"Innovation" - DAY 1

Tonic for the Transition

MAY 24 2022, 09:00-10:30 CEST

Leading experts discuss the issues facing China and Europe

- carbon neutrality
- technology
- cities
- business models
- industry

Viktorija Kaidalova - Section Head, FPI, EU Delegation to China

Chunping Xie - London School of Economics

Zhonghua Xu - Total Energies ASIA and EUCCC

Simon Göss, Energy & Climate Analyst, Co-Founder at carboneer

Renewables

MAY 24 2022, 10:45-12:15 CEST

Leading experts discuss the issues facing China and Europe

- wind & solar
- industrial heat
- BECCS
- heavy transport
- aviation

Mats Harborn - CEO, Scania China

Xing Zhang - Centre for Research on Energy and Clean Air

Tong Zhenyu - BD and Sales Manager, Novozymes

Mickael Naouri - PA Director, Power to X, Air Liquide

EU-China Energy Cooperation Platform

THE EUROPEAN UNION CHAMBER OF COMMERCE IN CHINA

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ONLINE PANEL DISCUSSION

- Innovation - Tonic for the Transition

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China's Transition to a Net Zero Carbon Economy

Dr Chunping Xie

Policy Fellow

Grantham Research Institute on Climate Change and the Environment (GRI)

London School of Economics and Political Science (LSE)

24 May 2022

Grantham Research Institute on Climate Change and the Environment

Centre for Climate Change Economics and Policy

E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

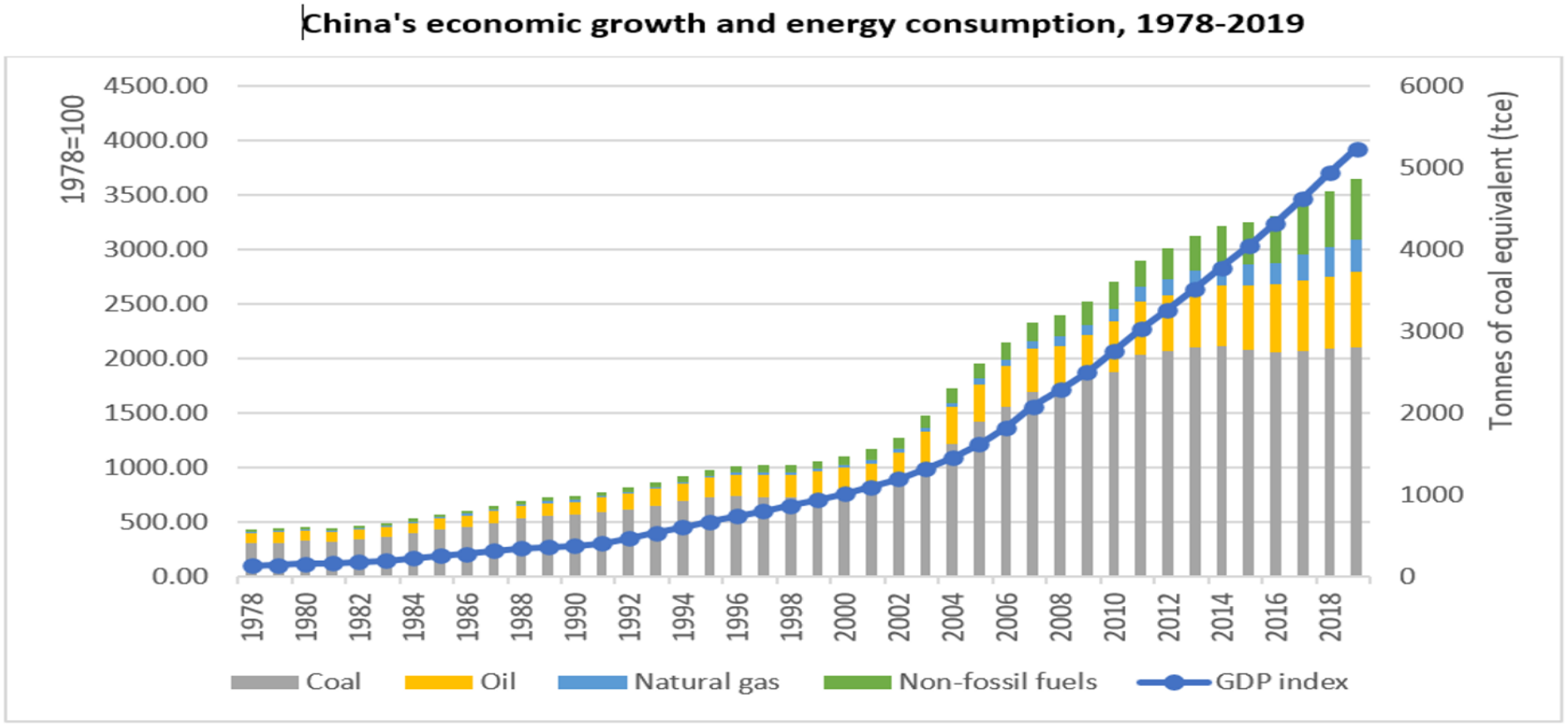
The Grantham Foundation for the Protection of the Environment

