

MAKING MICROGRIDS WORK: AN EMPIRICAL-LEGAL STUDY OF THEIR TRANSACTION COSTS UNDER EU LAW

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A ‘jurisprudence of consequences’, as conceptualised by Miller (1965), emphasises the importance of assessing the real-world impact of legislation. This remains crucial today, particularly when considering the role of legislation in the energy transition. A key example is the impact of current EU electricity market regulations on the development and operation of microgrids, which are decentralised electricity systems with significant potential to contribute to the energy transition (Uddin et al., 2023). Despite their potential, existing EU regulation does not address microgrids (Kojonsaari & Palm, 2021; Soshinskaya et al., 2014), leaving system developers and users in a state of uncertainty.¹ This uncertainty negatively impacts technological progress and ultimately hinders the broader energy transition (Haas et al., 2023). Supporting microgrids as part of the energy transition therefore requires a reassessment of the current legal framework, which starts with understanding the sources and impacts of uncertainty in the regulatory framework.

Microgrids are decentralised electricity systems that can operate independently of the centralised electricity grid but can also interact with it (Mauger, 2022).² In a microgrid, system users can produce and consume their own electricity, often from renewable sources (Uddin et al., 2023). Managing the production, distribution and consumption of renewable electricity in a microgrid has some technical advantages and could be beneficial to society in the energy transition. These include, but are not limited to, producing renewable energy, reducing

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1. This chapter builds on the author’s previous work as part of her PhD dissertation (Behrendt, 2023; Behrendt, 2025). In the development and operation of microgrids, the author focused on analysing the transactional uncertainty due to legal uncertainty and legal complexity.
 2. For a full overview of their technical characteristics, see: Carpintero-Rentería et al., 2019; Satapathy et al., 2024.

transmission losses, reducing the load on the centralised grid through system islanding,³ and encouraging electricity consumers to play a more active role in the energy transition (Mariam et al., 2016; Kurundkar & Vaidya, 2023; Uddin et al., 2023). However, a disadvantage of the use of microgrids is that as more users leave the centralised electricity grid, the costs of maintaining it will be shared among fewer customers. Therefore, to keep microgrids beneficial, tariff regulations must address this issue.

Despite the benefits of microgrids for advancing the energy transition, their implementation in the EU remains limited. This can be linked to the EU's regulatory framework for the electricity market. The existing regulation accommodates a centralised, top-down approach to electricity generation, distribution and consumption (Roggenkamp et al., 2016). Fully decentralised and islanded electricity systems, such as microgrids, fall outside the scope of this formal institutional framework of laws and regulations (Mauger, 2022). As a result, the limited number of individuals and organisations involved in microgrid development and operation face significant transactional uncertainty rooted in the uncertainty and complexity of the legal framework (Soshinskaya et al., 2014). In developing and operating a microgrid, this uncertainty increases transactional uncertainty and associated transaction cost, thereby discouraging their broader adoption.⁴

As noted, a 'jurisprudence of consequences' emphasises the need to consider and minimise the negative (real-world impact of legislation); in the case of microgrids, this refers to the transactional uncertainty and high transaction costs associated with microgrid development and operation due to legal uncertainty. To address this, the regulatory framework applicable to microgrids must be reconsidered. This necessitates, first, identifying the specific sources of transactional uncertainty within the law. Therefore, the central research question addressed in this chapter is, which transaction costs exist in the development and operation of microgrids resulting from uncertainty and complexity in the formal institutional framework governing the EU's electricity sector?

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3. Islanded means that the system can function disconnected from the centralised electricity grid. This is the technical characteristic that distinguishes microgrids from other decentralised electricity grids (Mauger, 2022). For a full overview of what microgrid islanding entails, see: Li et al., 2014.
 4. From an economic perspective, the reason for this is that in the absence of a regulatory framework for microgrids, transactional uncertainty arises (North, 1990). This uncertainty can stem from factors such as incomplete information, ambiguous contractual terms and, crucially, the legal framework itself. Due to transactional uncertainty, more time and resources need to be invested in organising the transactions for running a microgrid, which increases transaction costs. This may discourage system development, which is undesirable considering the positive impact that microgrids could have on the energy transition (Uddin et al., 2023).

