

A Research Primer on Energy Economics in LMICs

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Course Description

This 15-hour course is designed for advanced undergraduates and master’s students in Colombia who are interested in pursuing a PhD in economics. It provides a structured overview of key topics in energy economics with a focus on challenges and evidence from low- and middle-income countries (LMICs). The course includes seven modules covering energy access, pollution, demand-side management, EVs, renewables, and political economy.

Module 1: Energy Access, Supply, and Development

Objective: Explore the role of energy access in economic development, with a focus on electrification, labor markets, and productivity.

- Dinkelman, T. (2011). *The Effects of Rural Electrification on Employment: New Evidence from South Africa*. *AER*, 101(7), 3078–3108.
- Lee, K., Miguel, E., & Wolfram, C. (2020). *Experimental Evidence on the Economics of Rural Electrification*. *JPE*, 128(4), 1523–1565.
- Fried, S., & Lagakos, D. (2023). *Electricity and Firm Productivity: A General-Equilibrium Approach*. *AEJ: Macroeconomics*, 15(1), 1–30.
- Allcott, H., Collard-Wexler, A., & O’Connell, S. D. (2016). *How Do Electricity Shortages Affect Industry? Evidence from India*. *AER*, 106(3), 587–624.
- Greenstone, M., & Jack, B. K. (2015). *Envirodevonomics: A Research Agenda for an Emerging Field*. *JEL*, 53(1), 5–42.
- Burlig, F., & Preonas, L. (2023). *Out of the Darkness and Into the Light? Development Effects of Rural Electrification*. *AEJ: Applied Economics*, forthcoming.

Module 2: External Costs of Conventional Energy

Objective: Examine the human and environmental costs of fossil fuel use, with a focus on air pollution in LMICs.

- Ebenstein, A. et al. (2017). *New Evidence on the Impact of Sustained Exposure to Air Pollution on Life Expectancy from China's Huai River Policy*. *PNAS*, 114(39), 10384–10389.
- He, J., Liu, H., & Salvo, A. (2019). *Severe Air Pollution and Labor Productivity: Evidence from Industrial Towns in China*. *AEJ: Applied Economics*, 11(1), 173–201.
- Arceo, E., Hanna, R., & Oliva, P. (2016). *Does the Effect of Pollution on Infant Mortality Differ Between Developing and Developed Countries?* *EJ*, 126(591), 257–280.

Module 3: Energy Consumption and Energy Efficiency

Objective: Explore household and firm-level energy use, appliance choice, and the barriers to energy-efficient technology adoption.

- Gertler, P. J. et al. (2016). *The Demand for Energy-Using Assets Among the World's Rising Middle Classes*. *AER*, 106(6), 1366–1401.
- Berkouwer, S. B., & Dean, J. T. (2022). *Credit, Attention, and Externalities in the Adoption of Energy Efficient Technologies by Low-Income Households*. *AER*, 112(10), 3291–3330.
- Fowlie, M., & Meeks, R. (2021). *The Economics of Energy Efficiency in Developing Countries*. *REEP*, 15(2), 238–260.

Module 4: Demand-Side Management

Objective: Introduce DSM tools like ToD pricing, automation, and behavioral contracts using evidence from India and Vietnam.

- Garg, T., Lemus, J., Marshall, G., & Ta, H. (2024). *A Comparison of Contests and Contracts to Deliver Cost-Effective Energy Conservation*. Working Paper.
- Kane, N. et al. (2022). *Leveraging Automation and Incentives to Enhance Power Demand Flexibility*. Imperial College London & Tata Power.
- Ito, K. (2014). *Do Consumers Respond to Marginal or Average Price? Evidence from Nonlinear Electricity Pricing*. *AER*, 104(2), 537–563.
- Jessoe, K., & Rapson, D. (2014). *Knowledge Is (Less) Power: Experimental Evidence from Residential Energy Use*. *AER*, 104(4), 1417–1438.

Module 5: Charging Electric Vehicles

Objective: Analyze how EV charging behavior interacts with electricity pricing, network externalities, and environmental nudges.

- Bailey, M. R., Brown, D. P., Shaffer, B. C., & Wolak, F. A. (2023). *Show Me the Money! Incentives and Nudges to Shift Electric Vehicle Charge Timing*. NBER Working Paper No. 31630.
- Shaffer, B. (2020). *Misunderstanding Nonlinear Prices: Evidence from a Natural Experiment on Residential Electricity Demand*. *AEJ: Economic Policy*, 12(3), 433–461.
- Bailey, M. R. et al. (2024). *Electric Vehicles and the Energy Transition: Unintended Consequences of a Common Retail Rate Design*. NBER Working Paper No. 32886.
- Garg, T., Hanna, R., Myers, J., Tebbe, S., & Victor, D. G. (2025). *Electric Vehicle Charging at the Workplace: Experimental Evidence on Incentives and Environmental Nudges*. Working Paper.

Module 6: Renewable Energy and Technology Adoption

Objective: Investigate barriers to clean tech adoption and policy interventions for scaling renewables in LMICs.

- Hanna, R., Duflo, E., & Greenstone, M. (2016). *Up in Smoke: The Long-Run Impact of Improved Cooking Stoves*. *AEJ: Economic Policy*, 8(1), 80–114.
- Mobarak, A. M. et al. (2012). *Low Demand for Nontraditional Cookstove Technologies*. *PNAS*, 109(27), 10815–10820.
- Oliva, P., Parrado, F., & Pichler, S. (2020). *Technology Adoption under Uncertainty: Evidence from Zambia*. *Review of Economics and Statistics*, 102(3), 617–632.

Module 7: Political Economy and Institutional Capacity in the Energy Sector

Objective: Study how politics, regulation, and institutional strength shape energy outcomes and reform efforts.

- Mahadevan, M. (2024). *The Price of Power: Costs of Political Corruption in Indian Electricity*. *AER*, 114(2), 458–493.
- Duflo, E., Greenstone, M., Pande, R., & Ryan, N. (2013). *Truth-telling by Third-Party Auditors and the Response of Polluting Firms: Experimental Evidence from India*. *QJE*, 128(4), 1499–1545.
- Ryan, N., & Sudarshan, A. (2022). *Rationing the Commons*. *JPE*, 130(1), 210–257.