

Hydrogen from the right sources and in the right places

How policy can ensure that hydrogen contributes to European decarbonisation

2nd SustainED Copenhagen, 8th September 2023

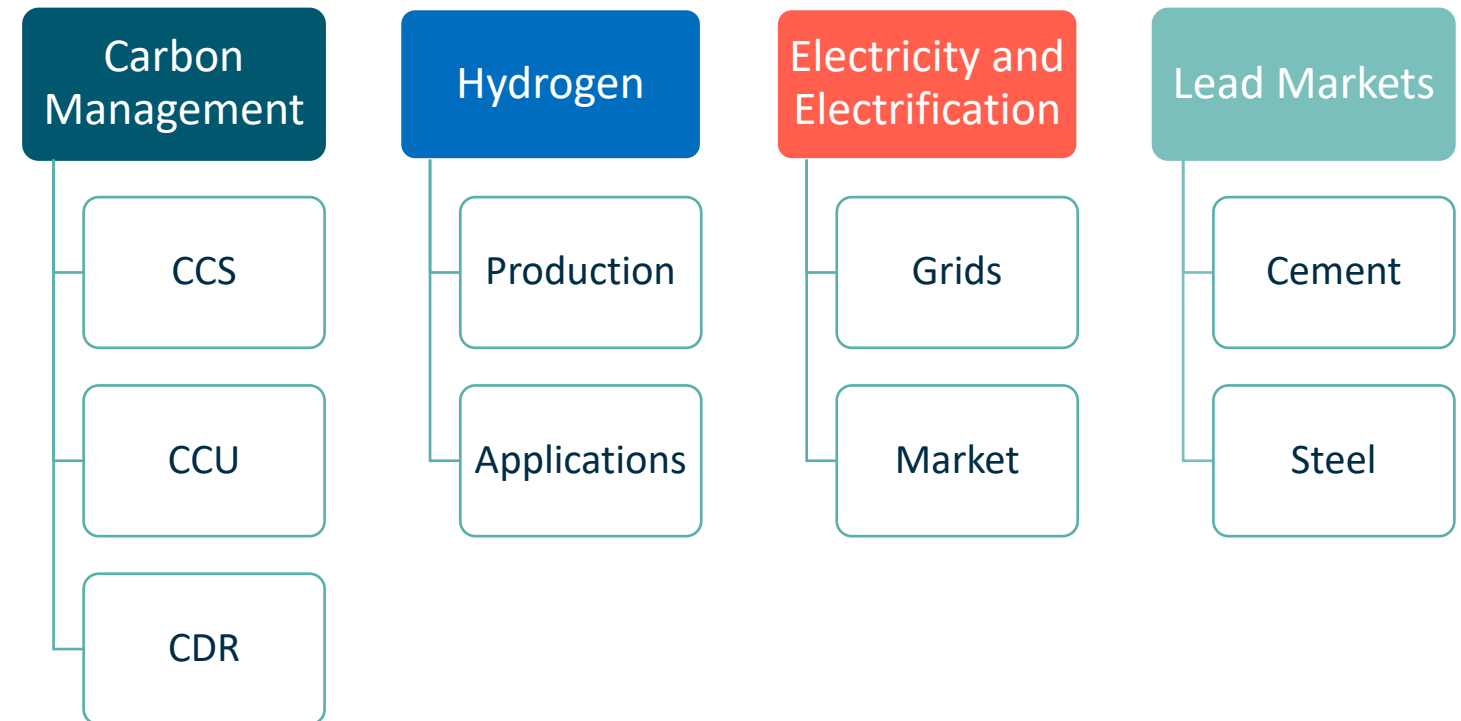
Luisa Keßler
Bellona Deutschland

Focus areas of Bellona Deutschland

Climate Action in Industry

Who we are

- International, independent climate NGO
- First office in Oslo in 1986
- In Brussels since 1994, with an EU policy focus
- In Berlin since 2021



