

EXECUTIVE SUMMARY

POWER OF THE MANY

Democratizing Energy Sharing

Transforming Citizens into Prosumers:
Democratizing Energy Sharing to Accelerate
Solar Adoption, Lower Bills, and Enhance Energy
Independence



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SYNOPSIS

In 2022, we published a paper on tokenizing the ownership of solar panel assets. The paper focuses on enabling local communities to finance and manage community-owned solar parks, promoting greater accessibility and participation in renewable energy initiatives.

Investing in solar panels through tokens helps community members reduce the “Not In My Back Yard” (NIMBY) resistance, promotes inclusivity, minimizes the inequality gap caused by the energy transition, and enhances residents’ skills. It also allows individuals with restrictions on installing rooftop solar panels—e.g., due to living in multi-unit or historical buildings—to still benefit from co-owning solar energy installations.

The concept of fractional ownership of solar parks fosters an ecosystem where multiple investors hold ownership of tokenized solar panels within a park. Initially, these tokens are offered by the asset manager, creating opportunities for widespread community participation in renewable energy generation.

Our vision is a decentralized energy system that transforms citizens into prosumers—both producers and consumers—within energy communities.

We are now excited to present our point of view on democratizing energy sharing within these communities. This model not only accelerates solar energy adoption but also helps lower consumer energy bills, reduce energy poverty, and improve energy security and independence. By empowering citizens to take greater control of electricity generation, it transforms them into active participants in the energy transition.

This citizen-driven approach to energy transition, supported by fractional ownership of solar parks, presents a unique pathway to mitigating global warming. By adopting and implementing programmable energy, we can lead the way towards a more inclusive and climate-resilient future. The energy sector is rapidly evolving towards distributed and sustainable energy production, driven by advances in solar panel technology, battery storage, and the emergence of Decentralized Autonomous Organizations (DAOs). It is an exciting time as these innovations are putting the power of energy management back into the hands of households, businesses, and communities to take greater control of their energy resources. Our consortium, Power of the Many, has investigated and uncovered patterns on how tokenization can democratize energy production, improve transparency, and enhance community engagement in the renewable energy industry.

KEY HIGHLIGHTS

1. Renewable Energy Sharing: We are witnessing a paradigm shift towards a decentralized energy future shaped by multiple energy sources, peer-to-peer (P2P) energy trading, and energy cooperatives. These changes promise several major benefits such as cost savings, environmental prosperity, and increased energy independence, rendering the energy landscape more sustainable and resilient.
2. Energy Sharing Communities and Hubs: At the heart of this transformation are local communities, such as Renewable Energy Communities (RECs) and Citizen Energy Communities (CECs), which play a critical role in local energy production and governance. These communities,



characterized by decentralized decision-making and dynamic adaptability, contribute to local energy resilience and sustainability.

3. Energy Sharing Solutions: Self-governing energy sharing within a regional community is no longer a distant dream - it is happening and is already enabled by energy-sharing solutions involving fractional ownership, digital platforms for community engagement, and smart contracts for transparent governance. These systems empower stakeholders to manage shared energy resources effectively, ensuring inclusivity and accountability.

4. Energy Sharing Ecosystem: This evolving ecosystem includes a diverse range of players—cooperatives, energy hubs, and others—who come together to manage resources, facilitate P2P trading, and provide critical services. It is a collaborative network that supports community-driven energy solutions, making the entire system more resilient and efficient.

5. Decentralized Governance Journey: Transitioning to decentralized models is not a simple task; it is a journey. It requires engaging communities from the start, understanding the baseline blueprint up to the deployment of digitalized infrastructure, and actively managing decentralized energy production. We need to arrive at a framework that helps communities achieve sustainable energy goals and overcome challenges such as regulatory compliance and effective governance. However, to fully realize this potential, regulatory uncertainty, technological

barriers, and governance challenges must be addressed through collaboration and co-creation with policymakers, industry stakeholders, and communities.

INTRODUCTION

This exploration into “Democratizing Energy Sharing” is not just about technology; it is about how digitalization, particularly tokenization, can reshape how we think about collaborating to generate and use energy. As solar panel costs decline, efficiency improves, and battery storage technology advances, we are moving toward a future of energy abundance. DAOs could provide a new framework for energy governance, enabling households, businesses, and communities to manage their energy resources through decentralized, transparent, immutable, and efficient systems. This revolution promises the democratization of energy production in a new era of efficient and transparent energy distribution and sharing.

THE RISE OF RENEWABLE ENERGY SHARING

The energy sector is undergoing a profound transformation to reduce CO2 emissions and mitigate climate impact. Renewable energy is becoming the primary electricity generation method, primarily from smaller and more distributed sources. This shift is driven by the need for



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sustainable operations, such as replacing internal combustion engines with electric vehicles and adopting renewable heating solutions like heat pumps. These changes necessitate a modern infrastructure for faster clearing, settlement, and device-level granularity using Internet-of-Things (IoT) devices. This new landscape offers consumers a more significant role, with the opportunity to engage directly in P2P energy sharing through decentralized technologies, effectively becoming prosumers.

