

Green energy: what does it take?

Future of green digital infrastructure: matching data to green electrons

18th June 2021

Elia Group: one of Europe's top 5 TSOs

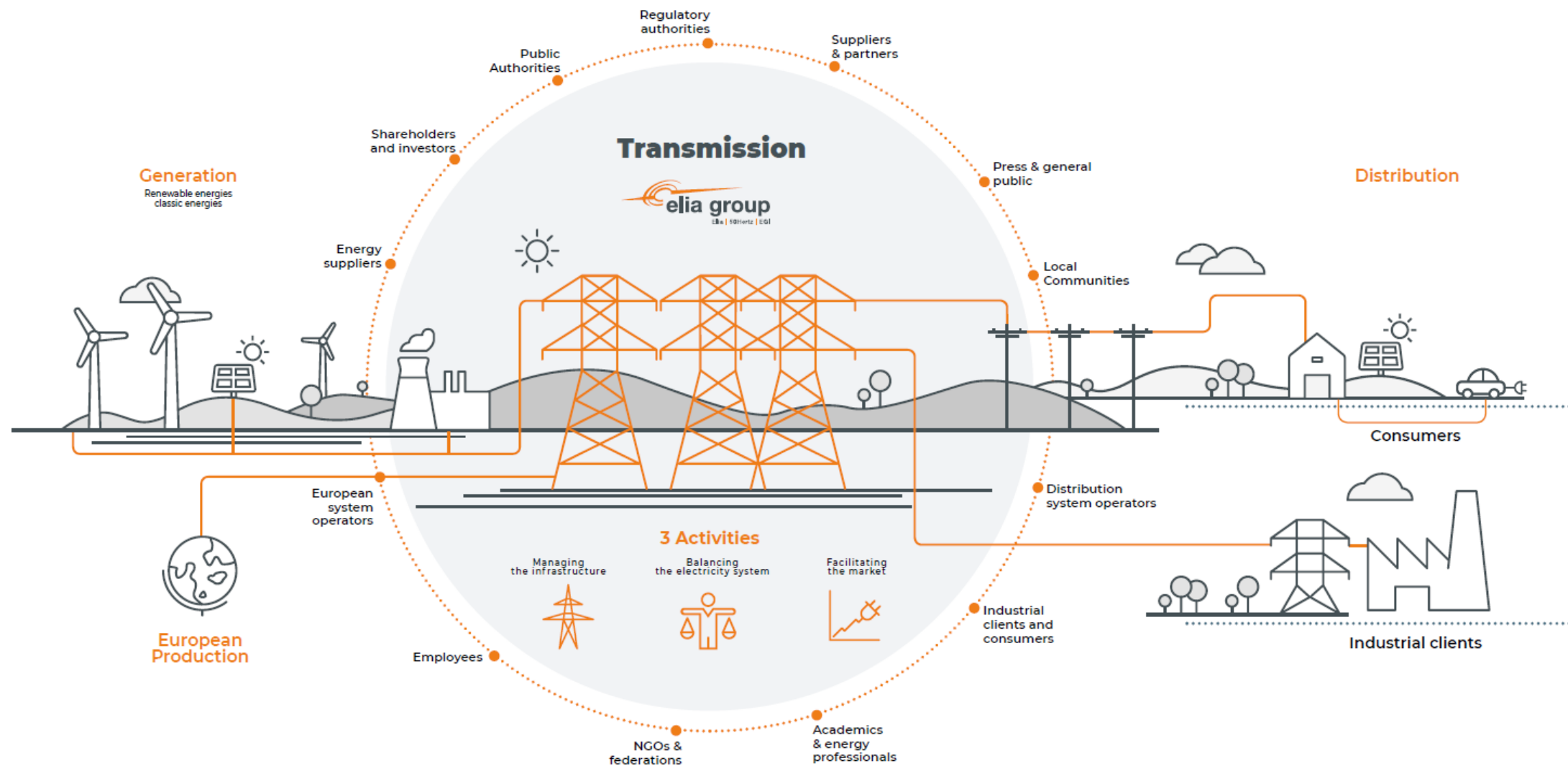
Elia Group is active in electricity transmission.

It encompasses two leading TSOs strategically located in two European regions:

