Blocking the Grid

Ethical Implications of Blockchain Applications in P2P Energy Trading

Wait, what?

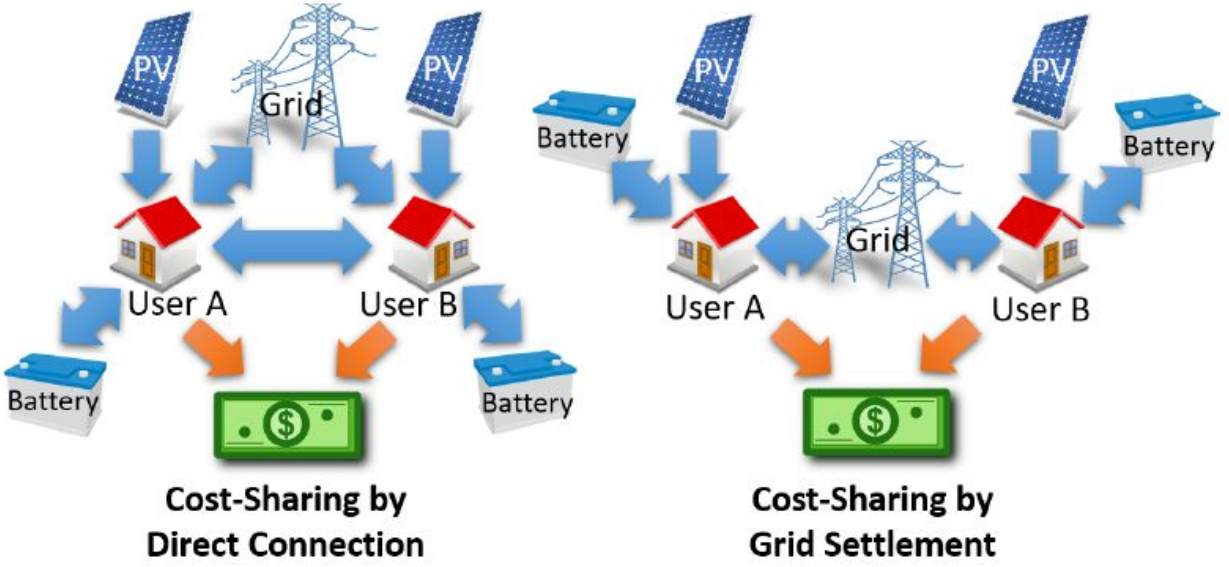


Figure 1: Illustrations of P2P energy sharing scenarios.

What is Peer-to-Peer Energy Trading?

- Rise of the prosumer
  - Increase in green energy accessibility
  - Feed-in tariffs
- Microgrids
  - Less energy “movement”
  - More local generation
- A marketplace for exchange

Why Peer-to-Peer?

For the Most Vulnerable, California Blackouts 'Can Be Life or Death'

As the widespread outages in the state continued for a second day, fears grew for sick and older residents and those who rely on medical equipment.

As Blackouts Hit California, Traders Manipulated Market

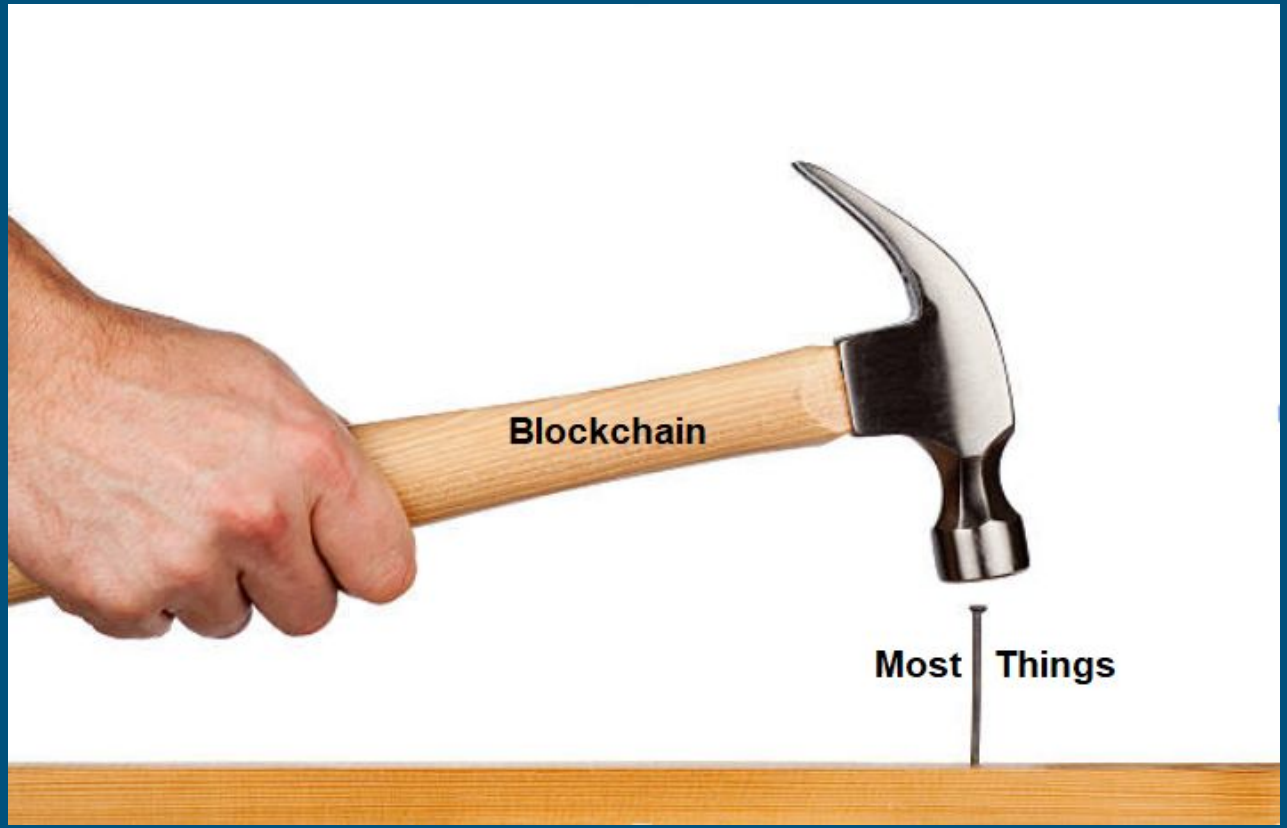
By Scott Thurm, Robert Gavin and Mitchel BensonStaff Reporters of The Wall Street Journal