Agenda

1. Use

Regret and no-regret sectors for hydrogen

2. Production & Acquisition

Scale of the challenge, risks and dilemmas

3. Transport

Dedicated, no-regret hydrogen network and no blending

4. Bellona's key asks across EU policy files



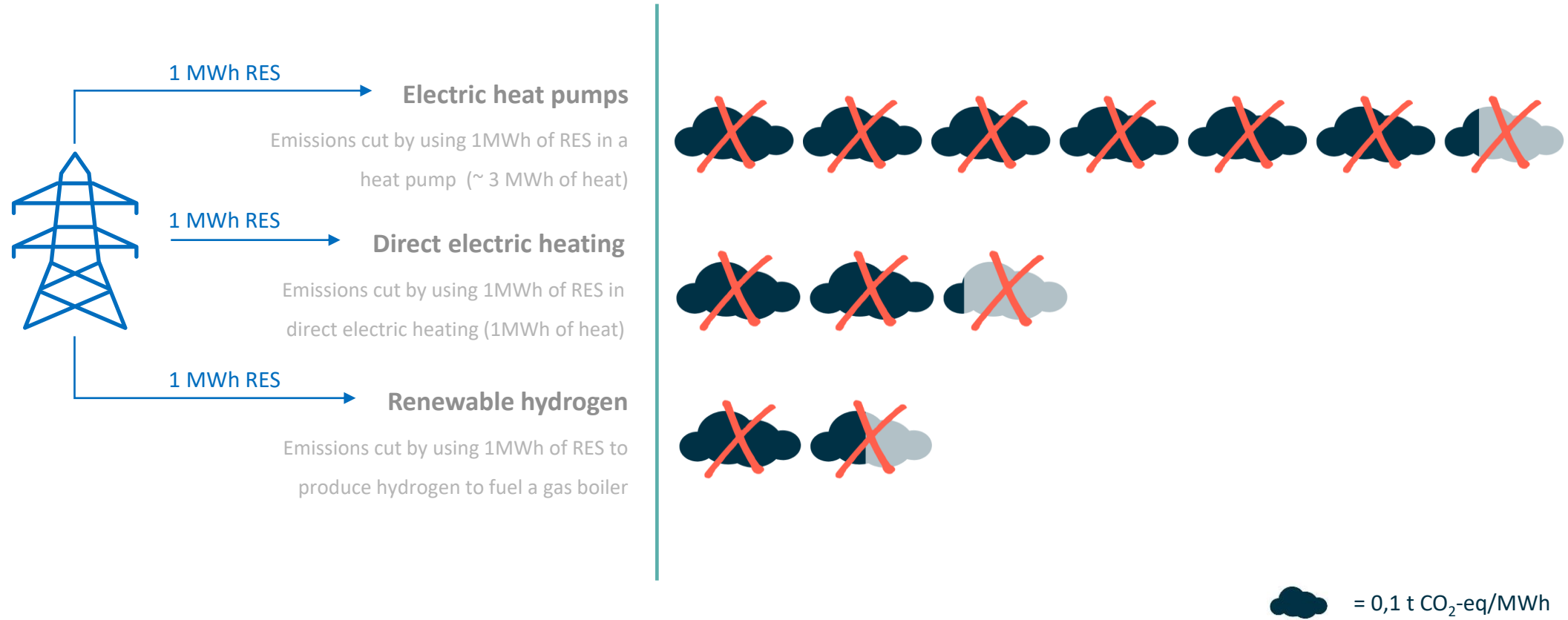
Use



Regret-sectors for hydrogen use

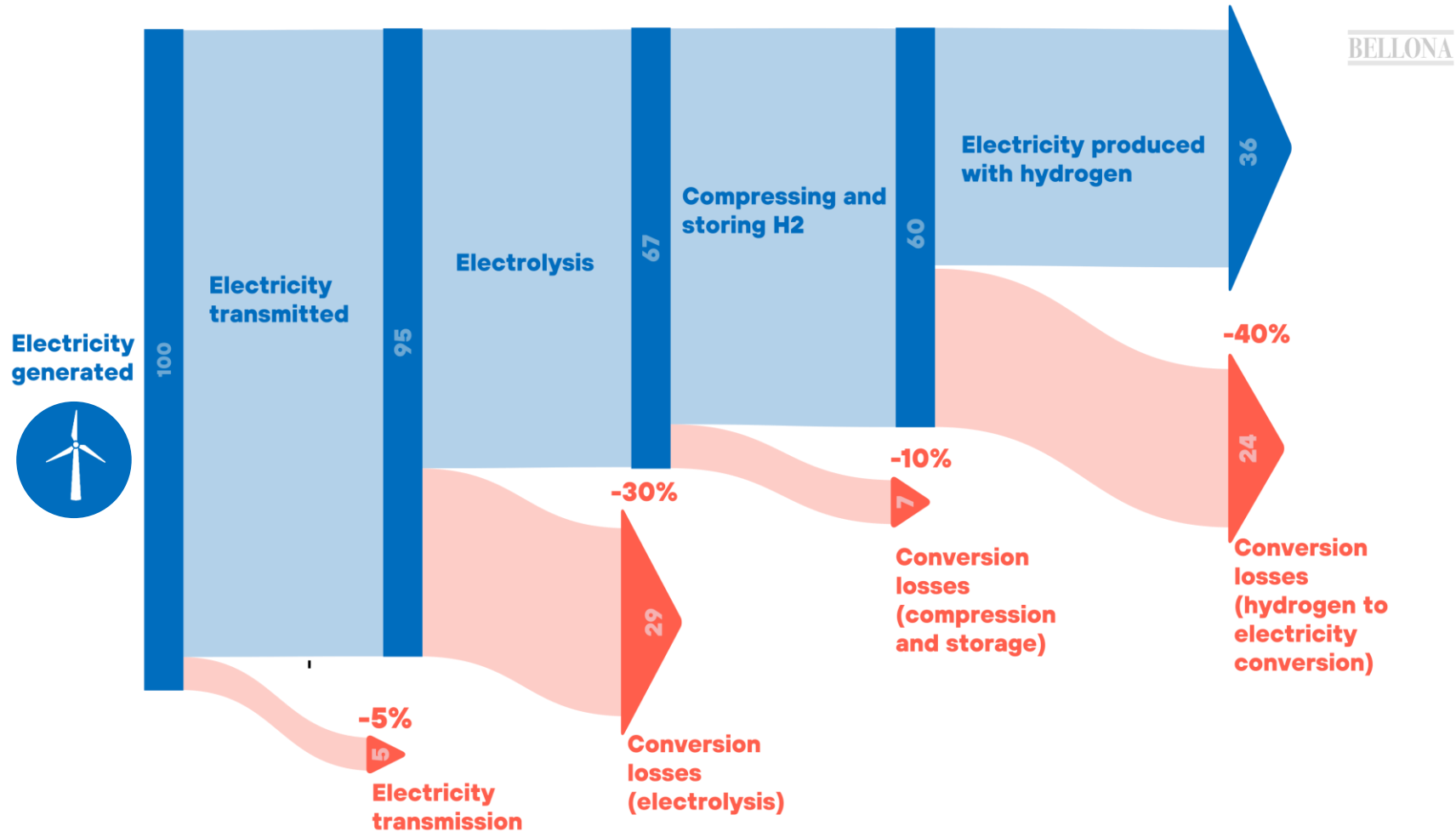
Hydrogen is a very inefficient energy carrier.
Wherever direct electrification is possible, it should always be preferred.

GHG reduction using 1MWh of RES to displace fossil fuels in home heating



Changing energy causes energy losses along the value chain

A power plant using 100% renewable hydrogen would consume almost three times the electricity it produces.



Hydrogen should be used where the climate value is the highest!



RED III targets for RFNBOs

Transport: 5,5% renewables until 2030, 1% of which is to be covered by RFNBOs.

Industry: until 2030 min. 42% of used hydrogen needs to be renewable, until 2035 min. 60%.