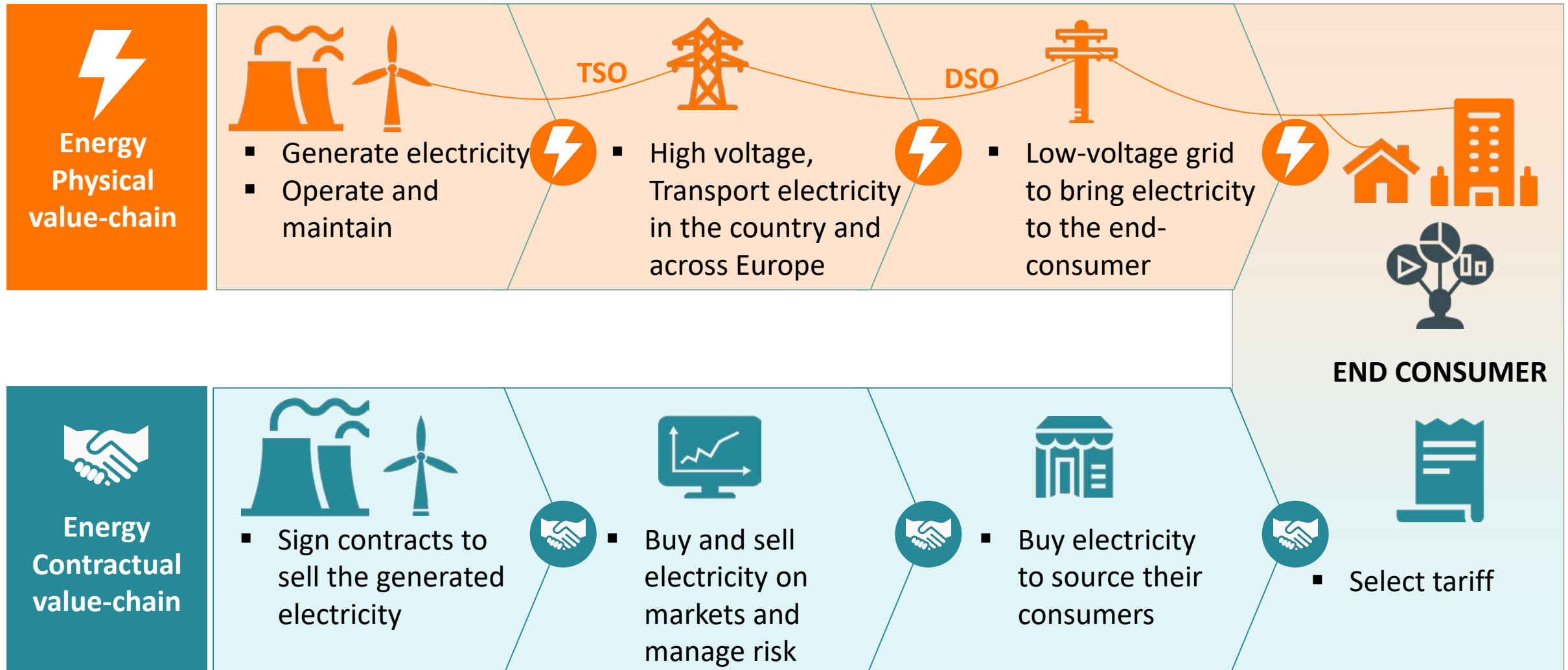
- Elia in Belgium
- 50Hertz in Germany



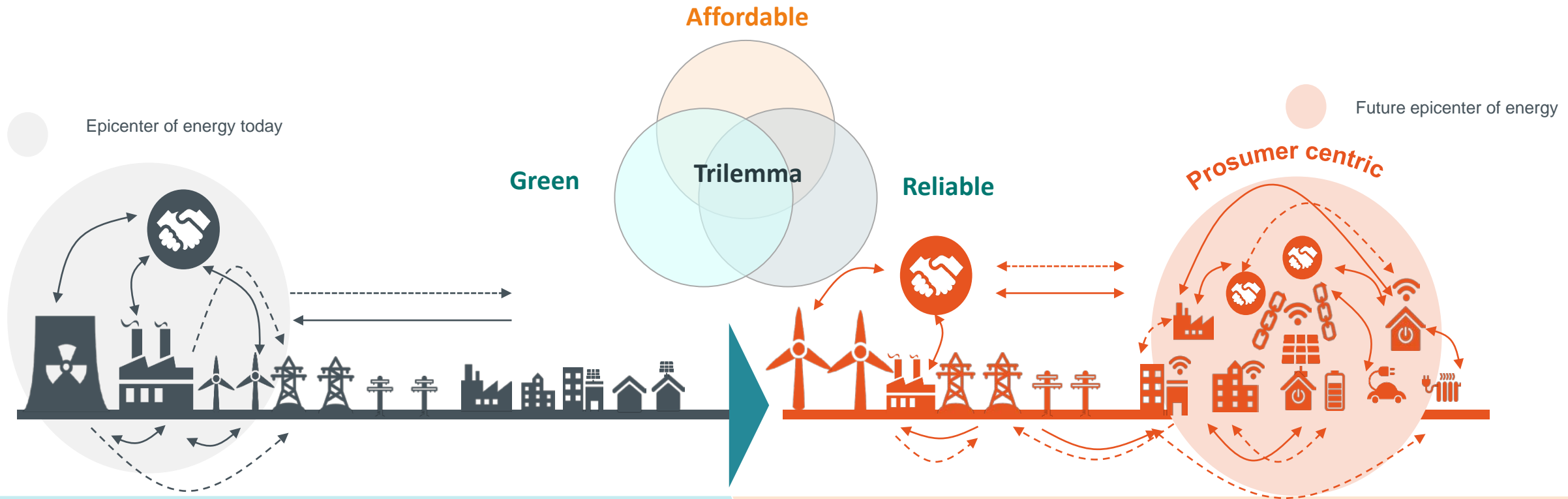
We connect generation and distribution



In the traditional value-chain of energy the energy is flowing progressively from major production centers towards the end-consumer






