Can oil and gas be a part of a Net Zero Future?

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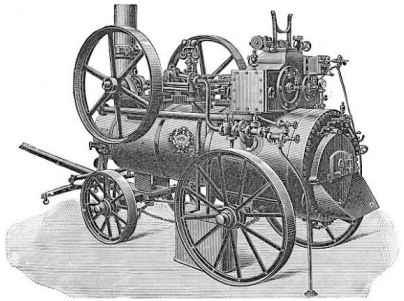
Over the past centuries, Humanity has been in transition; from wood to coal, coal to oil, oil to gas and alternatives (nuclear and renewables)

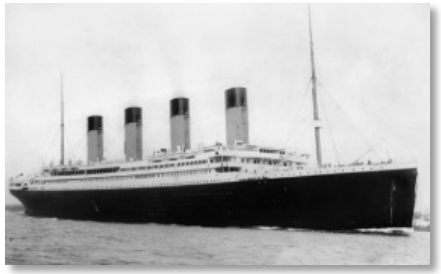
Wood

Prior to 1800s



c. 1760–1840

Coal



c. 1850s – 1940s

1902

First car in 1902

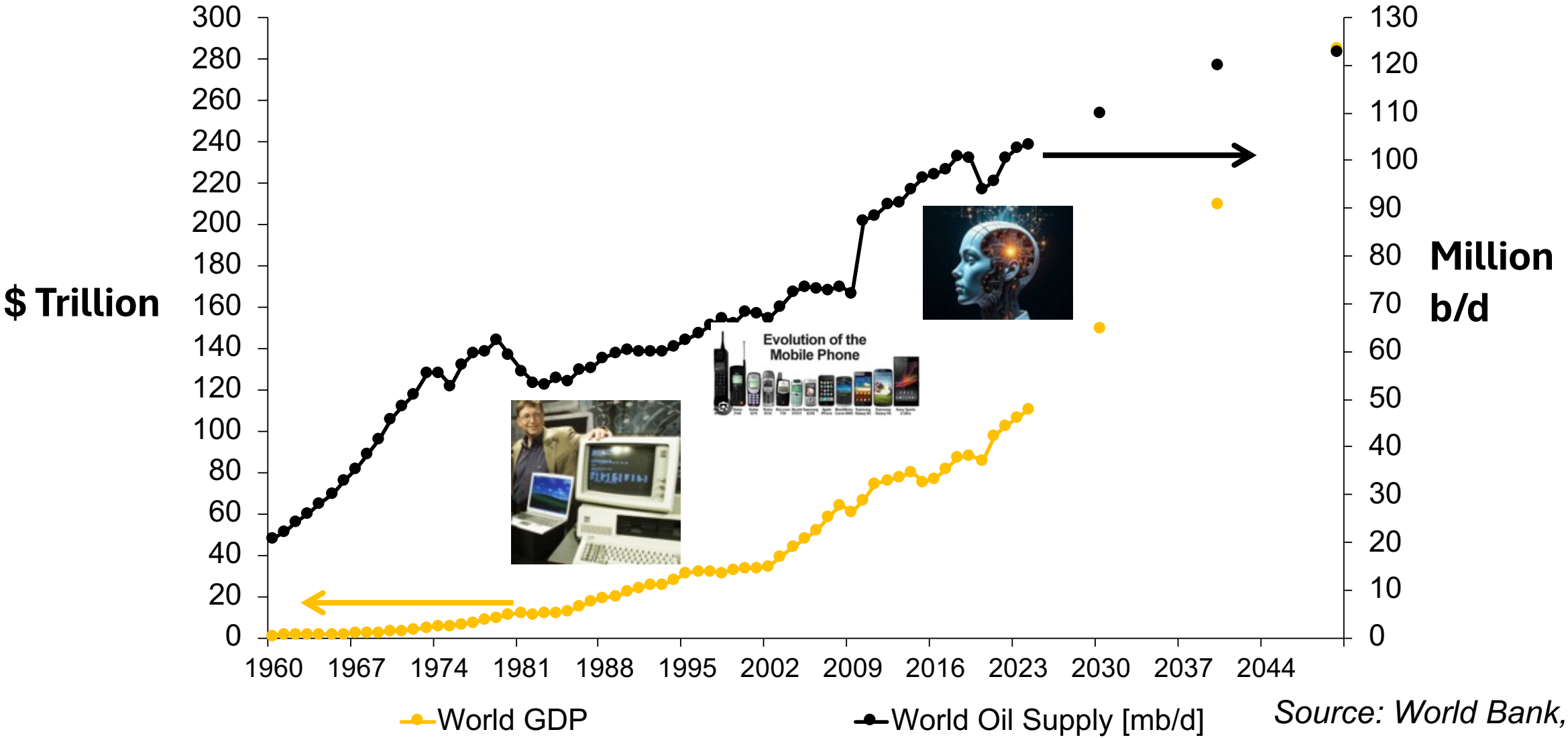
Oil

1940s - Present

Mid-20th century: Oil and natural gas overtook coal (post-WWII)

