

Energy Security: A Conceptual Review Of Scalar Tensions In European Electricity Governance

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Introduction

Particularly in Europe, “energy security” has since 2022 gained prominence on policy agendas, but it has also become somewhat of a “buzzword” in academic circles.

Furthermore, the concept has moved from being a niche technical concern to a central pillar of global stability. This paper was born out of a specific realization that became clear when we, coming from two very different perspectives, started talking and discussing.

Despite one of us being rooted in the complexities of electricity market models and the other in critical human geography, we soon discovered that the concept “energy security” made immediate sense to both of us. However, we also almost simultaneously realised that we were essentially understanding it from different *standpoints*.

This led us to the further realization that there was something interesting about the academic conversation and what Foucault would have called the *archaeology* of the concept. It is not that the concept has become an empty “buzzword” at all, quite the opposite. It has actually become “thick” with *accumulated* meanings.

As we looked closer, we saw that energy security has essentially functioned like a disciplinary relay race, where each runner has left behind a new historical layer of meaning. The result is, we would argue, a relatively *fragmented* academic discourse, as we have inherited all these different layers, while we, as researchers, have rarely stopped to examine the archaeological site itself.

So this was what we set out to do. We wanted to perform a critical, conceptual review where we did not simply *add* another building block on top of the pile but rather scrutinized whose *interests* the different watch towers were originally built to protect.

To put it simply, what we realised was that the electricity system looks fundamentally different depending on the position of *your* tower, or what we in the following will call the geographical scale. That is, if you are in a tower overseeing *Europe*, security looks like a technical triumph of grid frequency, interconnectors, and market efficiency. If you move to a more inward-looking *national* tower, the view changes. Now you see borders, national reserves, and the political need for sovereignty and popular support. However, if you look at the *nodes* where the power is actually put to use – that is, the household

level – electricity security is, to all intents and purposes, no longer about grid robustness, at least not in Europe. It is about affordability and the lived experience of a price spike.

So, one of our main arguments is that choosing which tower to stand in is not a neutral analytical choice. It is a “securitization technology”. By uncovering what we term “scalar constructions”, we thus argue that the choice of which tower to use as vantage point actively determines whose interests we treat as legitimate security concerns and which threats we decide to prioritize.

Given our curiosity about different analytical vantage points in mind, we started off by defining two core research questions to drive our investigation of the literature on energy security. Our first question concerns *how dominant conceptualizations of energy security in studies on the integrated European electricity market are refracted through scalar constructions, and whose security interests do these conceptualizations privilege.*

In other words, we wanted to move beyond just listing the 4As (availability, accessibility, affordability, acceptability) or technical dimensions. We wanted to see how the “watch tower” a researcher or policymaker chooses to stand in fundamentally changes what they define as a threat, and just as importantly, *who* they decide is in need of protection.

This leads us to our second question where we address the policy implications of the identified scalar constructions of energy security, thus moving from conceptual analysis to the real-world consequences. We are asking how these different ways of “scaling” security actually shape the rules of the European electricity market, and how these choices systematically distribute protection and vulnerability across different social groups.

Methods

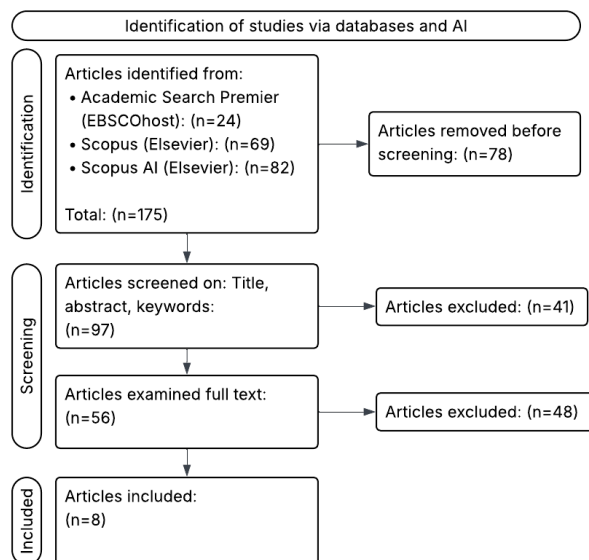
To answer these questions, we did not just want to aggregate more data. We wanted to perform a specific kind of synthesis that allowed us to dig into the underlying assumptions of the field. We therefore employed a methodology known as Critical Interpretative Synthesis (CIS). The goal of a CIS is to build theory and problematize established paradigms by uncovering conceptual patterns and the underlying assumptions in the literature.

