

The background of the slide features a stylized illustration. On the left, there are several overlapping mountain peaks in shades of light blue and white. In the center, two white, fluffy clouds are positioned against a teal background. Below the clouds, a dark grey silhouette of an industrial facility with two tall smokestacks is visible. The overall color palette is composed of various shades of blue, teal, and grey.

Industry in a Changing Climate

AGCI Industry Decarbonisation Workshop

Aspen CO, 13th November 2018

Jonas Helseth, Bellona Europa

jonas@bellona.org

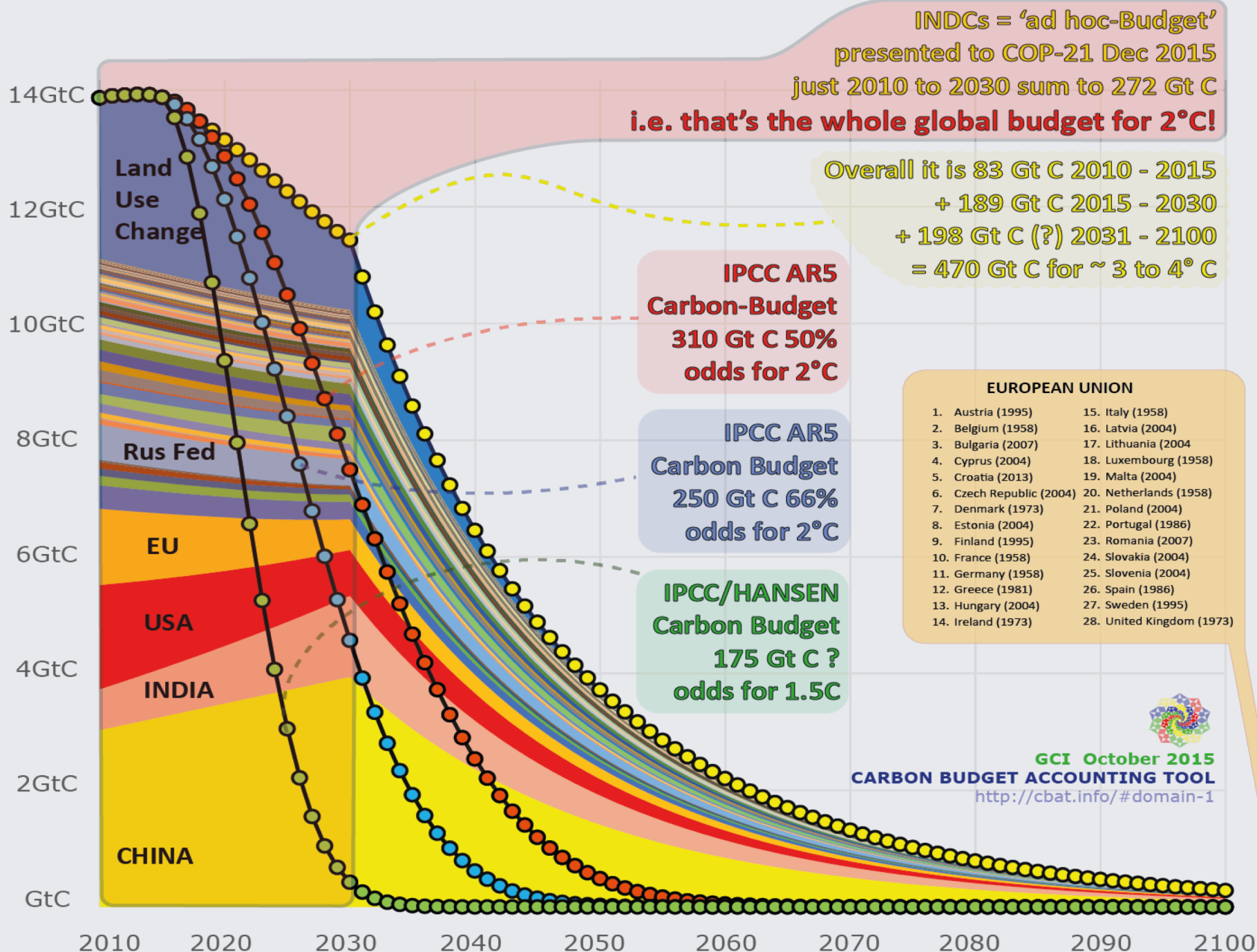


@Bellona_EU / @jonashelseth

DECARBONISING THE BACKBONE OF EUROPEAN ECONOMY



IPCC AR5 medium estimate 531 GtC emitted globally since mid 19th Century.



CLOCK IS TICKING

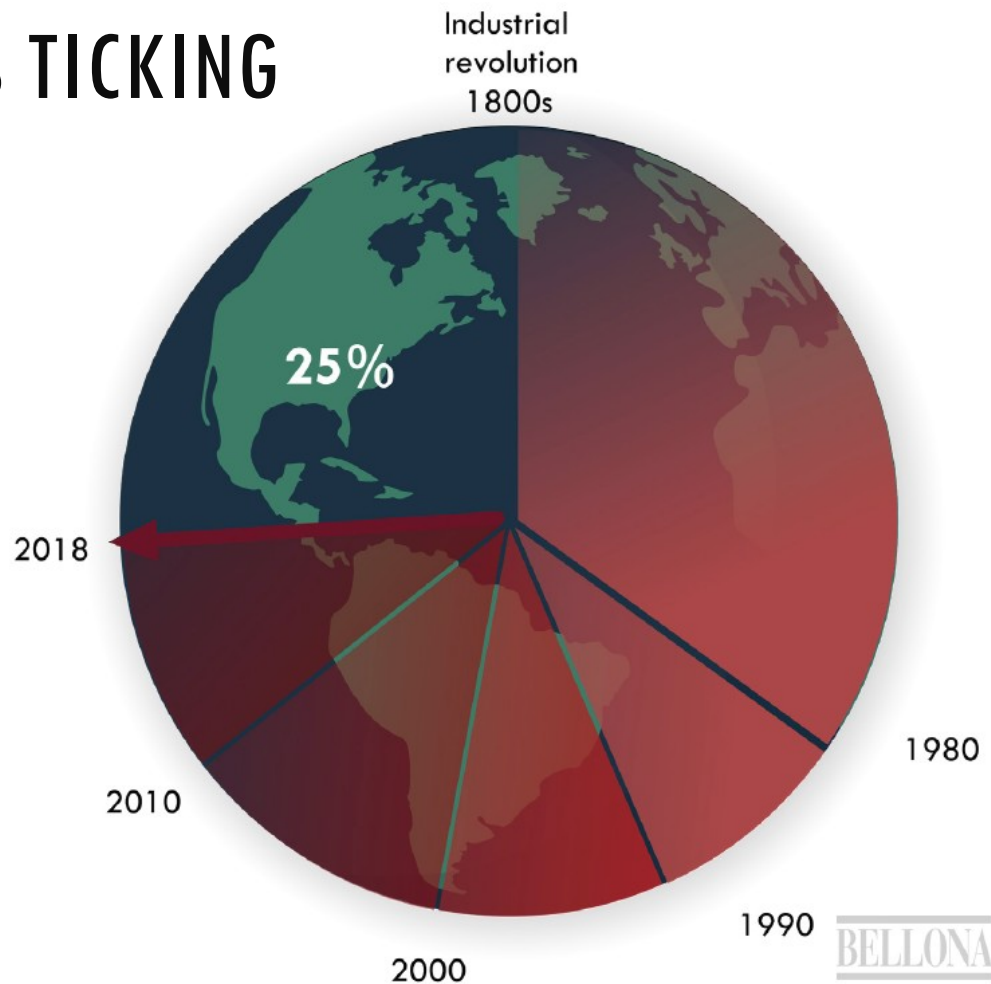
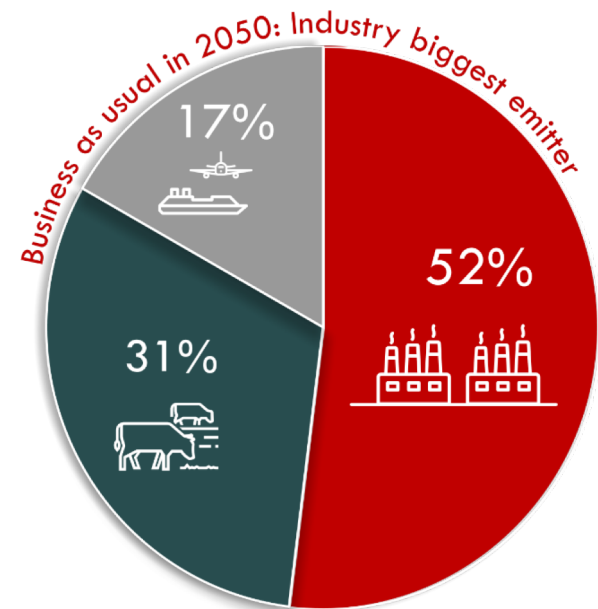
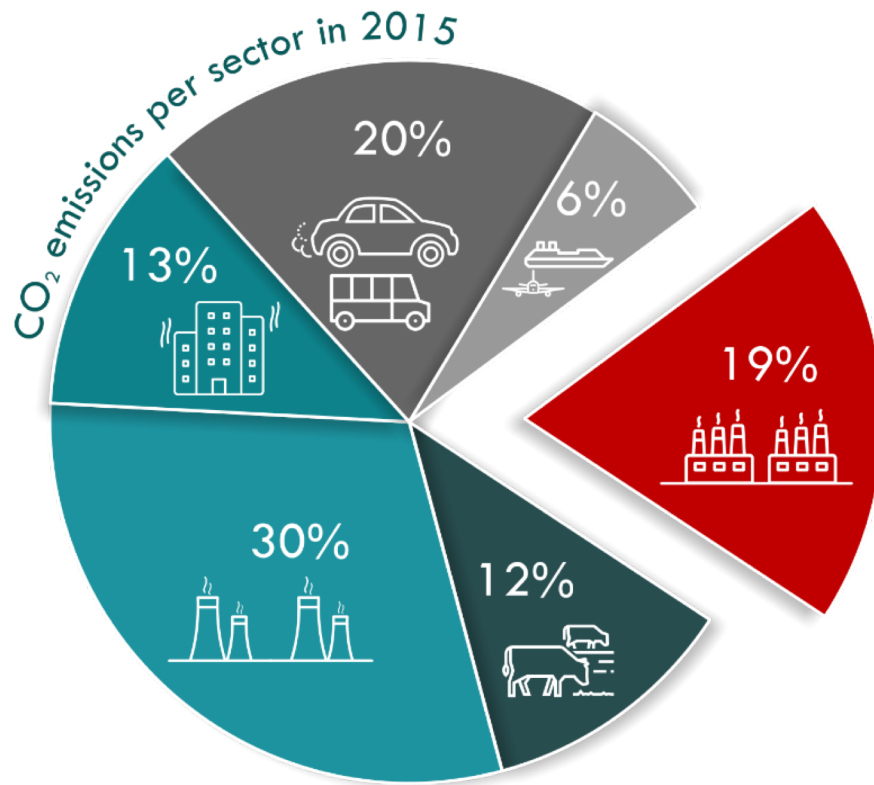


