Amber Mahone

44 Montgomery Street, Suite 1500, San Francisco, CA 94104
amber@ethree.com

ENERGY AND ENVIRONMENTAL ECONOMICS, INC. San Francisco, CA
Managing Partner

Amber Mahone is an experienced leader and consultant, with nearly two decades of experience focused on clean energy economics and policy analysis. Amber has supported state energy offices and regulatory bodies to inform energy and climate policies, such as developing decarbonization strategies and pathways for the Hawai'i State Energy Office, the California Air Resources Board, and the Colorado Energy Office. She worked directly with California Governor Jerry Brown, employing E3's analysis to advise him on setting the state's 2030 climate target in Executive Order B-30-15. Amber also works extensively with utilities across North America who want to understand the impact of energy policies on their investment strategies. Through her work across the country overseeing E3's hundreds of projects per year in system planning, asset valuation, and climate pathways, Amber has a unique and comprehensive vision of the energy sector. While she leads E3, she remains involved in key projects, especially in the emerging technology space.

Prior to joining E3 in 2007, Amber worked as a researcher at the International Monetary Fund. She holds an M.P.A. from Princeton University and a B.A. in International Relations from Wellesley College. Recent projects include:

- **City of Palo Alto Utilities, Citywide Electrification Funding & Financing Analysis (2024).** Led an evaluation of community cost to electrify building and transportation sectors in Palo Alto, and a study of potential funding and financing pathways to close the cost gap. Developed an analytical model to estimate the "community cost to electrify" and to structure the financing of future electrification programs.
- **California Air Resources Board, Hydrogen Technical Evaluation (2024).** Led the project team in developing a comprehensive report on hydrogen as called for in Senate Bill 1075. Provided technical and market analyses and provided policy recommendations to inform the report, including public engagement and collaboration across key climate and energy agencies.
- **Confidential Utility, Large Load Interconnection Study (2024).** Led the project team in analyzing the potential cost of service for a new municipal utility and infrastructure upgrade cost responsibilities for new large load interconnection customers. E3 studied large load interconnection policies and timelines across the U.S. and siting considerations pertinent to data centers.
- **California Energy Commission, Hydrogen Assessment (2023).** Led the project team in determining the role of hydrogen in decarbonizing the electricity grid in California. Developed an assessment of geologic hydrogen storage locations, costs, and characteristics, the current and potential future state of technology and their trajectories, and the water and emissions impacts of hydrogen use. E3 then developed an assessment of the infrastructure needed to develop hydrogen as a means for long-duration energy storage on the grid to help meet California's decarbonization goals.

- **Hawai‘i State Energy Office, Economywide Decarbonization Study (2023).** Led the E3 team in creating an economy-wide emissions accounting framework based on different policy scenarios, completing a legislatively mandated study to analyze pathways, and developing recommendations for achieving the state's economy-wide decarbonization goals. E3 analyzed policy recommendations, their feasibility, and level of impact, applying a unique lens for Hawai‘i with a particular emphasis on land use.
- **Hawaiian Electric, Hawai'i Economywide Decarbonization Scenarios (2022-2023).** Led the project team in developing long-term, economywide decarbonization scenarios that meet Hawai'i's target of net-zero GHG emissions by 2045, using E3's PATHWAYS model to analyze the impact that different policy measures would have on emissions, electric loads, and fuel demands in Hawai'i.
- **Colorado Energy Office, Opportunities for Hydrogen Deployment, 2021.** Led the E3 team that examined the potential role that hydrogen could play in the decarbonization of Colorado's economy. The public report for the Colorado Energy Office, *Opportunities for Low-Carbon Hydrogen in Colorado: A Roadmap,* outlines the state of the hydrogen market and potentially promising applications in Colorado, highlighting unique characteristics that could support hydrogen development in the state. The Roadmap distinguishes both opportunities and barriers to the deployment of hydrogen, as well as key steps that Colorado can take to realize its hydrogen potential.
- **Colorado Greenhouse Gas Pollution Reduction Roadmap, 2021.** The Colorado GHG Roadmap, which E3 supported with scenarios analysis using our PATHWAYS and RESOLVE models, presents actionable and achievable steps that Colorado can take to significantly reduce greenhouse gas (GHG) emissions over the next five, ten, and thirty years. While the state has already taken important steps toward decarbonization, E3's analysis found Colorado will need to take additional policy action to meet the climate goals established in 2019 in the state's Climate Action Plan to Reduce Pollution (HB 1261) targets.
- **California Air Resources Board 2022 Scoping Plan Analysis, 2021 –** 2022. Supporting the CARB in evaluating greenhouse gas reduction scenarios for California that achieve carbon neutrality by 2035 and 2045. Using the California PATHWAYS model to evaluate the energy systems transformations necessary across all sectors of the economy to achieve these ambitious goals.
- **Massachusetts Future of Gas Analysis for the Local Distribution Companies, 2021 –** 2022. Supporting the five investor-owned gas utilities in Massachusetts with their future of gas filings, as required by the Department of Public Utilities docket 20-80. Our independent consultant analysis evaluates strategies for Massachusetts to meet their climate reduction goals through 2050, drawing out the potential implications and trade-offs for the gas distribution companies and their customers, with a focus on energy affordability.
- **City of Philadelphia, Philadelphia Gas Works Business Diversification Strategy, 2021**. The City of Philadelphia and the Philadelphia Gas Works (PGW) commissioned E3 to develop a Business Diversification Study for PGW, together with the City, PGW, and other stakeholders. With this report, E3 defined and evaluated technology pathways to reduce greenhouse gas emissions from PGW's natural gas business, evaluated the impact of those pathways on PGW's current business model and its customers, and recommended a series of pilots and next. Ms. Mahone briefed the Mayor's office as well as the Gas Commission on the results of the Business Diversification Study.
- **California Energy Commission "Challenge of Retail Gas," 2018-2020.** Managed E3's analysis of the implications of economy-wide decarbonization for the state's natural gas utilities and customers. E3 evaluated two strategies for reducing carbon emissions from California buildings: building electrification and renewable natural gas. E3 found that building electrification is likely to be a lower-cost and lower-risk strategy for reducing carbon emissions from buildings in

