

Rowan Blockchain

Whitepaper

A tokenised platform for improving home renewable energy production and encouraging its wider adoption.

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Executive Summary

Market Opportunity

The Problem(s):

The current system for rewarding households for their rooftop-generated electricity is uneconomical and prehistoric in its design.

Currently, there is no way to track the energy generated by residential rooftop solar. Feed-in meters can track what's being fed into the grid, but the asset behind that is not tracked.

Using blockchain technology to encourage green energy is not viable due to the incredible amount of energy it takes to mine and validate transactions.

Our Solution(s):

Our platform will allow users to sell their energy peer-to-peer with other consumers bringing in immediate payments and at a much higher rate. This, coupled with extra rewards from mining and energy carbon offset certificates, increases the income of solar owners by more than 70% and lowers the cost for energy consumers by at least 20%.

By using our custom-built blockchain platform, consumers will be able to know when, where, how, and how much electricity was generated. How much was consumed on-site, and how much was fed onto the grid

We have a established proof-of-generation blockchain that is low-powered and low-carbon. Validation servers can be hosted by our partners and regulators, as well as solar customers using our proprietary SmartMiner technology.

The Market Growth

- The United Kingdom Solar Power Market is estimated to be at 15 GW by the end of 2023 and is projected to reach 43 GW in the next five years, registering a CAGR of over 23.53% during the forecast period.
- The United Kingdom has witnessed significant solar PV installations over the past decade, supported by the government's incentives, which can be credited to the growing clean electricity demand.
- As of May 2023, the United Kingdom registered that there is a total of 15.1 GW of solar capacity across 1,334,453 installations. This is an increase of 6.4% (911 MW) since May 2022. In absolute terms, this is the highest annual increase seen since December 2017.

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Abstract

Rowan Energy introduces a peer-to-peer framework that uses a unique Proof of Generation consensus mechanism to generate tokenised green energy certificates and Carbon Offset Certificates combined, allowing rewards for renewable energy production would create a viable economic model separate from the limitations currently enforced by energy companies, and will better reward small green energy generators (e.g. home solar panel owners) for the energy they generate.

A blockchain base layer provides the means of storing the tokens and ensuring they are accurately and securely handled between individuals and organisations who wish to buy renewable energy certificates, but this is only part of the solution. The blockchain itself will need to be lightweight, using very little energy for end-user nodes while performing at acceptable speeds to allow scaling, so the often-used proof-of-work model is not viable.

Custom hardware and software solutions are also required to allow nontechnical users to easily integrate the solution into their existing home generators without hitting the user-adoption hurdles many current-generation blockchain solutions face. These require a high level of UX work and a low level of required knowledge and technical ability to ensure widespread adoption.

This whitepaper explains how Rowan Energy bridges green energy and blockchain, fostering a more sustainable and inclusive energy ecosystem.

Background – Blockchain Technology

In 2009, Satoshi released the Bitcoin blockchain protocol, which enabled secure peer-to-peer value exchange without 3rd party intermediaries. This was a financial model built upon the use of “bitcoin” (and its constituent part, the “Satoshi”) as a value medium.

Using proof-of-work as the base requirement for storing data and generating new bitcoin (also known as “mining”), Bitcoin has proven itself highly secure, reliable, and effective, despite its relative cost in Fiat (or centrally issued, for example, by a government) currency.

In particular, Bitcoin solved the digital double-spend problem, namely how you ensure that someone does not use or spend the same digital value multiple times without a third “trusted” party maintaining a ledger of all transactions.

The nature of Bitcoin has some limitations as a wider solution for tokenisation and its ability for smaller, higher volume transactions, so over the following years, variations around the base blockchain concept (the data storage medium used, in effect, a type of database) emerged. In particular, tokenised solutions came to the fore.

These allow for generating and managing two types of tokens, fungible or non-fungible. These tokens can be tracked and exchanged peer-to-peer between users on that blockchain and managed through smart contracts, a form of custom program built for an individual solution.

Fungible tokens are those where two of the same type can be readily exchanged for each other for the same value. Non-fungible tokens are those which are unique and are not interchangeable. For example, if you lend someone a £10 note, you do not expect the same £10 note back when they repay you. They may do so with a different £10 or different denominations totalling £10.

