Sierra Spencer

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC.   San Francisco, CA
Consultant

Sierra Spencer joined E3 in 2019. Her work focuses on analyzing opportunities to leverage distributed energy resources to reduce the environmental impacts of energy use and supporting clients' transportation electrification and renewables integration efforts. Sierra has also worked on long-term resource planning with an emphasis on meeting emission reductions goals, maintaining system reliability, and achieving equitable outcomes. Prior to joining E3, Sierra conducted research on managed charging for electric vehicles and utilizing biofuels for central heating. In addition to her master's degree, Sierra received a M.S. in civil and environmental engineering from University of California, Berkeley and a B.S. in engineering and B.A. in environmental studies from Swarthmore College.

Recent E3 projects include:

- **Xcel Energy (2022).** Led a cost-benefit analysis of vehicle electrification in Xcel's Minnesota and Wisconsin service territories to understand the economic implications of proposed EV charging and school bus purchase programs on Xcel's Minnesota and Wisconsin drivers, ratepayers, and society as a whole. The cost-benefit analysis and written report supported the regulatory filing of Xcel's proposed EV programs.
- **Pacific Northwest RESOLVE for BPA study on the replacement of Lower Snake River dams (2022).** Led RESOLVE modeling to determine the value of the Lower Snake River dams under different clean energy policy, load growth, and emerging technology availability scenarios. RESOLVE modeling assessed the resources needed to replace the energy and reliability services provided by the dams and the costs associated with those resources.
- **Electrification Strategy for confidential electric utility (2021-present).** Conducted a cost-benefit analysis of transportation electrification, including the electrification of light-duty vehicles, parcel trucks, and transit buses, in the utility's service territory. Findings from the transportation electrification cost-benefit analysis were evaluated alongside a building electrification analysis to create a comprehensive electrification strategy for the utility.
- **Black Hills Colorado (2021-2022).** Led analysis in E3's RESOLVE capacity expansion model to assess the cost and reliability implications of options for long-term resource portfolios.
- **California Public Utilities Commission Net Energy Metering (NEM) proceeding (2021).** Conducted a cost-effectiveness analysis of party proposals for reforms to California's NEM policy. The cost-effectiveness analysis informed the California Energy Commission's proposed decision on the state's NEM reform.
- **New York Power Authority Transit Bus Electrification Master Plan (2021).** Evaluated the cost implications of electrifying New York state's five largest transit agencies outside of New York City by 2035. Findings were used to inform electrification roadmaps for each transit agency.
- **EV load shape modeling for utilities and automakers (2019-present).** Developed electric vehicle (EV) charging profiles under different charge management strategies using E3's EV Load Shape Tool for a variety of utility and automaker clients. Charging profiles are used to understand

implications of charge management strategies, electric rate designs, and technological innovations on additional load from EV charging.

- o **Hawaiian Electric Company EV charging rates and DCFC program expansion regulatory filings (2021).** Conducted cost-benefit analyses to support HECO's filings for Hawaii Public Utilities Commission approval of EV-specific electric rates and public charging infrastructure programs.
- o **California Public Utilities Commission Residential Energy Cost Calculator (2020-2021).** Worked to develop the Residential Energy Cost Calculator (RECC) as part of California's integrated resource planning (IRP) process. The RECC provides 10-year forecasts of customer energy bills and affordability metrics for two dozen types of households in California. The RECC will be used in the IRP process to assess implications of long-term planning decisions, such as emissions reduction targets, on residential customer energy costs and affordability. The RECC can also be used to compare the impacts of electrification and rate design on household energy costs.
- o **Sacramento Municipal Utility District 2030 Zero Carbon Plan (2020-2021).** Utilized E3's RESOLVE capacity expansion tool to assess the resource build and cost implications of different scenarios that comply with SMUD's 2030 zero emissions goals. Sierra helped to identify optimal resource portfolios under different carbon accounting methodologies and technology availability scenarios.
- o **Confidential renewable developer (2020).** Ms. Spencer worked on a team that analyzed expected renewable resource needs in utilities throughout the US and coal plant operating data to make projections on coal plants with retirement dates likely to be accelerated. This information was useful to the client in identifying locations for renewable project development opportunities.
- o **Confidential transit agency in US (2019).** Ms. Spencer helped determine the most economic renewable energy procurement option to meet a large U.S. transit agency's long-term sustainability targets. Ms. Spencer led development of load shapes for the transit agency's end uses and helped calculate the emissions and cost implications of different procurement strategies.

