

What is blockchain? What are renewable energy certificates (RECs)? And how will they both interact?

SP Group is hoping blockchain marketplace will encourage wider use of renewable energy sources.

WHAT IS BLOCKCHAIN?

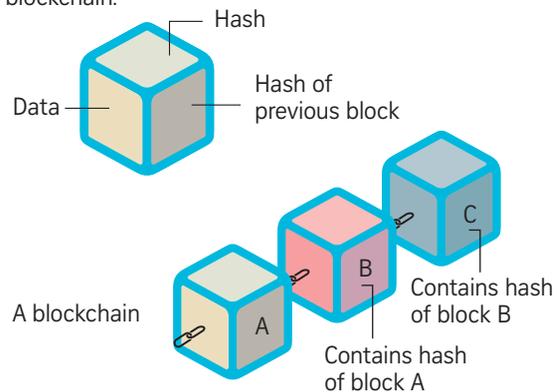
Imagine a digital ledger made up of a chain of blocks containing documents, which are digitally time-stamped. When a transaction is made, a document is generated. It is then distributed among other users who will have the exact copy of the document. Blockchain technology is regarded as open, transparent and public.

The block

Each block contains:

- **Data:** Information of buyer, seller and what is traded.
- **Hash:** Acts like a digital fingerprint it identifies the block and all of its content.
- **Hash of previous block:**

This automatically creates a chain of blocks or blockchain.

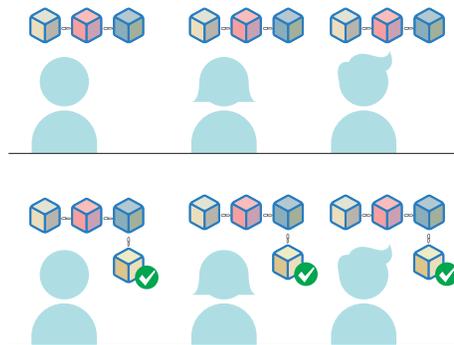


A hash is a string of numbers and letters unique to the block and its content

c5d324a76bd5988c632dc4762ab3426edc6893be

Security

- **Hash:** If block A is tampered with, a new hash will be generated in it. Block B, which contains the previous hash of block A, will detect the change and reject block A automatically.



- **Distribution:** Blockchain uses a peer-to-peer network. Users can run their own node (device) to connect to the network and get the full copy of the blockchain. When a new block is created, all nodes get the new block, too. Each node validates the block and adds it to the blockchain. Any tampered blocks will conflict with existing ones, and the other nodes will automatically reject the alterations.

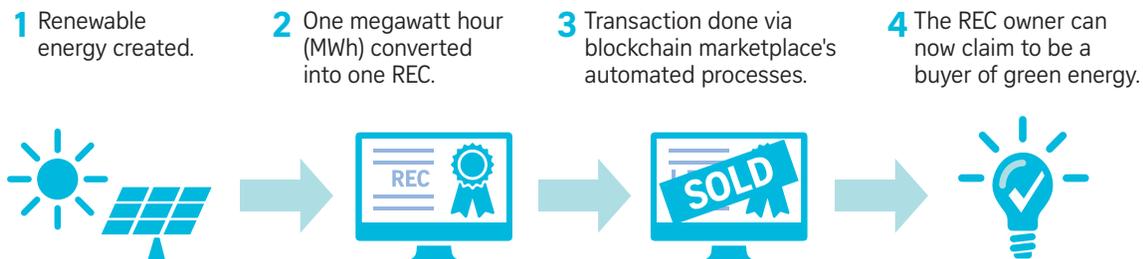
REC

Anyone who produces one megawatt-hour of electricity from renewable sources, like wind or sunlight, can be issued a renewable energy certificate (REC). This serves as proof that the energy it supplied to the grid is sustainable, and the REC can be bought by anybody anywhere in the world who wants to prove that it is supporting the production of clean energy. For example, if a

company gets its electricity from coal, it can still buy enough RECs that are equivalent to the electricity it uses, and then say that its electricity is clean. This is a way to encourage companies and people to generate more green electricity and supply it to the power grid, because they know that others are willing to buy their sustainably produced energy at a premium price.

How RECs are sold on SP Group's blockchain marketplace

Currently, RECs in Singapore are bought and sold through a highly intensive process, where it is hard for small-scale buyers like consumers to find sellers. The blockchain marketplace will automate the selling and verification process, and make it easier to connect REC buyers and sellers.



Why more companies are going green

- **Emissions:** It lowers companies' contributions to greenhouse gas emissions.
- **Jobs:** It stimulates the economy and creates jobs.
- **Reputation:** It is a public relations boost for the companies as they show customers that they care about the environment.