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Sezione Componentistica D'impianto

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Componentistica d'Impianto ANIMP

November 7th, 2023

Energy Industry Global Markets Forecast and Supply Chain Trends **2023**

AGENDA

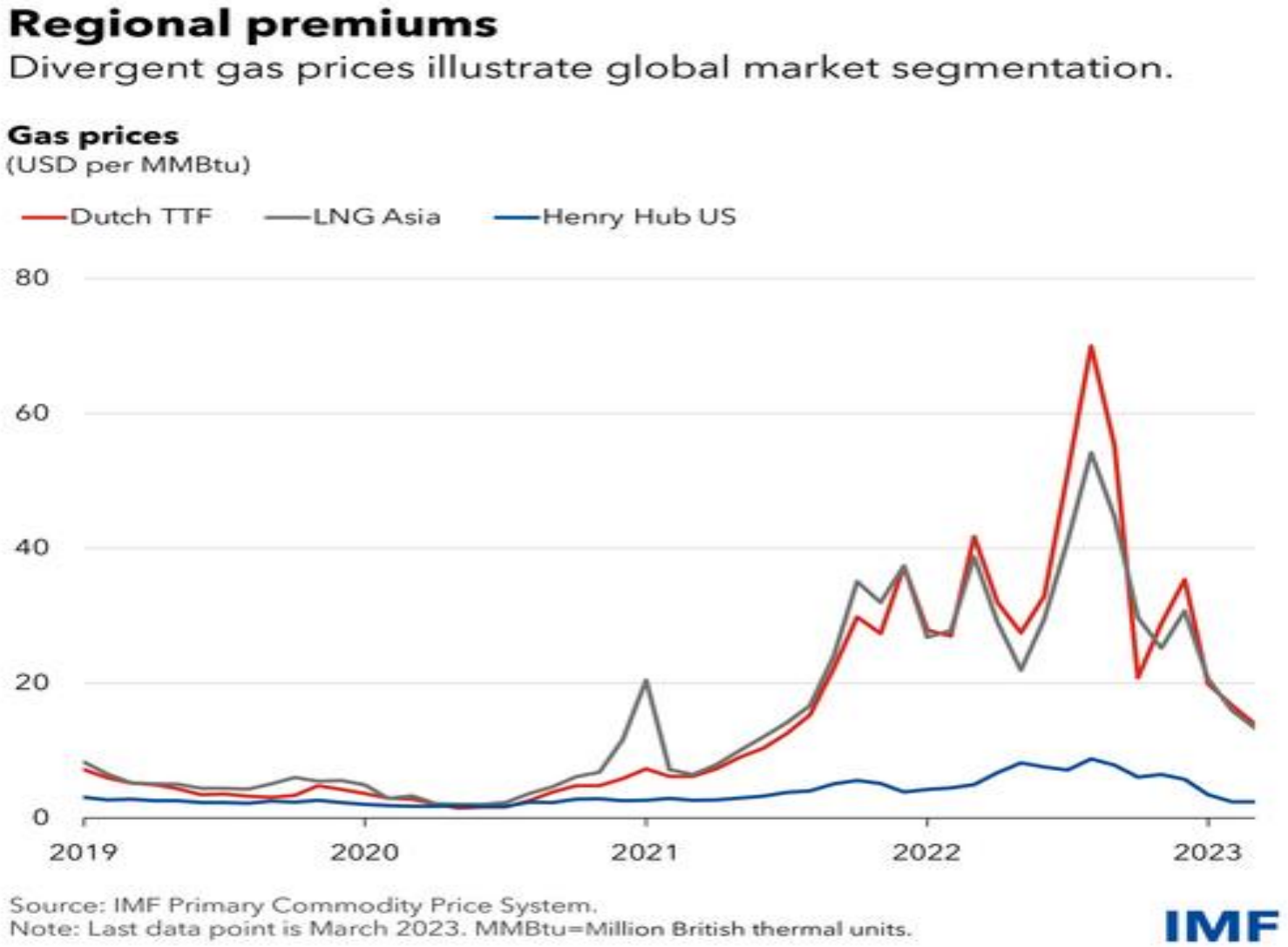
Market Trends
(D. Brkic)

Top 5 Trends in Supply Chain

Premise: balancing the **‘Energy Trilemma’**

Source: DNV Energy Transition Outlook 2023, October 2023

Global gas pricing, after record highs



Source: IMF May 23, 2023

The Russia-Ukraine war is likely to have long-lasting effects on the global energy system

Heightened energy security

Weaker economic growth

Changing mix of global energy supplies

Source: bp Energy Outlook 2023

Key points looking at the future

- Huge **uncertainties** ahead
  - ✓ Geopolitics….
  - ✓ Public opinion
  - ✓ Global consensus
- The **war in Ukraine** should accelerate the energy transition, but there is a growing concern re energy costs and supply availability
- **Oil&gas demand** will be active for a long time – but peak this decade (?)

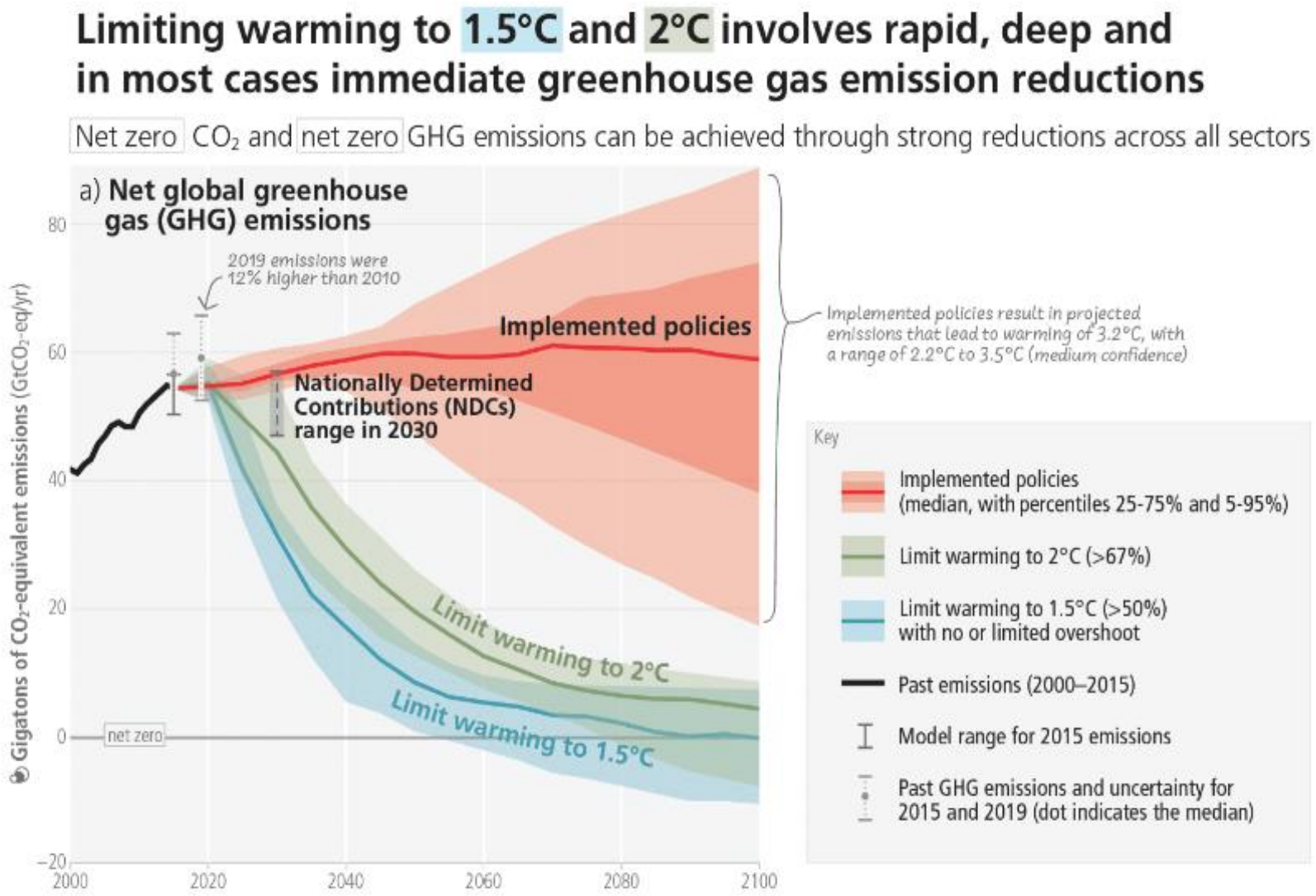
The same for related **capex investments**

- The **energy transition** is a **reality,** driven by numerous positive factors:
  - ✓ Public policy support
  - ✓ Technology advances
  - ✓ Market-driven solutions
- A **complex** process, still with significant **uncertainties** regarding the exact direction

➢ **COP28** in UAE - key milestone?

- Key dilemma: What **will** happen vs. what **should** happen?

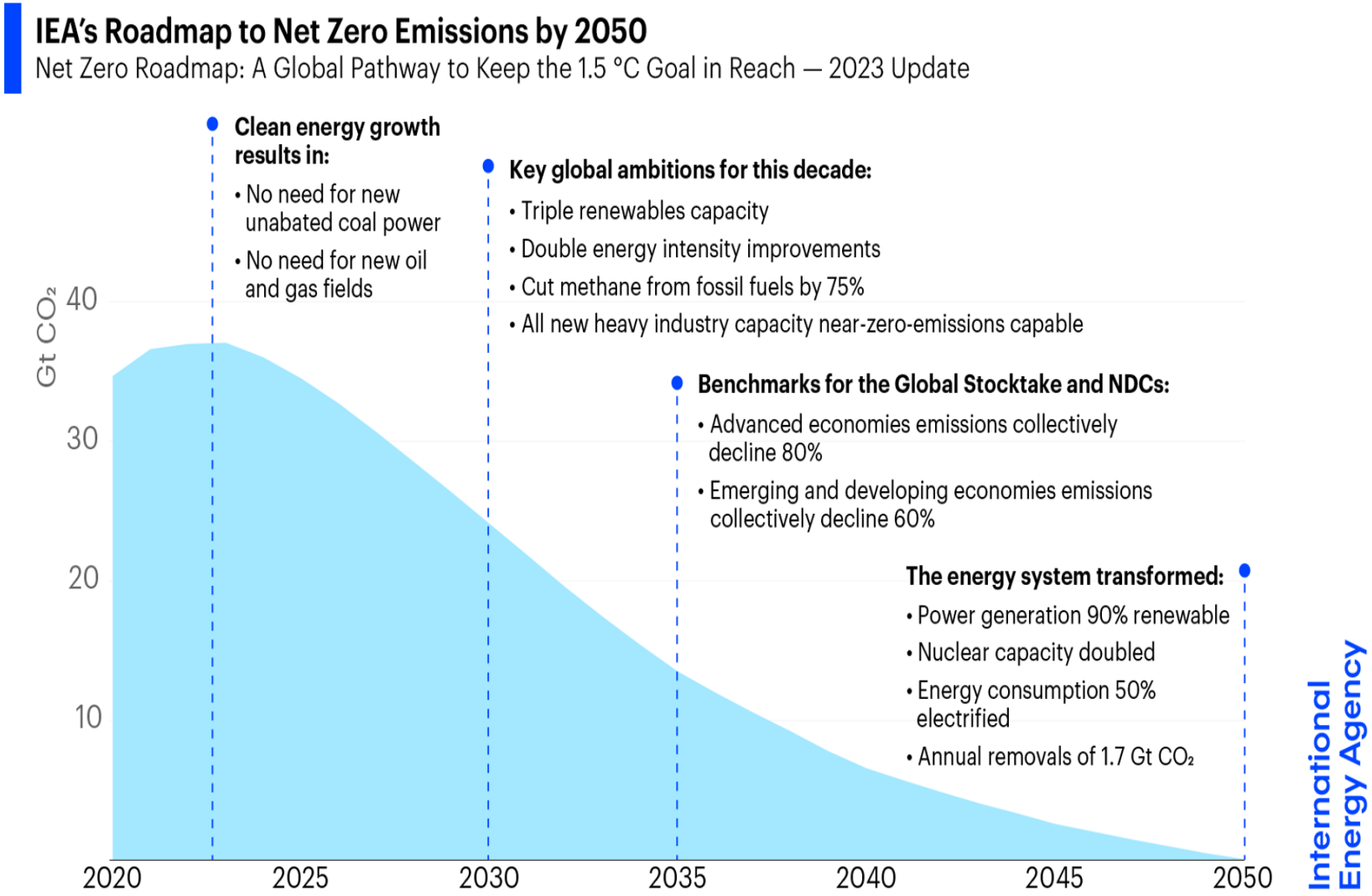
Green-house gas emissions challenge: Lots done, much more ahead of us



Source: IPCC Report March 2023

IEA Roadmap to Net Zero

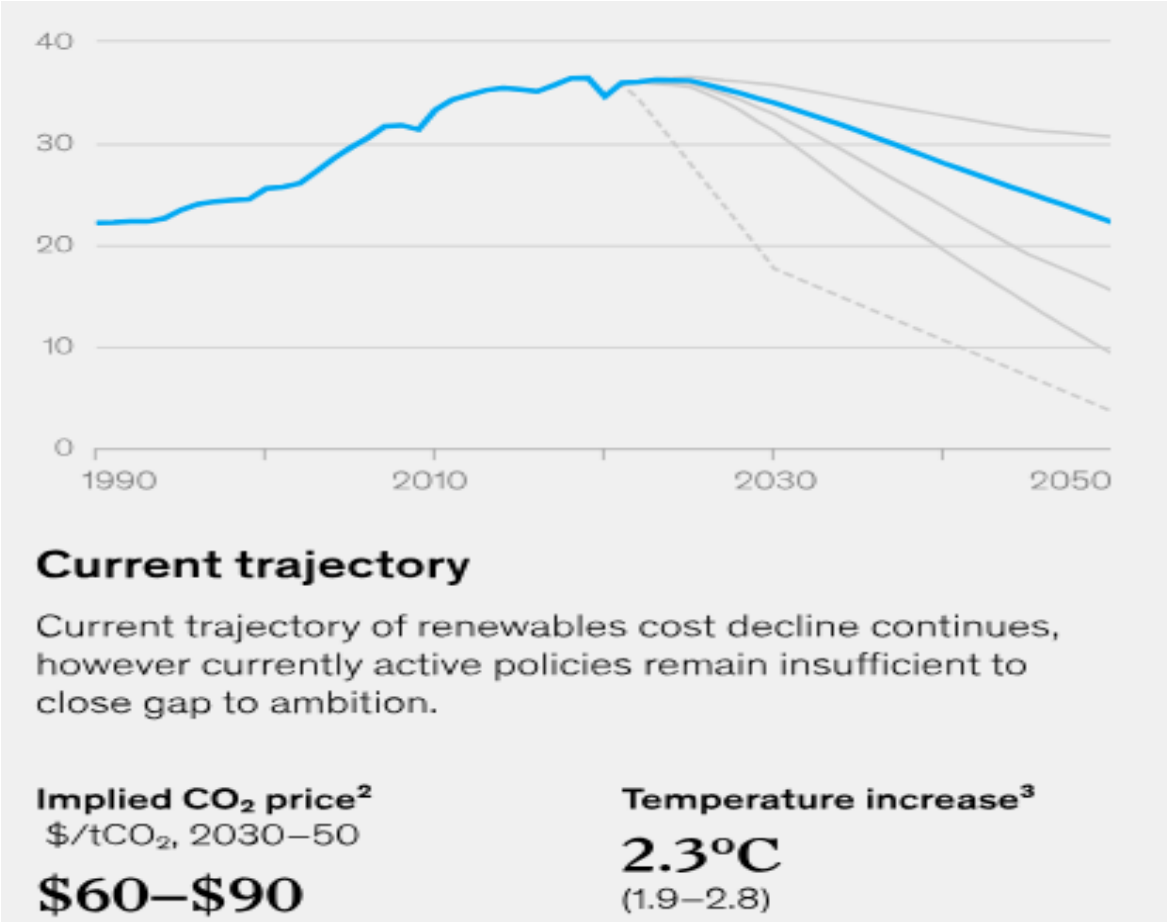
Of course, we know how to get there, if we want to



Source: IEA September 2023

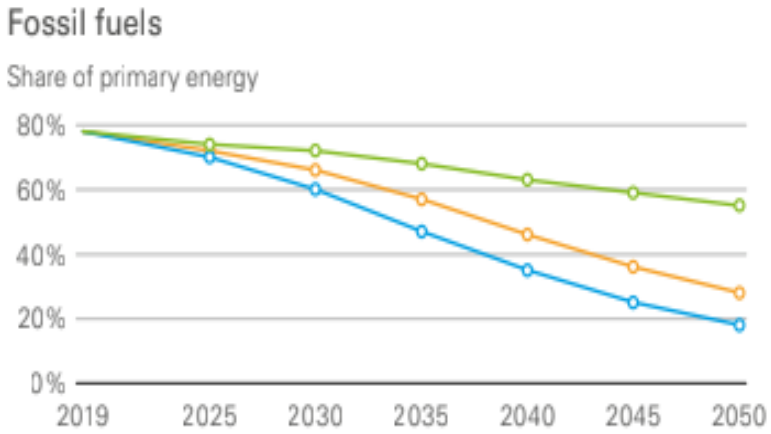
The CO2 emissions trajectory with current limitation policies is not sufficient to reach + 1.5 – 2 °C goals

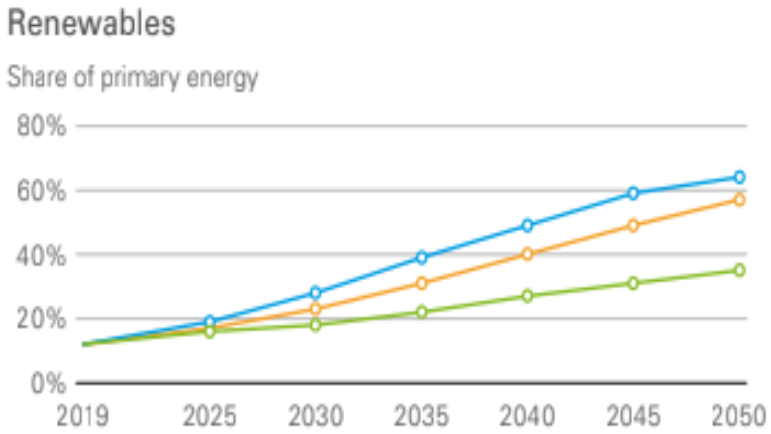
Global CO_2 emissions from combustion and industrial processes, $GtCO_2$ per year

