

STROMDAO

A consensus system for
decentralised energy markets

Thorsten Zoerner



REVOLUTION





Your new electricity provider: decentralised, autonomous, electric.

In world without subsidies, millions of solar households and businesses will become true market participants as active co-producers of energy.

New energy market participants. A preview.

An aerial photograph of a residential neighborhood. In the foreground, several multi-story apartment buildings are visible, each with a large array of solar panels installed on its roof. A large, mature tree stands prominently in the middle ground. In the background, a dense forested hillside rises, and a smaller town or city is visible at the base of the hill under a clear sky.

A micro utility cooperative



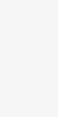
3519



3475



44



Produktion

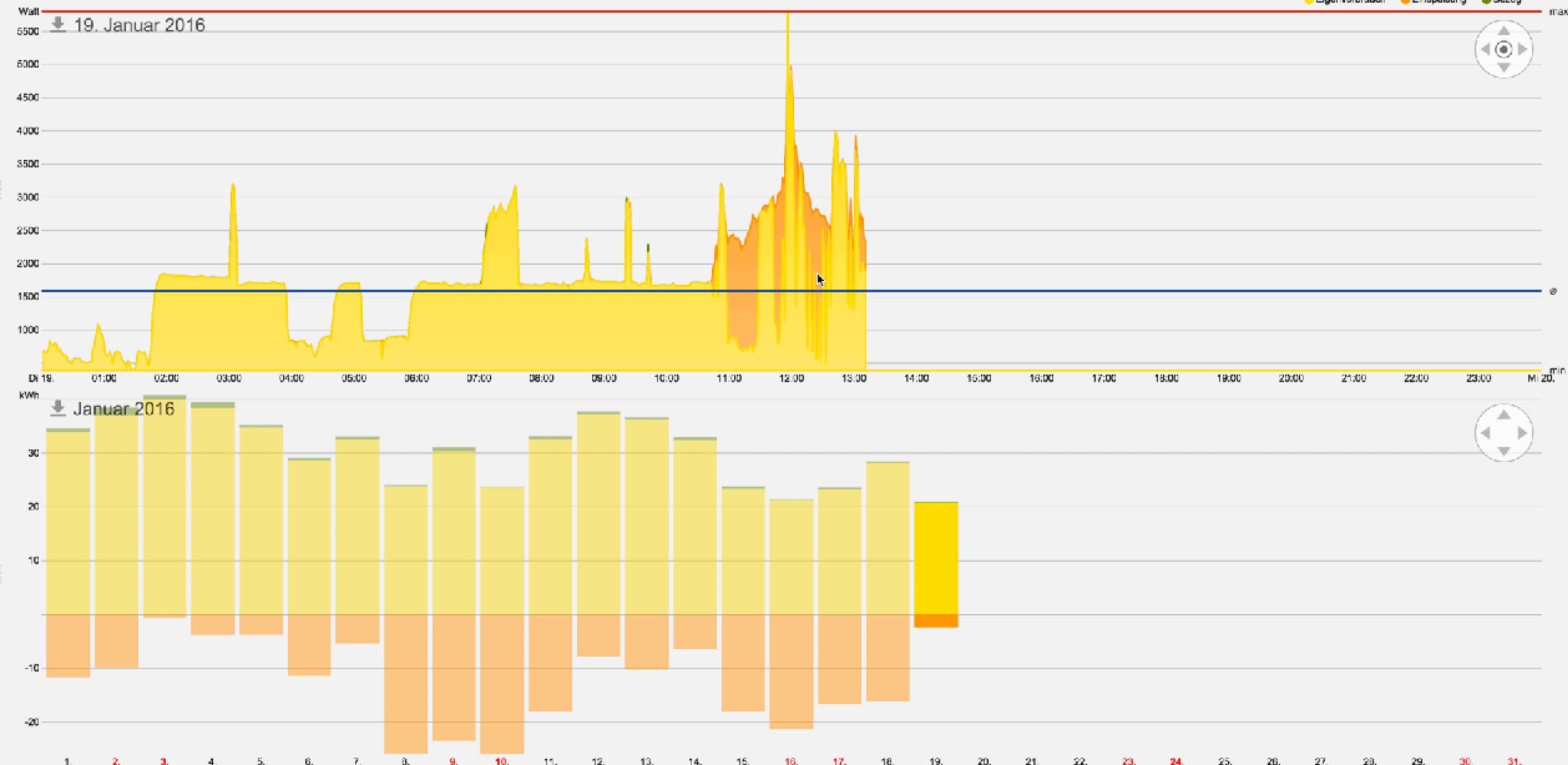
0 8 5 4 2 , 4 5 1 kWh

Bezug

0 0 8 1 9 , 5 6 4 kWh

Einspeisung

0 3 0 8 3 , 3 9 8 kWh



Next?



[REDACTED]

to stefan.thon

⌚ 22 Nov (2 days ago)



German

> English

[Translate message](#)[Turn off for: German](#)

Sehr geehrter Herr Thon,
unter Bezug auf unser vor 2 Tagen geführtes Telefonat hier einige ergänzende
Informationen:

Testfeld für einen Schwarm könnten die EFH gemäß Anlage sein.

Die Eigentümer sind interessiert.

Die Daten aller Einheiten (Bezug, Abgabe) sind im Web im 15 min-Zyklus abrufbar.

PV-Erzeugung und Verbrauch liegen in Echtzeit vor.

