**The Evergreen State College**

**Graduate Program on the Environment**

### Thesis Prospectus

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**STUDENT AGREEMENT:**

**SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**FACULTY READER APPROVAL:**

**SIGNATURE: \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

**MES DIRECTOR APPROVAL:**

**SIGNATURE:\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_**

1. *Provide the working title of your thesis[[1]](#endnote-1).*

**Rethinking Clean Energy Policy:**
Using Systems Analysis for More Effective Climate Action

1. *In 250 words or less, summarize the key background information needed to understand your research problem and question.*

Sustainability transitions research aims to explain how society shifts from one semi-stable state to another, with the ultimate aim of describing how to move to a stable state sustainable societal model. Through describing past transitions, practitioners aim to articulate a transition path towards sustainability and prevent transitions to less stable societal states in the wake of climate change. The field is vast, multidisciplinary, and relies on a basis of systems theory (Loorbach, Frantzeskaki, and Avelino, 2017).

The multi-level perspective (MLP) of transitions research presents three hierarchical levels to model change in socio-economic systems: landscapes, regimes, and niches. Landscapes exist at the broadest level, marking cultural values, societal pressures, and physical structures and limitations (Geels 2002). Regimes mark structural societal functions, actor networks, and the shared rules that maintain those functions over time. Niches represent new developments or opportunities for change that can develop and interact with regimes in multiple ways (Robertson Munro and Cairney, 2020).

 Systems leverage points are a useful tool for predicting the magnitude of impact a system intervention might have. A common tool for system intervention is policy, which in itself is a high order leverage point since policies represent power to organize socio-economic systems (Meadows 1999). To foster a transition towards sustainability, climate policy-actions can be ranked by which leverage point they act on (Abson et al. 2017). Understanding which degrees of leverage our current climate policies are utilizing may reveal new opportunities for acting at higher degrees of leverage, promoting more rapid systemic change towards sustainability.

1. *State your research question(s).*
2. How might a sustainable transitions conceptual framework explain gaps and reveal opportunities for policy meant to foster a clean energy transition in Washington state? (Focusing on policy as passed since 2018, when the legislature flipped to singular party control)
3. What leverage points do current Washington clean energy transition policies act on?
4. What leverage points exist that could be utilized to improve coherence between policy intent and execution?
5. What leverage points for climate action via policy remain unutilized in the state’s energy policy agenda and implementation?
6. What gaps in policy implementation fail to be explained by the model of socio-technical sustainable transitions theory when it is applied to a US state policy framework?
7. *Situate your research problem within the relevant literature. What is the theoretical and/or practical framework of your research problem?*

I am utilizing two separate theoretical frameworks to analyze the energy policy and the clean energy transition in Washington. The first of these conceptual frameworks is the Multi-Level Perspective (MLP) from socio-technical transitions (STT) research, originally outlined by Frank Geels in 2002. The MLP is a heuristic tool for describing the process of systemic transitions, and how they can occur over time, and why they sometimes don’t. It is composed of a three-level nested hierarchy of three conceptual levels. Landscapes represent the broader socio-cultural and physical landscape relevant to a specific transition focus. In the case of energy, this is composed of the physical infrastructure, regulating government agencies and public attitudes on energy sources. Beneath the landscape level are individual regimes, composed of shared rules, norms, and modes of achieving a specific goal. One example might be the prevalence of investor-owned utilities, who operate to return profit to shareholders, which represents a specific system goal that is difficult to change or modify. Then, the lowest level that is most open to radical change is niches. Niches represent areas of conflict or need for change within an existing regime. New technologies or ideas can arise to take advantage of niche spaces and given time to develop, may come to modify, or completely replace an existing regime. Niche-regime interactions are a topic of particular interest in STT research. One component of my research with the MLP framework will be to operationalize it for empirical use within my scope, as most evidence use to construct the MLP has been anecdotal (Geels 2002; Jørgensen 2012; Genus and Coles 2008).

The other conceptual framework I intend to utilize for my thesis is Donella Meadows “Leverage Points: Places to Intervene in a System” model, listing 12 degrees of action in order of increasing system changing power (Meadows 1999). This research was integrated into sustainable transitions research in 2017 by Abson et al. Abson and his colleagues argue that Meadows’ ranking of leverage points could be utilized for policy effectiveness analysis. The strength of policy actions can be ranked by system influence to create greater, more rapid systemic change for creating more sustainable socio-economic regimes within society (Abson et al. 2017). I will use this ranking framework to analyze the effectiveness of current state climate policy actions towards a rapid energy transition in the wake of climate change.