- James Watt's improved steam engine (1765–1769) made coal-powered machinery efficient and widespread
- The first practical coal-powered steamships emerged in the early 19th century, marking the shift from sail to steam propulsion using coal as fuel

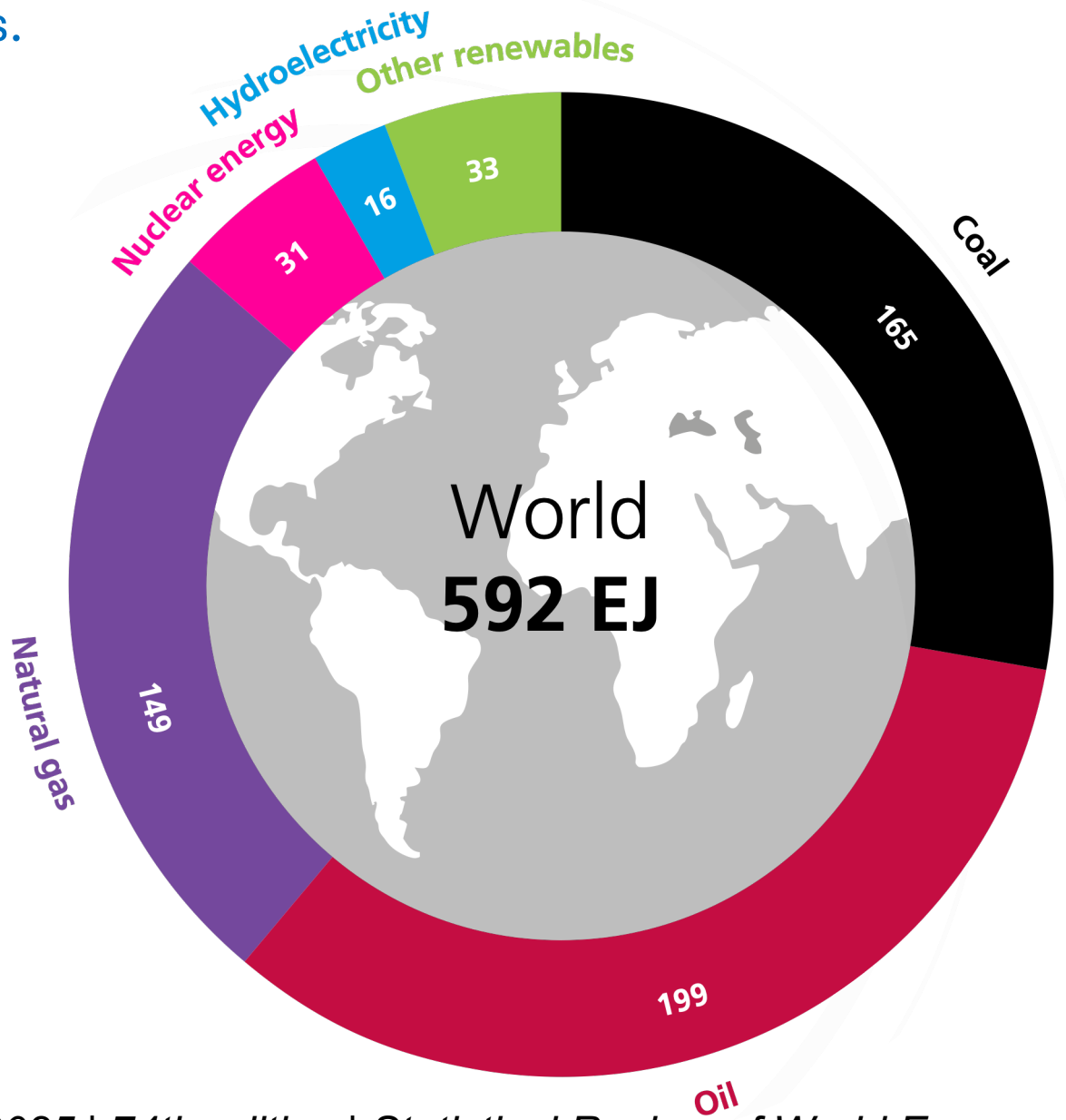
- And the Oil economy has driven much of our industrial and economic activities since the 1960s, driving the world economy from below $2t to more than $100t today (Energy & Technology meant higher productivity)
- The future will see rising population (9-10 billion people), smarter mobility (EVs & autonomous vehicles), and surging electricity demand by 2x3 in tech hubs for AI/data centres



Source: World Bank, EIA

Despite transitions, Fossil fuels continue to underpin the energy system, accounting for **87%** of the energy mix. Global energy demand increased 2% in 2024 with non-OECD countries dominating both the share of absolute demand and annual growth rates.