Pradigm shift will bring new trilemma while increasing complexity



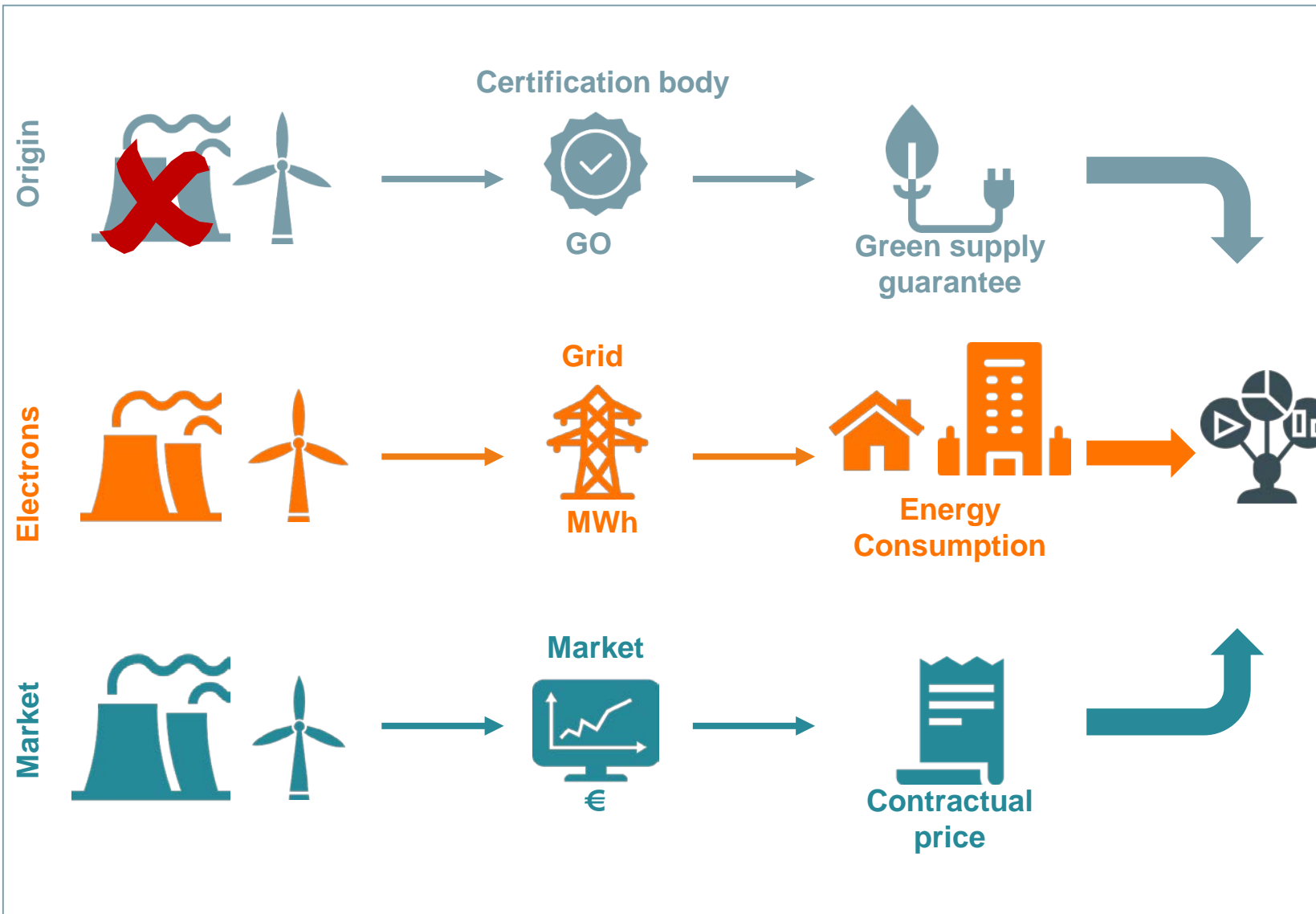
TRENDS

- Consumers ask for “green” energy
- Decentralization of generation, less classical plants
- Electrification of demand (EV, heat-pumps, storage)
- Interconnected market

CONSEQUENCES

-  More stakeholders, market participants
-  More dynamic, uncertain, close to real-time market
-  More complex and granular needs

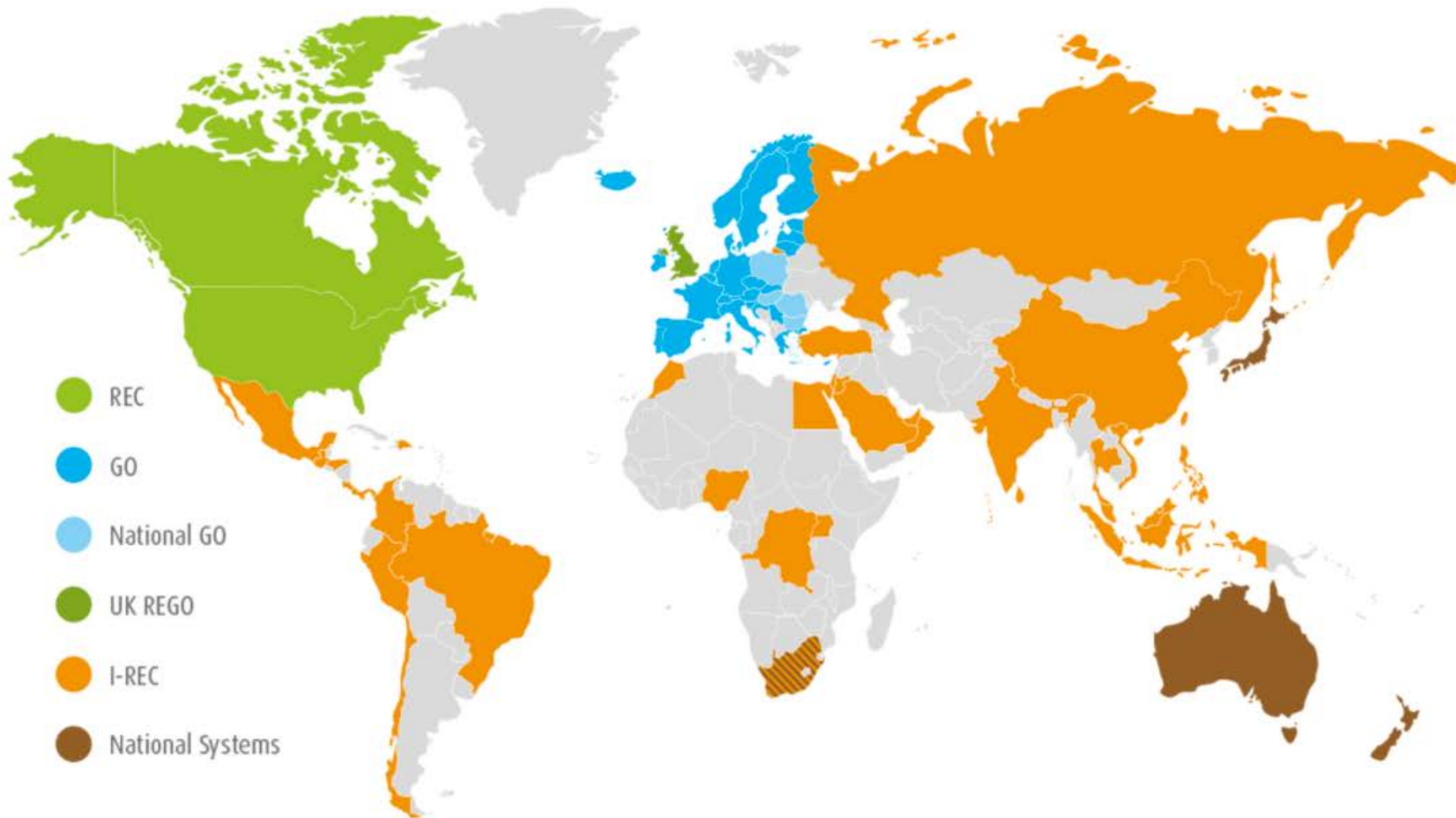
In Europe the Guarantee of Origin scheme is guaranteeing the sources while various other scheme exist at national level to support specific green techno



