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Paper

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Abstract

This paper critically examines the adequacy of the European Union's regulatory frameworks for Third Party Access (TPA) and sector coupling in securing energy supply while achieving the Green Deal's objective of a zero-emission economy by 2050. The analysis reveals significant gaps: TPA rules, designed for physical infrastructure, fail to address challenges posed by data-driven markets and the rise of Energy Data Platform Operators (EDPOs). Regulatory uncertainties regarding data access and innovation protection pose challenges for fair competition. Similarly, while RED II promotes renewable energy integration, it lacks clear provisions for cross-sector data coordination, limiting resource efficiency and sector integration. The findings suggest that existing frameworks are insufficient to secure energy supply in an increasingly digitalized energy system. Modernized TPA rules, robust data-sharing frameworks, and clearer guidelines for EDPOs are necessary to align market operations with the EU's climate ambitions.

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List of Abbreviations

AI	Artificial Intelligence
EC	European Commission
EDPO	Energy Data Platform Operator
EU	European Union
OJ	Official Journal of the European Union
RED II	Renewable Energy Directive II
REPowerEU	Renewable Energy Power Plan of the European Union
TFEU	Treaty on the Functioning of the European Union
TPA	Third Party Access

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1 Introduction

The European energy market faces unprecedented challenges at the intersection of geopolitical tensions, digital transformation, and climate objectives. The ongoing energy crisis, intensified by the Russia-Ukraine conflict, has exposed critical vulnerabilities in Europe's energy security. Simultaneously, the European Green Deal demands a fundamental transformation of energy systems, emphasizing the need for better sector integration and data-driven market solutions.

Within this context, two regulatory aspects have gained particular significance: Third Party Access (TPA) and sector coupling. While TPA rules were originally designed to ensure fair access to physical infrastructure, they now face new challenges with the emergence of Energy Data Platform Operators (EDPOs) and digital monopolies. Similarly, sector coupling—linking energy, transport, building, and industrial sectors—seeks to enhance system efficiency, support renewable energy integration, and accelerate decarbonization.

These developments require regulatory frameworks capable of supporting increasingly complex market interactions while safeguarding security of supply. This paper critically examines whether existing regulations—particularly Directive 2009/73/EC on TPA and Directive (EU) 2018/2001 (RED II) on sector coupling—are adequate to address these challenges. The analysis assesses their effectiveness in ensuring security of supply while promoting market efficiency and innovation.

2 Security of Supply

The concept of security of supply represents one of the three fundamental pillars of European energy policy, alongside environmental protection and market competition. This framework emerged gradually, shaped by the evolving body of European Union (EU) energy law and policy, with security of supply gaining prominence through pivotal historical events. As Delvaux observes, the concept of energy security first gained significance during World War I, when ensuring a stable energy supply became a critical concern¹. This importance was further

¹ B Delvaux, *EU Law and the Development of a Sustainable, Competitive and Secure Energy Policy* (Edward Elgar Publishing 2014) 35.

reinforced during the oil crises of the 1970s, when Europe's vulnerability to supply disruptions became starkly apparent, leading to the first coordinated European responses.

The EU's approach has been shaped by successive challenges, with the oil crises prompting Europe's initial moves to reduce import dependency and diversify energy sources. The 2009 gas crisis further exposed structural weaknesses, especially in terms of cross-border cooperation and emergency response mechanisms². These experiences directly informed the development of today's legal framework.

While the Treaty on the Functioning of the European Union (TFEU) sets out security of supply as a core objective, it does not explicitly provide a clear definition. Article 194 TFEU serves as the foundational legal basis, embedding energy security within broader policy goals³. The European Commission has sought to clarify this, defining it as 'the uninterrupted physical availability of energy products on the market, at a price which is affordable for all consumers (private and industrial), while respecting environmental concerns and looking towards sustainable development'.⁴

The social dimensions of energy security are particularly evident in public service obligations under secondary legislation. Directive 2009/73/EC allows Member States to impose transparent, non-discriminatory measures on energy market participants to ensure stable supply and protect vulnerable consumers⁵. As emphasized in Case AT.39816, these obligations should aim to strike a balance between market efficiency and social protection, particularly concerning pricing practices that may disproportionately affect vulnerable consumers.⁶

² Commission, *'The January 2009 Gas Supply Disruption to the EU: An Assessment'* (Commission Staff Working Document) SEC(2009) 977 final.

