# YIFEI LIU

## CONTACT

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## EDUCATION

**University of Wisconsin - Madison**

Ph.D., Agricultural & Applied Economics *Expected 2026*
Dissertation: Essays on Energy Policy, Investment, and the Energy Transition
Committee: Sarah Johnston (Chair), Dominic Parker, Daniel Phaneuf, Chenyu Yang

M.S., Agricultural & Applied Economics *2022*

Affiliation, Center for Culture, History, and Environment

**University of California, Berkeley** *2020*
*(with Highest Distinction and Honors)*

B.S., Environmental Economics & Policy

B.S., Environmental Science

## RESEARCH INTERESTS

Environmental and Energy Economics, Empirical Industrial Organization, Applied Econometrics

## RESEARCH PROJECTS

### Working Papers

- Permitting Risks, Litigation Threats, and Energy Infrastructure Investment (Job Market Paper)

- An Empirical Analysis of the Interconnection Queue (with Sarah Johnston, Chenyu Yang) [NBER working paper 31946] Reject and Resubmit at *Econometrica*
  Cited by the White House in Chapter 5 of the 2025 Economic Report of the President

- Market Structure and Transmission Investments in U.S. Electricity Markets

- Grid Connection Costs as a Barrier to Building New Generation: Evidence and Implications for Transmission Policy (with Sarah Johnston, Chenyu Yang) [RFF working paper 25-21] Submitted

### Selected Work in Progress

- Cluster Designs and Strategic Delay in Interconnection Queues (with Sarah Johnston, Chenyu Yang)

- Production Network, Wind Penetration and Environmental Impact: The Case of Texas Wholesale Electricity Market (ERCOT) (with Sheldon Du, Qinan Lu)

### Pre-doctoral Publication

- Identifying high-priority impact areas for electricity service to farmlands in Uganda through geospatial mapping (with Rebekah Shirley, Josephine Kakande, Mark Kagarura) *Journal of Agriculture and Food Research* 5 (2021): 100172

## RESEARCH EXPERIENCE

Research Assistant for Sarah Johnston, UW-Madison AAE *2020 - Present*
Power For All Researcher, UC-Berkeley Energy and Resources Group *2019 - 2021*
Research Assistant for Joseph Shapiro and Katherine Wagner, UC-Berkeley ARE *2019 - 2020*

## TEACHING EXPERIENCE

Global Health: Economics, Natural Systems, and Policy, UW-Madison AAE *Fall 2023*

## HONORS, SCHOLARSHIPS, AND FELLOWSHIPS

Property and Environment Research Center Graduate Fellowship *2025*
Deborah and David Penn Ag and Applied Economics Graduate Student Fund *2025*
UW-Madison Thomsen Distinguished Graduate Dissertator Fellowship (nominated) *2025*
Barbara Forrest Student Award *2024*
JP International Fund Research Presentation Award *2024*
UW-Madison Graduate School Conference Presentation Award *2022*
Deborah and David Penn Ag and Applied Economics Graduate Student Fund *2022*

## CONFERENCES & WORKSHOPS

2025: Property and Environment Research Center, CU Environmental and Resource Economics Workshop, UW Madison Environmental Seminar, UW Madison Applied Economcis Seminar, USAEE/IAEE North American Conference

2024: NBER Environment and Energy Economics Spring*, MEA Annual Meetings, UW Madison Environmental Seminar, IPWSD Workshop in Sustainable Development, AERE Summer Conference

2023: POWER Conference on Energy Research and Policy*, NBER Summer Institute IO*, UW Madison Environmental Seminar

2022: AAEA Annual Meeting, Wisconsin Public Utility Institute Regional Transmission Organization Fundamentals Program, UW Madison Environmental Seminar

2021: UC Berkeley/Sloan Foundation EEE Summer Program
** presented by co-author*

## JOURNAL REFEREE

*International Journal of Economy Energy and Environment*, *The Energy Journal*

## OTHER ACTIVITIES

UW Madison AAE Env/Res Seminar Organizer *2023 - 2024*
Graduate Committee Representatives *2023 - 2024*
Justice, Equity, Inclusion, and Diversity Delegate Delegate *2022 - 2023*
WiSolve Consulting Consultant *2021 - Present*

## SKILLS

**Computing** R, Python, MATLAB, Stata, ArcGIS, QGIS, LaTeX, Microsoft Office
**Languages** English (fluent), Mandarin (native), Cantonese (native)