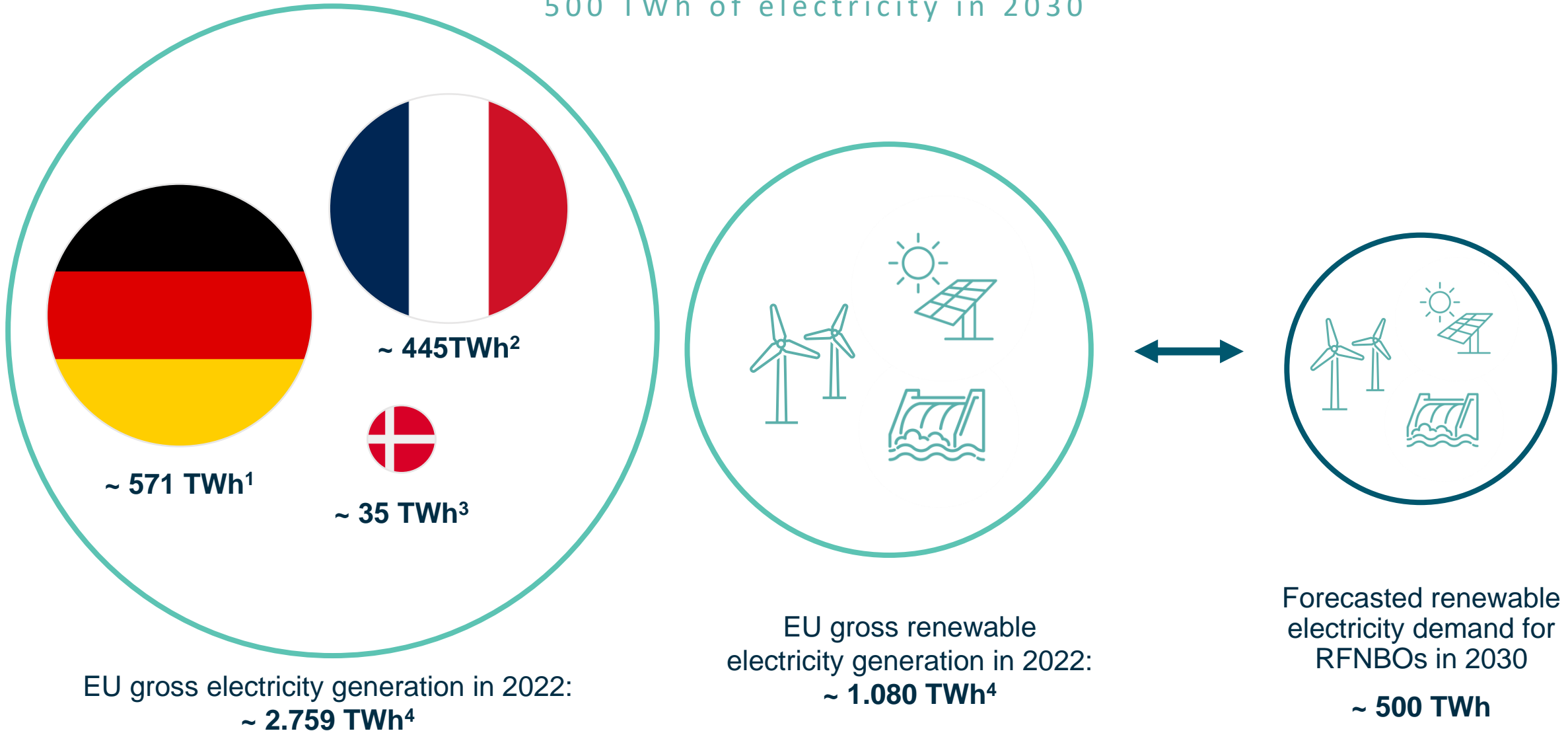
ReFuelEU Aviation: quota of 1,2% green H₂-based SAF until 2030, 5% in 2035 and 35% in 2050.

