Exergy in plain words

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1. The problem: clean energy is locked in

Oil and gas are expensive because billions of people need them and can reach them. Demand is global because access is global.

Local clean energy is locked inside its perimeter. Outside the perimeter nobody can reach it, so outside the perimeter there is no demand for it, and the price shows exactly that. **Prices are not wrong. They show the lack of access.**

Germany is making this visible. Under the reform approved by the government on 29 July 2026 and now before parliament, new rooftop systems from 1 January 2027 lose the permanent feed-in tariff — only a temporary payment for up to three years remains — and may feed at most half their capacity into the grid. In those hours a stored kilowatt-hour has no buyer at all. Whatever we offer competes with zero.

2. What we built

A unit of account whose denomination is energy itself: the kilowatt-hour. We call it a **note**.

Stablecoins measure their unit in dollars. The note is measured in kilowatt-hours. The dollar is only how its price is quoted, the way oil or wheat is quoted. **Nobody says oil is backed by the dollar.**

A note can be created only one way: by storing energy inside a network where it can be handed to a neighbour. Only members of a virtual power plant (VPP) or an energy community, connected by wire to others who can take a note back in energy, are admitted to mint. **A battery on its own, outside such a network, cannot mint.**

Behind every note stands a floating figure, recalculated on chain and readable by anyone at any moment. Section 3 explains what it means.

3. Two questions we always hear

Does the energy have to move? No. Does a battery have to answer for the notes? No.

Think of a note as a banknote with a number on its face: its share of all the energy stored in the network, by a simple formula: **total stored kilowatt-hours divided by all notes in existence.** The banknote travels; the energy stays where it is. And the number is not a promise from any particular battery. It is the same share for every note, measured and recalculated on chain.

Nobody promises to deliver energy against a note, and nobody ever “cashes it in”. When energy is consumed anywhere in the network, the number falls on every note at once; when batteries charge, it rises.

That is why there can be no run on the batteries. There is no obligation to deliver, so there is no default. The note shows, honestly and at any moment, its share of a real physical stock.

History already ran this test. A banknote once carried a promise to pay in gold, and the promise only ever held while nobody asked all at once. It broke in a run twice: for citizens in 1933, and for foreign central banks in August 1971, when the gold window closed. The world then kept the paper and dropped both the promise and the physical backing. The note takes the physical backing without the promise: **nothing to redeem, so nothing to break, and a stock that anyone can measure.**

4. The example: both are empty

Two communities in different countries. No wire between them. Inside each, the neighbours are connected: that is the VPP.

In Germany a participant has an empty battery. In his pocket is a note that reads **10 kWh**. Those ten kilowatt-hours really are stored somewhere in the network right now. He cannot pull them to his house, and he does not need to. He needs cash to pay his grid bill.

In Australia another participant also has an empty battery, and he has used up his notes over a stretch of bad weather. His neighbour down the street has a full battery.

1. The Australian buys the note from the German for money.
2. The German pays his bill, and the grid gives him electricity.
3. The Australian gives the note to his neighbour, and the neighbour gives him 10 kWh.

Both got energy. Nobody took a subsidy, and nobody did anyone a favour. Each acted out of his own need. **Not one electron crossed a border. The note did.**

Money here is only transport of value between the two parties. Nobody sets the price. The German sells even for less than his bill, because beyond his perimeter his stored energy would otherwise bring him nothing. The Australian buys as soon as the energy behind the note costs him less than power from his own grid. Any price between zero and the grid leaves both better off, so the deal does not wait for a lucky match. And there are many such pairs: members switch sides from day to day.

5. Why the neighbour takes the note

Reciprocity. Today he is full, tomorrow he will be empty and someone else will be full. Every prosumer has two problems that never go away: getting energy when he has none, and placing his surplus when he has too much. The note solves both, on different days.

A better form of storage. Energy in a battery fades: self-discharge, cell degradation, and it cannot move. The figure behind a note moves with charge and discharge across the whole network. The minting rule moves only up: after every million notes, the same stored kilowatt-hour mints half as many. As long as the network keeps storing, each note tends to hold more. So he is not speculating. He chooses the form in which to keep his energy.

6. The hardest case, and the everyday one

We chose the hardest case on purpose: nobody has energy, and the note still works. **That is what backing means.**

The operator's daily case is the easy one, and it is already here. At noon the batteries are full, the grid pays nothing for what is fed in, and nobody nearby needs the energy. Today that surplus is worth zero.

Connected to the network, it stands behind every note, and the operator can sell the notes he holds where energy is short right now. Somewhere it is evening and batteries are empty: the Australian from the example. For him a note is cheaper than his own grid, so he pays money for it. When it is noon in Germany, it is nine in the evening in Australia. **The surplus that was worth zero has a buyer**, and the buyer saves too. Each did his own arithmetic.

A week later the weather turns, and the same member takes energy from a neighbour for notes instead of paying the grid's retail price.

7. Why capital comes, and where it goes

Capital does not go where an idea is beautiful. It goes where there is a paying end consumer, and in proportion to how widely that consumer can be reached. Energy locked in a perimeter has a

consumer the size of the perimeter, so it attracts capital the size of the perimeter. Clean energy has lived on subsidies instead.

The note gives stored clean energy a consumer outside the perimeter. **Figuratively speaking, we built the wire. Electricity does not travel along it; its value does.**

Because notes change hands for money every day, every note has a price in money. Nobody sets it. It is the sum of private calculations between people who need energy. Three things behind that price are public: the stock is measured on chain, the minting rule only moves up, and the growth of the network is visible to anyone. What follows for those who hold notes, the reader will work out faster than we can. We make no forecast.

We never sell notes. The only way to get one is to store energy inside such a network, or to acquire it from someone who did. So money that comes for notes from outside the sector goes to the people who built storage, and from them into more batteries and panels, not into paper about them.

For clean energy this means a buyer for the hours the grid no longer pays for, energy on the days you have none, and no dependence on a subsidy that is ending.

8. Why anyone trusts the number

Because nobody sets it. It is one measured quantity divided by another. Each reading is signed by the device and by the VPP's own system, and both signatures are checked on chain before a single note is minted. Any data source that signs this way can feed the network; the protocol checks signatures, not brands.

Today readings come from operator telemetry. The next step is a certified meter that signs at the source with a key held in its chip, offered as a factory option in the battery cabinet. It is not our own hardware.

9. Is this a pyramid?

A pyramid needs an issuer that takes money, payouts funded by newcomers, and collapse when the inflow stops. None of the three applies. We never sell notes to anyone, so no money flows in to redistribute. A note is issued only against measured physical work. If nobody new ever joined, nothing would collapse: the notes would still reflect exactly the energy in the network. The figure is computed on chain from two measured quantities, and nobody, including us, can move it.

10. Where we are, and the one missing piece

Built: the protocol is deployed and running on a public testnet (Arbitrum Sepolia), with public, source-available code, a live dashboard and an SDK for VPP operators. A regulatory memorandum is written: we do not sell electrons, aggregate or dispatch. We are a settlement layer on top of what VPPs already do.

Missing: two connected communities in two countries. In Austria, settlement between members of an energy community is already permitted within one grid operator's zone. Nothing in the rules needs to change.

The hard part is built. What remains is small and specific: connect the first communities and let the first notes move between them.

Investors in Key Energy, Inc. buy equity in the company. Notes are never sold.

Paper (SSRN preprint): papers.ssrn.com/abstract=6500878 · Code: github.com/MagKey07/exergy-protocol · keyenergy.io
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