



Energy supply/ demand policy asymmetry: A meta-narrative review for a systems explanation

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ABSTRACT

Asymmetry in energy supply/demand policy is persistent, as governments around the world develop detailed plans to decarbonize energy supply, but comprehensive plans to reduce energy demand are missing. Such policy asymmetry is a systemic problem, and is manifest in many social systems, e.g. asymmetry in healthcare between curing illnesses and investing in preventive healthcare. There is no existing systemic explanation of the energy policy asymmetry, however, corresponding systemic explanations in other domains may be transferable by analogy. This research is the first step in characterizing the mechanisms behind this asymmetry.

A meta-narrative systematic review method is expanded to derive structural explanations from research in 14 different domains, including healthcare, waste management and traffic control. Preliminary results show that this method produces valuable insights on common systemic mechanisms. These include (i) a preference hierarchy for various actions to achieve system goals; (ii) the place of actor agency within the system, and the system's role to nurture actor capabilities; (iii) a tendency of certain systems to grow in size; (iv) the importance of system resilience, not just system productivity.

Building this conceptual understanding forms a strong base for further inquiry into mechanisms behind energy supply/demand policy asymmetry.

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Figures

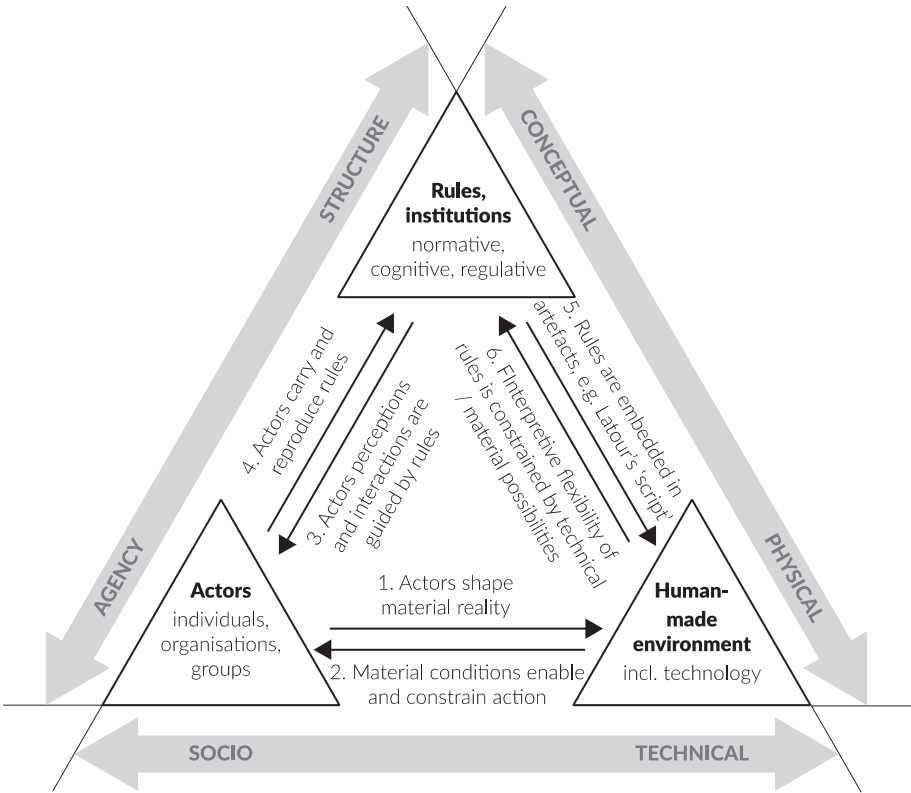


Fig. 1. Three ontological dimensions of socio-technical systems (based on [12,13]).