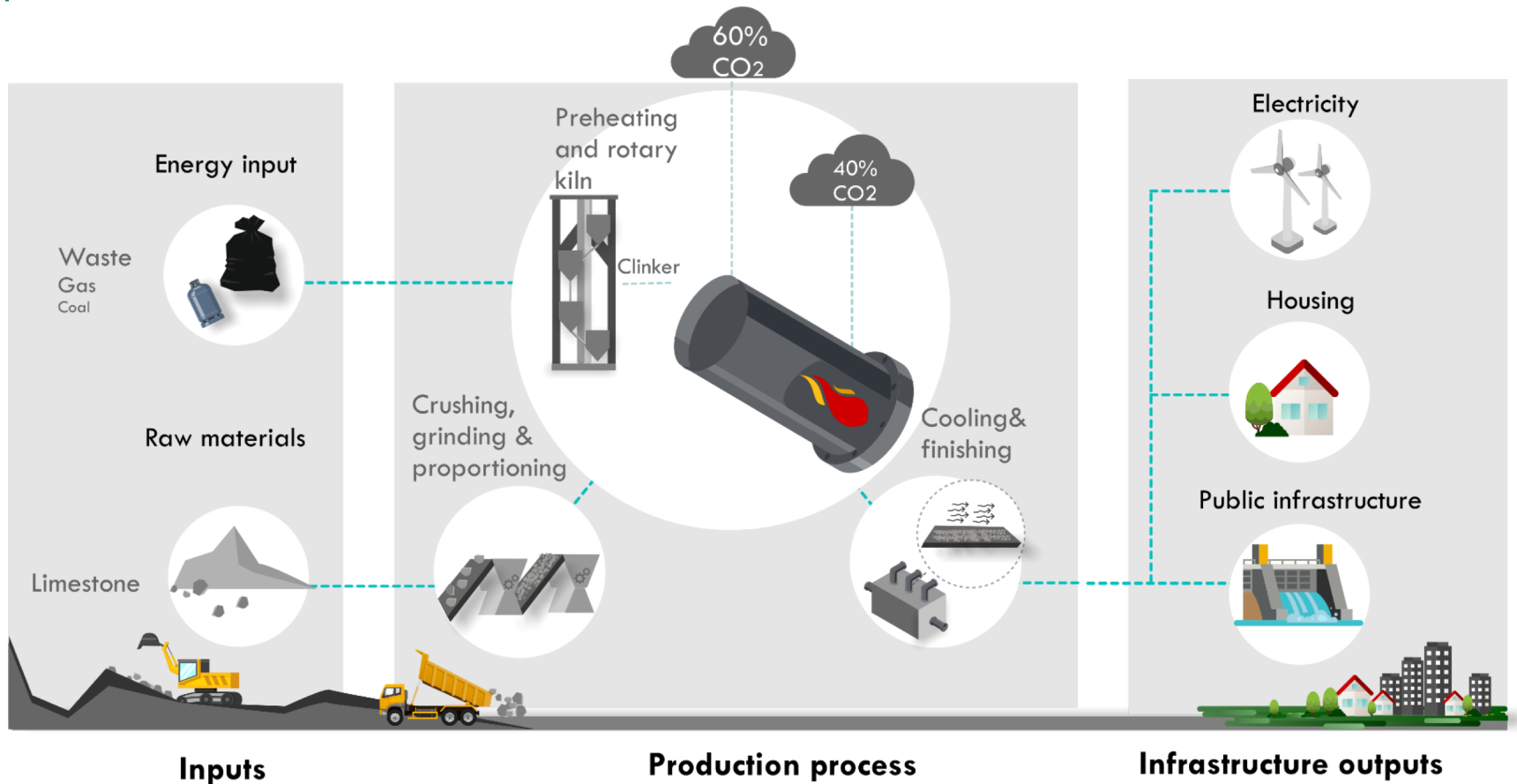
Figure 1: Over the past few decades, the pace of emitting greenhouse gases has hastened substantially. We now only have about a quarter of our carbon budget left before we cross the 2°C mark.