Utilization of systems analysis on state climate policy is important for ensuring that we are on the most rapid feasible path to sustainability. If climate polices are acting at lower degrees of leverage when there is opportunity to do more, the state is obligated by its own policies to do make those improvements. Washington has set a target to reduce greenhouse gas emissions statewide 95% by 2050 (RCW 70A.45.020). That is a short timeline for such a dramatic change. This is not a situation in a lab where you can watch a policy intervention fully play out and then do a new improved trial with what you learned. Effective climate policy requires ongoing criticism, refinement, and improvement of action to ensure the best chance at reaching those targets.

1. *Explain the significance of this research problem. Why is this research important? What are the potential contributions of your work? How might your work advance scholarship?*

Current research topics in the field of sustainability transitions include applications to real life and the question of agency in and management of transitions (Geels 2020). From an individual actor perspective, how does one utilize transitions research for change, exercising agency in transitions? I intend to look at a real-life case of modern (post 2018) energy policy in Washington state to apply transitions research to a US policy framework. Historically, transitions research has focused on case studies in the Netherlands and Europe (Loorbach, Frantzeskaki, and Avelino 2017), as well as Australia (Bryant and Thomson 2021). Spreading awareness of this research in the United States, as well as applying it to our policy framework to understand potential leverage points presents the opportunity to discover new climate policy approaches in Washington as well as reveal gaps in the applicability of STT in a modern transition scenario.

Furthermore, empirically operationalizing the MLP framework for qualitative analysis of socio-economic systems represents a contribution to the field of sustainable transitions, which has often relied on anecdotal and inconsistent use of key terminology for the model (Jørgensen 2012; Genus and Coles 2008). Rigorously defining these terms for coding under my research scope may further elaborate on the usefulness of MLP concepts for transitions analysis and management.

1. *Summarize your study design[[2]](#endnote-2). If applicable, identify the key variables in your study. What is their relationship to each other? For example, which variables are you considering as independent (explanatory) and dependent (response)?*

My study design involves two key components. The first is to articulate Washington’s clean energy transition through the terminology of socio-technical transitions (STT) research. This would include describing landscape influences that factor into how the clean energy transition is proceeding, then articulating current regimes of the Washington energy sector, and where niches exist and how niche developments are interacting with energy regimes in Washington. Key to this is rigorously outlining criteria for how I code landscape elements, as compared to coding evidence for regimes, or niches. Codes will also need to be developed for interactions between MLP levels, as the interactions between the landscape, regimes, and niches are what produce dynamic and chaotic systems transitions. These codes will help me discover emergent themes in Washington’s energy transition.

Data sources I will collect to code for MLP elements will come from a variety of places. I intend to start with reviewing current state energy policies and reviewing recent docket accounts from the Utilities and Transportation Commission (UTC) which regulates Washington energy utilities. From there, I will snowball my search for MLP elements to other leads mentioned from my current pool of data. To limit the scope of my systems model, I will limit sources to the past four years (since 2018, when the state legislature flipped to full democratic control for passing climate policy) unless an older policy, court case, or utility document with modern implications is mentioned. Collected codes for the MLP model will be used to construct a graphical model of the three-tier system hierarchy to visualize a current snapshot of the clean energy transition in Washington.

For the second component of my research, I intend to combine this STT model with a leverage point analysis of Washington energy transition policy-actions. I define a energy transition policy-action as any binding article/section/chapter of an RCW or WAC that has defined intent to foster or force a transition clean renewable electricity. Only policy-actions taken since 2018 will be considered within this research scope. This timeframe was chosen that election year marking the first democratic control of both state houses since climate action went on the party’s platform. To further narrow my scope, energy sources beyond electric generation, such as transport fuels and hydrogen will not be analyzed. I intend to work over Winter break to define my bounds more clearly (see week of January 2nd in question 14 for details). Key policies I will code for include RCWs modified in the Clean Energy Transformation Act and the Climate Commitment Act.

After having collected a list of policy-actions, I will use Abson et al.’s (2017) scale of leverage for systems interventions to qualitatively code policy actions by systems influence. Through this analysis, potential new policy opportunities may be identified with higher leverage in systems intervention. How I apply my codes for degree of leverage will be based on relevant literature. I aim to define my coding process in a rigorous enough manner to be reproduceable by other researchers. This will mean clearly delineating between leverage ranks for policy-action categorization.

