Tory Clark

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC. San Francisco, CA
Director 2015 – present

Ms. Clark advises E3 clients on cost-effective strategies for achieving economy-wide state and regional deep decarbonization goals. She has extensive experience building scenario-based models that provide decisionmakers in the U.S. and abroad with accessible, policy-relevant insights. Her past clients include the New York State Energy Research and Development Authority (NYSERDA), California Air Resources Board, Maryland Dept. of the Environment, Minnesota Dept. of Transportation, Oregon Dept. of Environmental Quality, and Xcel Energy. Upon joining E3 in 2015, Ms. Clark brought extensive research experience on economy-wide deep decarbonization and professional experience with energy modeling and stakeholder workshop facilitation. Ms. Clark earned an M.S. in Technology and Policy from the Massachusetts Institute of Technology (MIT) and a B.S. in Mechanical Engineering from Tufts University. Recent projects include:

- **Minnesota Decarbonization Pathways Analysis, Xcel Energy Northern States Power (2018-2019).** Managed the E3 team supporting Xcel Energy in the development of its Upper Midwest System Integrated Resource Plan for its IRP filing with the Minnesota Public Utilities Commission. E3 developed economy-wide scenarios for the State of Minnesota to highlight the role of the electricity sector in helping meet state decarbonization goals. E3 also analyzed the impact of deep decarbonization scenarios on Xcel Energy's Upper Midwest System over the 2020-2034 planning period and identified optimal resource investment portfolios that met resource adequacy needs in the context of state and corporate long-term greenhouse gas reduction targets.
- **Reducing Transportation Sector Emissions, Minnesota Dept. of Transportation (2019).** Managed the E3 team supporting the Minnesota Dept. of Transportation (MnDOT) in developing emissions scenarios to reach statewide emissions targets established by the Next Generation Energy Act (NGEA). Analysis addressed passenger vehicles, trucks, and buses and modeled four categories of measures: efficiency, electrification, non-energy sources, and low-carbon fuels. Scenario assumptions were developed with input from a technical expert working group and results were presented in-person across the state and via webinar with partner Great Plains Institute (GPI).
- **State and Federal Climate Policy Analysis, Maryland Dept. of the Environment (2017-present).** E3 is evaluating existing state and federal GHG reduction policies, in partnership with Towson University's Regional Economic Studies Institute (RESI), for the Maryland Dept. of the Environment (MDE). This project involves interpreting and representing state and federal regulations in the PATHWAYS model, developing scenarios of additional mitigation measures for Maryland, and presenting results to the Maryland Mitigation Working Group.
- **100 Percent Renewable Energy Analysis, Confidential State Energy Agency (2017-2018).** Managed the internal E3 team supporting a state energy agency in exploring the feasibility, timing, and cost of achieving a 100% renewable energy future. E3 used the LEAP model to create scenarios of energy end-use demands over time and the RESOLVE model to develop optimal

electricity capacity portfolios at high renewable penetrations. This project included a literature review, academic stakeholder outreach, and scenario modeling.

- **Greenhouse Gas Pathways Analysis, New York State Energy Research and Development Authority (2016-2017).** Managed the E3 team supporting the New York State Energy Research and Development Authority (NYSERDA) in developing a detailed greenhouse gas (GHG) analysis to quantify infrastructure and policy changes necessary to meet state goals. E3's climate mitigation analysis evaluates the GHG and cost implications of different scenarios that are consistent with New York's goal of reducing statewide GHG emissions 40% below 1990 levels by 2030 and 80% below 1990 levels by 2050. For this project, E3 developed a New York State decarbonization scenario tool in the user-friendly LEAP model (Long-range Energy Alternatives Planning system) for additional scenario analysis and continued use by NYSERDA.
- **2030 Target Scoping Plan Update Support, California Air Resources Board (2016-2017).** Worked with the California Air Resources Board (CARB) in developing an updated "Scoping Plan" in support of their requirements under Assembly Bill 32 (The Global Warming Solutions Act, 2006). E3's statewide greenhouse gas (GHG) mitigation analysis evaluated the GHG and cost implications of different 2030 scenarios that are consistent with the governor's goal of reducing statewide GHG emissions 40% below 1990 levels by 2030. For this project, E3 adapted our prior work using the California PATHWAYS model to reflect scenarios and assumptions requested by the CARB. The model results were translated into inputs to a macroeconomic analysis being performed by the CARB to evaluate structural and job impacts. The study results were presented as part of a high-profile stakeholder process, and included extensive public review and comment.
- **Economic Analysis of a Market-Based Carbon Reduction Program in Oregon, Oregon Dept. of Environmental Quality (2016-2017).** Managed work to evaluate economic impacts of adopting a carbon market in Oregon, per the directive of the State Legislature (SB 5701) for Department of Environmental Quality (DEQ). E3's approach involved the combination of a detailed literature review and a quantitative economic analysis. For the purposes of evaluating the economic effects of policies to reduce greenhouse gas emissions, we focused on two categories of policies: (1) 'complementary policies,' which are the policies that drive GHG emissions reductions outside of the carbon market (e.g. renewable portfolio standard and energy efficiency programs), and (2) a carbon market which provides a market-based compliance mechanism. E3 modeled the complementary policies in the energy-accounting model LEAP (Long-range Energy Alternatives Planning system), and the impacts of the carbon market using the IMPLAN macroeconomic model.
- **Title 24 Building Codes, California Energy Commission (2016).** Led the E3 effort to update the cost-effectiveness methodology for the 2019 California building code standards that will go into effect in 2020 (Title 24). E3 produced the time-dependent valuation (TDV) metric used to measure the cost-effectiveness of new energy efficiency measures for new buildings in California. TDV accounts for the time and geographic differences in energy costs seen in California energy prices, natural gas and propane markets, as well as in the costs of electric utility distribution and transmission systems.

MIT ENERGY INTIATIVE Cambridge, MA
Research Assistant 2013 – 2015

- Researched U.S. and international policy related to carbon capture and storage.
- Presented findings to lab sponsors in oral presentations and written summary reports.
- Worked with industry and CCS project stakeholders to design research scope.

STOCKHOLM ENVIRONMENT INSTITUTE Somerville, MA
Staff Scientist 2008 – 2013

- Managed project for the Mexican National Institute of Ecology (INECC) by facilitating stakeholder meetings, budgeting, managing 6 internal staff and external subcontractors, leading 3 workshops, and completing climate scenario modeling.
- Facilitated 12 week-long software training workshops in 9 countries in English and Spanish to an audience of academics, government officials, and utilities.
- Supported 4000+ active users of the LEAP (Long-range Energy Alternatives Planning) software system through online forums, emails and updated training materials.
- Created new accounting models of energy supply and demand to inform energy policy planning processes.

Education

Massachusetts Institute of Technology Cambridge, MA
M.S., Technology and Policy June 2015

Tufts University Medford, MA
B.S., Mechanical Engineering June 2008

Citizenship

United States

Authored Papers

1. "Preliminary Economic Outlook for California Residential ZNE" ACEEE Summer Study on Energy Efficiency in Buildings. 2016. Available online: http://aceee.org/files/proceedings/2016/data/papers/10_1071.pdf
2. "Assessment of the US EPA's determination for the role of CO_2 capture and storage (CCS) in new fossil-fuel power plants" Environmental Science & Technology. 2014. Available online: http://pubs.acs.org/doi/abs/10.1021/es501748r
3. "Can 'stranded' fossil fuel reserves drive CCS deployment?" Energy Procedia. 2014. Available online: http://www.sciencedirect.com/science/article/pii/S1876610214025776