

DeEnergy Market: Decentralized Solar Energy Tokenization & Trading Platform

Project Overview

A blockchain-powered platform that allows solar energy producers to tokenize surplus power and sell it directly to nearby consumers via smart contracts. Energy delivery is verified using smart meters and IoT devices.

Goals

- ☐ Enable solar producers to mint energy tokens (1 token = 1 kWh)
- ☐ Let consumers buy tokens and redeem for electricity
- ☐ Verify energy delivery via IoT meters and Chainlink oracles
- ☐ Ensure payments via escrow smart contracts
- ☐ Provide real-time dashboards for producers and consumers
- ☐ Govern platform rules using a DAO

Tech Stack

Blockchain & Smart Contracts

- ☐ Polygon or Gnosis Chain (low gas)
- ☐ ERC-20 tokens (ENGY) for kWh representation
- ☐ Solidity for smart contracts (escrow, token minting)
- ☐ Hardhat or Foundry for testing/deployment
- ☐ Chainlink for oracle data (meter values, pricing)

Frontend

- ☐ Next.js + TypeScript
- ☐ TailwindCSS + shadcn/ui
- ☐ RainbowKit / WalletConnect for wallet integration
- ☐ React Hook Form + Zod for form validation

IoT & Device Layer

- [] MQTT broker (e.g., Mosquitto) to push data
- [] Raspberry Pi + smart meter interface
- [] Node.js + Express/Fastify for device-to-chain bridge

Storage & Indexing

- [] IPFS/Filecoin for metadata
- [] TimescaleDB for energy data (time-series)
- [] The Graph Protocol for querying blockchain state

Data Visualization

- [] Grafana or Chart.js to display:
 - Token generation
 - Live pricing
 - Energy delivery & sales reports

DAO & Governance (Optional)

- [] Aragon / Snapshot for DAO voting
- [] ENGY token staking for governance rights

Workflow

1. [] **Register** as Producer/Consumer with wallet
2. [] **Meter** pushes kWh data to MQTT → backend API → blockchain
3. [] **Producer** mints ENGY tokens (1 token = 1 kWh)
4. [] **Consumer** purchases ENGY tokens via UI
5. [] **Smart Contract** escrows payment until energy is delivered
6. [] **Meter** validates delivery (oracle trigger)
7. [] **Payment** released to producer on confirmation

Revenue & Monetization

- [] 1-3% trading fee on each token purchase
- [] Premium dashboards for analytics
- [] DAO-based community upgrades

- ☐ Energy provider branding on profiles

Roadmap Checklist

Phase 1: MVP

- ☐ Token contract (ENGY) with mint/burn
- ☐ Simple Next.js UI
- ☐ Wallet connection
- ☐ Manual token trade
- ☐ Test IoT data push to backend

Phase 2: Production

- ☐ MQTT + Node.js bridge integration
- ☐ Chainlink Oracle feed
- ☐ Escrow smart contract
- ☐ DAO for voting
- ☐ Analytics dashboard

Contact / License

This project is community-oriented and open source. Feel free to fork, contribute, or use for your local solar grid.