Green Certificates vs. Guarantee of Origin

- GO and GC may refer to the same energy
 - Purpose of GO: proof to final customer that given share or quantity of energy was produced from renewables. **EU reliable tracking**
 - Purpose of GC: serve a certain national supporting scheme by remunerating a certain/minimum level of remuneration **Obligatory national instrument to support specific renewables techno.**
- To support specific techno, other scheme than Green Certificates exist as Feed-in Tariff

Multiple formats of Origin Certification exist around the world with GO's in EU



- Many different formats for GO generally cross border

But none of them will truly decarbonize the system... let's look at a simple example



EnergyYou is a supplier...

EnergyYou owns a solar farm generating more than 10MWh per year



Own 1 client called Jenny driving an electric car

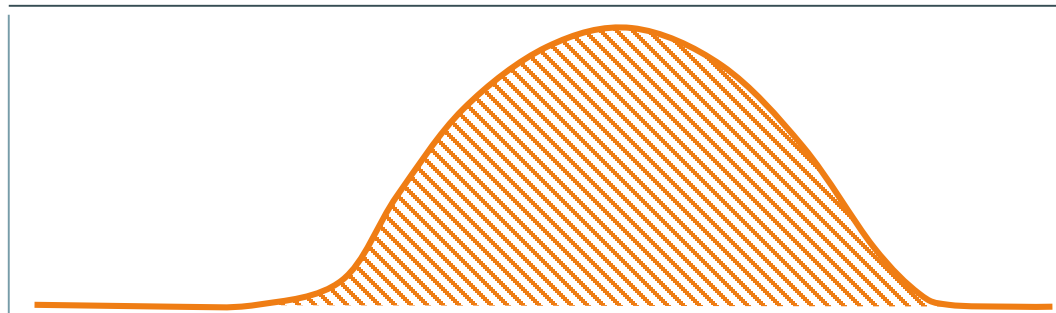


Jenny has no solar panel and therefore was attracted by the “allgreen” contract of EnergyYou



Jenny charges only at night while EnergyYou panel produce only during the day

EnergyYou solar production



- EnergyYou sell its electricity on the market during the day and buy on the market during the night to supply Jenny

EnergyYou market profile



- On the market, EnergyYou sells its solar production during the day and buy the production during the night