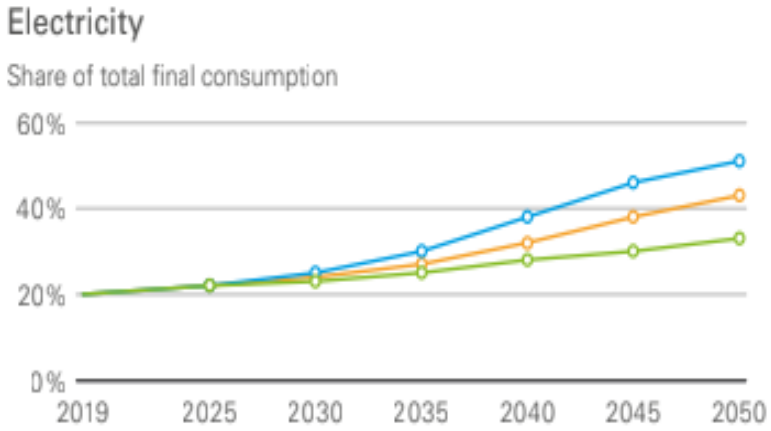


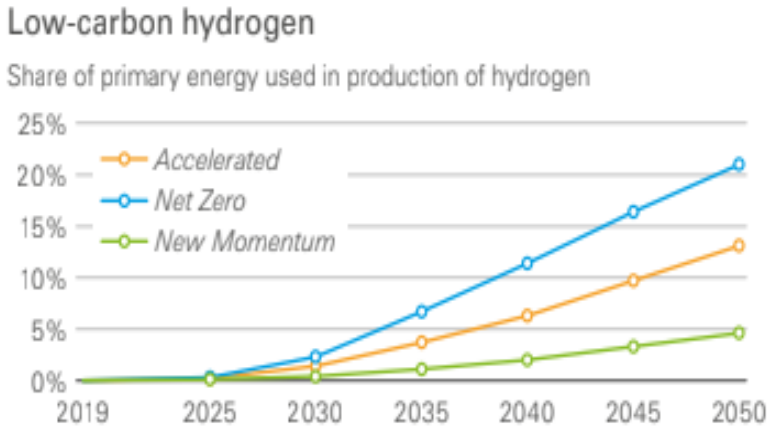
Source: McKinsey Global Energy Perspective 2023, Oct23

The future of global energy will be dominated by four trends:
declining role for **hydrocarbons**,
rapid expansion in **renewables**,
increasing **electrification**, and
growing use of **low-carbon hydrogen**



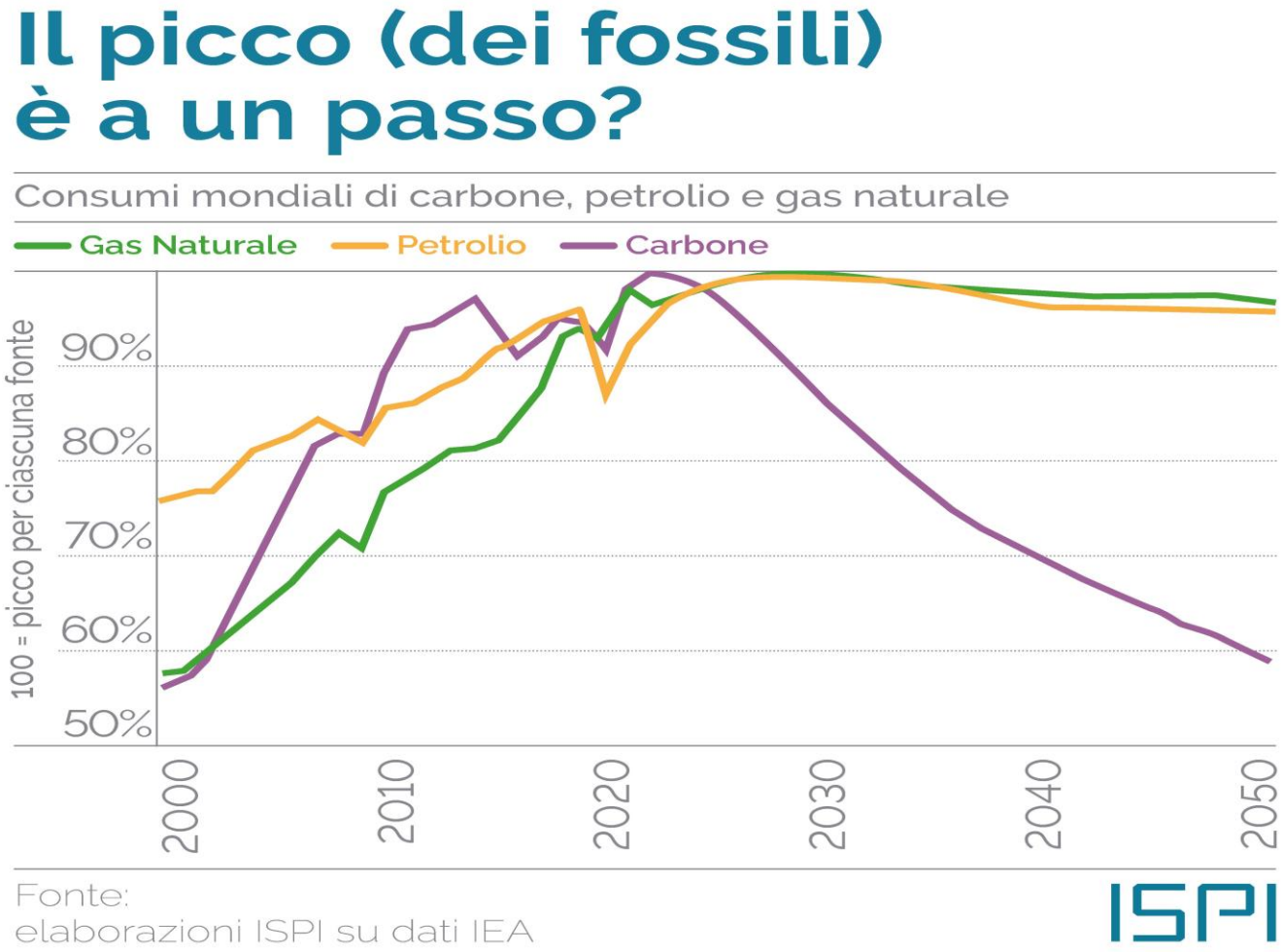






Source: bp Energy Outlook 2023

IEA now predicts **oil&gas demand peak** on the horizon

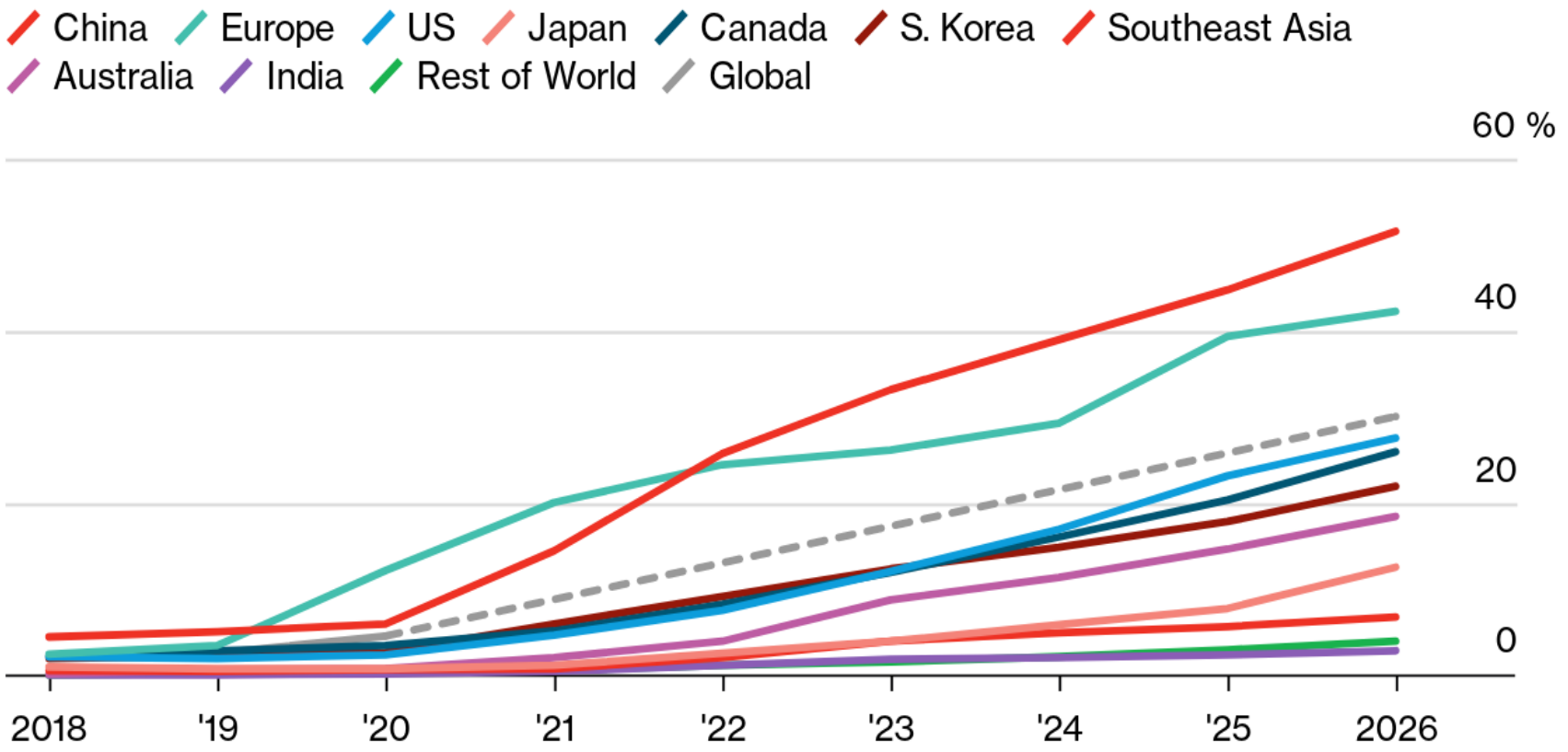


IEA: "Today's policy settings are now sufficiently strong that they produce a distinct peak in fossil fuel use before 2030"

Source: ISPI da IEA World Energy Outlook 2023 (24 October 2023)

EV Sales Set to Soar

EV share of new passenger vehicle sales by market



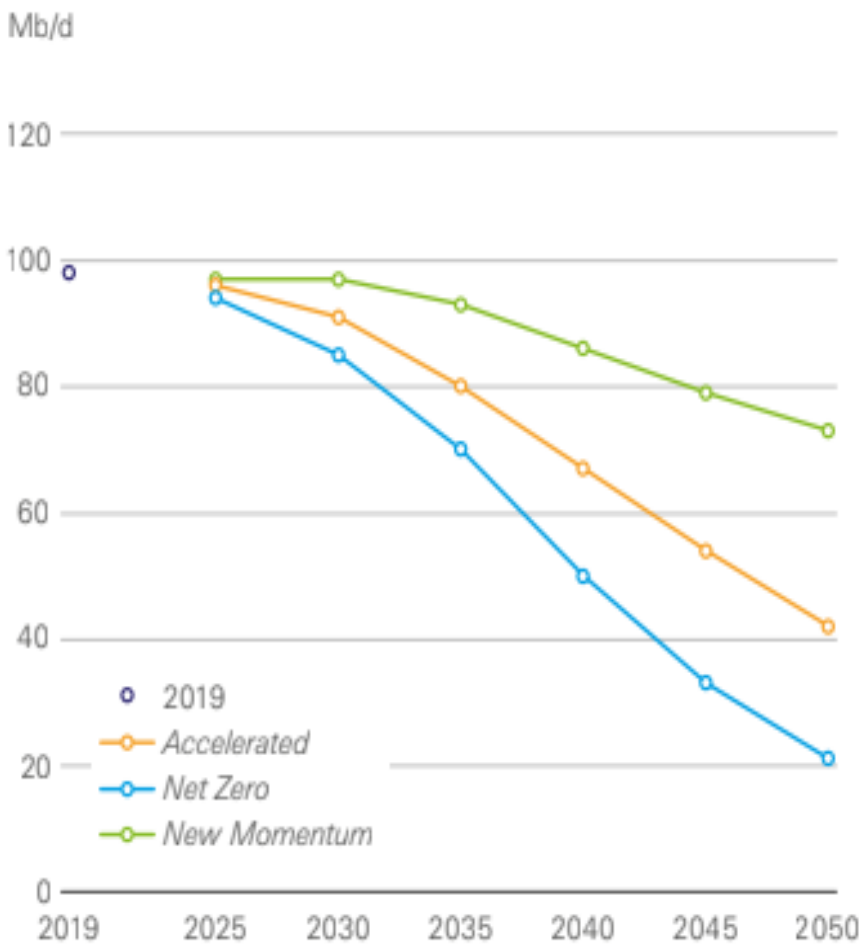
Source: BloombergNEF
Note: Europe includes the EU, the UK and European Free Trade Association (EFTA) countries. EV includes BEVs and PHEVs.

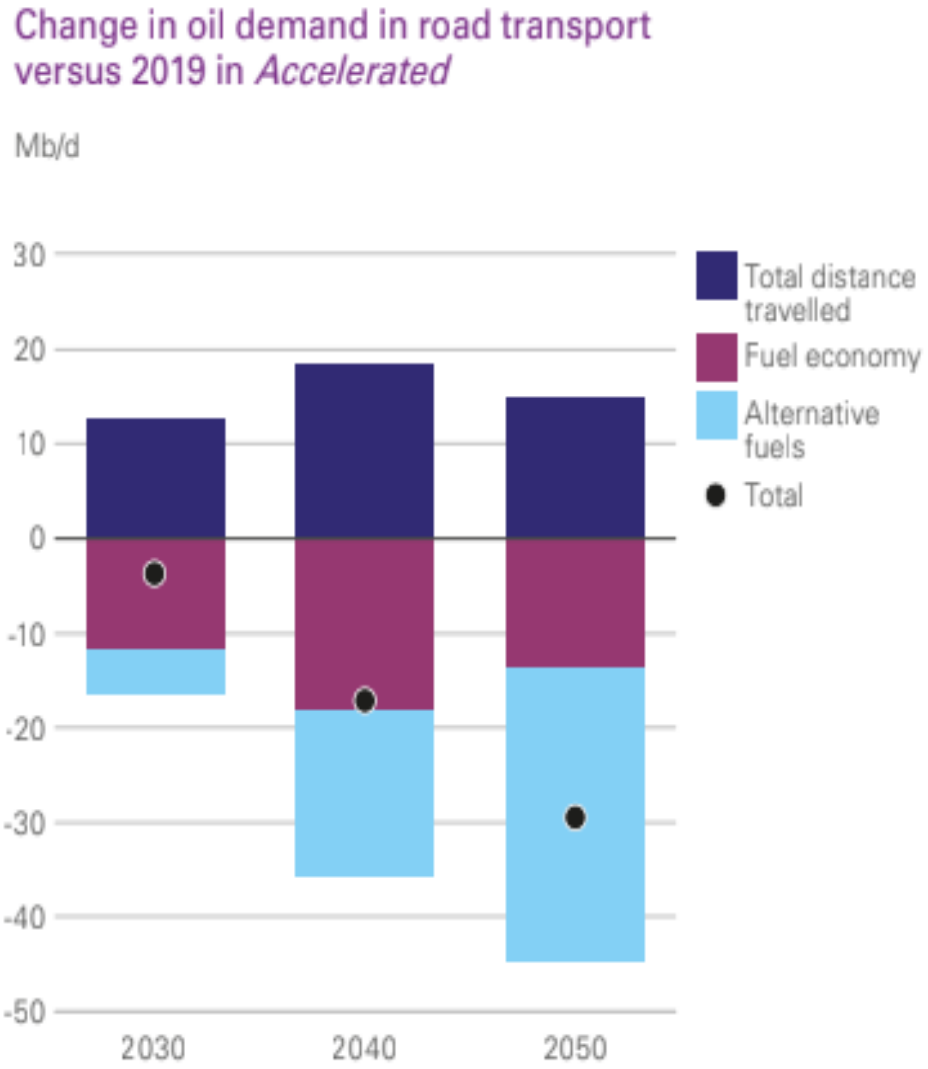
BloombergNEF

Source: Bloomberg July 2023

Oil demand to fall as use in transportation declines

(EVs, but also more efficient engines)