University of Leeds

LSE The London School of Economics and Political Science

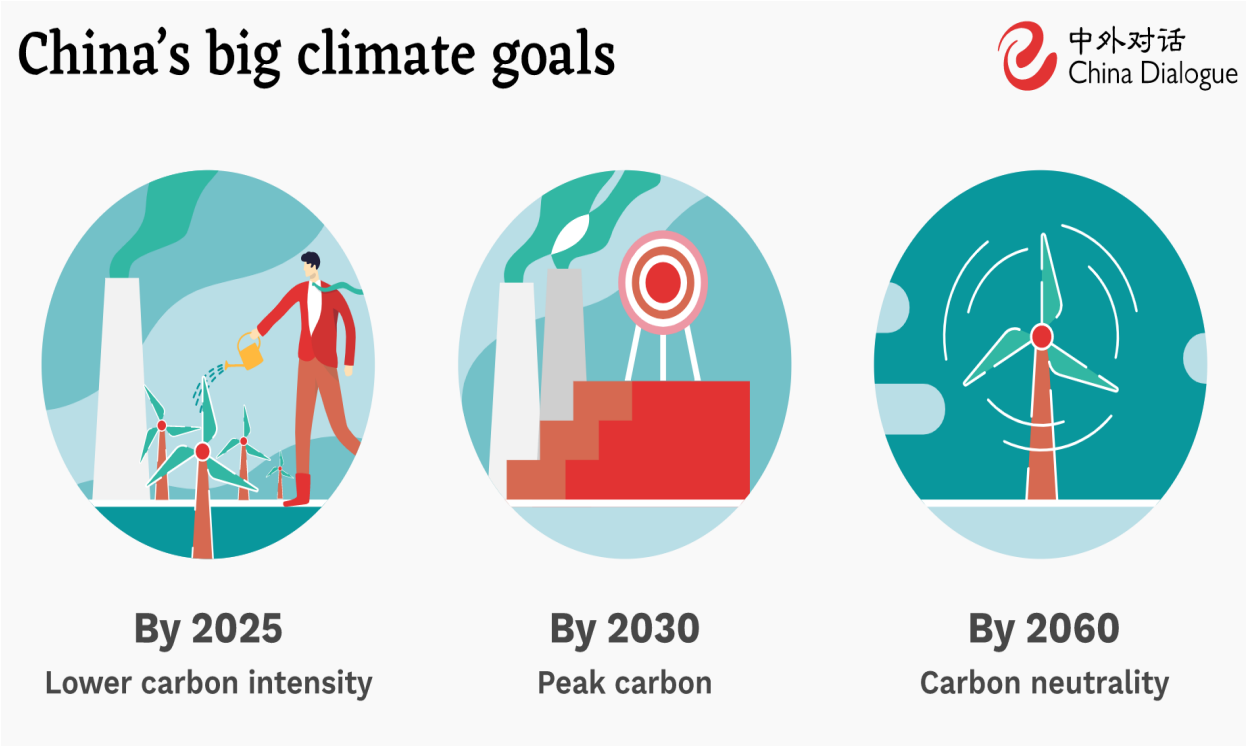
The world cannot go net zero unless China does

- China, because of the size of its economy and greenhouse gas emissions, must be a central player in the world as a whole and on climate action in particular.



Source: Authors, drawing on data from the National Bureau of Statistics of China.

China's leadership on climate change



Display of joint leadership

By NICHOLAS STERN/XIE CHUNPING | China Daily | Updated: 2021-11-16 08:08

JIN YU/FOR CHINA DAILY

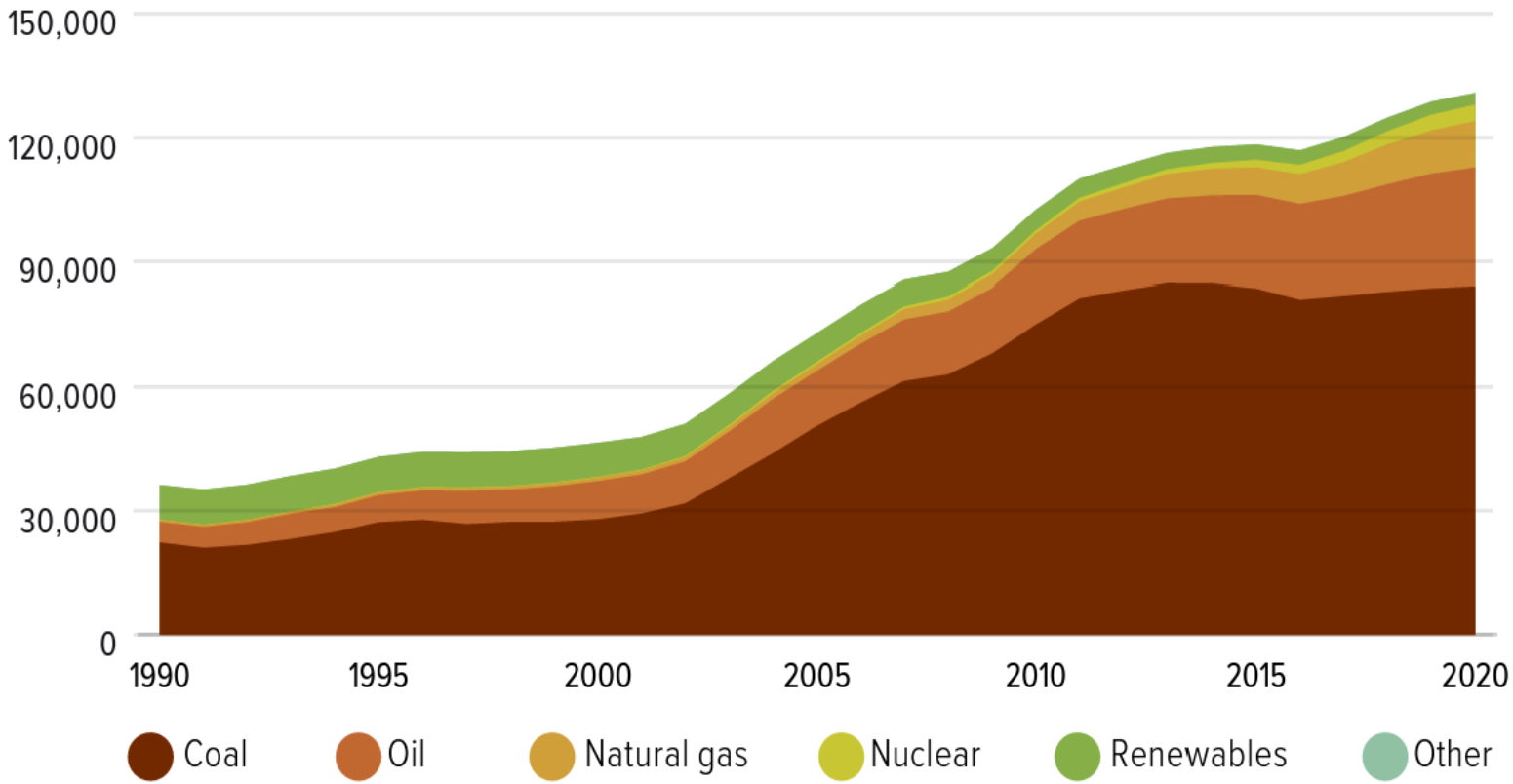
This decade is a crucial time for global cooperation and coordination on climate action