Even though the note itself is unique (by its serial number), they have the same value, so they are interchangeable.

Alternatively, if you lend someone your coat, you want the same coat back later. They can’t give you a different coat back even if it has the same financial value as yours. That is a non-fungible token.

Background – Blockchain Technology

Sometimes, a fungible token can become non-fungible. For example, a £10 note with a specific serial number might be considered a collector's item, so tracking unique aspects of any given token is still important. In blockchain-based tokenised solutions, this may be that a celebrity held a specific token at some point in the past, so it has an extra perceived value to the holder.

This tokenised ownership model can represent real-world items. For example, it could be a collectible marked with an RFID tag where the token is transferred between wallets as the physical device changes hands, or it can represent purely digital items, such as certificates of qualifications.

The resulting token economy opens up the world of ownership and value transfer by allowing several key functions that are highly desirable for the Rowan Energy solution.

Tokens can be exchanged between individuals directly without going through a third party. This reduces fees and enables faster development of new economic models.

Tokens can also represent part of a physical or digital item with value. For example, instead of owning a single taxi and taking profit from that as it is driven, people could own tokens representing small parts of multiple taxis, taking a smaller percentage reward from multiple locations.

Tokens can be tracked effectively and with 100% certainty as they change ownership. This is very different from current systems, which require a double-entry ledger approach and, in digital terms, risk having multiple copies of the same ownership representation. With the blockchain, you can not sell an item unless the system proves you own it, and once you receive it, you are 100% sure the previous owner no longer has it in their possession.

Background – Energy Markets

Energy markets have been ready for change for quite some time. With the technology of renewable energy sources becoming financially viable for home users, now is an ideal window for this change to occur.

The “big 5” energy providers in the UK (E.ON, British Gas, SSE, EDF Energy, and Scottish Power) are not popular with consumers, indicating a desire for a better system and new challengers to replace outdated and legacy systems.

Renewable energy has gained popularity over the last decade due to positive government subsidies for homeowners generating power and the companies supplying them with the equipment. However, even as the subsidies and financial benefits have decreased, demand from consumers for home renewable energy remains high.

According to the Solar Trade Association, around 700,000 homes in the UK have home solar panels installed before 2020. However, as of the latest data, over 1.3 million homes in the UK now have solar panel installations (only 4.1%), showing a considerable increase from the past and marking a significant step towards renewable energy adoption among UK households. This increasing trend showcases a growing awareness and adoption of solar energy, setting a solid foundation for the Rowan Energy solution to thrive and contribute to a more sustainable and self-reliant energy market plus there is a lot of headroom for growth.

Challenges

In addition to the infrastructure requirements, extensive and costly legal requirements exist to establish a power company. These are valid and in place for the protection of the individuals, but they do create a higher barrier to entry into the market through gaining an energy licence and restricting competition with the established providers.

There is also a lack of regulations and oversight around blockchain technology due to its role as a new emerging technology. Despite its clear benefits, there are consumer branding concerns and a lack of understanding of the significance and benefits of the technology as it relates to the individual user.

This may also be relevant for cryptocurrency holders and tokenised assets as central banks do not guarantee them or may create issues with their legal standing in some jurisdictions.

The existing energy suppliers also create challenges. The peer-to-peer nature of the Rowan Energy solution and its encouragement of home power generation, rather than power generated centrally and sent out, will impact their revenue models and create a level of conflict.

In turn, just as fossil fuel vehicle manufacturers and providers restricted early growth in electric vehicles, we may face deliberate push-back from companies whose market share we are cutting into.

Rowan Energy Vision

We envision a shift from the conventional shareholder-driven energy providers towards a more democratic model, where everyday individuals have the autonomy to manage the source of the energy they consume. Through our platform, we empower rooftop solar owners to sell their excess energy peer-to-peer, enhancing the rewards for self-generation and significantly accelerating the payment terms to near-instantaneous.

Imagine a scenario where your rooftop solar panels, equipped with a battery and a low-powered Rowan SmartMiner, serve your energy needs and act as a mini power station. The energy you generate caters to your consumption, with the surplus stored in your battery.