- Total energy demand increased across all regions, but the growth was far from evenly distributed, reflecting stark regional variations shaped by economic development, climate conditions, and energy policy.
- The Asia Pacific region drove 68% of the total global energy demand increase and was responsible for 47% of total global energy demand.
- Total renewable energy demand increased by 7%, of which China alone was responsible for more than the rest of the world combined (at 56%).
- Global growth in electricity demand continues to outpace growth in total energy demand.
- By 2050, global energy demand could rise 50% due to population growth and AI—yet we must cut emissions by half to meet climate goals."



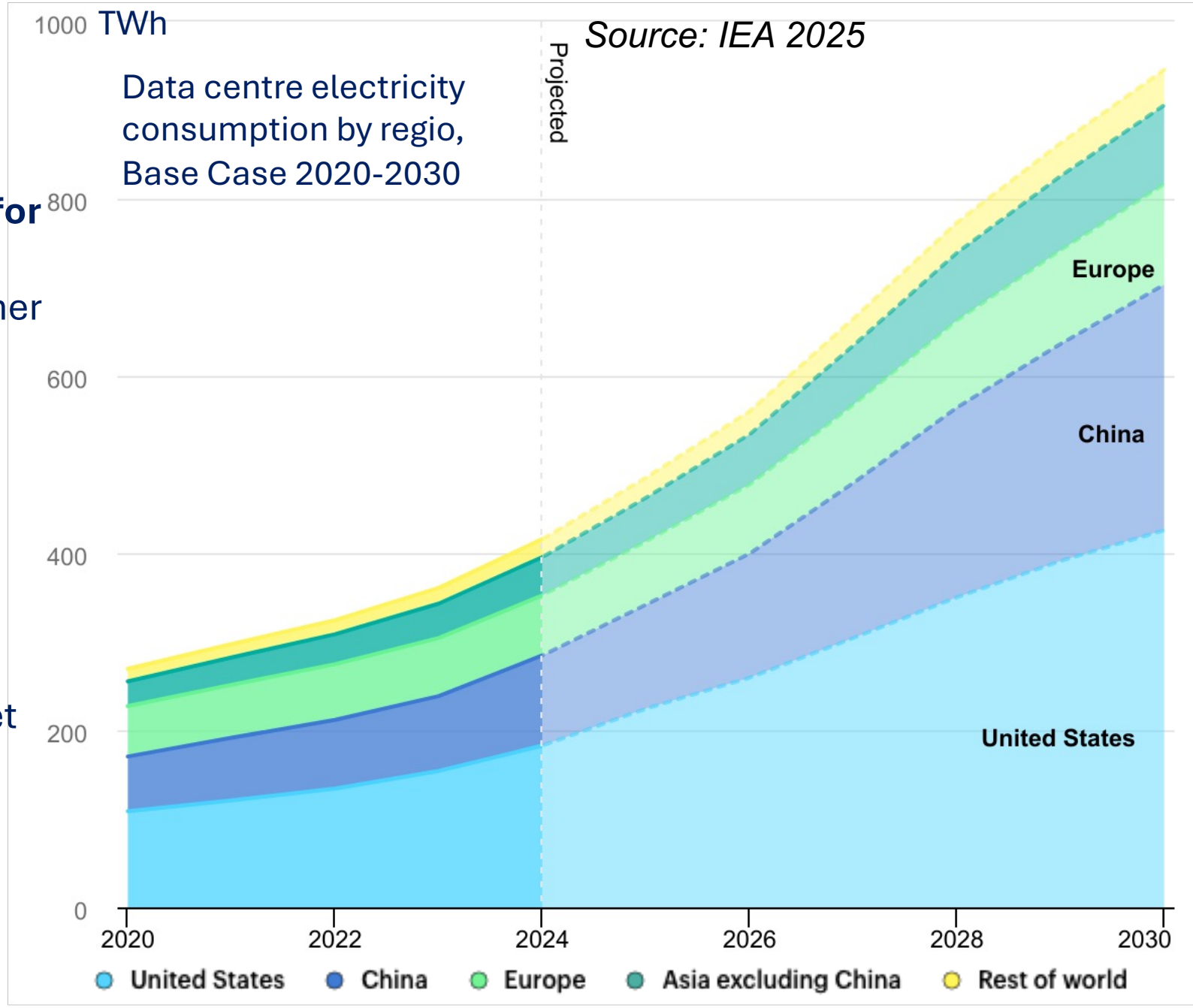
Source: 2025 | 74th edition | Statistical Review of World Energy

Power Demand From AI Data Centres to Quadruple in 10 years

1. Fueling Data Centre Power Through Refined Products and Gas Integration

2. Invest in Dedicated Power Solutions for AI Infrastructure (Behind-the-Meter Generation): Refineries can build or partner on gas-powered plants directly supplying data centers, bypassing grid constraints. Chevron and Exxon are pursuing such projects with carbon capture, potentially adding 38 GW of U.S. capacity tied to AI.

