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OPPOSITES ATTRACT: MICROGRIDS AND THE PAN- EUROPEAN POWER MARKET.

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EPEX SPOT, THE EUROPEAN POWER EXCHANGE

On 12 December 2017, LO3 Energy, an energy-tech company revolutionizing the future of energy through disruptive technologies, and the European Power Exchange EPEX SPOT signed a Memorandum of Understanding. Both companies committed to sharing their complementary expertise to develop solutions connecting the local and the wholesale market using blockchain technology and involving clean energy.

The partners

The power market, and wholesale power trading in particular, is currently influenced considerably by the so-called “three D’s”: Digitalization, Decarbonization and Decentralization.

The whole sector left the calm water, which it was used to for decades, a

couple of years ago and entered into a kind of hustle and bustle for the next new big trend or development. Plenty of potentially disruptive technologies and ideas are discussed, considered and pursued in pilot projects on the one hand. On the other hand, the evolution of existing technologies seems to attract distinctly less attention, which might be due to several potential drivers: Are stakeholder discontent with the present solution? Do the new ideas simply fire our imagination? Or are many market players simply afraid of missing (another?) change in the sector that might end up in being the last trend they miss - as it will simply sweep them away?

The energy world is being disrupted and challenged by multiple elements across the value chain, such as the massive development of renewables to reach the Paris Agreement, the emergence of local power communities and the increasing development of demand-response, electric vehicles, batteries, storage and IoT (Internet of Things) devices. Blockchain definitely belongs to the group of the most intensively discussed new drivers of today’s energy sectors. And they are widely considered a disruptive technology.

Blockchain is a decentralized and public digital ledger of transactions, held by all participants. Each transaction is secured being automatically registered, checked and approved at a high number of nodes of the network. Decentralizing the

information makes the system almost unhackable, as it is virtually impossible that all nodes composing the network are compromised at the same time. Either passing through a public or a private blockchain, transactions’ security and reliability are ensured by the distributed and mutual validation within the decentralized ledger. In both cases, no third party and middle man intervention is required for these objectives. Blockchain can be of great interest in many sectors, including the energy one.

It is said to revolutionize and democratize the energy business, to remove all kind of intermediaries and to blur the boundaries of the different markets we face today. And, indeed, we distinguish between the wholesale and the retail market, between local, national, regional, European and global markets. Would a new market design, developed from the scratch and taking into account today’s needs and technology, look like the present one?

At the Event Horizon 2017 event in Vienna in February 2017, a vast number of pilots and ideas in relation to blockchain were presented. Most of them presented a clear picture of a completely new market setting without a clear description of the way of implementation. When potential investors were asked to comment on the presentations, they offered an interesting advice: do not try to change the world in one step, give a clear, visible and controllable

example how the present environment can be supplemented or amended in beneficial way by starting to exploit the potential of the new technology.

The partners

LO3 Energy is a technology and business development consulting firm, based in Brooklyn, NY, USA, with a focus on emerging decentralized business models and innovative technologies related to energy, cleantech and currency systems. They focus on the energy sector and want to use new technologies – including blockchain – to put the end-consumer at the core of the energy business model, creating and developing efficient marketplaces for the energy sector. LO3 Energy argues not only to be a blockchain technology company but an energy technology company using the best and most promising technology available today, being blockchain.

EPEX SPOT has been a leading actor in the development and evolution of the European power spot market over the past decade. As a forerunner in the integration of the European power markets, EPEX SPOT has developed solutions toward the optimization of continental markets, the optimized use of interconnectors at European borders and the integration of renewables through innovative products. Technology is and has already been at the core of EPEX SPOT business, which is to create and foster a central and transparent marketplace

for spot power trading, using a state-of-the-art trading engine and set of software. Blockchain technology can bring a lot to the energy sector if well applied to its specificities related to the market and regulation.

Against this background, one can claim that EPEX SPOT was active in the fields of decarbonization since its establishment in 2008 by establishing both, the right market setting and the tailor-made products, to meet the increased power generation from renewable sources. However, in a fast changing world, it may prove harmful to complacently focus on the merits of the past.