During high-demand periods, this excess energy is fed onto the grid, purchased by your neighbour, with the payment in tokens instantly deposited into your wallet. These tokens can be utilised towards your energy bill, saved for future growth, traded on a public exchange for another cryptocurrency fiat currency, or even donated to your favourite charity.

Moreover, the consumer of your energy can access a portal to see the origin of the energy they use and how it's produced. This vision extends to rewarding everyone in the network for validating transactions through their Rowan SmartMiner.

Building on this vision, Rowan Energy aims to establish a full-stack solution to better reward home renewable energy generators and promote renewable energy generation in the UK and globally. Our solution is user-friendly, requiring no intricate understanding of the underlying technology for operation and benefit realisation.

Rowan Energy Vision

This solution comprises of three core components:

- The Rowan Blockchain and back-end software which allows for generation, storage and exchange of both the Rowan Coin (RWN), which can be publicly traded, and the tokenised energy and carbon offset certificates by anyone connected to the network.
- The Rowan SmartMiner, which acts as a node of the blockchain and has two key functions. The miner “mines” renewable energy certificate tokens for the user by tracking how much green energy they generate and stores these onto the blockchain. It also verifies transactions on the blockchain, proving that any exchanges made are valid and correct.
- The user software. This consists of a suite of software options allowing several functions onto the solution, including user management software for home green energy producers to allow them to monitor their green energy generation and manage their tokens and Rowan rewards.

By combining these 3 aspects, Rowan Energy ensures a strong architecture built around the latest available systems and a positive end-user experience, provided in a manner they are already familiar with.

Overview of the process

A user generates renewable green energy at home, for example, through solar panels.

The Rowan SmartMiner tracks the energy they generate, the data proving its “authenticity” as renewably sourced, and that data is converted into tokenised Certificates on the Rowan Blockchain.

The system counts the energy generated and allocates 10p worth of RWN from a predefined mining Pool, called the Rewards Pool, to the end-user. End users are currently paid in GBP. Once this Rewards Pool is exhausted, the end user will earn a share of the certificates and transaction fees paid by network users.

The user monitors the amount of solar energy generated, and their real-time rewards through the online portal.

Through the portal, the users can withdraw collected Rowan Rewards when conditions are met. These can be withdrawn directly into a PayPal or bank account or can be donated to charity.

Two certificates are generated by Rowan Energy Users:

- The first is a Rowan Offset Certificate (ROC), a tokenised certificate that can be used by businesses and individuals to offset your carbon footprint.
- The second is a Renewable Energy Certificate used in peer-to-peer energy trading.

Once ROCs are generated by Rowan users, they can be sold to companies looking to offset their carbon, but will not be listed on a public exchange, unlike the RWN. Fees for transferring these tokens are also paid in RWN, creating additional buy pressure on the market.

About the Rowan Blockchain

The Rowan Blockchain is a tokenised, proof-of-generation model chain. It is also built as a closed permissioned blockchain, although the RWN tokens are openly listed and can be traded and held by anyone using a compatible wallet.

Please note that the Rowan Blockchain is a fully independent system and not associated with 3rd parties or standard Ethereum wallets. At this time, due to the goals of creating a renewable energy “green” system, there are no plans to allow bridging to Ethereum or other systems. Rowan is unable to quantify the amount of carbon produced by these third-party chains.

The Rowan Coin, listed as RWN and available at the time of writing for trade on Probit, Coinstore and LATOKN public exchanges, is a pre-minted solution with a hard cap of 545 million RWN.

This means the RWN itself is not mined and has a fixed monetary policy. Although RWN is technically a mineable token, no more tokens will be minted. In the next update of the chain this feature will be removed.

RWN forms the reward part of the solution to green energy providers and the medium of fee payment for transactions across the network and on-chain.

The Rowan Offset Certificate or ROC token is a variant of the ERC-721 standard with additional functionality, which will be detailed in its own whitepaper.

Rowan Block Explorer

The Rowan Block Explorer shows transactions on the Rowan Blockchain between any two parties.

Currently, the block explorer does not show wallet balances or renewable generation data to abide by GDPR and data security laws associated with energy production.

The protocol is built on a proof-of-generation model where only SmartMiners connected to renewable energy generation systems that are permitted nodes can connect, validate transactions, or mint renewable energy certificates. In this way, a user is staking their ability to generate renewable energy to be allowed on the network and can be removed if acting in bad faith, for example, mining using non-renewable energy or tampering with the SmartMiner in any way.