4. Low-Carbon Fuels for Sustainable AI: Producing renewable diesel or hydrogen blends via AI-optimized processes to meet tech giants' net-zero pledges, positioning refineries as green energy partners.



But what can hydrocarbons do in a carbon-constrained economy?

Three Strategic Growth Pillars

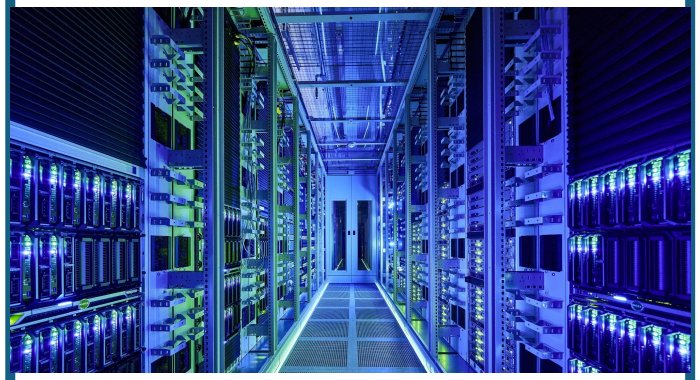
Chemicals & Circular Economy

- From Fuel to Feedstock: Recycle plastics → chemicals (chemical recycling, pyrolysis)
- Circular Carbon: → Recycle plastics → chemicals (chemical recycling, pyrolysis)
- CO_2 as Asset: → Capture → methanol, polymers (CCU)
- Impact: → +20–30% revenue diversification → 50% lower carbon intensity

Hydrogen & Low Carbon Clean Fuels

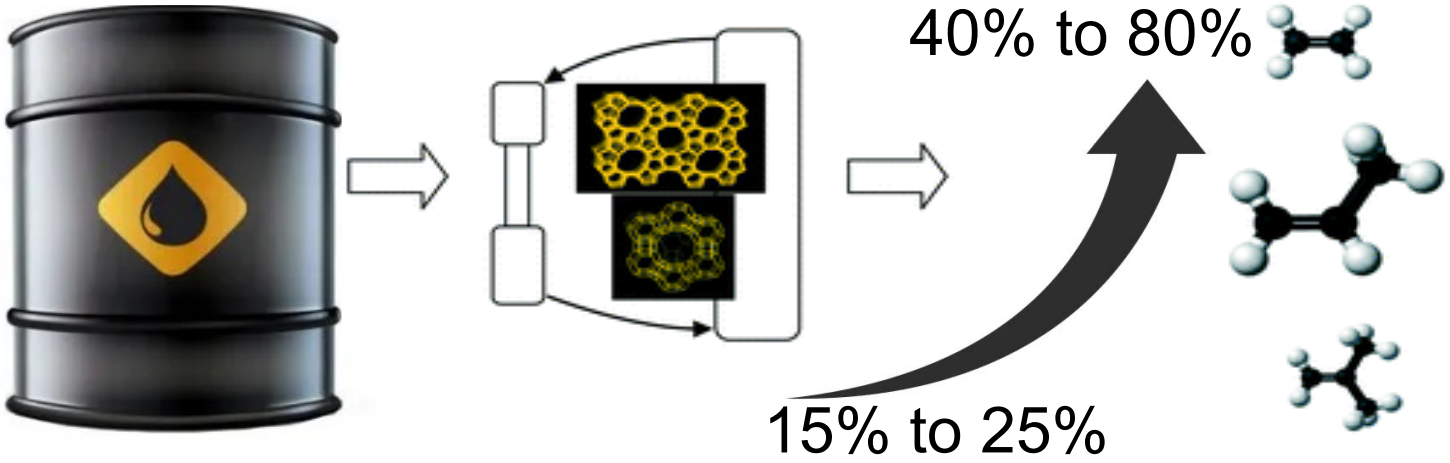
- Hydrogen Hub Leadership → Scale blue H_2 via SMR + CCUS
- Low-Carbon Fuels → e-SAF, renewable diesel, H_2 blending in pipelines
- Export-Ready H_2 → Ammonia carriers to EU/Japan (IMO-compliant)
- Impact → 10–15 Mtpa low-C H_2 by 2035 → $10–15B export revenue