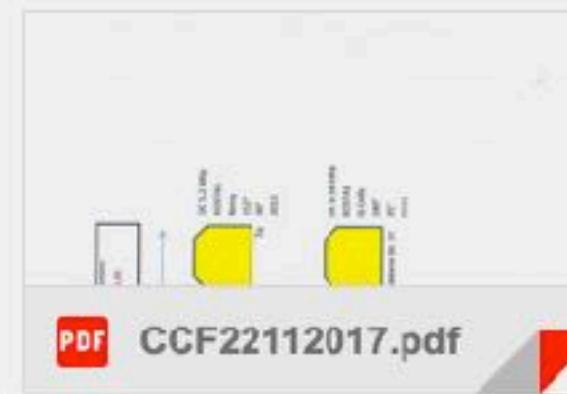
Zu klären wäre die rechtliche Gestaltung zwischen den Einheiten und der EV,
sowie der steuerliche Status des Schwarms bei Direktvermarktung.

Für weitere Informationen rufen Sie bitte unter [REDACTED] an oder schreiben Sie eine mail
an info@LT-system.de

Meine Adresse: [REDACTED]

Beste Grüße

[REDACTED]



Blockchain P2P

DI Gerhard Schumann

www.schumann.at

schumann@schumann.at

ca 90 m

DC 5,0 kWp
mit Fronius-Speicher
vorräuss.ca. 5 kWh



6b

DC 5,0 kWp
Kostal 5,5
Q-Cells
180°/270°
30°
2013



7

DC 5.2 kWp
KOSTAL
Benq
152°
30°
2013



7a

DC 4.94 kWp
KOSTAL
Q-Cells
270°
34°
2013



8

DC 6.58 kWp
KOSTAL
Q-Cells
180°
35°
2013

Eislebener Str. 37

Anlagen sämtl. mit 2-Richtungszählern und Web-Anbindung ausgerüstet (Solarlog)