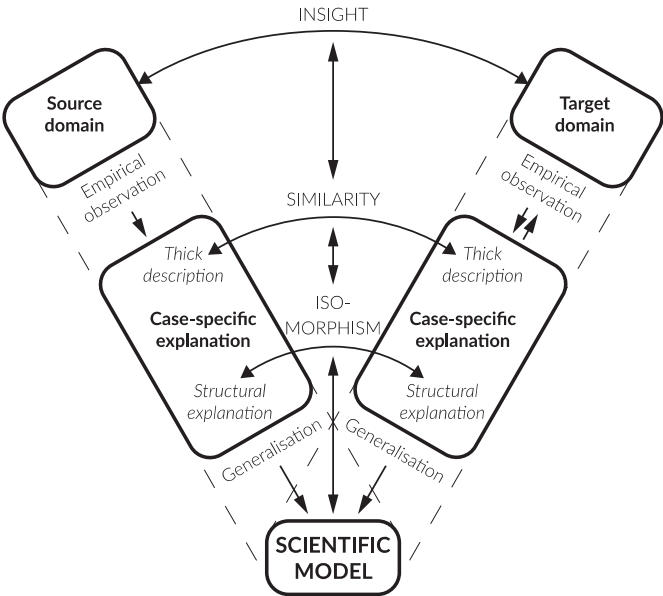


Fig. 2. Reasoning by analogy (based on [44]).

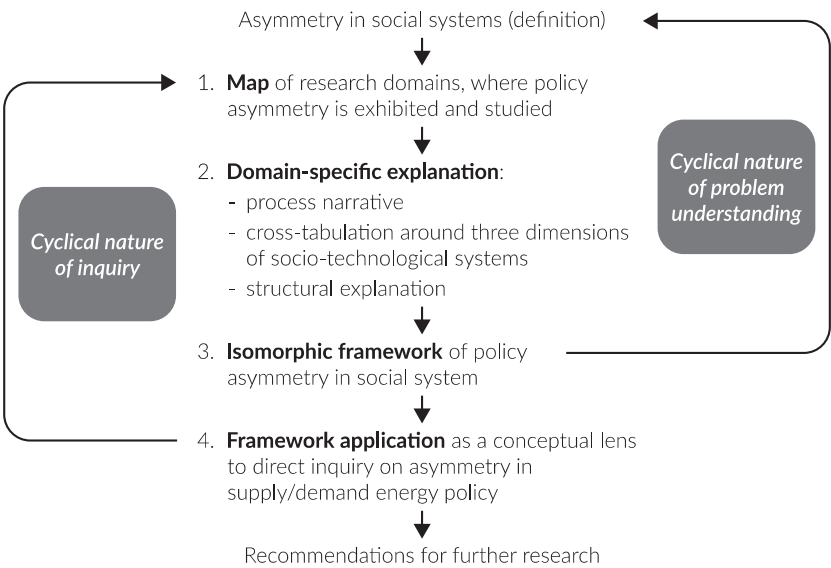


Fig. 3. Meta-narrative steps.

Analytical strategy	Accuracy	Generality
	High	Low
Process narrative	↑	↓
Coding and its visualisation via cross-tabulation		
Structural explanation		
	Low	High

Fig. 4. Accuracy and generality of analytical strategies.