AI & Data Centres



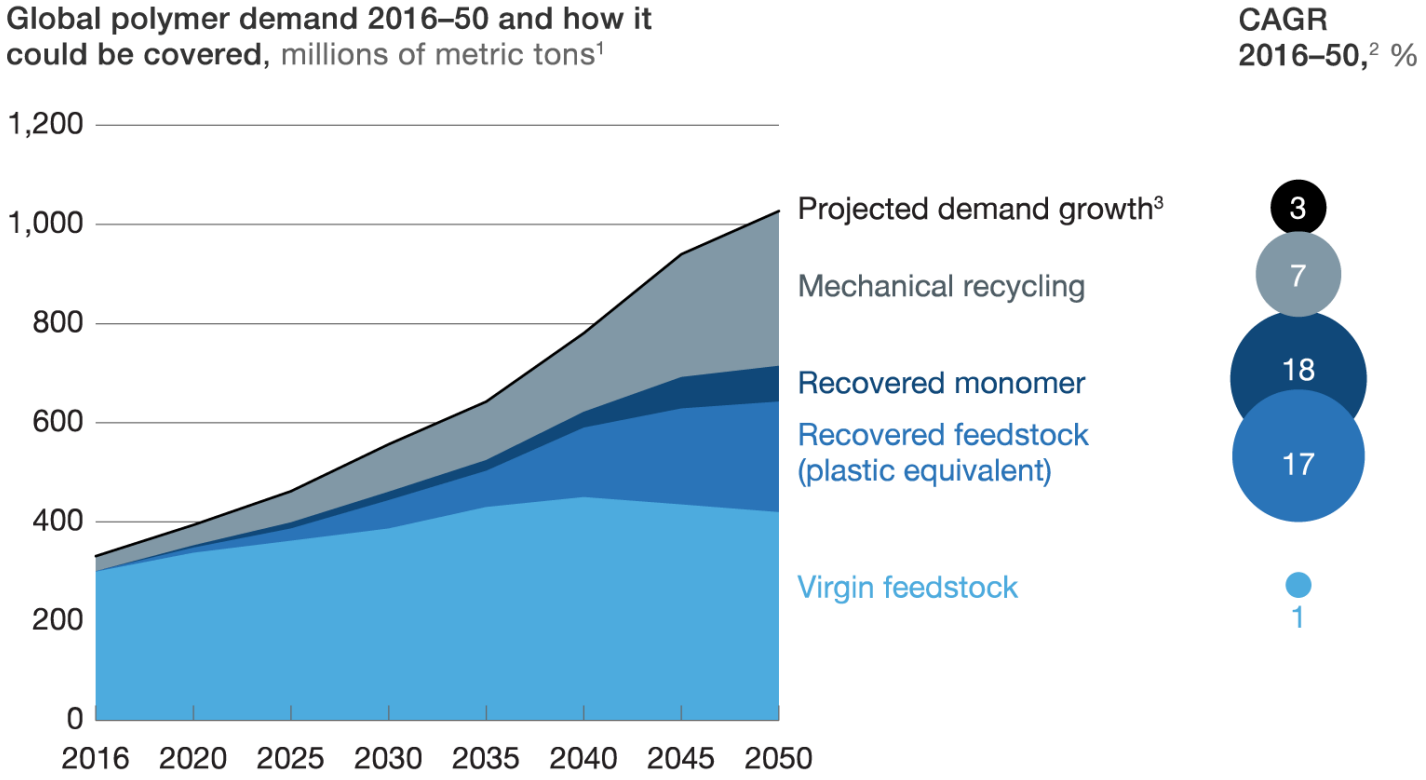
- Powering the AI Boom → Co-locate gas-to-power plants for hyperscale data centres
- AI-Optimized Refining → Predictive maintenance, yield optimization (+5–10% margin)

Converting crude oil to high-value chemicals for basic materials; Demand for petrochemicals is indisputably leading the growth in crude demand