4

3

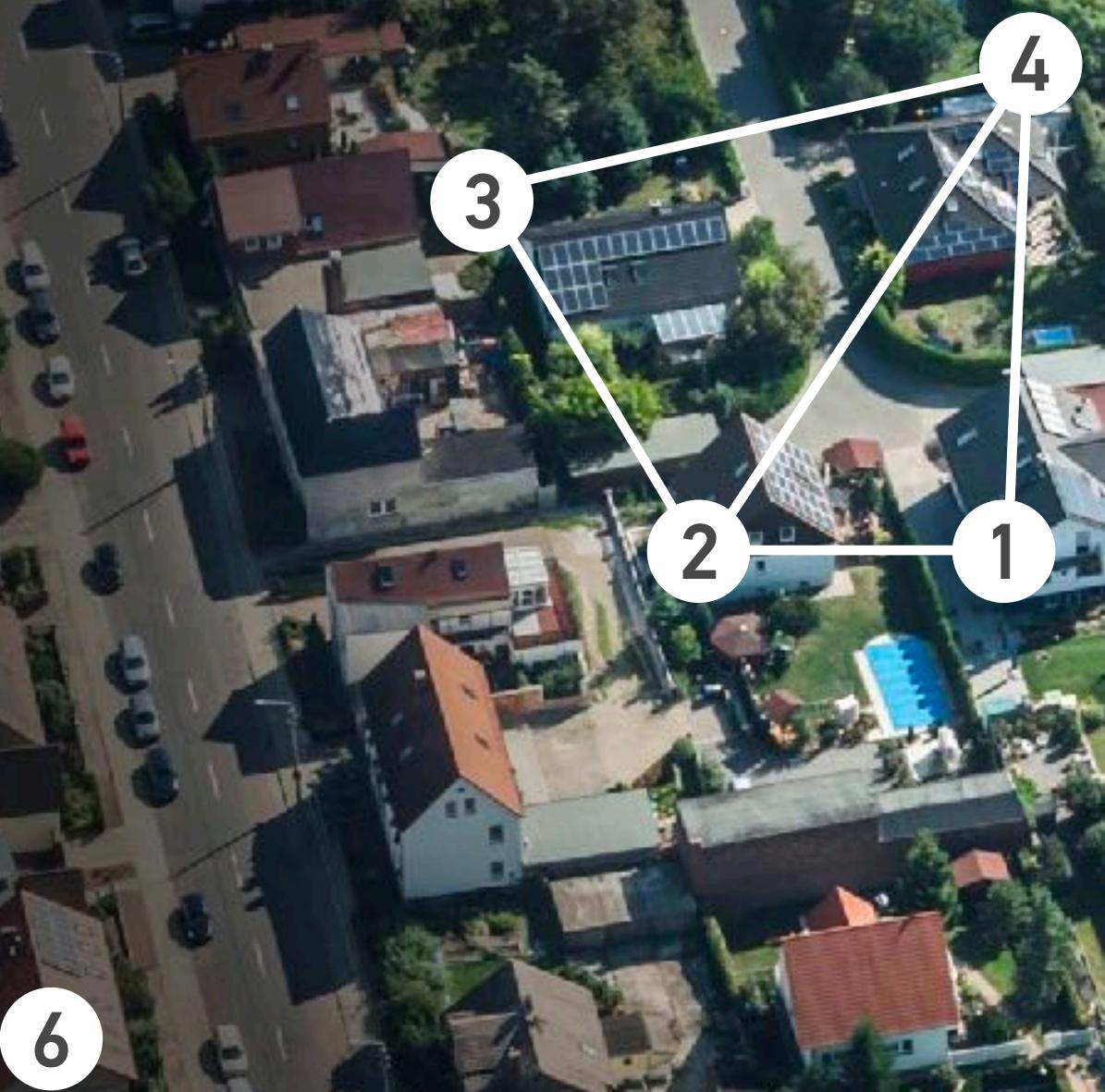
2

1

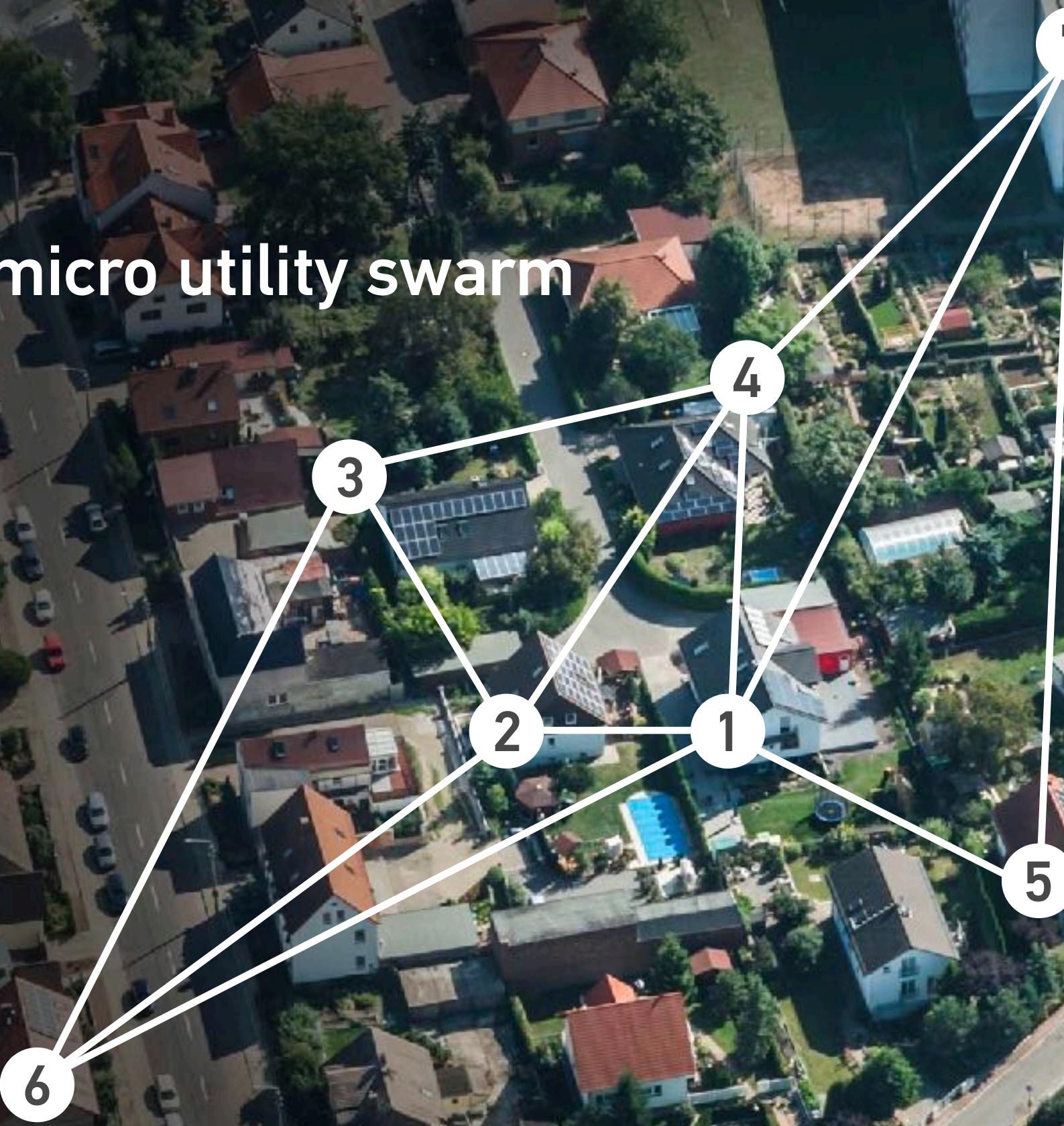
A micro utility swarm



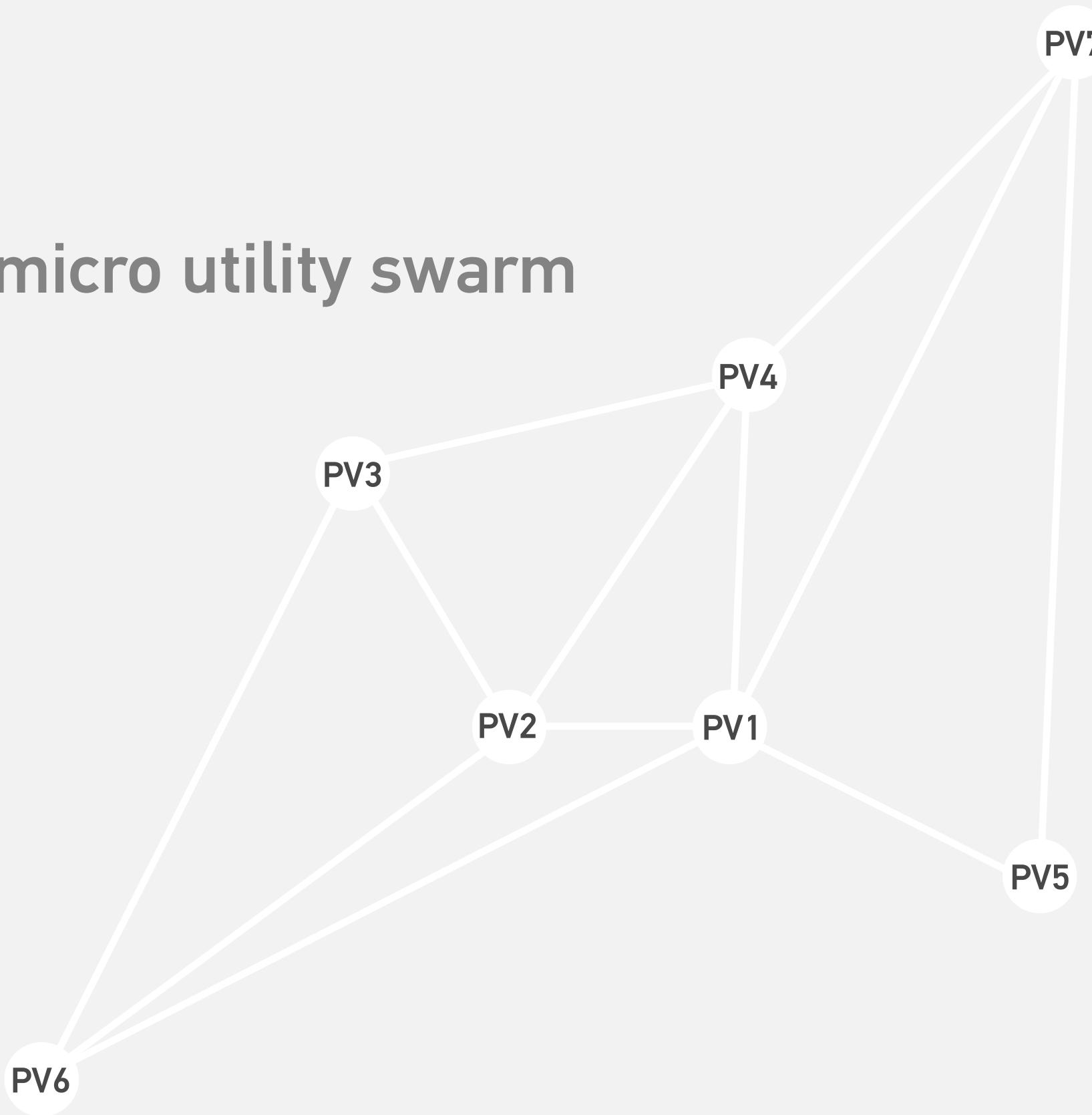
A micro utility swarm



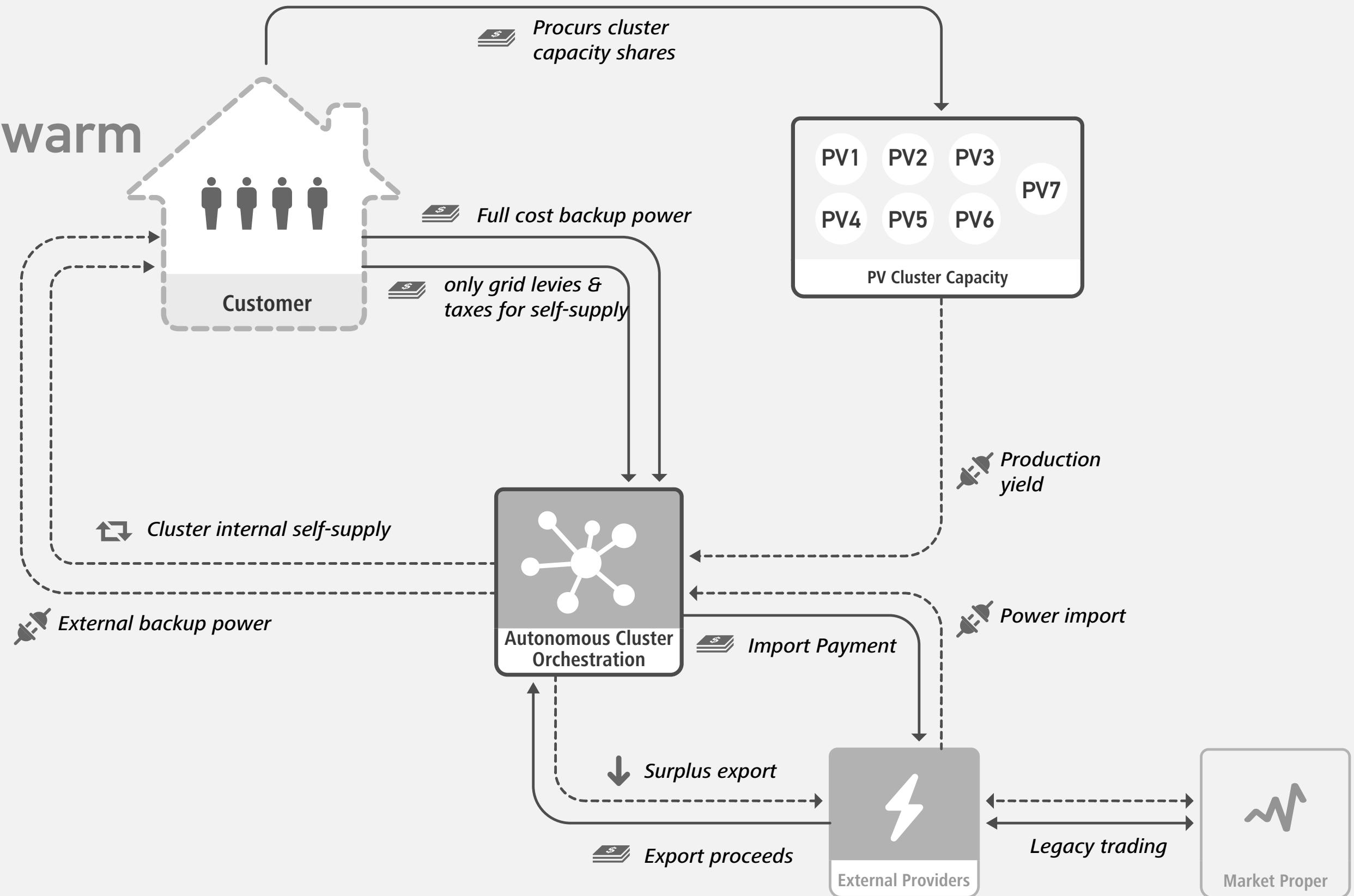
A micro utility swarm



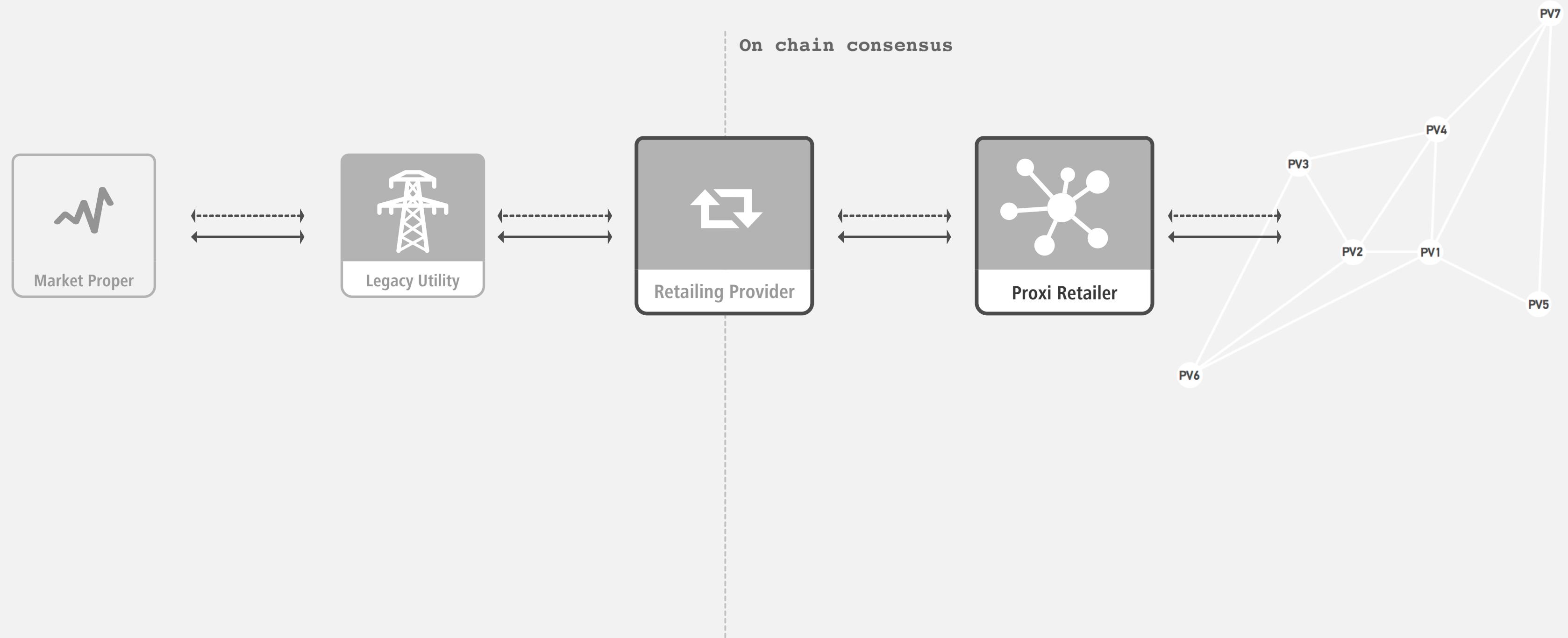
A micro utility swarm



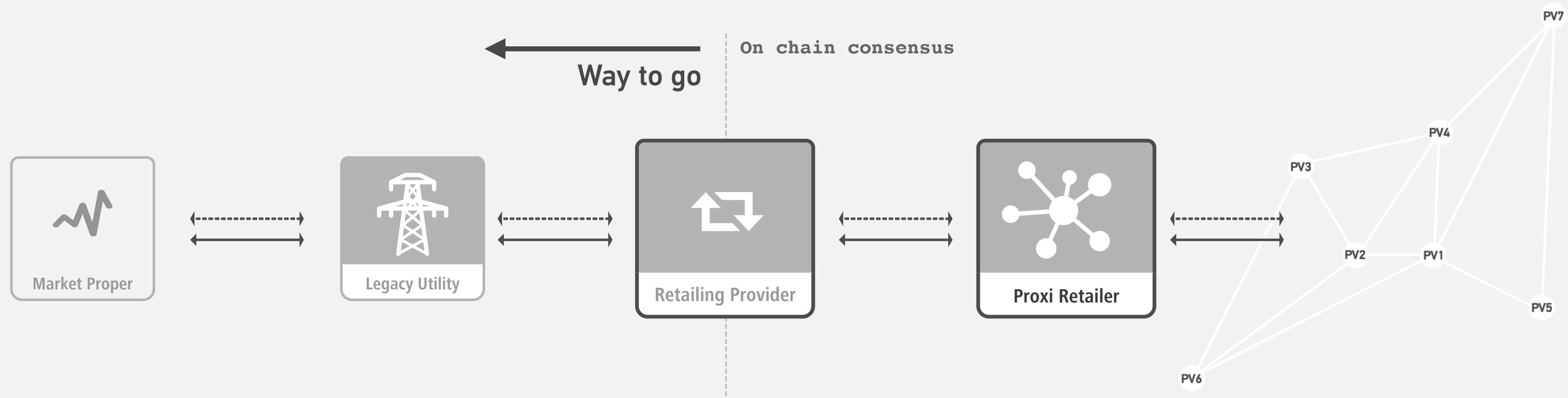
A micro utility swarm



