

**Bachelor's Thesis Topics**  
**Institute for Data, Energy, and Sustainability (IDEaS) at WU Vienna**

Last Updated: June 30, 2026

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| <b>Title</b>              | <b>Quantifying the energy saving potential of AI</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Advisor(s)</b>         | Dr. Behnam Zakeri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>Thesis description</b> | <p>This thesis investigates the potential of Artificial Intelligence (AI) in general, or large language models (LLMs) specifically, in saving energy, reducing greenhouse gases (GHGs), and improving sustainability, in a quantitative way.</p> <p>The energy and water demand of AI-based datacentres, especially LLMs, have raised sustainability concerns. However, AI can save significant amounts of energy and reduce GHGs by replacing humans and/or reducing traveling, activity, and material needed for various tasks. This thesis investigates this potential by analysing different tasks carried out or enhanced by AI, estimating the energy needs and environmental impacts of those tasks done by humans or without AI, and quantifying the energy savings and sustainability gains due to AI.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Selecting a set of tasks done by AI related to a specific theme (e.g., office work, studying, marketing, etc.) or in general.</li> <li>- Analysing the computational needs of those tasks when done by AI and estimating the energy needs of the respective data centres.</li> <li>- Estimating the equivalent energy and environmental impact of humans performing those tasks (e.g., see Ref. [1])</li> </ul>                                                                                                                                                                                                                                                                                                                                                            |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Familiarity with AI and its applications</li> <li>- Panel data analysis and systematic literature review</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>References</b>         | <p>[1] Fixing AI's energy crisis: <a href="https://www.nature.com/articles/d41586-024-03408-z">https://www.nature.com/articles/d41586-024-03408-z</a></p> <p>[2] The potential of AI for reducing energy demand in buildings: <a href="https://www.nature.com/articles/s41467-024-50088-4">https://www.nature.com/articles/s41467-024-50088-4</a></p> <p>[3] AI and energy use: <a href="https://www.weforum.org/stories/2024/07/generative-ai-energy-emissions/">https://www.weforum.org/stories/2024/07/generative-ai-energy-emissions/</a></p>                                                                                                                                                                                                                                                                   |

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| <b>Title</b>              | <b>Policies for electricity provision for data centres</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Advisor(s)</b>         | Dr. Behnam Zakeri                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Thesis description</b> | <p>The hype in using AI has raised sustainability concerns, e.g., due to energy needs of data centres. Many countries are filing increasing demand for electricity for data centres for the years to come. This is both because of the energy use and the grid capacity needs for meeting the increasing demand from data centres.</p> <p>On the other side, data centres could be a major <i>flexibility</i> solution for the power grid if they could adjust their load, e.g., by performing high-computational tasks at times when the grid has cheap or surplus electricity from wind and solar and running fewer computation tasks at times with no wind and solar energy in the system. As such, in some jurisdictions and electricity systems, the regulator has started to introduce new policies and regulations for connecting new data centres to leverage on their flexibility.</p> <p>This thesis aims to collect information on the recent advances on (i) the data centre electricity consumption worldwide and the challenges identified in different power systems connecting such data centres to the grid, and (ii) various policies being applied/proposed globally to overcome the reviewed challenges and/or to reduce the adverse impacts of the data centres on the grid.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Review the recent pipeline for data centre connection to the grid</li> <li>- Review the challenges and obstacles for connecting new data centres to the grid</li> <li>- Review and discussion of effective policies/regulations for connecting new data centres in different regions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Panel data analysis and systematic literature review</li> <li>- Synthesizing and summarizing policy documents (e.g., using LLMs)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>References</b>         | <p>[1] AI and energy (data centres): <a href="https://www.iea.org/reports/energy-and-ai">https://www.iea.org/reports/energy-and-ai</a></p> <p>[2] Data centres and the electricity grid: <a href="https://ember-energy.org/app/uploads/2025/06/Report-Grids-for-data-centres-in-Europe-PDF.pdf">https://ember-energy.org/app/uploads/2025/06/Report-Grids-for-data-centres-in-Europe-PDF.pdf</a></p> <p>[3] Ireland's policy for connectign new data centres: <a href="https://www.datacenterdynamics.com/en/news/ireland-plans-legislation-for-data-centers-to-build-and-run-own-power-lines-report/">https://www.datacenterdynamics.com/en/news/ireland-plans-legislation-for-data-centers-to-build-and-run-own-power-lines-report/</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |

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| <b>Title</b>              | <b>Mapping the Electric Vehicle Industry Using Natural Language Processing (replication study)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Advisor(s)</b>         | Dr. Kavita Surana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Thesis description</b> | <p>Industries driving the green transition are critical for achieving climate, energy, and economic goals. However, there is limited granular data on the geographic distribution of these industries and the firms involved.</p> <p>This thesis focuses on applying Natural Language Processing (NLP) techniques, specifically Named Entity Recognition (NER) and Relation Extraction (RE), to identify and map the global network of firms in the electric vehicle (EV) industry. The student will identify suitable data sources and NLP models, and apply them within an existing framework [2] to replicate the results presented in the referenced study.</p> <p>Additional materials, including previous theses on related topics, will be provided as background reading.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Identifying appropriate data sources (e.g., news articles, company reports, industry databases)</li> <li>- Selecting and evaluating suitable large language models (LLMs) in compliance with WU policies</li> <li>- Implementing prompts and methods proposed in the reference paper to replicate its results</li> <li>- Proposing extensions to the framework to cover other green industries or additional segments of the EV value chain</li> </ul>                                                                                                                                                                                                                                                                                       |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Familiarity with knowledge graphs and NLP techniques, particularly NER and RE</li> <li>- Understanding of LLMs and prompt engineering</li> <li>- Interest in the electric vehicle industry and/or global supply chains</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>References</b>         | <p>[1] Surana, K., Dobliger, C., Anadon, L. D., &amp; Hultman, N. (2020). Effects of technology complexity on the emergence and evolution of wind industry manufacturing locations along global value chains. <i>Nature Energy</i>, 5(10), 811-821. <a href="https://doi.org/10.1038/s41560-020-00685-6">https://doi.org/10.1038/s41560-020-00685-6</a></p> <p>[2] AlMahri, S., Xu, L., &amp; Brintrup, A. (2024). Enhancing Supply Chain Visibility with Knowledge Graphs and Large Language Models. <i>ArXiv</i>. <a href="https://arxiv.org/abs/2408.07705">https://arxiv.org/abs/2408.07705</a></p>                                                                                                                                                                               |

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| <b>Title</b>              | <b>Digital innovation for climate adaptation (literature review)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Advisor(s)</b>         | Dr. Kavita Surana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Thesis description</b> | <p>The goal of this thesis is to understand how data-enabled products are used for climate change adaptation and identify gaps in research or application.</p> <p>More specifically, this thesis will explore how data science-driven product innovations (e.g., climate dashboards, risk mapping tools, and predictive analytics platforms) are used to support climate change adaptation (e.g., heatwaves, wildfires, droughts, etc. where the scope can be narrowed by the type of climate impact or by geography).</p> <p>Through a focused literature review, the student will provide an overview of these innovations, what types of data they generate or use (including data sources, quality, scope etc.), how they contribute to adaptation actions at national or subnational levels, and whether the papers show evidence of any impact.</p> <p>A bibliometric analysis could be used to map trends in publication volume, keywords, and geographic focus and a complementary qualitative synthesis could highlight the role of data science in shaping adaptation strategies.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>Identifying digital products that could be used for climate change adaptation (focusing on 1-2 specific climate impacts)</li> <li>Systematic literature search in databases like Scopus or Web of Science</li> <li>Categorizing studies by product type, data type, and scope</li> <li>Conducting bibliometric analysis of keywords and publication trends to analyzing how data platforms have been used and where are the gaps</li> <li>Providing a perspective for future research and needs for decisionmakers</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>Interest in climate adaptation and data science</li> <li>Basic familiarity with bibliometric tools or willingness to learn (Python or R; or VOS Viewer)</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                       |
| <b>References</b>         | <p>[1] Ford, J.D., Tilleard, S.E., Berrang-Ford, L., Araos, M., Biesbroek, R., Lesnikowski, A.C., MacDonald, G.K., Hsu, A., Chen, C. and Bizikova, L., 2016. Big data has big potential for applications to climate change adaptation. <i>Proceedings of the National Academy of Sciences</i>, 113(39), pp.10729-10732.</p> <p><a href="https://www.pnas.org/doi/epdf/10.1073/pnas.1614023113">https://www.pnas.org/doi/epdf/10.1073/pnas.1614023113</a></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |

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| <b>Title</b>              | <b>Invention and global diffusion of technologies for climate change adaptation (replication study)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                    |
| <b>Advisor(s)</b>         | Dr. Kavita Surana                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                          |
| <b>Thesis description</b> | <p>This thesis aims to replicate and update the patent-based analysis of climate change adaptation technologies conducted by Touboul et al (2023), using The Lens database and its API. While innovation is widely recognized as essential for climate action, most research focuses on mitigation rather than adaptation to the increasingly evident impacts of climate change (e.g. heat waves, droughts, floods, etc.).</p> <p>This project focuses on adaptation, examining trends in patent filings globally. The thesis will reproduce the original study's methodology to identify relevant patents, analyze trends over time and across regions, and assess the global diffusion of adaptation technologies. The project contributes to understanding how innovation supports climate change adaptation and where gaps remain.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Collecting patent data via The Lens API</li> <li>- Filtering data using adaptation-related keywords and classifications</li> <li>- Analyzing data by year, geography, and technology type</li> <li>- Comparing with existing study and potentially extending the existing study (e.g. more recent years or specific countries)</li> <li>- Reporting on gaps and future research directions</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                             |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Data analysis (using Python or R)</li> <li>- Interest in climate policy or innovation studies</li> <li>- Willingness to work with APIs and large, structured datasets</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>References</b>         | <p>[1] Touboul, S., Glachant, M., Dechezleprêtre, A., Fankhauser, S., &amp; Stoeber, J. (2023). Invention and global diffusion of technologies for climate change adaptation: a patent analysis. <i>Review of Environmental Economics and Policy</i>, 17(2), 316-335. <a href="https://doi.org/10.1086/725365">https://doi.org/10.1086/725365</a></p> <p>Available at: <a href="https://ora.ox.ac.uk/objects/uuid:5519e550-479e-4bf2-8ab2-32cb112b7d8a/files/srv042v67v">https://ora.ox.ac.uk/objects/uuid:5519e550-479e-4bf2-8ab2-32cb112b7d8a/files/srv042v67v</a></p>                                                                                                                                                                                                                                                                   |

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| <b>Title</b>              | Identifying Determinants of Energy Firm Profitability Using Regularized Regression Techniques                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Advisor(s)</b>         | Msc. Robin Fischer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| <b>Thesis description</b> | <p>Understanding what drives profitability in energy firms is essential for designing effective corporate strategies and informing policy aimed at supporting the clean energy transition. However, the determinants of financial performance in this sector are diverse, ranging from firm size and capital structure to technology portfolio and regional exposure.</p> <p>In this thesis, the student will work with a panel dataset of global energy firms, including detailed financial metrics, technology composition (e.g., renewable vs. fossil-based capacity), and macroeconomic indicators. The focus will be on applying regularized regression techniques — specifically Lasso and Ridge regression — to identify the most important predictors of firm profitability, measured by Return on Assets (ROA).</p> <p>This thesis aims to provide the opportunity for students to start their first own machine learning project by applying two very established methods: Lasso and Ridge regression.</p> <p>Additional materials and R code templates will be provided to support implementation.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Preprocessing and standardization of firm-level financial and technology data</li> <li>- Implementation of Lasso and Ridge regression using R (or Python)</li> <li>- Interpretation of selected predictors and robustness checks</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Basic knowledge of linear regression and statistical learning</li> <li>- Willingness to work with R or Python</li> <li>- Interest in the energy sector and quantitative analysis</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>References</b>         | <p>[1] Muhire et al. (2024) <a href="#">Drivers of green energy transition: A review - ScienceDirect</a></p> <p>[2] Hastie, Tibshirani &amp; Friedman, <i>The Elements of Statistical Learning</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |

