Michael R. Davidson

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Academic Appointments

University of California, San Diego
Assistant Professor — 2019-PRESENT
School of Global Policy and Strategy
Mechanical and Aerospace Engineering Department, Jacobs School of Engineering

Education

Massachusetts Institute of Technology
Ph.D., *Engineering Systems*, Institute for Data, Systems, and Society — 2014-2018
Creating Markets for Wind Electricity in China: Case Studies in Energy Policy and Regulation
Committee: Ignacio Pérez-Arriaga, Valerie J. Karplus, Margaret Pearson

M.S., *Technology and Policy* — 2012-2014
Regulatory and Technical Barriers to Wind Energy Integration in Northeast China

Case Western Reserve University
B.S., *Mathematics and Physics*, summa cum laude — 2008
Auger Processes in Semiconductor Quantum Dots (*Dayton C. Miller Prize for Best Thesis in Physics*)

B.A., *Japanese Studies* — 2008
The Basis of Japanese Diplomacy: New Perspectives on Constitutional Revision (*in Japanese*)

Research & Work Experience

Belfer Center for Science and International Affairs, Harvard Kennedy School of Government
Post-Doctoral Research Fellow, Environment and Natural Resources Program — FEB 2018-JUL 2019
Identifying policy and technology options for decarbonizing China's coal and electricity sectors
Developing optimization formulations for modeling India's evolving electricity market

Joint Program on the Science and Policy of Global Change, Massachusetts Institute of Technology
Research Assistant, China Energy and Climate Project — AUG 2012-JAN 2018
Modeled effects of high-penetration renewable energy on power systems operation
Conducted 9 months of fieldwork on electricity market developments in China and India

Natural Resources Defense Council, Washington, DC and Beijing — AUG 2010-AUG 2012
US-China Climate Policy Coordinator
Developed seed grant proposal for China coal consumption cap project ($15 million raised to date)
Briefed US energy and climate policy-makers on Chinese policy developments

Asia Policy Point, Washington, DC — JAN 2010-AUG 2010
Visiting Fellow
Monitored domestic political developments in Japan and China for boutique foreign policy think tank

Fulbright China Program, U.S. State Department
Fellow, Tsinghua-BP Clean Energy Research and Education Centre, Beijing — DEC 2008-OCT 2009
Critical Language Enhancement Award, CET Academic Programs, Harbin — AUG 2008-DEC 2008
Investigated livelihood impacts of renewable energy on Chinese farmers and herders

Refereed Journal Articles

Davidson, M. R., Pérez-Arriaga, J. I. Avoiding Pitfalls in China's Electricity Sector Reforms. *The Energy Journal*, *accepted*.

Davidson, M. R., Pérez-Arriaga, J. I. (2018). Modeling Unit Commitment in Political Context: Case of China's Partially Restructured Electricity Sector. *IEEE Transactions on Power Systems*, *33*(5), 4889-4901. [link]

Davidson, M. R., Zhang, D., Xiong, W., Zhang, X., and Karplus, V. J. (2016). Modelling the potential for wind energy integration on China's coal-heavy electricity grid. *Nature Energy*, 1, 16086. [link]

Refereed Book Chapters

Davidson, M. R. Technology Integration in China's Electricity System: Central Targets and Local Challenges. (2019). In T. G. Rawski & L. Brandt (Eds.), *Policy, Regulation and Innovation in China's Electricity and Telecom Industries*. Cambridge University Press. [link]

Davidson, M. R., Kahrl, F., and Karplus, V. J. (2017). *Towards a political economy framework for wind power: Does China break the mould?* In D. Arent, C. Arndt, M. Miller, F. Tarp, & O. Zinaman (Eds.), *The Political Economy of Clean Energy Transitions* (pp. 250–270). Oxford University Press. [link]

Works In Progress

Davidson, M. R. From Barrier to Bridge: The Role of Coal in China's Decarbonization. In D. Schrag and H. Lee (Eds.), *China's Decarbonization Pathways (title pending)*.