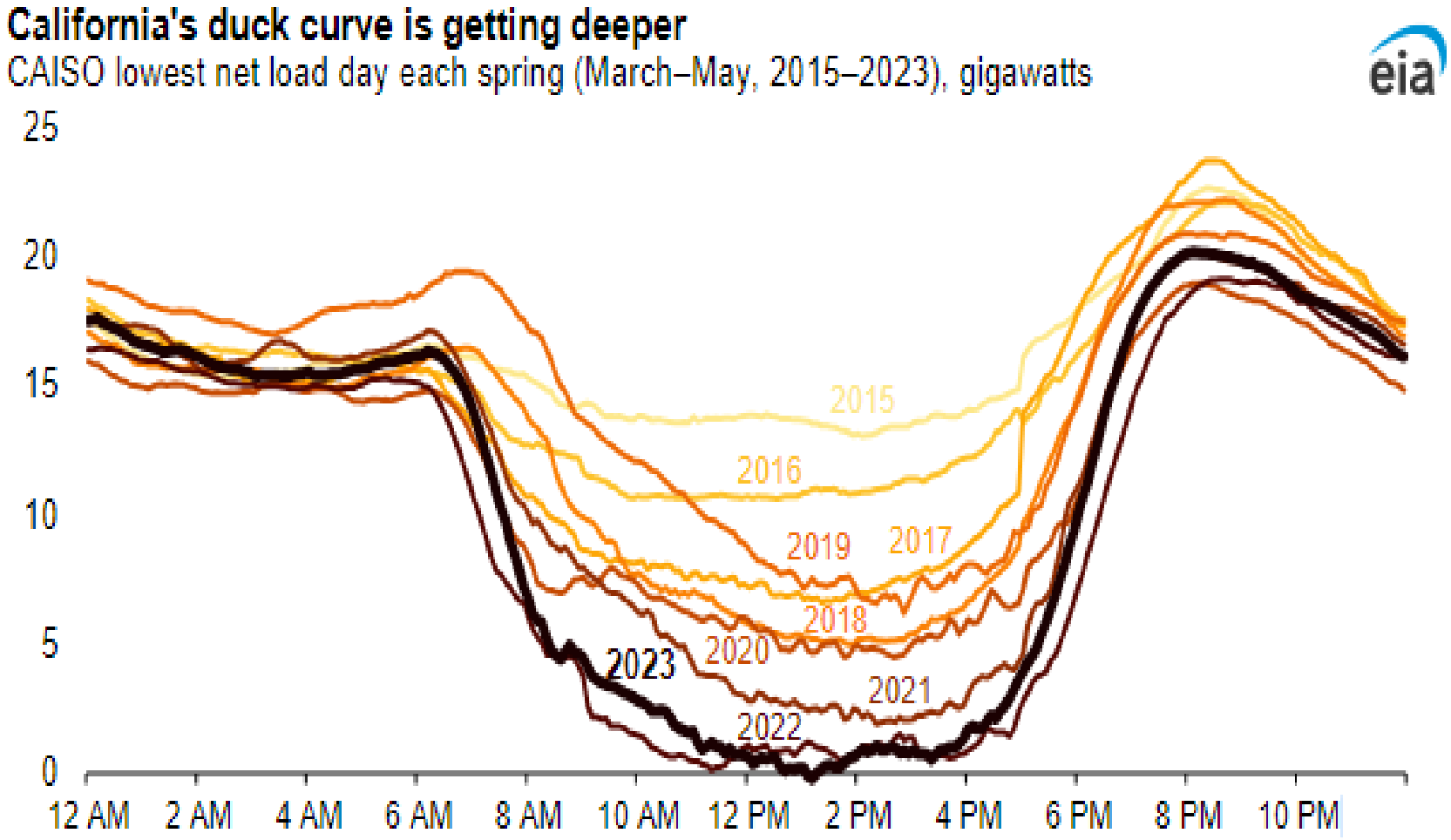


Source: bp Energy Outlook 2023

Natural Gas will remain an indispensable source of power

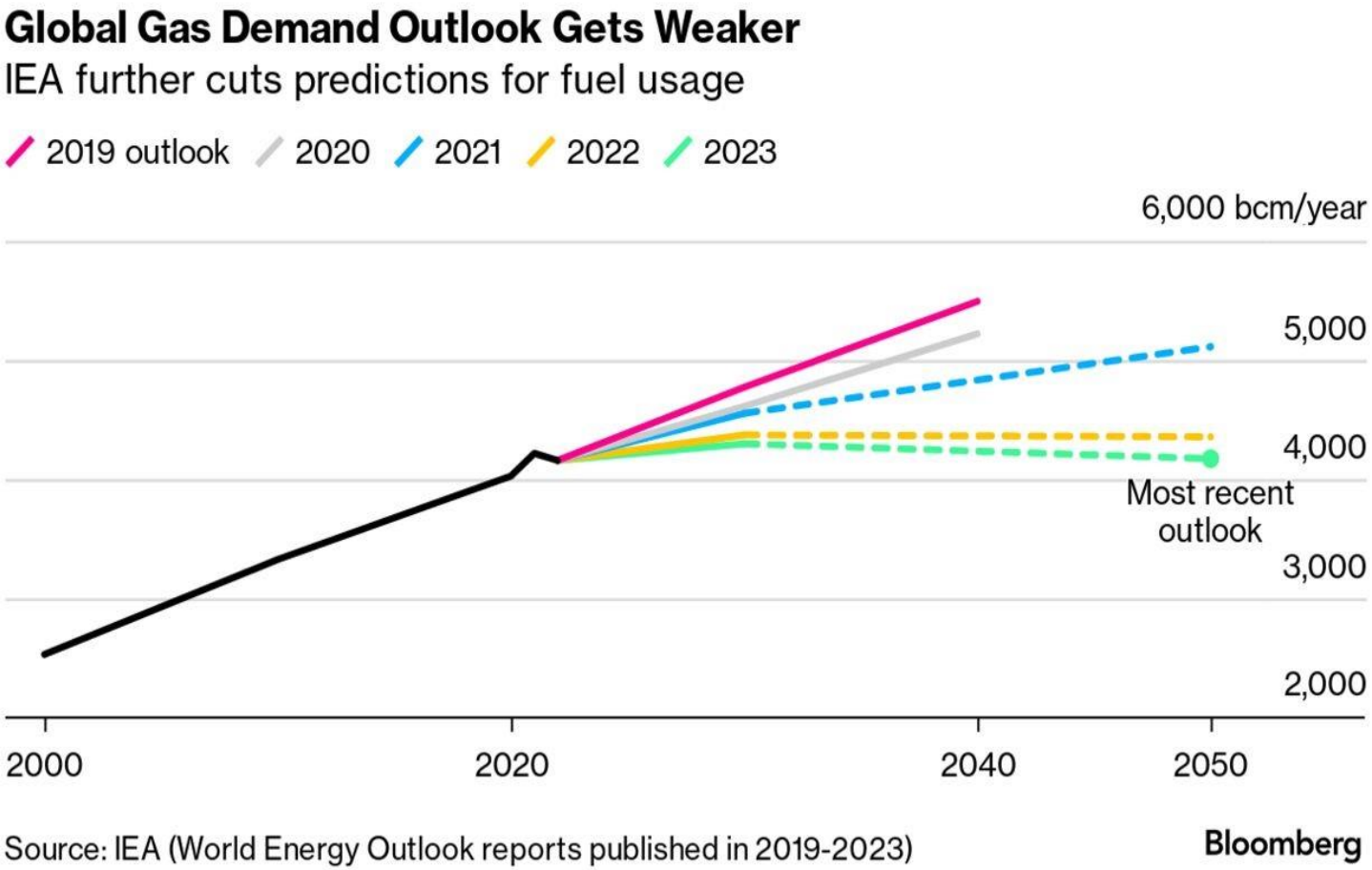
(only one of its many uses)

until a viable alternative is found to ‘smooth peaks and valleys’



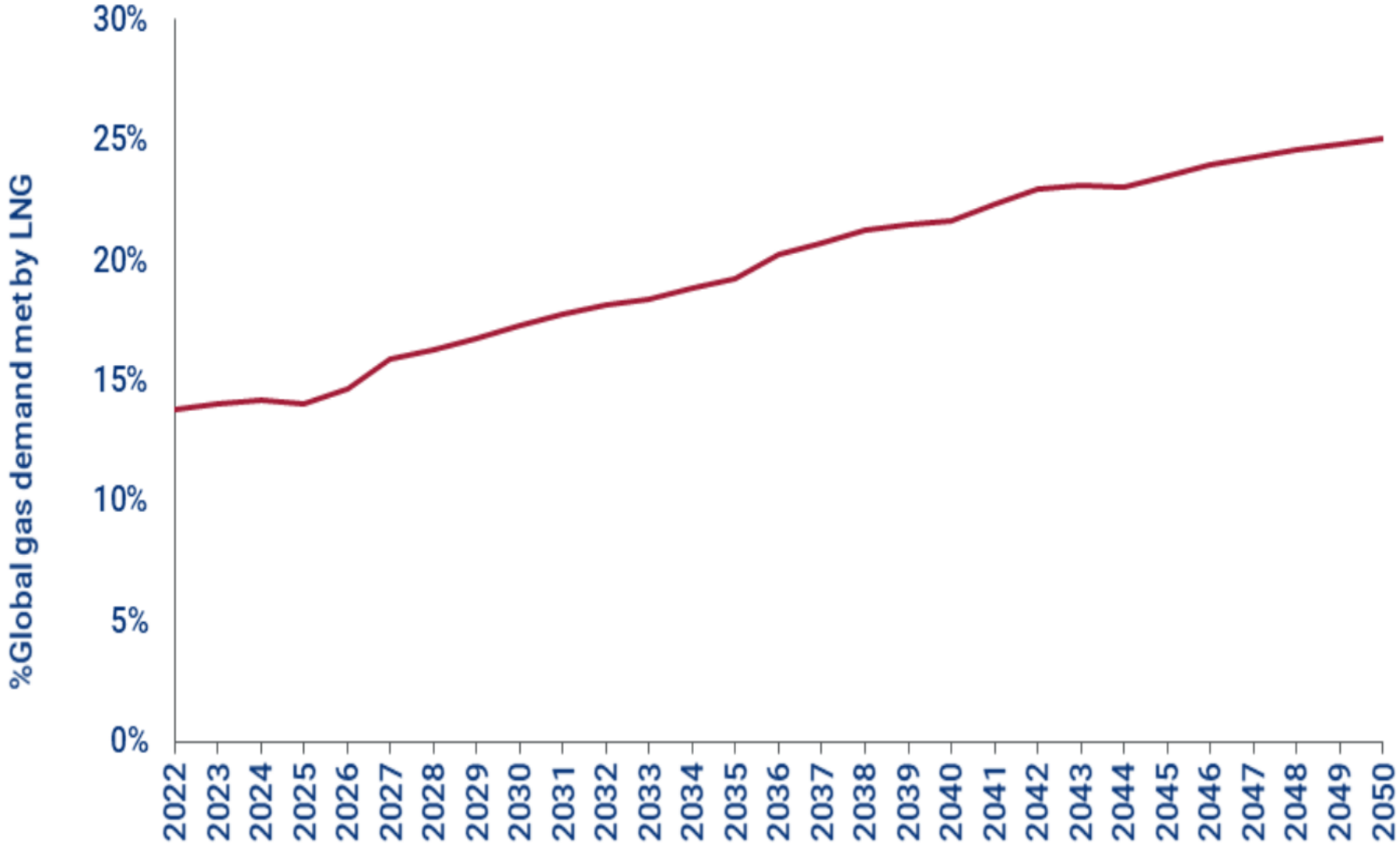
Source: U.S. Energy Information Administration, June 20, 2023

Also **Natural Gas demand** is projected to peak in the next decade



Source: Bloomberg from IEA World Energy Outlook 2023 (24 October 2023)

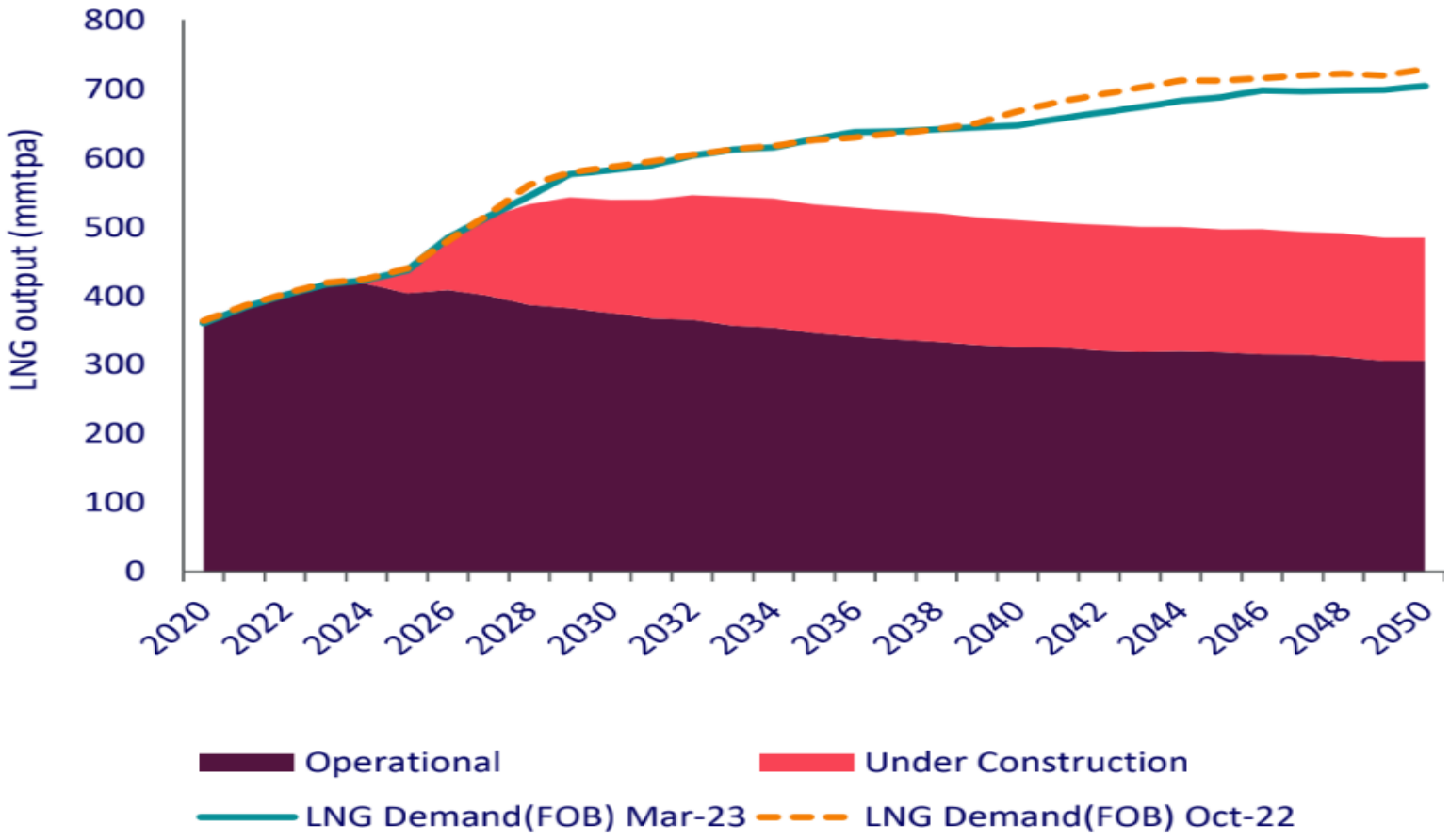
Growing % of Natural gas delivered as **LNG**, globally