Jenny's consumption



- Jenny works hard during the day and charge only the car during the night

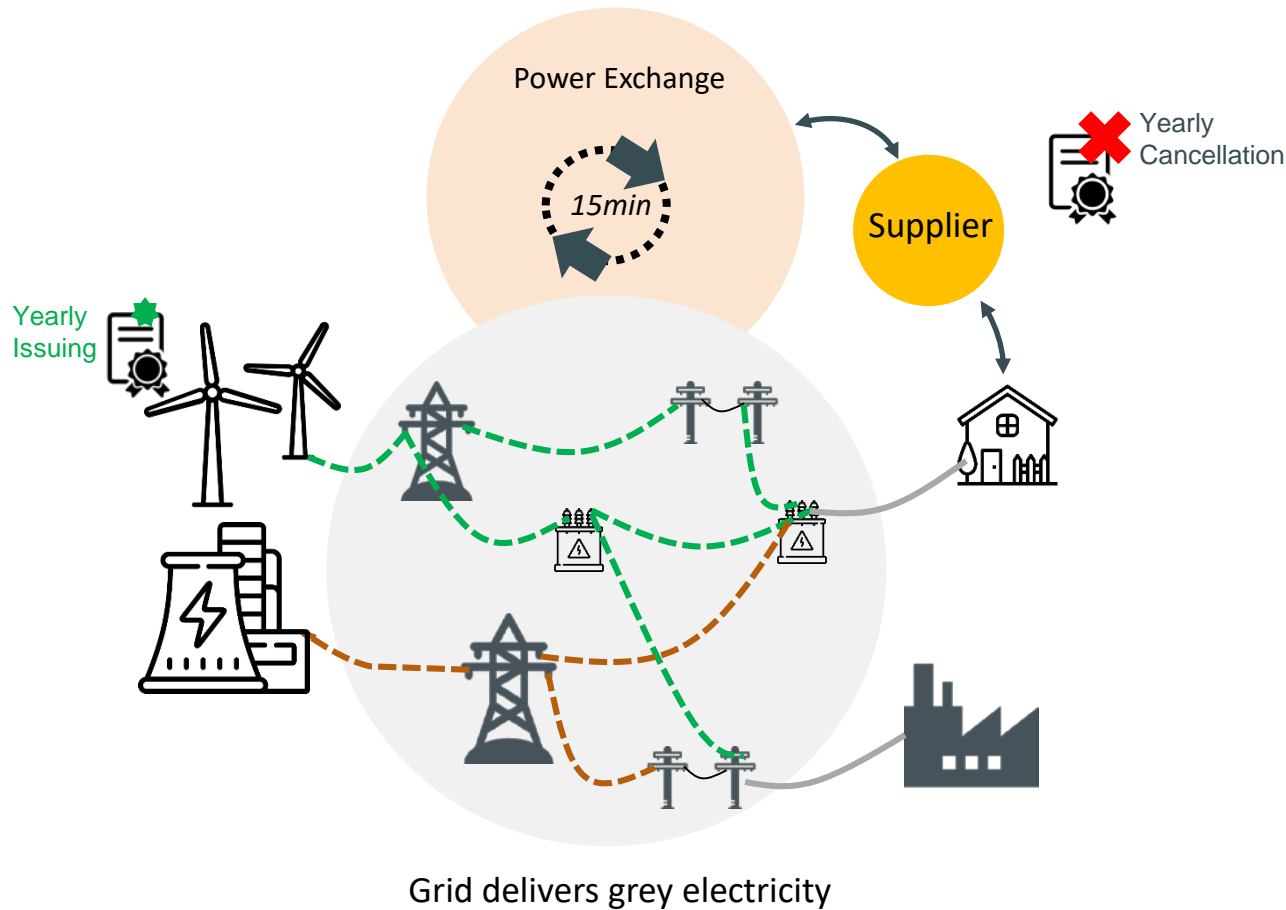


Each year
EnergyYou receives
10MWh of GO's for
its solar production



BUT
Jenny actually
consumed 100% of
grey electricity!

Today's electricity value chain neither reflect the source of electricity nor the timely availability



Characteristics of today's certificate system:

- Suppliers cover the client's *yearly* energy consumption with green certificates
- Certificates are issued on a yearly basis but energy is traded every 15min
- No physical grid constraints allow certificates from Island (no interconnector)
- No scarcity of certificates
- Flexibility is not incentivized

Corporates are becoming energy transition leaders and are seeking for true green energy – The existing GO mechanism is outdated

We are at the tipping point...

Policy-driven phase of the energy transition

- RES are being **subsidized** and the costs are being **socialized**
- GO's were developed to **allocate the green attribute** to the electricity.



Market-driven phase of the energy transition



*"Amazon and Ørsted Sign Largest Offshore Wind Corporate **Power Purchase Agreement** in Europe" (amazon.com)*

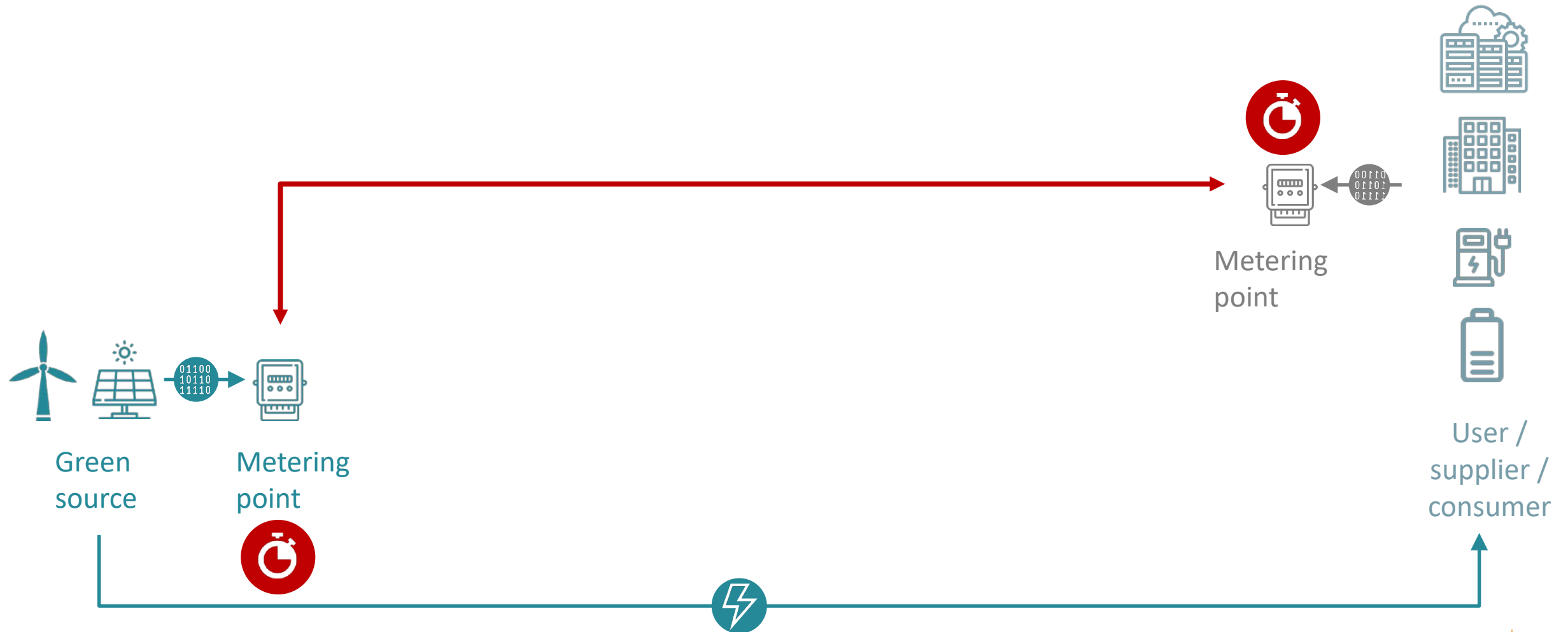
*"Corporates are now expected to be **energy transition leaders**"*