Production & Acquisition

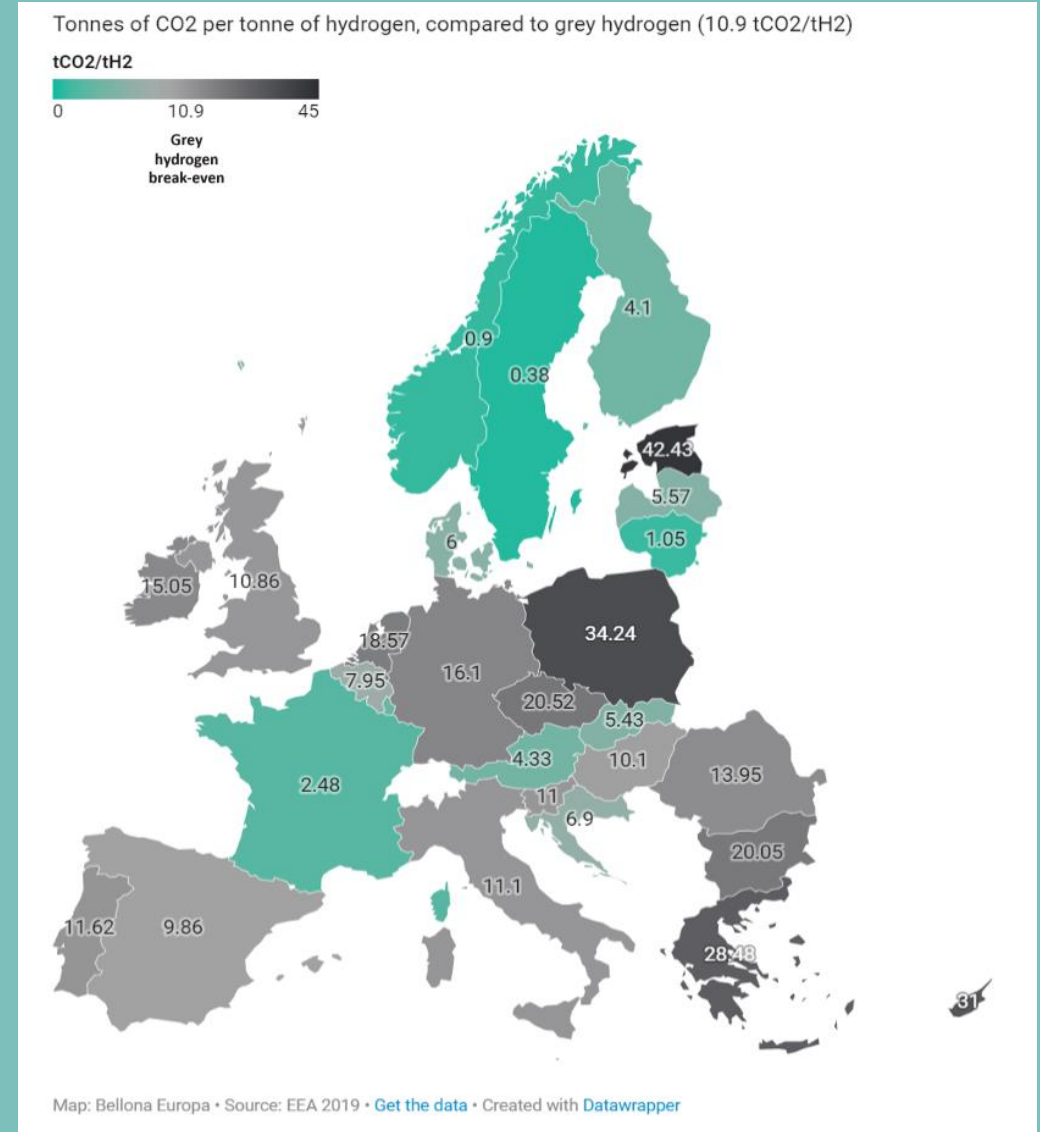
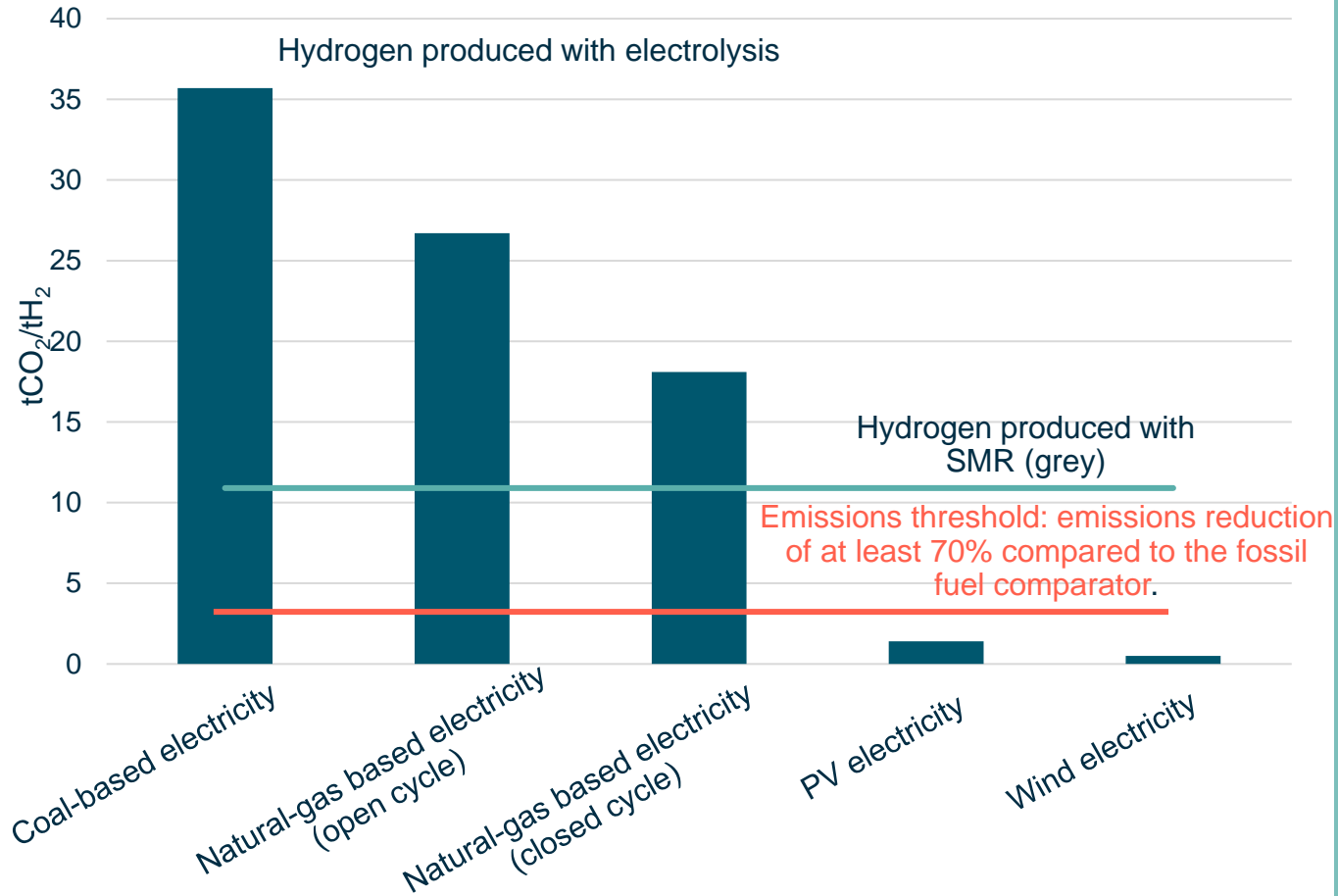