INDUSTRY EMISSION TRENDS

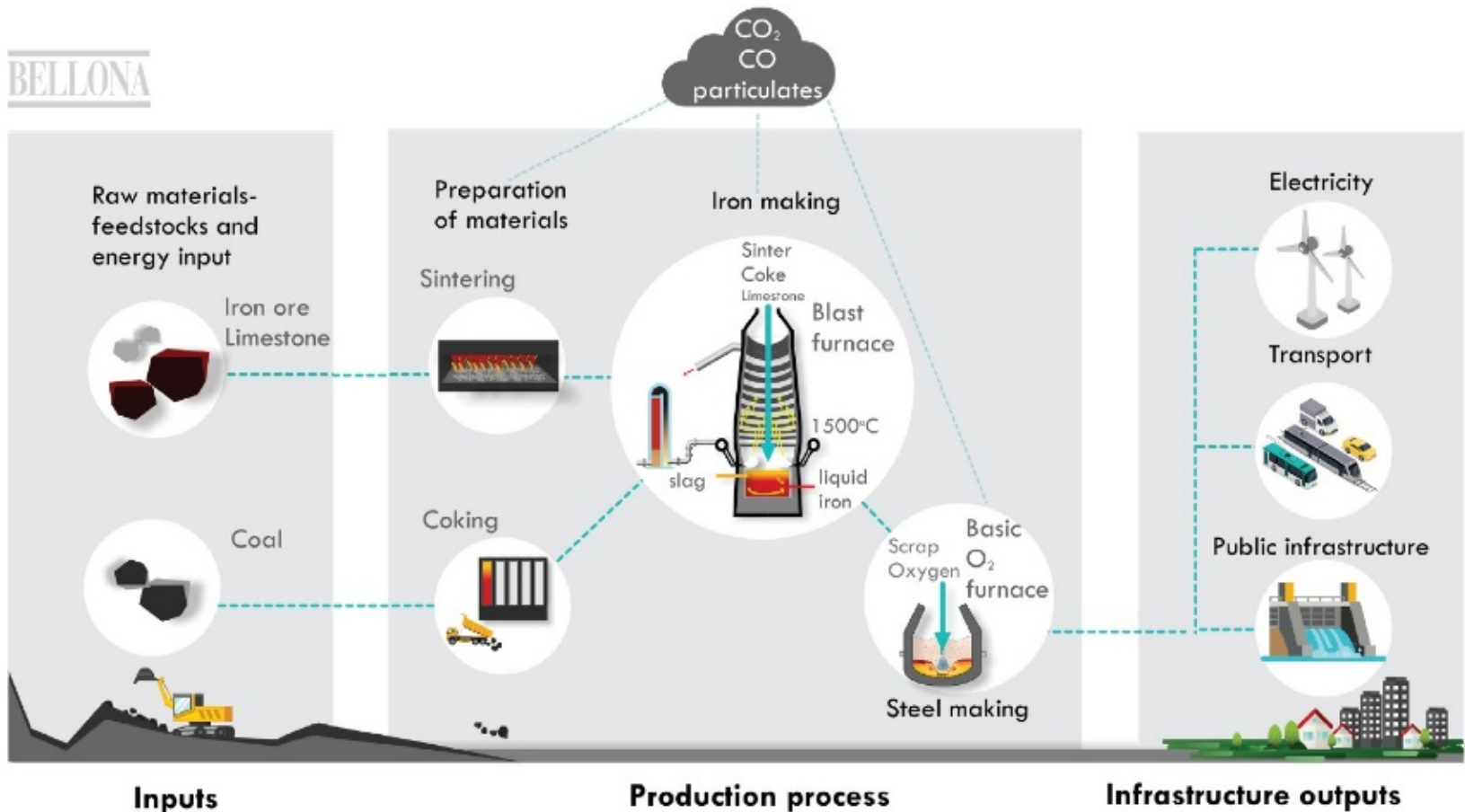




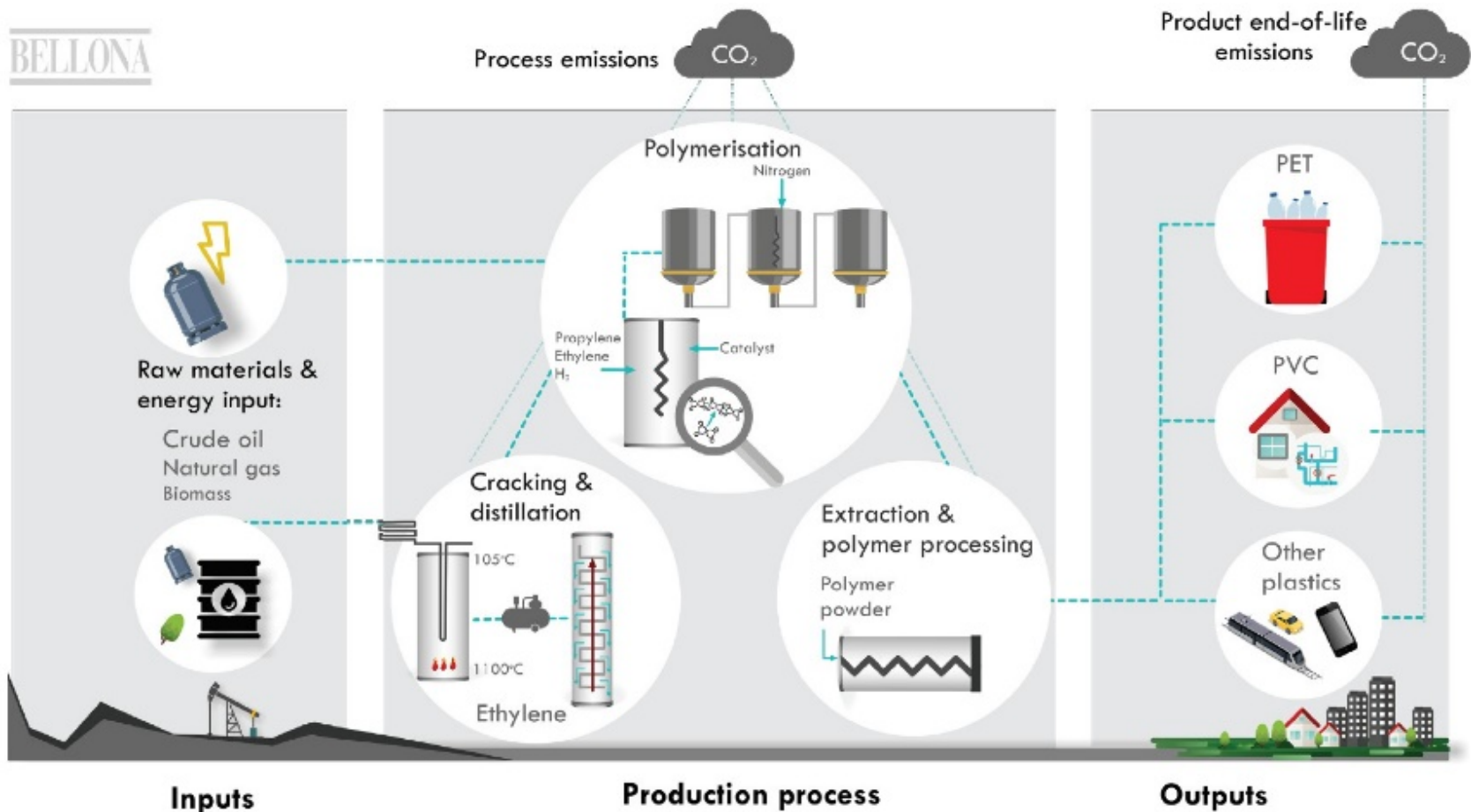
WHERE CEMENT EMITS



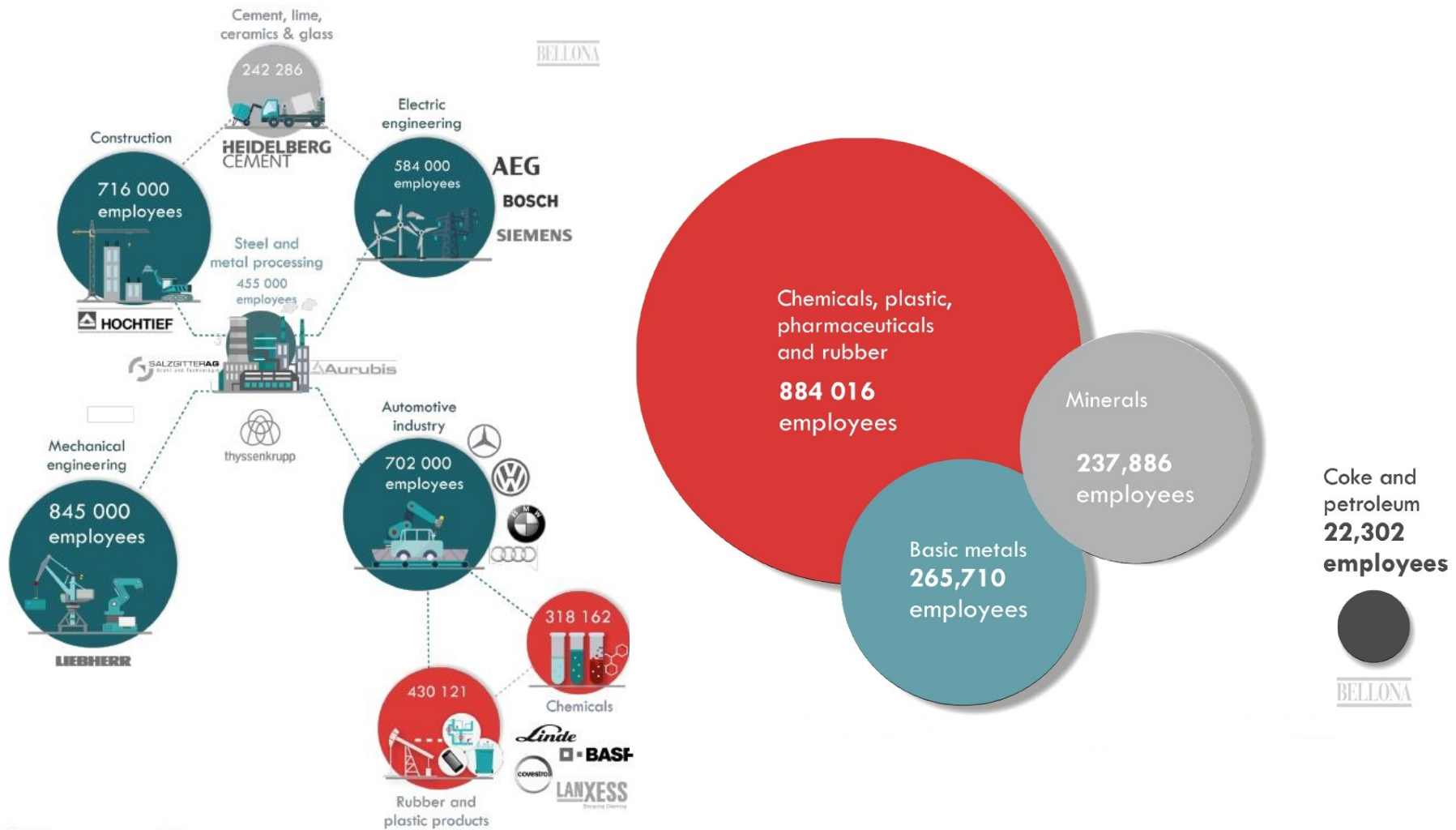
WHERE STEEL EMITS



WHERE CHEMICALS EMIT



NOT JUST A TRANSITION, BUT A JUST TRANSITION

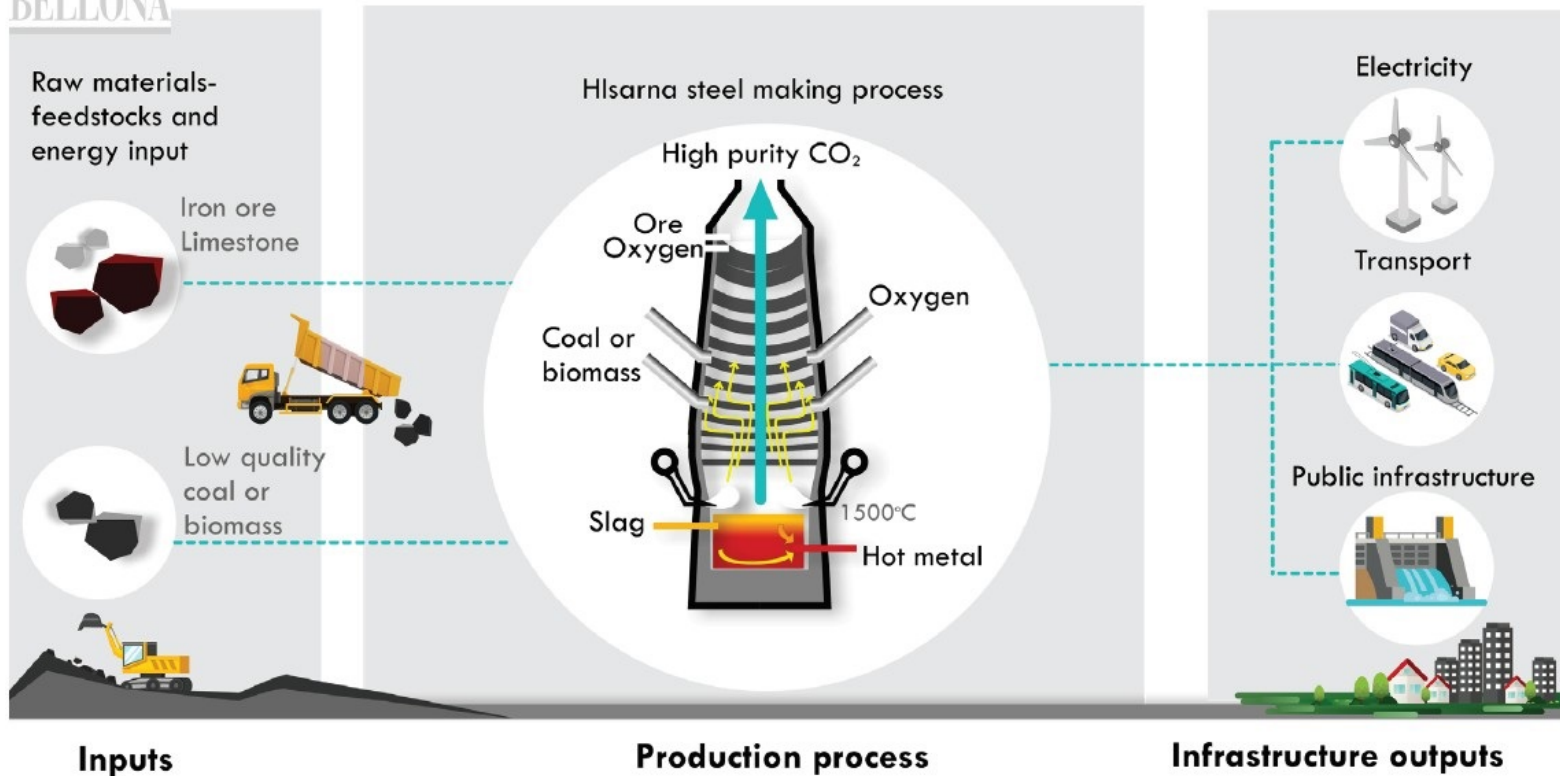


NEAR TERM ACTIONS, LONG TERM VISION

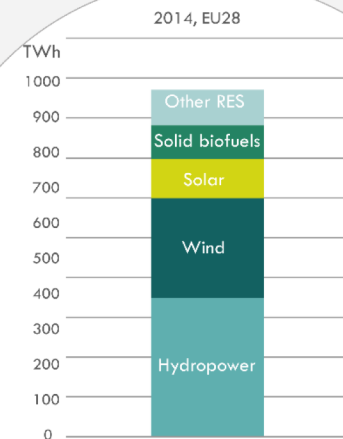
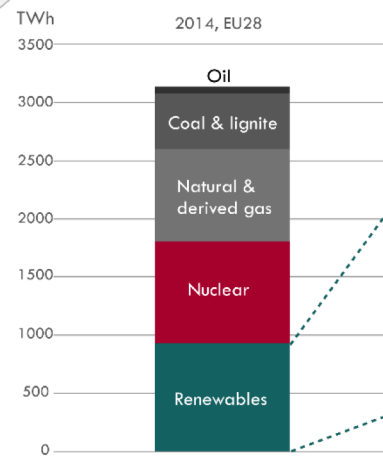
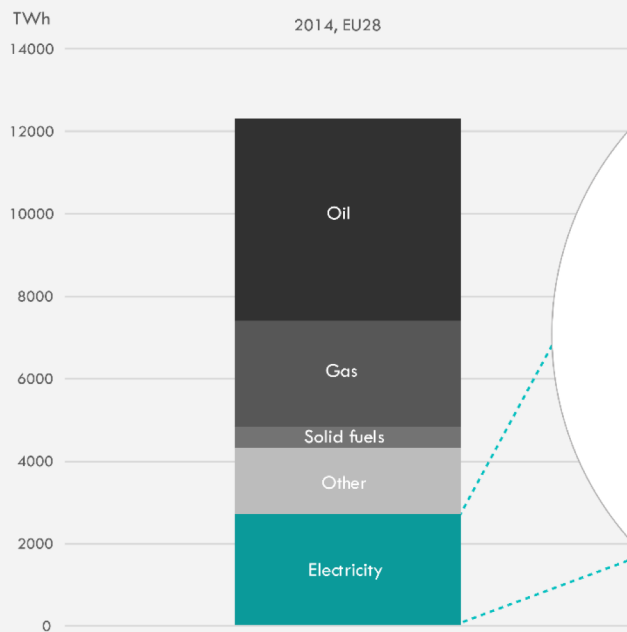


REINVENT — EXAMPLE STEEL: HISARNA

BELLONA

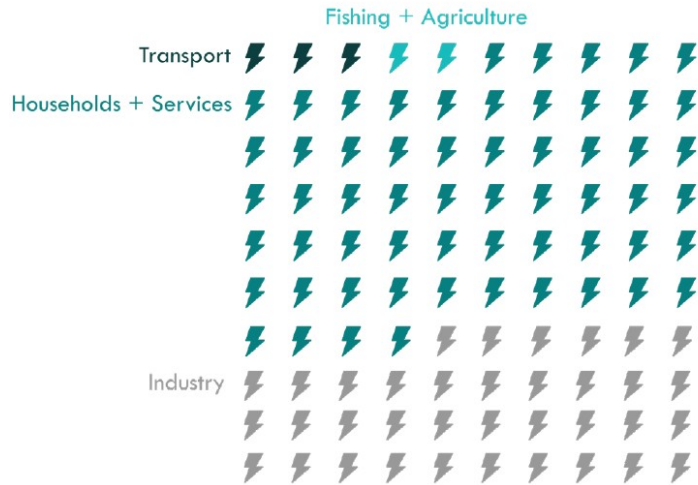


LIMITS OF ELECTRIFICATION



LIMITS OF ELECTRIFICATION

Total EU Electricity Use



Fishing + Agriculture

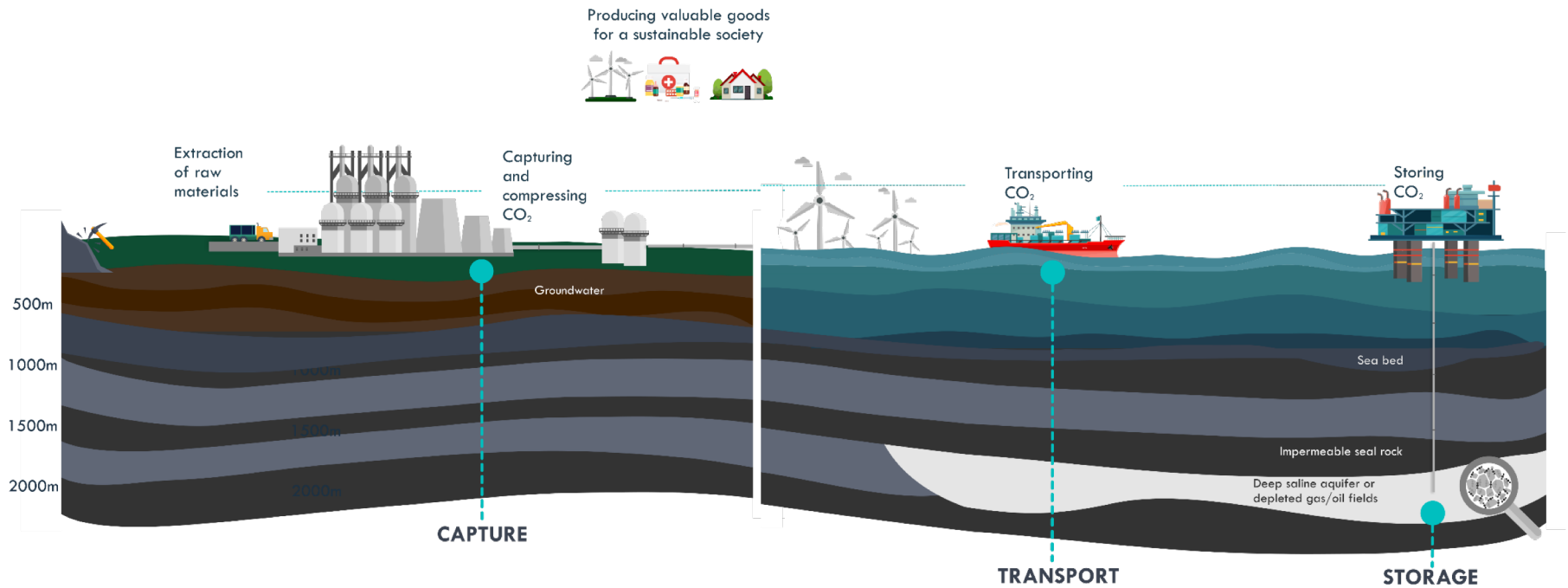
Cement

Steel

Chemicals

Electric Transport

INDUSTRY CARBON CAPTURE & STORAGE (CCS)



DOING CCUS RIGHT

Ensure safety of CO₂ transport and storage

Detailed assessments and monitoring of storage sites, and technical safety of means of transport (pipelines, ships, trains, trucks) are of highest priority. Focus on offshore storage (EU).

Complement capture technologies with improved efficiencies & least disruption

