Bird & Bird & Smart contracts

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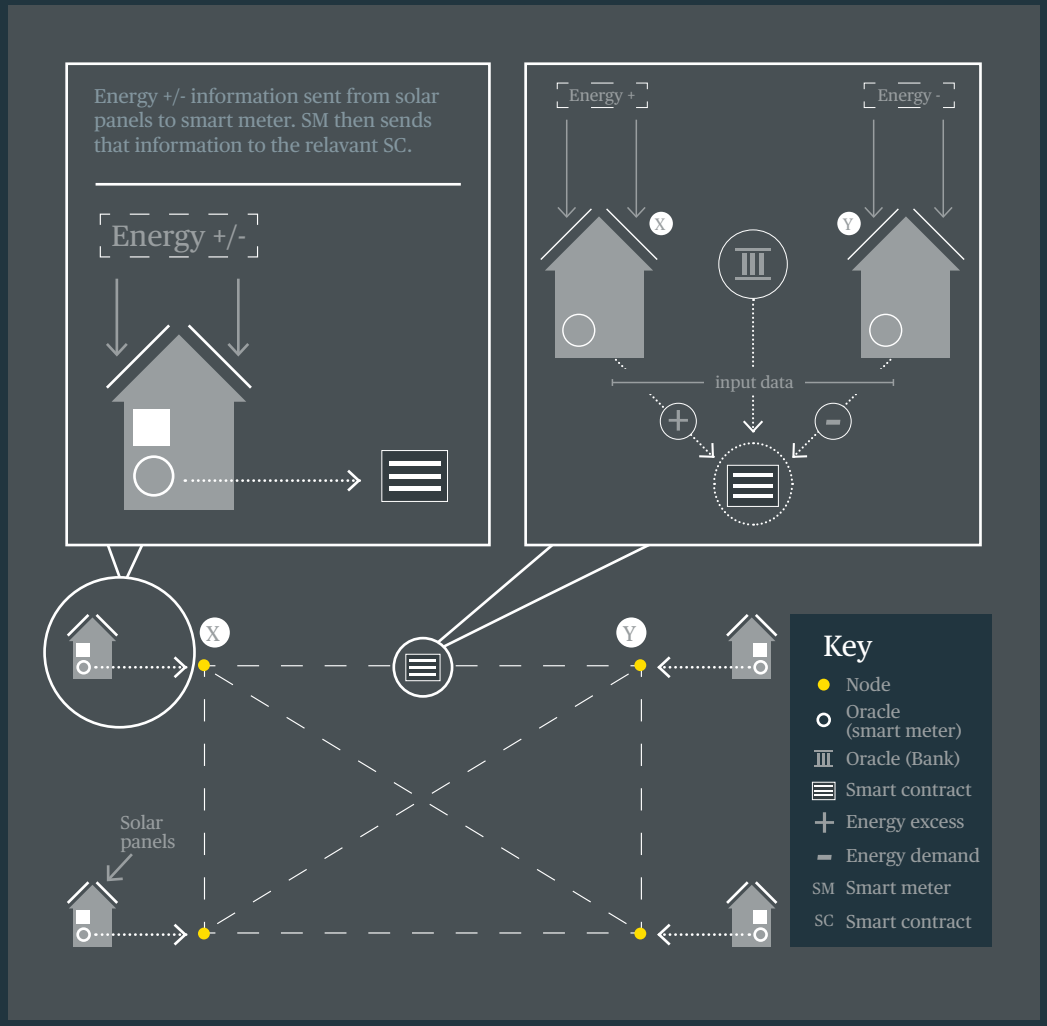
Smart contracts on a blockchain



Smart contracts

- This is computer code embedded in a block of data on the blockchain that automatically executes based on the terms of the code.
- The computer code is based on if/then conditionals: if X (the input) happens, then do Y (the output).
- Sometimes the input can be triggered by data from trusted external sources called oracles. An oracle is a trusted entity that the blockchain network relies on for data.

Transaction using smart contracts

- Several users run and participate in a private blockchain network.
- The blockchain network facilitates the transfer of excess energy from one user to another user with an energy shortfall.
- Users download the blockchain software and set up nodes that interact with each other to create the private blockchain network.
- The smart contract is set up and deployed on the blockchain. Transactions can be sent to the smart contract; for example, on Ethereum, smart contract have their own addresses on the blockchain so you can identify them and send transactions to them.
- When the smart contract receives the necessary input data it will run its code according to the terms.
- The terms could be:
  - Input: if X has excess energy and Y has an energy shortfall and pays for the excess energy, then
  - Output: X sells energy to Y.
- For the purposes of the illustration, the above-mentioned terms have been oversimplified (as the code would need to deal with how to choose between multiple requests from users with an energy shortfall and ability to pay for the excess energy, amongst other things!).
- Based on this illustration, the input requires three pieces of data (X has excess energy, Y needs the energy and Y has paid for it) and the output is the transfer of the energy from X to Y. The blockchain network would then record the energy transfer but the transfer itself would occur outside the network.
- The input data comes from external sources operating as oracles. For example, smart meters installed at X's and Y's homes would identify if X has an "energy excess" and Y has an "energy shortfall." Y's bank would identify when Y has paid for the energy. This data is sent by the oracles to the smart contract.
- The smart contract receives the input data and provided the inputs satisfy the smart contract terms, it will execute the output: the transfer of energy from X to Y.