Source: WoodMac November 2022

LNG – many more liquefaction and regas plants will be needed

LNG supply vs. demand by development status

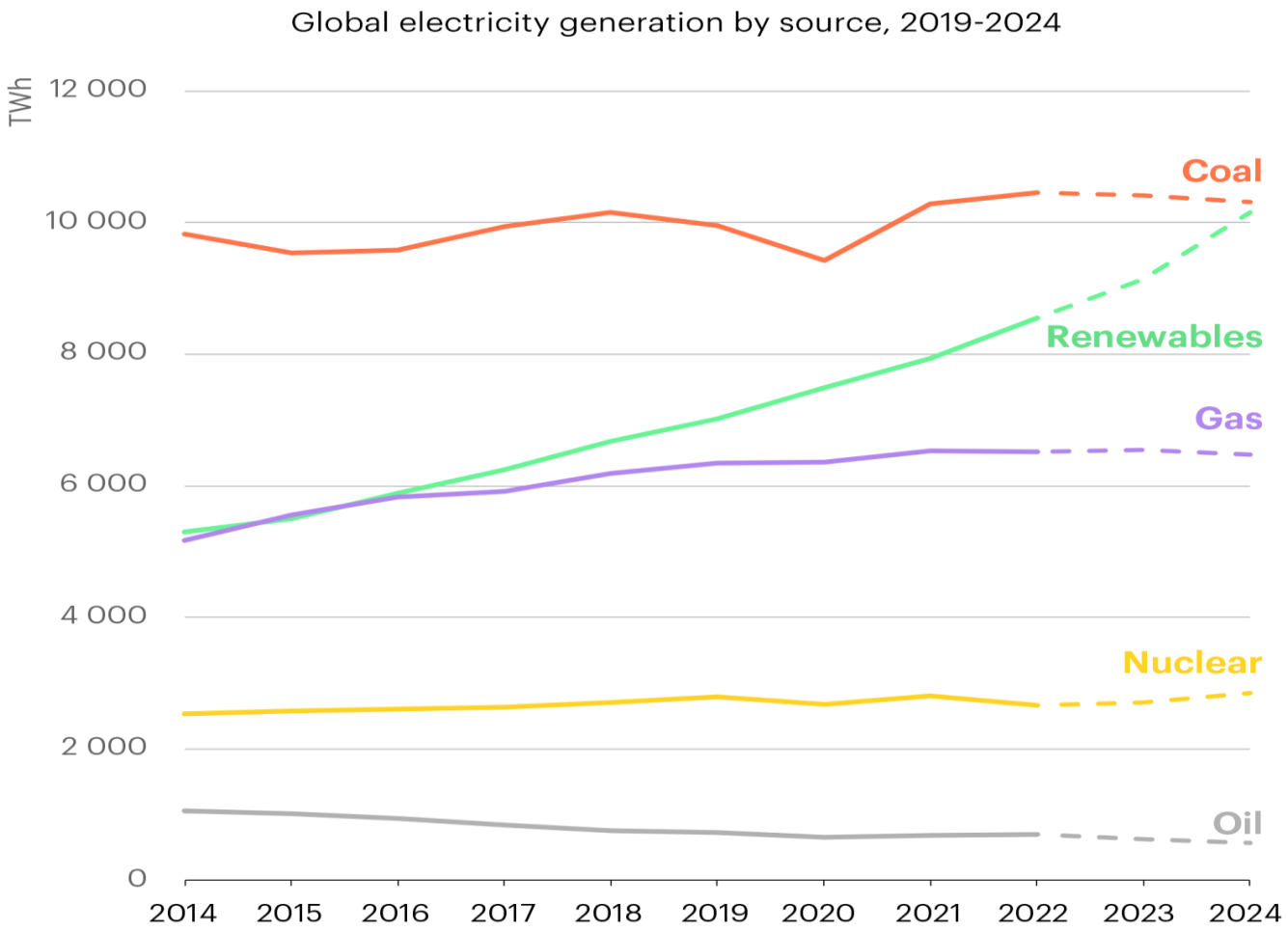


Source: WoodMac August 2023

LNG – A cleaner maritime and heavy-transportation fuel

LNG fuel for heavy duty **road transportation**

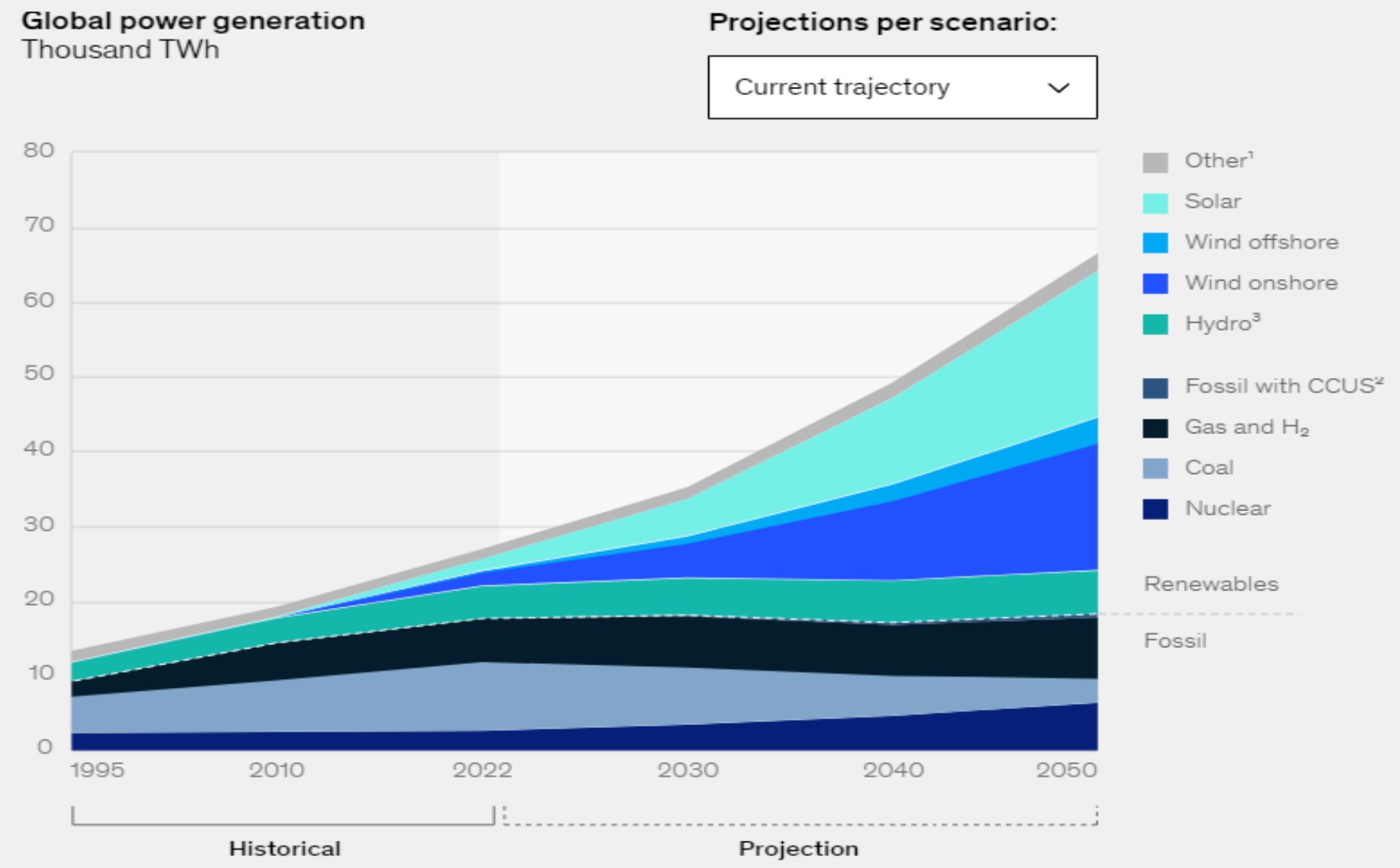
Renewables could overtake coal as the largest source of electricity generation as early as 2024



International Energy Agency

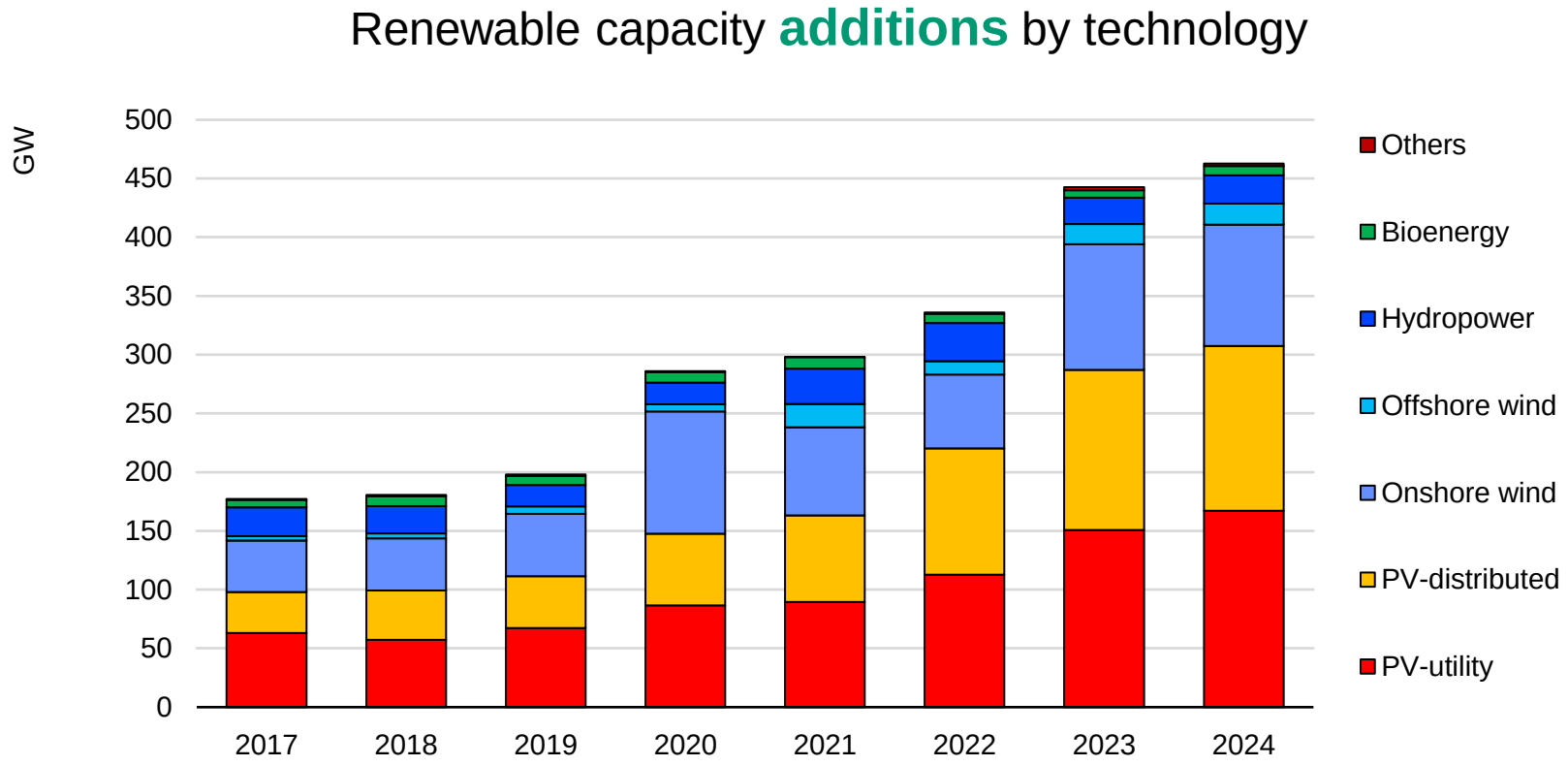
Source: IEA September 2023

All future power demand growth will be satisfied by **renewables**



Source: McKinsey Global Energy Perspective 2023, October 2023

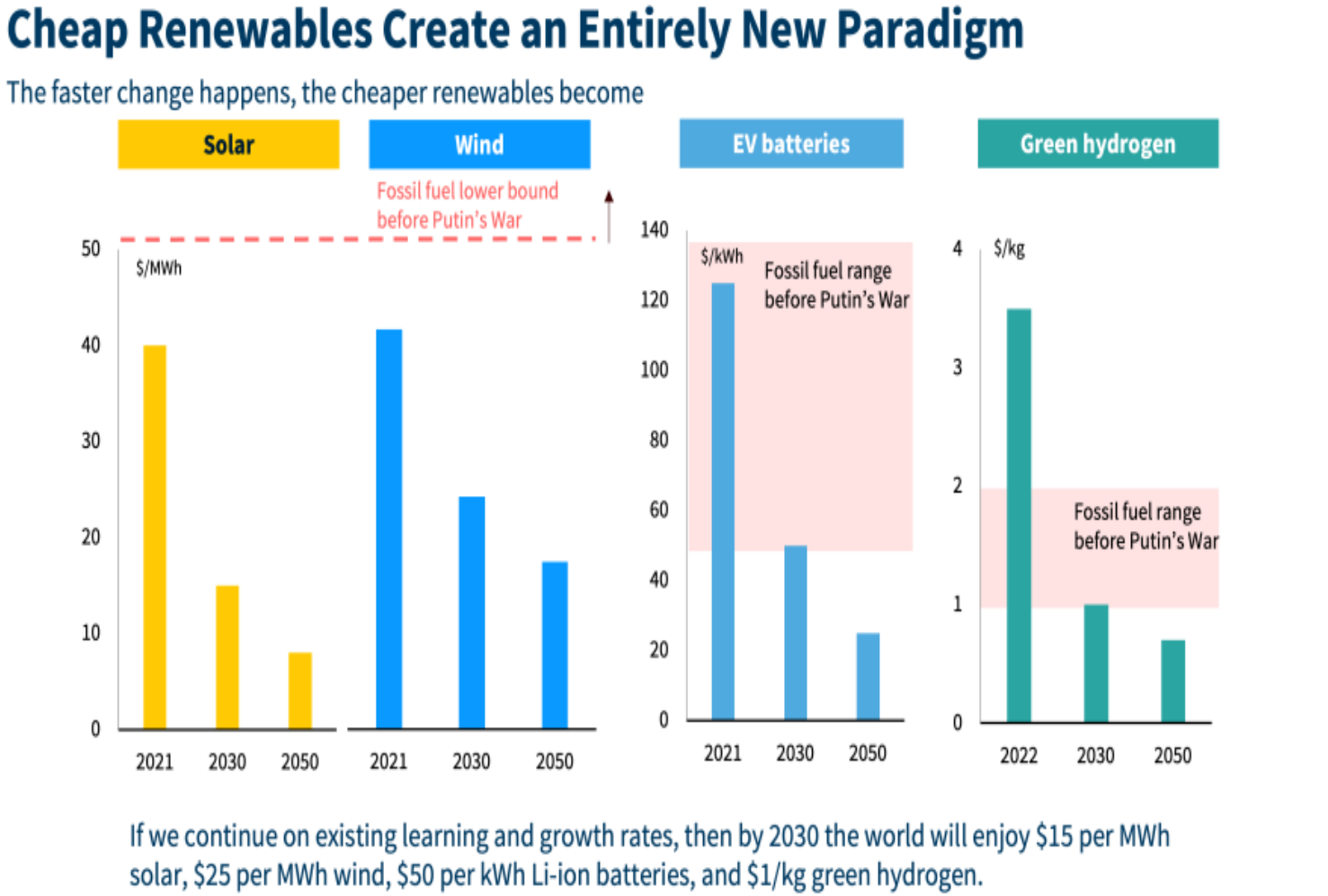
Led by solar PV, **renewable power investment growth** is breaking **new records**



Following two consecutive years of decline, onshore wind capacity additions are on course to rebound by 70% in 2023 to 107 GW, an all-time record amount. High energy prices also underpin distributed PV growth

Source: IEA July 2023

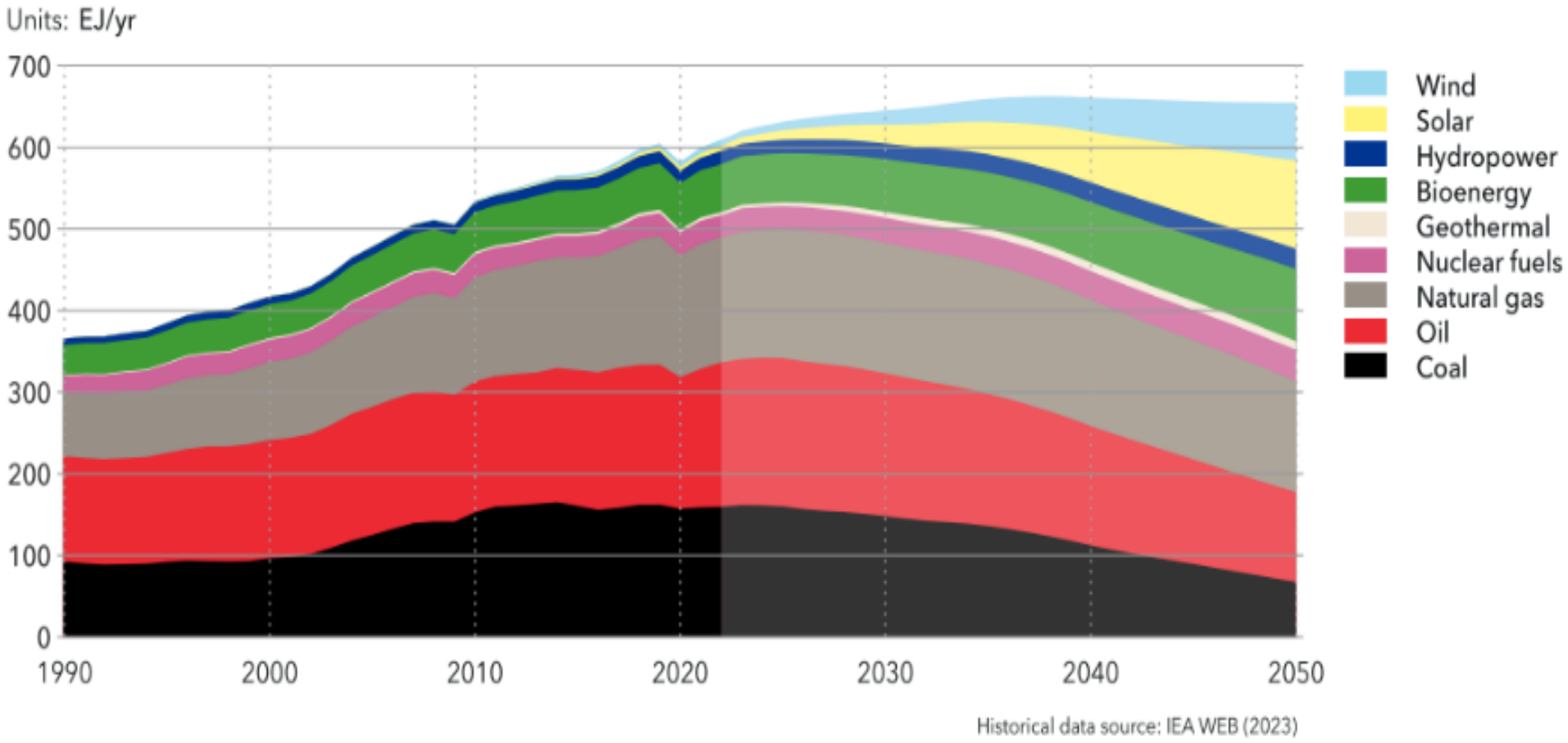
Cost reduction has been key to renewables and EV success
By 2030 the debate will be very different



Source: RMI; cost forecasts use Rystad's growth rates and observed learning rates. Hydrogen is competitive locations

In summary, the **global energy mix** is projected to shift gradually towards **power** produced mostly by **renewables**

World primary energy supply by source

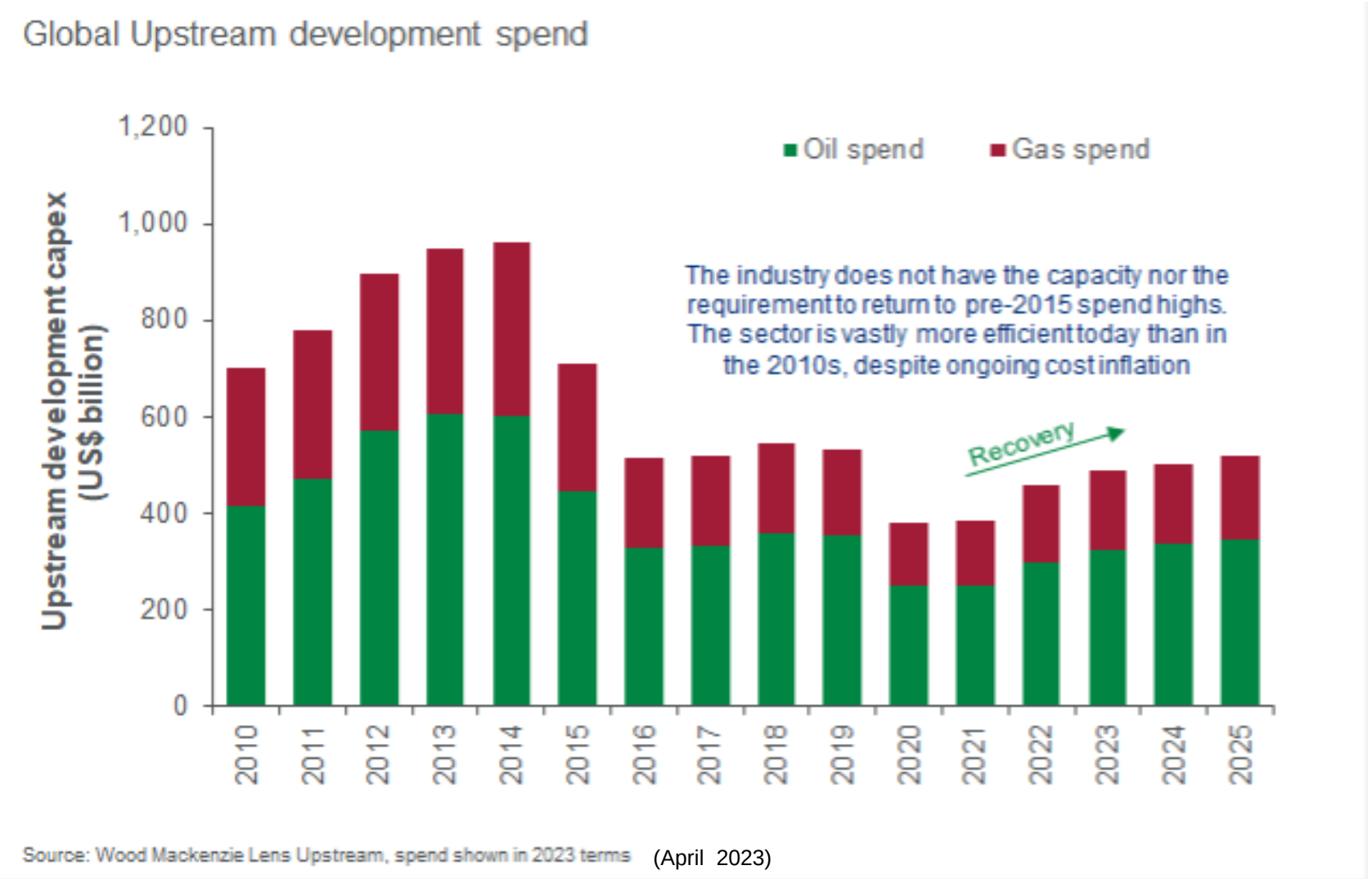


Source: DNV Energy Transition Outlook 2023 (October 2023)