We started off with a systematic search based on a multi-component search string (see Appendix A) across major databases (Scopus and Academic Search Premier), supplemented by AI tools like Scopus AI. This search strategy initially yielded 175 publications within the time frame we defined.

Through an iterative screening process focussing on theoretical depth, we employed purposeful sampling favouring diversity of thoughts and approaches until “theoretical

saturation” was achieved, meaning that we stopped when additional papers no longer fundamentally changed our conceptual map.

Because we come from separate disciplinary backgrounds we brought a different professional “gaze” to the screening process. We independently assessed the papers for their conceptual richness, and then spent time validating each other’s assessments. This meticulous process led us to arrive at eight core studies.



To structure our analysis, we followed the established framework for theory adaptation. We thus distinguished between domain theory, which represents the substantive field – in our case electricity security – and method theory, which provides the analytical lens used to re-examine that field – in our case, geographical scales.

Domain theory

In our effort to look deeper into the “archaeology” of energy security, we took the three perspectives identified by Cherp and Jewell in 2011 as our point of departure. These were (1) the political perspective on sovereignty, (2) the technical question of robustness, and (3) the economical perspective on resilience.

To do this, we also added the specifications developed by David Baldwin to our analytical skeleton. We asked of every study *whose* security was to be addressed – thus identifying the referent object – and security from which *threats*. To fill this skeleton with content, we furthermore analysed how the studies understood and employed the 4As framework. Finally, to understand the power dynamics at play, we included the concept of securitization as part of our domain theory.

This allowed us to see security not as an objective *technical* state, but as a *political construction*. In this view, a “securitizing move” is a political speech act justifying extraordinary measures such as state encroachment on the market.

Method theory

This leads us to our method theory and the concept of geographical scale. In our study, we move away from treating the local, national, or European levels as fixed “*containers*” for data. Instead, we understand scales as socially *produced* and politically *contested* arrangements of power, through which relations are organized.

We specifically use the concept of “scalar fixes”, which refer to those relatively durable configurations where a particular scale, for instance the national level, becomes the taken-for-granted site for regulation and decision-making.

We also look at the tension between so-called “spaces of dependence” – meaning the fixed, place-bound needs of households or national industries – and “spaces of engagement”, which are the broader EU-level arenas where actors must operate to secure those dependencies.

This theoretical setup allowed us to interpret securitization moves as *scalar* strategies, for instance as attempts to “jump scales” in order to relocate political issues to levels where a specific actor holds more influence.

To put this theoretical toolkit into practice, we translated these core concepts into six analytical dimensions. We coded for the *referent object* and *threats* to identify precisely who is being secured and from what. We mapped the *dimensions of energy security* to see which of the 4As are being prioritized, or marginalized, within the discourse. We also identified the *governance logic* to reveal the proposed means of security, that is, either through market price signals, national central planning, or local self-sufficiency. And we examined the *conceptualization* of security to see if it was treated as an objective, measurable entity or a subjective perception. Finally, and crucially, all of these dimensions are viewed through our lens of *scalar construction*. This allowed us to move beyond a purely *descriptive* review and thereby to perform what we call a *lines-of-argument* synthesis.

By mapping the literature in this way, we could analytically demonstrate how the “watch tower” the researcher stands in, fundamentally *refracts* every other aspect of energy security, that is, it changes the *threats* they see, the *people* they protect, and the *policies* they justify.