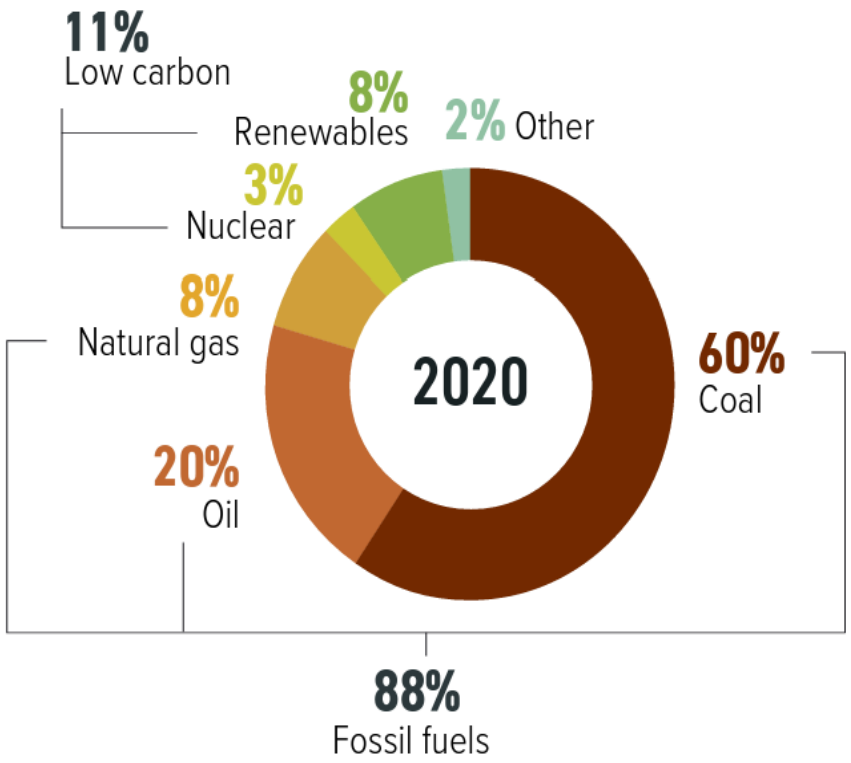
- In September 2020 President Xi Jinping announced at the United Nations General Assembly that ***China will aim for carbon neutrality by 2060***.

Over the last decade, China has moved from being a follower towards taking on a leadership role in global environmental governance.

Energy mix

Total primary energy supply (TPES) (PJ)





