Michael R. Davidson

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Education

Massachusetts Institute of Technology, Cambridge, MA
Ph.D. Candidate, *Engineering Systems*, Institute for Data, Systems, and Society — EXP. 2018
Committee: Ignacio Pérez-Arriaga (chair), Valerie J. Karplus, Margaret Pearson
Dissertation Title: Creating Markets for Wind Electricity in China: Hybrid Approaches to Energy Modeling and Regulation

Massachusetts Institute of Technology, Cambridge, MA
M.S., *Technology and Policy* — 2014
Thesis Advisors: Valerie J. Karplus, Ignacio Pérez-Arriaga
Thesis: Regulatory and Technical Barriers to Wind Energy Integration in Northeast China

Case Western Reserve University, Cleveland, OH
B.S., *Mathematics and Physics*, *summa cum laude* — 2008
B.A., *Japanese Studies*
Thesis Advisor: Harsh Mathur
† *Thesis*: Auger Processes in Semiconductor Quantum Dots

Honors and Awards

Martin Family Society Fellow for Sustainability	2015-2016
MIT Energy Initiative Energy Fellow	2012-2015
‡ Best Paper (M.S. Level), Technology, Management and Policy Graduate Consortium	2014
1st Place, US Association for Energy Economics Student Case Competition	2013
Fulbright Fellowship	2008-2009
Phi Beta Kappa, Alpha of Ohio Chapter	2008
Emile B. DeSauze Award for Highest Honors in Modern Languages and Literatures	2008
† Dayton C. Miller Prize for Best Thesis in Physics	2008
National Merit Scholar	2003-2008

Teaching Experience

Kaufman Teaching Certificate Program — SPRING 2017
MIT Teaching and Learning Laboratory

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

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

"Climate Change Policy" Seminar — JANUARY 2013, 2014
Lecturer, MIT Joint Program on the Science and Policy of Global Change

Refereed Publications

1. **Davidson, M. R.**, Pérez-Arriaga, J. I. Modeling Unit Commitment in Political Context: Case of China's Partially Restructured Electricity Sector. *IEEE Transactions on Power Systems*. (*Revise and resubmit*)
2. **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.

Other Publications

1. **Davidson, M. R.** (2017). Electricity systems integration challenges: A local perspective. In T. G. Rawski & L. Brandt (Eds.), *Policy, Regulation, and Innovation in Chinese Industry*, under revision.
2. **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.

3. **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.
4. **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.
5. 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.
6. **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.

Selected Presentations

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

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

Davidson, M. R. A Multi-Method Approach to Assess Institutional Design in Electricity Systems. American Political Science Association Annual Meeting. Philadelphia PA. 2016.

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

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.

Davidson, M. R., Karplus, V. J., and Pérez-Arriaga, J. I. Modeling Grid Operations in China's Partially-Restructured Electricity Market. INFORMS Annual Research Meeting. Philadelphia, PA. 2015.

Davidson, M. R., Karplus, V. J., and Pérez-Arriaga, J. I. Modeling Grid Operations in China's Partially-Restructured Electricity Market. International Association for Energy Economics North American Conference. Pittsburgh, PA. 2015.

Davidson, M. R. Regulatory Barriers to Decarbonizing China's Power Sector. Harvard China Project Seminar, Harvard University. Cambridge, MA. 2015.

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. China's Power Sector Regulation and Wind Integration Challenges. Instituto de Investigación Tecnológica, Comillas University. Madrid. 2014.

‡ **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.

Zhang, D., **Davidson, M. R.**, Gunturu, B., Zhang, X., and Karplus, V. J. An Integrated Assessment of China's Wind Energy Potential. Global Trade Analysis Project 16th Conference on Global Economic Analysis. Shanghai. 2013.

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

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

Research Experience

Joint Program on the Science and Policy of Global Change, MIT, Cambridge, MA
Research Assistant, China Energy and Climate Project 2012-PRESENT

Modeling large-scale penetrations of wind energy on power systems operation
Analyzing impacts of power sector reform in China and India on renewable energy utilization

Tsinghua-BP Clean Energy Research and Education Centre, Tsinghua University, Beijing
Fulbright Fellow 2008-2009
Assessed rural development impacts of various alternative energy options in China
Participant observation fieldwork in biogas maintenance

Professional Development and Service

Energy Policy, Reviewer 2017
Journal of Applied Meteorology and Climatology, Reviewer 2017
MIT Electricity Students Research Group, Co-President 2014-2016
IEEE Transactions on Sustainable Energy, Reviewer 2015
LANL, Grid Science Winter School, Santa Fe, NM January 2015
AAAS, MIT Organizer, Science/Engineering Congressional Visits Day, Washington, DC spring 2013

Professional Experience

Natural Resources Defense Council, Washington, DC 2010-2012
US-China Climate Policy Coordinator
Contributed to US energy and climate policy advocacy, briefing policy-makers and drafting international clean energy section of the annual Green Budget
Organized reports and workshops on China's shale gas environmental safeguards, Chinese renewable energy policy, and China's coal cap strategy
Supervised six graduate students and legal fellows on Rio+20 Earth Summit and China research projects

Professional Affiliations

APSA 2016-present
INFORMS 2015-present
IEEE 2015-present
IAEE/USAEE 2013-present

Language Skills & Selected Training

Chinese (Speak, Read, Write)
Critical Language Enhancement Award, CET Academic Programs, Harbin fall 2008

Japanese (Speak, Read, Write)
Global Engineering Education Exchange, Tohoku University, Sendai 2005-2006

French (Speak, Read)

Skills

Proficient in R, Python, GAMS, MATLAB, ArcGIS, SQL