Power of the Many

*Towards a citizens' driven energy transition through
fractional ownership of solar parks*

*How citizen-produced electricity will limit
global warming and lead the way to
inclusive climate resilience through the
adoption and application of
Programmable Energy*

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Energy Communities

In 2015, 193 countries ratified the Paris Agreement with the aim of strengthening the global response to climate change. The objective of the energy transition is to reduce energy-related greenhouse gas emissions to mitigate climate change. On top of this, the war in Ukraine has provoked a significant price surge in fossil fuels even while disrupting global supply chains and the whole industrial complex that depends on fossil fuels. This is compounding challenges already present as a consequence of the pandemic. As a result, the EU has increased the target for alternative sources of energy such as renewables to 45% by 2030.

As the climate emergency intensifies, everyday citizens rightly wonder how they can be part of the solution in adaptation and mitigation and impelling inclusive climate resilience that will limit planetary warming to 1.5 degrees from pre-industrial norms. In this whitepaper, we explore how Power of the many, will play a significant role in the energy transition and inclusive climate resilience. The global economy is in flux, as the transition to more sustainable energy production gathers momentum at a pace unforeseen even five years ago.

The European Commission is on a mission to find new ways to engage citizens in the energy transition. With so-called decentralized Energy Communities, the commission aims for energy generated locally, through local ownership, and the transformation of energy consumers to prosumers. The Netherlands has made this one of the main pillars of the Dutch Climate Agreement (Klimaatakkoord), in which environmental and market parties agreed to ensure that renewable energy projects on land will work together on an equal footing in development, construction and operation. This translates into more balanced distribution of ownership in a particular area, aiming at 50% ownership of both production and offtake by citizens and companies in the proximity of a solar park or wind park from 2030 on.

Programmable Energy

The working group is currently working on Programmable Energy consisting of electricity generated by individual citizens, with its value assured by tokenization and governed by smart contracts, can accelerate the transition to renewable energy, while assigning value to sustainable behaviors.

By tokenizing energy, we aim to empower local stakeholders through the financing and managing of community-owned solar parks. We envision a decentralized energy system in which people are empowered as *prosumers* in Energy Communities. Our solution increases solar uptake while cutting consumers' bills, lowering energy poverty, and increasing energy security and independence as a side effect. Investments via

Energy Communities lowers NIMBY (not-in-my-backyard) behavior, supports inclusion, avoids larger inequalities caused by the energy transition, and improves their skills. This puts the control of electricity generation back in the hands of the many by making citizens active participants in the energy transition. Energy Communities also enable citizens who cannot install rooftop solar - because of multi-dwelling buildings, monuments, or other restrictions - to enjoy the benefits of (co)owning solar energy installations.

Fractional Ownership of solar parks envisions the creation of an ecosystem in which solar panels belonging to a solar park are tokenized and owned by multiple investors. These tokens are initially offered by the asset manager. After a token has been sold for the first time, it can be traded among buyers and sellers. To do so, a platform where these kinds of transactions can be made is provided, and a secondary (liquid) market for tokens is enabled.

The use of panel-level data imbues property rights and live metadata tagging of green energy (Proof of Origin). This enables more democratic access to project finance opportunities for asset and off-take, thanks to the disruption of entry access barriers allowed by fractionalized ownership. This can boost individual and community ownership of solar parks. An open and decentralized digital platform for the energy sector provides the smart contract mechanism to store decentralized identities and their credentials and facilitates on-chain verification and transactions between parties.

The token represents rights attached to ownership of an individual solar panel. However, the possibilities to separate a solar panel from the solar park are limited. A solar park must act as a single legal entity to enter legal obligations such as land rights. Therefore, we propose the separation of legal and economic ownership. This means that a token represents economic ownership rather than legal ownership of a solar panel. To prove the feasibility of the project, we have implemented the fractional ownership model using the concepts and models described in this paper, and the Energy Token partners are now implementing this in larger parks across Europe.

The road to realization

Blockchain enables new financial models for local renewable energy from carbon credits, peer to peer and the potential for aggregation into investing mechanisms and green bonds. For example, The Green Digital Finance Alliance's report on Green Bonds and debt products observes that blockchain technologies can enable the aggregation of smaller-scale renewable energy projects into investable traceable financial instruments with 10x the efficiencies of traditional mechanisms. These findings were expanded in the Bank of International Settlement's Project Genesis report and pilots.

2Tokens in close cooperation with The Green Village demonstrate key findings in both a test and operational environment at the field lab. In addition, several partner organizations are actively building platforms automating issuance, management, and impact monitoring, focused on aggregated small and mid-sized renewable energy projects. Examples include Evercity.io, Blockchain Triangle, Riddle&Code together with Wien Energy and BlockLab, Port of Rotterdam.

Examples of successful supporting initiatives abound, and enabling the token economy in the power market will not happen overnight. We organized a roundtable to address the current challenges related to tokenizing energy.

Recommendations

While the use case elaborated on in this whitepaper reflects the successful tokenization of energy across a variety of business models by our partners, there remains much work to be done to leverage the prosumer as a core stakeholder of the new energy paradigm. Some of our key recommendations:

1. Use best practices from known and established use cases to convene the alignment and development of international standards and norms.
2. Apply tokenization and tokenomics to optimize economic value for the prosumer, taking full advantage of all the possibilities of distributed ledger technology, with the purpose to construct decentralized marketplaces for energy.
3. Develop common international standards such as the token taxonomy and investment frameworks. These are related to all aspects of consumer-generated electricity, smart grids, packaged energy, and carbon markets, with the aim of reducing barriers and democratizing the grid.
4. Align governance, regulation, safety standards, and access rules on common grounds and common purpose, leading to effectively removing practical barriers to adoption.

Famous last words

A note about the issues with some blockchains and energy consumption for maintaining these blockchains. We propose to solve this issue by building a technology stack that is net-zero or close to net-zero.

This Whitepaper is the work of the Energy Working Group of 2Tokens. The group kicked off in 2021 and concluded the first phase in summer 2022. The finalization of the first phase provides a way to tokenize solar parks. The Energy Working Group continues to develop novel tokenization ideas in the energy sector. In *Phase II*, we will tokenize the offtake of a solar park, including the energy generation itself, data collection and management by tokenization of Guarantees of Origin, Renewable Energy Credits, and other data streams, new forms of energy balancing, and smart grid management; energy governance; etc.

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Authors: Alex Bausch & Edgar Kampers

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https://www.energytoken.eu/
https://www.2tokens.org/energy-token
+31 10 206 02 04
info@2tokens.org