This chapter provides novel insights into the impact of legislation on microgrid development and operation. Given the limited number of existing microgrids and the distinct characteristics of each system, this study only provides insights into uncertainties and costs in relation to specific grids rather than a general assessment of transactional uncertainty.⁵ Nevertheless, such an exploratory study has not been conducted to date, making this study original. Furthermore, to carry out this empirical research, it was required to map the existing microgrid projects throughout the EU, which has also not been done before. The added value of the chapter lies in its empirical analysis of regulatory uncertainty and complexity for microgrid stakeholders, its related suggestions for legal reform, and its methodological contribution that can be used as a basis for future empirical legal studies.

To address the research question, this chapter is structured as follows: after this introduction, a brief literature review examines (empirical) research on transaction costs. Section 3 outlines the methodology, while Section 4 presents the main empirical findings, which suggest that the regulatory framework is misaligned with the deployment of microgrids. As a result, developers and operators face significant search and information costs in navigating the regulatory requirements. These findings form the basis for a reassessment of the legislation to support microgrids. Although a full legal analysis is beyond the scope of this chapter, the discussion in Section 5 provides a first indication of such an analysis. The final section concludes the chapter.

2 ANALYTICAL FRAMEWORK: TRANSACTION COSTS AND UNCERTAINTY

The theoretical foundation of this research is law and economics, and in particular transaction cost theory, specifically the work of Williamson (1981). He identified uncertainty as one of the three key factors influencing transaction costs, such as search and information costs, decision-making costs, negotiation costs and enforcement costs (Mundaca et al., 2013). The formal institutional framework, i.e. laws and regulations, plays an important role in minimising these costs by providing structure to the transaction and reducing uncertainty (North, 1990). However, the current institutional framework in the EU is inadequate for the development of microgrids, as it does not consider independent, islanded, energy systems at the local level (Mauger & Roggenkamp, 2021). Existing regulations are not tailored to the specific needs of these systems (Kojonsaari & Palm, 2021; Saeed et al., 2021; Soshinskaya et al., 2014; Warneryd et al., 2020).

5. As previously argued, the distinct characteristics of microgrids necessitate regulations that account for these differences (Behrendt, 2023). However, such regulations do not yet exist, likely due to evolving technology, shifting policy priorities, and the need for further research on market mechanisms and grid integration. This study, therefore, concentrates on specific uncertainties and costs rather than the broader regulatory framework.

While these authors acknowledge the problem of uncertainty, there has been little empirical investigation of its underlying sources. Furthermore, despite the extensive literature empirically researching transaction costs (see, for instance, Friese et al., 2020; Ménard & Saussier, 2000; Sirnes, 2021), only limited research has empirically identified transaction costs arising from (legal) uncertainty and (legal) complexity (Marneffe & Vereeck, 2011; Yang et al., 2022). The few studies that have done so generally rely on surveys and interviews (Shahab & Lades, 2024). To measure or indicate transaction costs, researchers have focused on differentiating between direct and indirect transaction costs. Direct costs include expenses like legal fees (Petersen et al., 2019), while indirect costs are less tangible and include the time and effort required to research and make decisions about a particular asset in the microgrid (Den Butter et al., 2009). Time is commonly used as a proxy for measuring indirect costs, reflecting the effort and resources needed to complete transactions (Mettepenningen et al., 2009; Shahab & Lades, 2024; Zhuang et al., 2020).

3 METHODOLOGY

The central research question in this chapter focuses on identifying the transaction costs that arise during the development and operation of microgrids due to uncertainty and complexity within the formal institutional framework governing the EU electricity sector. In answering this question, this research is divided into two parts. The first part seeks to identify and understand the specific uncertainties and complexities inherent in the institutional framework. The second part of the question explores the consequences of these uncertainties, in particular whether they translate into transaction costs. This links uncertainties to practical constraints (i.e. transaction costs) and their impact on microgrids.

3.1 *Exploratory Qualitative Research*

Microgrids have previously not been empirically studied from a perspective that combines a legal assessment with transaction cost theory. This chapter provides a first step in filling this gap in the literature, presenting an exploratory qualitative study analysing existing, planned and failed microgrids through surveys and interviews. This approach was chosen as the research involves a small, relatively new, research population and as exploratory research is particularly suitable to analyse an emerging phenomenon where limited data is available (Webley, 2010). The research was carried out in the following four stages.