Reduce resource input & energy demand. Plan for discontinuation of operations during implementation.

Keep CO₂ out of the atmosphere

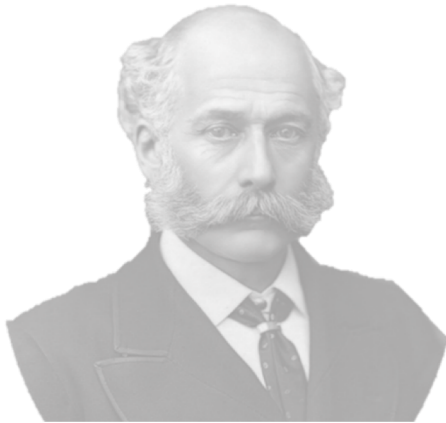
Beyond the integrity of the infrastructure, other options that use CO₂ to release it back into the atmosphere should not be regarded as mitigation solutions.

Cooperation brings CCS down the cost curve

Joint investments, shared infrastructure and clear legislation reduce costs and investment risks.

CO₂ NETWORK AS A PUBLIC GOOD

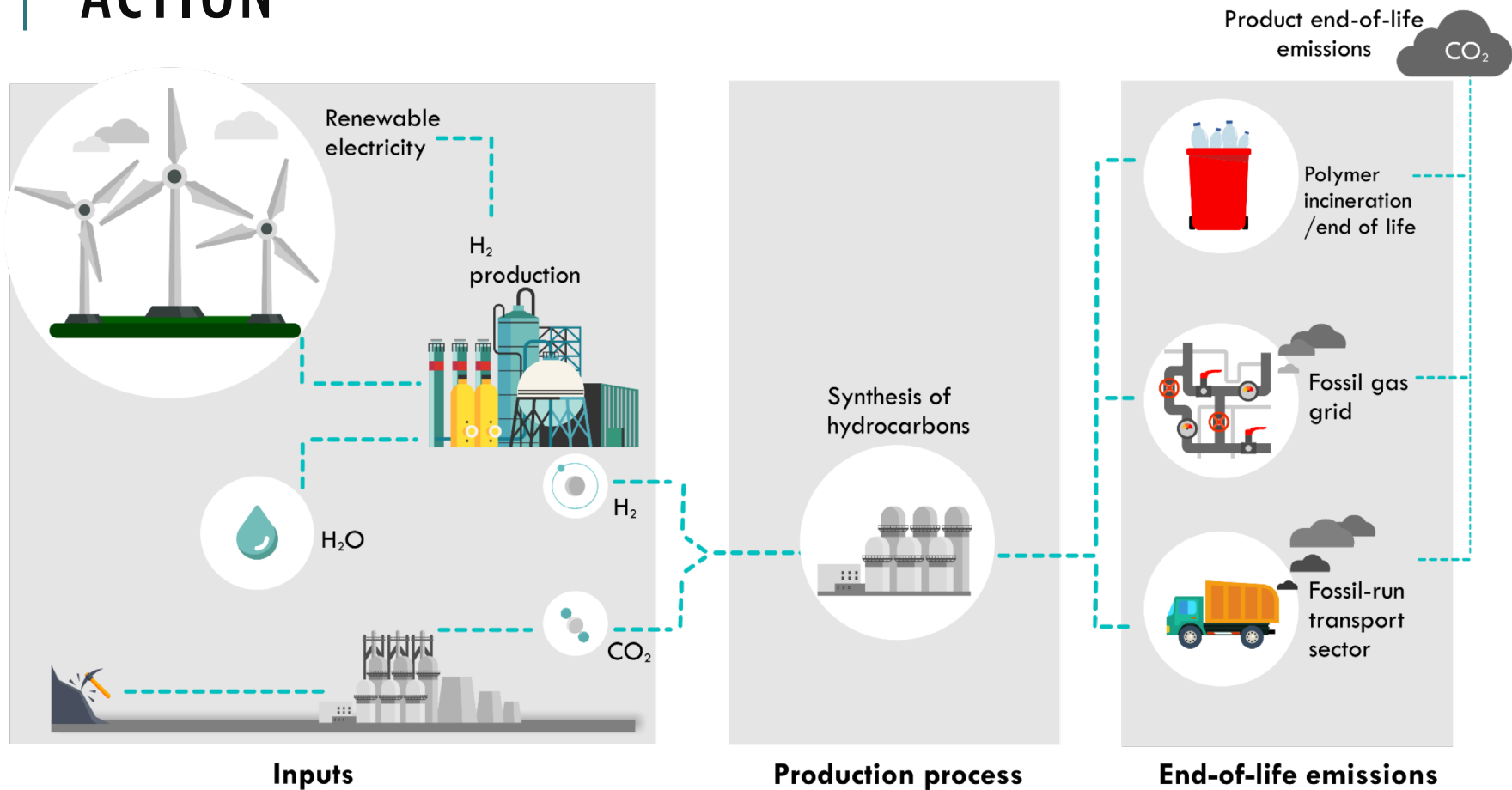
*In the early 19th century, London planned to expand its sewage system, yet faced widespread public opposition. Particularly wealthier people, living uphill, did not see why a general sewage system was needed and hence did not want to pay to improve the property of private individuals 'downhill'. In fact, **sewage was not seen as a public good**, and so the government initially considered it improper to use public money. **It took several cholera epidemics, thousands of deaths, and the 'Great Stink' of 1858 for London to finally modernize and upgrade its sewage system**, at last stopping the unchecked dumping of human waste into the city and the river Thames.*