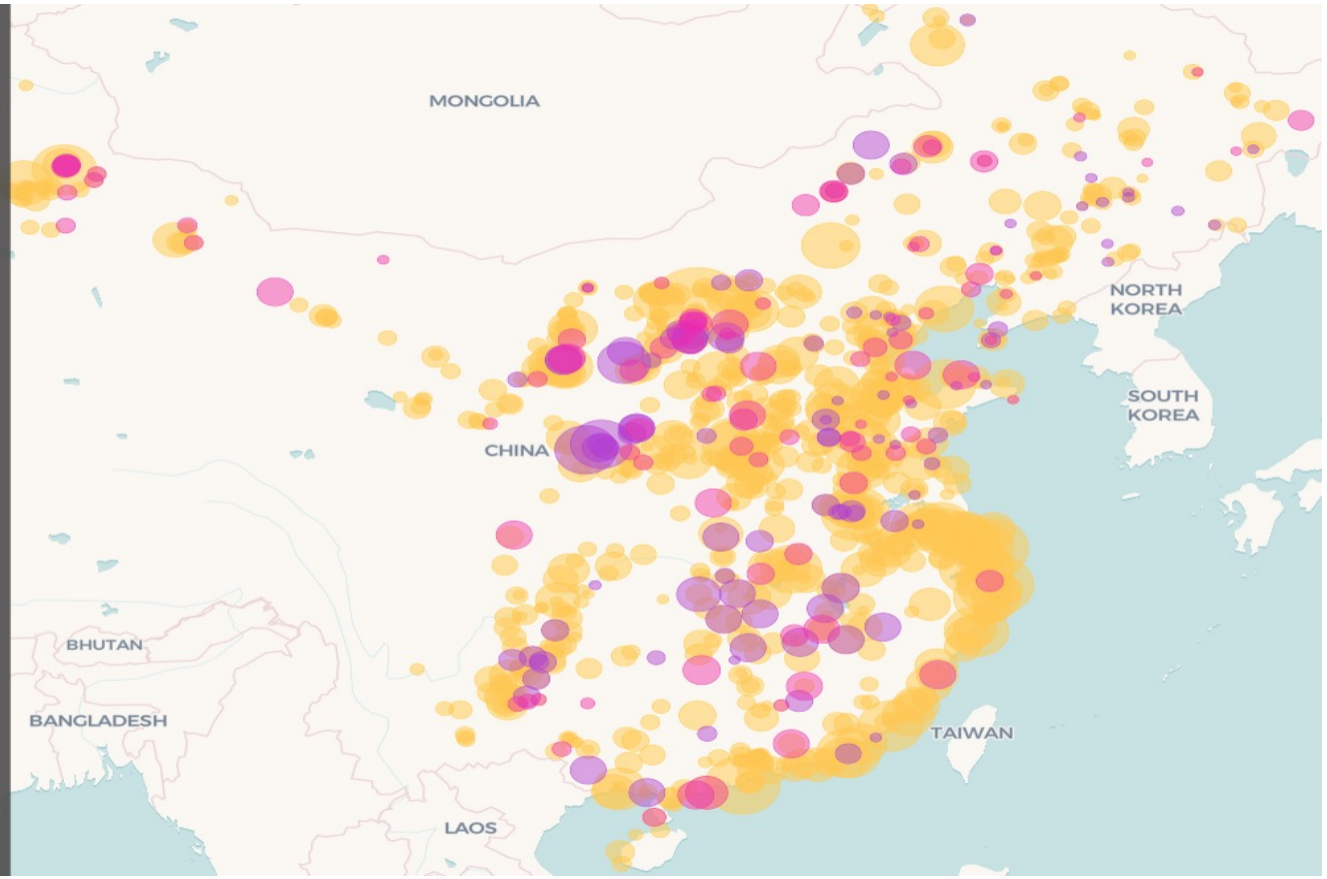
Enerdata, 2021 *Due to rounding, some graphs may sum to slightly above or below 100%*

How to get there : energy transition

- ***Moving away from coal while supporting affected coal workers and communities***. *The most crucial strategy for the new growth story is to stop building new coal-fired power plants – they cause significant damage to the environment and are very expensive. Bloomberg NEF, for example, suggests that solar farms and onshore wind are now the cheapest sources of new electricity for at least two-thirds of the world's population (Reback, 2019).*

- ***Speed up the transition to renewable energy to ensure security of energy supply.*** *Compared to fossil fuels including coal, oil and natural gas, renewable energy is much safe. Many renewables have become highly competitive economically, with wind and solar PV becoming ever-cheaper, energy storage costs falling, and network management improving.*

Challenge: the urgency of limiting the use of coal



- Cutting coal consumption and replacing it with cleaner energy, such as natural gas and renewables, has been a key part of China's energy strategy. But it is worrying that China is still building more coal capacity. It is deeply damaging to economies, societies, health and environment. There is no valid economic justification.

Challenge: grid management

- ***Improve flexibility of power grids without building more coal-fired plants.*** *The increasing penetration by renewable energy is technically and economically feasible with a wide range of options rather than using more coal, including retrofitting existing coal-fired plants; forming an interconnected electricity market (market coupling); demand-side response; energy storage; etc.*

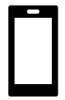
- ***Drive forward power sector reforms****, including better grid management and market-oriented pricing to avoid irrational prioritisation of coal-fired sources.*

Key areas of innovations

- Remarkable technical change in last dozen years on back of modest policy and broad sense of direction. Many net-zero activities (especially power) already cheaper than fossil fuel without carbon tax or subsidy.

Could we/should we have anticipated changes of the last dozen years?

Cost of renewables: down by a factor of more than 10.



Digital management: the iPhone is only 13 years old.

Electric vehicles

New materials

- Centrality of ***clean power***. Quadruple electricity in next three decades and all zero carbon by 2040 (IEA, 2021; ETC, 2021).
- **Crucial role of system design and management.**
  - ***Energy/transport*** (poorly integrated and polluting)
  - ***Cities*** (congested and polluted)
  - ***Land use*** (very destructive across the world; soil depletion, poisoned rivers, deforestation; inefficient and inequitable)
- **Digital management and AI great potential. Huge possibilities from use of information and AI for efficiency, integration, congestion, system management…**

Great opportunities: the transition can act as a new driver of growth

- ***Pursuing the carbon neutrality goal does not mean sacrificing economic growth***. 1) it helps shift the production possibility boundary, or in economic terms the production possibility frontier (PPF), outwards, through discovery and innovations; 2) it can push the economy towards lower costs through the increasing returns to scale and through improved efficiency.