TRANSPORTATION SUSTAINABILITY RESEARCH CENTER <div style="float:right">Berkeley, CA</div>
Graduate Student Researcher <div style="float:right">August 2018 – August 2019</div>

- o Analyzed electric vehicle (EV) driver behavior and charging data from BMW's ChargeForward pilot program
- o Assessed the effectiveness of BMW's optimizations of intra-locational charging sessions for producing economic and energy savings across different use cases

PRESIDENTIAL SUSTAINABILITY RESEARCH FELLOWSHIP <div style="float:right">Swarthmore, PA</div>
Research Fellow <div style="float:right">August 2017 – May 2018</div>

- o Researched logistical, cost, and sustainability components of biofuels as a replacement for natural gas in Swarthmore College's central heat plant
- o Presented research findings and a pilot proposal for biofuel made from waste cooking oil, including to the President and two Vice Presidents of the College

SWARTHMORE COLLEGE <div style="float:right">Swarthmore, PA</div>
Student Researcher <div style="float:right">November 2017 – May 2018</div>

- o Conducted a life-cycle assessment of a biofuel produced from waste cooking oil used in Swarthmore College's central heat plant
- o Compared results of waste vegetable oil to those of natural gas to make recommendations for Swarthmore's heating fuel choice
- o Presented results to key Swarthmore stakeholders and at ASME's 2018 IMECE Conference

CLIMATE SYSTEMS ANALYSIS GROUP   Cape Town, South Africa
Student Researcher   January 2017 – June 2017

- o Conducted a study titled "The Implications of 1.5 Degrees Celsius Warming on Grapes in the Western Cape"
- o Analyzed global climate model temperature data to find that global average warming of 1.5°C will be reached by 2030
- o Assessed the implications of global warming through the lens of grape production on the Western Cape
- o Determined that the Western Cape will experience higher increases in average temperatures and more frequent extreme heat events than the global average, resulting in declining grape quality and yield

SWARTHMORE COLLEGE   Swarthmore, PA
Student Researcher   June 2016 – August 2016

- o Conducted an experiment to compare shower times of college dorm residents with regular versus low-flow showerheads
- o Used the results of this experiment to persuade the College's Facilities to purchase low-flow showerheads for all dorm showers and personally changed 242 showerheads, saving 1 million gallons of water (60% of previous usage) per semester

THE PHILADELPHIA ZOO   Philadelphia, PA
Environmental Education and Animal Behavior Intern   May 2015 – August 2015

- o Conducted research on the activity levels of Amur tigers and African lions based on weather and time of day to inform guests on optimal viewing conditions for these animals
- o Operated interactive stations throughout the zoo to channel guests' enthusiasm over animals into environmentally conscious behaviors both at the zoo and in their everyday lives
- o Interpreted over 100 animals and adapted conversations and presentations to the size, age, and interest levels of audiences

Education

University of California, Berkeley   Berkeley, CA
M.S., Civil and Environmental Engineering (Energy, Civil Infrastructure, & Climate)   2019

Swarthmore College   Swarthmore, PA
B.S., Engineering and B.A., Environmental Studies   2018

Publications

1. Olsen, A., Burdick, A., Zohrabian, A., Spencer, S., Kramer, S., Moore, J. "BPA Lower Snake River Dams Power Replacement Study," July 2022. https://www.bpa.gov/-/media/Aep/power/hydropower-data-studies/e3-bpa-lower-snake-river-dams-power-replacement-study.pdf.
2. Spencer, S., Fu, Z., Apostolaki-Iosifdou, E., Lipman, T. "Evaluating smart charging strategies using real-world data from optimized plugin electric vehicles," September 2021. https://doi.org/10.1016/j.trd.2021.103023.

Citizenship

United States