Davidson, M. R., Pearson, M. Static Electricity: Institutional and Ideational Barriers to China's Market Reforms.

Davidson, M. R. Wind Curtailment in China: From Causes to Market Solutions.

Davidson, M. R. Electricity Markets in a Carbon-Constrained World: Reforming Scheduling Practices in China and India.

Other Publications

Davidson, M. R., Pérez-Arriaga, J. I. (2017). *Modeling Unit Commitment in Political Context: Case of China's Partially Restructured Electricity Sector*. MIT Center for Energy and Environmental Policy (CEEPR) Working Paper. [link]

Davidson, M. R., Kahrl, F., and Karplus, V. J. (2016). *Towards a Political Economy Framework for Wind Integration: Does China Break the Mould?* (Working Paper No. 32). United Nations University World Institute for Development Economics Research. [link]

Zhang, D., **Davidson, M. R.**, Gunturu, B., Zhang, X., and Karplus, V. J. (2014). *An Integrated Assessment of China's Wind Energy Potential* (Report No. 261). Cambridge, MA: MIT Joint Program on the Science and Policy of Global Change. [link]

Davidson, M. R. (2013). Politics of Power in China: Institutional Bottlenecks to Reducing Wind Curtailment Through Improved Transmission. *International Association for Energy Economics Energy Forum*, 4, 40–42. [link]

Davidson, M., Greene, G., and Liu, M. (2013). Untapped Potential: Energy Savings and Climate Benefits from Strengthening Water Use Efficiency in China's Building and Industrial Sectors. *China Environment Series 12*. Woodrow Wilson Center, Washington, DC. [pdf]

Enoe, M., He, Y., Pohnan, E., and **Davidson, M.** (contributing editor). (2012). *Lessons Learned: A Path Toward Responsible Development of China's Shale Gas Resources*. Natural Resources Defense Council White Paper. [pdf]

Davidson, M. (2010). Climate Security in East Asia: New Opportunities for Non-traditional Cooperation. *Center for Strategic and International Studies Pacific Forum*, 25. [link]

Teaching & Mentoring Experience

Kaufman Teaching Certificate Program SPRING 2017
MIT Teaching and Learning Laboratory
Designed syllabi, course assignments, and in-class exercises using latest learning research

Decision Support Models for Low-Carbon Electric Power Systems (ESD.S23) SPRING 2016
Teaching Assistant (Part-Time), MIT Institute for Data, Systems, and Society

Turbines to Tariffs: Technical and Regulatory Issues for Scaling Up Wind Energy JAN 2016
Lecturer, MIT Joint Program on the Science and Policy of Global Change

Climate Change Policy Seminar JAN 2013, 2014, 2017
Lecturer, MIT Joint Program on the Science and Policy of Global Change

Yale Environmental Protection Clinic 2011-2012
Supervised six graduate students and legal fellows on Rio+20 Earth Summit and China-related research projects

Languages

Chinese

Conducted 100+ interviews in Chinese with electricity sector stakeholders	2012-2018
Immersion language training, CET Academic Programs, Harbin	FALL 2008
Language book prize for high achievement in Chinese, Case Western Reserve University	2008

Japanese

Completed original research and thesis in Japanese	2008
Language book prize for high achievement in Japanese, Case Western Reserve University	2007
Global Engineering Education Exchange, Tohoku University, Sendai	OCT 2005-AUG 2006
Japanese immersion schooling, Yujin Gakuen, Eugene, OR	1992-1996

French

Vice-President, French Conversation Club, Case Western Reserve University	2006-2008
Completed 7 years of secondary school language training	1996-2003

Highest honors in modern languages and literatures, Case Western Reserve University 2008

Selected Presentations

Davidson, M. R. Renewable Energy Participation in Short- and Long-Run Markets: U.S. Lessons for China. 3rd Annual China Electricity Market International Summit. Beijing. 2019.