Authority is granted by Rowan Energy who maintain the full chain history and validate transactions while ensuring all connected additional nodes are valid.

Normal nodes are a physical device granted authority to act as a node, called the Rowan SmartMiner, which is placed in the solar generator’s property to monitor their energy generation and send that data to the network and also minted into ROC or in the near future Rowan Energy Certificates or REC tokens.

This model also allows for lightweight hardware which is not power intensive. However, if a regulatory body wanted oversight, they could have a full node server set-up to give them full visibility and ensure full system transparency.

Currently, the network can theoretically handle 219 transactions per second, allowing for growth without network congestion issues as each node groups its power generation into data groups before sending.

As households have their own wallets that can be tracked back via the ROC certificates. The UK ICO (Information Commissioner Office) states that even meter IDs are private information. Rowan needs to comply to GDPR rules to protect private data.

We are working with these UK governing bodies to enable us to reveal more data to the public.

The SmartMiner

The Rowan SmartMiner is an energy-efficient physical node installed onto solar or other renewable energy generator systems.

It provides a full MID-approved generation readings, replacing generation meters in solar infrastructure.

These attributes collectively contribute to a cost-effective, secure, and easily installed device for the end-user, requiring minimal direct interaction post-installation. The objective was to develop a plug-and-play hardware solution, contrasting the complex configurations and user setup typically found in most blockchain mining solutions.

Financial Model

The Rowan Blockchain is designed to be profitable for all parties generating the Renewable Energy Certificates while creating income for Rowan Energy to maintain the infrastructure and increase value for anyone holding the RWN.

Please note all figures relating to user solar generation are estimates and are not fixed.

Based on UK figures, we estimate that each user will generate 20kWh on average per day. Based on a standard residential 5kWp system. For each 1kWh, the user will be rewarded a fixed value in Rowan Rewards, currently set at £0.10. Solar customers are paid in fiat with the option to withdraw in RWN if they so wish.

This is in addition to users using the energy (and not paying for it from the grid) or selling it back to energy suppliers as they currently do.

On this basis, we estimate the average daily user earns up to an extra £2 from their home solar set-up. With the Rowan SmartMiner, users are not losing any capability to sell or use their energy as they currently do.

Rowan Energy uses an automated system to purchase RWN directly from public exchanges. The automated purchases are funded by onboarding fees and certificate sales. These purchases coupled with transaction fees are fed into the Rowan Rewards Pool.

Rowan SmartMiners can only be installed by Rowan Certified Installation Engineers. Rowan Energy has built a supply chain consisting of a wholesaler, distributors and installers. By keeping a tight control of who and where SmartMiners are in stalle. By insisting on a specific installation process model. Rowan can assure the data source is accurate and tamper free, adding further value to the ROC certificate.

Rowan Energy then resell the generated ROC certificates separately to 3rd parties looking to offset their carbon as a form of direct income. The REC certificates will be used as a proof of exchange when clients sell their energy peer-to-peer.

Sell pressure is directly managed by Rowan to prevent value drops at specific times (for example, month end).

Energy customers do not get a fully functional Rowan Wallet with their SmartMiner but a pane of glass to view and send rewards as necessary. Customers will not be able to receive Rowan from an exchange into their Rewards dashboard. This removes the possibility of money laundering abiding to FCA ML regulations introduced in Feb 2021.

In addition, all transactions on the chain require a fee in RWN, this fee includes gas for the transaction and a carbon fee, effectively offsetting each transaction. In the second version of the Rowan Wallet, users will receive an NFT carbon offset certificate in their Rowan Wallet for every transaction. Transaction fees and a portion of the carbon fee are paid directly into the Rowan Rewards Pool. As certificates are stored on the blockchain, and they are purchased by companies looking to offset their carbon generation, they will be required to make payments of fees in RWN as well. Rowan will provide the facility for this to take place.

