BLOCKCHAIN

Across the globe, oil and gas companies are testing blockchain, a distributed ledger technology that could make trading commodities simpler, cheaper and more transparent. However, some hurdles have yet to be overcome. S&P Global Platts' *Siobhan Hall*, Senior Editor – EU Energy Policy, and *Sebastian Lewis*, Content Director – China, explain.

Blockchain promises and pitfalls

Proponents of blockchain promise savings of up to 40% on back office post-trading costs, which could lower the barriers to market entry and bring in new players, while applying the technology to trade finance could help tackle fraud. However, the dearth of commercial applications so far shows that blockchain has still to prove its worth in the energy sector, with issues such as cost, scale, privacy and liability all potential deal-breakers.

Some of the biggest names in oil and gas, including Equinor, BP and Shell, as well as global trading houses like Gunvor, Koch and Mercuria, and big banks like ABN-AMRO, Société Générale and ING are now tackling these issues. These nine companies have set up Vakt, a London-based consortium working on a blockchain-based platform for post-trade processing that is intended to eliminate paper, improve efficiency and transform trade finance options.

Vakt plans to focus first on oil trading and, at the time of writing, intended to launch before the end of 2018, offering the consortium members processing services for BFOE (Brent-Forties-Oseberg-Ekofisk) North Sea crude trades. It plans to expand this initiative first to pioneer users – organisations that are ready to engage in a blockchain service – and then to other potential participants by the end of 1Q2019.

If all goes well, Vakt wants to offer services for Amsterdam-Rotterdam-Antwerp product barges and US pipeline crude trading, and eventually scale-up to enter many other oil and gas markets.

Consortium members ING, Mercuria and Société Générale already have some direct experience. In 2017 they used a blockchain to digitise the documents of a test African crude oil shipment, which was resold three times on the way to China.

Mercuria is also involved in OneOffice, a blockchain platform that Canadian technology company BTL is developing to offer post-trade reconciliation services for natural gas. The other partners include Russia's Gazprom – Europe's single biggest gas supplier – as well as Eni, Freepoint, Petroineos, Total and Vattenfall. BTL believes its platform could eventually cut back office costs for processing wholesale gas trades by 30–40%, and that this is a conservative estimate.

Asian interest

Meanwhile, China's Sinochem Group has also been testing blockchain for oil trading. In April 2018 it used a blockchain to carry out a simulated gasoline shipment from Quanzhou to Singapore, with inputs from HSBC, Xiamen Customs, China Certification & Inspection, ship owners and freight forwarding agencies. Sinochem claimed this was the world's first blockchain oil trade test directly involving government officials.

The test followed Sinochem's first simulated blockchain crude oil trade, for a shipment from the Middle East, in December 2017. It said that using digital bills of lading and smart contracts significantly enhanced trade efficiency, reducing financing costs.

In the Middle East, commodity information specialist S&P Global Platts is operating one of the first live commercial blockchain applications in the energy sector at the Port of Fujairah in the United Arab Emirates (UAE). It uses a blockchain platform to collect and publish weekly aggregated oil terminal stock levels on behalf of the Fujairah Oil Industry Zone (FOIZ) authority and data committee FedCom.

Publishing stock level data – a key supply data point for traders – is part of FOIZ and FedCom's efforts to develop Fujairah as a trading venue, not just a physical hub, by improving transparency. The private, permissioned blockchain allows data on it to be shielded from both other

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Photo: Shutterstock/dencg

blockchain members and the blockchain administrator. This allows a useful anonymous aggregated figure to be produced while respecting the commercial confidentiality of the individual submitters.

S&P Global Platts is now working with government agency Enterprise Singapore to look at digital options, including blockchain, for reporting oil inventory data in Singapore, one of the world's biggest oil trading and refining hubs.

The challenges

Probably the biggest challenge facing all industry-level blockchain trading projects is simply achieving the critical mass of participation needed to make using a new system commercially viable.

Companies that already have procedures in place – however inefficient – will not save money if they start using parallel systems, and yet they are unlikely to commit large volumes to a new system until they are confident it works and enough of their counterparties are on it. Without critical mass, costs per transaction will be higher and efficiency gains limited.