- We will see **competition** for true green electricity.

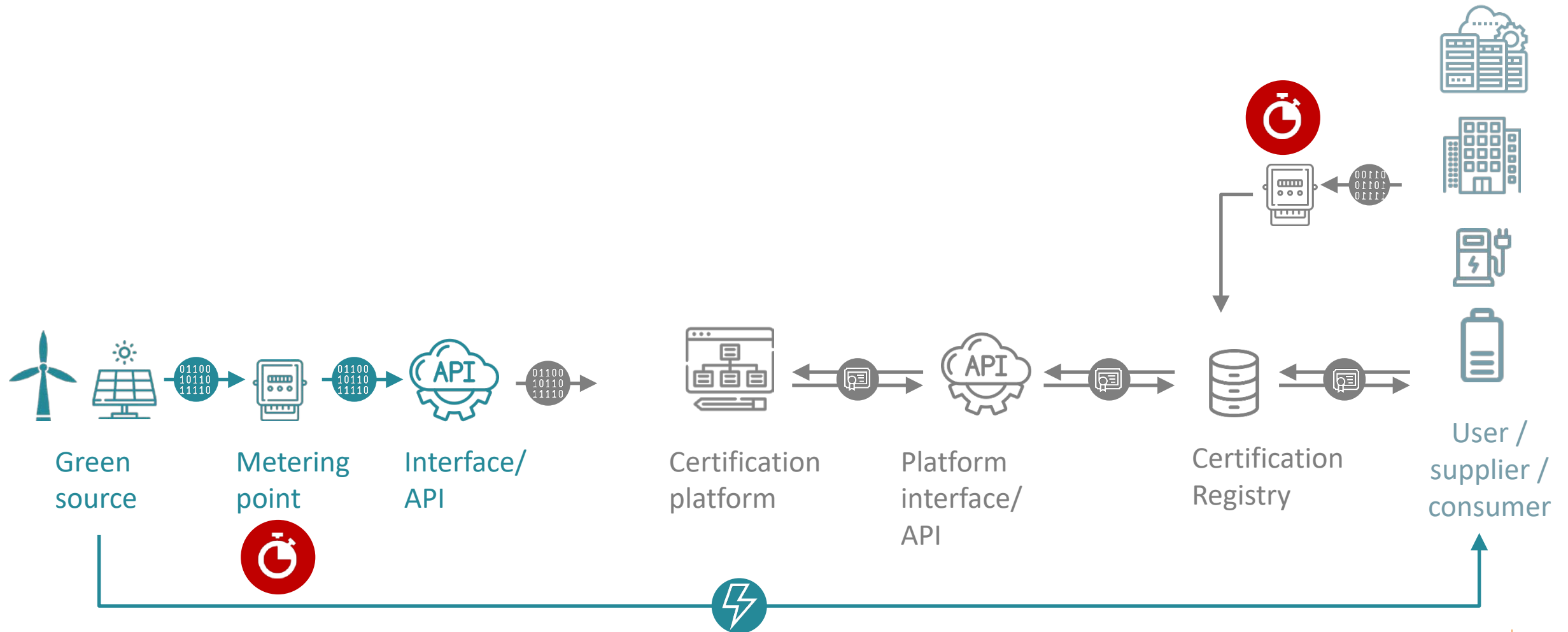
- No „true green“ mechanism for electricity available.

"While the GOs were a legitimate mechanism in the past, today, companies are worried about being accused of "greenwashing" when using GOs." (pv-magazine.com)