Once having completed coding, systems analysis of Washington’s energy transitions can begin. I will review which leverage points are utilized and use my MLP systems model of the energy arena to find leverage points which remain unutilized. Through this analysis, I hope to find where policy gaps between intent and execution occur in the state’s climate policy approach and propose possible solutions if they are emergent from my coded model of policy effectiveness.

1. *Describe the data that will be the foundation of your thesis. Will you use existing data, or gather new data (or both)? Describe the process of acquiring or collecting data[[3]](#endnote-3).*

I will be synthesizing new data through qualitative coding of existing policy documents. Coded elements representing a MLP systems view of the Washington energy arena and degrees of leverage that policy-actions act on will represent the foundation of my thesis results. In order to collect these documents, I will use Washington’s legislative website leg.wa.gov to collect relevant RCW and WAC documents. To find relevant policies, I will search definitions and intent sections of RCWs for key terms like “Energy transformation project” or “non-emitting electric generation,” which are used within the CETA legislation (Washington SB 5116, 2019).

For collecting evidence documents for building my MLP model, I will search both closed and ongoing case dockets in the UTC website (utc.wa.gov) relevant to rulemaking and implementation of energy transition policies on Washington utilities. For the sake of my project scope, I may limit my search to investor-owned utility regulation. Data sources beyond policy documents may be collected through referenced documents outside of the UTC, such as utility integrated resource plans, clean energy implementation plans, and public testimonies given at UTC hearings. Document collection will be largely purposive and non-systematic beyond staying within the set boundaries of my systems analysis.

1. *Summarize your methods of data analysis. If applicable, discuss specific techniques that you will use to understand the relationships between variables (e.g., interview coding, cost-benefit analysis, specific statistical analyses, spatial analysis) and the steps and tools (e.g., lab equipment, software) that you will take to complete your analyses.*

Data will be analyzed as it is collected through qualitative coding into discrete categories. Energy transition policy actions will be categorized into one of twelve degrees of leverage based on Donella Meadows’ 1999 research. These twelve leverage points will be subdivided into four broader categories for trend analysis adopted from Abson et al.’s (2017) framework, which built on Meadows’ ranking order. These categories in order of lowest to highest leverage are parameter modification, feedback guidance, systemic design change, and policies aimed at redefining system intent/overall function. Policy actions categorized will be listed in an excel sheet for quantitative trend analysis of which types of leverage are most popular for policy-actions to act on.

On the STT section of my research, a similar technique will be used, but instead to categorize by evidence of specific landscape/regime/niche factors in the Washington energy arena. Furthermore, specific interactions between landscape, regime, and niche elements will be documented. The specific coding methodology for these interactions is not yet clear in my research design as definitions will need to be set based in both the literature and my study scope. As I engage in the process of coding, the codes will be reworked and modified for recoding and revision of analysis as my data sources demand. The end result should be a reproduceable set of codes that other researchers could use to code the same data I do in my analysis. This is the empirical operationalization of the MLP that I discussed prior.

Coding will largely be done through simple digital pdf highlight by color code of relevant concepts. Coded excerpts from the data sources will be collected in excel sheets for trend analysis and modelling. If this proves difficult to manage, I may opt to purchase software designed for qualitative coding analysis, and coded sample collection.

1. *Address the ethical issues[[4]](#endnote-4) raised by your thesis work. Include issues such as risks to anyone involved in the research, as well as specific people or groups that might benefit from or be harmed by your thesis work, perhaps depending on your results. List any specific reviews you must complete first (e.g., Human Subjects Review or Animal Use Protocol Form).*

My research will not involve human or animal subjects. My data will be collected from publicly accessible documents. How I chose to analyze these documents and report results may impact policy maker decisions on clean energy policy, however, no permits are required for this purpose. My results will likely involve direct critique of Washington law, possibly harming policy maker reputation, though this is also normal given the nature of their position in public office.

1. *List specific research permits[[5]](#endnote-5) or permissions you need to obtain before you begin collecting data (e.g. landowner permissions, agency permits).*

No permits need to be obtained in order to conduct this research. All data sources I will collect for qualitative coding are openly accessible on public databases for free use.

1. *Reflect on how your positionality as a researcher could affect your results and how you will account for this in the research process[[6]](#endnote-6).*

 In my identity as a researcher, I am a European American trans-feminine person. My experience of gender transition has predisposed me to be in favor of change and intentional learning/teaching on all levels from individual to societal wide. I also recognize that growth is difficult, requiring both learning new lessons and unlearning those which are no longer congruent with change making. The concept of change and transition is what draws me to my topic, that is the need for a rapid societal level change to sustainable practice on all levels, however I do not see this as biasing my results in a particular direction. My research involves the investigation of how to promote societal level change through policy, not whether this change should occur or not.