Stage 1: Microgrid Selection

First, an overview of existing microgrids in the EU was made. Here, a major obstacle was that the term microgrid is not clearly defined, either from a technical or from a legal perspective. It was therefore necessary to define the research group. Electricity systems were selected based on the key characteristics of microgrids identified by Carpintero-Rentería et al. (2019). These are (i) islanded and grid-connected functionalities (ii) clearly defined electrical boundaries, and (iii) a control entity capable of managing energy resources along the loads. A literature review and internet search were conducted to identify electricity systems that meet these criteria. This led to the creation of a unique map, which is now publicly available, that indicates where microgrids exist across the EU.⁶ Subsequently, the developers and operators of these systems were contacted to participate in this research. These range from industrial sites where companies are connected to their own energy system, to residential areas where a group of households have developed their own grid, to researchers or electricity providers who have implemented microgrids to test technologies, to a village that has considered it but has deliberately not developed into a microgrid.

Stage 2: Surveys

A survey was designed that was structured into four distinct blocks. The first block focused on background information about the system. For example, respondents were asked about the parties involved (e.g. electricity customers, distribution system operators) and the ownership and operational responsibilities.

The second block assessed the development of microgrids and included questions on monetary costs as well as time and effort. In addition to specific questions on challenges to microgrid development (identified in the previous theoretical analysis), respondents also had room to share their own experience in open questions; for instance ‘what were the main barriers you encountered during the development of the microgrid?’ The third block mirrored the structure of the second, but with a focus on the operation of microgrids.

The final block discussed the legal dimensions. Questions explored the legal uncertainties and complexities experienced during the development and operational phases. For example, respondents had to rate the level of complexity associated with the development of microgrids on a scale of 0 to 10 and then respond to specific statements, with which they could strongly disagree or strongly agree. To make the questions more detailed, the survey also asked about specific

6. The map can be accessed via: Microgrids-Research.eu.

steps, such as the authorisation process and grid access procedures as established in existing legislation, specifically Directive 2019/944 on common rules for the internal market for electricity. To facilitate a full understanding, participants could also share their experiences in an open-ended question.

The survey was sent to 23 operational microgrids, 4 developing and 6 potential microgrids, 1 failed microgrid, and one system deliberately not developed into a microgrid. However, the response rate was lower than expected, with only six respondents providing information, and of those six, not all completed the survey fully. In hindsight, the low completion rate can probably be traced to the length of the survey (25 minutes), which is attributed to the complexity of the subject. Furthermore, it required specialised knowledge, which not all respondents appeared to have, especially where development tasks were outsourced. Microgrids that lack this expertise are less inclined to respond, and this implies that the results are likely to be an underestimation of transaction costs.

Stage 3: Interviews

To increase the robustness of the study, the third stage in this research included conducting 8 interviews. In addition to the respondents identified previously, which are microgrid developers, operators or microgrid users, energy consultancies involved in research on microgrid development were contacted, thus broadening the response base. The survey served as an interview guide but was adapted for each interview based on the respondent's expertise and specific details of the microgrid under discussion. This interview approach, also used by other researchers who studied transaction costs (Victor & Paulo, 2023), proved to be more suitable for evaluating transaction costs compared to the survey. It allowed for in-depth discussion of network specifics not captured in the survey. In addition, the interviews discussed some of the legal solutions proposed to reduce the uncertainty related to transaction costs, which had not yet been included in the surveys. Overall, respondents seemed more willing to discuss the topic orally. The mixed method of using both surveys and interviews led to 14 responses. While this number seems modest, it must be seen in the context of the relatively few microgrids identified in the EU.

Stage 4: Empirical Analysis

The fourth step was to analyse these responses, an exercise performed by manually coding the results. Responses were systematically categorised using keywords that addressed specific themes: uncertainties in development and operation, legal issues and activities that incur transaction costs. This approach was chosen primarily because of the relatively long interval between the surveys

and interviews, giving the researcher sufficient time to assess each response thoroughly. Manual coding allowed for a tailored evaluation of each respondent's input within the specific context of each microgrid.

The results gathered in the empirical analysis lay the foundation for a forthcoming fifth step, which involves conducting a legal analysis to evaluate how existing laws can be amended to facilitate the development and operation of microgrids. This chapter provides a brief overview of this analysis in the discussion section. However, a more in-depth exploration will be presented in a separate contribution, as a detailed discussion exceeds the scope of this chapter.

3.2 *Limitations of the Study*

While this study provides valuable insights, it is also important to acknowledge its limitations. First, the survey component of the research encountered a low response rate, which limits the degree to which the findings can be generalised. The research methodology itself may also contribute to this, as it may not have fully captured the different perspectives on microgrid development and operation. Although efforts were made to ensure a representative sample, the small and specialised population studied contributed to this challenge. Second, the qualitative interviews are inherently subjective and may introduce biases. They rely on the participants' recollections and on the institutional memory of microgrid developers and operators, which proved to be difficult to unlock. Despite the use of the interview guide to mitigate these biases, the interpretation of themes could be influenced by the perspectives of both researchers and participants. As a result, the complexity of the legal and regulatory intricacies at play may not have been fully captured. Future research could thus benefit from more diverse samples to validate and extend these findings, once more microgrids are set up.

