

DANIEL SANCHEZ

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An engineer and energy systems analyst studying deep decarbonization and climate policy

Current Experience

Postdoctoral Research Fellow, Carnegie Institution for Science / Department of Global Ecology, (2016-2017 [Expected])
Stanford University, Stanford, CA

Working with Drs. Ken Caldeira and Michael Mastrandrea to study near-zero emission energy systems, focusing on innovation and R&D priorities for stringent climate change mitigation

Supporting Near Zero, an initiative producing credible, impartial, and actionable information based on scientific data and expert judgment (NearZero.org)

Research Interests: technology commercialization, climate policy, energy systems modeling, bioenergy, quantitative decision support, carbon dioxide removal

Education

Ph.D., Energy and Resources, University of California Berkeley (2013- 2015)

Dissertation: “Deployment, Design, and Commercialization of Carbon-Negative Energy Systems”

Researcher, Renewable and Appropriate Energy Laboratory (RAEL). PI: Daniel M. Kammen

Graduate Student Researcher, Energy Biosciences Institute (EBI). PI: Hanna Breetz

Graduate Student Instructor, Climate Policy and Politics (Spring 2015). Dr. Danny Cullenward

M.S., Energy and Resources, University of California Berkeley (2011- 2013)

Project: “Dairy Biogas in California: Cost-Effective Development”

B.S.E., Chemical and Biomolecular Engineering, School of Engineering & Applied Science, University of Pennsylvania

Graduated Magna Cum Laude. Minor in Mathematics (2006- 2010)

Grants and Scholarships (Graduate)

National Science Foundation Graduate Research Fellowship (Amount = \$300k) (2012-2015)

Chancellor’s Graduate Diversity Fellowship, University of California Berkeley (2011-2015)

Analyst, “Cleaner Air, Cleaner Energy: Converting Forest Fire Management Waste to On Demand Renewable Energy.” California Energy Commission PON-14-303. (Amount = \$1.99M)

Analyst, “Building a Healthier and More Robust Future: 2050 Low Carbon Energy Scenarios for California” California Energy Commission PON-14-309. (Amount = \$700k)

Extracurricular Activities

Board Member, Center for Carbon Removal, Oakland, CA (2015-Present)

A nonprofit developing a number of initiatives to accelerate the development of scalable, sustainable, economically-viable strategies for removing carbon dioxide from the atmosphere.

Co-President, Berkeley Energy and Resource Collaborative (BERC) (2011-2014)

Led 3000 member student energy organization; managed executive and leadership team

Personally fundraised over \$100k for operating budget

Prior Research/Work Experience

Young Summer Scholar, Ecosystem Services and Management Group, International Institute for Applied Systems Analysis (IIASA), Vienna, Austria (Summer 2015)

Developed and enhanced electricity sector representation of the BeWhere model, a spatial energy siting model, to understand deployment of power-to-gas and power-to-liquids technology

Technology to Market Summer Scholar, Advanced Research Projects Agency-Energy (ARPA-E) (Summer 2013)

Conducted market research and economic analysis of natural gas exploration and production technology, synthetic biotechnology, and renewable fuels to inform program development

Climate Policy Research Intern, Division of Ratepayer Advocates, CA PUC (Summer 2012)

Led policy and economic analysis, report drafting, lobbying, and public communication on issue of biogas development for California Public Utilities Commission

Policy Associate, Capital Access Program, Green For All (2010- 2012)

Coordinated business development program for national environmental nonprofit. Portfolio included business coaching, workforce development, market research, and hosting of five national events

Energy and Environmental Policy Intern and Special Advisor, Center for American Progress (Summer 2009)

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Publications (Academic)

- D.L. Sanchez, D.M. Kammen. “A commercialization strategy for carbon-negative energy” *Nature Energy*, 1, 1-4 (2016). doi: 10.1038/NENERGY.2015.2
- D. L. Sanchez, M.D. Mastrandrea, M. Inman. “Global Priorities for Zero-Emission Energy Innovation: An Expert Elicitation and Discussion” *Near Zero* (2016). <http://www.nearzero.org/reports/global-innovation>
- D.L. Sanchez, D.S. Callaway. “Optimal Scale of Bioenergy with Carbon Capture and Storage (BECCS) Facilities” *Applied Energy* (2016) doi:10.1016/j.apenergy.2016.02.134
- D.L. Sanchez, J.H. Nelson, J. Johnston, A. Mileva, D. Kammen. “Biomass enables the transition to a carbon-negative power system across western North America.” *Nature Climate Change*, 5, 230–234 (2015).
- M. Bomberg, D.L. Sanchez, T. Lipmann. “Optimizing Fermentation Process Miscanthus-to-Ethanol Biorefinery Scale under Uncertain Conditions” *Environ. Res. Lett.*, 9, 064018 (2014).
- S. Mesfun, D.L. Sanchez, S. Leduc, F. Kraxner. “Power-to-gas and power-to-liquids for managing renewable electricity intermittency in the Alpine Region” Manuscript in preparation.
- D.L. Sanchez. “Dairy Biogas in California: Cost-Effective Development.” *PolicyMatters* Vol. 9 Issue 1.

