



NC SUSTAINABLE
ENERGY ASSOCIATION

What the Heck is Blockchain Technology?

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Who is NC Sustainable Energy Association?



NC SUSTAINABLE
ENERGY ASSOCIATION

Founded in 1978, the NC Sustainable Energy Association is a 501(c)(3) non-profit membership organization of individuals, businesses, government and nonprofits interested in North Carolina's sustainable energy future.

*NCSEA drives policy and market development
to create clean energy jobs,
economic opportunities and
affordable energy
to benefit all of North Carolina.*

State and federal agencies, universities, research associations, non-profits, national laboratories, etc.

Energy research to achieve energy supply, economic development, environmental and national security goals.

30 years of energy research

What Is Blockchain?

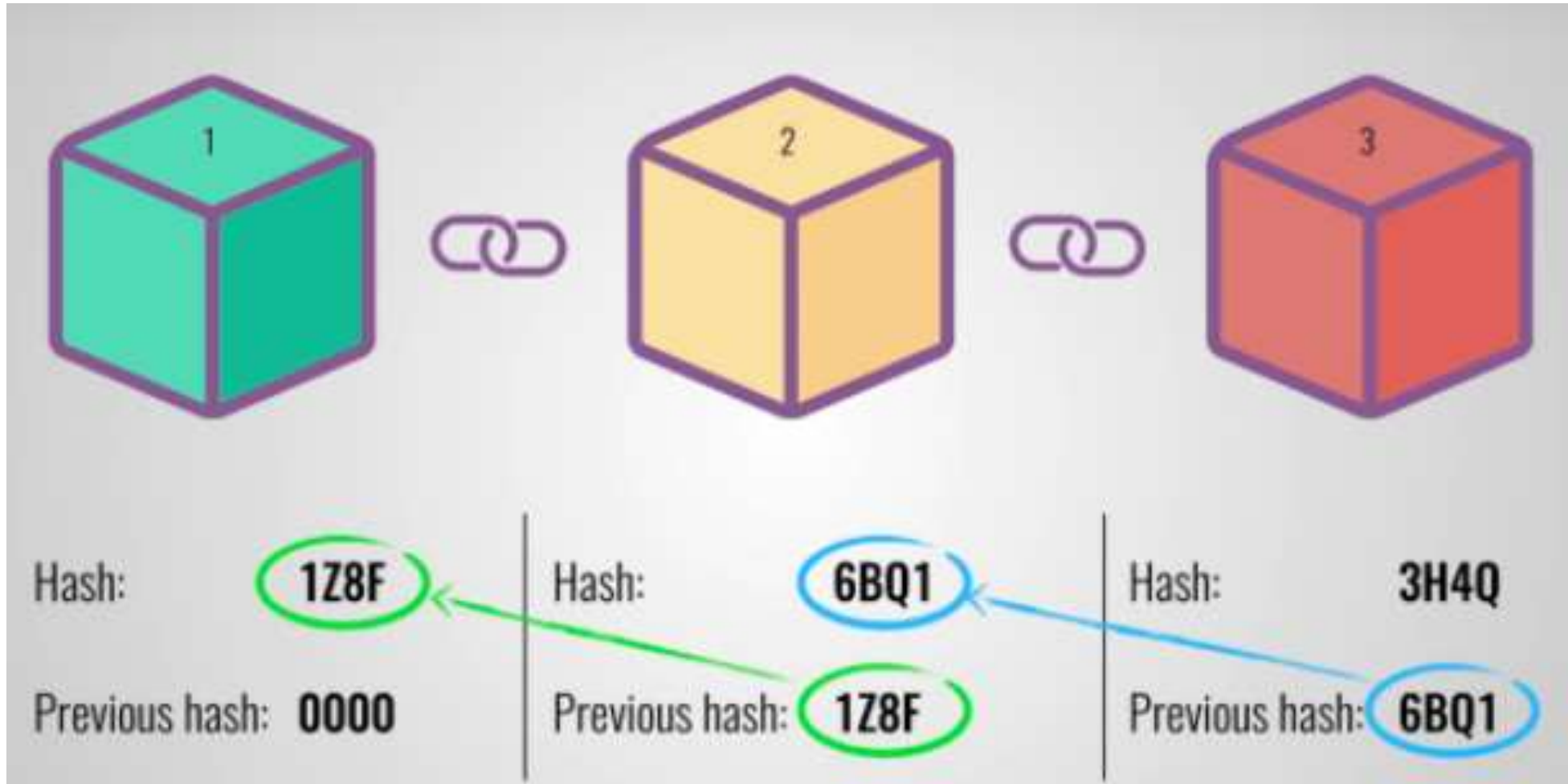


- Distributed and open network that allows different parties to verify transactions with one another
- Next level of the Internet of Things which will (may?) revolutionize way we exchange value without third parties (i.e., financial institutions)
- Security through encryption technology
- Consists of series of connected blocks, where each block has:
 - A hash
 - Data
 - The hash of the preceding block

What Is Blockchain?