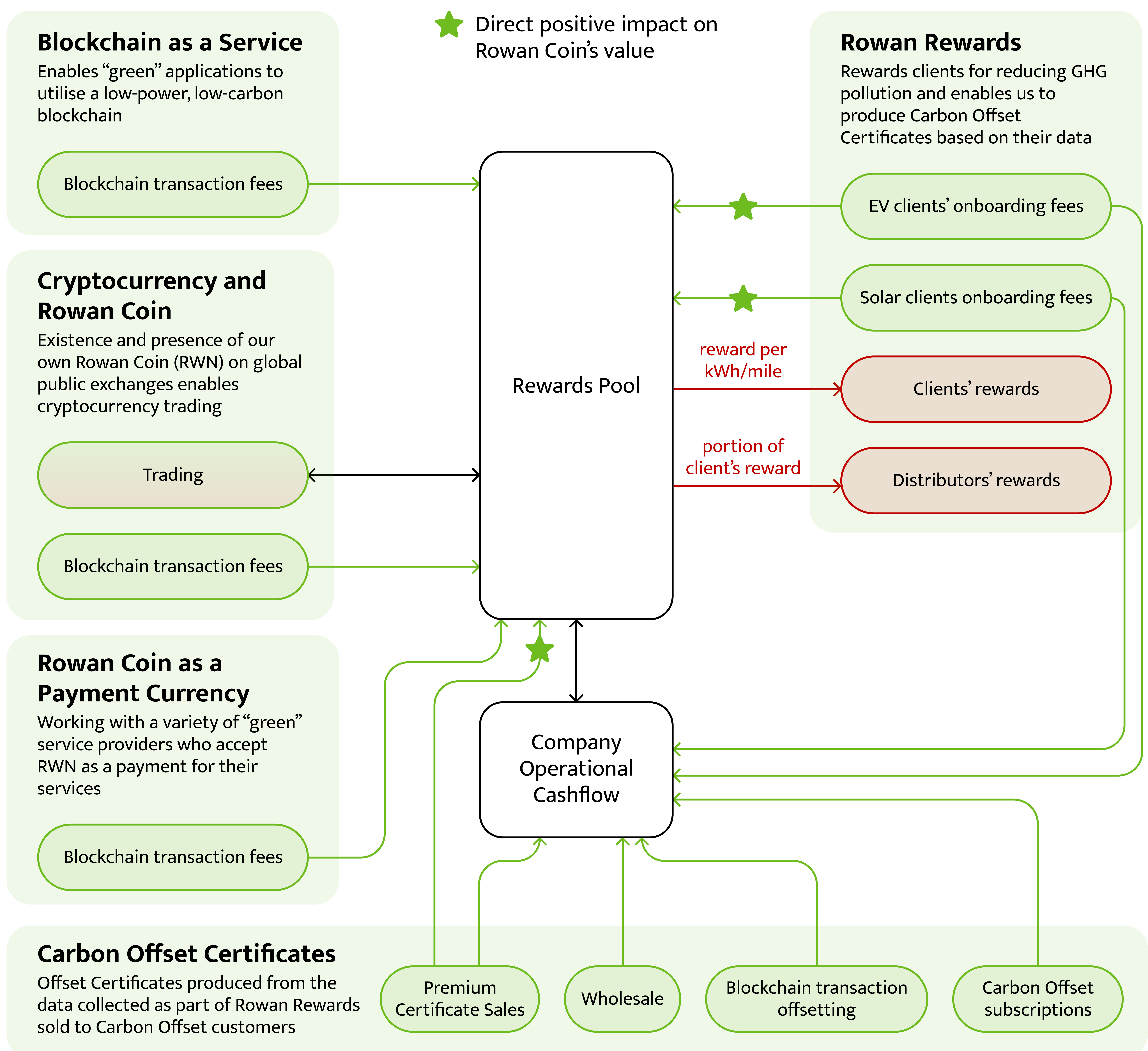
As such, we would expect to create a deflationary monetary system where the price gradually increases, with jumps in price as groups of new users and nodes are added to the system.

Token Model

Central to Rowan Energy's ecosystem is the Rowan Coin (RWN), a token designed to facilitate transactions and incentivise renewable energy generation within our network. The Rowan Coin underpins our Tokenomics model, which is grounded on supply and demand fundamentals, aimed at decreasing the circulating supply while incrementing the demand through real-world applications.

This, in turn, is envisaged to increase daily trade volumes and drive and support the tokens value.

