Blockchain technology: will it make a difference? – Perry Sioshansi's Letter from America

A growing number of experts working on Blockchain technology are convinced it has great potential. They claim it will revolutionize trading of virtually anything among any two parties virtually anywhere they may be. It is expected to be secure, inexpensive and instantaneous. Its applications are expected to revolutionize many industries, including peer-to-peer (P2P) electricity trading and much more. Yet nobody is really sure exactly how, when or why?

If the claims about its tremendous potential and the uncertainties about the means to its fulfilment sound contradictory, that is as things currently stand. Like the Internet in its early days, one can speculate about all the great applications but uncertain about how and when it may materialise.

What is clear, is that blockchain technology has the potential to make transactions among unlimited users, or possibly devices, seamless, virtually costless, secure, and instantaneous – just as PayPal made it easy for people to buy and sell items on, say eBay, and pay for it. The *EEnergy Informer*, for example, relies on Pay Pal to receive subscription payments from virtually anyone, anywhere, at any time. It is fast, secure and inexpensive.

Today, most transactions among parties requires one or more intermediaries, for example a bank, a financial institution or a broker, and these intermediaries – which typical facilitate trade and provide back office services, charge fees for their services. Blockchain technology offers an opportunity to cut out these intermediaries and their associated transaction costs.

Source: Blockchain in the energy transition, European School of Management & Technology (ESMT), Berlin, Nov 2016

A 23 February article by the Rocky Mountain Institute at RMI Outlet says, "we believe that blockchain technology has the potential to play a significant, potentially game-changing role in the global electricity system's transition to a more secure, resilient, cost-effective, and low-carbon grid."

RMI points out that the rapid "[...] growth in distributed energy resources (DERs)—such as rooftop solar, demand response, and electric vehicles—governments, utilities, and other stakeholders from across the globe are experimenting with new ways to better regulate and manage the electricity grid. These experiments currently face four main issues regardless of their geography:

- Controlling demand is difficult: Customers are concerned about privacy and sometimes loathe to share data—let alone allow third parties to control DERs that they own.
- Tracking flows of energy is imperfect: Energy markets and markets for the attributes of energy (e.g., renewable energy credits) can be expensive to run, can be subject to double spending, and can usually be accessed only via intermediaries.
- Not everyone can participate in the grid's evolution: In developed economies, only large, sophisticated businesses are able to enter into off-site power purchase agreements for renewables. In emerging economies, access to capital is a major barrier to accessing DERs and renewable energy, even if these technologies are capable of generating cost savings.
- Putting customers and DERs first is challenging: The entire grid was originally designed from the top down, making it challenging to put customers and DERs first.

RMI goes on to say that, "Although it is not yet 100% clear how, blockchain technology may be capable of solving these challenges:

- Blockchains provide privacy, enhance cybersecurity, and are a low-cost way of managing DER-focused transactions at the edge of the distribution grid.
- Blockchains provide a more transparent and, at the same time, a more secure way of tracking energy flows than the status quo.
- Blockchains enable small-scale and low-credit customers to participate in business models focused on DERs and renewable energy.
- Blockchains are a key enabler of balancing and managing the grid from the bottom up versus today's top-down approach".

Which explains why RMI and Grid Singularity, an Austrian start-up, have joined forces to launch Energy Web Foundation (EWF) to unleash the potential of the blockchain technology in the energy sector.

"When technologists connected individual computers via phone lines to exchange packets of information in the late 1960s, no one knew exactly what that technology—which would eventually become the Internet—was capable of."

"Sending digitally signed messages, or "e-mail," was immediately seen as a clear and interesting application, but not much else. In other words, the beginnings of the Internet looked intriguing, but nobody quite knew the extent of what it could do."

Not surprisingly, EWF believes that blockchain technology in the energy sector is at a similar early stage with many uncertainties about its future evolution and applications. According to the RMI Outlet article,

"We understand, at pilot scale, how to connect electricity loads, generators, and everything in between (e.g., distribution lines and batteries) to a blockchain ecosystem … to track flows of energy and value while allowing multiple parties to transact."

Which explains the rapid proliferation of numerous blockchain pilot demonstration projects to test the feasibility and basic functionality of, say, rooftop solar PV customers exchanging their excess generation with others in Brooklyn, New York or Sydney Australia.

According to experts working in this area, however, small-scale peer-to-peer trading such as these are just the tip of the iceberg. For example, Christoph Burger and Jens Weinmann at the European School of Management and Technology (ESMT) in Berlin point out:

"Within the energy transition we can distinguish between Energiewende 1.0 (German energy transformation) where the focus is on pushing renewables versus fossils. Some countries have now reached a high share of renewables, Energiewende 2.0, where the focus of the grid operator is to balance variable supply and demand. In this environment, blockchain offers a powerful alternative to traditional solutions by enabling active participation of large numbers of distributed resources without an intermediary."

"The real disruptive potential of blockchain in the energy market, however, is realised in the context of an off-grid or micro-grid environment where blockchain technology operating on an open platform manages multitudes of small distributed generators, loads, EVs, and energy storage devices on the network by facilitating trades among its members. In such an environment, the function of the distributed network would be automated."

Among the challenges facing experts working in the emerging field is to identify exactly where the technology's value proposition lies and how to commercialize and monetize it. This is among the priorities of EWF, which intends to conduct studies on several hundred potential applications already identified. Multiple stakeholders including utilities, regulators and customers have to be convinced of the value of the applications and their benefits before blockchain technology can be successfully implemented on wide-scale.

The development of common, open-source blockchain platform that multiples of users can use for multiples of applications creates other challenges. Once such a platform is in place, utilities, traders, customers, and financial institutions can build specific applications that deliver value.

Burger and Weinmann, however, acknowledge that there might be not one open source blockchain platform given the many alternatives competing for wide-spread acceptance. ESMT offers a blockchain program further described at their website.

Perry Sioshansi is Founder and President of Menlo Energy Economics and is the editor and publisher of EEnergy Informer, from which we have sourced this article, and which we commend.