California. E3 also found that, particularly under a high building electrification future, customers remaining on the natural gas system could face disproportionately high costs in the absence of a gas transition strategy.

- **Pacific Northwest Pathways to 2050, 2018.** Managed E3's analysis of regional 2050 decarbonization scenarios for the Pacific Northwest on behalf of gas distribution utility NW Natural. E3 analyzed four scenarios – two maintaining direct use of gas in buildings, and two assuming large-scale building electrification – and, unlike prior studies, paid special attention to the costs and performance of space heating technologies. Gas scenarios require reducing the carbon intensity of natural gas, high building energy efficiency, and deeper GHG reductions in non-building sector emissions; electrification scenarios require rapid adoption of electric heating technologies and significant electricity sector investments to address winter peak demand.
- **California Air Resources Board 2030 Target Scoping Plan Update, 2016 – 2017.** Managing E3's greenhouse gas modeling work with the California Air Resources Board as part of a public stakeholder process to update the state's AB 32 Scoping Plan. This project requires interpreting and representing federal, state and local laws and regulations in the PATHWAYS model and presenting the modeling results to state agency staff and the public.
- **California Independent System Operator SB 350 Regional Integration Study, 2016.** Managing E3's role in a complex modeling project with the California Independent System Operator to evaluate the costs and benefits to California ratepayers of regional integration of the Western Grid. This study also assesses the greenhouse gas, land use, environmental justice and jobs impacts of regional integration of the grid. The study was legislatively mandated under California SB 350 (2015) and is part of a broad stakeholder process.
- **California Energy Commission Long-term Energy Futures, 2016 – 2017.** Managing a large research grant with the California Energy Commission though the Electric Program Investment Charge (EPIC). The research grant was awarded to E3 to develop and evaluate long-term greenhouse gas reduction scenarios for California in the context of understanding climate change impacts to the state's energy infrastructure and economy. The research project is being performed in conjunction with Lawrence Berkeley National Laboratory, UC Berkeley and UC Irvine.

INTERNATIONAL MONETARY FUND (IMF) Washington, DC
Research Assistant, Policy Development and Review Department 2003 – 2005

- Researched and wrote case study on macroeconomic impacts of aid inflows to Ethiopia as one of five case studies for IMF Board Paper. Created briefing material and wrote speeches for the IMF Spring and Annual Meetings, the G-8 Summit in Gleneagles, as well as other high profile international summits.

Education

Princeton University Princeton, NJ
M.A., Public Affairs - Certificate in Science, Technology, and Environmental Policy June 2007

Wellesley College Wellesley, MA
B. A., International Relations, minor in Economics 2003
Summa Cum Laude

Bard College, International Honors Program — Annandale-on-Hudson, NY
Global Ecology Study Abroad Program in the United States, England, Tanzania, India, the Philippines and Mexico — 2001 – 2002

Publications

1. *Mahone, A. Z. Subin, R. Orans, M. Miller, L. Regan, M. Calviou, M. Saenz, N. Bacalao, (2018) "On the Path to Decarbonization," IEEE Power and Energy Magazine, 1540-7977, July/August issue.*

2. *Mahone, A. Z. Subin, J. Kahn-Lang, D. Allen, V. Li, G. De Moor, N. Ryan, S. Price, (2018) "Deep Decarbonization in a High Renewables Future: Updated Results from the California PATHWAYS Model" California Energy Commission, CEC-500-2018-012.*

3. *Mahone, A., D. Mahone, E. Hart, (2016) "What if Efficiency Goals were Carbon Goals?" ACEEE Summer Study 2016 Conference Proceedings.*

4. *Yeh, S., C. Yang, M. Gibbs, D. Roland-Holst, J. Greenblatt, A. Mahone, D. Wei, G. Brinkman, J. Cunningham, A. Eggert, B. Haley, E. Hart, J. Williams, (2016), "A modeling comparison of deep greenhouse gas emissions reduction scenarios by 2030 in California", Energy Strategy Reviews, 13-14 (2016) 169-180.*