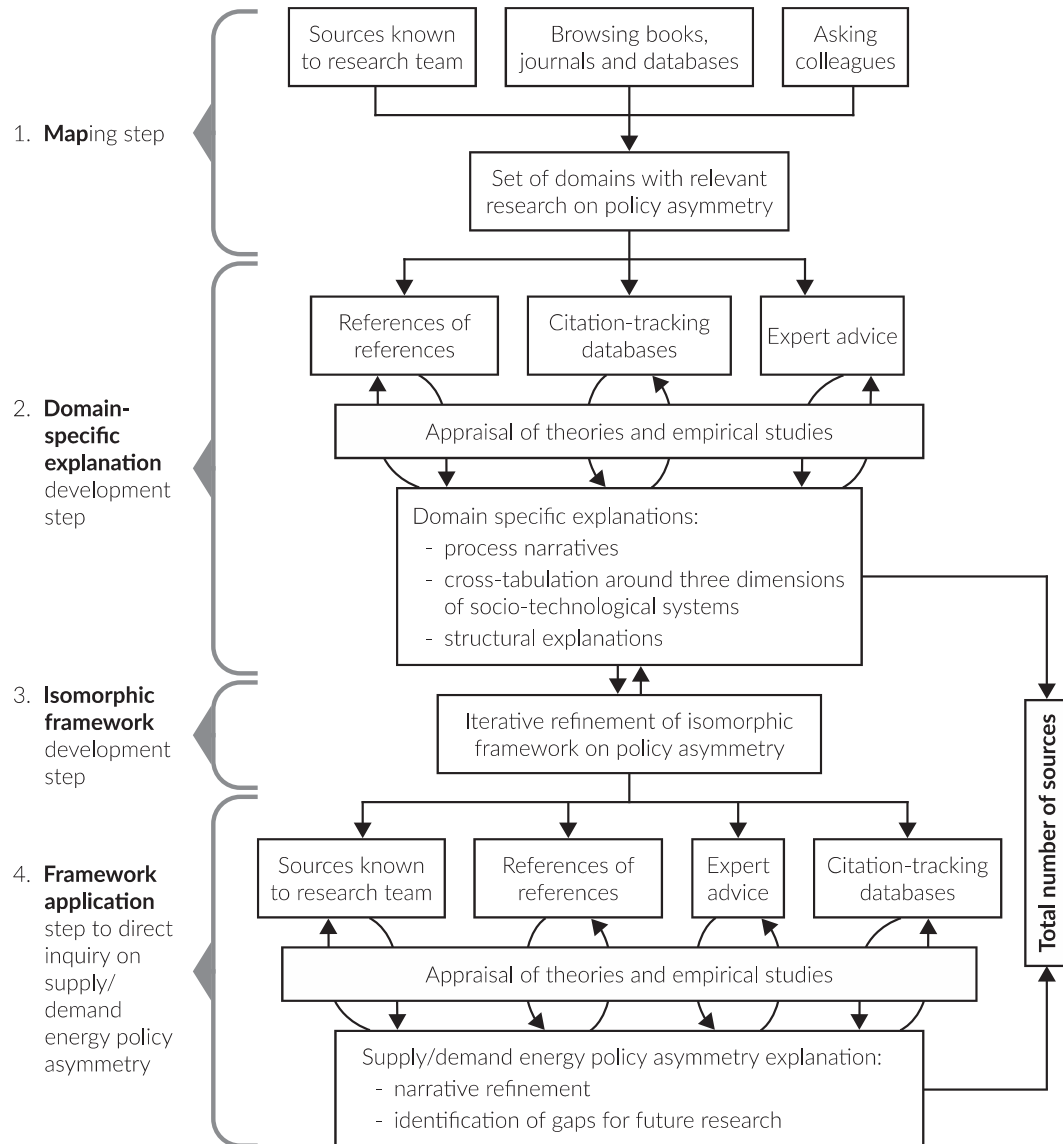


Fig. 5. Search strategies.

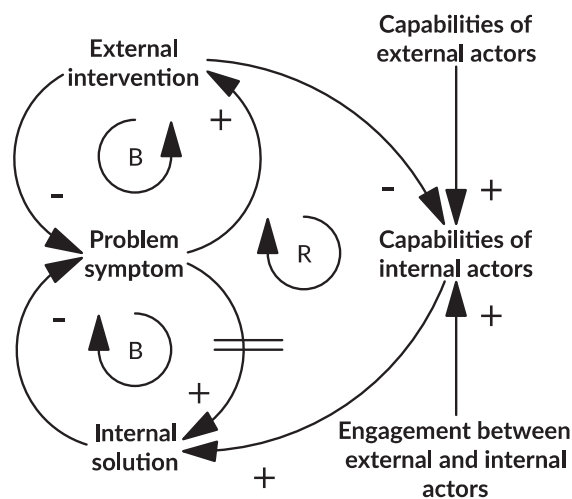


Fig. 6. The role of actor agency and structure within the system.

