

**ENERGY AND ENVIRONMENTAL ECONOMICS, INC.**  
*Senior Consultant*

San Francisco, CA

Mr. Zhang has extensive research and modeling experience in electricity system analysis, including residential demand, solar PV potential, and renewable integration. His work focuses on the cost-effectiveness and adoption of distributed energy resources (DER) and building electrification. He has also assisted several asset valuation clients estimate potential storage revenues in the California and New York markets. Highly technically skilled in Python and tool development, Mr. Zhang helps lead the development of both RESTORE, which is E3's DER dispatch model with a focus on PV + storage, and IDSM, which is E3's integrated demand-side resource management tool to identify the least-cost integrated DER portfolio for targeted distribution planning areas.

Mr. Zhang joined E3 in 2018 after completing his Master of Environmental Management (MEM) at Duke University. In addition to his master's degree, he holds two bachelor's degrees in both environmental science and economics from Xiamen University in China. As a 2018 EDF Climate Corps fellow at Dartmouth College, he helped design and implement the Green Labs program on campus to reduce campus carbon intensity. Selected projects at E3 include:

- **NYSERDA Electrification Roadmap (2020 – Present):** Developed new features to expand the capabilities of the BEEM tools to evaluate the cost-effectiveness and consequent adoption of building electrification under different incentive frameworks.
- **California Energy Commission Nonresidential PV and Storage Mandate (2020 – Present):** Technical lead on evaluating the cost-effectiveness of PV and/or storage systems on new non-residential buildings to support final decisions on 2022 California building standards using E3's DER dispatch tool (RESTORE).
- **Hawaiian Electric Companies Integrated Grid Planning (2019 - Present):** Developed new features to expand the capabilities of E3's capacity planning tool (RESOLVE) to support HECO's Integrated Grid Planning process to develop updated system needs assumption and evaluate bids on each of HECO's operating islands in the context of Hawaii's long-term energy policies.
- **Silicon Valley Clean Energy (SVCE) Distributed Energy Resources and Electrification Potential (2019):** Worked with a community choice aggregator (CCA) to explore the impact of various incentive mechanisms and rate designs on the adoption of building electrification, electric vehicles, residential solar PV, behind-the-meter storage and smart home technologies.
- **Tata Power Delhi Distribution Limited (TPDDL) (2018 – Present):** Explored the cost-effectiveness and the least-cost portfolio of distributed energy resources (DER) technologies within TPDDL's service territory on a project funded by the U.S. Trade and Development Agency (USTDA).
- **NYSERDA Value of DER (VDER) Value Stack Calculator, (2018 – Present):** Developed the tool to help contractors better estimate compensation for specific solar projects under the Value Stack tariff in New York State.
- **California Energy Commission (CEC) EPIC Solar + Storage Tool (2018- 2020):** Developed the publicly-available optimal dispatch model as one of the developers to estimate the value

proposition of solar, storage, and other distributed energy resources with a focus on their location on the system.

## **DARTMOUTH COLLEGE**

Hanover, NH

*EDF Climate Corps Fellow*

Jun 2018 – Aug 2018

- Assessed Dartmouth's Green Labs Program to date, identified gaps, and opportunities
- Designed a strategic scheme for Green Labs Program; assessed and described barriers to implementation
- Developed financial analysis of Dartmouth's options for Green Labs investments and showed expected paybacks

## **CENTERS OF AMERICAN STATES**

Shanghai, China

*Market Research and Business Development Intern*

Jun 2017 – Aug 2017

- Supported Michigan State Governor's trade mission to China by representing one Michigan-based company to interact with 60 high-potential Chinese business partners and successfully invited 16 of them to 1-on-1 business meetings, which resulted in a \$3 million investment in the client's R&D
- Performed market research to identify the list of high-potential partners and made 300+ cold calls to establish relationships with these firms

## **DUKE UNIVERSITY**

Durham, NC

*Graduate Teaching Assistant*

Sept 2017 – Spring 2018

- Held office hours and lab sessions; graded assignments and exams for Instructors Dr. Dalia Patino-Echeverri and Dr. Timothy Johnson on *Modeling for Energy Systems and Markets for Power Systems*; and for Instructor Dr. Elizabeth Albright on *Applied Data Analysis*

### Project Experience

- **Residential Microgrid System Design** Sept 2017 – Dec 2017  
Explored optimal designs of residential community microgrids under various scenarios in San Diego, CA, by using HOMER (microgrid optimization model) and considered the regulatory framework, financial incentives, project economics, and case-specific constraints
- **Power System Renewable Integration** Jan 2017 – Apr 2017  
Applied optimization and simulation in simplified power system models to analyze the effect of different renewable energy strategies on the system's reliability, costs, and emissions
- **Supply-Chain Sustainability Life-Cycle Assessment (LCA)** Jan 2017 – May 2017  
Led a 3-member team to identify a 30% carbon-reduction opportunity for one REI's (top sports gear manufacturer & retailer) product by developing an LCA model to quantify the product's supply-chain sustainability under various scenarios (scope 1, 2, and 3 carbon emissions)
- **Scenario Analysis for Duke Energy Integrated Resource Planning (IRP)** Sept 2016 – Dec 2016  
Developed policy-change scenarios to bind the impacts of natural-gas-policy uncertainty with Duke Energy's capacity planning; using a simplified capacity planning spreadsheet model
- **GIS-Based Multi-Criteria Wind Farm Site Selection** Sept 2016 – Dec 2016

Evaluated 10 nominated sites in North Carolina by the criteria of land feasibility, regulations, bird population, wind resource, and economics to filter out the optimal sites by using ArcGIS and spreadsheet modeling

### Research Experience

- **Increasing Solar PV Capacity at Duke University** Apr 2017 – May 2018
  - Estimated available installation area, the technical potential (87.1 MWdc), and hourly power output of on-site PV capacity atop rooftop and parking lots by geospatial analysis, PVWatts, and HOMER (energy models)
  - Analyzed the grid impact of PV integration by modeling and simulating the power system operation in CPLEX (system optimization software) under various scenarios
  - Summarized the regulatory framework for large-scale solar projects, implementation barriers, and best practices from other universities
  - Performed financial analysis for various PV project configurations by spreadsheet modeling considering the availability of financial incentives (ITC), and then compared the GHG abatement cost of PV projects with other available carbon-abating strategies, informing a better pathway to achieve climate goal
  
- **Bottom-Up Model of Residential Electricity Demand China by End-Uses** Sept 2017 – May 2018
  - Analyzed detailed household energy-audit data to categorize residential customers by their energy consumption behaviors using statistical clustering methods in R
  - Approximated hourly load-profiles for different behaviors of each household appliance, and then interpolated the hourly generation at the city and province level by available demographic, socioeconomic, geographic, and appliance energy efficiency data, using spreadsheet modeling and R
  
- **End-Use Model of Residential Electricity Demand in Mexico** Jan 2017 – May 2017
  - Assisted in developing the end-use model of residential electricity demand in Mexico by cleaning input data, updating model parameters, and visualizing results in Tableau

### Education

Duke University	Durham, NC
<i>Master of Environmental Management</i>	May 2018
Xiamen University	Xiamen, China
<i>B.S., Environmental Science, Bachelor of Economics</i>	2016

### Citizenship

China