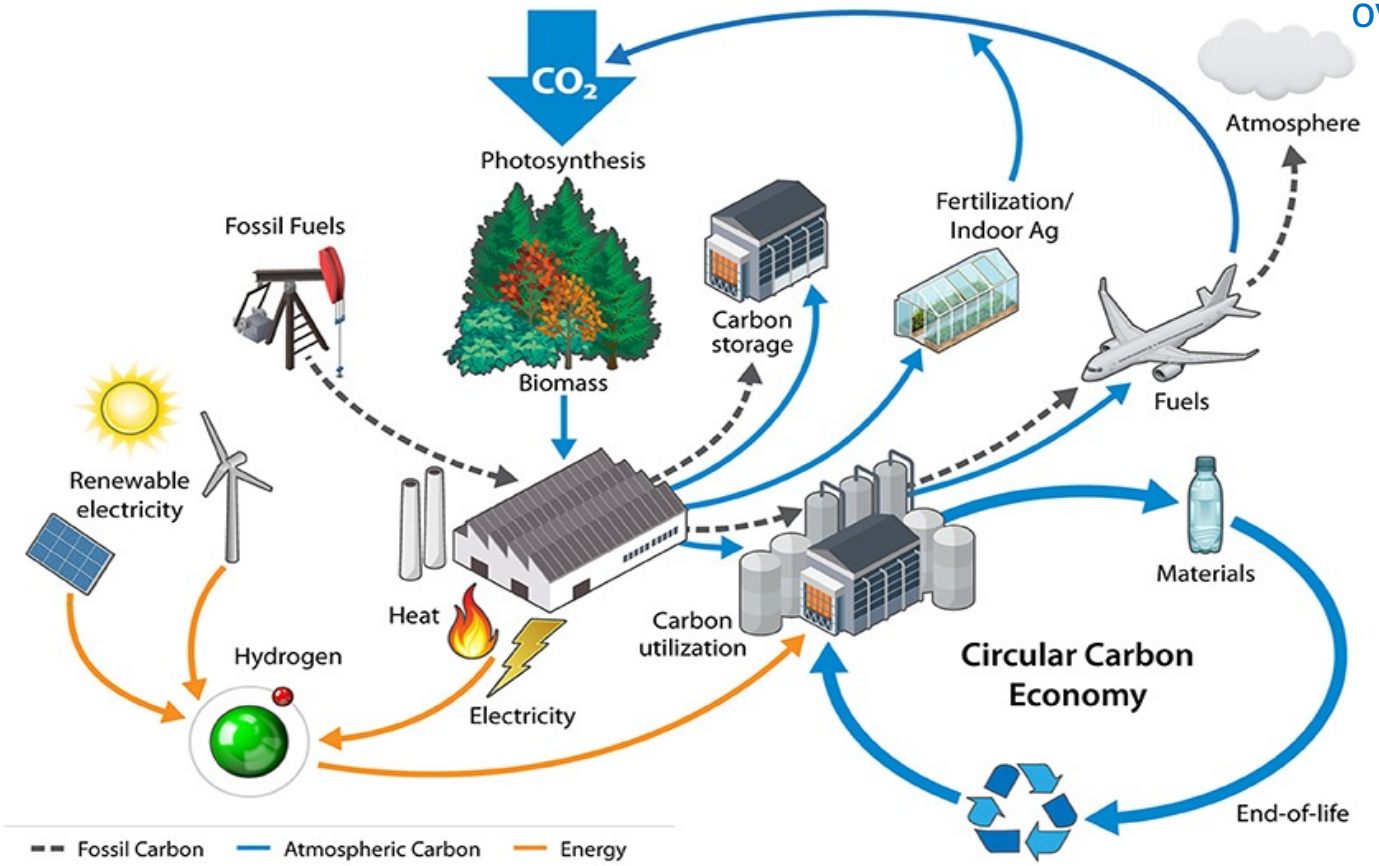


- Crude oil to chemicals is a major push in the refining industry to maximise the yield of chemicals per barrel of oil instead of traditional transportation fuels
- Offering a viable option to increase profit margins and ensuring a future viability in the context of the energy transition
- This involves tweaking existing technologies and processes in an integrated refining complex