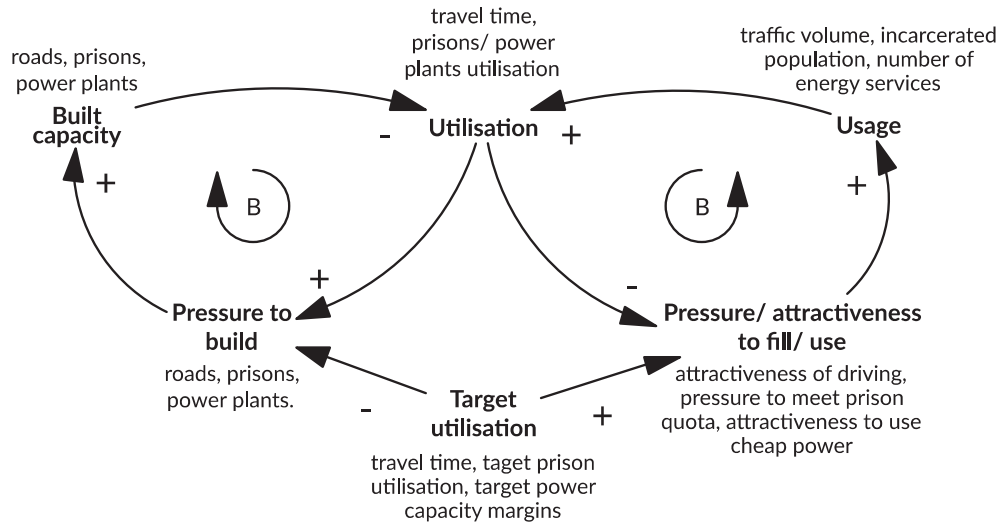


Fig. 7. Tendency for the system size to increase.

Table 1

Meta-narrative principles and their application in the current review.

Principles	Definition	Application in current research
Pragmatism	What to include is not self-evident. The review is guided by what will be most useful to the intended audience(s).	Selection criteria: domain – richness of research on the policy asymmetry topic; papers – contribution to the topic.
Pluralism	The topic should be illuminated from multiple angles, perspectives and research domains.	14 research domains are chosen to draw isomorphic insights from.
Historicity	Research traditions on the topic within each research domain are often best described as they unfolded over time.	Process nature of narratives of studied research domains.
Contestation	‘Conflicting data’ from different research domains should be examined to generate higher-order insights.	Conflicting data is documented, discussed and used to generate higher-order insights.
Reflexivity	Reviewers must continually reflect, individually and as a team, on the emerging findings.	Research log by the first author; all author regular re-write policy asymmetry definition; regular team's meetings.
Peer review	Emerging findings should be presented to an external audience and their feedback used to guide further analysis.	External feedback is sought from an expert in each of the studied research domains.

Table 2

Hierarchies of solution strategies.

Healthcare	Waste	Food waste Papargyropoulou 2014*	Biodiversity IUCN, UNGC 2012*	Carbon Horgan 2011*	Energy Ademe 2022
Primal and primary prevention	Prevent	Prevention	Avoidance	Avoid wasted energy	Sufficiency
Secondary prevention	Reduce		Minimization	Efficient conversion	Shifting service provision
	Reuse	Redistribute	Restoration	Renewable energy	Efficiency
	Recycle	Animal feed/ compost	Offset	Offset	Renewable
Tertiary prevention	Recovery	Energy recovery			Carbon sink
	Landfill	Disposal			

Table 3
Hierarchies of solution strategies in supply/demand energy policy.

Energy	Energy A-S-I	Energy [10]
Sufficiency	Avoid	Change energy-using activities
Shifting service provision	Shift	
Efficiency	Improve	Improve energy efficiency
– Technological efficiency		
– Efficiency <i>per unit of service</i> provided		Flex energy demand in time
– Flexibility: efficiency over <i>time</i> and <i>area</i>		Switch fuels
Renewable		
Carbon sink		

Table 4
Examples of the role of actor agency across different domains.