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How Does Blockchain Work?



There are four distinct steps:

1. A member of the network enters a transaction
2. Details of the transaction are sent to the other members of the network
3. If the network members verify the transaction, it is approved
4. After it is approved, a new block with the transaction details is added to the most recently created block

Why do we energy nerds care?



- Allows people to trade energy between themselves like Venmo for money transactions
- Potential to create local renewable energy markets to allow extra energy to be sold to others through peer to peer trading eliminating the middle man

More background...



- Bitcoin is an application of blockchain, but blockchain is its own technology
- Blockchain has unclear regulatory authority which is difficult in regulated markets such as banking and utilities

ars TECHNICA BIZ & IT TECH SCIENCE POLICY CARS GAMING & CULTURE FORUMS

GREAT SCOTT! —

New study quantifies bitcoin's ludicrous energy consumption

Bitcoin could consume 7.7 gigawatts by the end of 2018.

Nobody Knows Exactly How Much Energy Bitcoin Is Using

New research suggests that Bitcoin will account for 0.5 percent of the world's electricity demand by the end of this year. But one researcher says he still isn't getting the whole picture.

Energy & Blockchain Continued



Example:

Blockchain pilot to coordinate wind power generation and distribution, electric vehicles, and consumer battery charging and discharging in Germany and the Netherlands



Energy & Blockchain Continued



Example:

Secure(?) tracking of renewable energy credits



<https://news.sap.com/2018/07/blockchain-trade-renewable-energy-utility-operators-consumers/>
<https://www.greenbiz.com/article/blockchain-bluster-and-beliefs>

Energy & Blockchain Continued



Example: Peer to peer energy sales



Enexa | South Australia.



The Brooklyn Microgrid | Brooklyn, New York.

<https://lo3energy.com/innovations/>

In a posh Bangkok neighborhood, residents trade energy with blockchain

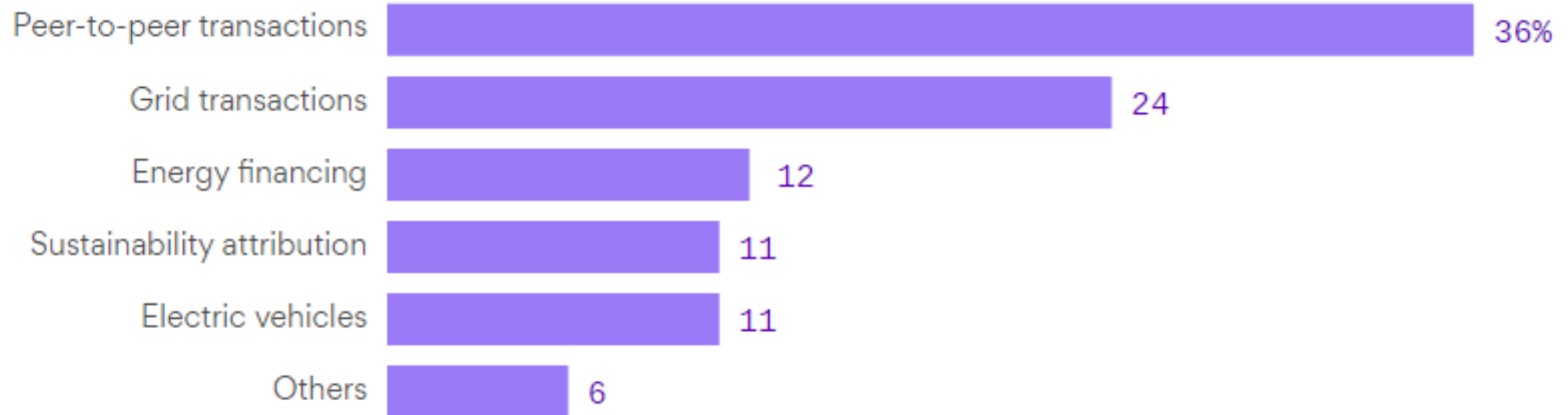
<https://www.reuters.com/article/us-thailand-renewables-tech/in-a-posh-bangkok-neighborhood-residents-trade-energy-with-blockchain-idUSKCN1LD0Z8>

Energy & Blockchain Cont'd



Share of blockchain initiatives in the electric power sector

Global, as of July 2018



Adapted from Livingston et al., 2018, "[Applying Blockchain Technology to Electric Power Systems](#)"; Chart: Axios Visuals



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Blockchain – now you're an expert, right?

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