5. *Olson, A., A. Mahone, E. Hart, J. Hargreaves, R. Jones, N. Schlag, G. Kwok, N. Ryan, R. Orans, R. Frowd, (2015), "Halfway There: Can California Achieve a 50% Renewable Grid?", IEEE Power and Energy Magazine (July/August 2015) 41 – 52.*

6. *McKenzie, L., R. Orans, J. Williams, A. Mahone, (2014) "Strengthening the Clean Power Plan: Three Key Opportunities for the EPA," The Electricity Journal, Vol. 27(10), 80-92.*

7. *Williams, J., A. DeBenedictis, R. Ghanadan, A. Mahone, J. Moore, W. Morrow III, S. Price, M. Torn, (2012) "The Technology Path to Deep Greenhouse Gas Emissions Cuts by 2050: The Pivotal Role of Electricity," Science, Vol. 335, 53 – 59.*

8. *Mahone, A., B. Haley, R. Orans, J. Williams, (2011) "Electric Vehicles and Gas-Fired Power: A Strategic Approach to Mitigating Rate Increases and Greenhouse Price Risk," Public Utilities Fortnightly (Dec 2011) 42 - 50, available at: http://www.fortnightly.com/exclusive.cfm?o_id=918*

9. *Orans, R., F. Pearl, A. Mahone, (2010) "A Modest Proposal: After Cap and Trade," The Brookings Institute papers, available at: http://www.brookings.edu/papers/2010/0628_cap_trade_pearl.aspx*

10. *Mahone, A., C.K. Woo, J. Williams, I. Horowitz (2009) "Renewable Portfolio Standards and Cost-Effective Energy Efficiency Investment," Energy Policy, 37(3), 774 - 777.*

Selected Presentations

1. *(2018) "From Ambition to Action in Transportation," Invited panelist, UC Davis at the Global Climate Action Summit (GCAS), September 12, 2018, San Francisco, CA.*

2. *(2018) "Deep Decarbonization in a High Renewables Future," UC Davis California Climate Policy Modeling (CCPM-3) Workshop, May 2018, Davis, CA*

3. *(2016) "PATHWAYS to Decarbonization: Implications for Electricity Generation, Renewables and Natural Gas," IPIECA Low Emissions Pathways Workshop, March 15 – 16, 2016, Houston Texas.*

4. *(2016) "Cap and Trade and Other Carbon Reduction Policies: Complementary of Counterproductive?" EUCI Conference on Optimizing Carbon Market Mechanisms in the Western Interconnect, January 20 – 21, 2016, Los Angeles, CA.*

5. *(2015) "West Coast Climate Change Policies," Western States Petroleum Association Issues Conference, October 30, 2015, Half Moon Bay, CA.*

6. *(2015), "California Climate Goals for 2030 and 2050," California Council for Environmental and Economic Balance Summer Issues Seminar, July 15, 2015, Lake Tahoe, CA.*

7. *(2015) "Cap and Trade and Complementary Climate Policies in California: AB32 and Beyond," North American Carbon Program, January 28, 2015, Washington, DC.*

8. *(2014) "The Long Game: Energy Efficiency in a Low Carbon World" March 30 – April 1, 2014, ACEEE National Symposium on Market Transformation, Baltimore, MD.*

9. *(2014) "The Effect of High Renewable Penetration on California Markets and Carbon Balance," with Arne Olson, EUCI Conference on California Carbon Policy Impacts on Western Power Markets, January 27, 2014, San Francisco, CA.*

10. *(2011) "Emerging Programs & Policies in Customer Information and Behavior," Behavior, Energy and Climate Change Conference, Nov. 30 – Dec. 2, 2011, Washington DC.*

11. *(2011) "Carbon Reductions and Impacts on Electric Utilities," Southeast Electricity Exchange IRP Task Force Meeting, September 20, 2011, Charlotte, NC.*

12. *(2011) "Energy Efficiency and CO2 Savings," International Energy Program Evaluation Workshop on Evaluating Carbon Emissions from Energy Efficiency Projects, August 15, 2011, Washington DC.*

13. *(2011) "Ratepayer risk, Greenhouse Gas Emissions and Electric Vehicles," Advanced Workshop in Regulation and Competition, 24th Annual Western Conference, June 16, 2011, Monterey, CA.*

14. *(2010) "Getting to 2050: Pathways to deep reductions in GHG emissions," WestCARB Annual Business Meeting, October 19, 2010, Sacramento, CA.*

15. *(2009) "Energy Efficiency in 2050: Long-Term Greenhouse Gas Reduction Targets," ACEEE'S Fifth National Conference on Energy Efficiency as a Resource, September 27 – 29, 2009, Chicago, Illinois.*

16. *(2009) "Long-term Greenhouse Gas Reductions in California: Vehicle Electrification and Electricity Generation in 2050," 32nd IAEE International Conference: Energy, Economy, Environment: The Global View, June 21 – 24, 2009, San Francisco, California.*

17. *(2008) "Energy Efficiency's Impact on California's Renewable Energy Development," ACEEE Summer Study on Energy Efficiency in Buildings, August 17 – 22nd, 2008, Pacific Grove, CA.*