## ABSTRACTS

**Permitting Risks, Litigation Threats, and Energy Infrastructure Investment** [Job Market Paper]

Abstract: Capital investment in energy infrastructure is essential to support economic growth and meet rising electricity demand. In the U.S., however, legal risks arising from the infrastructure permitting process may deter such investment, though their magnitude and mechanisms remain unclear. Using novel litigation data on environmental and land-use permits, I study this question in the context of renewable energy infrastructure. I find that litigation influences market entry through two channels. Directly, historical litigation deters renewable market entry by 4 percent at the mean entry rate through perceived risk, while legal precedent encourages entry by 9 percent by clarifying legal standards. Indirectly, through regulatory agency responses, litigation extends permit review timelines by 21 days on average and by 206 days following negative rulings, while legal precedent alleviates these delays through the same mechanism. Legal precedent functions as a public good: individual developers bear full costs of legal proceedings while benefits from legal clarity accrue to all future projects. This likely leads to underinvestment in legal precedent, consistent with economic theory and observed patterns where most developers with unfavorable rulings do not engage in further legal proceedings. I develop a structural model of entry and legal proceedings that accounts for selection and estimates average permitting costs of $5.5 million, or 14 percent of expected project net profits. Counterfactual simulations show appeal subsidies increase market entry by 6 percent, compared to 3.4 percent from permitting cost reductions and less than 1 percent from stronger precedent influence. Internalizing the externalities of legal precedent may accelerate renewable deployment more effectively than administrative reforms alone.

**An Empirical Analysis of the Interconnection Queue** (with Sarah Johnston, Chenyu Yang) [NBER working paper 31946] Reject and Resubmit at *Econometrica*

Abstract: Generators applying to connect to the U.S. power grid go through an interconnection queue. Most wind and solar generators that begin the process do not complete it. Using new data, we find that a long queue increases the average waiting time, and high interconnection costs are a key factor in a generator's decision to withdraw. We develop and estimate a dynamic model of the queue and quantify the effects of policy reforms. Our simulations indicate that reducing waiting times can significantly increase completions. An alternative queuing mechanism can therefore increase completed capacity by removing certain generators to reduce congestion. A flat entry fee has a similar effect. We also quantify the effects of reforming how interconnection costs are assessed. These policy reforms lead to a substantial reduction in carbon emissions.

**Market Structure and Transmission Investments in U.S. Electricity Markets**

Abstract: A reliable and robust electricity transmission infrastructure is essential for supporting the the power sector. This paper evaluates the impact of a specific market design, known as market dispatch, on transmission infrastructure investment. Traditionally, electricity within a specific region was supplied by a single, regulated utility company. However, in the late 1990s, many regions in the United States began to shift towards a market dispatch system, where electricity generation is supplied by multiple utility companies and each company's quantity is determined by an auction. Despite this change, the transmission operations of these companies continued to be regulated based on a cost-of-service basis. I use a dynamic difference-in-differences design, taking advantage of the staggered roll-out of market dispatch. The findings suggest that the adoption of this system leads to increases in transmission investment by the utilities, nearly doubling the investment levels at the mean. However, there is no robust evidence to suggest that these utilities spend more on high-voltage transmission infrastructures, which are considered pivotal for reducing greenhouse gas emissions.

**Rising Grid Connection Costs are a Barrier to Expanding Electricity Generation Capacity** (with Sarah Johnston, Chenyu Yang) [RFF working paper 25-21] Submitted

Abstract: Meeting projected growth in electricity demand and climate goals will require building new electricity generators. These generators must connect to an increasingly congested electric grid. We collect new data on grid connection costs for the largest regional grid operator in the United States. Network upgrade costs for grid connection have risen over time across fuel types and locations, and planned generators with high network upgrade costs are much more likely to be canceled. We show that recent transmission spending by the grid operator is associated with lower network upgrade costs for connecting generators. These findings emphasize the critical role of transmission capacity in expanding electricity generation capacity.

**Cluster Designs and Strategic Delay in Interconnection Queues** (with Sarah Johnston, Chenyu Yang)

Abstract: Cluster study designs are increasingly used to manage grid connection requests submitted by new electricity generators. Under this scheme, grid operators group projects together to streamline the interconnection process. We collect new data on this process for SPP, a grid operator that uses cluster studies. We find that this design leads to significant interdependence in connection costs across generators. Moreover, the estimated connection cost for a given generator tends to fall as other generators leave the queue, leading to a war of attrition. We develop a model of a generator's decision to wait or withdraw and consider the effects of alternative policies.

**Production Network, Wind Penetration and Environmental Impact: The Case of Texas Wholesale Electricity Market** (with Sheldon Du, Qinan Lu)

Abstract: the US government has spent billions subsidizing renewable energy investments every year to aim for the ambitious goal of carbon neutrality. However, the majority of these subsidies are production-based and overlook the locational and network characteristics of the electricity grid. Using detailed data from the Texas wholesale electricity market, we examine how the entry of wind generators alters the production network and affects emissions. We find that wind generation at different locations displaces different sets of fossil fuel generators, leading to varying environmental outcomes. Moreover, policy-driven clustering of wind investments can exacerbate transmission congestion and increase curtailment. By accounting for spatial heterogeneity and interconnection effects, our analysis provides a more accurate estimate of the emissions benefits from wind expansion and highlights the importance of coordinated grid planning.

## REFERENCES

**Dr. Sarah Johnston** (Chair)
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Economics
University of Calgary
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(Previously at University of Wisconsin-Madison)

**Dr. Dominic Parker**
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