Press (Selected)

- B. Plumer. “Can we build power plants that actually take carbon dioxide out of the air?” *Vox.com*. 3/11/2015.
- R. Meadows. “Biomass could generate carbon-negative power.” ESA 2015. Dispatches. *Frontiers in Ecology and the Environment* **13**: 124–128. <http://dx.doi.org/10.1890/1540-9295-13.3.124>.
- N. Bauer. “Power systems: Carbon negative at the regional level.” *Nature Climate Change*, 5, 196–197 (2015).

Reviews

- D.L. Sanchez. “Blessing, with Menace?” *Science* Vol. 345. No 146. doi:10.1126/science.1256191
- D.L. Sanchez, D.M. Kammen. “Removing harmful greenhouse gases from the air using energy from plants.” *Frontiers for Young Minds*, 3:14, doi: 10.3389/frym.2015.00014.

Correspondence

- D.L. Sanchez, J.H. Nelson, J. Johnston, A. Mileva, D. Kammen. “Emissions accounting for bioenergy with CCS.” *Nature Climate Change*, 5, 495–496 (2015).

Conference Presentations

All presentations by D.L. Sanchez, except where noted

- “The Transition to a Carbon-Negative Power System.” Bioenergy with Carbon Capture and Sequestration workshop, Washington, D.C. May 18, 2015. Co-hosted by the US Department of Energy’s Office of Fossil Energy and the Bioenergy Technologies Office. Oral.
- “Carbon-Negative Energy Systems” (Offered several times, based on PhD dissertation)
Energy and Resources Group Colloquium. Wednesday, November 18 2015. Berkeley, CA. Oral.
Invited Seminar. Lawrence Berkeley National Laboratory. November 23, 2015. Oral.
Invited Seminar. Lawrence Livermore National Laboratory. April 6, 2016. Oral.
- “Optimal Sizing of Biomass Electricity with Carbon Capture and Storage (BECCS): Framework and Application to Illinois.” Tokyo Institute of Technology Third International Education Forum on Environment and Energy Science. Perth, WA. December 2014. (Selected ‘Best Presentation Award’)
- M.S. Torn, et al. “Ecological Limits to Terrestrial Biological Carbon Dioxide Removal” American Geophysical Union Fall Meeting. San Francisco, CA. December 2014.
- “Drivers of Optimal Sizing of Cellulosic Biorefineries” Union of Concerned Scientists / Great Plains Institute Cellulosic Biofuels Summit. Ames, IA. July 2014.
- “Natural Gas Exploration and Production Economics: What can the U.K. learn from the United States?” Gas: An (Un)conventional Pathway Towards Our Energy Future? Cambridge University. June 2014.
- “Exploring the Role of Bioenergy in Decarbonization in the WECC using the SWITCH Model.” Presentation to Western Energy Policy Research Conference. Portland, OR. September 2013.

Consulting Reports

- M. O’Hare, P. Alstone, D. Sanchez. “Environmental Risks and Opportunities in Cannabis Cultivation.” BOTEC Analysis, prepared for Washington State Liquor Control Board. August 2013.
- “Energía Reino Verde 12 MW Giant King Grass Biomass Power Plant Feasibility Study” PELICAN, S.A. Nicaragua, 2014.

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Publications (Non-academic)

- D. Sanchez. “Natural Gas Exploration and Production Economics in the United States.” Advanced Research Projects Agency – Energy (ARPA-E) Technology-to-Market Program. 2014.
- D. Sanchez. “First Markets for Chemicals from Bioconversion of Methane and Sugars.” Advanced Research Projects Agency – Energy (ARPA-E) Technology-to-Market Program. 2014.
- D. Sanchez, N. Rogers, J. Parillo. “Dairy Biogas in California: Cost-Effective Development.” White paper by Division of Ratepayer Advocates / California Public Utilities Commission. 2012.
- “Water Works: Rebuilding Infrastructure, Creating Jobs, Greening the Environment.” Green for All/ American Rivers/ Pacific Institute/ Economic Policy Institute Report. October 2011.
- “Nonprofit Social Enterprise: Models and Funding.” Green for All Capital Access Program. Feb. 2012.
- “A Roadmap for U.S.-China Collaboration on Carbon Capture and Sequestration.” Center for American Progress/ Asia Society/ Lawrence Livermore National Laboratory Report. November 2009.
- Numerous blog posts published on ClimateProgress.org, GreenForAll.org, BERC, and LifeAtErg