³ Consolidated Version of the Treaty on the Functioning of the European Union [2012] OJ C326/47, art 194.

⁴ European Commission, *'Towards a European strategy for the security of energy supply'* (Green Paper) COM(2000) 769 final, 29 November 2000.

⁵ Directive 2009/73/EC of the European Parliament and of the Council of 13 July 2009 concerning common rules for the internal market in natural gas [2009] OJ L211/94, art 3.

⁶ *Commission Decision relating to a proceeding under Article 102 of the Treaty on the Functioning of the European Union and Article 54 of the EEA Agreement* (Case AT.39816 –

Current challenges remain multifaceted, combining operational concerns with long-term strategic risks. Persistent import dependency, particularly for natural gas, continues to jeopardize supply stability. More recently, the Russia-Ukraine conflict has intensified concerns regarding energy security in Europe. The geopolitical tension has led to the EU launching the REPowerEU Plan, which aims to reduce dependency on Russian fossil fuels, accelerate the transition to renewable energy, and enhance energy diversification.⁷

A key element of this strategy is the investment in infrastructure, which remains essential—even when it may not deliver immediate financial returns. As Talus observes, ‘Some of the investment made does not generate profit at all, but is nonetheless essential in order to ensure security of supply and the proper functioning of the market.’⁸

These challenges must be addressed within the broader objectives of the EU's energy policy, particularly the transition toward a low-carbon economy. The interaction between the three foundational pillars—security of supply, environmental protection, and market competition—highlights both opportunities and challenges, requiring careful legal and policy adjustments. For instance, while promoting renewable energy supports both environmental goals and supply security by reducing import dependency, it can initially pose challenges for market competition through necessary support schemes. The legal framework must, therefore, evolve to manage these complexities while balancing all three pillars of EU energy policy effectively.

3 Analysis of Provisions

The evolution of energy market structures requires a re-examination of traditional regulatory approaches. This analysis focuses on two key provisions: TPA and sector coupling, with particular attention to their application in emerging market structures. While these concepts were initially developed for conventional, linear energy systems, their application in an increasingly

Upstream Gas Supplies in Central and Eastern Europe) C(2018) 3106 final [2018] OJ C 258/5.

⁷ European Commission, ‘REPowerEU Plan’ (Communication) COM(2022) 230 final.

⁸ K Talus, *Introduction to EU Energy Law* (Oxford University Press 2016) 6.

integrated and digitalized energy landscape as shown in Figure 1, presents significant regulatory challenges.⁹

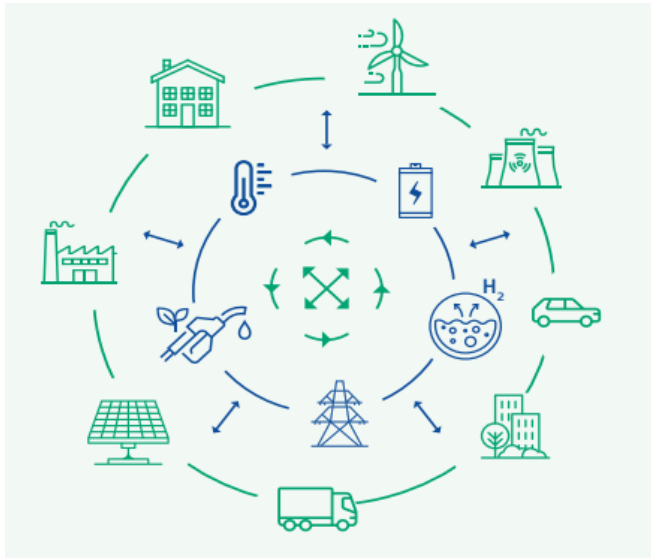


Figure 1: Integrated Energy System Structure

In this evolving framework, modern energy systems are shifting from linear structures into integrated, circular networks. EDPOs play a central role by aggregating market data, coordinating energy flows, and facilitating market operations. This transformation presents new regulatory challenges, particularly regarding the application of TPA in increasingly data-driven markets.

