

PubPol 590S.04 /ENERGY 590S.04
Impact Evaluation: Energy and Development
Spring 2020

Mon, Wed 1:25 PM - 2:40 PM
Sanford 225

Instructor

Professor Robyn Meeks

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Office hours location: Gross Hall 102R (within the Energy Initiative)

Course description

Access to clean and modern energy (electricity, natural gas, biogas, etc.) is key to both meeting basic needs and achieving economic growth (World Bank, 2006; UN, 2016). For example, with one in five people throughout the world still lacking access to electricity, an urgency surrounds this push to increase electrification rates and access to energy more broadly in many developing countries.

Indeed, energy access was included in the recently Sustainable Development Goals, ensuring it continues to be a development priority through at least 2030 (UN, 2016).

Universal energy access is often viewed as a catalyst for economic growth and development, yet the existing evidence on the welfare impacts of electrification remains mixed. An incomplete understanding of the microeconomic foundations of the energy-development relationship is both a significant knowledge gap and a critical policy challenge. Indeed, governments and international organizations alike are mobilizing considerable resources to ensure access for all, but there may be profound opportunity costs associated with large-scale investments in energy infrastructure in low-income settings.

With an increasing number of organizations operating at the energy-development intersection seeking to determine the extent to which their programs or policies have a causal impact on particular outcomes, the ability to understand rigorous impact evaluations and the methods they employ has become a valuable skill. This course will provide students with an understanding of (1) the status of empirical economic evidence on the energy and development relationship, and (2) the importance of causal evidence to estimate the impacts of energy interventions and policies in developing countries. This course aims to provide the skills necessary to both evaluate the merits of existing studies as well as propose future impact evaluations.

To do so, the course will first cover the empirical methods commonly employed in such evaluations. Applications of these methods will be understood through topics such as measuring the energy “ladder”, the demand for and role of electrification in development, the demand for energy efficiency, the health impacts of and demand for clean cook stove technologies, and spillovers in technology adoption, amongst others. Before the end of the course, students will apply these methods by designing their own impact evaluation and commenting on other students’ proposed evaluations.

Goals of the course

- To understand the current status of (and gaps in) the economic evidence on the energy-development relationship;
- To understand the case for evaluating the impacts of energy-related programs and policies in developing countries;
- To understand conceptually the empirical economic methods commonly applied to evaluate programs and policies and to assess the relative strengths and weaknesses of these methods;
- To build skills necessary to identify research questions relevant for policy, how an impact evaluation might contribute to current understanding for such policies, and the appropriate empirical methods used to measure impacts of a given program or policy.
- To build the case for an impact evaluation and evaluate the merits of proposed research given existing research, methods employed.

Course textbooks & reading materials

- Gertler, Paul J.; Martinez, Sebastian; Premand, Patrick; Rawlings, Laura B.; Vermeersch, Christel M. J.. 2016. *Impact Evaluation in Practice*, Second Edition. Washington, DC: Inter-American Development Bank and World Bank. *This is marked in reading list as [IEP 2nd Edition]*. Also available online: <https://openknowledge.worldbank.org/handle/10986/25030>
- All other readings can be found via a link in the syllabus or posted on our course Sakai site.

General notes

The *instructors' obligations* to students are to (1) treat students with respect; (2) foster students critical thinking skills while providing them with a substantive foundation in the course's subject matter; (3) create and sustain a learning community that fosters robust discourse, deep listening, and the collective pursuit of knowledge; 4) assess students fairly, conscientiously, and in a timely manner; (5) be available to answer students questions and otherwise facilitate their progress in class.

Students' obligations to the instructors and classmates are to (1) attend class regularly and arrive on time; (2) arrive well prepared to contribute thoughtfully and constructively; (3) treat instructors and classmates with the respect and dignity with which they themselves wish to be treated; 4) conduct themselves in a professional manner befitting their future standing as a public representative of our School and University, as well as the other communities of which they are, and will be, a part; and 5) abide by the [Duke Community Standard](#).

Computers in class

You may use computers to take notes in class if you keep the screen so it does not block or distract other students. Please do not to check email or conduct non-class business during class.

Participation in class discussion is an important part of this class!! If computers are becoming a distraction, I reserve the right to change this policy and prohibit the use of computers.