- ***Facilitate economic upgrading***. The low-carbon transition is both a challenge and an opportunity, as it is to some extent consistent with the needs for new forms of growth, structural transformation and economic upgrading in China.

- ***Offers better job opportunities***. China's energy transition will create millions of jobs in the renewable energy sector. A recent study by Varro and Fengquan (2020) suggests the job-creation rate of renewable industries is about 1.5 - 3 times that of traditional energy industries.

Sustainable growth, with the low-carbon transition at its core, is not only good for the environment and climate, but also can offer new drivers of growth and rural revitalisation, and lasting improvements to wellbeing.

Thank you for your attention!
Q&A

TotalEnergies Strategy and Innovation For Energy Transition

Zhonghua Xu

VP, Head of TotalEnergies R&D for Asia

National Chair for Energy WG of EUCCC

More people, with better living standards

Assumptions

- World population: from 7.6 to 9.7 Ghab in 2050
- World GDP to grow +3.3%/yr
- Historical data: +3.6%/yr over the last 20 years, with primary energy up +2.0%/yr

Less carbon

Collective mobilization

- Paris Agreement
- Regulations & mandates at State & Local levels
- Investors push / access to finance
- Industry mobilization
- Consumers
- Technology & Innovation

From Total to TotalEnergies

Re-innovate Ourself, Build up New Future

Our Actions

More Energy

Focusing on **oil projects** with low breakeven

Expanding along the **gas value chain**

Developing profitable & sizeable **low carbon electricity**

Storage

Less Emission

Investing in **carbon neutrality** businesses

Promoting **circular** economies

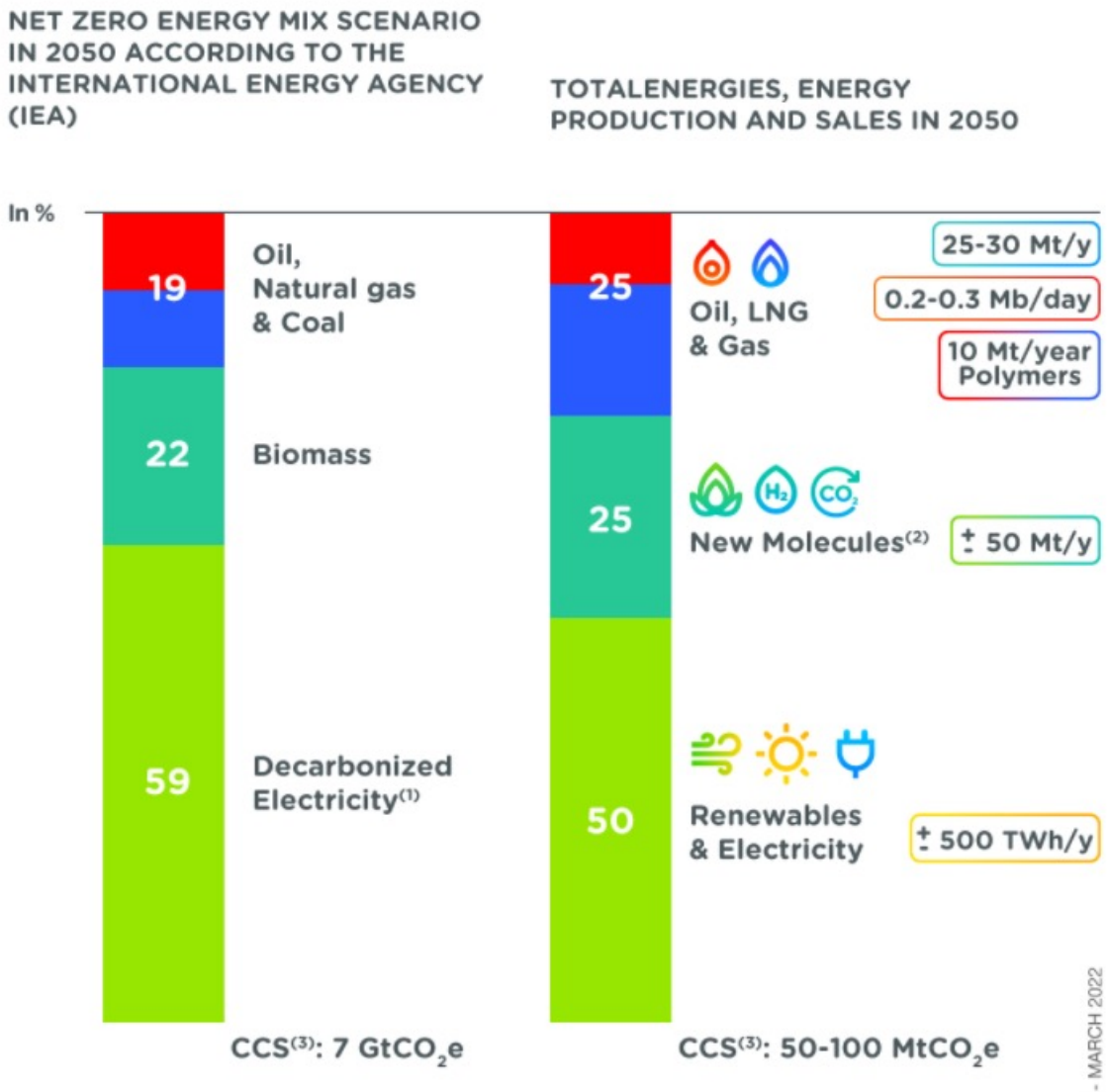
R&D & Innovation

Accelerating **Digital**

TotalEnergies

Energy is Our Life.