Blockchain swarm abstraction



Blockchain swarm abstraction

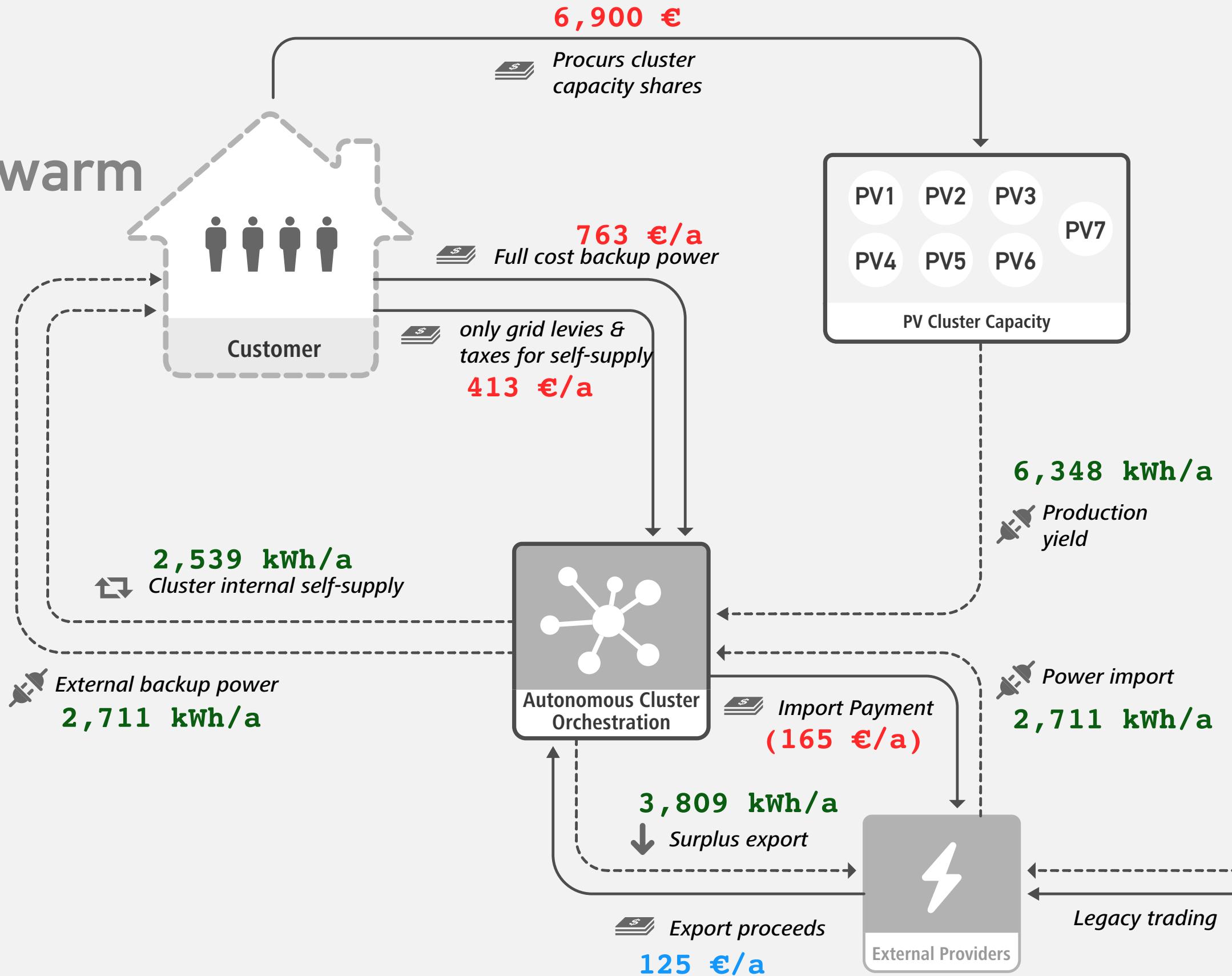


Why?

People want to maximise the value
that they can derive from their property.

A micro utility swarm

PV Assumptions	
PV-Anlage	6.9 kWp
PV-Yield	920 kWh / kw / a
	6348 kWh
PV price per unit	1000 EUR/kW
PV cost liveline cost	6900 EUR
Power consumption annual	5250 kWh / a
Laufzeit	25 a
HyS self consumption ratio	0.4
HyS Autarkiegrad	0.48



Hybrid Economics

Solar is competitive today.

HyPower Saldo		vs	Standard Power Saldo	
Cost consumption	1175 EUR / a		Cost consumption	1360 EUR / a
Cost Invest PV	276 EUR / a		Cost Invest PV	0 EUR / a
Income export	-125 EUR / a		Einnahmen Export	0 EUR / a
Total	1326 EUR / a			1360 EUR / a
Savings	34 EUR / a			
Savings total	854 EUR over 25 yrs			

PV Assumptions	
PV-Anlage	6.9 kWp
PV-Yield	920 kWh / kw / a
	6348 kWh
PV price per unit	1000 EUR/kW
PV cost livetime cost	8800 EUR
Power consumption annual	5250 kWh / a
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HyS Autarkiegrad	0.48



Energy-only markets do not work well for renewables.

