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 NORTON ROSE FULBRIGHT

Unlocking the blockchain

A global legal and regulatory guide

Chapter 4: Digitizing the energy value chain

A preview



Overview

Interest in blockchain and distributed ledger technology (DLT) has grown dramatically over the last twelve months. This has triggered growth in investment in businesses operating in this area and marked engagement from all industry sectors (energy and financial institutions in particular) in blockchain and DLT, as well as notable pilot projects and live deployments.

Against this backdrop, a number of regulators have been focusing on the benefits, challenges and risks posed by blockchain and distributed ledger technologies and how these might operate within the existing regulatory framework. Any proposed deployment will need to take into account such regulatory considerations and a range of other legal issues. In view of this, Norton Rose Fulbright's global blockchain and distributed ledgers practice group has produced a global legal and regulatory guide to blockchain and distributed ledger technologies.

This guide will be published in a series of chapters, covering the following topics and use cases.

Topics

- An introduction to blockchain technologies
- Using intellectual property rights to protect distributed ledger technology
- The regulatory considerations
- Litigation and dispute resolution considerations
- Competition/anti-trust issues
- Tax considerations

Use cases

- **Digitizing the energy value chain**
- Digitizing the insurance value chain
- Securitisation and trade receivables finance
- Identity (including data privacy issues)
- Clearing and settlement
- Supply chain management
- DAOs (decentralised autonomous organisations)

We hope that you will find this fourth chapter on *Digitizing the energy value chain* insightful and would welcome the opportunity to discuss any aspect of it with you in greater detail.

If you would like to receive Chapter 4 and register for the subsequent chapters, please contact rachel.dawes@nortonrosefulbright.com.

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Preview page

In this chapter we examine how digitizing the energy value chain through the use of blockchain and other DLT has the potential to revolutionize the energy industry, from the way energy is traded and distributed, to the way the market is regulated and how business relationships grow. The use of DLT, and applications enabled by it, will give the energy industry a new technology platform which, if deployed effectively, could lead to a fundamental change in how the industry shares data and transacts.

The original premise of DLT was to allow participants to control data on a shared “ledger” and to transact on the basis of verified data. As such, DLT has immediate application in energy asset management, energy trading and payment mechanisms, improving the effectiveness of existing processes. However, as understanding of DLT is rapidly increasing, new applications are being developed, tested and deployed. In future, the use of DLT, in combination with other emerging technologies such as smart contracts, intelligent sensors and the Internet of Things, could, change user engagement and potentially even alter market structures.

In this guide, we explore existing, emerging and future applications of DLT in the following energy industry sub-sectors

- **Energy trading:** DLT is potentially disruptive to every stage of the energy trading value chain. DLT, when combined with intelligent sensors, is expected to enable more reliable means of verifying the provenance and ownership of commodities, as well as associated attributes such as renewable energy certificates and carbon credits. It is also likely to promote the emergence of new products, pricing structures, and trading strategies, more reflective of real-time supply and demand. Cost reductions in deal-execution are likely to be achieved by enhanced information flow and disintermediation, using smart contracts to automate the execution of trades. Post-execution, DLT could enable a more secure and efficient interface with regulators, and increase the speed of clearing and settlement, thereby reducing counterparty credit risk.
- **Oil and gas:** The oil and gas industry is already actively looking at deploying DLT across the value-chain. Indeed, DLT may itself be a tool to facilitate the joint ventures which characterize the industry. Looking at different aspects of the value chain, in upstream exploration and production, DLT combined with smart sensors could facilitate data-capture and record-keeping, as well as enabling asset optimization using data-driven insights. Midstream, DLT has many applications, ranging from enhanced commodity tracking and trading practices (using electronic bills of lading and customs declarations for example) to more effective scheduling of tanker movements and improved monitoring of remote assets. Downstream, DLT combined with intelligent sensors and smart contracts, could make refueling outlets more efficient and automate payment systems, as well as optimizing natural gas trading and pipeline operations.

- **Power:** DLT has the potential to fundamentally change the structure of the power sector. Coupled with increasingly distributed energy resources, DLT is likely to blur the distinction between the traditional roles of consumer, generator and supplier, facilitating the development of new products and business models, such as decentralized micro-grids and peer-to-peer energy trading systems. DLT-registered tokens are already providing new sources of capital for project development and blockchain-controlled platforms are being trialed for electricity grid management. With the roll-out of smart meters, DLT has the potential to make metering systems more accurate, to facilitate switching of suppliers and to better monitor energy efficiency savings. Electric vehicle charging and vehicle to grid services may also be enabled.

The physical movement of energy remains at the heart of these transactions. Therefore, it is necessary to consider how DLT-enabled applications will interface both with physical energy infrastructure and with the regulatory framework governing the sector. These industry-specific considerations must also be overlaid with other, more ubiquitous regulatory requirements, such as rules relating to data-privacy, corporate governance and fraud prevention. The result is a complex regulatory matrix, which varies according to energy sub-sector and jurisdiction, and which will inevitably need to adapt to accommodate the opportunities that DLT presents.

Finally, the adoption of DLT by the energy sector also needs to be carefully considered in the light of the energy demand required for it to function; it must be sustainable. The energy usage required will depend on whether a permissionless system is needed, which may not be the case in many energy applications. Designers of new platforms and solutions will need to be mindful of this.

The analysis is not intended to be exhaustive, nor can it be – as innovation accelerates other applications, legal considerations and commercial issues are bound to emerge over time.

Chapter structure

In the first section of this guide we examine why the energy industry needs to understand blockchain and DLT. We then provide a recap of what DLT is and how it works. Next, we explore existing, emerging and future applications of DLT in key energy industry sub-sectors: energy trading, oil and gas, and power. We then consider some of the main overarching regulatory issues which will need to be addressed by businesses operating in the energy industry in relation to DLT. Finally, we examine the energy usage of DLT and consider whether its adoption is sustainable.

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