Rebuild our business to have a better future of sustainable development.



(1) Hydro, solar, wind and nuclear (2) Biofuels, biogas, hydrogen and e-fuel/e-gas
(3) Carbon capture and storage

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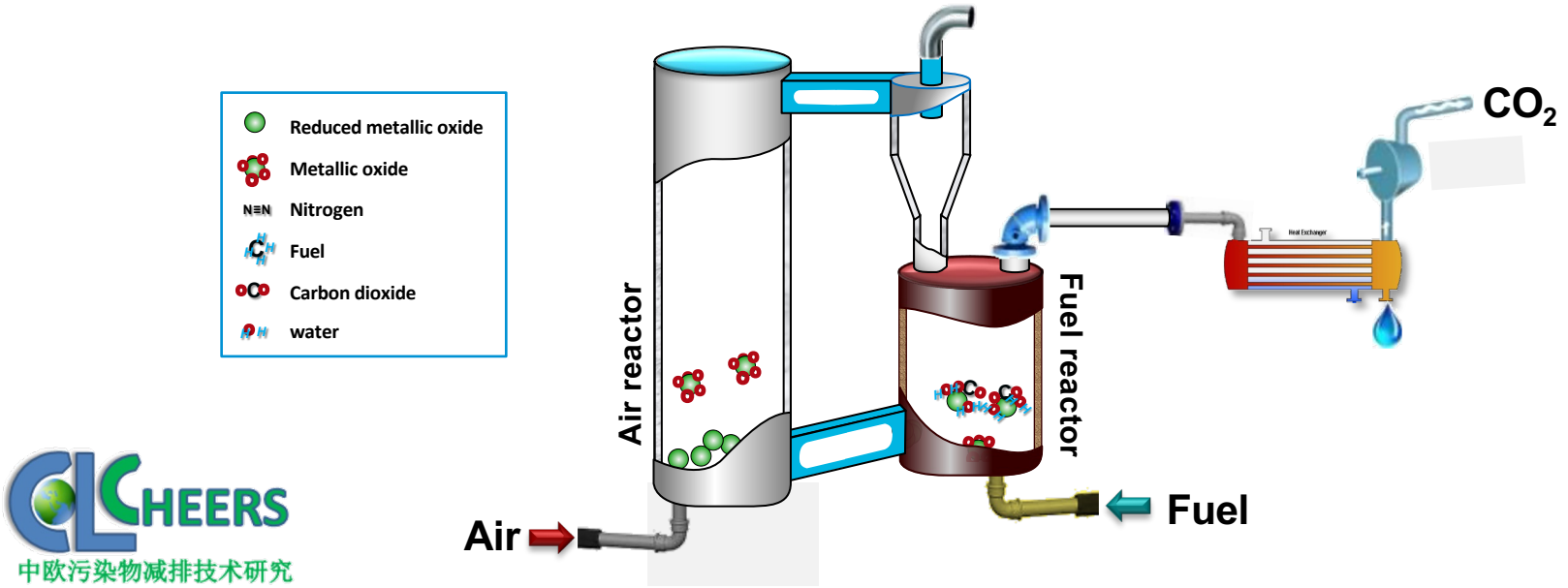
CHEERs: Chinese European Emission Reduction Solutions



CHEERs
中欧污染物减排技术研究

CHEERs：World Largest CLC-based Carbon Capture Demo
20 million €, 9 European-Chinese Partners

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Energy WG of EUCCC

- 2000 members for EUCCC
- Energy WG has 200+ members, and WG focus on energy transition and carbon neutrality
- Promote EU-China cooperation on gas, renewable energy, hydrogen, electricity through advocacy, etc.
- Working closely with ECECP for European energy interest.
- 4 EU-China Innovation platform: hydrogen, offshore wind, Energy Storage and Smart Energy
- Dozens of high-level meetings
    - ✓ EU-China Energy Night
    - ✓ EU-China Hydrogen Summit, Offshore Wind Conference

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CCS and Carbon Removal: Are we ready?

Simon Göß, CHINA: Carbon Neutral by 2060 - Innovation, 24.05.2022

Our Services

Compliance CO2-markets

- Strategic alignment of your company with the European CO2 markets
- Preparation and implementation of your commitments
- Market access and services on the compliance markets