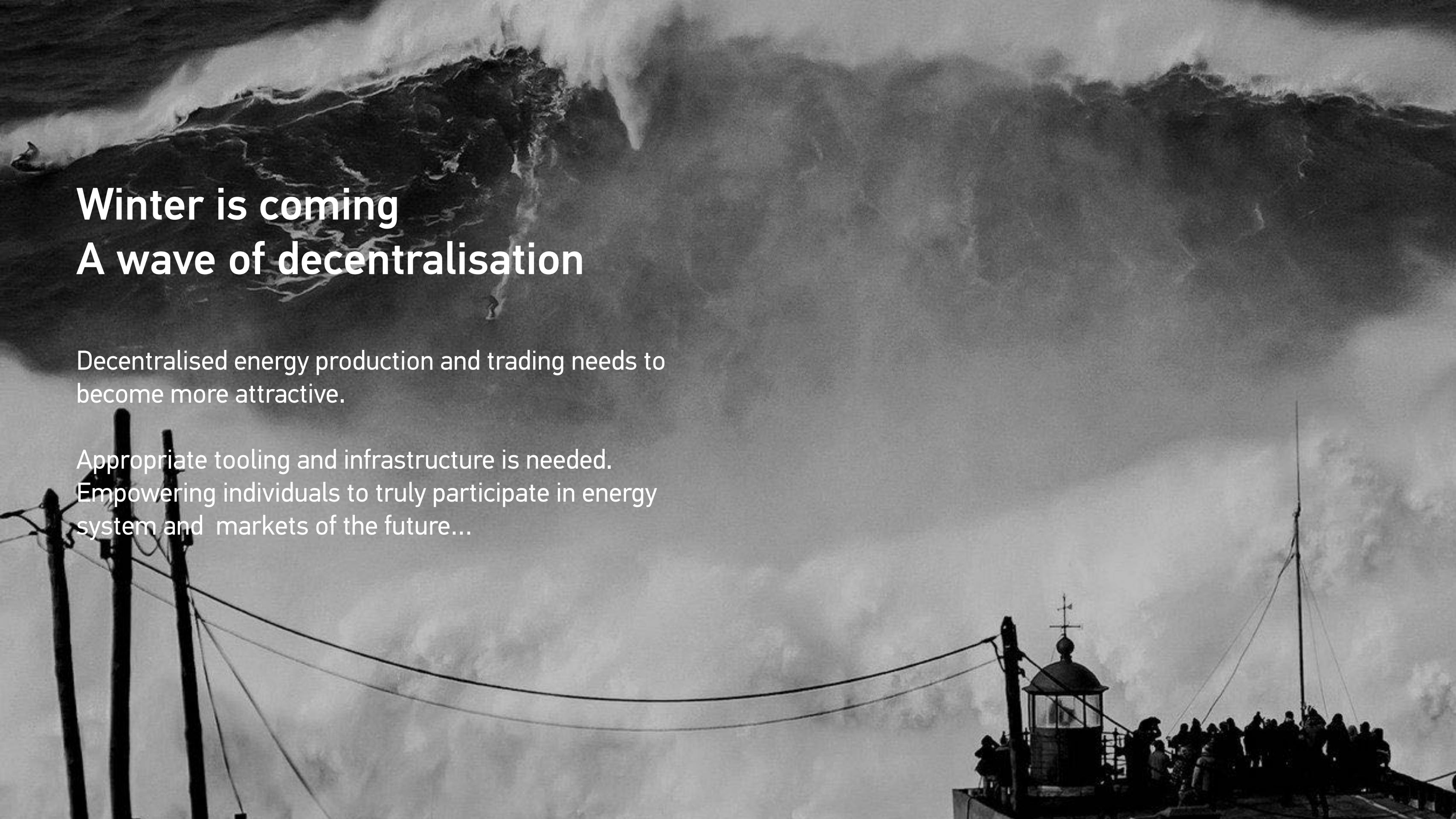
This is a big problem. All renewable capacity needs to be kept running in the future. We need the power. And there is no back-up.

1.5 Million

Wind and photovoltaic
installations

103 Terawatthours

Wind and PV production
in 2016 (17.3 %)



Winter is coming

A wave of decentralisation

Decentralised energy production and trading needs to become more attractive.

Appropriate tooling and infrastructure is needed.
Empowering individuals to truly participate in energy system and markets of the future...

A photograph showing a woman with blonde hair and a man with dark hair and a mustache standing on a roof. They are surrounded by numerous blue solar panels. The roof has a brown tiled surface. The lighting suggests it's either sunrise or sunset, casting a warm glow on their faces.

People want this

People demand greater agency in shaping their energy and supply systems.

Self supply, battery storage, power to heat, electric vehicles, demand response peer trading:
There is a latent but increasing desire to more actively engage with energy markets.

How?

**Market access, requires access to the
means of market communication**

We need to evolve the language (protocol) of
how we communicate in energy markets.

Regelungen zur Adressierung

EDI@Energy Kommunikationsrichtlinie
Verfahrensbeschreibung zur Abwicklung des
Austauschs von EDIFACT-Dateien

A consensus machine for energy transactions.

A machine designed establish and maintain irrevocable consensus among market participants.

Blockchain technology can be utilised to facilitate and enshrine any kind of energy market transaction between participants with diverging interests.

Blockchain Technology

will

Replace EDIFACT/MSCONS as the predominant language of market communication

Blockchain Technology

provides

A single communication bus that all market participants each own and share at the same time

Collaborative networks of co-production.

Blockchain technology will be the transactional backbone of energy systems of the future.

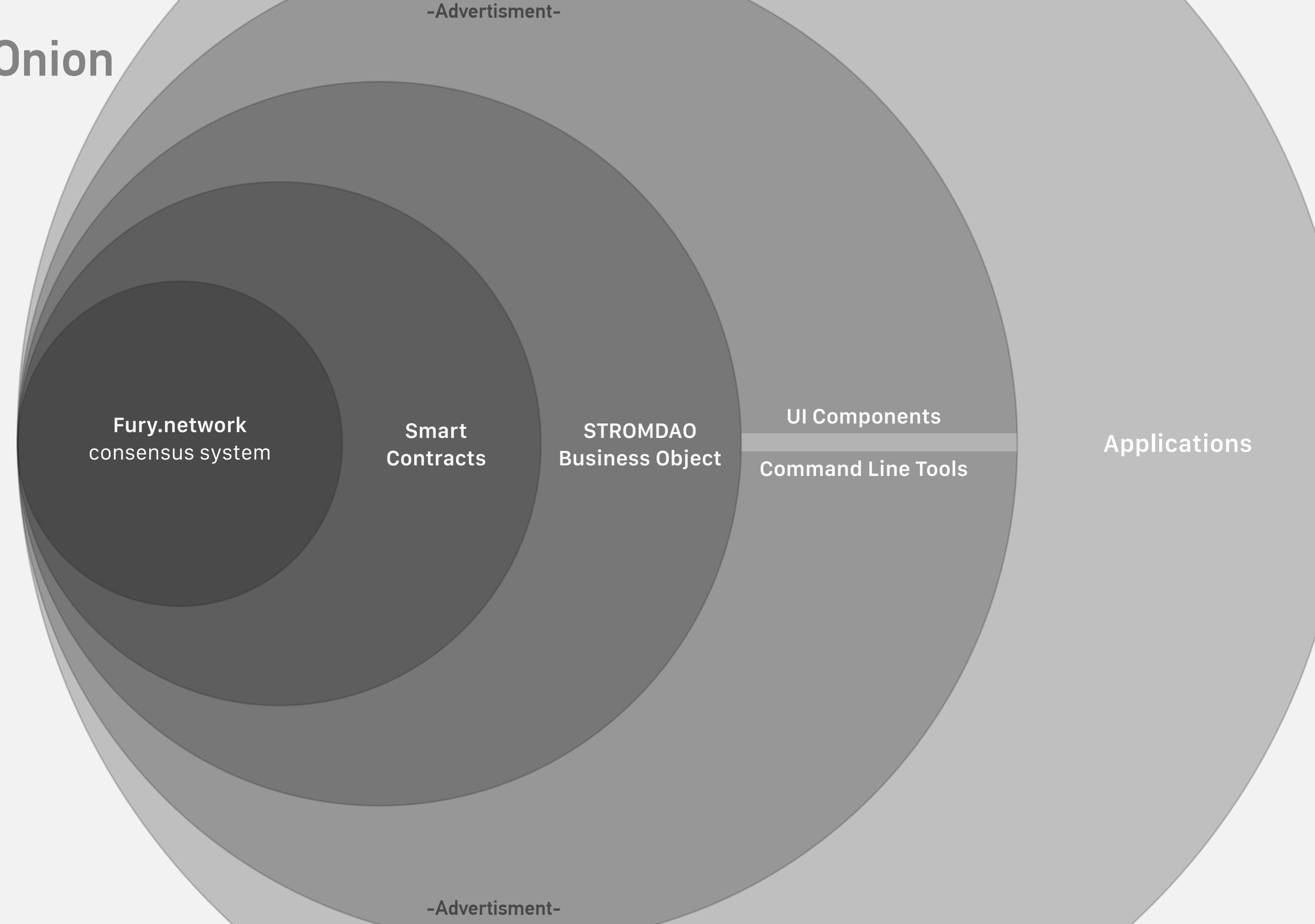
Linking consumers, producers, service providers and everyone in between into value networks of co-productive peers.