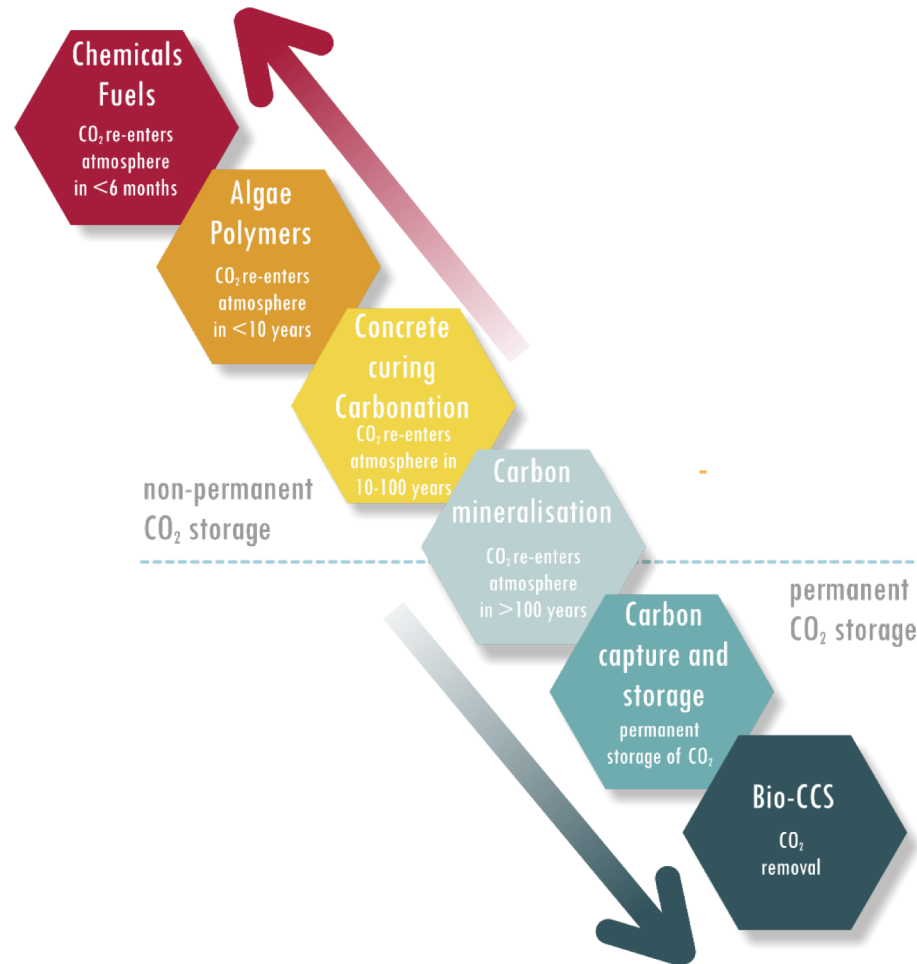
“[The principle] was of diverting the cause of the mischief to a locality where it can do no mischief.”

Sir Joseph Bazalgette, Civil Engineer

CO₂ UTILISATION - NOT EVERY CCU IS CLIMATE ACTION

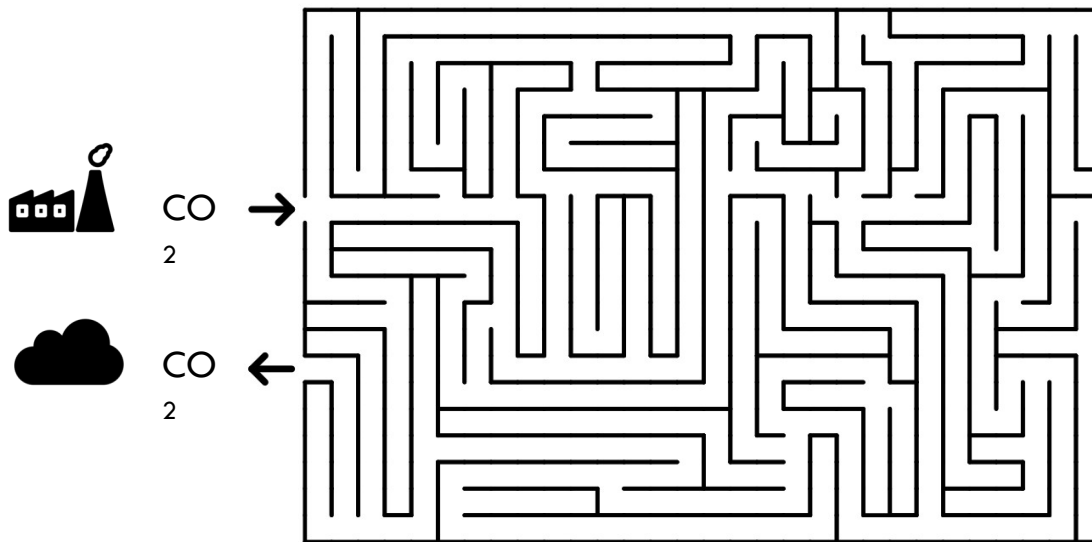


NOT EVERY CCU IS CLIMATE ACTION



HOW DO POLITICIANS DEAL WITH CCU?

Its complicated:

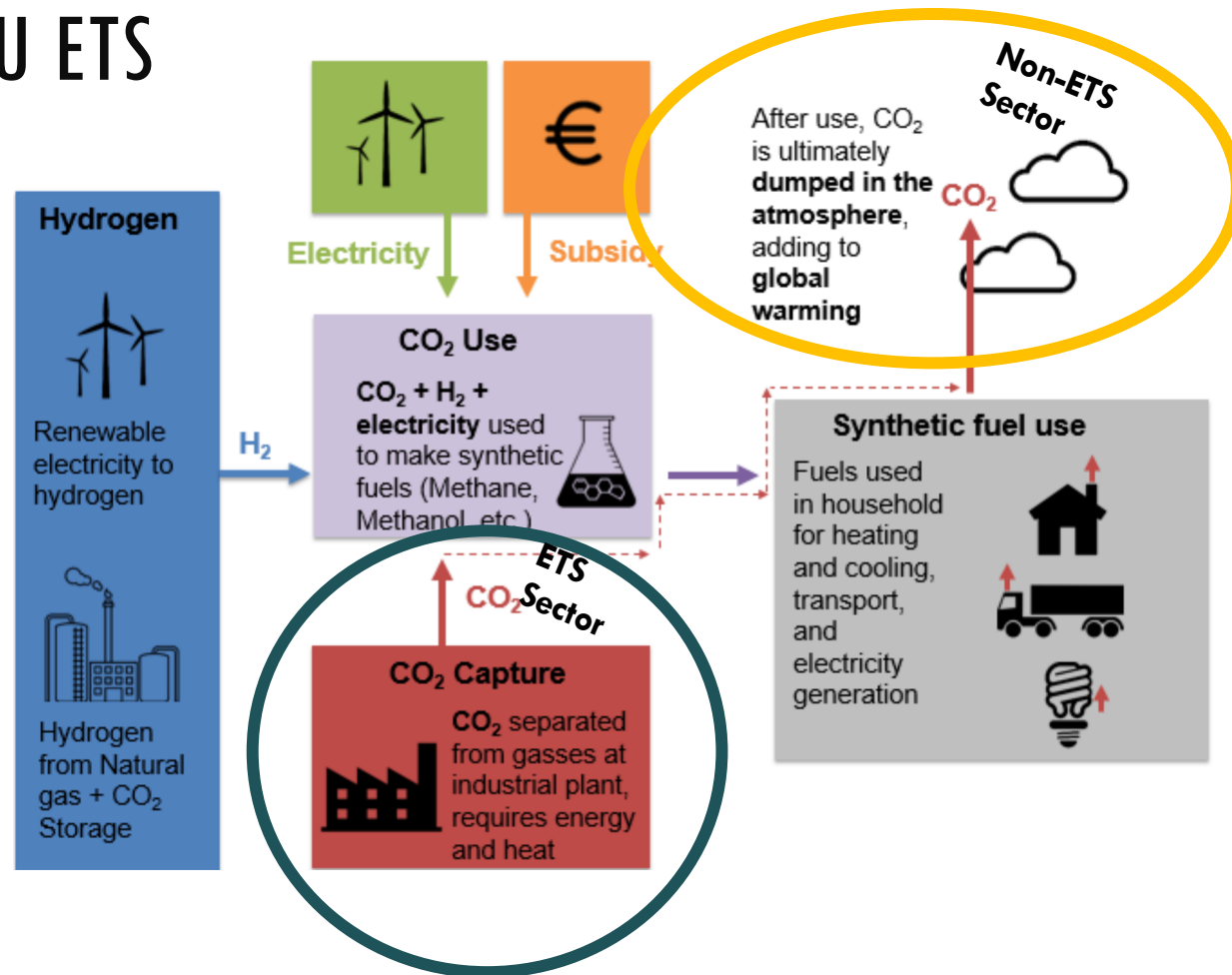


CCU AND THE EU ETS

CCU can link emissions from one sector to another

CO₂ captured and use in one sector can then be emitted in another

Different CO₂ reduction policies can become entangled or short-circuited



DIF
IMP

Alternativer Kraftstoff

Wunder-Diesel macht Autoindustrie Hoffnung

Von Klaus Dieter Oehler - 10. Juli 2017 - 21:36 Uhr

Ein synthetisch hergestellter Kraftstoff könnte eine Konkurrenz zum Elektroantrieb werden. Er wurde in Norwegen entwickelt.