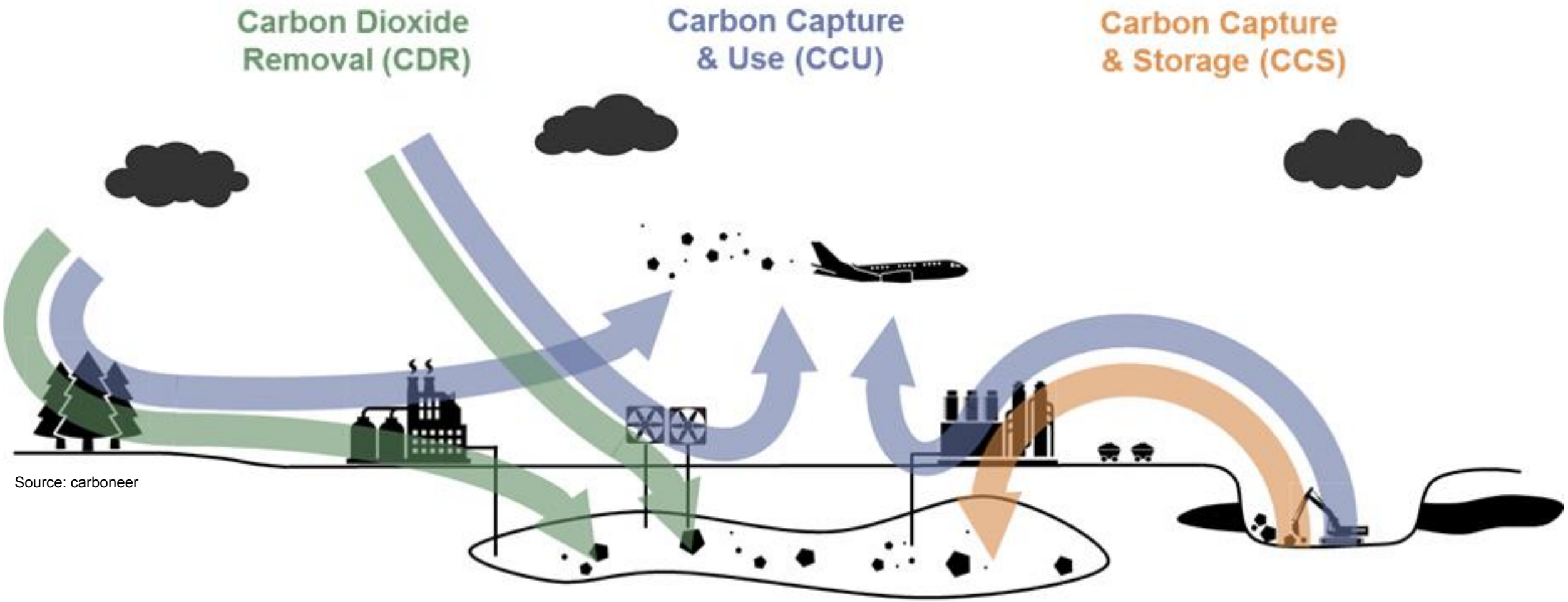
Climate neutrality and carbon removal

- Strategy development for climate neutrality and carbon dioxide removal
- Development and restructuring of your climate portfolio towards neutralisation
- Access to high-quality carbon removal credits

Training and education

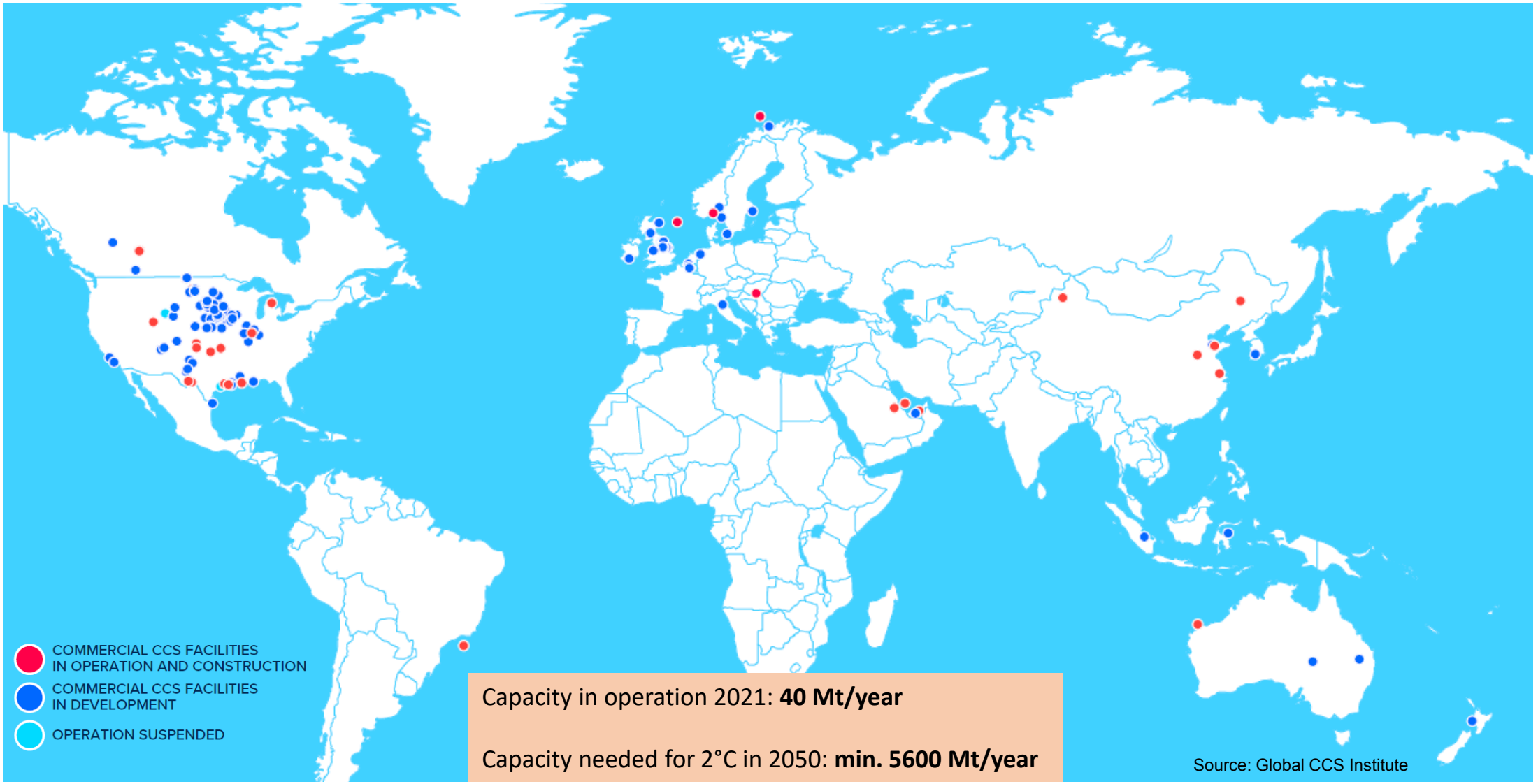
- Training on carbon markets, carbon removal and climate neutrality
- Transfer of know-how through strategy workshops
- Expert speakers