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| <b>Title</b>              | Clustering Methods in Energy Research: A Structured Literature Review                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                               |
| <b>Advisor(s)</b>         | Msc. Robin Fischer                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                  |
| <b>Thesis description</b> | <p>Clustering algorithms have become essential tools in energy-related research to uncover structure in high-dimensional data, group similar technologies, identify country typologies, or detect patterns in energy consumption, production, and emissions. Applications range from classifying electricity users and generation profiles to mapping corporate energy portfolios and analysing investment behaviours.</p> <p>This thesis aims to provide a structured literature review of how clustering methods — such as K-means, hierarchical clustering, DBSCAN, or model-based approaches — have been applied across subfields of energy research.</p> <p>This thesis is ideal for students who wish to explore unsupervised machine learning techniques conceptually and are interested in the intersection of energy research and data-driven methods.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>- Comparison of clustering approaches</li> <li>- Literature search (e.g., using Scopus, Google Scholar) in specific sub-fields of energy research</li> <li>- An analysis of methods used, problems addressed, and the quality and scope of data</li> <li>- An assessment of gaps and perspectives on future research</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>- Interest in unsupervised learning, energy systems, and applied data science</li> <li>- Understanding of how to use scientific databases and formulate search strings</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>References</b>         | <p>[1] Alova (2021)</p> <p>[2] Hastie, Tibshirani &amp; Friedman, <i>The Elements of Statistical Learning</i></p>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |

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| <b>Title</b>              | <b>Delays in Energy Infrastructure Development: The Role of Public Opposition and Governance Gaps (literature review)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>Advisor(s)</b>         | Damiano Alessi                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                            |
| <b>Thesis description</b> | <p>The goal of this thesis is to understand how public acceptance and procedural justice influence delays in the development of energy infrastructure. More specifically, this thesis will explore how opposition from communities, lack of stakeholder engagement, or perceptions of unfairness contribute to delays in energy projects such as transmission lines, wind farms, and other large-scale installations (with the scope optionally narrowed by geography or technology type).</p> <p>Through a focused literature review, the student will provide an overview of the social, political, and institutional causes of delay, emphasizing how public attitudes and governance processes shape project timelines, and identifying any relevant metrics, data sources, and quantitative methods that have been used. The thesis will first identify key factors (e.g., NIMBYism, consultation quality, compensation mechanisms) and then analyze qualitative case studies and quantitative assessments to understand the relationship between public acceptance and permitting speed. The thesis will provide a synthesis of the evidence on the drivers of timing of infrastructure development, and provide a perspective on key gaps and future research.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>• Systematic literature search in databases like Scopus or Web of Science</li> <li>• Screening and selection of studies based on relevance to energy infrastructure delays, type of project (e.g., transmission lines, wind farms), geographic focus (e.g., Europe), and inclusion of public or governance-related factors.</li> <li>• Comparative synthesis of findings across different technologies or countries to identify common drivers of delay and effective responses.</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>• Interest in energy policy, public engagement, or infrastructure development</li> <li>• Basic familiarity with reading academic literature (policy, economics, energy journals)</li> <li>• Willingness to learn simple bibliometric or qualitative coding techniques if needed</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>References</b>         | <p>[1] Bertsch, V., Hall, M., Weinhardt, C., &amp; Fichtner, W. (2016). Public acceptance and preferences related to renewable energy and grid expansion policy: Empirical insights for Germany. <i>Energy</i>, 114, 465–477.<br/> <a href="https://doi.org/10.1016/j.energy.2016.08.022">https://doi.org/10.1016/j.energy.2016.08.022</a></p> <p>[2] Steinbach, A. (2013). Barriers and solutions for expansion of electricity grids—the German experience. <i>Energy Policy</i>, 63, 224–229.<br/> <a href="https://doi.org/10.1016/j.enpol.2013.08.073">https://doi.org/10.1016/j.enpol.2013.08.073</a></p> <p>[3] Hess, D. J., McKane, R. G., &amp; Pietzryk, C. (2022). End of the line: environmental justice, energy justice, and opposition to power lines. <i>Environmental Politics</i>, 31(4), 663–683. <a href="https://doi.org/10.1080/09644016.2021.1952799">https://doi.org/10.1080/09644016.2021.1952799</a></p> <p>[4] Batel, S. (2020). Research on the social acceptance of renewable energy technologies: Past, present and future. <i>Energy Research &amp; Social Science</i>, 68, 101544. <a href="https://doi.org/10.1016/j.erss.2020.101544">https://doi.org/10.1016/j.erss.2020.101544</a></p>                                                  |