Scale of the challenge

Producing 10 Mt of green hydrogen will consume around 500 TWh of electricity in 2030




Producing hydrogen from electricity can result in high emissions



Sustainability criteria for RFNBOs in RED III

3 RULES TO MAKE SURE HYDROGEN IS REALLY GREEN



Temporal matching between hydrogen production and contracted renewable generation ensures that fossil fuels do not fill the gap when renewables are not available.

Additionality: Newly deployed and unsubsidised renewable generation assets ensure that the new demand coming from electrolyzers does not cannibalise the renewables that are decarbonising the rest of the economy.

Geographical correlation: Placing the electrolyser and the power generation on the same bidding zone ensures that a physical connection between electricity supply and demand exists.

Hourly correlation between RES generation and H₂ production.

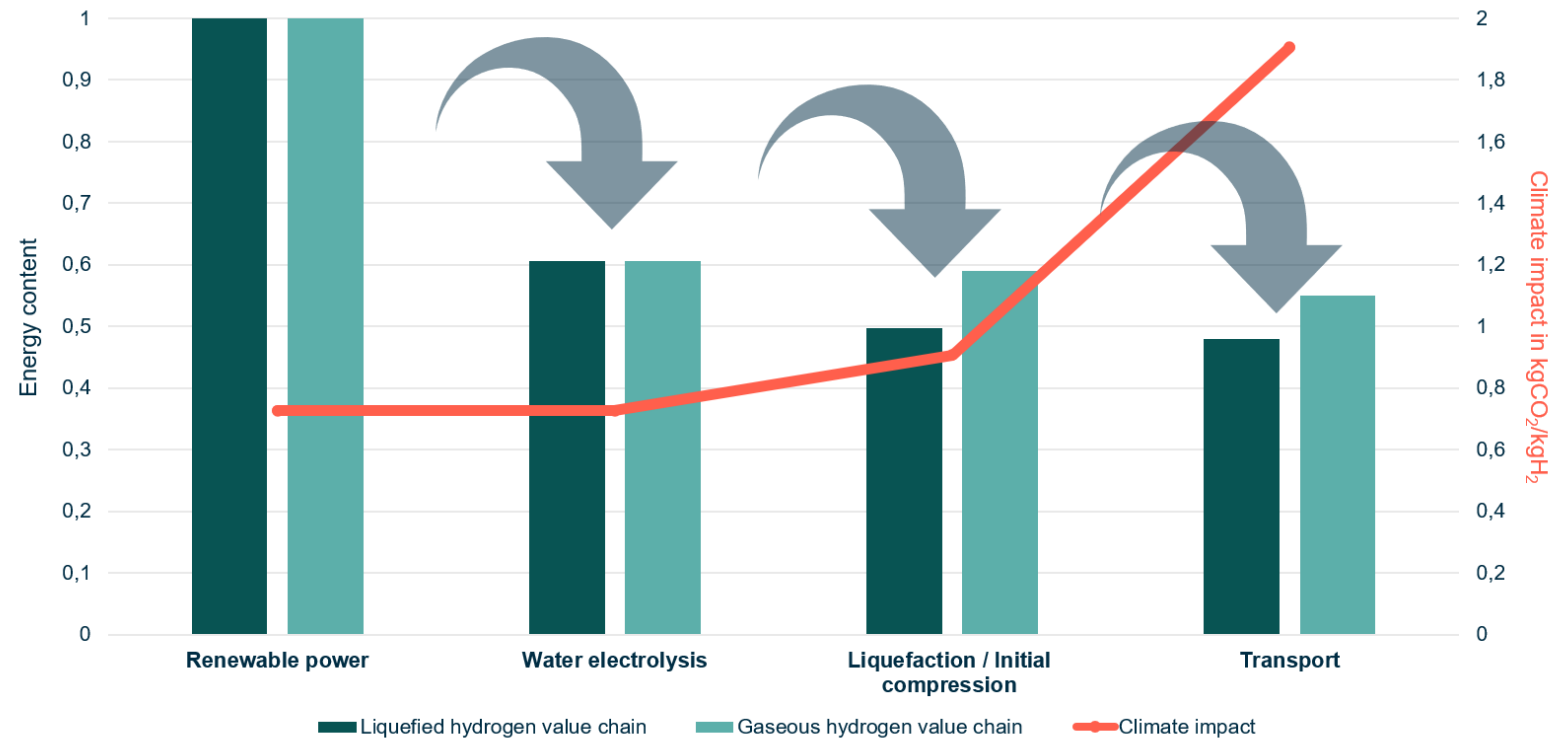
RES production facility running for < 3 years; curtailed electricity; or electricity mix has RES share of > 90%.

