

Michael Wara

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April, 2024

Professional Experience

Senior Director for Policy, Sustainability Accelerator, Stanford Doerr School of Sustainability 2022-present

First employee in Sustainability School program to build campus-wide initiative focused on technology and policy acceleration to impact at scale. Assist cross-functional teams of faculty, postdocs and graduate students in engagement, translational research, and co-creation of knowledge with external partners. Develop strategic vision for Sustainability Accelerator in partnership with Dean of SDSS. Co-lead initial Sustainability Accelerator grantmaking process. Collaborate on external relations and stewardship with Dean of SDSS and External Relations teams. Actively manage \$10M/y portfolio of sustainability focused technology and policy projects to drive impact at scale.

Director, Climate and Energy Policy Program and Senior Research Scholar, Stanford University Woods Institute for the Environment 2017-present

Found and direct campus wide initiative on climate and energy policy connecting engineering, natural science, law and business to climate and energy policy problems. Conceptualize and assist in drafting statutory modification to liability regime for prescribed fire in California (SB332). Serve on the California Catastrophe Response Council, overseeing \$21 billion Wildfire Fund. Serve on the Commission on Catastrophic Wildfire Cost and Recovery. Advise California policy makers on utility and wildfire issues in development of wildfire legislation (SB 901 and AB 1054). Advise Environmental Justice advocates and key legislative policy makers on development of carbon pricing approaches in California (AB 398/AB 617), Washington, Virginia, Massachusetts, and Utah. Advise local governments on legal and policy barriers to building electrification. Conduct research on energy and climate law and policy. Assist policy makers in developing effective, legal, efficient, and evidence-based approaches to reducing greenhouse gas emissions. Develop state-wide approaches to managing catastrophic wildfire risk in California. Leverage Stanford University faculty and student expertise on energy and climate science, economics, law, and policy to assist policy makers in achieving better climate and energy policy outcomes.

Consultant to California Public Utilities Commission and Office of Electric Infrastructure Safety, Level 4 Ventures 2022-present

Assist CPUC in implementing S-MAP and SB884 related wildfire processes related to cost effectiveness and undergrounding of electric distribution lines. Assist Office of Electric Infrastructure Safety and Public Utilities Commission in developing guidelines for wildfire risk for electric utilities in California and in reviewing utility wildfire mitigation plans. Assist OEIS in developing and running Risk Model Working Group to improve collaboration on risk management issues. Assist Office of Electric Infrastructure Safety and Public Utilities Commission in developing guidelines for wildfire risk for electric utilities in California and in reviewing utility wildfire mitigation plans. Assist OEIS in developing and running Risk Model Working Group to improve collaboration on risk management issues.

Consultant to California State Senate Pro Tem on the PG&E Bankruptcy 2019-2019

Provide advice and analysis to the Senate pro Tem on the PG&E bankruptcy, stabilization of electric utility credit ratings, policies to require utility wildfire risk mitigation and development of the California Wildfire Fund.

Associate Professor of Law and Justin M. Roach, Jr. Faculty Scholar, Stanford Law School 2011-2017

Teach environmental, climate and energy law; mentor students; conduct research on energy law, energy policy, energy modeling, climate law and climate policy; present results of research at academic and professional conferences; lead teams of students in advising and assist UNFCCC, federal, state, and local governments and NGOs on development of energy, electricity and carbon market policies; write comments on proposed regulations; organize and write amicus briefs before U.S. Supreme Court on Federal Power Act and Clean Air Act issues; testify before U.S. Congress, California Legislature, Federal Trade Commission.

Assistant Professor of Law, Stanford Law School 2008-2011

Teach environmental law, climate and energy law; mentor students; conduct research on energy law, energy policy, climate law and climate policy; present results of research at academic and professional conferences; lead teams of students in advising federal, state, and local governments and NGOs on development of energy, electricity, and climate policies; write comments on proposed regulations; testify before U.S. Congress, California Legislature.

Research Fellow, Stanford Law School

2007-2008

Teach international environmental law; conduct research on climate law and climate policy; present results of research at academic and professional conferences; testify before U.S. House of Representatives on design of cap-and-trade.

Associate, Land Use and Government Practice, Holland & Knight, LLP

2006-2007

Assist clients in horizontal entitlement of large development projects; advise clients and California Building Industry Association on development of CEQA compliance strategies for GHG emissions; advise clients on cleanup of brownfield sites; advise and advocate before EPA and Congressional staff regarding energy related tax credits and loan guarantees.