Research domain	Description
Addiction	Using alcohol, drugs, etc. to relieve stress and not facing the actual problem itself
Governmental aid	Attempts to solve pressing problems only to foster dependency and need for increasing aid
Social support system	Families have no space, time, skills or willingness to care for their elderly members.
ENERGY POLICY	Guaranteed energy provision reduces the role of actor agency

Table 5
Examples of increasing system size across different domains.

Research domain	Description
Traffic control	Number of roads and traffic
Criminal justice	Number of prisons and incarcerated population
ENERGY POLICY	Number of power stations and demand for energy services

Table 6
Examples of different system focuses and corresponding policy strategies across different domains.

Research domain	System focus	
	System productivity	System resilience
Organizational process improvement	focus: Maximize profit policy: Exploitation	focus: Build capacity to adapt to market change policy: Exploration
Infrastructure	focus: Maximize output policy: Longer times for infrastructure use	focus: Maintain the quality of service policy: Pro-active maintenance
Pollution control	focus: Reduce harm policy: End-of-pipe treatment	focus: Mirror the law of nature (ecosystem resilience) policy: Upstream solutions
Healthcare	focus: Cure disease policy: Invest in treatment, drug development, etc.	focus: Build internal resistance to disease policy: Invest in health promotion
Foster care	focus: Reduce number of children in care system policy: Solve cases quicker	focus: Maximize child welfare policy: Give quality time for each case
Population control	focus: Increase population policy: Abortion ban	focus: Support people to have their desired family size policy: Free contraceptives and abortion; easier divorce laws, support for families in need, investment in education and healthcare.
ENERGY POLICY	focus: Provide secure, cheap and sustainable energy to meet demand policy: Predict demand and provide net zero carbon energy	focus: Build capacity to fulfill societal functions in light of disturbance in energy supply policy: Shape demand and build actor capabilities to play an active role in the system

REFERENCES FROM THE FOLLOWING SLIDES:

Study context

- Energy consumption vs energy services consumption[47]
- Supply/ demand policy asymmetry [10]
- Relative attention to the supply- and demand-side in energy future assessment/ scenarios:
 - o An assumption that demand will outstrip supply of sustainable energy and carbon capture technologies will be required: [5,23,45]

- o An assumption of low energy demand: [3,17]
- o Variation of scenarios: [40]
- o Other evidence of asymmetry: [33]

- Arguments in favour of demand-side reductions:
 - o Effectiveness of carbon emission reductions: [10,29]
 - o Numerous co-benefits: [7,24]

- Sifting attention to demand-side policies: [8,9,25,30]

Theoretical conceptualization

- Socio-technical system: [12,13]
- Systemic problem: [32,37]

Methodology

- Reasoning by analogy: [34,35,44]
- Meta-narrative systematic review: [14–16,26,49]
- Meta-narrative steps: [28]

Preliminary results

- Hierarchies (references): [1,36,43,46,48]
- Actor capabilities (references): [32,41]
- Increasing system size (references): [27,42]
- System focus and rules (references):
 - o Resilience: [2,11,18–22]
 - o Organizational management: [4,6,31,38,39]

CRedit authorship contribution statement

Yekatherina Bobrova: Conceptualization, Methodology, Formal analysis, Investigation, Writing – original draft, Writing – review & editing, Project administration. **Nick Eyre:** Conceptualization, Formal analysis, Investigation, Writing – review & editing, Funding acquisition. **Tina Fawcett:** Conceptualization, Formal analysis, Investigation, Writing – review & editing. **Colin Nolden:** Conceptualization, Formal analysis, Investigation, Writing – review & editing. **George Papachristos:** Conceptualization, Methodology, Formal analysis, Investigation, Writing – review & editing.

Data availability

No data was used for the research described in the article.

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Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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