3.1 Third Party Access: Directive 2009/73/EC

TPA is a basic principle in the liberalization of EU energy markets. It ensures that market participants can use essential infrastructure, such as gas pipelines and electricity networks, under fair and non-discriminatory conditions.¹⁰ The main legal framework for TPA is Directive 2009/73/EC, which promotes competition by ensuring non-discriminatory access to essential energy infrastructure, thereby mitigating the effects of natural monopolies. TPA is important for market transparency and prevents dominant players from excluding competitors.¹¹

⁹ European Commission, 'Digitalisation of the Energy System' (European Union 2020) <https://digital-strategy.ec.europa.eu/en/policies/digitalisation-energy> accessed 21 February 2025.

¹⁰ Directive 2009/73/EC, op. cit.

¹¹ K Talus, op. cit. 19.

The EU implements TPA through two main approaches: regulated access and negotiated access. In regulated access, market regulators set fair prices and conditions, ensuring open, non-discriminatory access for all participants.¹² In contrast, negotiated access allows market participants to agree on terms through commercial contracts, offering greater flexibility but potentially limiting fair competition.¹³ Initially, both methods were allowed under the First Energy Package. However, the Second Energy Package later prioritized regulated access to promote competition and fairness across member states.¹⁴ When applied to data access, regulated access could raise security concerns, as unrestricted entry might expose sensitive systems to malicious actors. Negotiated access, by allowing for prior verification of data users, may offer a more secure alternative for sensitive digital platforms.

The regulatory framework works on three levels. The first level, defined by gas and electricity market directives, requires Member States to ensure TPA through clear systems for infrastructure use.¹⁵ The second level adds detailed rules for network access, including tariffs for cross-border electricity exchanges, which must be fair and non-discriminatory.¹⁶ The third level uses EU competition law, especially the essential facilities doctrine, which stops dominant market players from restricting access to infrastructure that is necessary for fair competition.¹⁷

In a circular energy system, as illustrated in Figure 1, data flows and coordination functions are highly interconnected. This raises the question of whether data monopolies should be analyzed as isolated elements or as part of a broader system. Likely, the latter approach is more appropriate, as systemic control can emerge from the convergence of multiple data points, even without a clear monopoly in any single area. Just as the European Commission looks at the whole energy system instead of focusing on individual pipes or cables, the same should apply to data markets.¹⁸ For an EDPO, it is important to assess the entire

¹² Ibid, 20.

¹³ Ibid.

¹⁴ B Delvaux, *op. cit.* 50.

¹⁵ Directive 2009/73/EC, *op. cit.*, art 32.

¹⁶ Regulation (EC) No 1228/2003 on conditions for access to the network for cross-border exchanges in electricity [2003] OJ L176/1.

¹⁷ TFEU, *op. cit.*, art 102.

¹⁸ K Talus, *op. cit.* 75.

system. Data flows and coordination functions are interconnected. Even without a clear monopoly, market dominance can result from controlling different parts of the system. This risk is intensified by first-mover advantages, particularly in data-driven markets where early access to vast amounts of information can establish long-term dominance, especially in AI-powered forecasting systems.

This raises an important question: Should existing TPA rules apply to data monopolies? The essential facilities doctrine, traditionally used for infrastructure, could also apply to data platforms. According to Article 102 TFEU, a company that abuses its dominant position by limiting access to essential facilities can face regulation.¹⁹ Applying this rule to EDPOs could mean regulating exclusive control over important energy data to ensure fair competition. However, excessive regulation of data access could risk constraining innovation and reducing incentives for EDPOs to develop advanced predictive algorithms.

Data monopolies also create unique challenges. Unlike physical infrastructure, it is often impossible to replicate the collection of critical market data. As the European Commission has noted, even with some alternatives, the whole system can still be an essential facility if competitors cannot challenge market leaders without fair access.²⁰ In the case of EDPOs, access to aggregated market data might be necessary to maintain a competitive market. The three types of data—input data, processed data, and output products—must be handled differently based on their nature and purpose: input data should be shared non-discriminatorily, processed data can be partially shared for transparency, and output products must be protected to safeguard intellectual property and foster innovation. The key issue is whether existing TPA rules should be updated to cover new data monopolies. Regulations may need to evolve to ensure fair and transparent access to essential data systems in today's increasingly digital energy markets.