Education

J.D., Stanford Law School

2003-2006

Ph.D., Ocean Sciences, University of California at Santa Cruz

1997-2003

B.A., Columbia College, Columbia University

1991-1995

Recent Presentations and Testimony

Plenary speaker on energy affordability and wildfire, California CCA Annual Meeting, April 2024

Sole academic invited witness, Affordability oversight hearing, California Assembly Utilities Committee, February 2024

Plenary speaker, RedSky Summit, November 2023

Plenary speaker on utility wildfire risk, Oregon Rural Electric Cooperative Association Conference, October 2023

Plenary speaker on utility wildfire risk, Northern California Power Authority Annual Conference, October 2023

Invited witness on Low Carbon Fuel Standard reform, CARB Env. Justice Advisory Committee, September 2023

Sole academic invited witness, Costs of Wildfire in the United States, US Senate Budget Committee, February 2023

Wildfire Safety and Utility Operations and Maintenance, CREPC-WIRAB, Fall, 2021

Legal Barriers to Building Decarbonization, Woods Institute Webinar, June 2021.

Climate Resilience in the West, American Bar Association SEER Meeting, June 2021.

Reevaluating the Policy of Building in Harm's Way, Milliman Climate Resilience Forum, March 2021.

A Strategic Plan for California's Wildfire Pandemic, Woods Institute Webinar, April 2021.

Affordability Challenges in California Energy Rates, California Public Utility Commission, February 2021.

Courses Taught

Energy Law; Sustainable Food Policy Lab (w/Debbie Sivas and Dan Ho); Smoke Policy Lab (w/Debbie Sivas); Equitable Building Decarbonization Policy Lab (w/Debbie Sivas); Introduction to Resource, Energy, and Environmental Economics; Environmental Law and Policy; International Environmental Law; Climate Change Economics, Law, and Policy (w/Larry Goulder); Clean Air Act and Carbon Taxes Policy Lab (w/Debbie Sivas); Climate and Energy (w/Dan Reicher); Property Law.

Service

Member, California Department of Insurance California Climate Insurance Working Group

Member, Tamalpais Design Review Board

Member, Citizens Oversight Committee, Marin Wildfire Protection Agency

Steering Committee Chair, California Council on Science and Technology Study on Costs of Wildfire in California.

Commissioner, California Catastrophe Response Council.

Commissioner, California Commission on Catastrophic Wildfire Costs and Recovery.

Committee Member, National Academy of Sciences Panel on Developing a Research Agenda for Carbon Dioxide Removal and Reliable Sequestration.

Committee Member, California Council on Science and Technology Study on Natural Gas Storage.

Recent White Papers

Developing and Supporting the Federal Wildland Firefighting Workforce, Abigail Varney, Samuel Wallace-Perdomo, Michael Wara, Debbie Sivas, Michael Mastrandrea, Jessica Yu, Cassie Jurrenci and Eric Macomber,

Climate and Energy Policy Program Whitepaper, August 2023,
https://woods.institute.stanford.edu/system/files/publications/Woods-Wildland_Fire_White_Paper.pdf.

Alison Ong, Michael Mastrandrea and Michael Wara, The Costs of Building Decarbonization Policy Proposals for California Natural Gas Ratepayers: Identifying Cost-Effective Pathways To A Zero Carbon Building Fleet, Climate and Energy Policy Program Whitepaper, June 2021,
https://woods.institute.stanford.edu/system/files/publications/Building_Decarbonization_Policy_CA_Natural_Gas_Ratepayers_Whitepaper.pdf.

Michael Wara, A New Strategy for Addressing the Wildfire Epidemic in California, Climate and Energy Policy Program Working Paper, April 2021,
https://woods.institute.stanford.edu/system/files/publications/New_Strategy_Wildfire_Epidemic_Whitepaper_1.pdf.

Nicholas Wallace, Amanda Zerbe, Michael Wara and Debbie Sivas, Removing Legal Barriers to Building Electrification, Climate and Energy Policy Program Working Paper, October 2020, https://www-cdn.law.stanford.edu/wp-content/uploads/2020/10/2020-10-20_Natural-Gas-Memo_formatted.pdf.

