

Xiaoyuan (Charles) Li, Ph.D.

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ENERGY AND ENVIRONMENTAL ECONOMICS, INC.

San Francisco, CA

Consultant III

Dr. Li joined E3 in 2018 after completing his Ph.D. in environmental engineering from Princeton University. His work focuses on analyzing and modeling long-term greenhouse gas mitigation strategies, and on combining E3's strengths in electricity planning and building electrification to assess how electrification and decarbonization of electricity contribute to reducing economy-wide emissions. He has led technical analysis on recent building electrification studies in California and New York, as well as recent decarbonization studies in Maryland and Nova Scotia. Dr. Li brings extensive research experience at the nexus of renewable energy, air pollution, and climate change. In addition to his doctoral degree, he holds a B.S. in atmospheric and oceanic sciences from Peking University in China.

Selected E3 projects include:

- **Silicon Valley Clean Energy (SVCE) Distributed Energy Resources and Electrification Potential (2019 – ongoing).** Working with a community choice aggregator (CCA) to explore the potential of building electrification, electric vehicles, residential solar PV, behind-the-meter storage and smart home technologies. Developing a model to project consumer adoption of building electrification technologies based on current and projected costs and various rate designs and incentive levels.
- **New York State Heat Pump Potential Analysis (2019 – ongoing).** Supporting the New York State Department of Public Service (DPS) by analyzing the economic and achievable potential of heat pumps in New York. Developed a consumer adoption model to project the uptake of air-source heat pumps and ground-source heat pumps from 2020 to 2025 in each of the state's utilities' service territories given projected cost reductions and assumed incentive levels.
- **Residential Building Electrification Market Assessment in California (2018 – 2019).** Developed a building electrification model to assess the capital costs, energy costs and greenhouse gas impacts of various electric appliances including air-source heat pumps, heat pump water heaters, induction cookstoves and heat pump clothes dryers in residential dwellings versus traditional fossil-based appliances. The study, commissioned by three of California's largest electric utilities – Southern California Edison (SCE), Sacramento Municipal Utility District (SMUD), and the Los Angeles Department of Water and Power (LADWP) – found that building electrification would deliver lifecycle cost savings for most home types and would significantly reduce greenhouse gas emissions from homes, starting today.
- **Maryland State Climate Plan (2018 – ongoing).** Supporting the Maryland Department of Environment (MDE) in exploring the feasibility, timing, and cost of achieving steep greenhouse gas reductions in the 2030 and 2050 timeframes. Helped develop a Maryland-specific PATHWAYS model to analyze various measures across the state's economy, as well as the timeframes in which emissions reductions would occur. E3's work forms the basis of Maryland's draft climate plan, which will be finalized in December 2019.

PRINCETON UNIVERSITY

Assistant Instructor

Princeton, NJ
September 2014 – May 2017

- Taught six semesters of undergraduate-level courses including *Innovation in Engineering Practice*, *Global Environmental Policy*, *Introduction to Environmental Engineering*, and *Environmental Nexus: Science, Ethics and Literature*
- Supervised 40-plus student engineering projects

PRINCETON UNIVERSITY

Assistant Researcher

Princeton, NJ
September 2012 – March 2018

- Using a PV performance model (PVLIB-Python), discovered that air pollution in Eastern China can reduce solar PV output by more than 30%, and that the combination of air pollution and panel soiling in Eastern China, Northern India, and the Middle East can reduce solar PV output by more than 50%
- Developed an integrated energy modeling framework that simulates renewable energy performance using satellite data, optimizes system dispatch, and evaluates system reliability

PRINCETON UNIVERSITY CHINA ENERGY GROUP

President

Princeton, NJ
2015 – 2016

- Led the 2016 US-China Environmental Scholars Forum featuring 150 on-site attendees and 200 webcast followers, more than doubling preceding years’ participation levels
- Fundraised over \$8,000 to hold 10 campus events and promote discussion of cutting-edge energy and environmental issues

ASSOCIATION OF CHINESE STUDENTS & SCHOLARS AT PRINCETON UNIVERSITY

Cultural Chair

Princeton, NJ
2013 – 2014

- Stage-managed two on-campus performances featuring 50 performers and 20 stage staff
- Fundraised over \$3,000 for cultural programs, increasing the association’s financial capacity by over 30%

Education

Princeton University
Ph.D., Environmental Engineering and Water Resources
Dept. of Civil and Environmental Engineering

Princeton, NJ
2018

Peking University
B.S., Atmospheric and Oceanic Sciences, College of Physics

Beijing, China
2012

Citizenship

China

Selected Publications

1. **Li Xiaoyuan**, Liu Junfeng, Mauzerall Denise L, Emmons Louisa K, Walters Stacy, Horowitz Larry W, Tao Shu (2014) Effects of trans-Eurasian transport of air pollutants on surface ozone concentrations over Western China. *J Geophys Res Atmos* 119(21):12,338-12,354.
2. **Li Xiaoyuan**, Wagner Fabian, Peng Wei, Yang Junnan, Mauzerall Denise L (2017) Reduction of solar photovoltaic resources due to air pollution in China. *Proc Natl Acad Sci* 114(45):11867–11872.
3. Guo Yixin, Liu Junfeng, Mauzerall Denise L, **Li Xiaoyuan**, Horowitz Larry W, Tao Wei, Tao Shu (2017) Long-Lived Species Enhance Summertime Attribution of North American Ozone to Upwind Sources. *Environ Sci Technol* 51(9):5017–5025.
4. Li Zhongshu, Liu Junfeng, Mauzerall Denise L, **Li Xiaoyuan**, Fan Songmiao, Horowitz Larry W, He Cenlin, Yi Kan, Tao Shu (2017) A potential large and persistent black carbon forcing over Northern Pacific inferred from satellite observations. *Sci Rep* 7:43429.
5. Yang Junnan, **Li Xiaoyuan**, Peng Wei, Wagner Fabian, Mauzerall Denise L (2018) Climate, air quality and human health benefits of various solar photovoltaic deployment scenarios in China in 2030. *Environ Res Lett*. doi:10.1088/1748-9326/aabe99.