¹⁹ TFEU, op. cit., art 102.

²⁰ European Commission, *Digitalisation of the Energy System*, op. cit.

3.2 Sector Coupling: Directive (EU) 2018/2001 (RED II)

The transition towards a low-carbon economy has driven the EU to adopt increasingly integrated energy market structures. Sector coupling—linking different energy sectors such as electricity, heating, gas, and transport—has emerged as a key strategy to enhance system efficiency, support renewable energy integration, and promote decarbonization. Although Directive (EU) 2018/2001 (RED II) primarily focuses on promoting renewable energy, it indirectly sets the foundation for sector coupling by encouraging the use of renewable energy across interconnected sectors.²¹ However, RED II does not provide a comprehensive legal framework for addressing the challenges that arise from cross-sectoral integration.

RED II sets clear objectives to increase the share of renewable energy in the EU's overall energy consumption, aiming for a minimum target of 32% by 2030.²² The directive promotes sectoral integration by supporting the adoption of renewable energy in heating and cooling systems and recognizing hydrogen as a renewable energy carrier through guarantees of origin.²³ This integration is essential to achieving the EU's climate goals, particularly the European Green Deal's ambition of climate neutrality by 2050.²⁴

From a legal perspective, sector coupling challenges traditional market structures by creating new interdependencies between sectors that were previously regulated separately. While RED II encourages the deployment of renewable energy across sectors, it lacks specific provisions to manage these emerging connections. This regulatory gap can lead to issues such as infrastructure bottlenecks, fragmented regulations, and insufficient incentives for cross-sectoral investments.

The lack of a clear legal framework for sector coupling also creates uncertainty for market participants, potentially discouraging investment and innovation. Integrating hydrogen or power-to-gas solutions requires clear market access

²¹ Directive (EU) 2018/2001 of the European Parliament and of the Council of 11 December 2018 on the promotion of the use of energy from renewable sources [2018] OJ L 328/82.

²² Ibid, art 3(1).

²³ Ibid, art 19(7)(b)(ii).

²⁴ European Commission, *The European Green Deal* (Communication) COM(2019) 640 final.

rules, infrastructure support, and coordination mechanisms—areas not fully addressed by RED II.²⁵

These challenges are particularly relevant for data-driven coordination mechanisms, such as those facilitated by EDPOs. Efficient sector coupling relies on real-time data integration across energy flows, consumption patterns, and market signals. Without clear data-sharing obligations or regulatory support for cross-sector data integration, the full potential of sector coupling cannot be realized.²⁶

The current legal framework also raises concerns about maintaining competition and ensuring security of supply. Cross-sector integration could lead to market concentration risks if certain entities gain disproportionate control over critical infrastructure or data flows.²⁷ Addressing these risks requires a regulatory framework that ensures fair access to essential infrastructure while promoting flexibility and innovation.

In conclusion, while RED II provides a valuable foundation for advancing renewable energy integration, it does not fully address the legal and regulatory complexities of sector coupling. A more comprehensive framework is needed to enable efficient market integration, safeguard fair competition, and ensure that sector coupling contributes effectively to the EU's decarbonization objectives.

4 Assessing Legal and Economic Implications

The transformation of the European energy market demands a critical assessment of existing regulatory frameworks. TPA and sector coupling are central to promoting fair competition and integrating renewables. Yet, data-driven systems and the rise of EDPOs introduce new legal and economic challenges that current regulations fail to fully address.

This section examines the adequacy of TPA and sector coupling frameworks, focusing on regulatory gaps, market distortions, and the balance between

²⁵ European Commission, *Hydrogen Strategy for a Climate-Neutral Europe* (COM(2020) 301 final).

²⁶ European Commission, *Digitalisation of the Energy System*, op. cit.

²⁷ Consolidated Version of the Treaty on the Functioning of the European Union, op. cit., art 102.

competition and innovation. It also considers whether traditional tools, like the essential facilities doctrine, are fit for modern, data-driven markets.

The TPA framework, established under Directive 2009/73/EC, was designed to ensure fair and non-discriminatory access to essential infrastructure. While effective for traditional energy markets, it fails to address the complexities of data monopolies. The rise of EDPOs, which control critical market data, could create new forms of dominance not covered by current TPA rules.