This is exactly why EPEX SPOT has already started to place emphasis on digitalization and decentralization for several years, which can be particularly illustrated by the development of its intraday markets: real-time trading, smaller granularity of products and increased speed of processing orders are the consequences of digitalization. The reduction of lead-time, i.e. the time span between entering into a transaction and its start of delivery, to five minutes, the successful implementation of 15 minute products and the increased relevance of automated trading, which results in more than 250.000 orders per day would not have been possible without the dedication to exploit the possibilities offered by new technologies. As decentralization is concerned, the key to success needs to be found in the smooth integration

of different market layers. EPEX SPOT is still convinced that a large and coupled market area results in higher welfare. Nevertheless, quite comparably to the smaller granularity of our products, there is an incremental benefit to differentiate on a local level, to look for smaller units. For instance, this can support grid stability and enable demand side response. The future importance of local markets cannot be underestimated. They will play a key role to help both supply and demand (residential neighborhoods, businesses, prosumers) and local distribution system operators in managing flexibility and demand response. This will especially be the case in a world with more microgrids and renewable energy sources. However, the project partners are convinced that local markets will coexist with the existing coupled and national wholesale markets.

This is the reason, why the solution should be looked for in the perfect integration of the different market layers. To market participants it should not be essential to know on which market layer they are trading at a certain timeframe. The possibility to enter into a transaction at the best conditions and the access to the best signals are key.

The idea

EPEX SPOT and LO3 Energy intend to combine their know-how to connect their systems and develop a prototype where local microgrids are plugged to

the wholesale power market.

We are living in an environment where through new technologies individuals can have high impacts on their community and beyond. However, is there a need for a new technology in the power wholesale market? It is about merging markets and their players. The current wholesale market design implies access barriers. Blockchain technology promises to offer an approach of welcoming new market segments that would have been considered retail ones in the past. This is exactly what LO3 Energy is doing, allowing people to be active on their energy bill and consumption. Their blockchain based smart meters and Exergy platform allow microgrid users to trade renewable energy on a real-time basis. Connecting the systems of both partners will make it possible for the local market players on the microgrid to access the wholesale power market, and therefore increase market opportunities for the new microgrid market players who are the prosumers. This partnership will enable prosumers to be an active part of the energy market: First, they will be able to feed excess electricity back into the grid and receive payments for that. Moreover, they can purchase a potential shortfall in energy on the market. And finally, the optimization of energy consumption at a local level, contracting for cheaper energy when needed, for battery refill for example, is facilitated.

At the same time, the envisaged approach focuses on manageable sizes to address the issue of the required computing power. This is broadly considered a bottleneck of the new technology as the encryption process is far from being straightforward. Therefore, it is not envisaged to replace the entire wholesale market by a single blockchain. Instead, smaller local entities shall be added. Therefore, the known limits in the calculation process do not matter at all.

The new partnership encompasses both blockchain technology at a microgrid level, enabling peer-to-peer trading and setting up a decentralized registry on the microgrid, and wholesale trading expertise at a national level and beyond. Opposites attract and join their forces to serve the energy model of the future.

The benefits

The partners want to combine their forces to apply the best technology and the best expertise to the energy sector, because they are convinced this will bring great added value to all participants, actively including end-consumers and have positive and transparent impacts on social welfare for the full energy chain. There is a strong belief that the benefits of this project can be manifold:

For end-consumers, it gives the ability to turn into prosumers and

become an active link of the energy chain. The project increases market opportunities when microgrid supply is not sufficient (consumption peak, cold spell) or in case of over-supply within the microgrid. Finally, microgrid users will benefit from accurate price signals to value their energy production.

For the electricity network, a more sophisticated integration of RES is supported. Furthermore, the grid operator and indirectly utilities are supported by providing real-time information and consumption and power production in a smart way, easing up balancing of the network and supporting congestion management.

As security of supply is concerned, this project allows to better distribute energy and strengthen energy resiliency (which is a big issue in the US, where short blackouts can happen) and to handle peak consumption periods in a better way.

And finally, the wholesale power market in general can benefit from connecting microgrids since this will further enhance liquidity and have positive impact on prices and further optimize social welfare in a more vertical way than today.

