

Blockchain: Downfall Or The Future Of Utilities?

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Photographer: Akos Stiller/Bloomberg

Energy may be the lifeblood of civilisation but that simply means that as the energy market changes, so does the way we do business. Blockchain is being touted as the solution to almost every problem but, in the energy markets, it might just be the key to transformation.

[Bloomberg](#) recently wrote about how blockchain has the capacity to upend the traditional utility model as it empowers consumers. Simon Tucker, Partner and Head of Energy Europe at Infosys Consulting agrees and says, ‘The blockchain bubble obscures the fact that this technology has the potential to transform the energy market beyond recognition.’ Beyond recognition however means that we don’t know how things are going to play out, and that means everything to play for.

There is no doubt that markets and accompanying services are developing. According to Denis Baranov, Principal Consultant, Data Art, ‘Experiments started in early 2016 with a US based company in Brooklyn, New York. The owner of a solar panel sold energy to his neighbour via Ethereum smart contract. This happened on the Brooklyn micro-grid managed by Lo3 Energy. In the same year in Amsterdam, the first European energy trade via blockchain happened.’ He adds, ‘I’m absolutely sure we will have more and more such kind of events happening in the nearest future. The market is already preparing to adapt new technologies.’

Until recently most conversations about blockchain have been about Bitcoin, Ethereum and ICO’s as a new means of raising funds for crypto-currency creation. The more understanding we gain about blockchain's potential however, the more interest there is in the opportunities it offers in industries from energy to financial services, real estate to healthcare.

Robert Kaluza, Chief Operating Office of blockchain company Billon Group explains blockchain as the generic description of a technology that is a distributed way of storing data. He describes the distributed ledger technology (DTL) approach as one which ensures the consistency of data and no harmful change. He uses the analogy of banks, were the system currently operates central authorisation on data that is stored and protected, while blockchain means theoretically means everyone has access to the data, effectively cutting out the middleman.

A society and marketplace can be built on blockchain says Kaluza, adding, ‘publish the terms and conditions of the social contract and terms are automatically settled using electronic money, and such a system can be used within an industry or extended to a city or country.’

Of course, as with any new technology, there are a number of issues which need to be addressed before we can assess the extent to which blockchain will help or hinder the utility market: cost, scalability and understanding of its potential.

Cost

It’s a given that cost is key in energy markets, new infrastructure and technologies need low cost deployment. One of the arguments against the use of blockchain has been the enormous cost of its use. Joanna Hubbard, co-founder of energy tech firm Electron says, ‘The famously high energy consumption of the bitcoin blockchain is a result of the ‘proof of work’ mechanism that maintains the security of a network on which nodes are neither trusted nor identified.’

According to Robert Schwarz, Principal at Poyry, Bitcoin’s algorithms run at around ~45 TWh/a – a similar consumption to economies the size of Greece or Algeria. He says that this can’t remain the case if blockchain is to go mainstream. He says, ‘It’s difficult to justify such an energy use, regardless of the benefits provided by the blockchain... There are other concepts like proof-of-stake or proof-of-authority.’ Hubbard agrees, ‘most of those of the energy industry as whole as it happens, are using permissioned, consortium blockchains, in which node operators are both trusted and identified. This means that blocks can be added to the chain by ‘proof of authority’ instead which uses relatively little energy.’

Scalability

With proof of stake and proof of authority approaches, there is a higher chance of achieving scale. Baranov says that blockchain, as a distributive technology, is by its very nature scalable. The solution is probably not to use existing public blockchains, which are used by millions and

millions of people. It might be possible to create a series of new private blockchains, and then scalability should not be an issue.

New business models

There are a range of new business models in the energy sector that blockchain enables, the most obvious of which is peer-to-peer energy trading, cutting out the middle man. Christoph Burger, senior academic at ESMT Berlin Business School suggests four key options where blockchain can reduce process costs or help organise networks:

- Automated billing based on flexible retail prices
- Proof of origin of generation source
- Enabling smaller generators to be part of demand response
- P2P trading

One example is Hubbard's Electron platform. She says, 'What is transformative about our platform is that these trades are capable of being both a bilateral and multilateral basis. For example, a single battery is capable of selling balancing services to the systems operator, locational constraint management services to a distribution network operator and help a supplier manage a trading imbalance all at the same time. Multilateral trading like this ensures that asset owners realise the full value of their distributed generation and the system balances more efficiently.'

Schwarz says, 'The current pilots are a first start and they are moving in the right direction. The question is whether the entire market design will change, or if blockchain solutions will adapt to the existing market design. In any case, we should see balancing being integrated in some form into the existing projects to really make a difference.'

Grid

There is little question that electricity grids and systems are undergoing fundamental changes as the energy markets evolve to meet the challenges of the twenty-first century. Designed to manage large power assets with predictable profiles, they now need to co-ordinate and manage up to millions of different assets, of different sizes and profiles. Hubbard says, 'Blockchain will underpin this coordination and assimilation function. It will open this market up to mass participation in a trusted, rules-based and auditable manner.'

Data

Where blockchain really has impact is in managing data. As Tucker points out, 'In the energy sector, data has gone from an asset to a burden. From managing the complex documentation of inefficient transactions across global energy markets, to ever-growing regulation, wide-scale adoption of the IoT across energy infrastructure and supply chains, and the rise of increasingly-sophisticated cyber-attacks, energy businesses are drowning in data and urgently need a way to control and authenticate information.'

While it's true that there is the potential for utilities to be bypassed by peer-to-peer trading, it's actually far more likely that those utilities which accept and adapt the technology for their own needs will prove successful.

Tucker points out the enormous benefits that such technologies can bring. He says, ‘Blockchain has an enormous potential to reduce the risk of fraud, error, and invalid transactions, while simultaneously reducing credit risk through a trusted ledger mechanism. The technology can also be used to remove or reduce fractional costs and make financial transactions more efficient, facilitate regulatory reporting requirements, and enable interoperability by standardising data formats across organisations. But these solutions aren’t far off in the distant future – they’re happening here and now.’

In terms of how the market is likely to evolve, Schwarz points out, ‘It depends a lot on the utilities and how innovative they will be. When future business models based on the blockchain become a reality, it will be too late to start investing resources into the technology. In that situation it is a threat. However, utilities could be leading the innovation in this sector, together with regulation. Even if the margins become smaller due to more efficient blockchain-based solutions, an innovative utility will still play a role in the energy markets.’

The original article can be viewed here:

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