Capital investment is critical for a green future

Source: McKinsey, August 2023

Traditional **investments** in **upstream oil&gas** will recover, then plateau

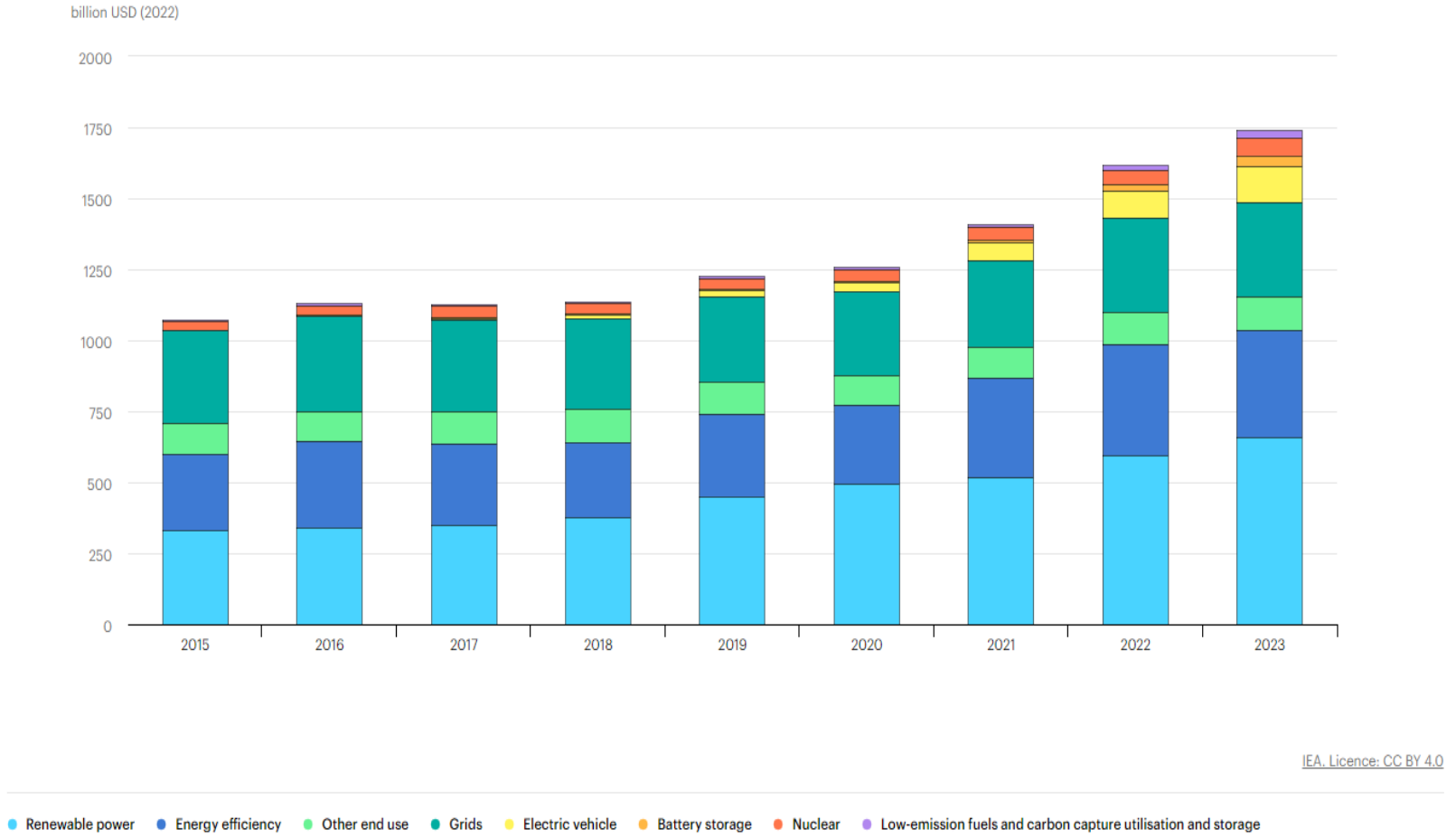


Source: Wood Mackenzie Lens Upstream, spend shown in 2023 terms (April 2023)

Investments in 'clean energy' have been overtaking those in traditional fuels - and will continue to grow faster

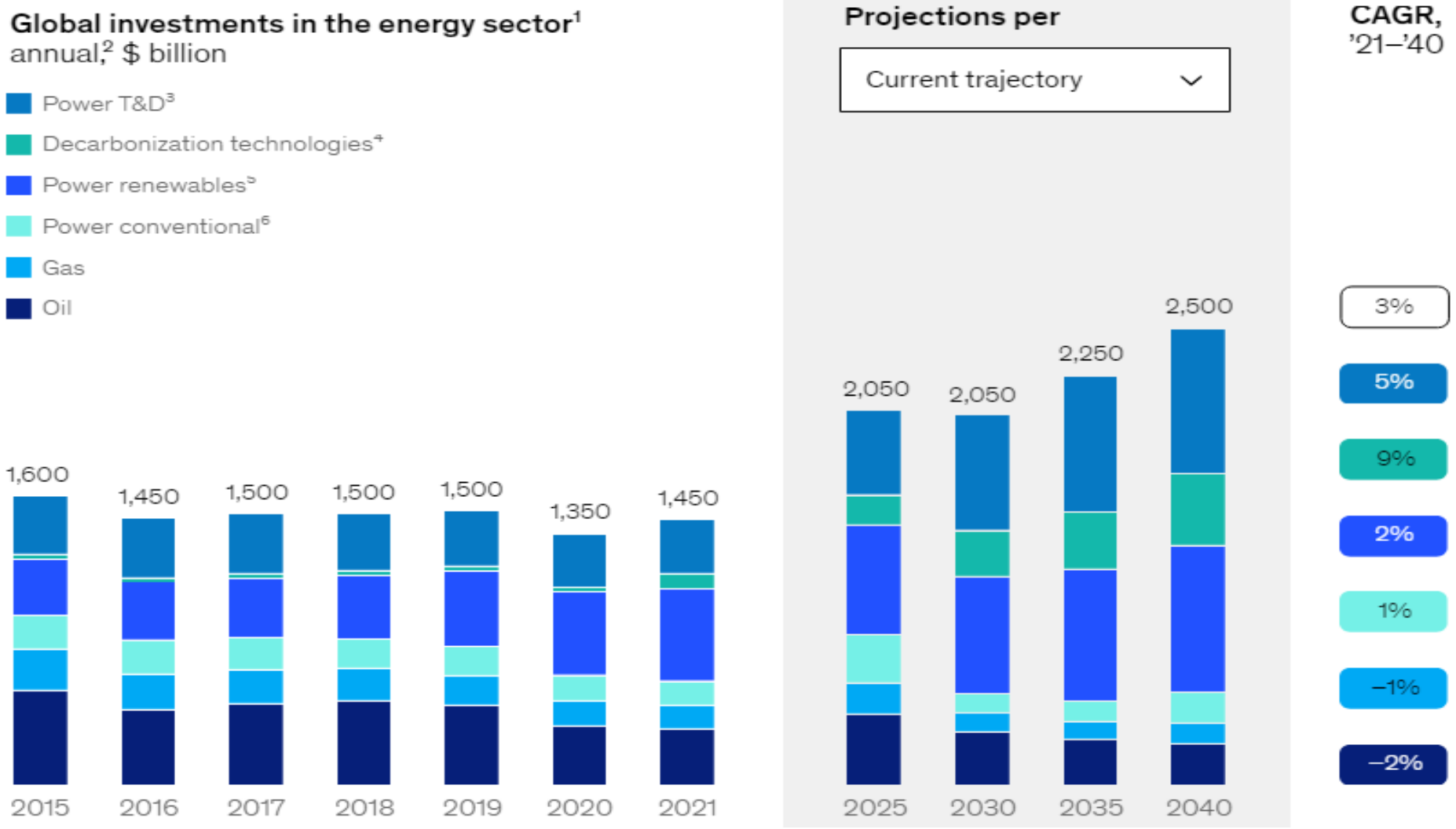
Renewables Energy Efficiency Networks Batteries Nuclear Low-C fuels

Annual clean energy investment, 2015-2023



Source: IEA World Energy Investment, May 2023

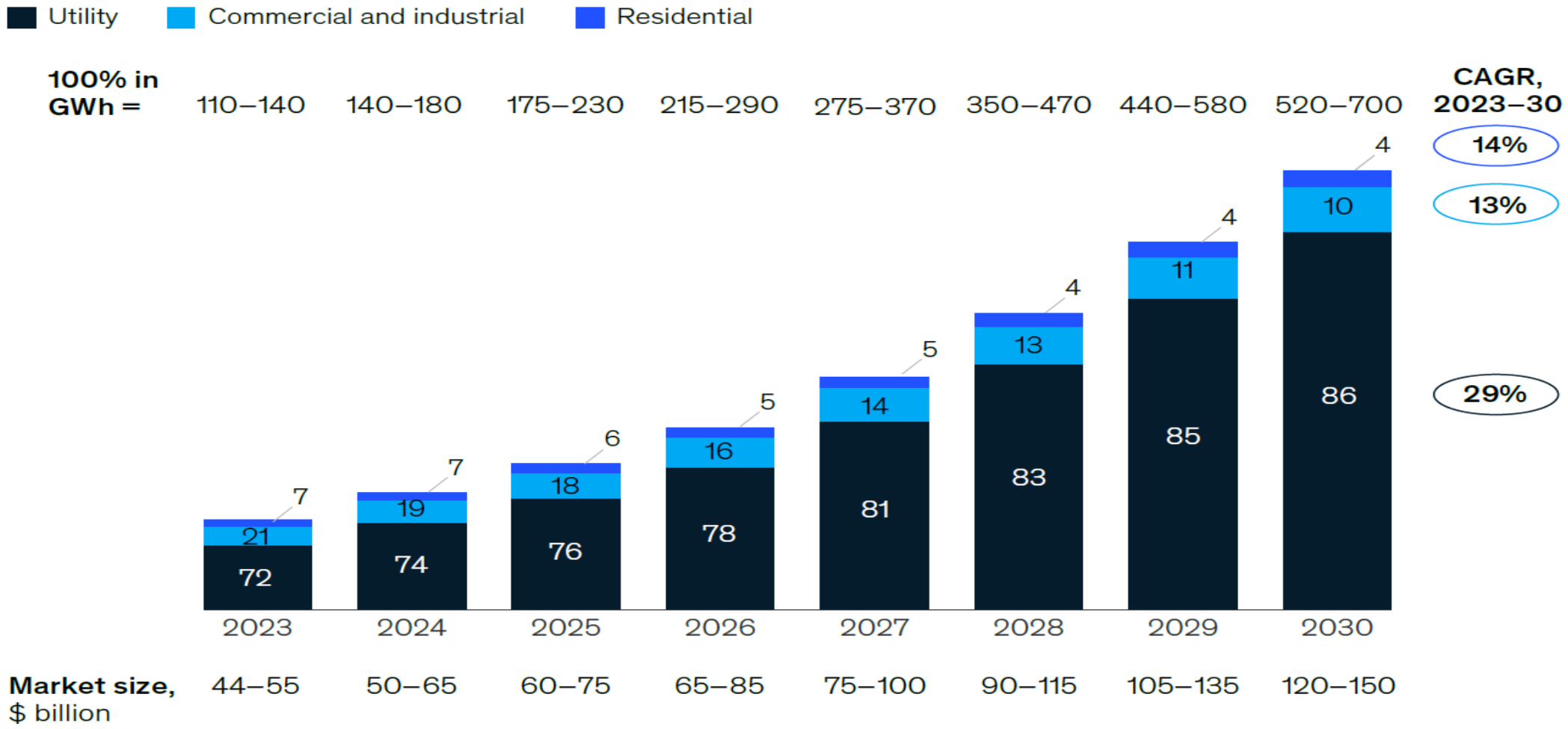
Investments in the energy industry are expected to grow, mostly in new green areas



Source: McKinsey Global Energy Perspective 2023, Oct23

Applications of **batteries** to grow significantly

Annual added battery energy storage system (BESS) capacity, %



Source: McKinsey & Co, 8 August 2023

New energy transition technology developments:

Floating PV

New Jersey

South Korea

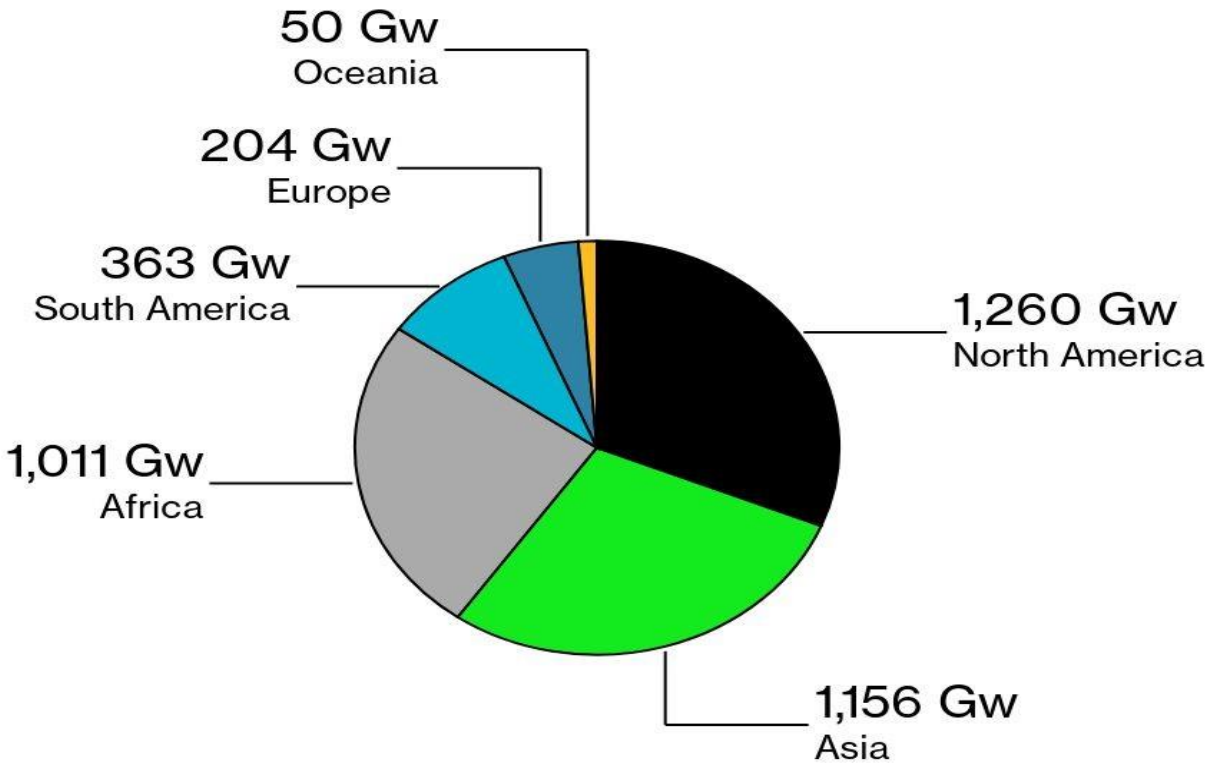
China

Source: Bloomberg, July 2023

Floating Solar potential locations

Floating Solar Potential Capacity

There are more than 6,600 water bodies suitable for floatovoltaics



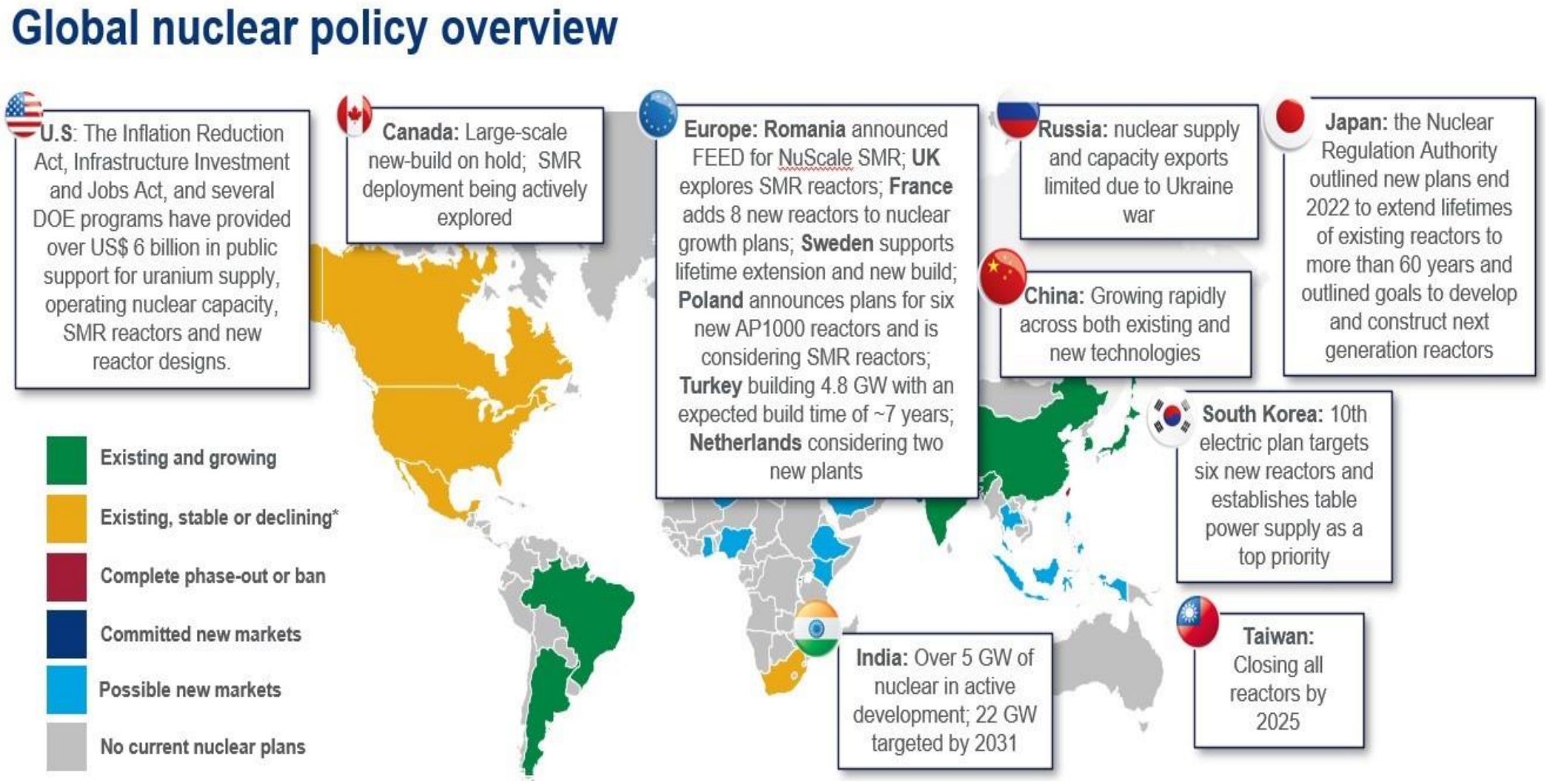
Source: World Bank via Bloomberg
Note: Based on 10% use of assessed man-made water bodies