**Peer to peer energy means
equal market access and opportunity
regardless of scale**

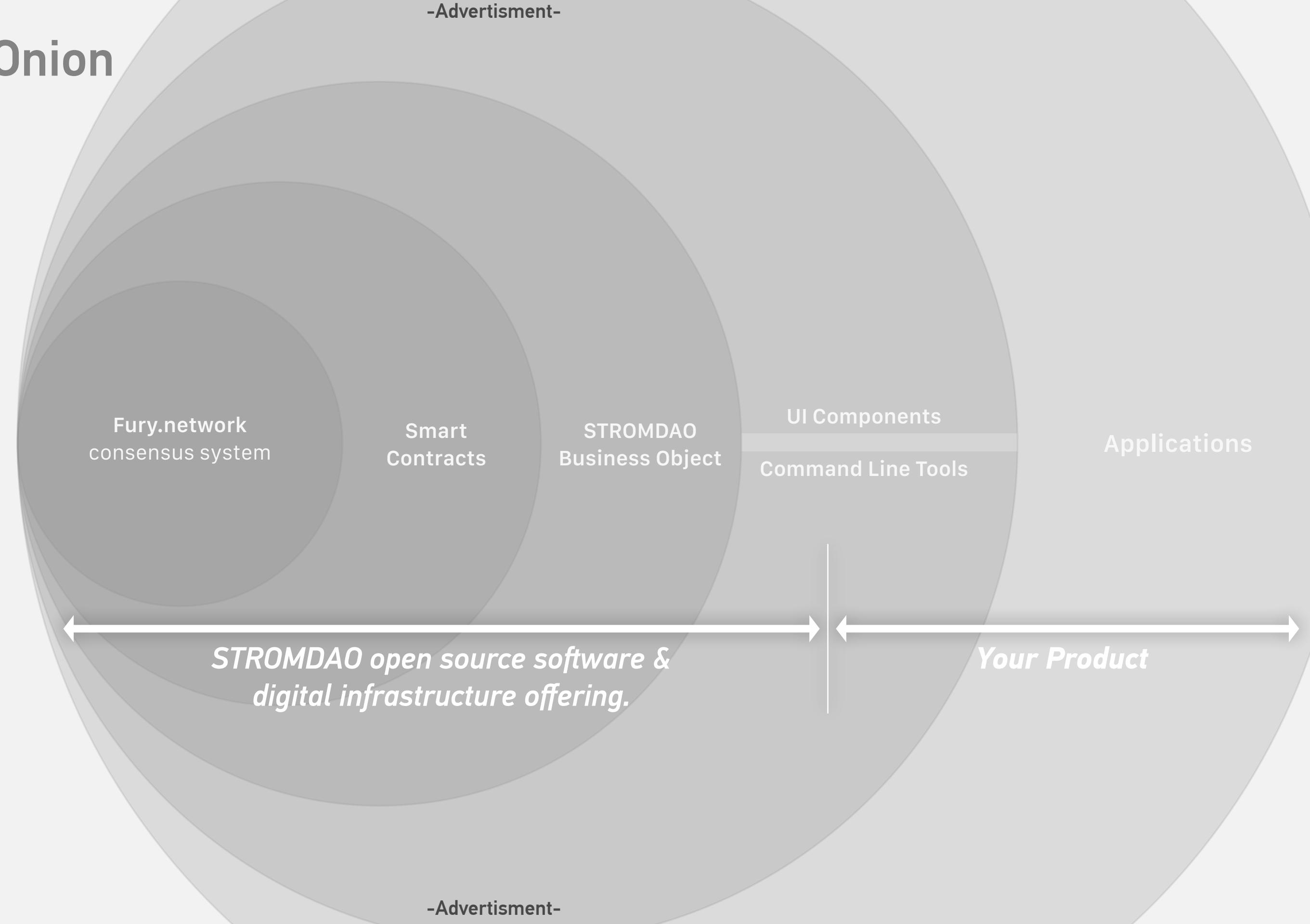
STROMDAO Onion

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