

## BLOCKCHAIN: A NEW TOOL TO ACCELERATE THE GLOBAL ENERGY TRANSFORMATION\*

Blockchain was one of the big topics of conversation in September 2018 at IRENA Innovation Week, where more than 400 corporate leaders, government officials and experts at the forefront of energy gathered to discuss the innovations driving the energy transformation forward. A blockchain is, in a basic sense, a secure, continuously growing list of records. It is constructed as a decentralised database that is distributed and managed by peers, rather than by a central server or authority. This technology is enabling a new world of decentralised communication and coordination, by building the infrastructure to allow peers to safely and quickly connect with each other without a centralised intermediary. Cryptography ensures security and data integrity, while privacy remains intact.

Greater complexity requires greater network intelligence, transparency and visibility. To understand the disruptive potential of blockchain to the energy sector, consider how electricity is generated. By and large, most countries rely on large, centralised power plants that generate electricity and then send it across long distances over power grids that were built as a one-way street, sending electricity from the producer to your home. Moreover, the markets in which grids operate are complex multi-party interactions involving grid operators, energy companies, and energy producers that run on a country-wide level. Today, grids have become increasingly complex, with increasing shares of variable distributed generation (such as rooftop solar), increasing numbers of internet-connected devices (such as smart appliances), and increased loads from the influx of electric vehicles. Blockchain can help operate power grids with high penetration of variable distributed generation and flexible demand-side resources in a more efficient, automated way, all with lower transaction costs.

Since the start of 2017 alone, more than fifty new start-ups launched that are working specifically on energy, raising more than USD\$320 million. Today, there are more than 70 demonstration projects deployed or planned around the world, such as LO3's Brooklyn Microgrid project, where customers can choose to power their homes from a range of renewable energy sources, and people with their own solar panels can sell surplus electricity to their neighbours. Another, from German power giant RWE, is using the Ethereum blockchain to authenticate users and manage billing at electric car charging stations. However, new consensus protocols are being developed and tested all the time. As the technology matures, software platforms built on blockchain will be an increasingly attractive method to handle the increasingly complex and decentralised transactions between energy users, producers of various sizes, traders and utilities, and retailers. Furthermore, blockchain's ability to autonomously reconcile supply and demand between meters and computers based on smart contracts is a revolutionary efficiency improvement.