3.3 *Indication of Transactional Uncertainty and Transaction Costs*

Considering the above, this exploratory analysis serves as a starting point for empirical research into transactional uncertainty and the resulting transaction costs in microgrid development and operation. This chapter identifies sources of transactional uncertainty within the legal framework and provides an indication of the transaction costs incurred by specific microgrids without directly measuring them. Consequently, the results indicate sources of uncertainty and capture relative transaction costs in the microgrids analysed, rather than providing a general estimation for all microgrids (Webley, 2010). This still helps to understand the legal hurdles in the development and operation of microgrids, which is the first step necessary to facilitate their development.

4 RESULTS

The following section presents the key empirical findings. It suggests that the EU's formal institutional framework is incompatible with microgrid development and operation. As a result, developers and operators spend significant time on research and on understanding the applicable rules, leading to transaction costs, especially search and information costs. In the following sections, the findings of transactional uncertainty are described first, followed by the formal institutional framework and transaction costs.

4.1 *Transactional Uncertainty*

The key finding is that uncertainty is linked to the lack of clarity about what a microgrid is from a legal perspective. This even affects the (legal) future of the microgrid, as respondents are unsure whether their microgrid will remain operational. Reasons for this are the incompatibility of the law as, for instance, evolving legislation does not support microgrids or because the microgrid is based on a legal vacuum that may not be legally accepted if challenged in court. Respondents link the uncertainty to the fact that microgrids are relatively new and that the law is incomplete to guide their development. There is little help from regulatory authorities, municipalities or the system operator of the centralised grid; one respondent stated that developing a microgrid currently means 'creating your own story' rather than following predefined guidelines. Furthermore, as regulations are continuously changing, this leads to navigating a perceivably complex regulatory landscape and documentation process.

4.2 *Formal Institutional Framework*

Uncertainty arises from the formal institutional framework, which is incompatible with how microgrids are developed and operated, and some respondents face legal prohibitions, such as a ban on operating as an islanded system or on owning a private network.

A key issue within the regulatory framework refers to identifying and meeting permitting and licensing requirements. This includes finding a legally acceptable structure for the system and determining the legal allocation of network management responsibilities. In this respect, one respondent emphasised the need for market actors to take on some of the responsibilities currently held by publicly regulated entities. Another respondent highlighted the ineffectiveness of current legislation. At the development stage, for example, there is a lack of clear legislation on the authorisation and construction of, and access to, a microgrid. In the operational phase, there is no legislation to determine the ownership,

operation and maintenance of a microgrid, with existing laws focusing only on flexibility services. Other legal challenges relate to ensuring access to both the central grid and the microgrid. Furthermore, existing tariff regulations are affecting the financial viability of microgrids. This is closely linked to difficulties in securing financing and establishing a sustainable business model. This lack of legal precedent and clear guidance further contributes to the respondents' perception that the development and operation of microgrids is legally uncertain and complex.

Interestingly, not all respondents see regulatory uncertainty and complexity as a problem. Because there are not many laws in place to guide microgrid development, one respondent perceives this as more freedom to get things done. This opinion is echoed by another, who emphasises the need to be creative in applying the law to achieve something new.

One respondent provides detailed insight into the complications that may arise for developing a microgrid under the current legal framework: The microgrid under discussion is located in an industrial park. Originally constructed as a direct line, the infrastructure developed into a microgrid.⁷ Due to the expansion of the system, the microgrid operator applied to the National Regulatory Authority (NRA) for the status of a Closed Distribution System (CDS).⁸ However, this was rejected by the NRA, who claimed that the system did not meet the benchmark for determining that it primarily consumes and distributes its own electricity, which is a legal requirement for a CDS. As a result of the denial, the microgrid will disintegrate because all connected lines will need to receive their own European Article Number (EAN codes) for electricity supply.⁹ Currently, the microgrid is still in place until a decision is made on who takes over the operation of the system, leaving the grid operator with regulatory uncertainty about the future of the system. In the meantime, the parties involved in the management of the microgrid are extensively researching options to find legal solutions to keep the microgrid, as they perceive this to be an interpretation issue of the NRA. In addition, there is now confusion related to the operation of the system, as the rules previously established for the direct line are no longer applicable, but the rules applicable

7. A direct line, defined in Art. 2, para. 41 and regulated in Art. 7 of the 2019 Electricity Directive, is an electricity line that links one isolated generation site with one isolated customer.