Energy sharing optimizes the use of renewable sources, storage systems, and smart grids among households, businesses, and institutions, helping to lower costs and improve energy security. It is about community ownership, distributed generation, dynamic consumption, P2P energy sharing, energy storage and conversion, and smart grids. However, it is also about distributed governance, which will become crucial for managing shared energy resources and ensuring local decision-making, stakeholder participation, transparency, flexibility, and member empowerment. Energy sharing is pivotal for transitioning to a decentralized green energy market, reflecting trends like local energy production, the proliferation of energy communities and hubs, technological advancements, policy support, community engagement, sustainability, and economic opportunities. These trends indicate a significant shift towards a more decentralized, sustainable, and community-oriented energy future. Admittedly, there are many hurdles to overcome, such as regulatory challenges, a need for more sophisticated tools for fractional ownership of energy assets, decision-making complexities, inefficient value distribution, and sustaining community engagement. Dealing with these challenges involves coordinated efforts across technological innovation, regulatory reform, community engagement, and investment

in infrastructure and tools. But with a shared vision, these are challenges we can address together.

ENERGY SHARING COMMUNITIES AND HUBS

Our paper highlights how Energy Communities (ECs) and Energy Hubs (EHs) are the key players in the transition to sustainable energy. These local initiatives empower stakeholders to collectively generate, share, and manage energy. ECs and EHs function as living systems characterized by dynamic interactions, adaptation, feedback loops, resilience, evolution, and symbiosis.

ECs are defined by common goals, collective action, democratic governance, social and economic benefits, inclusivity, regulatory frameworks, and empowerment. They are supported by European Union's legislation, including the Clean Energy for All Europeans package, and include RECs, CCECs, and Municipality-led Renewable Energy Communities.

EHs integrate various energy resources and technologies to support efficient energy management within specific areas. Types of EHs include homeownership associations, commercial energy hubs (e.g., shopping malls), and industrial renewable energy hubs. It is important to understand how EHs and ECs differ in ownership structures, scope and scale, infrastructure ownership, and levels of community engagement.



ENERGY SHARING SOLUTION

Our paper proposes that a comprehensive energy-sharing solution integrates several vital components to ensure effective and sustainable operation. These components include:

- **Virtual Power Plant:** It optimizes energy-sharing practices based on local needs and goals.
- **Community Engagement:** A user-friendly digital platform that facilitates participation and collaboration among community members.
- **Fractional Ownership:** It allows broader participation and financial empowerment through shared investment in energy assets.
- **Distributed Governance:** Digital tools for transparent and inclusive decision-making, including membership management, proposal submission, and agreement on investment options.
- **Treasury Management:** It automates member rewards and value distribution using smart contracts and blockchain technology.

Implementing energy token solutions can encompass fractional ownership, localized energy production, governance, and community participation through an intuitive interface, with rewards in the form of kWh Energy Tokens. These tokens are tied to tokenized power agreements, with rewards according to ownership stakes.

Effective governance involves transparent decision-making processes, democratic participation, clear governance structures, inclusive membership criteria, transparent communication, accountability mechanisms, flexibility and

adaptability, sustainability focus, and legal and regulatory compliance.

ENERGY SHARING ECOSYSTEM

The emerging landscape within the energy-sharing ecosystem includes Cooperatives, Energy Hubs, and Service Providers. Each component has distinct roles and responsibilities that collectively drive the system's efficiency and effectiveness.

- **Cooperatives:** They Provide overarching governance and coordination, ensuring alignment among various stakeholders and establishing principles for sustainable energy management.
- **Energy Hubs:** They operate locally, empowering community members to manage their energy resources collectively.
- **Service Providers:** They offer specialized services such as technical expertise, project management, financial advisory, consulting on regulatory compliance, and community engagement.

The synergy between ecosystems and markets creates a robust network of value and trust flows. Ecosystems provide the regulatory and cultural framework, governance mechanisms ensure self-regulation and community engagement, and markets facilitate economic exchanges.

The transition to a decentralized, regenerative economic framework involves leveraging energy protocols and smart contracts on blockchain ledgers to integrate renewable energy sources. Essential building blocks for a successful regenerative energy DAO include effective governance,



reward systems, financial transparency, communication, talent management, tokenization, coalition hubs, blockchain layers, innovative technologies, and ecological benefits frameworks. Creating an effective energy DAO involves defining a clear purpose and vision, ensuring legal compliance, choosing the right blockchain platform, verifying membership, designing tokenomics, establishing governance mechanisms, deploying smart contracts, ensuring security, engaging and educating members, iterating and adapting, and collaborating with partners. It is about building something autonomous, inclusive, flexible, and fair.

The democratization of renewable energy sharing through tokenization holds promise for a sustainable, equitable, and decentralized energy future. By leveraging the collective power of individuals and communities, we can accelerate the transition to renewable energy and build a resilient and inclusive energy ecosystem. This transformation aligns with broader trends in the energy sector, such as decentralized energy production, energy communities and hubs, and smart grid technologies.

CONCLUSION

Digitalization, particularly tokenization, empowers individuals and communities to participate in energy management decisions, promoting transparency, inclusivity, and accountability. Tokenization will enable peer-to-peer energy trading, creating economic opportunities and incentivizing renewable energy adoption.

Challenges such as regulatory uncertainty, technological barriers, and governance issues must be addressed to unlock the full potential of DAOs in renewable energy sharing. Collaborative efforts from policymakers, industry stakeholders, and community members are essential to overcome these obstacles.



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