Updated Sept. 16, 2002 12:01 am ET

Why Blockchain?

- Distributed ledger managed by block nodes
- Secure for transactions
- “Trustless”
- Decentralized, less financial overhead
- Load forecasting in the chain

But also...



Ethical concerns of prosumerism

- Does a utility company depend on prosumer generation or not?

TOSSED ASIDE IN THE 'WHITE GOLD' RUSH

Indigenous people are left poor as tech world takes lithium from under their feet

Ethics of Peer-to-Peer

Pros:

- Reduces power costs across the board
- Increases access to green energy sources for those who cannot afford the equipment
- Makes for a more reliable grid
- Community-based

Cons:

- How do we balance the load?
- How do we implement safety nets?
- How do we keep it secure?
- How does it interact with the grid as a wider entity?

Ethical Concerns of Blockchain

The Blockchain Trilemma

- “At odds” with itself
- Scalability: More nodes means a longer time for each transaction
- Decentralized: Staying “trustless”
- Security: Avoiding the 51% attack

Social Efficacy and Price of Anarchy

- Cost Sharing methods, coalition forming, and maximizing utility

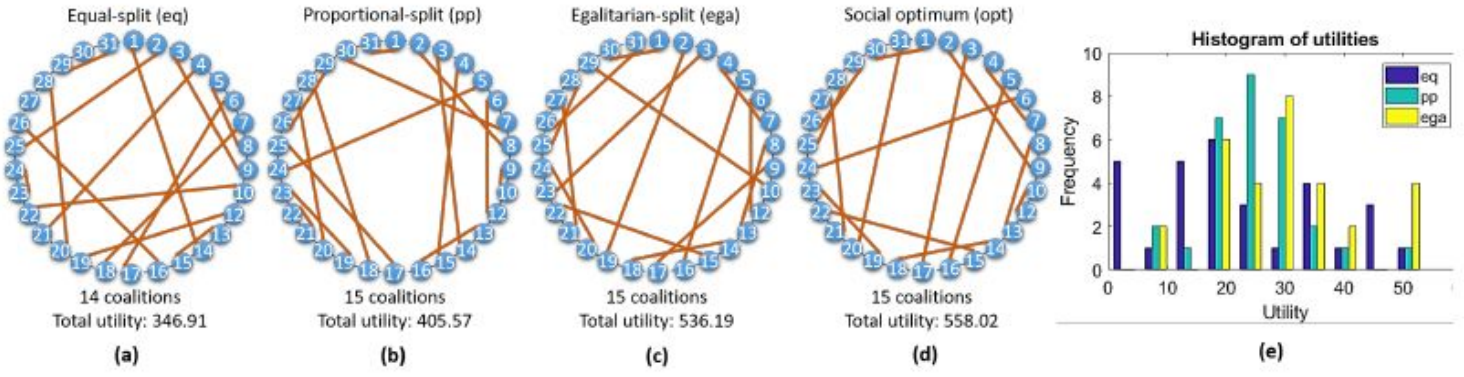


Figure 7: Coalition structures under different cost-sharing mechanisms in (a)-(c) and social optimumin (d). (e) The distribution of utilities of individual users.

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