A central question is whether data monopolies should be treated like physical infrastructure monopolies. The essential facilities doctrine, traditionally applied to physical assets, could be extended to data platforms. This would ensure fair access to critical information for market participants. However, overregulation could discourage innovation, particularly for EDPOs developing AI-driven forecasting tools. Striking a balance between fair access and protecting proprietary innovations remains a challenge that current TPA frameworks do not fully address.

Market concentration risks are particularly relevant in data-driven markets. Early movers can initiate a feedback loop: access to data enables better forecasting and coordination, attracting more users and generating additional data. This cycle can create systemic market power over time, even without formal monopolies. AI technologies can accelerate this process, deepening market dominance in the absence of adequate regulations.

The traditional TPA framework prioritizes regulated access to ensure fairness. However, applying this model to digital platforms, particularly EDPOs, could introduce security risks by allowing unrestricted access to sensitive systems. A more secure alternative might be negotiated access, where data users are vetted through contractual agreements. This approach could better safeguard critical market data while balancing the need for fair competition and innovation.

While RED II establishes a foundation for integrating renewable energy across sectors, its lack of provisions for cross-sector data coordination creates regulatory gaps that challenge market efficiency and innovation. This oversight complicates sector coupling, as it fails to address the legal and operational complexities of connecting sectors like electricity, gas, heating, and transport.

EDPOs face additional challenges in facilitating sector coupling. Without clear obligations for data sharing and coordination, integration across sectors remains limited. As sector coupling progresses, it increases the interdependence between the energy sectors, which could lead to systemic risks and market distortions if not properly managed.

The absence of a clear legal framework for cross-sector data integration can weaken security of supply. Without synchronized data flows, market participants may struggle to forecast demand accurately or manage energy flows efficiently. Addressing these challenges requires regulatory reforms that promote flexibility, ensure fair access to essential data, and support the development of innovative solutions for integrated energy systems.

This assessment reveals that existing regulatory frameworks inadequately address the complexities of modern, data-driven energy markets. While TPA provisions ensure fair access to physical infrastructure, their application to data platforms remains unclear. EDPOs, as key market coordinators, face legal uncertainties regarding data access, intellectual property, and competition risks.

Similarly, RED II provides a foundation for sector coupling but falls short in regulating data-driven integration across energy sectors. The absence of clear data-sharing obligations and cross-sector coordination mechanisms could hinder innovation and undermine security of supply.

To ensure fair competition and foster innovation, regulatory frameworks must evolve to reflect the realities of an increasingly digital and interconnected energy market. Clearer legal definitions for data access, stronger safeguards for intellectual property, and targeted rules for sector coupling are necessary to support the energy transition.

5 Conclusion

This assessment highlights significant gaps in the EU's regulatory framework regarding both security of supply and the objectives of the Green Deal. While Directive 2009/73/EC (TPA) and RED II establish foundational rules, they fall short in addressing data-driven market dominance and cross-sector coordination,

both essential for achieving a modern, resource-efficient, and competitive zero-emission economy.

The application of TPA rules to digital platforms exposes clear limitations. EDPOs, while offering potential for enhanced system coordination and resource efficiency, face unclear obligations for data access and innovation protection. This regulatory uncertainty hinders the development of competitive digital services essential for managing future energy systems. The traditional essential facilities doctrine requires updating to address data monopolies while protecting necessary innovation in AI-driven forecasting.

Sector coupling frameworks, particularly under RED II, lack the comprehensive approach needed for an integrated green economy. The absence of binding data-sharing obligations between sectors impedes efficient resource allocation and limits cross-sector optimization. This fragmentation creates barriers to achieving both security of supply and emission reduction targets, particularly in emerging areas like power-to-gas integration.

Looking forward, regulatory frameworks must evolve to support both energy security and Green Deal ambitions. This requires modernized TPA rules that recognize data as an essential facility while safeguarding innovation, stronger cross-sector coordination mechanisms, and clear guidelines for EDPOs. Without such targeted reforms, the EU risks replicating traditional market dominance patterns in the digital space—potentially undermining both its security of supply and its vision for a competitive zero-emission economy by 2050.