Grüner Diesel, das wäre doch was. Deutsche Autoingenieure hoffen auf den neuen Kraftstoff.

Foto: dpa-Zentralbild

Frankfurt - Die deutschen Auto-Ingenieure haben sich noch nie so richtig für eine rein elektrische Antriebsart für die Fahrzeuge der Zukunft begeistern können. Daher kommt ihnen nun eine Initiative, die ausgerechnet aus dem nicht unbedingt als Autoproduktionsland bekannten Norwegen kommt, gerade Recht.

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THE INTERNATIONAL
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VDA

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Carbon Capture and Use

CCU Transport fuels in numbers



Total energy use in EU ROAD Transport is $\approx 3,305$ TWh

Creating synthetic transport fuels from electricity is $\approx 60\%$ *efficient*

Total EU
electricity
generation
is 3,030
TWh

**Powering all of
Europe's cars by
CCU fuels would
need 5,500 TWh!
1.8 times TOTAL
current electricity
production in all
of the EU**

Electric
Cars

Internal combustion
engines are highly
inefficient.
If EU road transport
was electric ≈ 800
TWh, **85% lower
energy requirement**

REVIEWING THE CCU (P₂X) LOBBY NUMBERS...

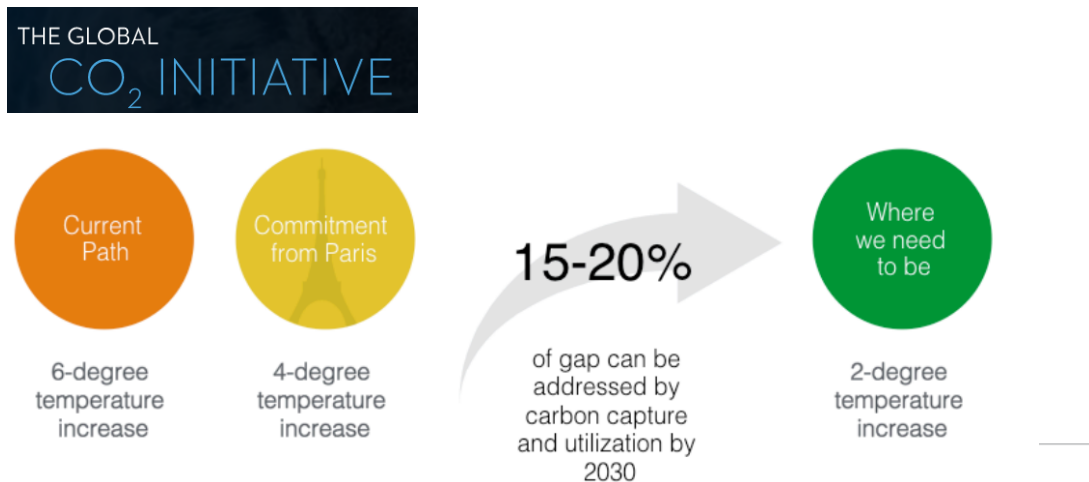


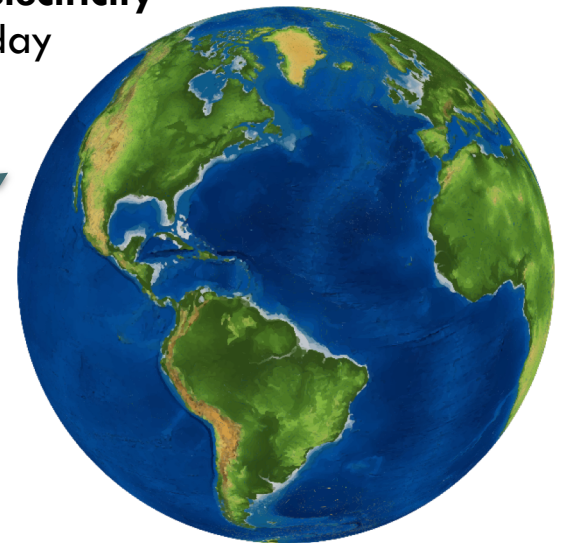
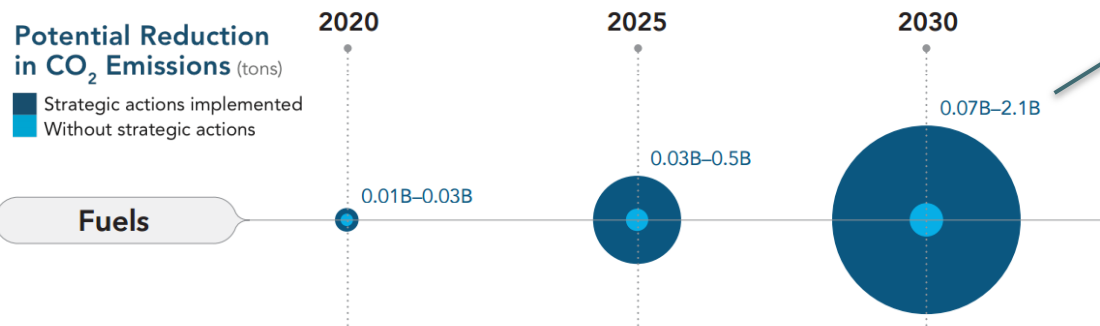
Figure 4: CBPI can play a significant role in addressing gap to achieve a 2° future

Source: Issam Dairanieh, CO₂ Sciences, "Market potential and environmental impact of CO₂ conversion technologies"

REVIEWING THE CCU (P₂X) LOBBY NUMBERS...

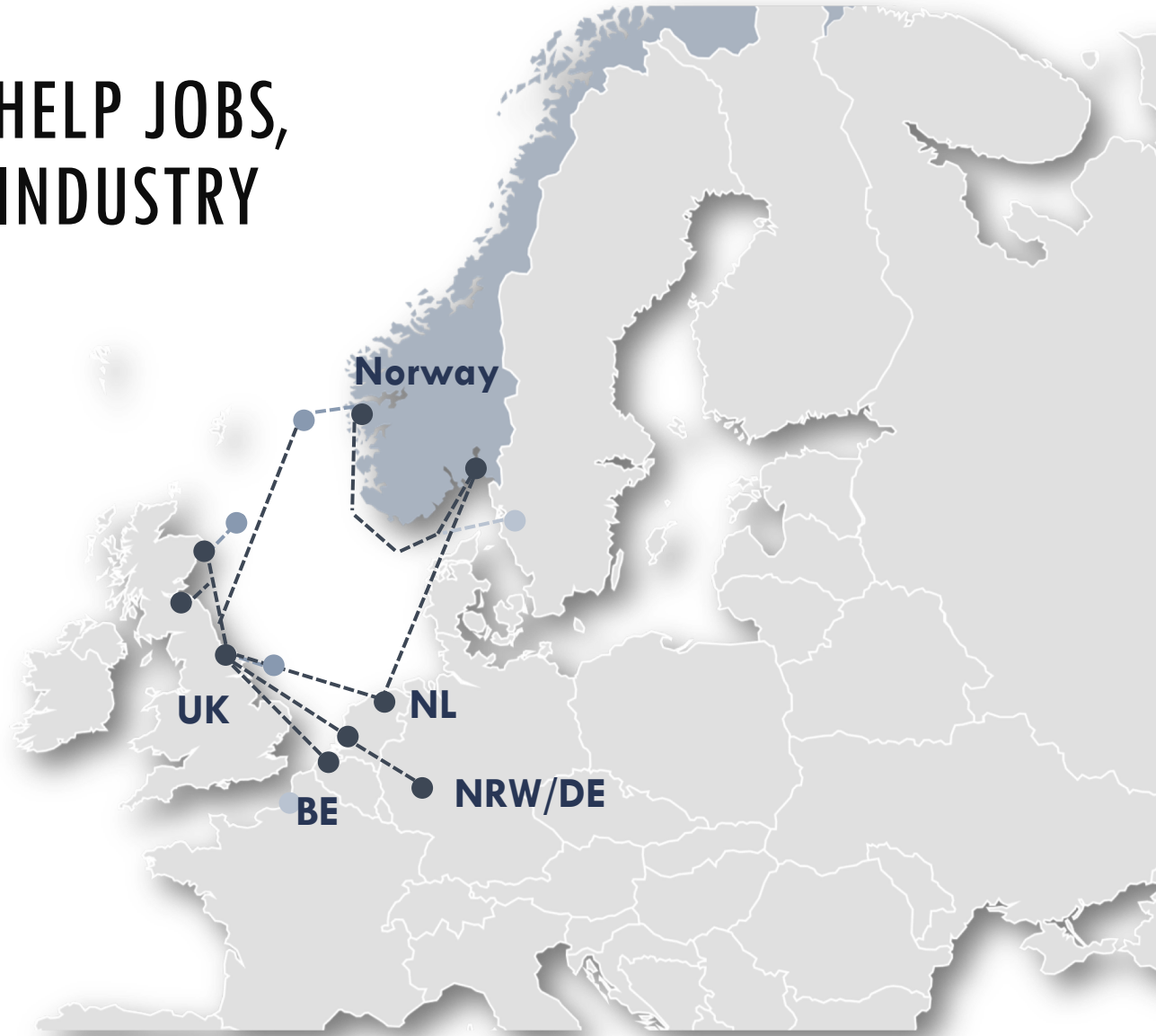
THE GLOBAL CO₂ INITIATIVE

Putting 2.1 billion tonnes of CO₂ into fuels
would require **≈ all of the electricity**
generated on the planet today