Marshall Burke, Sam Heft-Neal and Michael Wara, Managing the Growing Cost of Wildfire, Stanford Institute for Economic Policy Research Policy Brief, October 2020,
<https://siepr.stanford.edu/sites/default/files/publications/PolicyBrief-October2020.pdf>.

Publications

Xiao Wu, Erik Sverdrup, Michael D. Mastrandrea, Michael W. Wara, Stefan Wager. Low-intensity fires mitigate the risk of high-intensity wildfires in California's forests. *Science Advances*. 2023. DOI:10.1126/sciadv.adi4123.

Burke M, Childs ML, de la Cuesta B, Qiu M, Li J, Gould CF, Heft-Neal S, Wara M. The contribution of wildfire to PM_{2.5} trends in the USA. *Nature*. 2023 Oct;622(7984):761-766. doi: 10.1038/s41586-023-06522-6. Epub 2023 Sep 20. PMID: 37730996.

Wang, Z., Wara, M., Majumdar, A. *et al.* Local and utility-wide cost allocations for a more equitable wildfire-resilient distribution grid. *Nat Energy* (2023). <https://doi.org/10.1038/s41560-023-01306-8>.

Marshall Burke, Anne Driscoll, Sam Heft-Neal, Jiani Xue, Jennifer Burney and Michael Wara, The Changing Risk and Burden of Wildfire in the United States, PNAS January 12, 2021 118 (2); <https://doi.org/10.1073/pnas.2011048118>.

Barbara Haya, Danny Cullenward, Aaron L. Strong, Emily Grubert, Robert Heilmayr, Debbie Sivas, and Michael Wara, Managing Uncertainty in Carbon Offsets: Insights from California's Standardized Approach, *Climate Policy* (2020).

Michael Wara, Competition at the Grid Edge: Innovation and Antitrust Law in the Electricity Sector, 25(2) *New York University Environmental Law Journal* (2018).

Danny Cullenward and Michael Wara, Pricing Carbon: California's Unfinished Climate Priority, *Bulletin of the Atomic Scientists* (Jan. 10, 2017).

Michael Wara, Fostering Competition in the 21st Century Electricity Industry, 40 *Harvard Environmental Law Review Forum*, 41 (2016).

- Michael Wara, Building an Effective Climate Regime While Avoiding Carbon and Energy Stalemate, *Columbia Journal of Environmental Law* 41(2), 313-394 (2016).
- Danny Cullenward, Jordan T. Wilkerson, Michael Wara, and John Weyant, Dynamically Estimating the Direct Costs of U.S. Climate Policy with NEMS: A Case Study of the Climate Protection Act of 2013. *55 Energy Economics*, 303-318 (2016).*
- Michael Wara, Danny Cullenward, and Rachel Teitelbaum, Peak Electricity and the Clean Power Plan, *28 Electricity Journal*, 18 (2015).*
- Michael Wara, Instrument Choice, Carbon Emissions, and Information. *Michigan Journal of Environmental and Administrative Law* 4(2) (2015).
- Heather Ford, Christina Ravelo, Petra Dekens, Jonathan LaRiviere, and Michael Wara, The Evolution of the Equatorial Thermocline and the Early Pliocene El Padre Mean State. *Geophysical Research Letters* 42 (2015), DOI: 10.1002/2015GL064215.*
- Meredith Fowlie, Lawrence Goulder, Matthew Kotchen, Severin Borenstein, James Bushnell, Lucas Davis, Michael Greenstone, Charles Kolstad, Christopher Knittel, Robert Stavins, Michael Wara, Frank Wolak, and Catherine Wolfram, An Economic Perspective on the EPA's Clean Power Plan: Cross-State Cooperation Key to Cost-Effective CO₂ Reductions, *346 Science* 815 (2014).*
- Michael Wara, California's Energy and Climate Policy: A Full Plate, But Perhaps Not a Model Policy, *70 Bulletin of the Atomic Scientists* 26 (2014).
- Jonathan P. LaRiviere, A. Christina Ravelo, Allison Crimmins, Petra S. Dekens, Heather L. Ford, Mitch Lyle, & Michael W. Wara, Late Miocene Decoupling of Oceanic Warmth and Atmospheric Dioxide Forcing, *486 Nature* 97 (June 7, 2012).*
- Michael Wara, Measuring the Clean Development Mechanism's Performance and Potential, *in* *Climate Change Science and Policy* (eds. Steve Schneider, Armin Rosencranz, Michael D. Mastrandrea, and Kristin Kuntz-Duriseti; Island Press, 2010).
- Michael Wara, Measuring the Clean Development Mechanism's Performance and Potential, *55 UCLA Law Review* 1759 (2008).
- Michael Wara, Is the Global Carbon Market Working?, *445 Nature* 595 (2007).*
- Michael Wara and Ana Christina Ravelo, Data Report: Mg/Ca, Sr/Ca, Mn/Ca, and Oxygen and Carbon Isotope Records of Pliocene-Pleistocene Foraminifers from ODP Leg 202 Site 1237, *in* *Proceedings of the Ocean Drilling Program, Scientific Results, Leg 202* (R. Tiedemann, A.C. Mix, C. Richter, and W.F. Ruddiman, Eds.) (2006).*
- Michael Wara, Ana Christina Ravelo, and Margaret L. Delaney, Permanent El Niño-Like Conditions During the Pliocene Warm Period, *309 Science* 758 (2005).*
- Ana Christina Ravelo, Dyke H. Andreasen, Mitchell Lyle, Annette Olivarez Lyle, & Michael W. Wara, Regional Climate Shifts Caused by Gradual Global Cooling in the Pliocene Epoch, *429 Nature* 263 (2004).*
- Ana Christina Ravelo and Michael W. Wara, The Role of the Tropical Oceans on Global Climate During a Warm Period and a Major Climate Transition, *17 Oceanography* 3, 32 (2004).
- Yair Rosenthal, Michael Wara et al., Interlaboratory Comparison Study of Mg/Ca and Sr/Ca Measurements in Planktonic Foraminifera for Paleoceanographic Research, *5 Geochemistry, Geophysics, Geosystems*, April 20, 2004.*