8. A closed distribution system, under Art. 38 of Directive 2019/944, refers to an energy network that distributes electricity exclusively to non-household customers within a defined geographical area, such as an industrial park or business district, and is not accessible to the public or residential consumers. It can be seen as the closest, legally recognised system that resembles a microgrid, which is why the developers applied for this status.

9. An EAN code is an identification number for a connection to the electricity grid. If each house in the system must get its own EAN code, then they will get their own connection to the grid, which means that the system is no longer a microgrid.

to a CDS have been denied, leaving its management in a state of uncertainty. Furthermore, another respondent highlights that direct application of CDS rules to smaller microgrid systems is impractical due to the inherent complexity of those rules. Setting up a CDS involves understanding complex regulatory issues to ensure energy efficiency, technical feasibility and legal compliance, in particular for industrial service sites. While these regulations are essential to ensure a reliable energy supply and to protect grid users, they pose significant challenges for smaller projects, such as microgrids.

4.3 *Transaction Costs*

The aforementioned uncertainties and issues in the formal institutional framework have resulted in various transaction costs. Direct costs include fees for outsourcing tasks to (legal) experts or system managers. However, the most cited source of transaction costs are indirect costs, specifically search and information costs, arising from the substantial time and effort required to understand applicable laws and procedures. For instance, a hotelier explained that legal research delayed the development of the hotel by 1.5 years and increased construction costs. Furthermore, a microgrid software provider noted that significant development time is spent filling knowledge gaps to secure support from authorities, which is critical to building trust and fostering system growth for microgrids, especially within grid companies, to increase their willingness to cooperate. Similarly, another dedicated most time to training the distribution system operator responsible for the centralised grid and noted that system operators often lack the necessary training to manage complexities with microgrids, which explains the aforementioned lack of guidance.

Other transaction costs in microgrid projects are decision-making costs that arise from the necessity to select appropriate technologies for the microgrid, often requiring extensive research and consultation. Negotiation costs are incurred during discussions to secure access to both the centralised grid and the microgrid, involving significant time and resources. Monitoring and verification costs are necessary to oversee the microgrids development and operation, ensuring adherence to legal and regulatory standards. Furthermore, enforcement and compliance costs emerge when the legal status of the microgrid is challenged, necessitating legal interventions and potentially leading to additional legal disputes, as will be further discussed in the next section. Finally, trading costs are involved in the authorisation procedures and in securing the necessary permissions for accessing both the centralised grid and the microgrid. These costs collectively illustrate the extensive financial and administrative burdens resulting from the current regulatory landscape.

The foregoing issues lead to the following overview. Transactional uncertainty in microgrids stems from their novelty and the unclear legal status within current regulatory frameworks. Furthermore, microgrid operators often lack guidance from authorities on how to develop or operate microgrids. From a legal perspective, key issues include prohibitions on certain grid constellations, navigating permitting and approval requirements, establishing suitable legal structures for the development and operation of the microgrid, and identifying tariff regulations and financing for microgrids. From these challenges arise significant transaction costs, including expenses for legal expertise and extensive research efforts (Figure 1).

Figure 1 Research Results

Key Factors of Transactional Uncertainty	Key Issues in the Legal Framework	Main Resulting Transaction Costs
Microgrids are new, and their legal status within the regulatory framework is unclear: Respondents 4, 6, 8, 9, 11	Legal prohibitions on certain grid constellations: Respondents 5, 6, 7, 9	Respondents incur direct costs for outsourcing legal expertise: Respondents 4, 6, 8, 9, 11
Leaving operators to their own devices, there is a lack of guidance from the authorities on how to develop and operate a microgrid: Respondents 9, 11	Identifying and meeting permitting and approval requirements: Respondents 3, 5, 6, 9, 12, 14, 15	Respondents incur indirect costs for time spent on research, resulting in search and information costs: Respondents 3, 4, 5, 6, 9, 11, 12, 13, 14
	Finding a possible legal structure: Respondents 6, 9, 12, 13, 14	
	Tariff regulation and financing: Respondents 6, 9, 12, 14, 15	

5 DISCUSSION

Although exploratory, the results presented in the previous section indicate that the regulatory framework in the EU is overly uncertain and complex, creating barriers to the deployment and operation of microgrids. This mismatch between regulatory structures and the practical needs of microgrid stakeholders results in high transaction costs, specifically search and information costs.