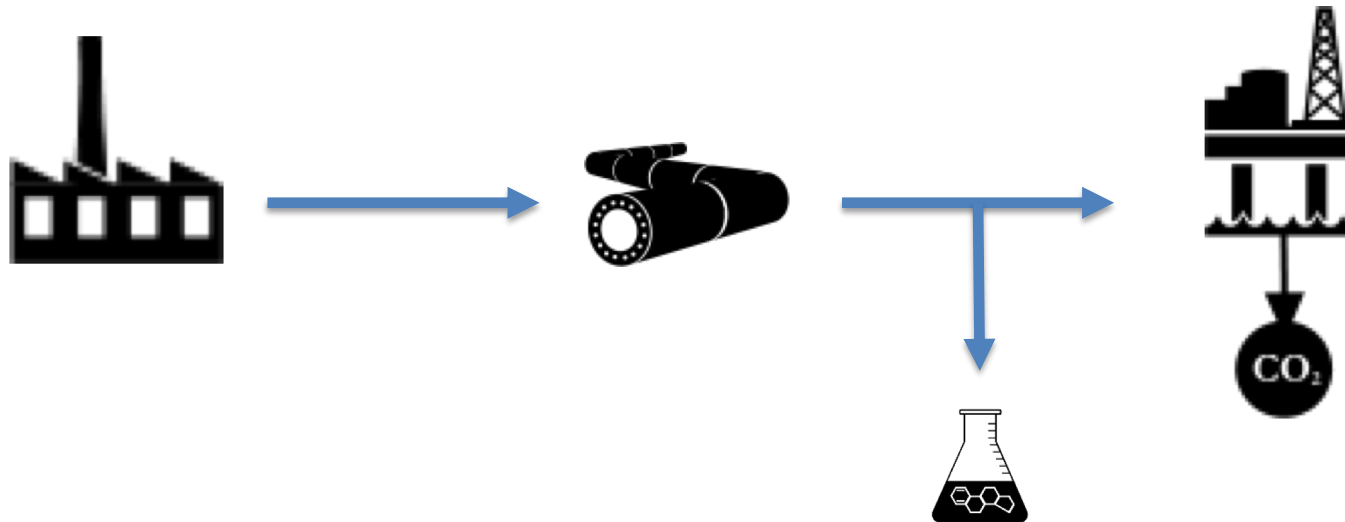


Source: Issam Dairanieh, CO₂ Sciences, "Market potential and environmental impact of CO₂ conversion technologies"

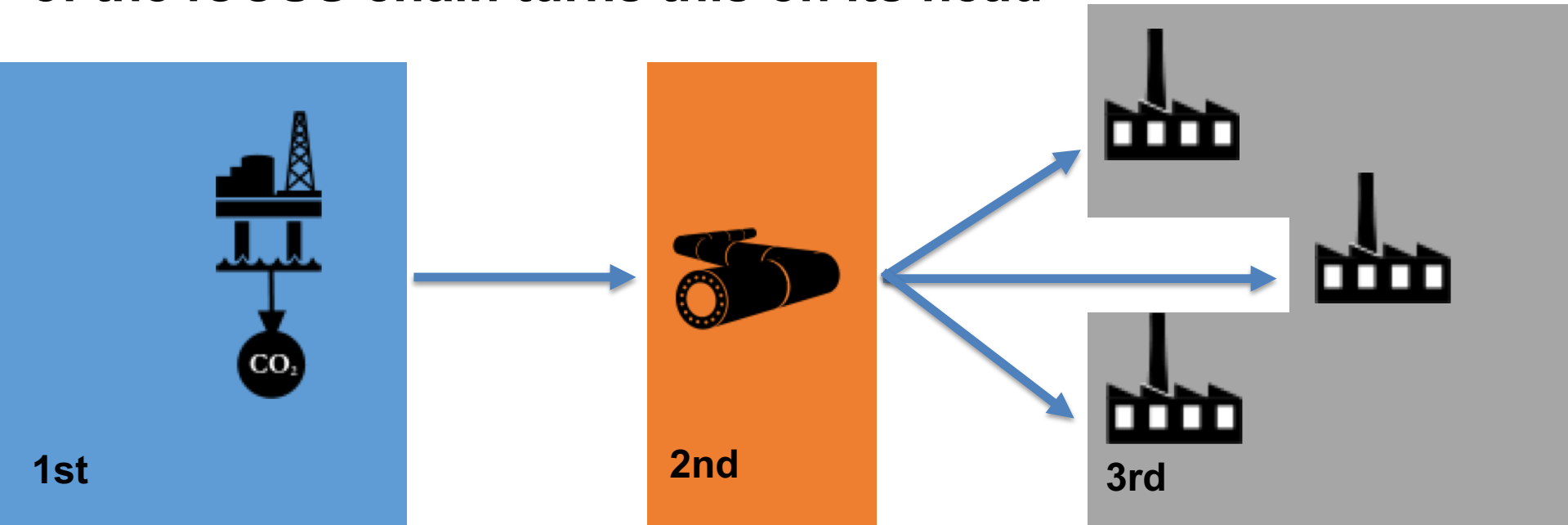
POLICY MUST HELP JOBS, CLIMATE AND INDUSTRY



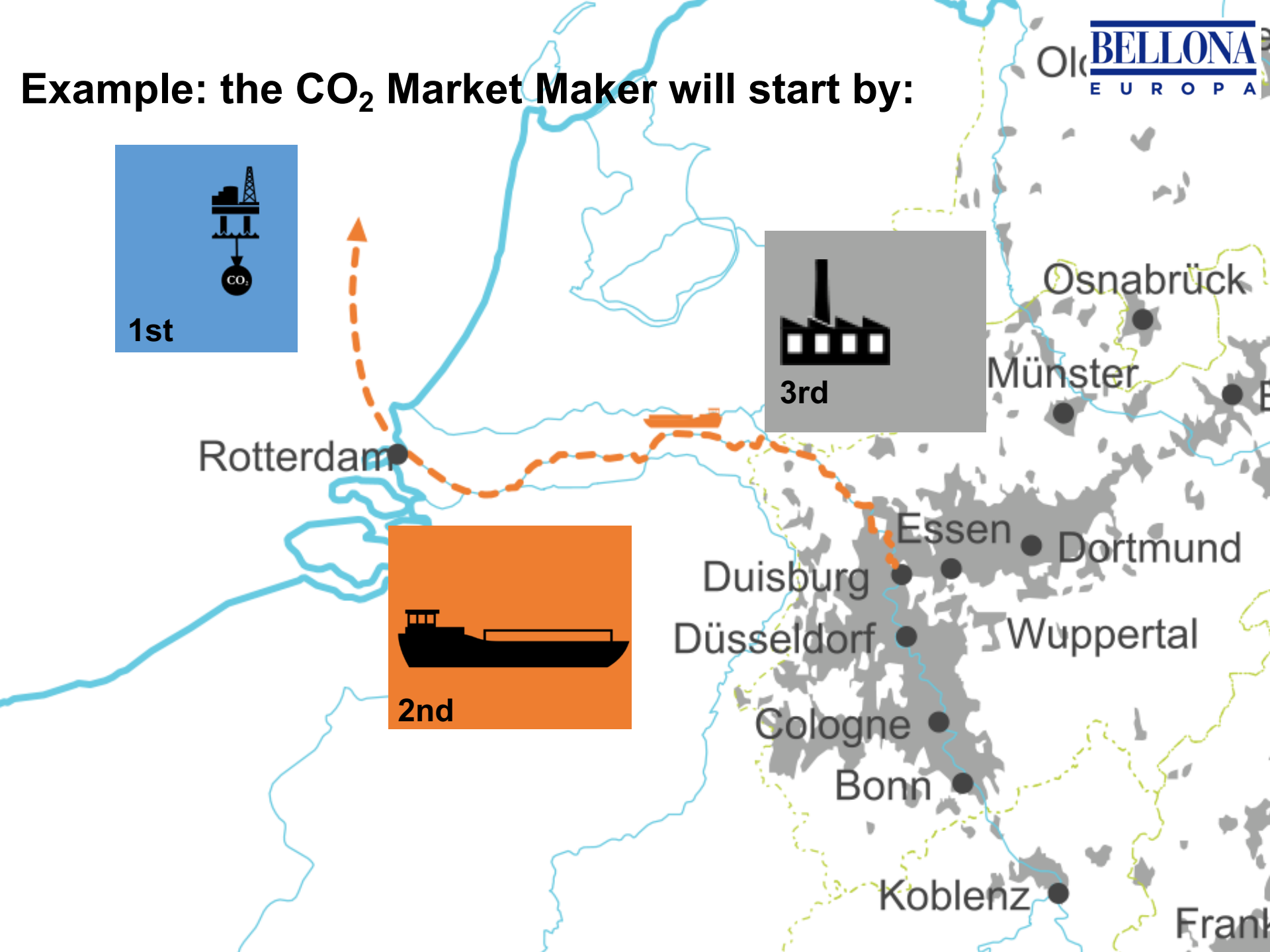
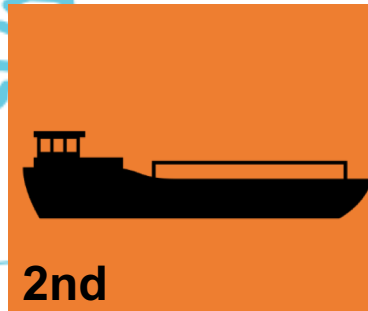
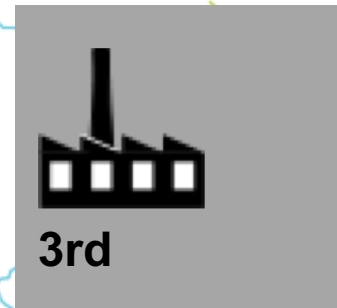
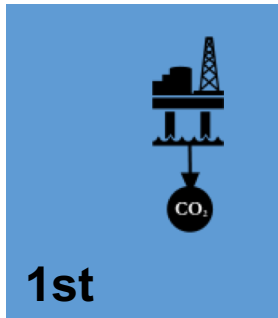
The CCS value chain...