Another risk identified by European power industry association Eurelectric is that a blockchain's security remains unproven until it is big enough to be worth trying to hack. So, while scaling up improves the efficiency and viability of a project, it may also increase its risk of attack.

Another key concern is the privacy of the data involved. The competitive advantage in commodity trading often lies in being able to exploit price arbitrages over product specifications, location and time. Companies will not want their suppliers or buyers, let alone their competitors, having access to transaction data that can be used to uncover trading strategies.

Blockchain developers like R3, Hyperledger and Vakt all stress that their systems can be configured so that only the counterparties involved have access to the transaction data, with all data fully encrypted. While a big part of the blockchain mantra is that it is a secure system, companies may need a lot of reassurance before transferring their confidential trade data on to a blockchain platform in viably large quantities.

Transparency threat

Blockchain's ability to create real-time records of location and ownership of commodities could greatly increase transparency across the supply chain. The immutable digital record of ownership could facilitate securitisation of commodities in storage and in transit, potentially revolutionising the way capital is deployed across the industry.

But it also poses a significant threat to current actors in the market. Many of those involved in pilot projects are existing industry players, like banks and traders. They may be taking part to see what the risk is to their current business model, reserving judgment on actually committing to a blockchain system.

A system that successfully cuts costs, for example, also lowers barriers to entry, potentially bringing in more competitors to challenge the incumbents and their margins.

Legal headaches

Then there are the legal issues, such as which law should govern a blockchain contract that can exist virtually on a computer or a cloud located anywhere in the world? Who is liable for mistakes in a private decentralised network?

Other issues include defining the legal status of a smart contract which executes automatically according to a set of pre-defined rules. Is it a legal person or a contract? Is the programmer of the smart contract liable for its operation if it executes automatically?

These are problems for companies, regulators and governments to resolve, and the answers may be different in different jurisdictions, leading to legal interoperability problems.

Many different blockchain platforms developing in various different ways could also lead to system interoperability problems. Agreeing to common industry standards is the usual way to avoid this, but the pace of technological change could make it particularly challenging in this sector. The European Commission, for example, considers it may have a role setting EU standards to ensure interoperability between platforms and programs, and across national borders. Any potential EU legislation will be technology neutral and not specifically about blockchain, according to a senior EC official.

But such legislation could remove legal requirements for keeping paper records, for example, and clarify whether smart contracts should be binding across borders, both of which would support blockchain take-up. Another way in which regulators can help is to offer start-ups and project developers 'regulatory sandboxes' – a controlled space to test ideas under regulatory supervision without fear of costly compliance breaches.

How blockchain works

Blockchain is best known as the technology behind the Bitcoin cryptocurrency, but it could be used in any process involving transactions and exchanging data.

It works by creating a network where every member has a copy of a shared ledger. The ledger is updated using agreed common rules – a consensus algorithm – for verifying and adding new data blocks to the chain. The data on the ledger cannot be changed, creating a permanent, immutable record.

Once the blockchain is in place, automated code-based processes known as 'smart contracts' can interact with and update the ledger without direct human intervention.

Bitcoin is based on a public blockchain which uses an energy-intensive 'proof of work' consensus algorithm to verify transactions, known as 'mining'.

Developers are looking at less-energy intensive alternatives for the private, permissioned blockchains being explored for commodity trading applications. A private, permissioned blockchain has restrictions on membership, and data can be shielded from other members and the blockchain administrator. ●

Source: Blockchain for commodities, S&P Global Platts, 2018

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AI, machine learning

Blockchain also is not the only game in town. The possibilities and rewards of artificial intelligence (AI) and machine learning, for example, are also attracting interest across the energy sector.

Vakt, for example, has said that it is choosing an open source system to be able to respond to technological and market changes. It is also limiting the blockchain portion of its system to 20–25% and fulfilling the rest with apps on top. This is a risk mitigation strategy against potential future interoperability issues and shows how blockchain is just one part of the new digital trading infrastructure.

Overall, the current reliance on manual, cross-checked, paper-based administrative tasks to process individual commodity trades through to settlement and delivery looks set to change, and industry is preparing for it.

'There's a full acceptance in the front office of any trading room in Singapore that blockchain will change not just how we trade, but potentially what we trade and who we trade with,' according to Iain Lawson, BP's Head of Structured Products for the Eastern Hemisphere. ●