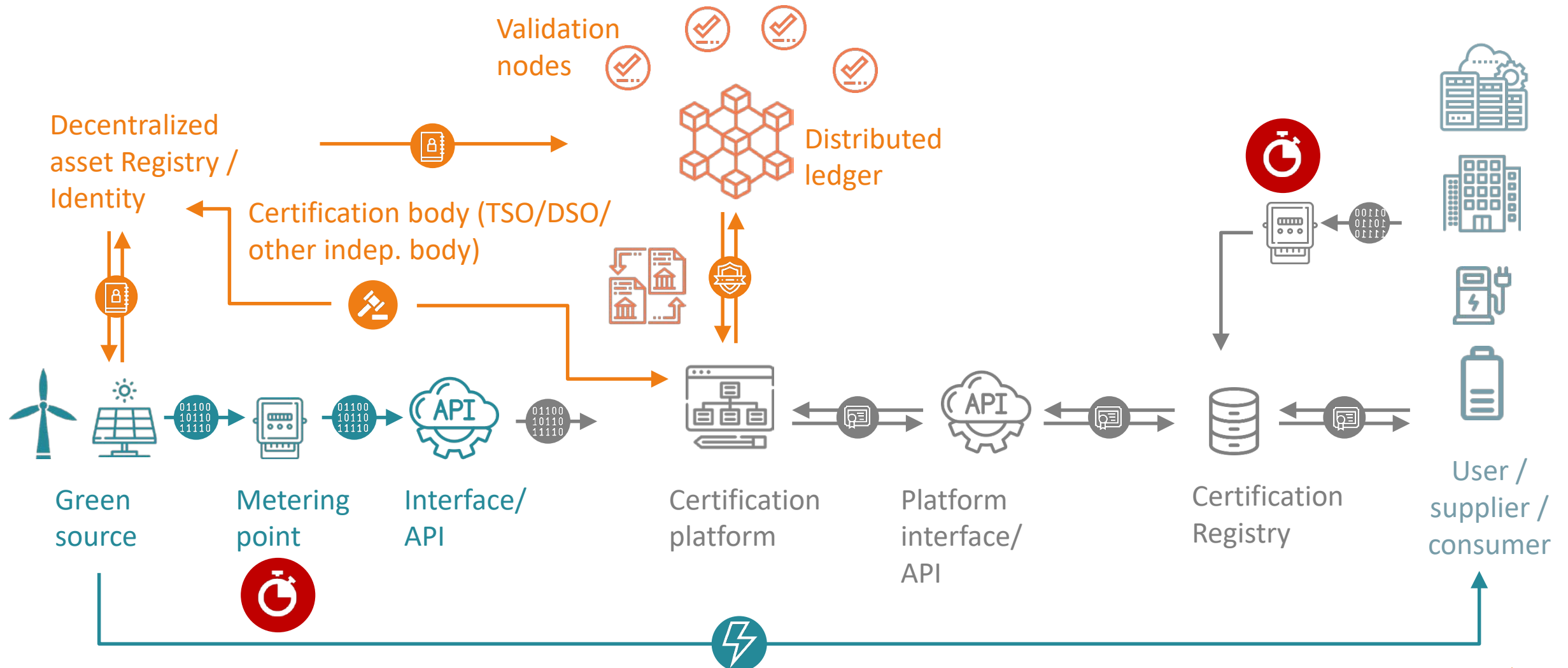
Green tracking starts from matching consumption and production data in real-time...



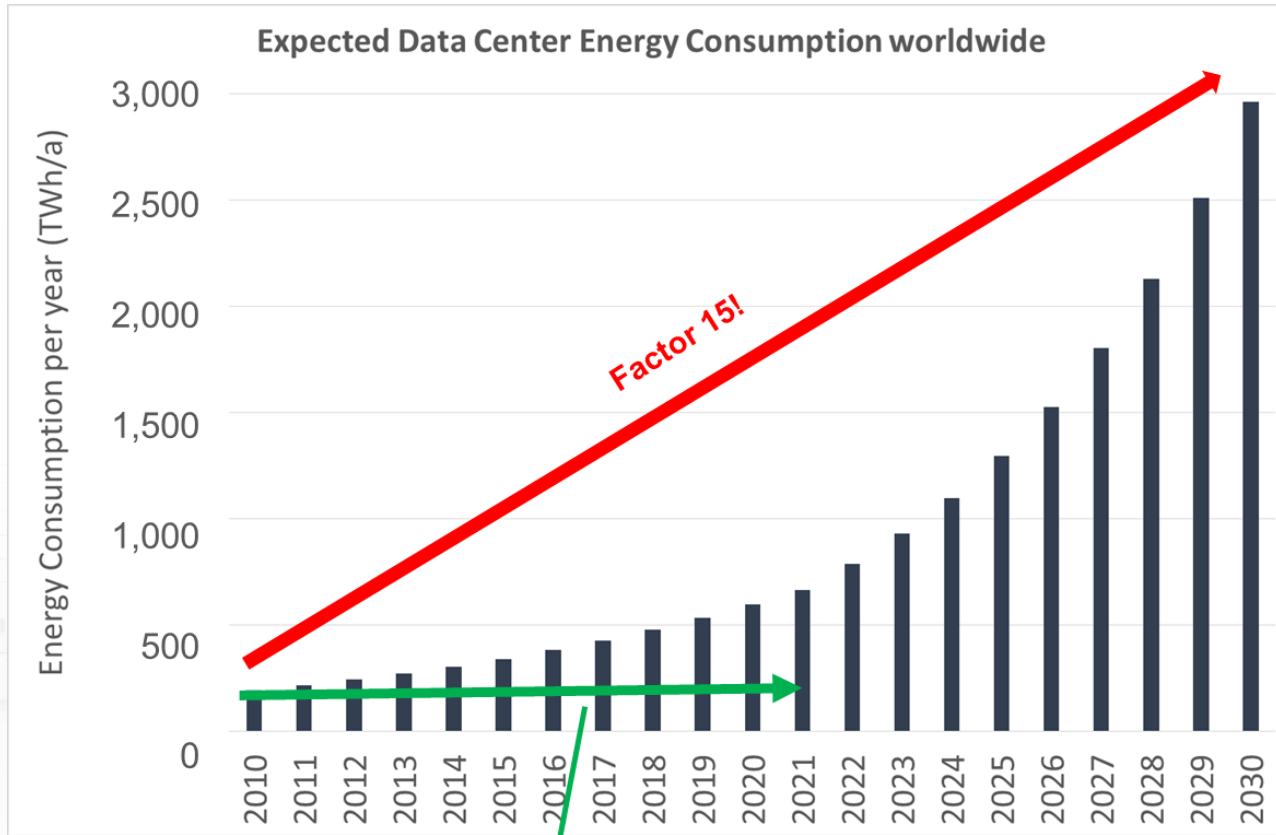
... and need a granular registry of certificate...