Bloomberg

Source: Bloomberg, August 2023

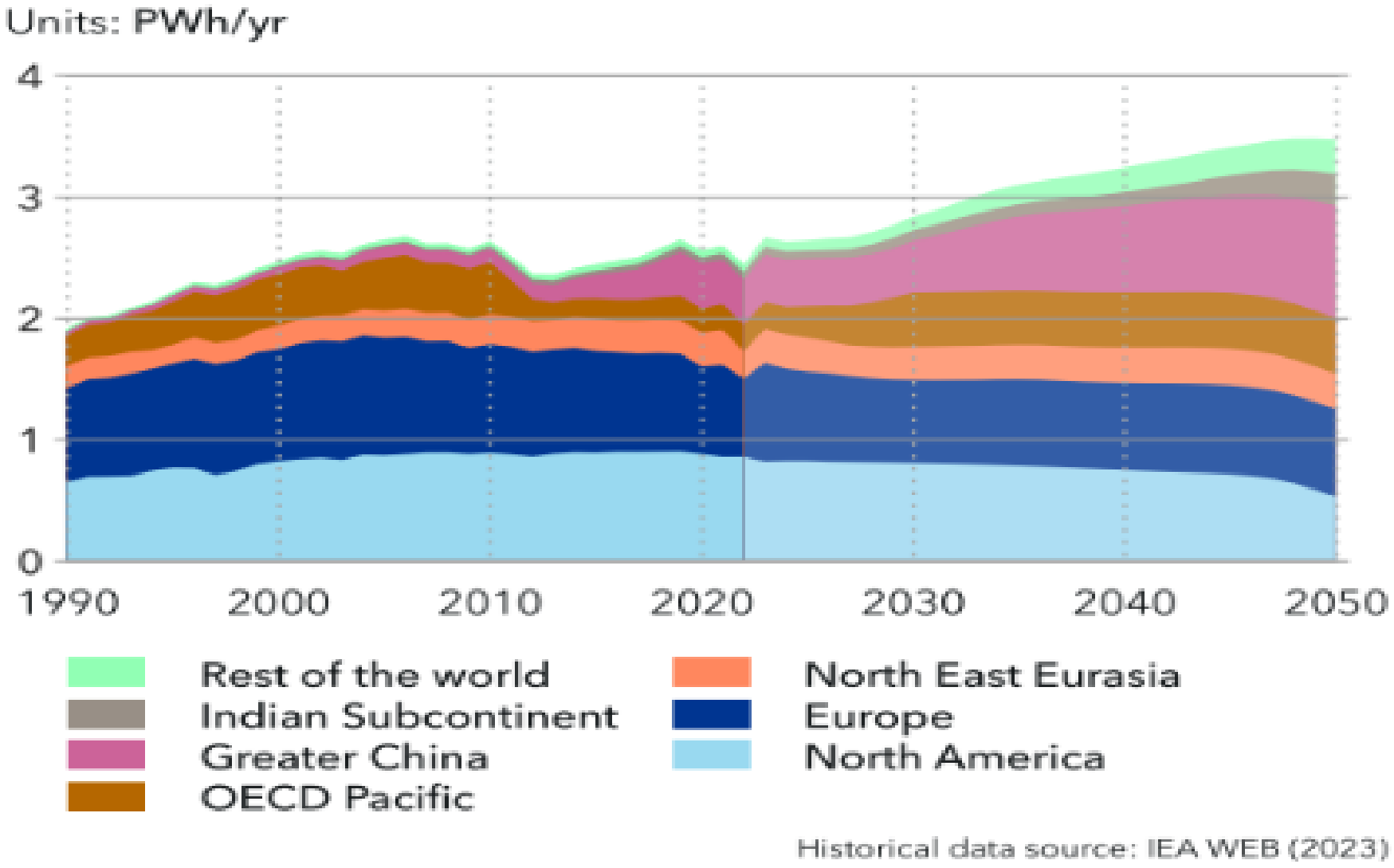
Nuclear?

The 2020s could be the decade of change



Source: WoodMac, March 2023

Nuclear power generation forecast, by region



Source: DNV Energy Transition Outlook 2023, October 2023

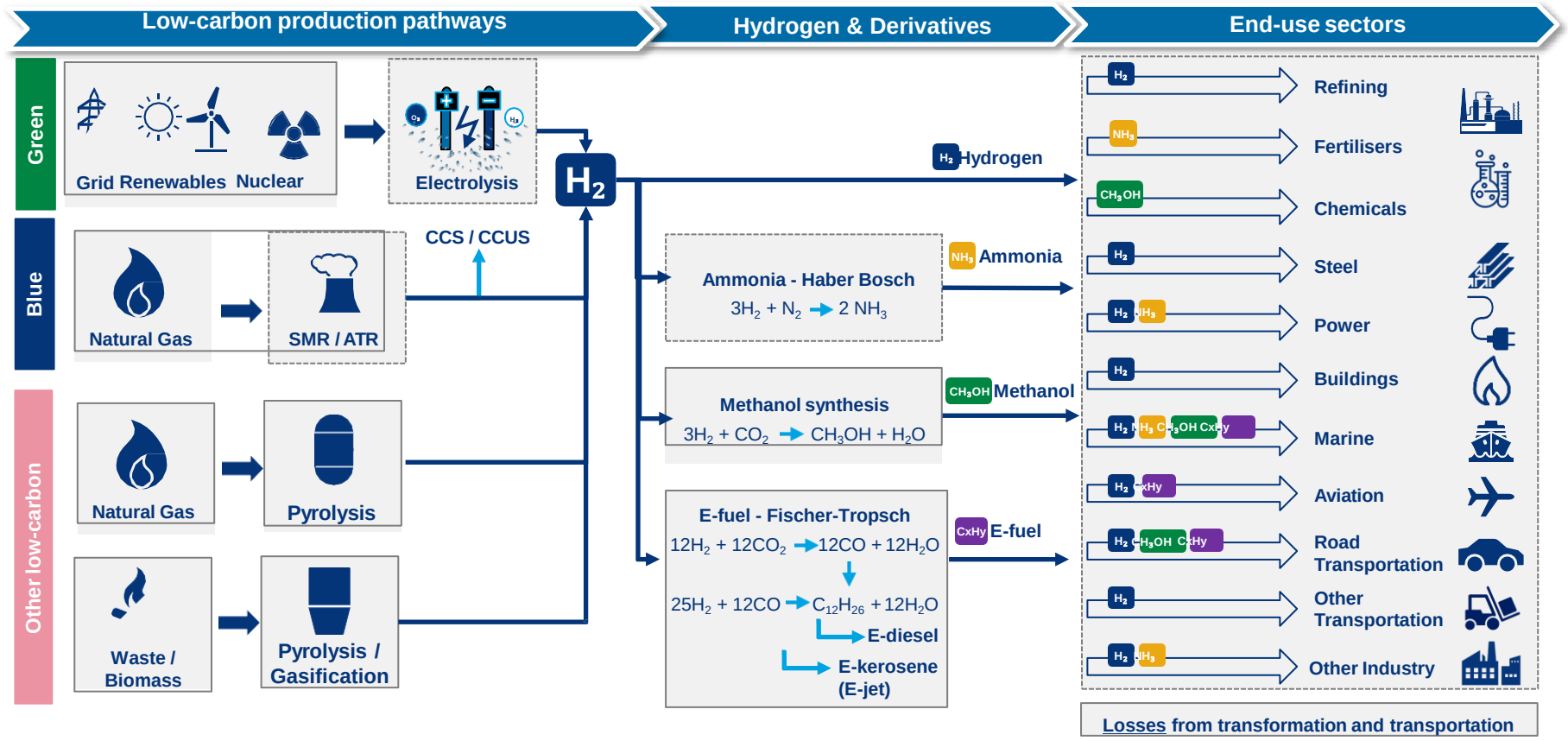
New energy transition technology developments

Direct Air Capture Unit - Occidental

Source: Bloomberg, August 2023

Are we ready for the ‘hydrogen economy’

Hydrogen and derivatives – ammonia, methanol and e-fuels – will help decarbonising hard to abate end-use sectors



Source: Wood Mackenzie, May 2023

Hydrogen - Critical factors

- **Extremely promising**
  - Huge number of projects under way, virtually everywhere in the world
  - General belief that costs should come down with industrial experience, infrastructure build-up and technology development to competitive levels

- **Numerous trial programs (large and small)** starting with massive **public support - billions** being invested

- Key issue: **creating matching demand and supply growth**
  Governmental policies and supports indispensable for take-off

- Likely **first areas** of commercial application:

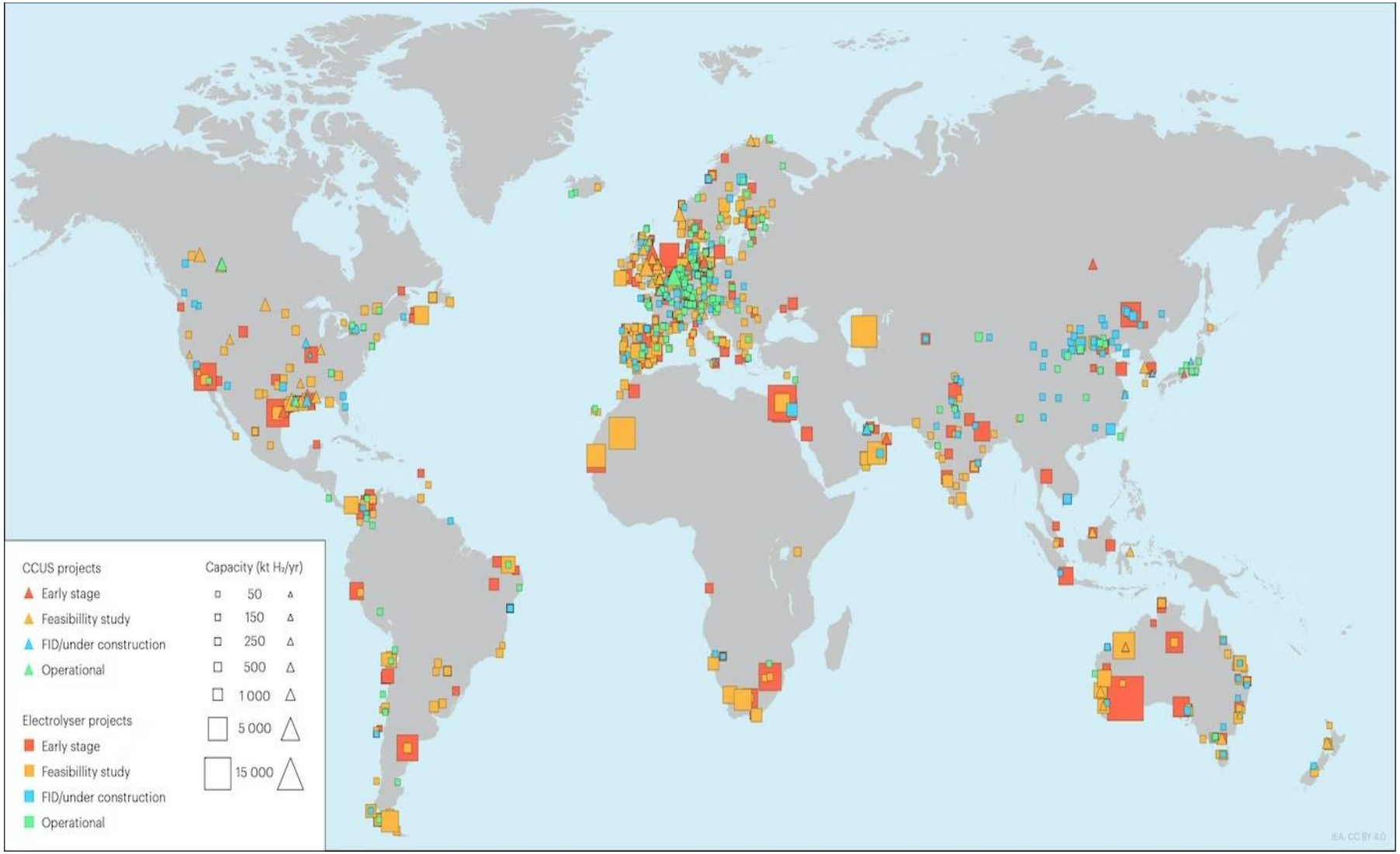
  ‘**Hard to abate’ sectors**, where direct electrification alternatives are not possible – e.g. iron and steel industry

  Trains in non-electrified railways

  Buses and **trucks**

  Automotive?

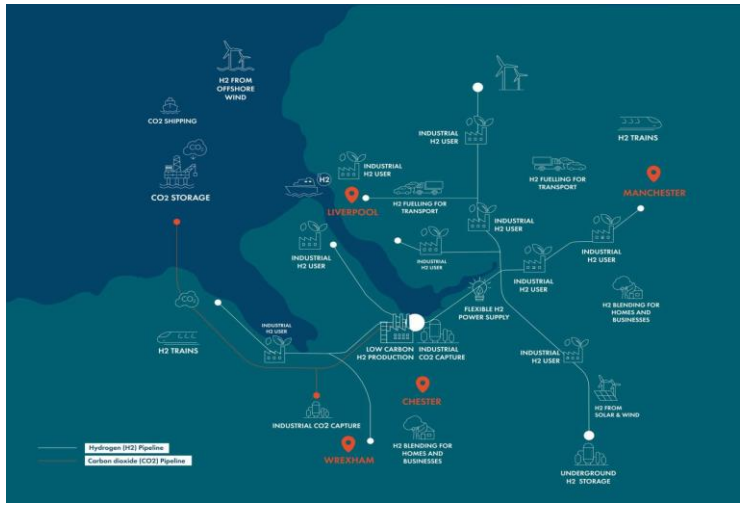
Growing number of ‘green’ and ‘blue’ hydrogen and CCUS projects, worldwide



Source: IEA Global Hydrogen Review, September 2023

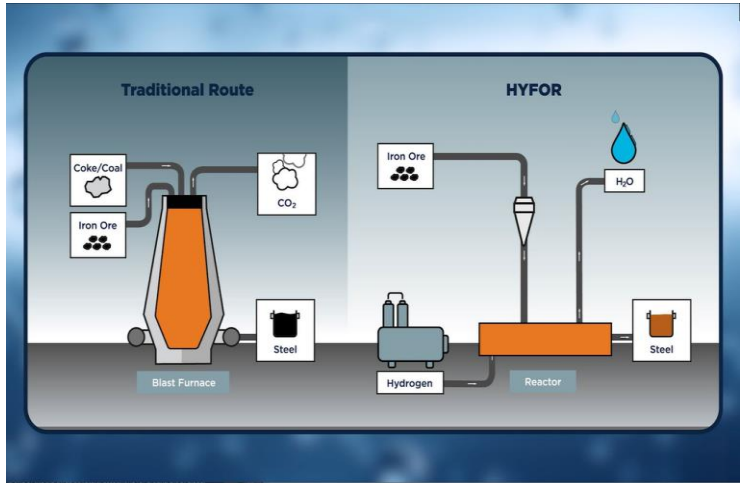
Some project examples – H2 generation, CCUS and utilization

Eni Hynet NW in the UK



Porthos CCS Project Rotterdam

Hyfor for metallurgy



IKEA H2 Trucks (The Driven, October 2023)