Assignments and grading

The final grade for the course is based on the following activities and assignments:

Assignment	Description	Percent	Due Date
Participation	Attendance and participation in discussion. Quality participation requires completing the readings. This is a seminar and participation is crucial.	20%	Every class
Policy memo	Students will write one 2-page policy memo summarizing your views on the status of impact evaluations on electrification. What are the strengths? Weaknesses? Gaps in literature? These are due on at the beginning of the class session.	15%	Feb 19 th
Initial research question	Propose a topic for an impact evaluation. What are potential research questions? Why are these questions important? Submit in writing to Prof Meeks at the beginning of the class session and be ready to share your idea with the class.	5%	Feb 26 th
Presentation of draft proposal	Present slides on your draft project proposal to class (~ 8-10 minutes per student). Should build on research question, connect topic to existing literature, describe proposed impact evaluation method, potential data. Submit your presentation slides to Prof Meeks and your peer reviewer at the beginning of the class session. <i>Presentations randomly allocated across March 25, 27th.</i>	20%	March 18 th Or 23 rd
Peer review	Review a fellow student's proposal. Provide constructive feedback on research design, methods, etc. Submit in writing to Prof Meeks and your peer at the beginning of the class session.	15%	March 30 th
Final research proposal	Prepare final proposal, incorporating all feedback (including peer review). These are due on at the beginning of the class session.	25%	April 15 th

Accommodations: Please contact Professor Meeks as soon as possible if you have any special needs that require accommodation for assignments, course attendance, etc., so that we can ensure that proper accommodations are made.

Class participation: You are expected to come to class on time and prepared for the lecture and/or discussion. You are encouraged to ask questions during class and express your views during class discussions. If part of a lecture is confusing and you are unable to get clarification during class, please attend office hours.

Academic honesty: Honesty is basic to what we do at the university and in this course. I encourage you to study together, discuss course material outside of class. However, **when it comes to writing assignments, you must do your own work.**

You are expected to adhere to all aspects of the *Sanford School of Public Policy Code of Professional Conduct* (available on pp. 18-22 of the MPP Student Handbook). The MPP student handbook has been made available to you through your Class of 2020 Sakai site.

Reading assignments

Class	Date	Topic & Readings
1	Jan 8	<p>Energy and development – Why do we care? Topics: Intro to class and topic.</p> <ul style="list-style-type: none"> • UNDP. “The Energy Access Situation in Developing Countries.” (<i>skim</i>) • SDG 7: Affordable and Clean Energy. https://www.un.org/sustainabledevelopment/energy/ • (Optional) Tracking SDGs: https://sdg-tracker.org/energy#targets
2	Jan 13	<p>Energy and development – Why evaluate? Topics: Evidence-based policies/investment; Theory of change; Overview of methods</p> <ul style="list-style-type: none"> • IEP 2nd Edition Chapter 1-2
3	Jan 15	<p>Evaluating impacts Topics: Causal inference & counterfactuals; Intro to randomized control trials</p> <ul style="list-style-type: none"> • IEP 2nd Edition Chapters 3-4 • Wolfram, Shelef, and Gertler “How will Energy Demand Develop in the Developing World?”
4	Jan 22	<p>Randomized experiments Topics: RCTs in more detail; RCT application to energy</p> <ul style="list-style-type: none"> • Hanna and Oliva “Moving Up the Energy Ladder” <i>AER: Papers & Proceedings</i> (2015) • Duflo, Glennerster, and Kremer, “Randomization Toolkit”
5	Jan 27	<p>Randomized experiments and demand for energy Topics: An RCT on the demand for electricity <i>Read according to random assignment:</i> <u>Group A</u></p> <ul style="list-style-type: none"> • Wolfram, Lee, and Miguel. “Experimental Evidence on the Economics of Rural Electrification.” <p><u>Group B</u></p> <ul style="list-style-type: none"> • Barron and Torrero. “Household Electrification and Indoor Air Pollution”
6	Jan 29	<p>Regression discontinuity Topics: An intro to RDD</p> <ul style="list-style-type: none"> • IEP 2nd Edition Chapter 6
7	Feb 3	<p><i>In-class movie: “The Boy Who Harnessed the Wind”</i></p>
8	Feb 5	<p>Regression discontinuity <i>Guest speaker: Rob Fetter</i> Topics: An application of RDD to electricity</p> <ul style="list-style-type: none"> • Burlig and Preonas. “Out of the Darkness and Into the Light? Development Effects of Rural Electrification” • Fetter and Usmani. “Fracking, Farmers and Rural Electrification in India”
9	Feb 10	<p>Instrumental variables Topics: An intro to IV</p> <ul style="list-style-type: none"> • IEP 2nd Edition Chapter 5 • Duflo and Pande. “Dams”
10	Feb 12	<p>Instrumental variables Topics: Applications of IV to electricity <i>Read according to random assignment:</i> <u>Group A</u></p>

