

Binance Academy : blockchain for business sustainability

course 2 : Potential Blockchain Use Cases to All Firms

Module : Use Case: Renewable Energy

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Blockchain can facilitate the integration and management of renewable energy sources by enabling decentralized energy trading, grid management, and investment in renewable energy projects.

Comprehensive explanation

- Blockchain can enable peer-to-peer trading, allowing individuals and organizations to buy and sell excess renewable energy directly without intermediaries.
- This can encourage investment in renewable energy generation and lead to more efficient energy distribution and consumption.
- Blockchain can provide a secure and transparent platform for crowdfunding renewable energy projects, allowing individuals and organizations to invest in clean energy initiatives and track their impact.

Recommendations/goals

- Implement a blockchain-based platform for peer-to-peer energy trading that allows users to trade excess renewable energy securely and transparently.
- Use blockchain to record and manage energy generation and consumption data, improving the accuracy and reliability of grid management.
- Develop a crowdfunding platform using blockchain technology to enable secure and transparent investment in renewable energy projects.
- Collaborate with energy providers, regulators, and technology companies to create standardized frameworks and pilot projects that demonstrate the potential of blockchain in the renewable energy sector.

Developing a decentralized renewable energy system using blockchain technology involves several key steps from a business perspective.

- Define the scope and objectives
- Choose a sustainable blockchain platform
Select a blockchain platform that meets the system's requirements for scalability, security, energy efficiency, ease of use. When making this decision, consider factors such as consensus mechanisms and access control. It is also possible to create your own blockchain platform rather than using existing ones like Ethereum, Solana, or BSC. However, please note that developing a custom platform carries significant risks, as decentralized technology requires co-creation efforts from multiple stakeholders.
- Design the system architecture
- Tokenize energy assets

- Develop smart contracts
- Integrate data source and IoT devices
- establish a marketplace
- ensure regulatory compliance
- Monitor and evaluate

To maintain the integrity of such a system, several factors must be considered and addressed, including:

- **Energy Storage.** energy storage systems, such as batteries, are crucial for ensuring that excess energy generated during peak times can be stored and used during periods of lower energy generation.
- **Grid Connectivity.** The decentralized energy systems must be connected to the existing grid to ensure proper flow and distribution of energy and ensure that energy can be distributed to where it is needed.
- **Energy management systems.** To ensure the efficient and reliable distribution of energy, an energy management system must be in place that can monitor and control the flow of energy within the system.
- **Maintenance and upkeep.** Regular maintenance and upkeep of renewable energy sources and energy storage system is essential to ensure the continued operation and reliability of the system.
- **Community Involvement.** The success of a decentralized renewable energy system is dependent on the involvement and support of the communities it serves. Encouraging community ownership and participation in the system can help to ensure its long term sustainability.

About Power Ledger

This is a platform that I think is very well presented.
You can even stake their token called POWER.

You can check out their website at powerledger.io.

They use blockchain technology. Let's explore how blockchain is implemented here.

Power Ledger has now launched a public blockchain, which means their platform is live.

If I'm not mistaken, they operate with two chains:

1. Power Ledger Chain
2. Ethereum Chain

So, they use these two chains for their renewable energy trading marketplace.

Before going deeper, I believe it's important to check their social media, especially their YouTube channel.

Whenever I develop content—whether for undergraduate, PhD students, or for the general public interested in blockchain accessibility—I always look at the original sources, including podcasts, webinars, and Zoom sessions.

Although some of their content was last uploaded about a year ago, I still find it relevant.

They also hold regular Zoom meetings to discuss their projects.

This shows their credibility and seriousness, which is why I chose them as a case study.

On this platform, you can stake decentralized energy and connect it to either Ethereum or the Power Ledger Chain.

Their platform is modular and scalable, and their products can be contracted separately.

If you want to learn how it works, you can visit their website and explore further.

They have clients across Europe, North and South America, Asia, Australia, and Africa—almost worldwide.

You can also learn about their peer-to-peer (P2P) energy trading features.

Offices & Contact

Power Ledger has offices in Perth, Bangalore, Barcelona, and Tokyo.

If you have any questions, you can email them at: sales@powerledger.io or fill out the contact form on their website.

Platform Features

They say their track and trace features help trace the origin and flow of energy.

This is important because it allows consumers to choose the source of energy they want to use.

Their platform enables subsidy-free P2P solar energy trading.

They also design user-friendly systems to facilitate this.

My Goal

My goal is simply to introduce this case study — not to promote the company.

If you are interested and want to learn more, make sure to do your own in-depth research.

Do not make any financial decisions without thorough understanding.

Understand the business fundamentals and evaluate the company's future potential before investing in their tokens or business.

Blockchain's Role

Blockchain facilitates the integration and management of renewable energy sources by:

- Enabling decentralized energy trading.
- Supporting grid management.
- Enabling project financing for renewables.

One of the most important applications is P2P energy trading.

P2P Energy Trading

For example, in Finland, we can install solar panels on our rooftops and sell the generated energy to anyone who needs it — even neighbors or distant users.

This means you don't have to sell energy back to a big energy company; you can sell directly to other individuals.

This encourages investment in renewable energy systems, turning it into a source of income, not just for personal consumption.

Blockchain and Crowdfunding

Blockchain also offers a secure and transparent platform for crowdfunding renewable energy projects.

If you want to build a decentralized renewable energy P2P platform, here are the suggested steps:

1. Allow P2P transactions.
2. Use blockchain to record and manage energy production and consumption data.
3. Improve the accuracy and reliability of grid management.
4. Create a dedicated crowdfunding platform for renewable energy.
5. Collaborate with energy providers, regulators, and tech companies.

Blockchain Platforms & Architecture

Choose the right blockchain platform. For example:

- Power Ledger built their own blockchain (Power Ledger Chain).
- But you can also use existing blockchains like Ethereum, Solana, or Binance Smart Chain.

It depends on your resources, R&D capacity, and technical expertise.

Then:

- Design the system architecture.
- Tokenize the energy assets.
- Develop smart contracts.
- Integrate IoT devices for real-time energy data.

Energy is a measurable asset (in kilowatts), so tokenization is relatively straightforward.

Challenges in Decentralized Energy

However, there are major challenges:

- Energy storage is difficult.
 - Energy transmission leads to power loss.
For example: If someone in Lapland sells energy to someone in Helsinki (over 800 km away), how do you transmit that energy?
 - This system is very different from carbon credit systems because energy has a short life cycle.
 - Proper grid management is essential.
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Community Engagement & Regulatory Compliance

You must consider technical factors like:

- Grid connectivity.
- Energy system management.
- Community engagement.

This requires technical expertise and supportive infrastructure.

Final Thoughts

Even though blockchain seems like it can solve everything, successful implementation still depends on domain-specific expertise.

For example, my team can design ESG reporting systems, but we are not energy experts.

We would need to collaborate with colleagues from departments specializing in energy management.