

UNECE

Ninth International Forum on Energy for Sustainable
Development

Digitalisation in the Energy Sector – Blockchain – Legal Perspectives

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Two key transitions are underway...



Energy Transition

- Shift from fossil fuels toward cleaner and more sustainable energy
- Climate change mitigation
- Informed consumers
- Decentralisation

Fourth Industrial Revolution

- Fusion of digital, physical and biological technologies
- Marked by rapid and exponential technological change, multidisciplinary progress and system-wide innovations

What is the blockchain opportunity?

What?

- Immutable ledger, distributed/visible, reconciliation - consensus, smart contracts
- Trustless transaction technology

Where Useful?

- Environment where low level of trust – open markets
- Potential for error or fraud - address double spending, duplication
- Transaction costs and market entry barriers

Opportunity?

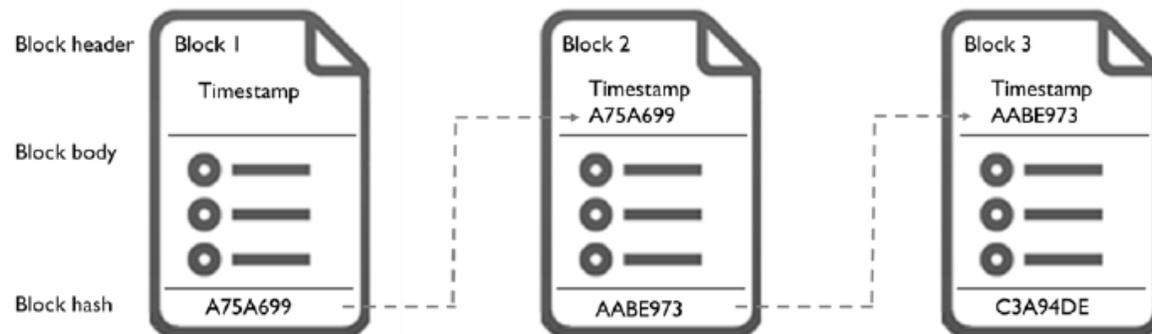
- Facilitate new business models
- Enhance existing transaction arrangements – operation, efficiency, transparency
- Enable innovative and scalable transactions
- Utility across energy value chain

Blockchain – technical definition

“Blockchains are distributed digital ledgers of cryptographically signed transactions that are grouped into blocks. Each block is cryptographically linked to the previous one after validation and undergoing a consensus decision [creating a ‘blockchain’]. As new blocks are added [blockchain is an ‘add only’ ledger], older blocks become more difficult to modify. New blocks are replicated across all copies of the ledger within the network, and any conflicts are resolved automatically using established rules.”

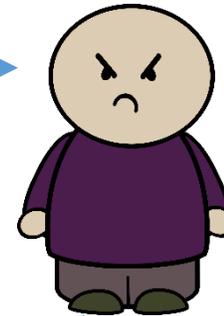
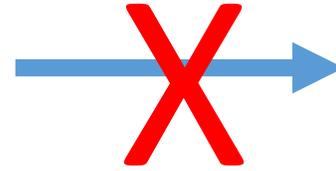
U.S. Department of Commerce’s National Institute of Standards Technology (NIST), *Draft NISTIR 8202* (January 2018) 9.

Block N hash = hash (Block N header, Block N body)



Jean Bacon, et al., ‘Blockchain Demystified’ (2017) QMUL School of Law, Legal Studies Research Paper No. 268/2017.

Blockchain as a trustless transaction technology (example)



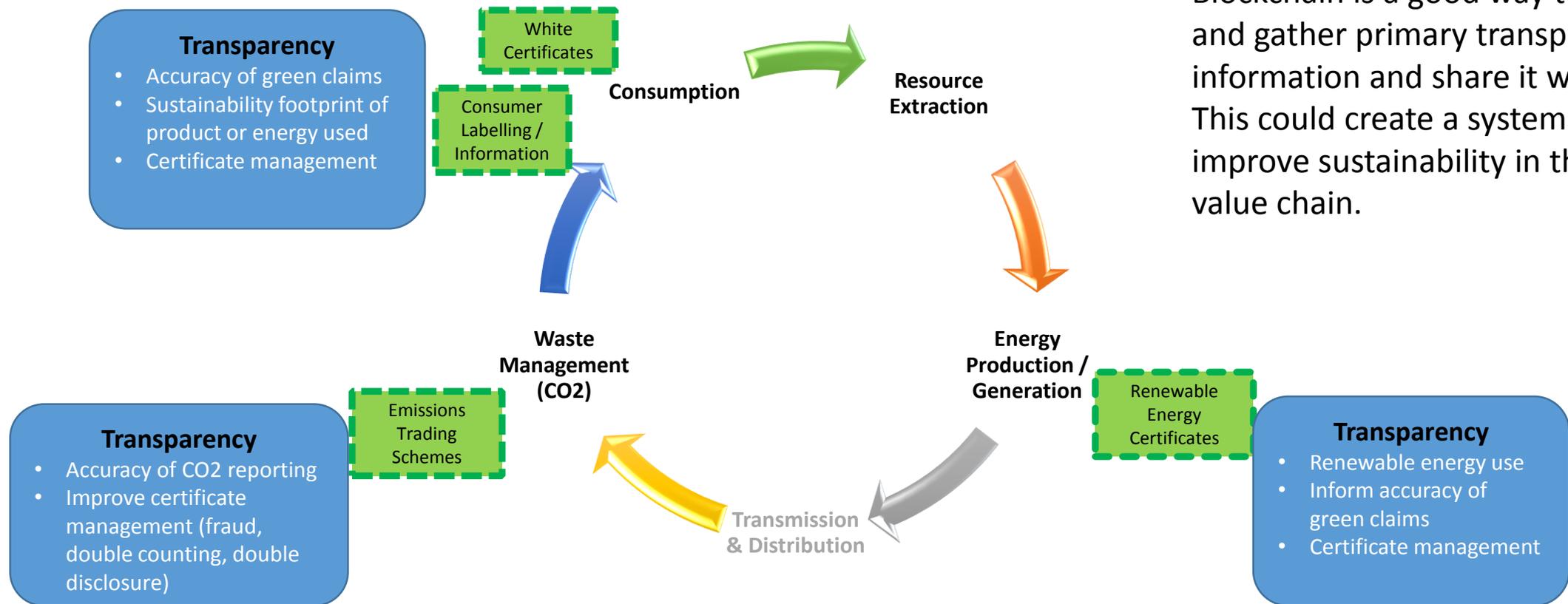
Why is a trusted authority needed?

- Assurance of title authenticity
- Protect against fraudulent transactions and claims
- Central and secure record repository
- Transfer requirements set in law

Problems?

- Transaction inefficiencies – time, cost
- Physical security – single point of failure
- Limited access
- Limited visibility

Blockchain could be used to improve sustainability by enhancing transparency of data in the energy value chain



Blockchain is a good way to capture and gather primary transparency information and share it widely. This could create a system to improve sustainability in the energy value chain.

Further reading

For further information on blockchain and decarbonisation of the energy sector, see our research paper “**Blockchain for Governance of Sustainability Transparency in the Global Energy Value Chain**” at https://papers.ssrn.com/sol3/papers.cfm?abstract_id=3236753

See also our Microsoft Cloud Computing Research Centre research on **blockchain**, including further information on its application in the energy sector at: <http://www.mccrc.org/events/2017-symposium-blockchain/>

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