... for which blockchain could offer a suitable option in a context of highly decentralized system



One major consumer and pro-active sector is digital infra...



Forecast from IEA 2017

- Invest in R&D and more advance energy efficiency:
 - More rationale use
 - More efficient cooling
 - Heat re-use



- Commit to 100% green energy including smart planning of auto-consumption:
 - Green PPA's
 - Auto-consumption (solar, battery...)



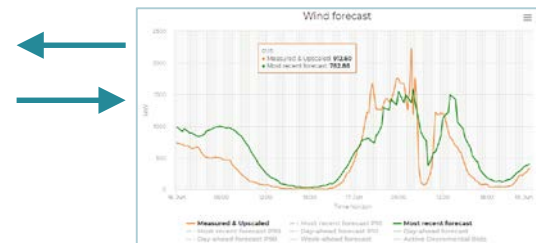
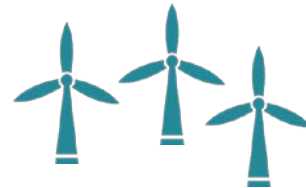
To truly decarbonize we need to link applications to energy physics

Imagine



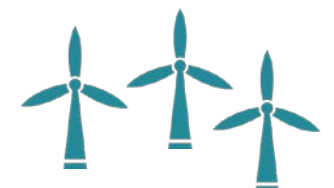
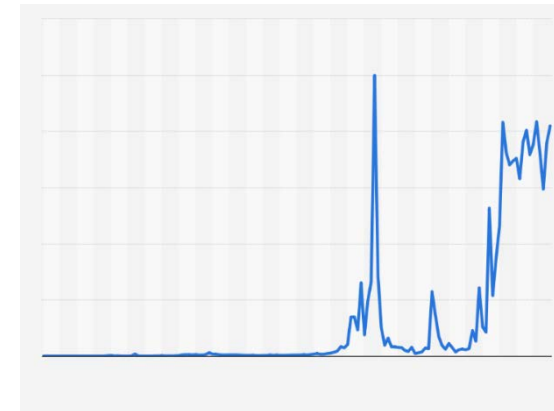
Netflix streaming cost or availability
changing according to green energy

Netflix green subscription or premium



Bitcoin mining revenue varying according
to green energy production conditions

Mining cost linked to green production



What drives our target audience – Does it drive you as well?

Credibility

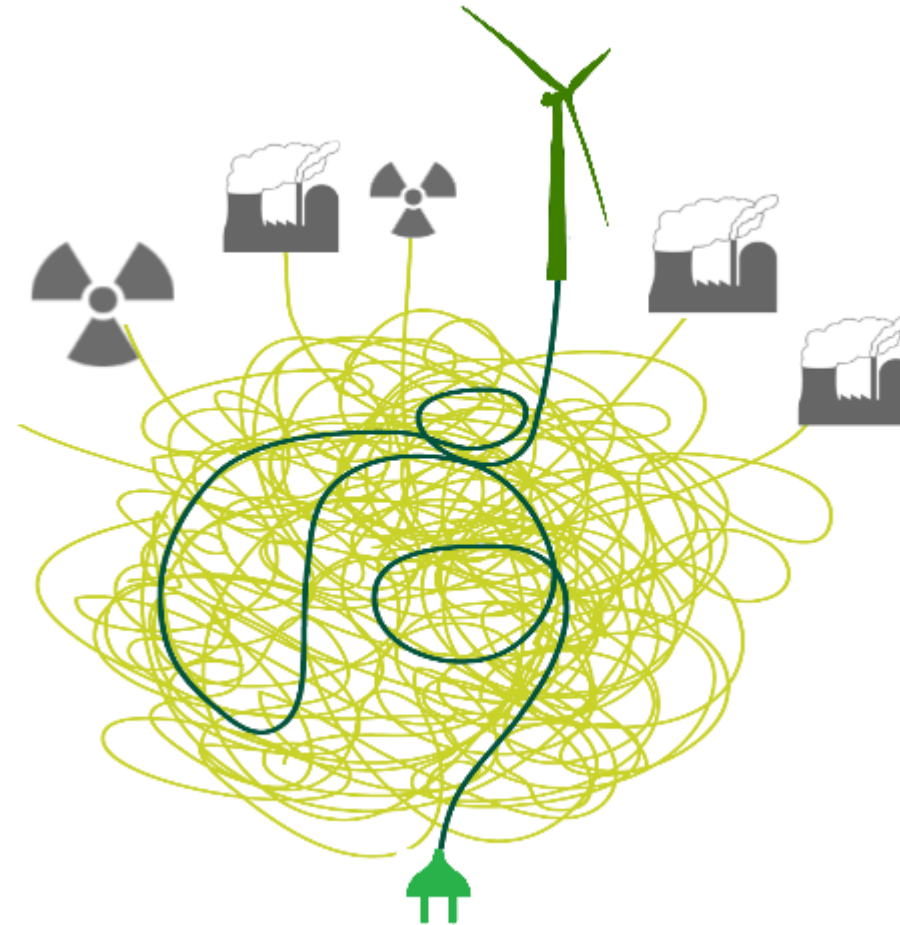
Avoid getting caught up in 'green washing' their consumption.

24/7 green

Requiring finer granularity than today's Guarantees of Origin with 12 months validity period

Transparency

Uniform and standardized way of reporting on "greenness"



PPAs are not enough

Reaching 100% green with only bilateral PPAs (and storage) is tough and inefficient since missing out on portfolio effects

Simplicity

The mechanisms for being 24/7 green should be easy and straightforward.

Planning

Optimization of own processes in function of (future) available energy should be possible, incl. XB optimization for multinationals.