 My investigation of change processes may be biased by my background experience as a physical scientist, from which I have a broad base understanding of technology and technological evolution. Consequentially, my research may give a more in-depth discussion of technological approaches to societal transitions, with a lower depth perspective of the sociological mechanisms to foster transition. This background is appropriate for my proposed study of transitions in energy systems, granting me a broad level understanding of the technical weeds of energy grids and technologies therein. It is my intent as a researcher to investigate both the social and technical ends of the transition spectrum equitably, as is relevant to my research topic and methods.

1. *Provide at least a rough estimate of the costs associated with conducting your research.  Provide details about each budget item so that the breakdown of the final cost is clear.*

The data I will be collecting for my research is available in open public websites and state archives. These resources are of no cost and are digitally accessible with any internet connection. No travel would be required, simply many hours of reading, coding, and re-reading. A potential cost may arise in the use of data management software for qualitative data and codes, however, it is not my intent to use these tools at the present. Thus my research cost comes out to zero.

1. *Provide a detailed working outline of your thesis.*
2. Introduction
	1. So what? The need for ongoing scrutiny of climate policy to achieve state climate goals.
	2. Research questions
	3. Brief overview of research frameworks
		1. Socio-technical transitions (STT) and the Multi-Level Perspective (MLP)
		2. Leverage point analysis
3. Literature Review
	1. Introduction w/ roadmap
	2. STT research
		1. Define landscape, regime, niche elements
		2. Discuss interactions between MLP levels
		3. History and evidence for the MLP, lack of empirical evidence
		4. Criticisms of the MLP, need for reflexive scope and bound to use of key terms
	3. Overview of systems theory
	4. Systems interventions
		1. Leverage points in a system
		2. Individual actor level agency within systems
		3. Previous case studies of intentionful transitions in energy arenas
	5. Washington Energy Arena and Clean Energy Policies
4. Methods
	1. Data sourcing and collection
	2. Qualitative coding using the MLP to model the Washington energy arena
		1. Bounding and scope of the WA energy arena
		2. Bounding and scope of key MLP terms, creating an empirically replicable coding scheme
			1. Landscape
			2. Regime
			3. Niche
	3. Classifying current clean energy policy-actions taken post 2018 into the degree of leverage they act upon.
		1. Refining definitions of each degree of leverage such that coding by degree of leverage is replicable by other studies
5. Results
	1. STT MLP model of Washington energy transition arena
		1. Landscape constraints and trends
		2. Regimes and shared rules of utility operations
		3. Niche developments
		4. Ongoing multi-level interactions between niche, regime, and landscape elements
	2. Leverage point ranking of clean energy policy actions
6. Discussion
	1. What went well in analysis utilizing sustainable transitions research for policy analysis? Where did it not work well?
		1. Empirical operationalization of STT
		2. Development of qualitative codes, reworking of the codes
		3. Where did STT fail to describe components of the clean energy policy landscape in Washington? Do these warrant a refinement of the STT research framework?
	2. What do these models say about clean energy policy gaps between intent and execution?
	3. New opportunities in state climate policy based on leverage point analysis
7. Conclusion
	1. Key takeaways
	2. Implications for state climate policy and recommendations to policy makers
	3. Limitations of my research analysis
8. *Provide a specific work plan and a timeline for each of the major tasks in the work plan. Be as realistic as you can, even though you will probably need to alter this schedule as you complete the tasks. Remember that faculty readers take time to return your drafts and that the final polishing and formatting of your thesis for binding will take longer than you ever imagined.*