Davidson, M. R. Creating Markets for Wind Electricity in China: An Analysis of Grid and Institutional Causes of Curtailment. Harvard Kennedy School Energy Policy Seminar. Cambridge, MA. 2018. [summary] [slides]

Davidson, M. R. Institutions, Conflicts, and Political Economy in Renewable Energy Integration: Case of China, and Thoughts for India. Brookings India. New Delhi. 2017. [video]

Davidson, M. R. Markets for Wind Electricity in China: Case Studies in Energy Policy and Regulation. Duck Family Graduate Workshop in Environmental Politics and Governance. Seattle, WA. 2017.

Davidson, M. R. Hidden Costs of Technology Development by the Plan: Case of China's Coal Fleet Upgrading. AAAS Annual Meeting. Boston. 2017. [link] [slides] (***Winner, Social Sciences Category, AAAS Student Poster Competition***)

Davidson, M. R. Pitfalls in China's Electricity Sector Reforms: International Lessons. Energy Revolution and Green Low-Carbon Development High Level Roundtable. China Energy Research Society. Beijing. 2016.

Davidson, M. R. Decarbonizing China's Power Grid. Woodrow Wilson International Center for Scholars. Washington, DC. 2016. [link]

Davidson, M. R. and Qi, T. Re-Analysis Data for Fine Temporal Resolution Wind Power Estimation: A Comparison of Boundary Layer Parameterizations. Graduate Climate Conference, Woods Hole Oceanographic Institution. Woods Hole, MA. 2015. [link] [poster]

Davidson, M. R. Robust Unit Commitment from Data-Rich Wind Power Forecast Models. Grid Science Winter Conference, Los Alamos National Laboratory (*offsite*). Santa Fe, NM. 2015.

Davidson, M. R., Karplus, V. J., and Pérez-Arriaga, J. I. Technical and Institutional Barriers to Increasing Wind Integration in Northeast China. Technology, Management and Policy Graduate Consortium, Instituto Superior Técnico. Lisbon. 2014. (***Best Paper, M.S. Level***)

Davidson, M. Greening China: Opportunities for International Cooperation and Improved Transparency. Columbia University. New York. 2011.

Davidson, M. Greening China through Clean Energy and Rule of Law. Tulane Law School Summit on Environmental Law and Policy. Tulane, LA. 2011.

Honors and Awards

Initiative for Sustainable Energy Policy Fellow, Johns Hopkins SAIS	2017-PRESENT
Winner, Social Sciences Category, AAAS Student Poster Competition	2017
Martin Family Society Fellow for Sustainability	2015-2016
UNU-WIDER Research Grant	2015
MIT Energy Initiative Energy Fellow	2012-2015

Technology, Management and Policy Graduate Consortium, Best Paper, M.S. Level	2014
1st Place, US Association for Energy Economics Student Case Competition	2013
Phi Beta Kappa, Alpha of Ohio Chapter	2008
Outstanding Senior in Mathematics Case Alumni Award	2008
National Merit Scholar	2003-2008

Professional Development and Service

Reviewer for *Applied Energy*, *Economics of Energy & Environmental Policy*, *Energy Policy*, *IEEE Transactions on Sustainable Energy*, *Joule*, *Journal of Applied Meteorology and Climatology*, *Journal of Renewable and Sustainable Energy*, *Oxford University Press*

MIT Electricity Students Research Group
Co-President 2014-2016

Los Alamos National Laboratory
Participant, Grid Science Winter School JAN 2015

American Association for the Advancement of Science
MIT Organizer, Science/Engineering Congressional Visits Day SPRING 2013

National Center for Science Education, Washington, DC
High school environmental science project mentor, EnvironMentors 2010-2011

PlaNet Finance (*now: Positive Planet*), Beijing
Provided interpretation and expert input on microfinance biogas project OCT 2009

Engineers Without Borders, Case Western Reserve University Chapter
Planned water system project in the Dominican Republic 2006-2007

Professional Affiliations

American Political Science Association
IEEE Power & Energy Society
Institute for Operations Research and the Management Sciences (INFORMS)
International Association for Energy Economics / US Association for Energy Economics

Computer Proficiencies

R, python, GAMS, MATLAB, ArcGIS, SQL