Hydrogen Valleys – an Italian concept now applied worldwide

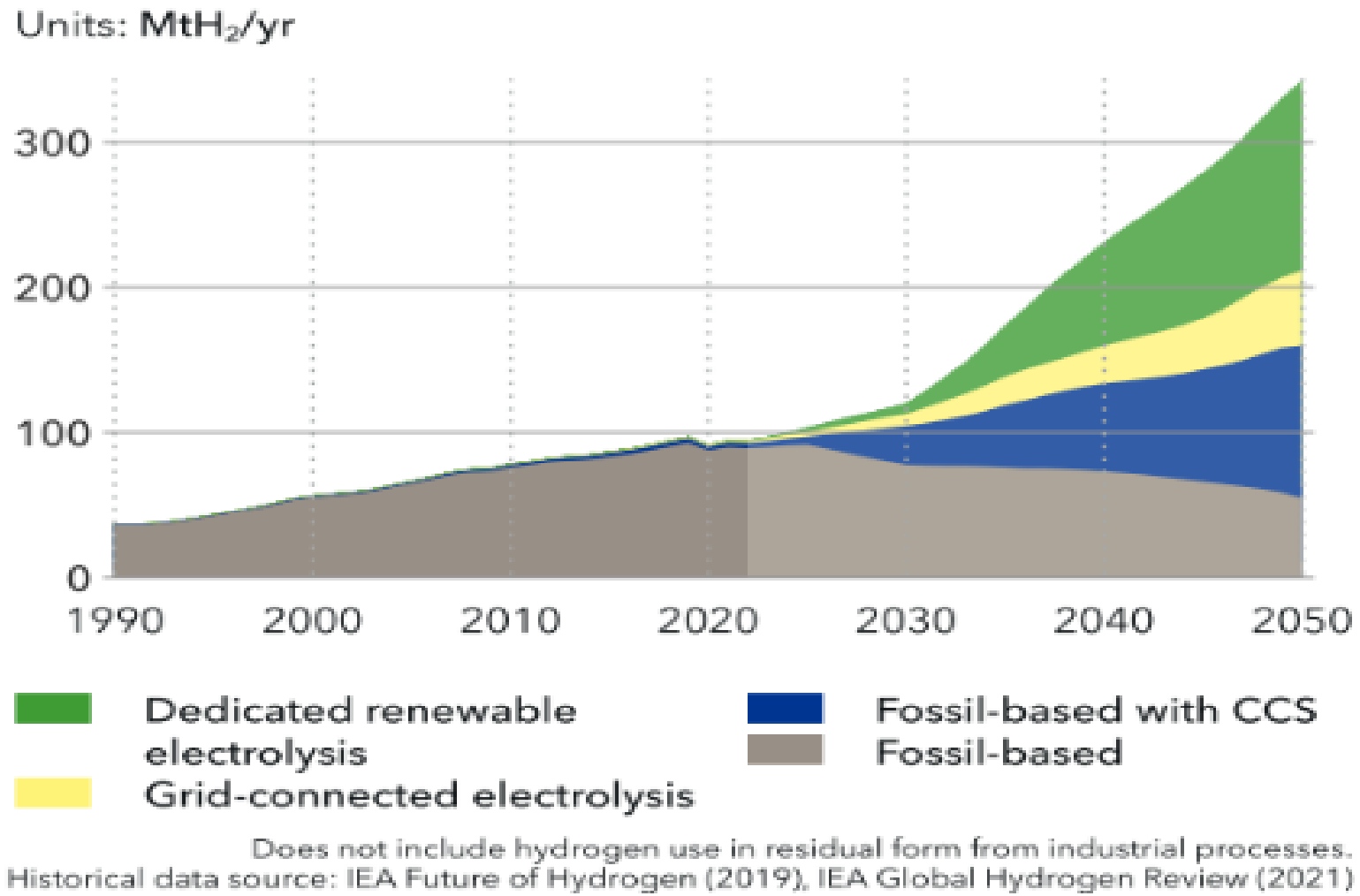
Source: Clean H2 Partnership, February 2023

… e.g. US DOE **Hydrogen Hubs**

Source: PowerEngineering, October 2023

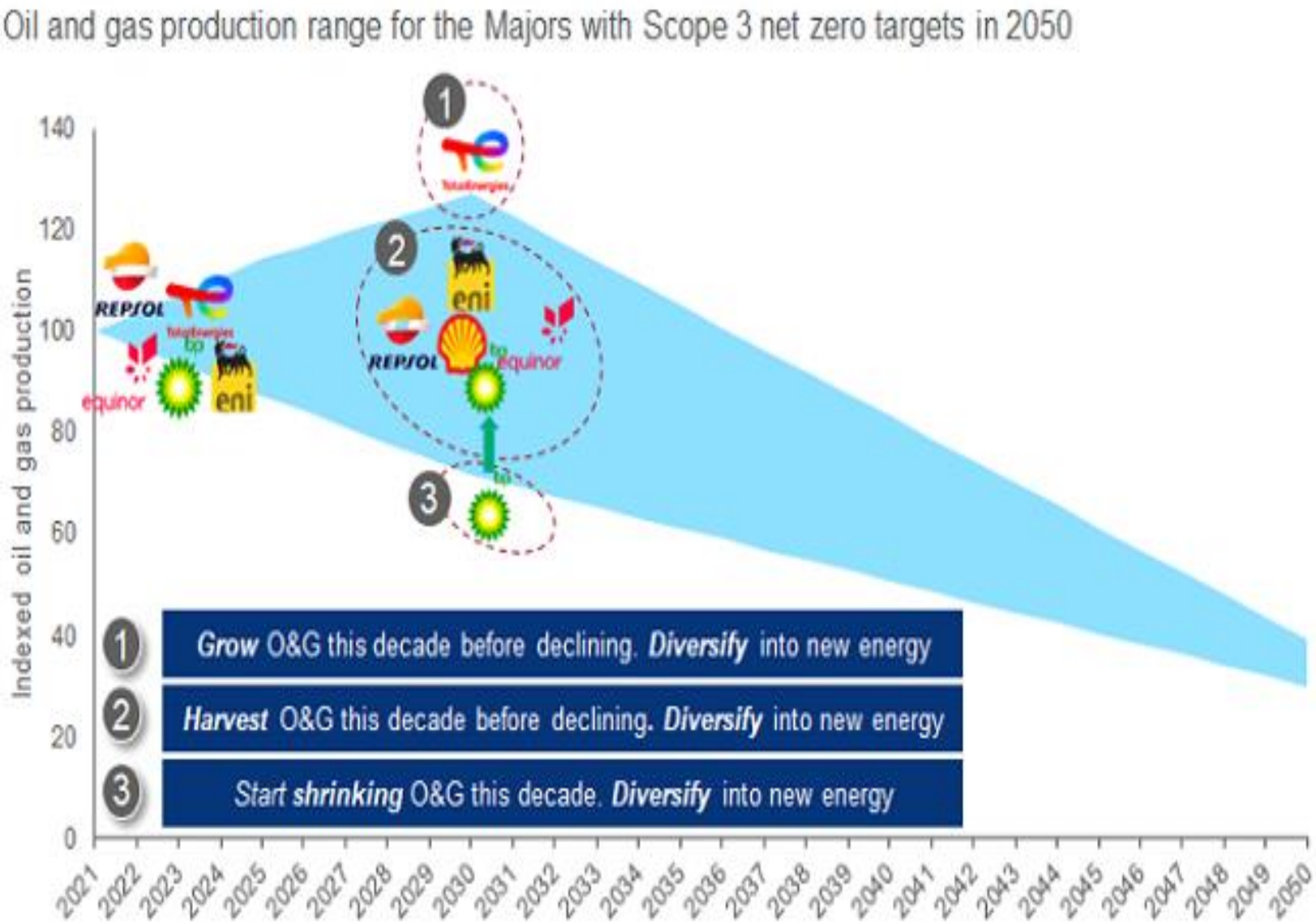
World hydrogen production forecast by production route

But taking off later, in a decade



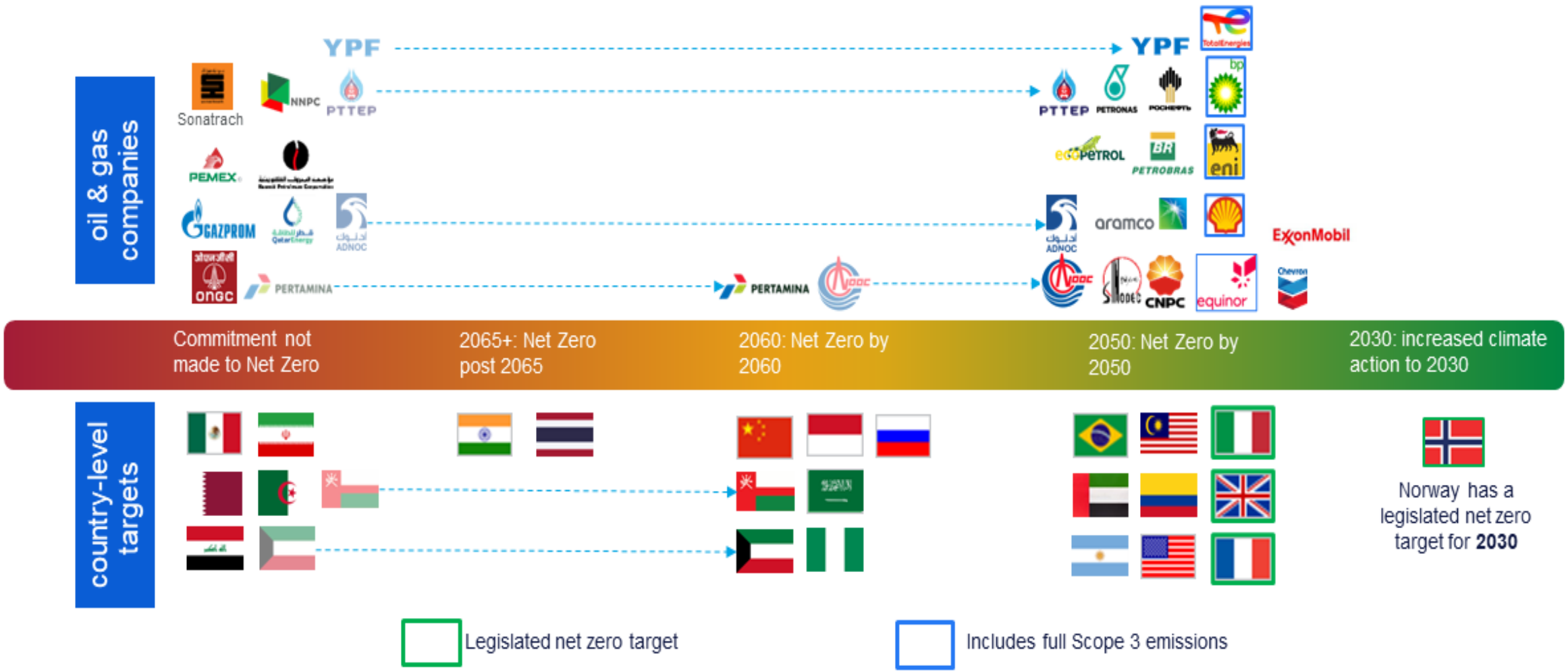
Source: DNV Energy Transition Outlook 2023, October 2023

The **energy majors** are realigning their strategies…



Source: Wood Mackenzie

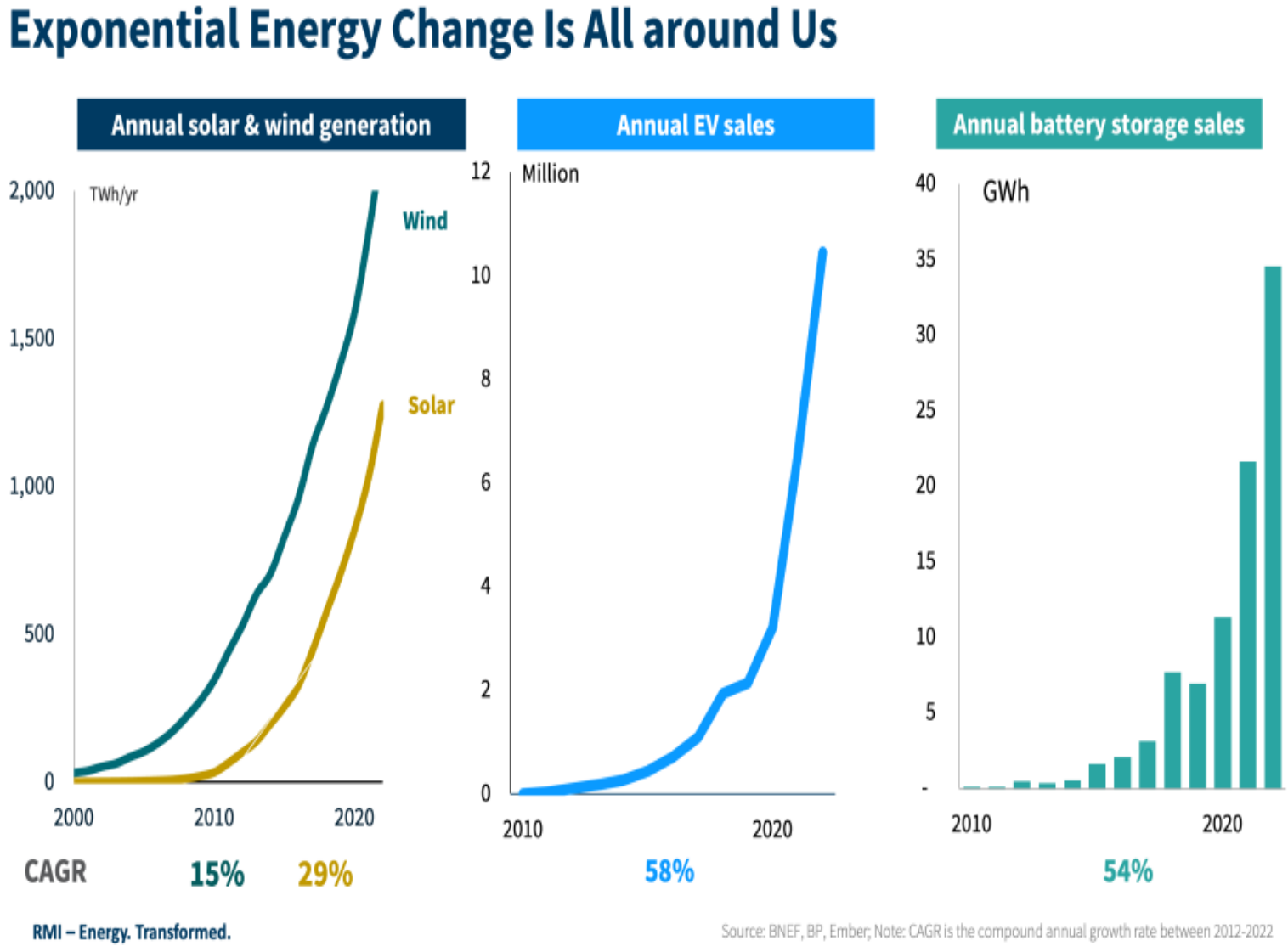
Most NOCs now have decarbonisation ambitions and a net zero target



Source: Wood Mackenzie

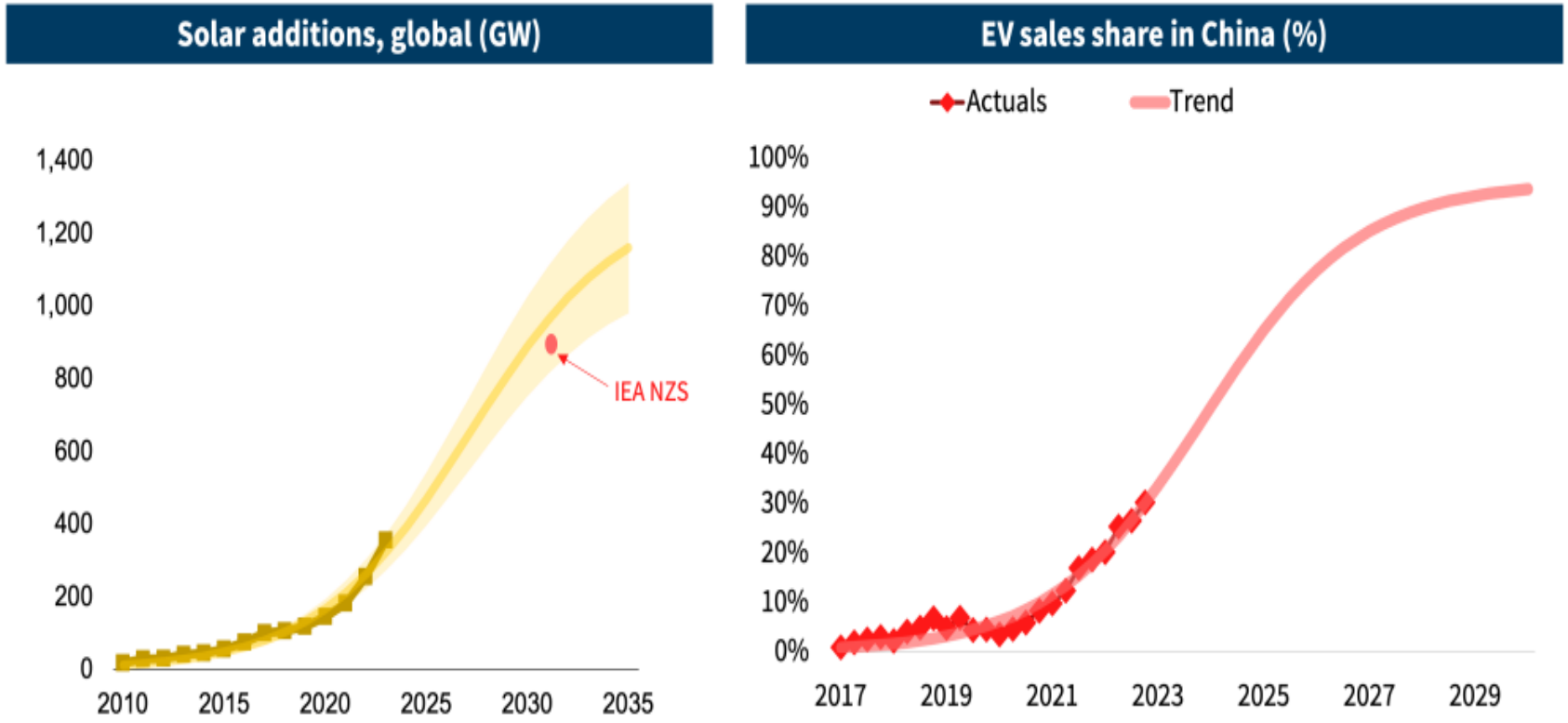
Beware surprises:

The renewables revolution is **exponential**, not linear



The 2020s could be the *decade of change*

This is the decade that renewables sales race up the S-curve



Exponential modeling of key renewable technologies has been the best way to model growth so far, and implies that they will move up the steep part of the S-curve during this decade.