|  |  |
| --- | --- |
| Week of Date | Tasks |
| 1/2/23 | * Complete definitions for first version of MLP qualitative codes, store in excel sheet with examples of how each code is used
* Begin data collection for MLP elements, continue data collection over the course of winter quarter
* Start first draft of methods section
 |
| 1/9 | * Complete first draft of methods section (submit for feedback)
* Begin first coding round for MLP model
* Thesis workshop + work time
 |
| 1/16 | * Write draft introduction for thesis (submit for feedback)
* Revise methods if necessary
* Continue collecting and coding data for MLP system model
 |
| 1/23 | * CEC Hearing
* Complete first round of coding
* Decide on whether to revise project scope to fit project bounds
* Review consistency of codes, rework definitions, prepare to recode with new definitions
* Thesis Workshop
 |
| 1/30 | * Begin second round of qualitative coding of data sources
* Begin collection of policies within relevant scope, and extracting specific policy actions from RCW’s and WAC’s
 |
| 2/6 | * Continue coding of by leverage points and MLP elements
* Start writing a new section of thesis
* Thesis Workshop
 |
| 2/13 | * Continue coding
* Review codes, decide if a third revised round of coding is necessary
* Create a draft graphic of MLP system, dividing by three levels and tracking interactions between the three
 |
| 2/20 | * Continue review of coded data, picking out trends, patterns, gaps, consider bullet point draft of results/discussion sections for key insights with regards to research questions
* Begin writing results section OR begin third round of revised coding
* Thesis Workshop
 |
| 2/27 | * CEC Hearing
* Complete draft of results section/third round of coding
* Begin writing discussion section (or results section if third round of coding was necessary)
 |
| 3/6 | * Attend WOHESC
* Thesis Workshop
* Set aside time for GIS Special Topics Final Project
* Revise graphic of MLP system model
 |
| 3/13 | * Complete draft of discussion section (or results section)
* Write draft of conclusion section
 |
| 3/20 | * Winter Quarter Eval Week
* Rest
 |
| 3/27 | * Spring Break
* Open space to write or revise sections in preparation for full draft completion.
 |
| 4/3 | * Write discussion section if third coding round was necessary
* Write title page
 |
| 4/10 | * Have a complete draft ready
* Reread Schimel as relevant for writing/editing needs
* Revision literature review
 |
| 4/17 | * Revisions
 |
| 4/24 | * Complete a revised draft either this week or the next
* Graphic making while waiting for feedback
 |
| 5/1 | * Begin preparation of presentation, considering framing of presentation and audience
* Revisions
 |
| 5/8 | * Revisions
 |
| 5/15 | * Revisions
* Finalize presentation
* Practice presentation with others
 |
| 5/22 | * Oral presentation
* Revise formatting of final draft
 |
| 5/29 | * Complete final draft
 |
| 6/5 | * Time to either panic revise a fourth draft or celebrate
 |
| 6/12 | * Party
 |

1. *Who, beyond your MES faculty reader, will support your thesis? Indicate support both within and outside of Evergreen. Be specific about who they are and in what capacity they will support your thesis. If you are working with an outside agency or expert, be specific about their expectations for your data analysis or publication of results.*

Laurance Geri – Evergreen Faculty
I’ve met with Larry in the past to discuss energy policy. He was the first to introduce me to STT research. His role will be purely advisory, as he is an expert within my field. This advisory role may include reviewing written sections and pointing me towards new relevant data sources that are within my research scope, but will not be formally structured in any capacity.

1. *List the 3-5 most important references you have used to identify the specific questions and context of your topic, help with issues of research design and analysis, and/or provide a basis for interpretation. For each annotated reference, explain how your project specifically connects to the source by extending, challenging, or responding to the conclusions, methods, or implications. For any other sources cited in this document provide a complete bibliographic citation.*

References

Abson, David J., Joern Fischer, Julia Leventon, Jens Newig, Thomas Schomerus, Ulli Vilsmaier, Henrik von Wehrden, et al. 2017. “Leverage Points for Sustainability Transformation.” *Ambio* 46 (1): 30–39. <https://doi.org/10.1007/s13280-016-0800-y>.

This research article connects the concept of leverage points, first introduced by Donnella Meadows in 1999 (we read her article in ESS), to sustainability transitions research. The authors primary argument is that interventions aiming to foster a transition to a sustainable stable-state society are largely acting on lower points of leverage from a systems perspective. While well intentioned, changes made at low leverage points are less likely to fundamentally change our societal system to a new sustainable semi-stable state. The authors extend Meadows model to categorize the 12 hierarchical leverage points into 4 groups. In ascending order for degree of system influence, these are parameters, feedbacks, design, and intent. Through the hierarchy proposed by the authors, a framework is created for ranking the effectiveness of systems interventions in transitions. Answering my second research question would utilize this article as a basis for categorizing state policy actions to foster a clean energy transition off of fossil fuels.

Aligica, Paul D., and Vlad Tarko. 2012. “Polycentricity: From Polanyi to Ostrom, and Beyond: POLYCENTRICITY.” *Governance* 25 (2): 237–62. <https://doi.org/10.1111/j.1468-0491.2011.01550.x>.