Reviewing the investment and delivery profile of each part of the iCCUS chain turns this on its head

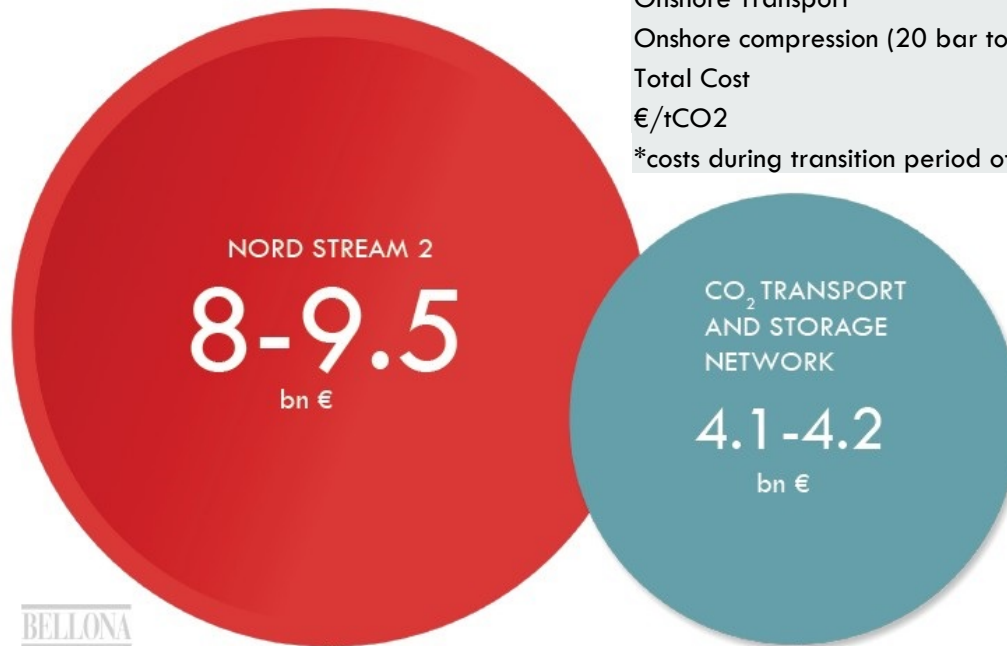


Example: the CO₂ Market Maker will start by:



SHARING MEANS SAVING MONEY

Netherlands
Transport & Storage



Germany Transport
& Storage

<i>Abatement Scenarios</i>	Low	Mid	Mid Newbuilt	High
CO ₂ abated (Mt)	476	654	654	964
Mothballing*	133	216	120	474
Injection	1 499	2 740	4 154	3 382
Offshore Transport	740	764	764	1 404
Onshore Transport	366	366	366	376
Onshore compression (20 bar to HP)	1 490	2 072	2 072	3 072
Total Cost	4 229	6 158	7 477	8 707
€/tCO ₂	8,9	9,4	11	9,0

*costs during transition period of infrastructure before being re-used for CO₂ transport

A SHARED CO2 NETWORK...

Is **a no-regrets option** that provides a path for **industry** to deeply decarbonise, protects investments and existing assets.

is as a corner stone of a *Just Transition* for industry, **labour unions** ensure that jobs remain in Europe. It safeguards the welfare of Europe's workers.

allows **governments** at a local and national level to fulfil their obligations under binding international targets and towards their constituents by protecting their health, their jobs, and the environment and climate.

helps **civil society** to ensure that no industry emissions are 'unavoidable' and forces industry to deeply decarbonise. With no excuses left, industry decarbonisation will not be delayed further.

WHAT IS NEEDED & WHAT TO DO

A CO2 network will not simply appear, we need PROJECTS & FINANCE.

Cooperation

Among Industry partners, Unions, Policy-Makers (local, national, European)

Policy frameworks and finance instruments that suit the needs

Projects of Common Interest; Innovation Fund; Regional & National Mechanisms

Develop and Deploy Projects

Industry-scale projects need clear, detailed plans (location, size, costs)

Think Strategic

Develop Projects where they can set you up for the long term

'NORTHERN LIGHTS' & THE NORDICS

It's the first full-industry-scale shared CO₂ network in the world with two industry capture projects and opportunities to expand.

Sweden seeks to become carbon neutral by 2045 and may choose to cooperate with Norway on CCS for its own industry.

●
Offshore Storage

● **Fortum Waste Incinerator**
● **Norcem Cement Plant**

NETHERLANDS -

Klimaatakkord

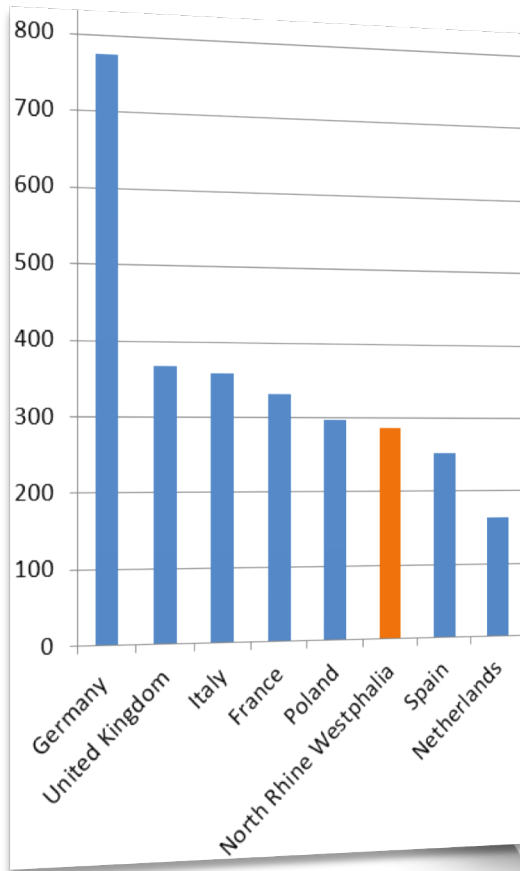
The Dutch government requires industry to reduce over 14Mt of CO₂ emissions by 2030.

Port of Rotterdam plans to become region's Gateway for CO₂ storage.

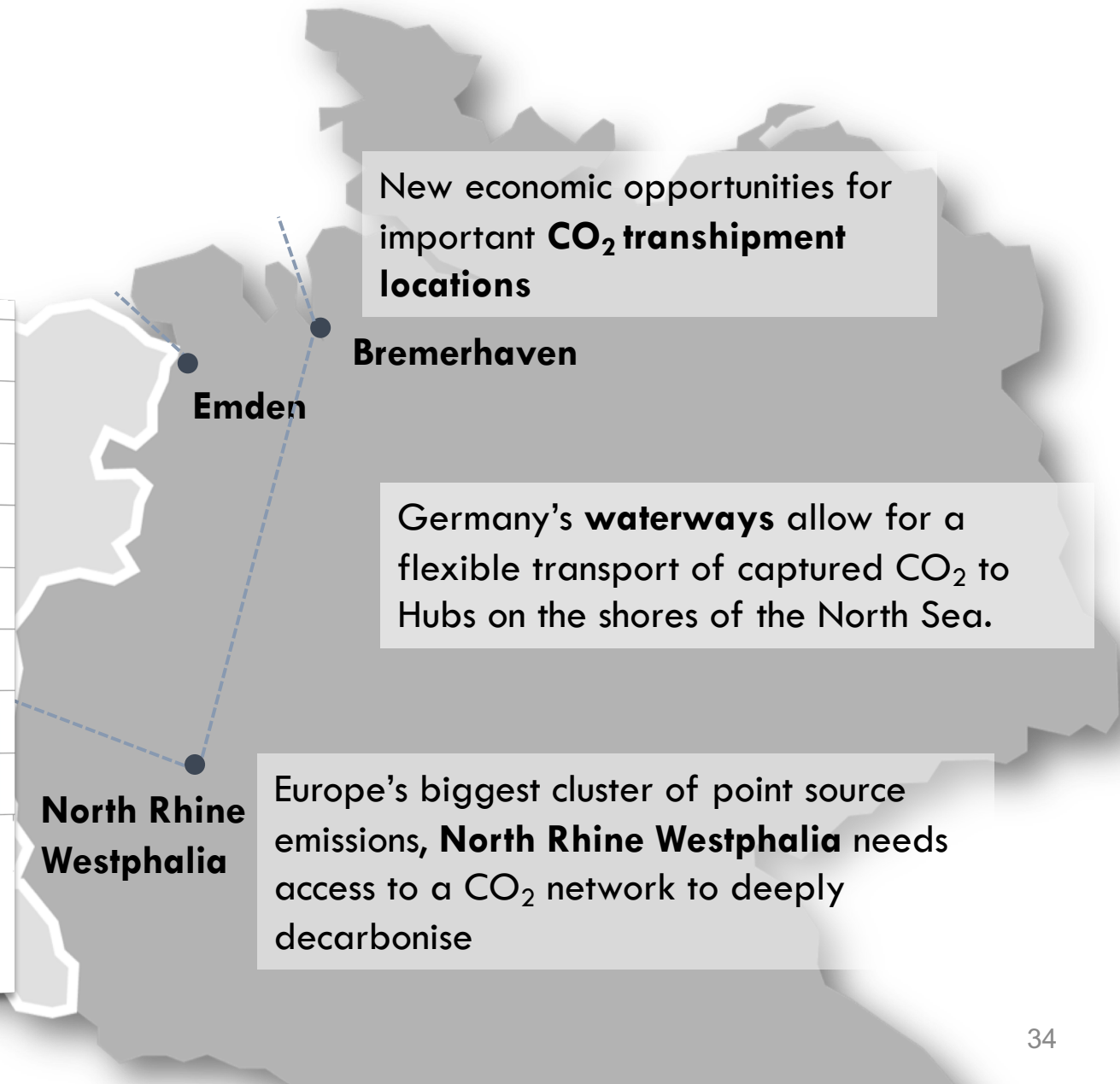
20% of Dutch Emissions from Rotterdam.



GERMANY



12/4/18





INDUSTRY IN A CHANGING CLIMATE

AN
INDUSTRY'S
GUIDE TO
CLIMATE
ACTION

Indirectly
emit CO₂

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EUROPA

**WE HAVE
A PROBLEM**

2

produce CO₂
emissions

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**A DIVERSITY
OF OPTIONS,
A LACK OF
SOLUTIONS**

3

we can
fix it

BELLONA
EUROPA

**THE DAWN
OF A NEW
INDUSTRY**

4

we can
fix it

BELLONA
EUROPA

**A FAREWELL
TO INACTION**

Thank you!

@Bellona_EU
@jonashelseth

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