Michael W. Wara et al., Possible Roles of pH, Temperature, and Partial Dissolution in Determining Boron Concentration and Isotopic Composition in Planktonic Foraminifera, 18 *Paleoceanography* 1100 (2003).*

James C. Zachos, Michael W. Wara et al., A Transient Rise in Tropical Sea Surface Temperature During the Paleocene-Eocene Thermal Maximum, 302 *Science* 1551 (2003).

Michael W. Wara et al., Application of a Radially Viewed Inductively Coupled Plasma-Optical Emission Spectrophotometer to Simultaneous Measurement of Mg/Ca, Sr/Ca, and Mn/Ca Ratios in Marine Biogenic Carbonates, *Geochemistry, Geophysics, Geosystems*, August 7, 2003.*

Michael Wara, Ana Christina Ravelo, & J.S. Revenaugh, The Pacemaker Always Rings Twice, 15 *Paleoceanography* 616 (2000).*

Accepted Papers, Working Papers and Drafts in Preparation

Michael Wara, The California wildfires as climate adaptation: risk management, and institutional change, In preparation.

Other Legal and Policy Writing

Mason Inman, Michael Mastrandrea, Danny Cullenward, and Michael Wara, Comment to the California Air Resources Board re: Managing Uncertainty and Risk in the Proposed Scoping Plan Update (Apr. 10, 2017).

Michael Wara and Danny Cullenward, Comment to the California Air Resources Board re: Discussion Draft: 2030 Target Scoping Plan Update (Dec. 16, 2016).

Michael Wara and Danny Cullenward, Comment to the California Independent System Operator re: Regional Integration Straw Proposal (Dec. 8, 2016).

Michael Wara and Danny Cullenward, Comment to the California Air Resources Board re: Public Workshop on the 2030 Target Scoping Plan (Nov. 21, 2016).

Danny Cullenward and Michael Wara, Comment to the California Air Resources Board re: Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms (Legal comment letter) (Sep. 19, 2016).

Michael Wara and Danny Cullenward, Comment to the California Air Resources Board re: Proposed Amendments to the California Cap on Greenhouse Gas Emissions and Market-Based Compliance Mechanisms (Policy comment letter) (Sep. 19, 2016).

Michael Wara, Comments on the Proposed Washington State Clean Air Rule (173-442 WAC) (July 22, 2016).

Severin Borenstein et al., Comments on the Proposed Carbon Pollution Emission Guidelines for Existing Stationary Sources: Electric Generating Units, 79 FR 34830 (June 18, 2014), Docket ID: EPA-HG-OAR-2013-0602 (Dec. 1, 2014).