McKinsey&Company

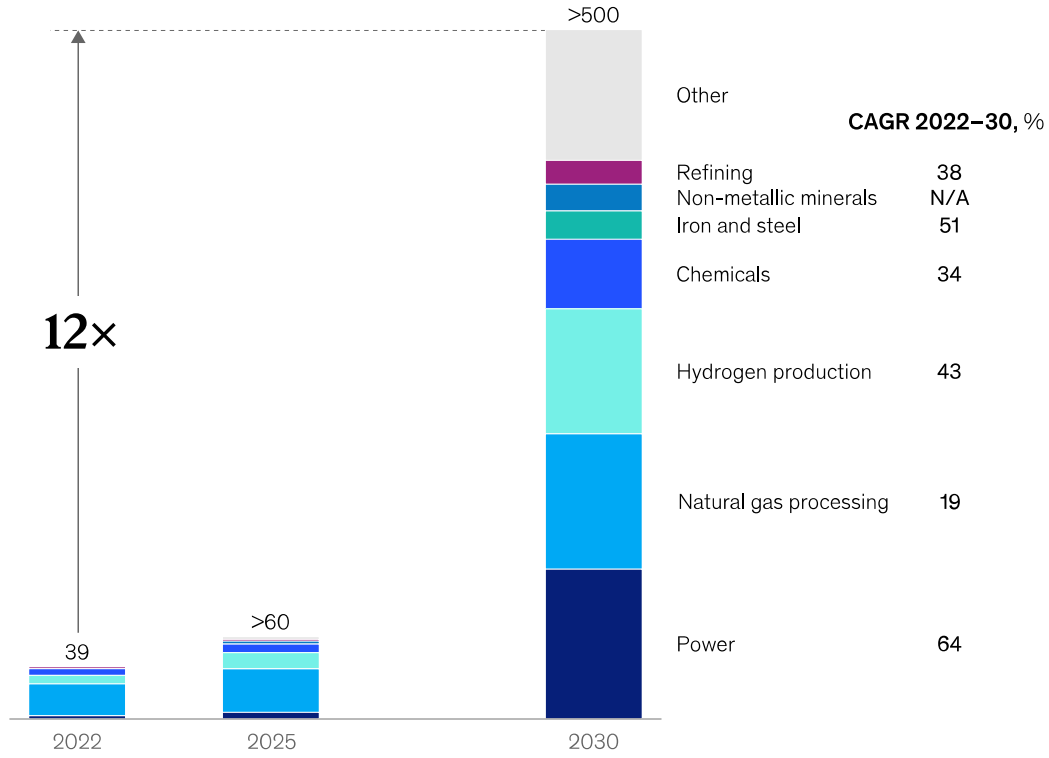


Opportunities for Oil and Gas in Circular Carbon Economy (CCE): Investors should prioritize $4-6 trillion annually in low-carbon tech by 2030



The CCUS market has seen a step change in planned projects over the past two years

Capacity of announced projects Mt of CO_2



Note: As of July 2023, excludes abandoned or cancelled projects.
[1]Globally, including biopower, direct air carbon capture and storage (DACCS), and various other projects.
Source: Rystad CCUS Database; McKinsey Energy Solutions' Global Energy Perspective 2023

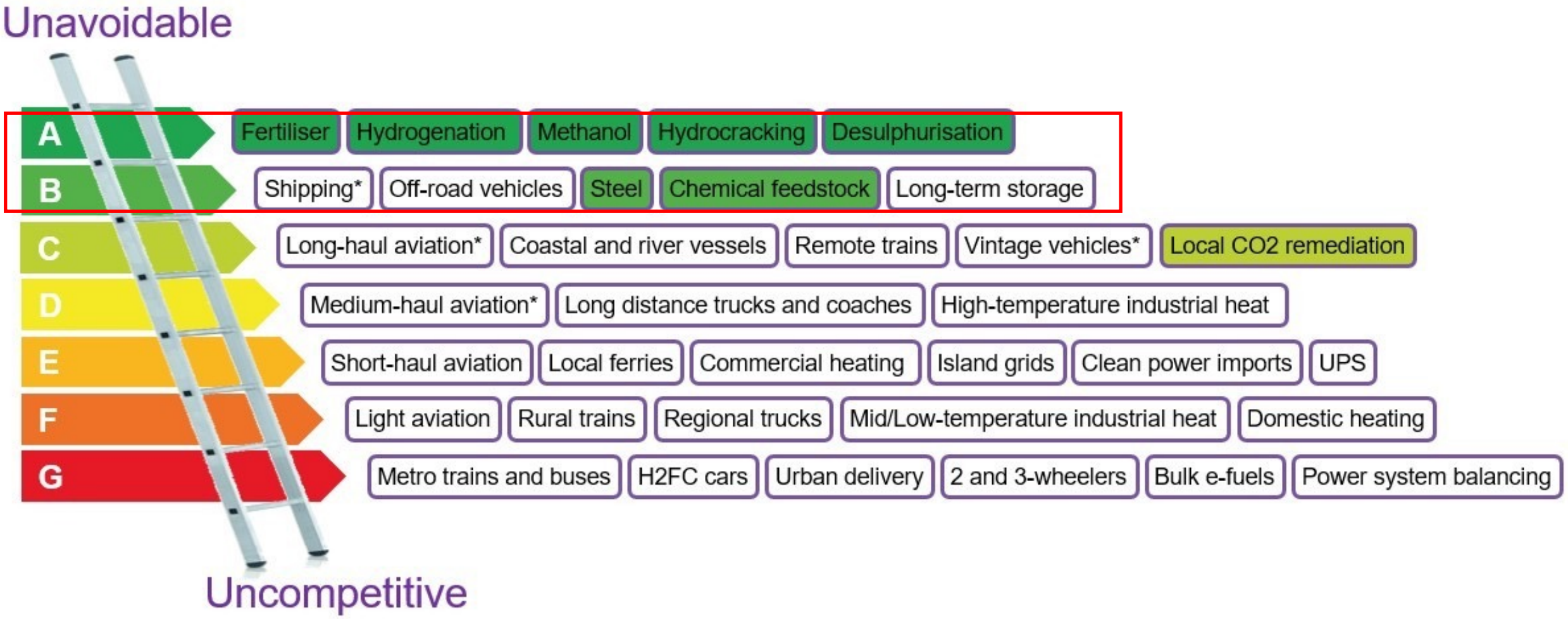
McKinsey & Company

- Tan, E.C. and Lamers, P., 2021. Circular Bioeconomy Concepts—A Perspective. *Frontiers in Sustainability*, 2

Hydrogen looks cool; but we need to stay realistic!

