaces much more effectively than those laying on white surfaces (June 13, 2001, Rm 20).
- Biella Room Lecture at CSUH (Now CSUEB): “California’s Energy Crisis: Muddling Markets, Environment, and Justice”, California State University, Hayward, May 9, 2001, 12 – 2pm, Biella Room.
- Guest Lecture in Environmental Science at UCB: K. Garbesi, “California’s Energy Crisis: The Implications for Efficiency, Renewables, and Environmental Justice”, Invited Speaker for Environmental Science (98/198), a lecture series course titled: “Think Globally, Act Locally”, 182 Dwinelle Hall, UC Berkeley Campus, January 31, 2001.
- Invited Talk in Environmental Engineering at UCB: K. Garbesi, “Energy Options in a Warming World”: Civil and Environmental Engineering Seminar Series, UC Berkeley, April 28, 2000.
- Guest Lecture in Geography at CSUH (NOW CSUEB): Professional Biography, for Prof. H. Eder’s, Seminar on Research Theory and Philosophy of Geography, F1999.
- Invited Talk for Geography and Environmental Studies at CSUH (NOW CSUEB): “Urbanization and Sustainability”, Geography and Environmental Studies, California State University at Hayward, June 19, 1999.
- Invited Talk, Hampshire College: “Science and Education for Environmental Problem Solving”, Hampshire College, Massachusetts, April 6, 1998.
- Invited Talk, Mt. Holyoke College, “Environmental Research: An Interdisciplinary Collaborative Process”, Mt. Holyoke College, February 2, 1998.
- Panel Discussion for Professional Forum: with M. Walpert, M. Tucker, "Bay Area Solar Development," Talk and panel discussion for Women Energy Associates. January 6, 1998, Sinbad's in San Francisco.
- Invited Panelist for “Public Forum”: with 4 other Bay Area Scientists. November 18, 1996, Oakland, CA. Part of Panel lead by Former California Governor Jerry Brown. We interpreted and answered the public's questions about the "World Scientist's Warning to Humanity". The document was written on November 18, 1992, by 1575 scientists from 69 countries including 99 out of 196 living scientists who are Nobel laureates, warning the world's citizens about the seriousness of the global environmental predicament.

- Invited Talk, Environmental Engineering, Princeton University: “Where was all that Radon Coming From? New Insights into Soil-Gas Transport of Radon into Houses”. Major Talk, Department of Civil and Environmental Engineering, Water Resources Program, Princeton University, February 7, 1994.
- Invited Talk, Environmental Engineering, Princeton University: “Issues of Heterogeneity and Scale in Soil Processes”. Major Talk, Department of Civil and Environmental Engineering, Water Resources Program, Princeton University, February 7, 1994.
- Invited Talk, Environmental Engineering, Princeton University: “Where was all that Radon Coming From? New Insights into Soil-Gas Transport of Radon into Houses” Department of Civil and Environmental Engineering, Water Resources Program, Princeton University, February 7, 1994.
- Invited Talk Environmental Engineering, UCB: “Where was all that Radon Coming From? New Insights into Soil-Gas Transport of Radon into Houses” Environmental Science, Policy, and Management, UC Berkeley, February 2, 1994.
- Invited Laboratory Talk: "How much Radon is Really Getting into Houses?" Meeting of Women in Science and Engineering, November 28, 1994, Lawrence Berkeley Laboratory, Berkeley, CA 1994.
- Invited Talk, International Forum: “A Global Perspective on Human Health, Airborne Pollutants, and the Environment”, delivered to the International Summer School on Science and World Affairs, Energy and Environment Group, Shanghai, China, August, 1992.
- Invited Talk, International Forum: "Environment and Security: Inextricable Links", plenary talk for the International Summer School on Science and World Affairs, Energy and Environment Group, Moscow Institute of Physics and Technology, Aksakovo, USSR-June - July, 1991.
- Invited Talk, International Forum: "Global Warming and Ozone Depletion: Mechanisms and Ecosystem Impacts", Pacific, Gas and Electric Co. Marketing Meeting, Red Lion Hotel, San Jose, CA.--Sept. 17, 1990.

Media Coverage and Events

Provide frequent media interviews. Complete records not kept on this section.

- Media Event and Television News: Solar Suitcase Media Event, Featuring the work of the Social Impact Solar Program. Feature on, [ABC Channel 7 news: Hayward Students Invention will Help Power Schools in Africa](#), Cesar Chavez Middle School, Friday, February 10, 2017.
- East Bay Times Article: [Hayward: Lighting up the night one solar suitcase at a time](#). By Darin Moriki, February 24, 2017.
- Radio: The California Report, KQED Public Radio (SF 88.5FM), interview with Cy Musiker Interview on the economics and environmental benefits of solar hot water systems, 9/7/07.
- Television News: Several interviews news given since 2000.
- Documentary: 2001, Interview with Michael Orkin, PhD, Executive Director, CNTV on solar energy in California.

- Newspapers: Interviews for *The Pioneer*: “Global Warming Poses a Serious Risk, Cal State East Bay Scientist Says”, January 25, 2007 “Solar Power Advocate Comes to Light”, May 9, 2003. Interview with Michael Kay for The Daily Californian, “Scientist Develops Efficient Wind Energy Methods”, September 14, 2005.