


Chapter 5

Data Privacy Challenges of Blockchain Energy Systems

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ABSTRACT

In recent years, blockchain has made waves in the energy sector due to its decentralised, transparent, and immutable nature. On the other hand, the resulting breadth of blockchain applications in the autonomous operations and management of transactive energy systems has raised profound legal-related challenges, risks, and caveats. Data privacy breaches in blockchain energy landscapes present a considerable conundrum as they go to the root of societal values and human rights. The growing concerns prompt pessimism such that energy market participants are less inclined to engage in blockchain-enabled peer-to-peer energy trading. The author explores diverse data protection issues associated with permissioned and permissionless blockchain energy applications and speculate on how they may contribute to economic and social disruptions. Such exploration is beneficial as rising tensions will likely stagnate blockchain energy operationalisation and global diffusion. An earnest and effective dialogue of data protection challenges is necessary to fill the regulatory void.

1. INTRODUCTION

While academic scholars and industry players hail the benefits of blockchain, it is pertinent to reckon with numerous foundational challenges. In this article, the

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author discusses data privacy issues that perturb blockchain applications in energy trading domains. Blockchain is a double-edged sword for data privacy. While its transparency and immutability can enhance trust and data integrity, these features can conflict with privacy needs. The technology's trustless nature eliminates intermediaries, but the permanent, publicly viewable record of transactions, which is accessible to all participants in the network, raises significant privacy concerns. This section explains why this tension becomes particularly relevant in blockchain-based energy trading, where regulatory frameworks must balance transparency benefits with data protection requirements.

The author explores the friction between blockchain applications in energy trading systems and data protection regulations. There are many data protection regimes around the world, which exemplify the rights granted to individuals whose personal data is processed. For instance, the General Data Protection Regulation (GDPR) is appraised as the pioneer or the “gold standard” in data protection laws, exhibiting immense promise in providing stringent safeguards for users’ data rights (Diamantopoulou et al., 2022; European Union, 2016). The GDPR is a role model for other nations by advancing its efforts, both in theory and practice, when ensuring robust data protection mechanisms. The Australian Privacy Act emulates the GDPR by extending comprehensive data rights in line with a privacy-focused approach (“Privacy Act”, 1988). However, the Act does not embody the right to (a) erasure, (b) portability, and (c) object to the processing of personal data (Potter et al., 2020). The United States has multiple federal and state data protection laws to protect the personal data of its citizens. Federal data protection laws include the Driver’s Privacy Protection Act of 1999 (DPPA), the Children’s Online Privacy Protection Act (COPPA), and the Health Insurance Portability and Accountability Act (HIPAA) (“Children’s Online Privacy Protection Act”, 1998; “Driver’s Privacy Protection Act,” 1999; “Health Insurance Portability and Accountability Act”, 1996). Further, California, Virginia, and Colorado are amongst the privacy-centric states that have enacted comprehensive consumer privacy laws, imposing obligations on collecting, using, assessing, or deleting personal data (“California Consumer Privacy Act,” 2018; “Colorado Privacy Act”, 2021; “Virginia Consumer Data Protection Act,” 2021). The House Energy & Commerce Committee recently proposed the American Data Privacy and Protection Act (ADPPA) to enact comprehensive national data protection legislation (“American Data Privacy and Protection Act”, 2022). The ADPPA extends multiple data protection rights to data subjects, such as the right to access, rectify, and delete personal data, beyond many existing state laws (“American Data Privacy and Protection Act”, 2022). Multiple jurisdictions in Asia have implemented data protection laws that advance (a) data protection principles, (b) data subjects’ rights, such as the right to data portability, access, correction, and deletion, and (c) obligations and responsibilities of data controllers, sharing many

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