Bögel, Paula Maria, and Paul Upham. 2018. “Role of Psychology in Sociotechnical Transitions Studies: Review in Relation to Consumption and Technology Acceptance.” *Environmental Innovation and Societal Transitions* 28 (September): 122–36. <https://doi.org/10.1016/j.eist.2018.01.002>.

Bögel, Paula, Kateryna Pereverza, Paul Upham, and Olga Kordas. 2019. “Linking Socio-Technical Transition Studies and Organisational Change Management: Steps towards an Integrative, Multi-Scale Heuristic.” *Journal of Cleaner Production* 232 (September): 359–68. <https://doi.org/10.1016/j.jclepro.2019.05.286>.

Bryant, Jayne, and Giles Thomson. 2021. “Learning as a Key Leverage Point for Sustainability Transformations: A Case Study of a Local Government in Perth, Western Australia.” *Sustainability Science* 16 (3): 795–807. <https://doi.org/10.1007/s11625-020-00808-8>.

Butler, C., C. Demski, K. Parkhill, N. Pidgeon, and A. Spence. 2015. “Public Values for Energy Futures: Framing, Indeterminacy and Policy Making.” *Energy Policy* 87 (December): 665–72. <https://doi.org/10.1016/j.enpol.2015.01.035>.

Cairney, Paul. 2012. “Complexity Theory in Political Science and Public Policy.” *Political Studies Review* 10 (3): 346–58. <https://doi.org/10.1111/j.1478-9302.2012.00270.x>.

Chilvers, Jason, Timothy J Foxon, Stuart Galloway, Geoffrey P Hammond, David Infield, Matthew Leach, Peter JG Pearson, Neil Strachan, Goran Strbac, and Murray Thomson. 2017. “Realising Transition Pathways for a More Electric, Low-Carbon Energy System in the United Kingdom: Challenges, Insights and Opportunities.” *Proceedings of the Institution of Mechanical Engineers, Part A: Journal of Power and Energy* 231 (6): 440–77. <https://doi.org/10.1177/0957650917695448>.

Cox, Emily, Sarah Royston, and Jan Selby. n.d. “The Impacts of Non-Energy Policies on the Energy System: A Scoping Paper,” 100.

De Boer, Jessica, Christian Zuidema, and Katharina Gugerell. 2018. “New Interaction Paths in the Energy Landscape: The Role of Local Energy Initiatives.” *Landscape Research* 43 (4): 489–502. <https://doi.org/10.1080/01426397.2018.1444154>.

Edling, Laura, and Cecilia Danks. 2022. “What Came First, the Pellet or Boiler? Interacting Leverage Points within a Sociotechnical System in the United States.” *Energy Research & Social Science* 88 (June): 102627. <https://doi.org/10.1016/j.erss.2022.102627>.

Geels, Frank W. 2002. “Technological Transitions as Evolutionary Reconfiguration Processes: A Multi-Level Perspective and a Case-Study.” *Research Policy* 31 (8–9): 1257–74. [https://doi.org/10.1016/S0048-7333(02)00062-8](https://doi.org/10.1016/S0048-7333%2802%2900062-8).

Geels, Frank W. 2006. “Multi-Level Perspective on System Innovation: Relevance for Industrial Transformation.” In *Understanding Industrial Transformation*, edited by Xander Olsthoorn and Anna J. Wieczorek, 44:163–86. Environment & Policy. Dordrecht: Kluwer Academic Publishers. <https://doi.org/10.1007/1-4020-4418-6_9>.

Geels, Frank W. 2011. “The Multi-Level Perspective on Sustainability Transitions: Responses to Seven Criticisms.” *Environmental Innovation and Societal Transitions* 1 (1): 24–40. <https://doi.org/10.1016/j.eist.2011.02.002>.

Geels, Frank W. 2020. “Micro-Foundations of the Multi-Level Perspective on Socio-Technical Transitions: Developing a Multi-Dimensional Model of Agency through Crossovers between Social Constructivism, Evolutionary Economics and Neo-Institutional Theory.” *Technological Forecasting and Social Change* 152 (March): 119894. <https://doi.org/10.1016/j.techfore.2019.119894>.

Geels, Frank W., Tim Schwanen, Steve Sorrell, Kirsten Jenkins, and Benjamin K. Sovacool. 2018. “Reducing Energy Demand through Low Carbon Innovation: A Sociotechnical Transitions Perspective and Thirteen Research Debates.” *Energy Research & Social Science* 40 (June): 23–35. <https://doi.org/10.1016/j.erss.2017.11.003>.