As highlighted in Section 4.1, the lack of a clear legal definition for microgrids increases uncertainty and complicates efforts to establish or enforce their legal status. For example, one respondent expressed concern that the legal basis of their microgrid project might not stand up in court if challenged. Similarly, as discussed in Sections 4.2 and 4.3, developers and operators struggle to navigate complex regulatory requirements, identify appropriate legal structures, and meet permitting obligations. These challenges are compounded by the lack of specific

rules governing access to microgrids and restrictive tariff frameworks, which make it difficult for operators to expand and secure financing for infrastructure development. As it stands, the current institutional framework is not well suited to supporting the practicalities of microgrid development and operation.

For the deployment of microgrids in energy transitions, targeted legal reforms should be considered that align the regulatory framework with the operational realities of microgrids. According to the findings presented earlier, a key priority should be to reduce transaction costs, an inherent goal of regulation (Marneffe & Vereeck, 2011; North, 1990). For instance, one critical area involves addressing the legal ambiguity surrounding the legal status of microgrids. However, this approach involves trade-offs. Rigid definitions may limit future innovation, while a more flexible framework might fail to resolve current uncertainties (Ranchordás, 2015). Achieving the right balance will require what Majumdar and Marcus (2001) describe as “an appropriate balance between rules and discretion” to enable stakeholders to exercise choice effectively within a system of constraints. A potential solution could be to integrate microgrids into existing regulatory categories, such as energy communities or CDS, to provide a more predictable legal framework.¹⁰

Other critical regulatory incompatibilities also need to be addressed. For example, the EU’s unbundling regime, which separates network operations from commercial activities, restricts microgrid operators from managing both grid infrastructure and commercial activities. A review of this regime could provide operators with greater flexibility in developing and operating microgrids. In addition, stakeholders often report difficulties in accessing relevant legal and regulatory information, and thus significantly higher compliance costs. Establishing centralised information points or guidance platforms could help reduce these information asymmetries by providing transparent, accessible and up-to-date regulatory guidance.

While a detailed discussion of these reforms is beyond the scope of this chapter, future research will explore these issues in more depth. The results gathered in this contribution lay the basis for the legal analysis that will aim to explore how tailored regulatory solutions can address these challenges while ensuring that

10. In EU law, an energy community is defined in Art. 2, para. 11 and regulated in Art. 16 of the 2019 electricity directive. It is a legal entity whose members jointly engage in the production, distribution and consumption of energy, prioritising environmental, economic and social benefits over profit. A CDS, defined and regulated in Art. 38 of the same directive, is a closed network for industrial, commercial or shared sites, in which electricity is distributed primarily to a limited group of users within that site. Both systems resemble microgrids and could serve as a legal foundation for their regulation, but for this approach, certain legal amendments are necessary, which are further explored here: Mauger, 2022, Behrendt, 2023.

microgrids are viable in the long term. This next phase of research will focus on developing a legal environment in which microgrids can evolve as integral components of the electricity system.

6 CONCLUSION

Focusing on a ‘jurisprudence of consequences’ offers a perspective for researchers to evaluate the real-world impact of legislation. This is particularly important in the field of energy law, given the role of legislation in supporting innovative technologies that can advance the energy transition. In this context, this chapter empirically indicates how current EU electricity legislation negatively impacts the development and operation of microgrids.

Through exploratory surveys and interviews, the findings presented in this chapter suggest that the current regulatory framework for microgrid development and operation imposes transactional uncertainty on microgrid developers and operators, rooted in the regulatory framework, which increases transaction costs. Specifically, the perceived legal complexity and uncertainty of EU electricity market regulation increases search and information costs that can undermine the feasibility of microgrid implementation. However, an issue deserving further investigation is that not all respondents perceive this uncertainty and complexity as problematic, as this suggests a divergence in perception.

By highlighting the issue of transactional uncertainty, this study reveals a mismatch between the regulatory framework and the practical realities of microgrid implementation. To ensure that microgrids can contribute effectively to the energy transition, EU regulation needs to be altered to minimise legal uncertainty and complexity.

In essence, the case of microgrids illustrates how regulatory uncertainty and complexity impact the financial and operational burdens that limit technological progress. Identifying these issues is a prerequisite to addressing them and creating a reformed regulatory framework that facilitates the deployment of microgrids to accelerate the energy transition. This shows that focusing on a ‘jurisprudence of consequences’ can support emerging technologies by removing regulatory barriers and encouraging innovation.

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