Lines-of-argument synthesis

Our lines-of-argument synthesis reveals that the literature clusters around distinct scalar *positions*, each producing its own version of “security”.

Study	Scalar construction	Dimensions of energy security	Conceptualization	Referent object	Threats	Governance logic
Borowiec-Kapek (2026)	National/cross-country comparison)	Availability Affordability	Objective	National electricity system Households	System instability Price pressure Import dependence	Indicator-based comparative governance of integrated markets
Hawker et al. (2017)	National override/capacity mechanisms	Availability Sovereignty	Subjective (perceived at national level)	National system adequacy State control	Dependence on non-domestic capacity Perceived supply insecurity	National intervention vs. EU market integration
Sæther & Neumann (2024)	Inter-/Intra-national (price areas)	Availability Security of supply	Objective	Integrated market robustness Cross-border supply system	Price shocks System stress	Market integration robust also under stress
Venzelou & Poullikkas (2024)	pan-European interconnection	Availability Affordability/cost efficiency Accessibility	Objective	Integrated electricity market infrastructure	Regulatory fragmentation Geopolitical tensions Infrastructure bottlenecks	Market integration through coordinated regulation and investment
Mutani et al. (2018)	Local/community	Acceptability Accessibility	Objective	Local energy community autonomy	Grid dependency Climate change	Decentralized community energy system and local self-sufficiency
Jääskeläinen et al. (2022)	Household within national market	Affordability (failure)	Objective	Vulnerable consumers/households	Price spikes Scarcity pricing Market-design tensions	Market-based pricing versus affordability protection
Muhammad et al. (2025)	Household within national context	Affordability	Objective	Vulnerable households	Price volatility	Policy implications of household energy risk
Demski et al. (2018)	Individual within national context	Affordability Stable availability	Subjective (perceived at individual level)	Individuals/public concern	Perceived affordability stress Reliability concerns Dependence	Necessity of managing energy prices and imports

First, when we look at studies centred on the pan-European and system level, we see a focus on availability and robustness. From this “watch tower”, the referent object is the integrated market itself. The threats are technical, i.e. infrastructure bottlenecks and regulatory fragmentation. The logic here is that integration is security; market signals and cross-border flows are seen as the most efficient way to ensure stability.

As we move to the national scale, the logic shifts toward sovereignty and autonomy. In these studies we see the “Single Market” through the lens of a security *dilemma*. Here, the threat is a perceived inability to completely rely on neighbouring states during a crisis, leading states to “jump scales” back to the national level by implementing

measures such as Capacity Mechanisms. In this tower, security is thus defined as national *self-sufficiency*.

An often-overlooked, but vital perspective, is found at the local and community scale, exemplified by the paper by Mutani et al (2018). This study demonstrates a distinctly *relational* scalar construction, where the referent object is the local energy community itself. Here, the threat is dependency on the external grid. The governance logic is one of decentralized self-sufficiency, where renewable energy *cooperatives* seek autonomy through local coordination, proving that even sub-national scales generate unique security narratives.

Finally, when we rescale our focus to the household and individual level the entire conceptualization changes again. Here, the referent object is the vulnerable consumer, and the primary threat is *affordability*. From this position, the very market mechanisms that ensure “system robustness” at the European level, are seen as the source of “lived insecurity” through price spikes.

In sum, the synthesis shows that electricity security is not a fixed technical target, but a *contested, multi-scalar* governance problem. We thus argue that the current European discourse is characterized by a scalar *divergence*. For instance, what looks like a technical *success* of market coupling at the EU scale ensuring scarcity pricing, can be experienced as a catastrophic security *failure* at the household scale resulting at times in unaffordable bills.

Securitization tensions

Building on this observation of scalar divergence, we identified five overlapping securitization tensions. These tensions allow us to see exactly how the "securitization technology" we mentioned earlier operates in *practice*.