Genus, Audley, and Anne-Marie Coles. 2008. “Rethinking the Multi-Level Perspective of Technological Transitions.” *Research Policy* 37 (9): 1436–45. <https://doi.org/10.1016/j.respol.2008.05.006>.

Haddad, Carolina R., Valentina Nakić, Anna Bergek, and Hans Hellsmark. 2022. “Transformative Innovation Policy: A Systematic Review.” *Environmental Innovation and Societal Transitions* 43 (June): 14–40. <https://doi.org/10.1016/j.eist.2022.03.002>.

Hirt, Léon F., Guillaume Schell, Marlyne Sahakian, and Evelina Trutnevyte. 2020. “A Review of Linking Models and Socio-Technical Transitions Theories for Energy and Climate Solutions.” *Environmental Innovation and Societal Transitions* 35 (June): 162–79. <https://doi.org/10.1016/j.eist.2020.03.002>.

Jørgensen, Ulrik. 2012. “Mapping and Navigating Transitions—The Multi-Level Perspective Compared with Arenas of Development.” *Research Policy* 41 (6): 996–1010. <https://doi.org/10.1016/j.respol.2012.03.001>.

This research article reframes transitions research through a purposive lens, critiquing the usefulness of the MLP. Chief concerns it raises include asking how individual actors can utilize the MLP to make more informed decisions in guiding transitions. This topic of actor agency highlights an issue in transitions research of whether having a model of transitions can aid in the fostering of rapid transitions to sustainability. Whether actor agency is feasible is cast into doubt as transitions are argued to be chaotic and inherently multifaceted. Ulrik, like others in the field, critiques the MLP in how to distinguish between the three levels. This highlights a need in my own research to be rigorous and transparent in how I define and utilize MLP terminology within my research scope. He also introduced the concept of “arenas” in transitions research, to allow partitioning of transitions research to specific sectors of society and their associated regimes, institutions, and actor networks. My research, for example, will be within the arena of electric utilities and renewable generation.

Kaufman, Stefan, Alexander Saeri, Rob Raven, Shirin Malekpour, and Liam Smith. 2021. “Behaviour in Sustainability Transitions: A Mixed Methods Literature Review.” *Environmental Innovation and Societal Transitions* 40 (September): 586–608. <https://doi.org/10.1016/j.eist.2021.10.010>.

Kemp, René, and Derk Loorbach. 2005. “Dutch Policies to Manage the Transition to Sustainable Energy,” 29.

Kieft, Alco, Robert Harmsen, and Marko P. Hekkert. 2020. “Toward Ranking Interventions for Technological Innovation Systems via the Concept of Leverage Points.” *Technological Forecasting and Social Change* 153 (April): 119466. <https://doi.org/10.1016/j.techfore.2018.09.021>.

Klapper, Rita, Lindsay Berg, and Paul Upham. 2020. “Probing Alignment of Personal and Organisational Values for Sustainability: An Assessment of Barrett’s Organisational Consciousness Model.” *Sustainability* 12 (18): 7584. <https://doi.org/10.3390/su12187584>.

Loorbach, Derk. 2010. “Transition Management for Sustainable Development: A Prescriptive, Complexity-Based Governance Framework.” *Governance* 23 (1): 161–83. <https://doi.org/10.1111/j.1468-0491.2009.01471.x>.

Loorbach, Derk, Niki Frantzeskaki, and Flor Avelino. 2017. “Sustainability Transitions Research: Transforming Science and Practice for Societal Change.” *Annual Review of Environment and Resources* 42 (1): 599–626. <https://doi.org/10.1146/annurev-environ-102014-021340>.

Loorbach, Derk, and Jan Rotmans. 2006. “Managing Transitions for Sustainable Development.” In *Understanding Industrial Transformation*, edited by Xander Olsthoorn and Anna J. Wieczorek, 44:187–206. Environment & Policy. Dordrecht: Kluwer Academic Publishers. <https://doi.org/10.1007/1-4020-4418-6_10>.

Markard, Jochen, Marco Suter, and Karin Ingold. 2016. “Socio-Technical Transitions and Policy Change – Advocacy Coalitions in Swiss Energy Policy.” *Environmental Innovation and Societal Transitions* 18 (March): 215–37. <https://doi.org/10.1016/j.eist.2015.05.003>.

Meadows, Donella. 1999. “Leverage Points: Places to Intervene in a System.” *The Sustainability Institute*.

Mitleton-Kelly, Eve, ed. 2003. *Complex Systems and Evolutionary Perspectives on Organisations: The Application of Complexity Theory to Organisations*. 1st ed. Advanced Series in Management. Amsteradm: Pergamon.

