

## Blockchain: Rearranging Trust

### *Trust:*

*assured reliance on the character, ability, strength, or truth of someone or something*

*dependence on something future or contingent: hope*

*reliance on future payment for property (such as merchandise) delivered*



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### A 'trustless' technology

In the view of blockchain proponents, one of the technology's major advantages is that it doesn't require trust to conduct transactions. In today's world, transactions require trust or, in the place of trust, intermediaries, which exist to facilitate the transaction, record the details, and serve as guarantors that each party has sufficient assets. However, intermediaries cannot always be trusted, as illustrated by the "Byzantine Generals problem," an oft-cited analogy used to explain blockchain<sup>1</sup>. Proponents argue that blockchain removes the need for trust and thus also removes the need for intermediaries.

Bitcoin, the first cryptocurrency application of blockchain technology, aimed to resolve concerns about the trustworthiness of financial intermediaries by creating a "trustless" system<sup>2</sup>. Two inherent components of trust are vulnerability and expectation: there is a possibility for disappointment, but both parties accept the risk because they believe in a positive outcome<sup>3</sup>. Bitcoin developers suggest that it can reduce reliance on trust by reducing the risk of disappointment.

This may be true if one takes a narrow view of the transformative quality of the blockchain. Our analysis suggests that blockchain technology may not *reduce* the need for trust so much as *shift* the burden of trust.

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<sup>1</sup> <https://medium.com/all-things-ledger/the-byzantine-generals-problem-168553f31480>

<sup>2</sup> <https://bitcoin.org/bitcoin.pdf>

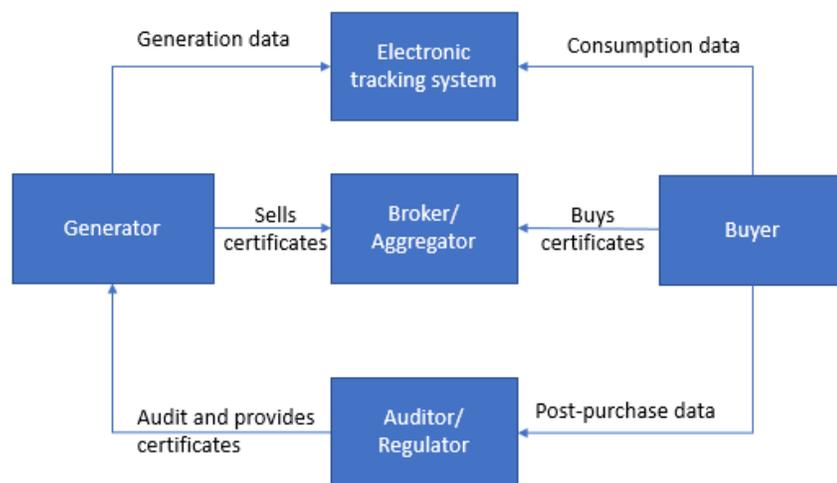
<sup>3</sup> [http://files.clps.brown.edu/jkrueger/journal\\_articles/krueger-2009-thepsychologytrust.pdf](http://files.clps.brown.edu/jkrueger/journal_articles/krueger-2009-thepsychologytrust.pdf)

## How does blockchain shift trust?

The focus on blockchain has been on ensuring that parties complete their transactions and that transactions are immutably recorded. However, we argue that trust is still a factor outside of the immediate transaction environment. To illustrate, we'll use the trading of renewable energy certificates, which currently requires multiple steps.

Traditionally, a certificate-creating regulator must verify the validity of the renewable energy generator, while brokers aggregate certificates from the generators and link buyers and sellers. A simplified diagram of this process is shown below in Figure 1.

**Figure 1: Current renewable energy trading (stylized)**



Source: Cornerstone Capital Group

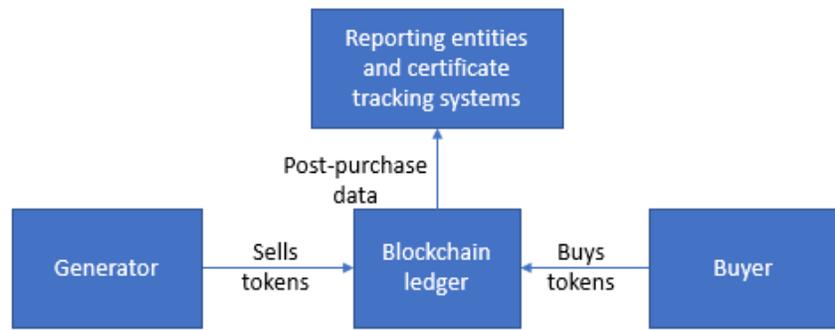
Proponents argue that no “trust” or intermediary is necessary...

Proponents of blockchain renewable energy trading argue that no “trust” or intermediary is necessary because the technology allows parties to trade directly, and only when both parties have their assets ready. As shown in Figure 2, the renewable energy generator links sensors to a blockchain-enabled ledger. As each MWh of renewable energy is generated, the ledger updates its records with a new certificate, recorded as a digital token. Buyers can source certificates by buying tokens, and the transaction history is recorded on the blockchain ledger.