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| <b>Title</b>              | <b>Geospatial methods in energy technology diffusion (literature review)</b>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Advisor(s)</b>         | Christian Rumpelnik MMSc                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                         |
| <b>Thesis description</b> | <p>Incorporating spatial data into models of technology diffusion is essential for understanding how innovations propagate through networks of interconnected offtakers. This is particularly relevant in the context of energy and climate technologies, where adoption is shaped by indirect network effects, reinforcing mechanisms, and local context.</p> <p>The goal of this thesis is to review how spatial data has been integrated into models of technology diffusion in energy and climate research. Applications include renewable energy, electric vehicles, heat pumps, and hydrogen, with models used to analyse regional patterns and policy outcomes.</p> <p>This thesis will conduct a structured literature review of spatial diffusion approaches — including, e.g., agent-based models, spatial econometrics and integrated assessment models — highlighting how each incorporates spatial dynamics into diffusion processes.</p> <p>The project is well suited for students interested in geospatial methods, and the characteristics of (energy) innovation and technology diffusion.</p> |
| <b>Methods</b>            | <ul style="list-style-type: none"> <li>• Coding of studies by data type and adaptation use case</li> <li>• Systematic literature search in databases like Scopus or Web of Science</li> <li>• Conducting bibliometric analysis of keywords and publication trends</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>Prerequisites</b>      | <ul style="list-style-type: none"> <li>• Interest in (energy) innovation and technology diffusion</li> <li>• Interest in spatial methods</li> <li>• Basic familiarity with bibliometric tools or willingness to learn</li> </ul>                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
| <b>References</b>         | <p>[1] Leibowicz, B.D, Krey, V., Grubler, A. (2016). Representing spatial technology diffusion in an energy system optimization model. Technological Forecasting and Social Change, 103, 350-363.<br/> <a href="https://doi.org/10.1016/j.techfore.2015.06.001">https://doi.org/10.1016/j.techfore.2015.06.001</a></p> <p>[2] Few, S., Djapic, p., Strbac, G., Nelson, J., Candelise, C. (2024). A geographically disaggregated approach to integrate low-carbon technologies across electricity networks<br/> <a href="https://doi.org/10.1016/j.rset.2025.100109">https://doi.org/10.1016/j.rset.2025.100109</a></p> <p>[3] Wang, Z., Artl, M., Zanolco, C., Majumdar, A., Rajagopal, R. (2022). DeepSolar++: Understanding residential solar adoption trajectories with computer vision and technology diffusion models<br/> <a href="https://doi.org/10.1016/j.joule.2022.09.011">https://doi.org/10.1016/j.joule.2022.09.011</a></p>                                                                                                                                                                        |