Rhodes, Aidan, Jim Skea, and Matthew Hannon. 2014. “The Global Surge in Energy Innovation.” *Energies* 7 (9): 5601–23. <https://doi.org/10.3390/en7095601>.

Robertson Munro, Fiona, and Paul Cairney. 2020. “A Systematic Review of Energy Systems: The Role of Policymaking in Sustainable Transitions.” *Renewable and Sustainable Energy Reviews* 119 (March): 109598. <https://doi.org/10.1016/j.rser.2019.109598>.

This article presents a critical analysis through literature review of previous discussions of energy policy through the framework of transitions research. Chief among the authors criticisms is the lack of shared definitions of key transitions and systems theory terminology, resulting in a lack of coherence. The authors claim that any discussions of transitions theory should define the terms they use from the broader literature within their own work, such that they’re use of the term can be checked for validity against the literature and promote more conscious discussion. The authors also highlight exemplar articles that branch between energy policy and transitions research, providing both a guide for me as a new researcher in this field as well as a list of follow up articles for me to pull in my literature review.

Rogge, Karoline S., Benjamin Pfluger, and Frank W. Geels. 2020. “Transformative Policy Mixes in Socio-Technical Scenarios: The Case of the Low-Carbon Transition of the German Electricity System (2010–2050).” *Technological Forecasting and Social Change* 151 (February): 119259. <https://doi.org/10.1016/j.techfore.2018.04.002>.

Sanderson, Ian. 2006. “Complexity, ‘practical Rationality’ and Evidence-Based Policy Making.” *Policy & Politics* 34 (1): 115–32. <https://doi.org/10.1332/030557306775212188>.

Smith, Adrian, Jan-Peter Voß, and John Grin. 2010. “Innovation Studies and Sustainability Transitions: The Allure of the Multi-Level Perspective and Its Challenges.” *Research Policy* 39 (4): 435–48. <https://doi.org/10.1016/j.respol.2010.01.023>.

Stafford, Benjamin A., and Elizabeth J. Wilson. 2016. “Winds of Change in Energy Systems: Policy Implementation, Technology Deployment, and Regional Transmission Organizations.” *Energy Research & Social Science* 21 (November): 222–36. <https://doi.org/10.1016/j.erss.2016.08.001>.

Svennevik, Elisabeth M.C. 2022. “Practices in Transitions: Review, Reflections, and Research Directions for a Practice Innovation System PIS Approach.” *Environmental Innovation and Societal Transitions* 44 (September): 163–84. <https://doi.org/10.1016/j.eist.2022.06.006>.

Upham, Paul, Paula Bögel, and Elisabeth Dütschke. 2020. “Thinking about Individual Actor-Level Perspectives in Sociotechnical Transitions: A Comment on the Transitions Research Agenda.” *Environmental Innovation and Societal Transitions* 34 (March): 341–43. <https://doi.org/10.1016/j.eist.2019.10.005>.

Winskel, Mark, Nils Markusson, Henry Jeffrey, Chiara Candelise, Geoff Dutton, Paul Howarth, Sophie Jablonski, Christos Kalyvas, and David Ward. 2014. “Learning Pathways for Energy Supply Technologies: Bridging between Innovation Studies and Learning Rates.” *Technological Forecasting and Social Change* 81 (January): 96–114. <https://doi.org/10.1016/j.techfore.2012.10.015>.

1. You are not locked into this title; its purpose is to help you identify the main point or topic of your thesis at an early stage. [↑](#endnote-ref-1)
2. You might discuss selection of case studies, sampling methods, experimental design, and/or specific hypotheses you will test. You should also address any specialized knowledge or skills that are necessary to complete the research. [↑](#endnote-ref-2)
3. If you are planning to use existing data, explain the specific source, contact information, arrangement with collaborating agencies, and expectations about use of data and final products of your research. If you are planning to gather new data, describe specific methods, time, place, and equipment that will be required. [↑](#endnote-ref-3)
4. If you’re not sure where to start, consult a ‘Code of Ethics’ or other similar document from an academic society in an applicable field of study. [↑](#endnote-ref-4)
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6. Your *positionality as a researcher* refers to the fact that one’s “…beliefs, values systems, and moral stances are as fundamentally present and inseparable from the research process as [one]’s physical, virtual, or metaphorical presence when facilitating, participating and/or leading the research project…” (The Weingarten Blog 2017). [↑](#endnote-ref-6)