		<ul style="list-style-type: none"> Dinkelman. “The Effects of Rural Electrification on Employment: New Evidence from South Africa” <i>AER</i> (2011) <p><u>Group B</u></p> <ul style="list-style-type: none"> Lipscomb et al. “Development Effects of Electrification: Evidence from the Topographic Placement of Hydropower Plants in Brazil” <i>AEJ: Applied Economics</i> (2013)
11	Feb 17	<p>Difference-in-Differences Topics: An intro to DD</p> <ul style="list-style-type: none"> IEP 2nd Edition Chapter 7
12	Feb 19	<p>Difference-in-Differences Topics: An application to privatization (... of water...) and property rights</p> <ul style="list-style-type: none"> Galiani et al. “Water for Life: The Impact of the Privatization of Water Services on Child Mortality” Field “Entitled to Work: Urban Property Rights and Labor Supply in Peru”
13	Feb 24	<p>Matching Methods <i>Guest speaker: Subhrendu Pattanayak (To be confirmed)</i></p> <ul style="list-style-type: none"> Khandker, Koolwal, and Samad. Ch4 Propensity Score Matching. Usmani, Jeuland, and Pattanayak. 2018. “NGOs and the effectiveness of interventions”
14	Feb 26	<p>Matching Methods <i>Read according to random assignment:</i></p> <p><u>Group A</u></p> <ul style="list-style-type: none"> Peters, Vance and Hardsdorff. “Grid Extension in Rural Benin: Micro-Manufacturers and the Electrification Trap.” <p><u>Group B</u></p> <ul style="list-style-type: none"> Samad and Zhang. “Heterogeneous Effects of Rural Electrification.”
15	Mar 2	<p>Electricity Quality <i>Read according to random assignment:</i></p> <p><u>Group A</u></p> <ul style="list-style-type: none"> Rud “Electricity provision and industrial development: Evidence from India” <p><u>Group B</u></p> <ul style="list-style-type: none"> Allcott et al. “How do electricity shortages affect industry? Evidence from India”
16	Mar 4	<i>In-class movie:</i> watch Katibayaz movie
----- <i>Spring Break</i> -----		
17	Mar 16	<p>Electricity Theft and the Infrastructure Quality Trap</p> <p><u>Group A</u></p> <ul style="list-style-type: none"> McRae “Infrastructure quality trap” <p><u>Group B</u></p> <ul style="list-style-type: none"> Mahadevan “The Price of Power: Costs of Political Corruption in Indian Electricity”
18, 19	Mar 18, Mar 23	In class presentations of draft proposals (dates to be assigned)
20	Mar 25	<p>Addressing Methodological Challenges Topics: Heterogeneous Treatment Effects; Spillovers;</p> <ul style="list-style-type: none"> IEP 2nd Edition Chapter 9 Carranza and Meeks. 2018. “Energy Efficiency and Electricity Reliability”

21	Mar 30	<p>Introduction to Energy Efficiency</p> <ul style="list-style-type: none"> Fowlie and Meeks. 2019. “Rethinking Energy Efficiency in the Developing World”
22	Apr 1	<p>Addressing Methodological Challenges Topics: Unintended Behavioral Effects Other issues</p> <p><u>Group A</u></p> <ul style="list-style-type: none"> Davis et al. 2014. “Cash for Coolers: Evaluating a Large-scale Appliance Replacement Program in Mexico” <p><u>Group B</u></p> <ul style="list-style-type: none"> Davis et al. 2018. “How Effective is Energy-Efficient Housing? Evidence from a Field Experiment in Mexico”
23	Apr 6	<p>Clean Cooking: The Impacts of</p> <ul style="list-style-type: none"> Hanna, Duflo, and Greenstone. “Up in Smoke: The Influence of Household Behavior on the Long-run Impact of Improved Cooking Stoves” Meeks, Sims, Thompson. “Waste Not: Can Biogas Deliver Sustainable Development?”
24	Apr 8	<p>Clean Cooking: The Demand for <i>Guest speaker Marc Jeuland (Tentative)</i></p> <ul style="list-style-type: none"> Jeuland et al. “The need for policies to reduce the costs of cleaner cooking in low income settings: Implications from systematic analysis of costs and benefits” Pattanayak et al. “Experimental evidence on promotion of electric and improved biomass cookstoves”
25	Apr 13	<p>Energy for Heating/Cooling and Pollution Topics: Pollution, heating, cooling <i>Read according to random assigned:</i></p> <p><u>Group A</u></p> <ul style="list-style-type: none"> Almond et al. “Winter Heating or Clean Air: Unintended Impacts of China’s Huai River Policy” Jayachandran. “Air Quality and Early-Life Mortality” Evidence from Indonesia’s Wildfires” <p><u>Group B</u></p> <ul style="list-style-type: none"> Ebenstein, et al. “Winter Heating or Clean Air: Unintended Impacts of China’s Huai River Policy” “Does the Effect of Pollution on Infant Mortality Differ between Developing and Developed Countries? Evidence from Mexico City”
26	Apr 15	<p>Bringing it All Together, Policy Impacts, and Future Challenges</p> <ul style="list-style-type: none"> IEP 2nd Edition Chapter 11, 13, 14 Zwane et al. “Being surveyed can change later behavior and related parameter estimates”