Clean Hydrogen Ladder: Chemicals & processes

Liebreich Associates



** Via ammonia or e-fuel rather than H2 gas or liquid*

Source: Liebreich Associates (concept credit: Adrian Hiel/Energy Cities)

What do we need?
We need new policies, financing tools, and partnerships are needed to align energy security with climate goals?

- New policies like carbon pricing in +100 countries
- Financing tools (green bonds, blended finance) to mobilize $1 trillion/year for developing nations
- Partnerships (public-private, e.g., COP alliances or tech consortia)
- Valuation of CO_2 as a feedstock
- Willingness to pay for lower-carbon-intensity products
- Human capital

Without these, we risk energy shocks—think 2022's gas crisis

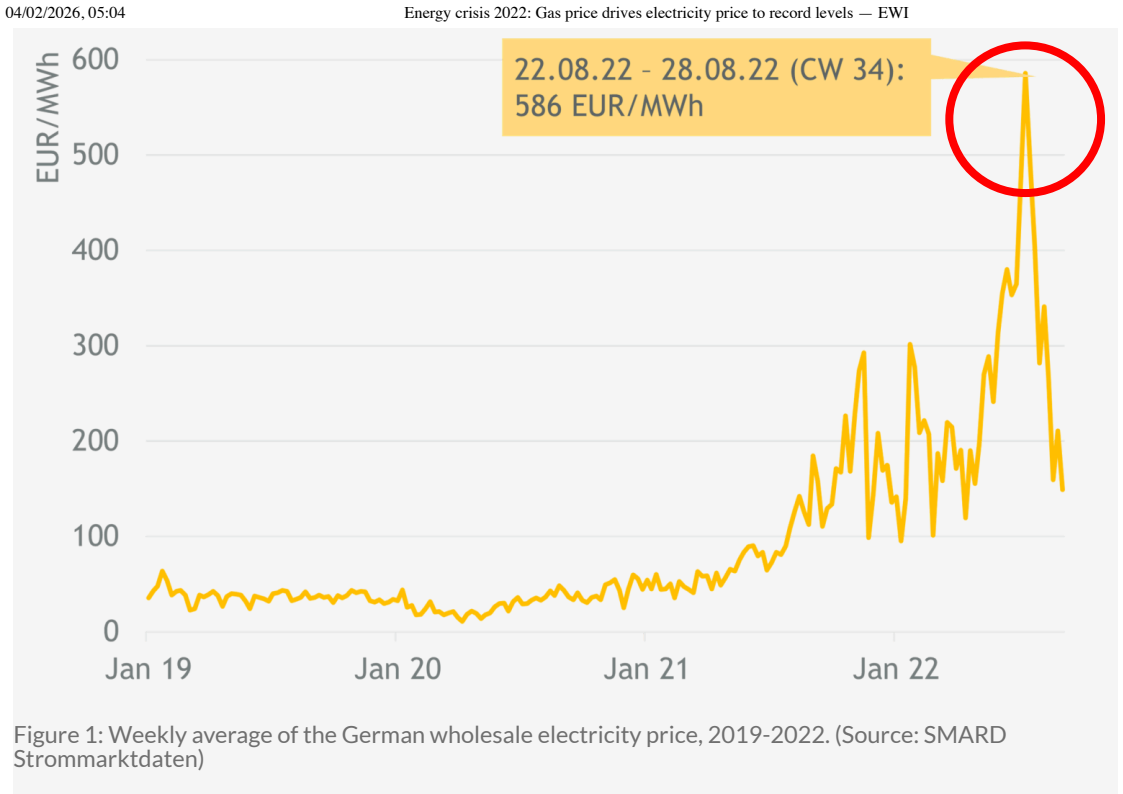


Figure 1: Weekly average of the German wholesale electricity price, 2019-2022. (Source: SMARD Strommarktdaten)

And Yes, Oil & Cas have an essential role in the transition of global energy systems through

- Producing necessary feedstock for chemical feedstocks
- Capturing, utilising and converting CO_2 into high-value-added products
- Providing energy demand for the booming demand for power for AI and Data Centres
- Ultimately enabling the oil and gas industry to secure a key part of the global efforts for net zero future

The future isn't fixed; it's shaped by our choices in investment and collaboration

THANK YOU!

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