Same or adjacent bidding zone with same or higher day-ahead prices; or adjacent offshore bidding zone.

Risks and challenges of importing 10 Mt of hydrogen and its derivatives into the EU in 2030

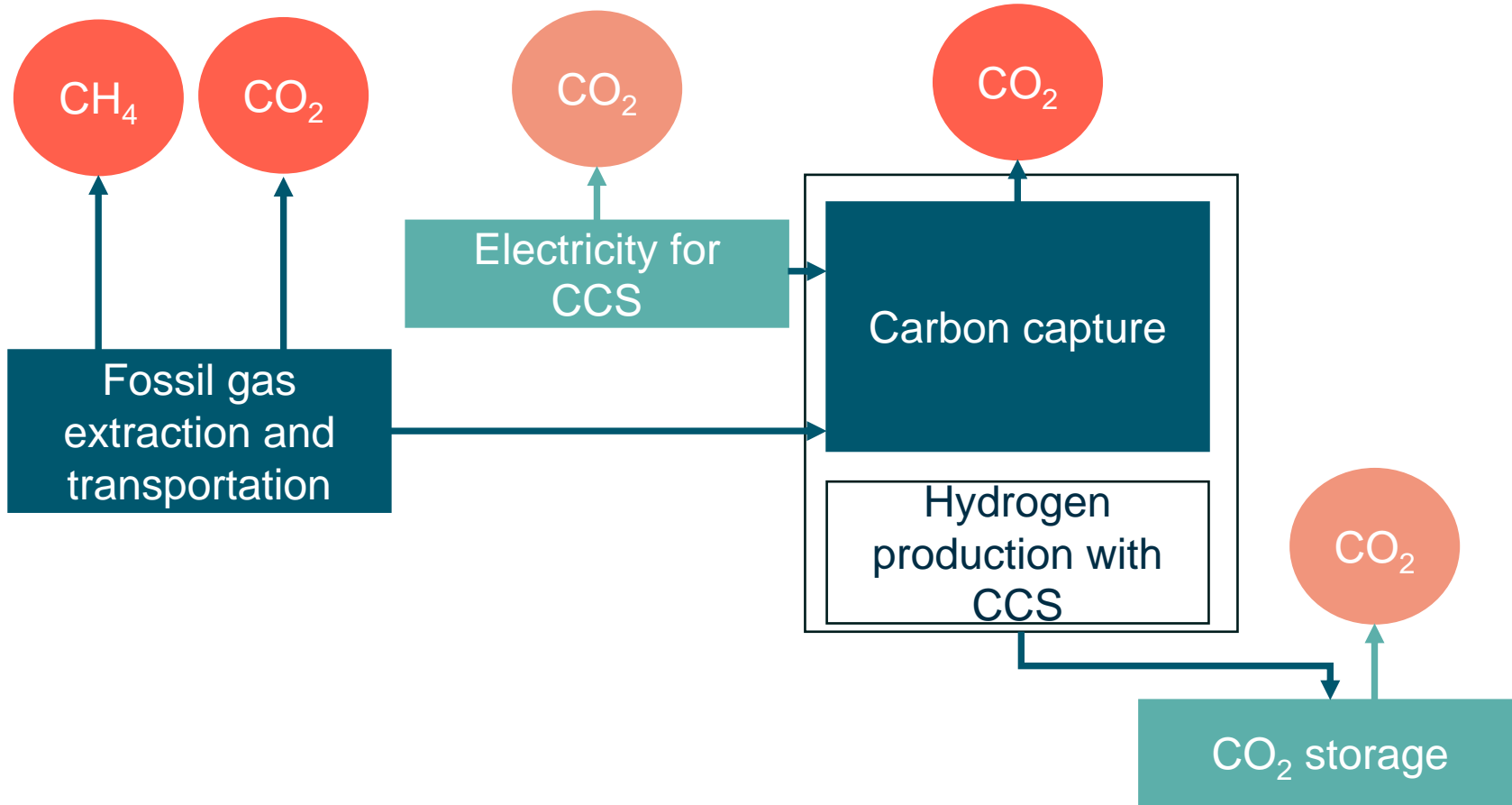
- Without **additionality** hydrogen risks cannibalising the energy transition in exporting countries
- Producing electrolytic hydrogen in water-stressed areas risks increasing **conflicts over water**
- **Transporting hydrogen** or its derivatives over long distances is challenging and **can significantly increase the fuel's climate footprint** and cost
- Banking on hydrogen imports comes with **high costs and enormous resource challenges.**

