# Roland Berger Spotlight

<u>How blockchain could foster peer-</u> <u>to-peer energy exchange.</u> Blockchain has the potential to disrupt the energy market. As the technology allows for secure transactions without intermediaries, the business model of most energy players and utilities could be about to change.



## The energy market could use a blockchain makeover

The energy market is particularly crowded with intermediaries. Think of energy suppliers, buying energy from producers and selling it on to consumers. Or grid operators, who are tasked with the recording of consumption data and the settlement of tariffs for using the grid. Even though those companies have set up a functioning energy supply system, their current services come with several inherent drawbacks. They cause delays when customers want to switch suppliers or pay their energy bills, as they need time to execute orders. They create a lock-in effect, as consumers can only buy energy from a single supplier at a time. They monopolize customer data and their systems are vulnerable to attack or failure.

Blockchain could address these issues, while maintaining the merits of the current system. A blockchain, like the name suggests, is a chronological chain of transactions or "data blocks" which cannot be manipulated and is stored in every node of a network. Each block can list data, such as property rights, entitlements and identities. All transactions are stored in a decentralized general ledger, with data subsets distributed throughout the node network. Security is ensured by public (encryption code) and private keys (similar to PIN codes). By definition, a blockchain is immutable, hence it is extremely difficult to alter without collusion, and any tampering can be identified easily. Moreover, it is decentralized, which means that all local entities hold a subset copy.

#### Figure 01: Selected blockchain Analogy features ..... ..... One digital identity > Certified land charge > Passport ..... ..... Secure and traceable transactions > Bill of exchange/endorsements > "Eternal" track changes mode ..... ..... **Real-time execution** > Mouse trap > Stop-loss order •••••• One single source of truth > Land registry > Notarial deed .....

For business purposes, blockchains combine 4 useful features: (1) one digital identity, (2) secure and traceable transactions, (3) real-time execution and (4) a single source of truth. These features enable peer-to-peer transactions. If all (perfectly identifiable) users continuously keep track of irreversible transactions, there is no more need for a third party to govern transactions.  $\rightarrow 01$ 

#### Inspiring use cases have been developed

Several businesses are already offering peer-to-peer energy services, based on blockchain. FinTechs have taken an early lead, but interesting cases have emerged in the energy industry as well.  $\rightarrow 02$ 

#### Figure 02: Blockchain use cases in the energy industry

	CENTRAL CLEARING	P2P ENERGY SALES	P2P BUDGET METERS
Concept	Simplify the exchange of data between grid operators and energy suppliers	Allow prosumers to sell their excess renewable energy directly to other consumers	Simplify the recharging and adminis- tration of budget meters
Relevance of blockchain	Decentralizing the ledgers could pre-empt the need for a Central Market System and smart contracts could automate billing	Decentralized ledgers and smart contracts could enable instant P2P sales of energy	Decentralized ledgers and direct deposits avoid costs for administration and money transfers
••••••			
Best practice	Nasdaq Linq, a blockchain-based platform, allows for the issuance and transfer of shares without intermediary	LO3 Energy in Brooklyn and Power Ledger in Australia set up a blockchain to allow consumers to sell excess renewable energy to peers	Usizo is a crowdfunding platform relying on bitcoin blockchain-enabled smart meters to which foreign donors can directly deposit cash
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### Use Case #1: Track and share consumption data in a blockchain to enable instant clearing

#### Assessment of the current situation

Grid operators and suppliers need to exchange data on assets, contracts, consumption and billing

They are currently setting up a central clearing house, "Atrias", adopting common systems and processes for these data flows

Due to the complexity of the project (multiple legislations, different IT systems/processes to migrate from), the project has incurred substantial delays and large cost overruns

The project will facilitate interactions within the energy industry, but operational savings and added value for end consumers is limited

#### **Blockchain use case**

Several blockchain principles could help to simplify the Atrias project: > Decentralized ledgers could increase transparency and enable local clearing of transactions and energy exchanges

> Smart contracts would enable more automated billing

Nasdaq Linq could be regarded as a best practice – It is a blockchain-based platform, allowing for OTC share issuance and transfers, without the need for an intermediary

#### Use Case #2: Enable P2P energy sales and leverage the use of renewable energy sources

#### Assessment of the current situation

Currently, prosumers' local production is deducted from their consumption, according to the energy price of their contract with their energy supplier

Enabling prosumers to market their energy themselves would have several advantages:

- > Prosumers could benefit from selling "at the right time" (when demand is high), earning a premium compared to the standard rates of their contract
- > Private investments in renewable energy sources will be more attractive
- > New, innovative business models will emerge to balance supply and demand

#### Blockchain use case

Blockchain could enable P2P energy sales, because:

- > (Smart) metering data on production and consumption can be tracked and verified in real time
- Payments can be handled in a secure and transparent environment, thanks to smart contracts and cryptocurrencies

The Brooklyn Microgrid initiative of LO3 Energy could be considered a best practice – They created a local network of 50 prosumers and consumers that are free to sell and buy energy to and from each other through an app linked to a blockchain

## Use Case #3: Simplify the recharging and administration of budget meters

#### Assessment of the current situation

Consumers that have been excluded by energy suppliers are shifted to a prepaid energy contract and budget meter, both provided by the distribution system operator

The recharging of the budget meter is cumbersome, as advance payments need to be debited to a card, which can only be done locally at the offices of the grid operator and its partners

Smart meters will allow for distant recharging, but will still require a lot of administration and money transfer costs will still be incurred

#### Blockchain use case

Blockchain could facilitate the recharging of budget meters, because: > (Smart) metering data on consumption can be tracked and verified in real time

> Payments can be made directly to the budget meter, thanks to smart contracts and cryptocurrencies

Usizo in South Africa shows the potential of the technology – It is a crowdfunding platform, based on blockchain, through which donors can directly deposit money on someone's budget meter

#### **Call for action**

Energy players should test the merits of blockchain by developing concrete use cases. An agile approach should be adopted to test minimum viable products as soon as possible at minimal cost. 3 steps should be considered: **On your marks!** Mobilize a blockchain core team; identify, select and describe use cases; test their high-level feasibility and market potential **Get set!** Define an initial blueprint and build mock-ups of the selected use cases; describe the overall value proposition

**Go!** Formalize and validate the business plan; prepare a roadmap towards a full proof of concept

As for all major innovations, market players need to drive the blockchain developments now rather than waiting for others to disrupt their business model.

## WE WELCOME YOUR QUESTIONS, COMMENTS AND SUGGESTIONS

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