The basics



Source: carboneer

Global CCS landscape

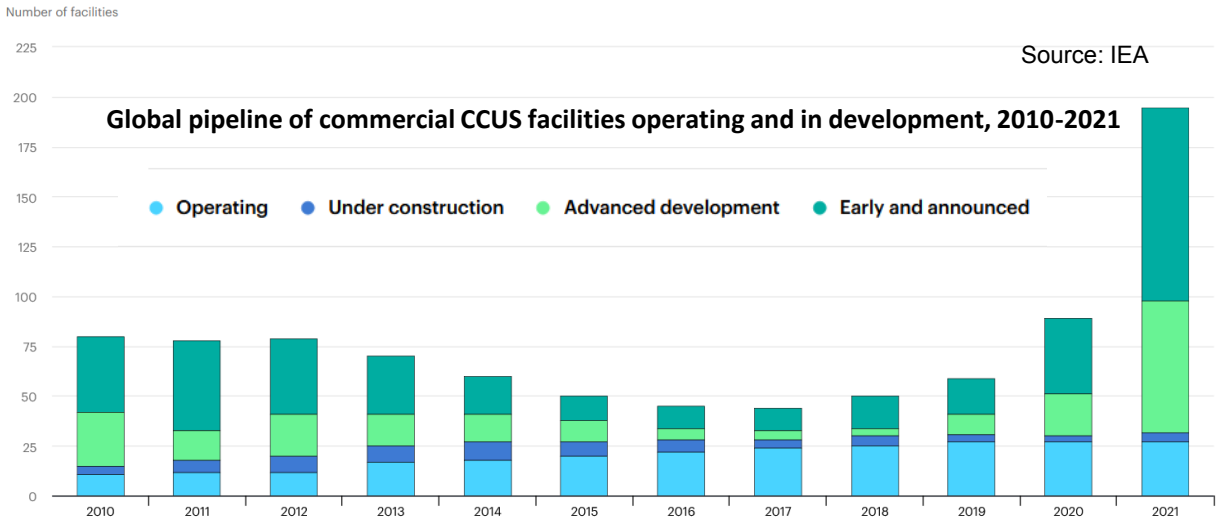


Different scale of CCS

› EU: mainly for industrial emissions, power sector less important

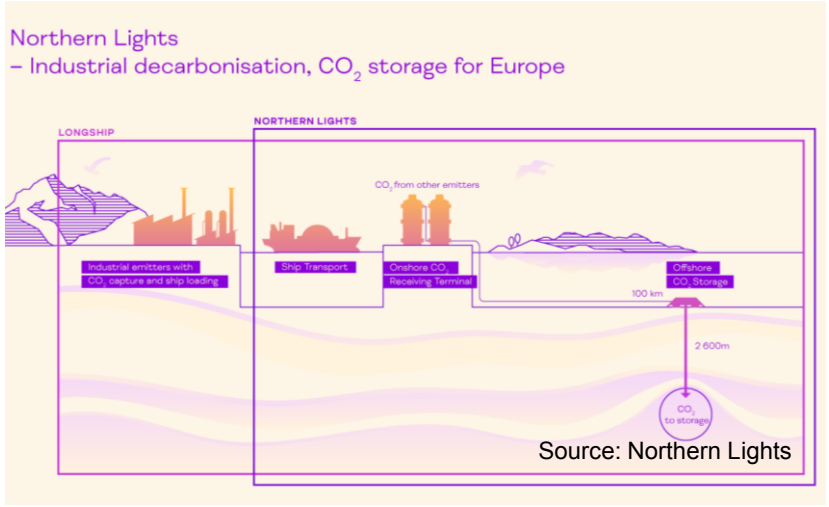
› US: front-runner with large projects and infrastructures

› China: different scale and carbon neutrality requires CCS in power sector



CCS and Carbon Removal projects in Europe

Longship and Northern Lights: CCS-Infrastructure



Oslo Varme : Waste-to-Energy and CCS

Porthos: CCS-Infrastructure

Project Orca: Direct Air Capture and Storage

Incentivising innovation in carbon tech

- Carbon pricing and CBAM introduction:
  - EU ETS allowance prices now in the right territory

- Funding programmes at EU level:
  - Innovation Fund (10 bil. EUR) and Connecting Europe Facility (25 bil. EUR)

- EU certification scheme for carbon removal:
  - Sustainable Carbon Cycles and framework by end of 2022

Main take-aways

CCUS is not Carbon Removal – we need to be clear what we talk about

CCS and Carbon Removal projects gain momentum in Europe

Sectoral need and scale of CCS and Carbon Removal differ by region

Carbon pricing, funding programmes and regulatory certainty required

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Thanks for your attention!

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