Imports must be subject to strict sustainability governance standards to avoid a new resource curse!



Source: Data on energy content Galimova et al. 2023 (dark turquoise) & Hermesmann et al. 2022 (light turquoise); data on climate impact sourced from Hermesmann et al. 2022

What role can blue hydrogen play?

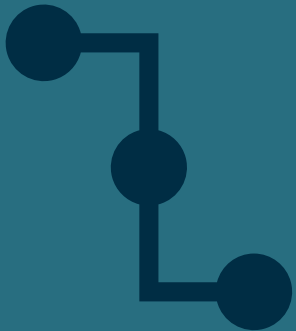


Prohibition of exploration and development of new fossil gas reserves.

Emissions accounting along the entire value chain!

- Exclusively fossil gas from systems with minimal and reliably monitored upstream greenhouse gas emissions.
- High carbon capture rates need to be achieved (above 90%).

Transport



Dedicated no-regret and fit-for-purpose hydrogen infrastructure

Only a hydrogen infrastructure designed to achieve the greatest possible emission reductions in the overall energy system is in our common European interest

7 REASONS WHY BLENDING HYDROGEN WITH NATURAL GAS IS A BAD IDEA

-  1. Directs investments into a false hope
-  2. Makes targeted use harder
-  3. Does not achieve significant emissions cuts
-  4. Increases fossil gas dependency and prices
-  5. Decreases the purity of the gas
-  6. Has health & safety risks
-  7. Increases the likelihood of greenhouse gas leaks

- Only such hydrogen corridors that link European industrial clusters with no alternative decarbonisation pathways to hydrogen production and strategic storage sites
- Ownership unbundling of fossil gas and hydrogen network operators
- Monitoring system to prevent hydrogen leakage

Bellona's key asks across EU policy files



Bellona's key asks across EU policy files

Well-designed policies can help ensure that hydrogen supports decarbonisation instead of hampering it

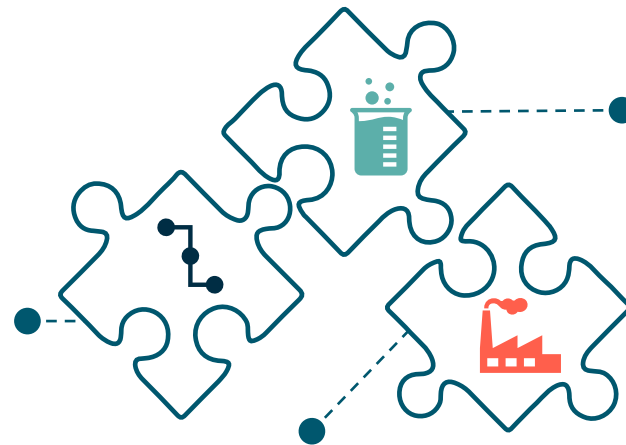
Transport

Blending hydrogen into the existing gas grid **should be minimised**, as it does not provide significant emissions reductions.

Only no-regret hydrogen transportation infrastructure that maximises system efficiency.



- Gas Market Package
- Ten Year Network Development Plan (TYNDP)



Use

Hydrogen use should be **limited** to those sectors that have no feasible alternative decarbonisation pathways.



- RED
- Net Zero Industry Act (NZIA)
- ReFuelEU Aviation & FuelEU Maritime
- Alternative Fuel Infrastructure Regulation (AFIR)

Production & Acquisition

Electrolytic hydrogen should only be produced from **additional** as well as temporally and geographically matched **renewable electricity generation**.

Carbon intensity is the key metric: upstream emissions, carbon capture and storage rates, and any other leakage along the value chain should be taken into account.



- RED & Delegated Acts
- Hydrogen Bank
- Gas Market Package & (upcoming) Delegated Acts

Thank You!

Get in touch!



Luisa Keßler

Policy Advisor Sustainable

Hydrogen Economy

luisa@bellona.org