Tokenomics



Supply and Demand Dynamics

The strategy to manage supply and demand is multifaceted. On the supply side, Rowan Energy uses buyback strategies where Rowan Coins are purchased from the open market whenever a new customer joins the network with a SmartMiner.

This buyback strategy reduces the circulating supply of RWN, creating scarcity, intended to increase demand for the token.

On the demand side, several products are being developed that will necessitate the purchase of RWN for functionality, including a Central Membership Site, partnerships with like-minded companies, a Shopify plugin, and a Carbon Fee associated with transactions on the Rowan Blockchain.

Rewards and Incentivization

Rowan Energy incentivizes solar customers through the Rowan Rewards program, rewarding them for every kilowatt-hour (kWh) they generate. The rewards are sourced from a Rewards Pool and converted into GBP.

The Rewards Pool is a designated group of wallets under Rowan Energy's control, seeded with approximately 180 million RWN as a buffer. This Rewards Pool is crucial for ensuring the sustainability of the rewards program.

Carbon Offsets as NFTs

Rowan's Carbon Offsets embody a unique aspect of our model, minted as non-fungible tokens (NFTs) based on the ERC-721 standard on the Rowan Blockchain.

Each kWh of renewable energy generated contributes to the available carbon offset certificates, with an initial aim of selling these for £0.12 and envisioning a rise to £0.20 shortly, in line with the increasing value of carbon.

Transaction and Carbon Fees

In the upcoming version of the Rowan Blockchain, a carbon fee will be levied for each transaction, with users receiving an NFT carbon offset certificate in their wallet. This fee is in addition to the standard transaction fees charged on the Rowan Blockchain, a portion of which is directed into the Rowan Rewards Pool, fostering a continuous cycle of value and reward within the ecosystem.

Price Management Strategies

Rowan employs a bot to monitor its market. This aims at stabilising and growing the token value as required, based on successful implementations witnessed with other cryptocurrencies.

The Rowan Coin (RWN) Token Model encapsulates a well-thought-out strategy to promote renewable energy production, incentivize participants, and create a sustainable and scalable business model.

By aligning the incentives for renewable energy production with the mechanics of supply, demand, and value growth for RWN, Rowan Energy is poised to contribute significantly towards a greener future while presenting a viable and attractive proposition for investors and participants alike.

Roadmap



The Team



David Duckworth
CEO and Founder

An experienced Network Security Advisor & Senior Engineer. David has been a technical lead for projects with Deutsche Bank, Aviva and Barclays. He has a strong background in networks, firewalls and Python. He has a passion for Blockchain and has developed an energy-trading based DLT. In 2014, he built an enterprise-level Bitcoin mine and has run businesses in printing, services, property and IT



Simon Ludlam
Director

Originator of innovative, high profile energy investments and transactions in Europe and the Americas. 20 years of experience within Investment Banking and Private Equity identifying and executing value creative opportunities. Broad experience across all the energy sub-sectors with specific expertise in the power transmission, midstream oil, gas and regulated assets. Recent hands-on operator experience running a private equity controlled energy companies.



Halam Rose
Director

Angel Investor and technical and commercially oriented. Experienced and visionary in software, wireless and engineering. Determined that customers will profit from my analytical, technical and commercial skills. Many years experience in 10T, Smart Meters. Also a technical founder of a hugely successful IOT company.



Martin Hostacny
CTO

A keen technologist with many years' experience in running diverse technology teams and delivering complicated software projects. Martin has spent last 7+ years as a tech leader in the IoT space. He believes in helping the environment through production of renewable energy and that is why he decided to join Rowan Energy.

Conclusion

Rowan Energy is, first and foremost, an energy company looking to solve the issues of low return for renewable energy and green-washing in the industry.

While it uses a cryptocurrency to form part of its back-end and offers tools to those wishing to purchase RWN directly, it is not a cryptocurrency company, and cryptocurrency investors should be clearly aware that the price action of the RWN will be a side-effect of the end-user case, not the drive of the business model.

By operating using a blockchain system, Rowan Energy can offer services in the home renewable energy markets not previously available, including tokenised Renewable Energy Certificates and tokenised peer-to-peer energy trading, improving both consumer confidence in renewable energy and providing a better ROI for those active participants in renewable energy.