...But the broader “transaction ecosystem” still requires trust

However, this argument looks at the renewable energy trading system through the narrow lens of immediate transaction mechanics. The broader “transaction ecosystem” still requires trust:

**Figure 2: Blockchain-enabled trading system**



Source: Rocky Mountain Institute, Cornerstone Capital Group

- **Auditing:** The blockchain-enabled transaction does not remove the need for a trusted regulator to confirm that the generator is producing renewable energy or that the sensors are operating as intended.
- **Price negotiation:** Direct trading between generators and buyers requires both parties to feel fully informed about prices. Thus, the generator and/or buyer may rely on a trusted price reference (oracle).

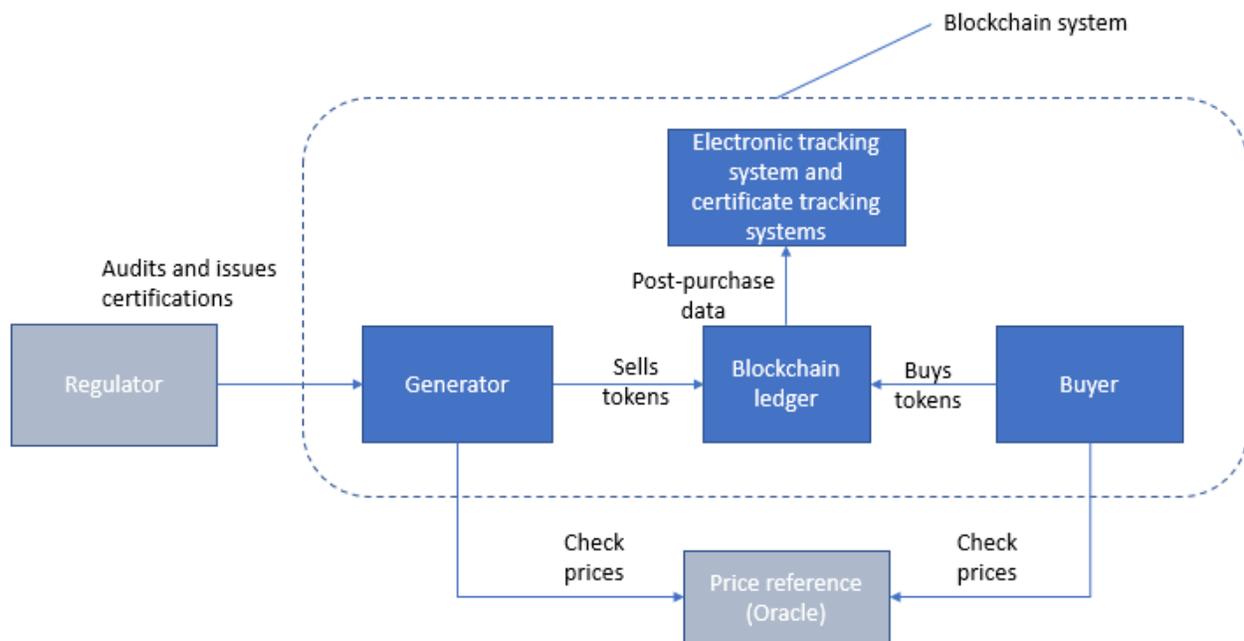
The ecosystem, therefore, looks more like Figure 3. In this diagram, the proposed blockchain renewable energy trading shifts the “burden of trust” from transaction intermediaries to parties outside the enclosed system. This shift might transfer responsibility to entities that are not prepared, which could be particularly dangerous as the blockchain purposefully does not allow for arbitration or the undoing of transactions. For example, a buyer who spends financial resources on a certificate from a generator who is improperly audited may have no means of recourse. Once the transaction is executed, it is recorded and unable to be undone or negotiated.

**The technology’s ability to set the boundaries of the transaction environment may create as much complexity and risk as it resolves**

Our assessment raises questions for investors in blockchain-enabled applications, as well as more mainstream investors assessing how to improve efficiency of trading. The ability of the technology to set the boundaries of the transaction environment may create as much complexity and risk as it resolves. At what point does it become prohibitively expensive to expand the scope of technological control to remove the need for trust? Is the need for trust such a significant drag on the economy or society?

These questions around how trust is shifted and at what cost apply beyond the current discussions of Bitcoin and blockchain bubbles. Investors across the market may benefit from assessing the relative cost versus efficiency of redistributing the responsibilities of trust outside the immediate transaction environment. A narrow view may position investors for unforeseen consequences, including negated efficiency gains or failure to deploy blockchain technology in the most valuable way.

Figure 3: Cornerstone’s assessment of blockchain renewable energy trading



Source: Cornerstone Capital Group

### ***Efficiency in shifting trust***

Blockchain proponents speak of a future facilitated by trustless systems. Our assessment, currently, is that blockchain does not *reduce* the need for trust but rather *shifts* the burden of trust beyond the scope of the actual transaction. This may increase the efficiency of the immediate transaction, while moving intermediary roles to the edges of the transaction system. New responsibilities may be transferred to intermediaries who are unprepared or create bottlenecks. Investors purely focused on transaction-level trust may not be aware of the risks the might arise from such shifts.

### ***Value in shifting trust***

Investors interested in reducing the trust involved in transactions should determine whether the application is focused on the core vulnerability within the system. For renewable energy trading in particular, we view monitoring and auditing of the generators as a key vulnerability. At this point, blockchain-supported renewable energy does not address these concerns. The system still relies on trusting a third-party auditor or a set of sensors to ensure that the renewable energy is valid. Blockchain applications that address the critical issues in a trading system are likely to be more strongly positioned.



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