First, we identify a *methodological* tension between subjective *perceptions* and objective *measurements*. While many studies rely on "objective" indicators, we argue that even the most technical market models are underpinned by political assumptions about risk and what constitutes an "acceptable" level of subjectively experienced vulnerability among the public.

Second is a *theoretical* tension regarding the legitimate logic of governance. We see a constant pull between state-centred approaches, which favour central planning and regulation, and market-based approaches, which rely on price signals and optimization. These are not just different *tools*, they represent a fundamental disagreement over where the authority to define electricity security and protect the citizen should reside.

Third, there is a *thematic* tension regarding which of the "4As" is prioritized. We argue that the way these dimensions are prioritized serves to institutionalize *particular versions* of security. For example, the “robustness” perspective often foregrounds

technical availability, while the “resilience” perspective rather prioritizes market-based accessibility, both often rendering affordability a secondary “social” concern.

Furthermore, our analysis shows that EU-level system studies almost exclusively foreground availability and technical robustness. In contrast, affordability and acceptability only become analytically central when we *rescale* our focus to the household or the local energy community.

Fourth, we see a sharp political tension, a scalar battle so to speak between the ambition to harmonize European markets and the reluctance of nation-states to relinquish national sovereignty.

This might explain the persistence of "national backdoors," such as Capacity Mechanisms, which states might use to "jump scales" back to national control when they no longer trust the integrated market to ensure their specific needs.

Finally, the literature points to a tension of *path dependency*. We see a conflict between the new and more encompassing "spaces of engagement" created by the EU at the regional scale, and the place-based and fixed "spaces of dependence" of households and local infrastructures which remain *anchored* at the local and national levels. In our view, these underlying dependencies explain why existing "scalar fixes" in governance are so resistant to change.

Taken together, these five tensions reveal that the scale we choose to prioritize does not just *frame* the analysis. Rather, they demonstrate that every analytical choice we make serves to *systematically distribute* protection and vulnerability across different social groups and the European energy landscape.

Conclusion

To wrap up, we would like to pull these threads together and return to our point of departure, sharing our final reflections on what we believe is really at stake when we talk about electricity security in Europe today.

While we began this journey as an archaeological excavation of the sedimented layers of energy security – delineating the conceptual layers of sovereignty, robustness, and resilience – our conceptual review has helped us to uncover what we believe is what Foucault would term the *genealogy* of the concept of electricity security. In other words, we realized that these layers are *value-laden*.

Translated into geographical terminology, this means that scale is not a *neutral* backdrop for our models – it is not just a container for data or a level of analysis. Instead, we argue that the way we *scale* this problem is, in itself, a “securitization technology”.

By choosing which “watch tower” to stand in, we are not just *measuring* an isolated aspect of security, we are actively *constructing* it. When we stand in the European tower,

focus on system adequacy, and optimize for the integrated market, we are performing a “securitization move” that treats market efficiency as the ultimate security goal. But in doing so, we often, unintentionally, sideline the vulnerabilities at the household level, rendering their struggle with a price spike as an “external” social concern rather than a core security failure.

Our most important contribution is thus the revelation that electricity security is, as mentioned, a contested, multi-scalar governance problem, not a fixed technical target. Every time we advocate for market coupling or a national capacity mechanism, we are not just solving a technical glitch; we are rescaling authority and redistributing who gets protected and who remains vulnerable.

For us, as researchers, this means that even the most mathematically precise optimization model ought to be regarded as part of a *politically contested* terrain. It rests on an inherited “scalar fix” that decides *whose* security counts as *legitimate*.

As we move forward in Europe’s energy transition, we argue that our policy should reflect this. We should therefore move away from the idea of a single “national” or “systemic” umbrella solution. Instead, we must be transparent about the fact that market integration is a *security reform*.

We thus need *differentiated* instruments for different scales, because a secure system at the top is of little value if it creates an unlivable insecurity at the nodes where the power is actually put to use.