Michael Wara, Adele C. Morris, and Marta R. Darby, How the EPA Should Modify Its Proposed 111(d) Regulations to Allow States to Comply by Taxing Pollution, Brookings Institution, Climate And Energy Economics Discussion Paper (Oct 28, 2014), at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2516456.

Michael Wara, What's in the BSER: EPA's Process for Setting State Goals in the Clean Power Plan, Common Resources, Resources for the Future, (June 10, 2014), at <http://common-resources.org/2014/whats-in-the-bser-epas-process-for-setting-state-goals-in-the-clean-power-plan/>.

Danny Cullenward & Michael Wara, Carbon Markets: Effective Policy? 344 Science 1460 (2014).

Samuel D. Eisenberg, Michael Wara, Adele C. Morris, Marta R. Darby, and Joel Minor, A State Tax Approach to Regulating Greenhouse Gases under the Clean Air Act, Brookings Institution (May 22, 2014), at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2440925.

Michael Wara, America's Natural Gas Lever, New York Times (March 7, 2014), at <http://www.nytimes.com/2014/03/08/opinion/americas-natural-gas-lever.html>.

Michael Wara, Danny Cullenward, Jordan T. Wilkerson, and John Weyant, Analysis of the Climate Protection Act of 2013, prepared for Senators Sanders and Boxer, at http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2392656.

Brief for Amici Curiae Benjamin F. Hobbs et al. in Support of Petitioners, *U.S. EPA v. EME Homer City Generation, L.P.* (Sep. 9, 2013), at http://www.americanbar.org/content/dam/aba/publications/supreme_court_preview/briefs-v2/12-1182-12-1183_pet_amcu_bfh-sso-js-fw.authcheckdam.pdf.

Michael Wara, Ambition is not Enough, New York Times, (June 26, 2013), at <http://dotearth.blogs.nytimes.com/2013/06/26/seeking-more-obam-action-less-rhetoric-on-warming/>.

Michael Wara, Comment to Climate Action Reserve regarding Mexico Forest Protocol for Carbon Offsets (Mar. 2012).

Michael Wara, Comment to Climate Action Reserve regarding Coal Mine Methane Protocol for Carbon Offsets (Jan. 2012).

Michael Wara, Response to the Call for Public Input by the Executive Board of the Clean Development Mechanism Regarding Design of an Appeals Process for the Clean Development Mechanism (April 23, 2010).

Michael Wara, Comments on the Validation of Zhejiang Guodian Beilun Ultra-supercritical Power Project, submitted to the Executive Board of the Clean Development Mechanism (Dec. 2009).

Michael Wara, Written Testimony submitted to the U.S. Senate Committee on Energy and Natural Resources, Concerning Methods of Cost Containment in a Greenhouse Gas Trading Program (Sep. 15, 2009).

Michael Wara, Written Testimony submitted to the Subcommittee on Energy and Environment, U.S. House of Representatives, Concerning the Role of Offsets in Climate Legislation, (Mar. 3, 2009).

Michael Wara, How Sustainable Is My Company? Commercial Speech, Carbon Neutrality, and Offset Quantification, 38 ABA Trends 1 (July/August 2007).

Funded Projects

Strategic Planning for Wildfire in California, Resources Legacy Fund, 2020

Building Decarbonization, Heising-Simons Foundation, 2019.

Carbon Dioxide Removal in California: Identifying Constraints and Proposing Remedies, Funding Source: Hewlett Foundation, 2019.

Development of Wildfire Policy Solutions, Funding Source: Energy Foundation, 2018.

Study on Implementation of AB 398 (Cap-and-trade extension) in California, Funding Source: Energy Foundation, 2017.

Policy Analysis in Support of State Carbon Pricing Proposals, Funding Source: Overlook International Foundation, 2017.

Futurecasting – Co-PI with Ram Rajagopal and Steve Comello, Funding Source: Precourt Institute for Energy, 2017.

Economic and Legal Analysis of Carbon Tax Proposals – Co-PI with John Weyant. Funding Source: Precourt Institute for Energy, 2013

A Policy Framework for Evaluating North American Natural Gas Exports – Co-PI with John Weyant, Funding Source: Stanford Natural Gas Initiative, 2014-2016.

Solutions for Air Energy Climate and Health (SEARCH) – Co-PI in multi-institution grant, Funding Source: Environmental Protection Agency, 2015-2020.