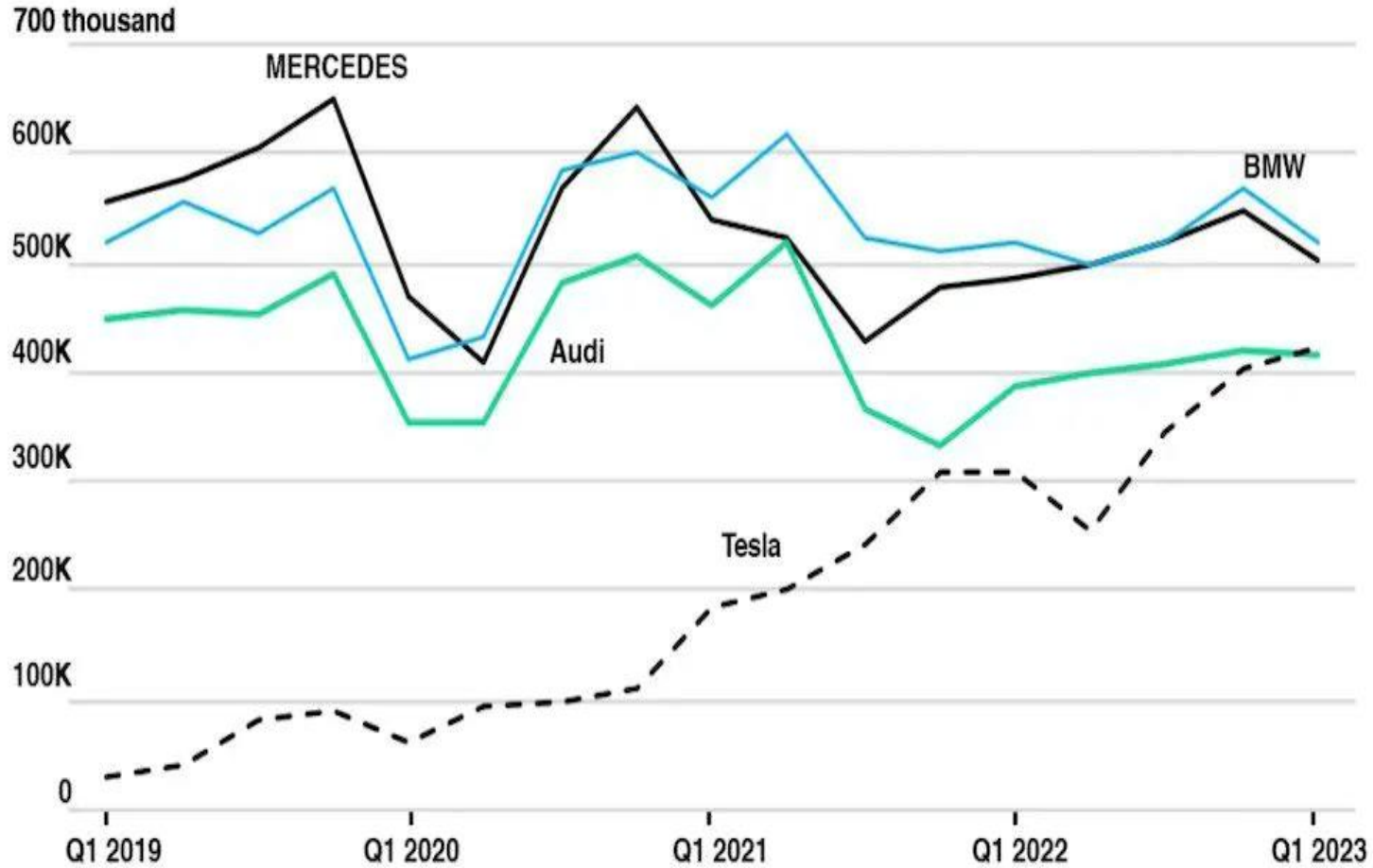
RMI – Energy. Transformed.

Source: BNEF (past), RMI (exponential extrapolation)

Beware surprises: **new suppliers**

Tesla global volumes muscle past Audi, just as volume brands come into targe

Fig. 23/0421: Global premium deliveries by quarter



Source: OEM data, Schmidt Automotive Research / European Electric Car Study

Mercedes-Benz brand only, BMW doesn't include MINI

The European Electric Car Study

Schmidt Automotive Research

All of a sudden **China** became a **leading exporter of cars**

Source: The Economist, August 14, 2023

Conclusions

- **The energy transition is under way**, but with big uncertainties regarding:
  - Timing
  - Exact direction
  - Quantification
- **Traditional fuels** will remain as base-load and later as '**companion**' or '**transition**' fuels for a long(er) time – but no further growth

Capex investments in **oil&gas to plateau**, in **renewables to grow** rapidly

- We could face **shortages** caused by **geopolitics, under-investment**, **uncertainties**
- Big issue: **revamping** the **supply chains** by incumbent players

Beware **surprises** from **new entrants!**

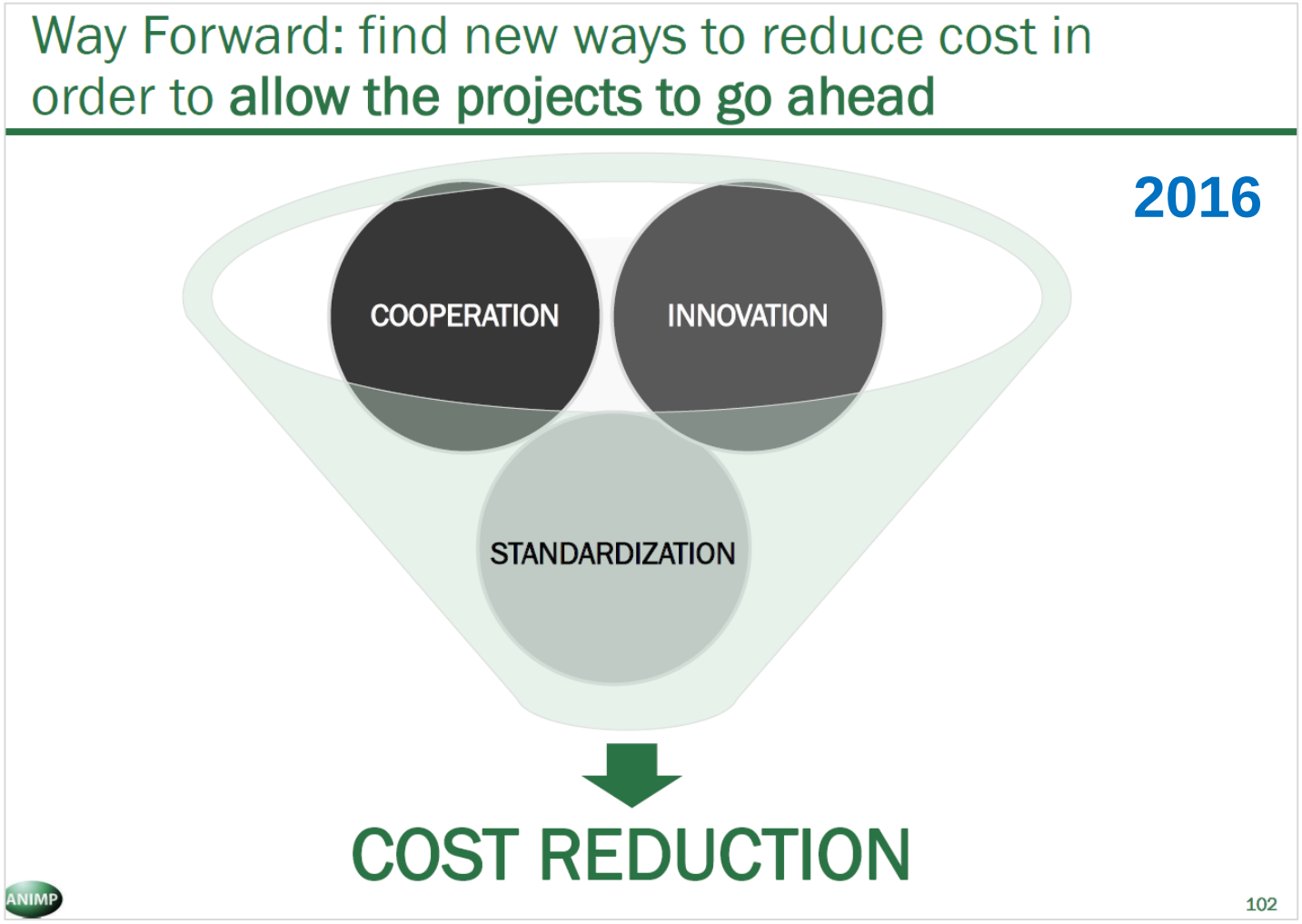
AGENDA

Market Trends

Top 5 Trends in Supply Chain

(G. Franchini)

TOP Trends in Plant Engineering Supply Chain



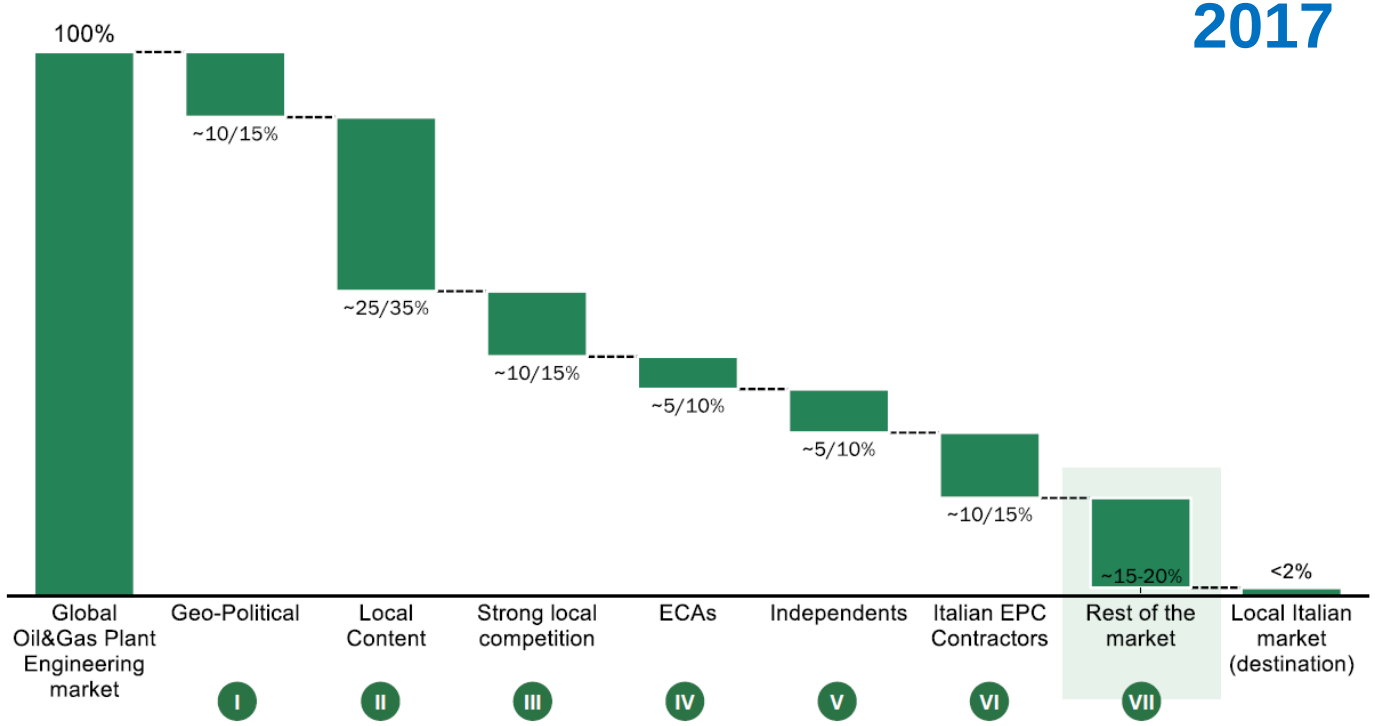
TOP Trends in Plant Engineering Supply Chain

VII Rest of the Market

Breakdown of the Global Oil&Gas Plant Engineering market, 2016-2019

ILLUSTRATIVE

2017



Source: SupplHi analysis on the SupplHi Projects Database

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ENERGY INDUSTRY GLOBAL MARKETS FORECAST, October '17

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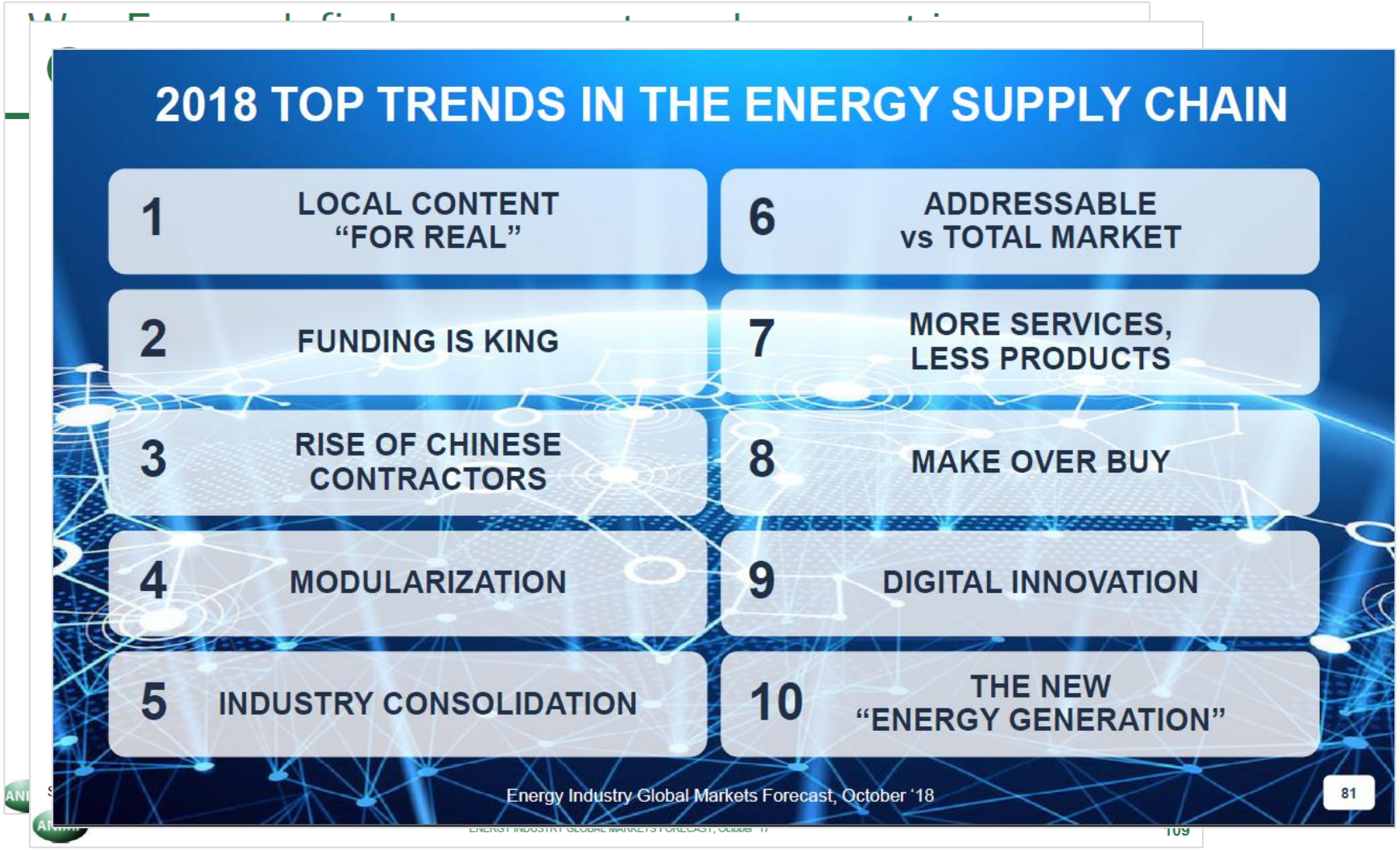
TOP Trends in Plant Engineering Supply Chain



TOP Trends in Plant Engineering Supply Chain

TOP Trends in Plant Engineering Supply Chain

TOP Trends in Plant Engineering Supply Chain

TOP10 Trends in B2B Industrial Supply Chain, 2021

ranking 2021		ranking 2020	ranking 2019	trend	
1	POST-COVID COSTS ESCALATION	-	-	⇈	New
2	CAPEX CHALLENGE (BUNDLE & UNBUNDLE)	2	1	→	
3	ESG SUSTAINABILITY	4	4	↑	
4	CARBON EMISSIONS	6	-	⇈	
5	LOCAL CONTENT	3	2	↓	
6	ENERGY TRANSITION (H2, ...)	1	7	↓	
7	VISIBILITY & SUPPLIER ENGAGEMENT	-	-	↑	New
8	DIGITAL & STANDARDIZATION	5	5	→	
9	PROJECT MANAGEMENT	8	8	→	
10	INDUSTRIAL POLITICS	10	10	→	

ANIMP Source: SupplHi analysis

ENERGY INDUSTRY GLOBAL MARKETS FORECAST, OCTOBER 2021 73

TOP Trends in Plant Engineering Supply Chain

TOP5 Trends in Plant Engineering Supply Chain | 2023

1 THE RETURN OF GIANT PROJECTS

2 THE CENTRICITY OF MIDDLE EAST

3 LOCAL CONTENT

4 NET ZERO

5 RISK RESILIENCE

1 Boom in Oil&Gas projects, driven by under-investment

2020-2022 under-investment

The energy industry has been under-investing since the peak of 2014, with investments in **traditional energy (Oil&Gas Upstream) falling 50% in 2020 from the peak** and driving an 18% reduction in global primary energy investments, from $1.3trn in 2014 to $1trn in 2020

Depletion & loss of production

Several Oil&Gas **project investment decisions have been delayed since 2014**, translating into 10 mn bl/d of lost oil production by 2024-25 – equivalent to Saudi Arabia's annual production – and 3 mn boe/d of lost LNG production – more than Qatar.

Energy Sustainability not able to compensate

The focus has shifted in recent years to **energy sustainability**, but the overall growth of the investments in renewables has **not been sufficient to compensate** for the abrupt drop in investments in the traditional energy space, given the smaller scale and higher capital intensity per unit of energy output.

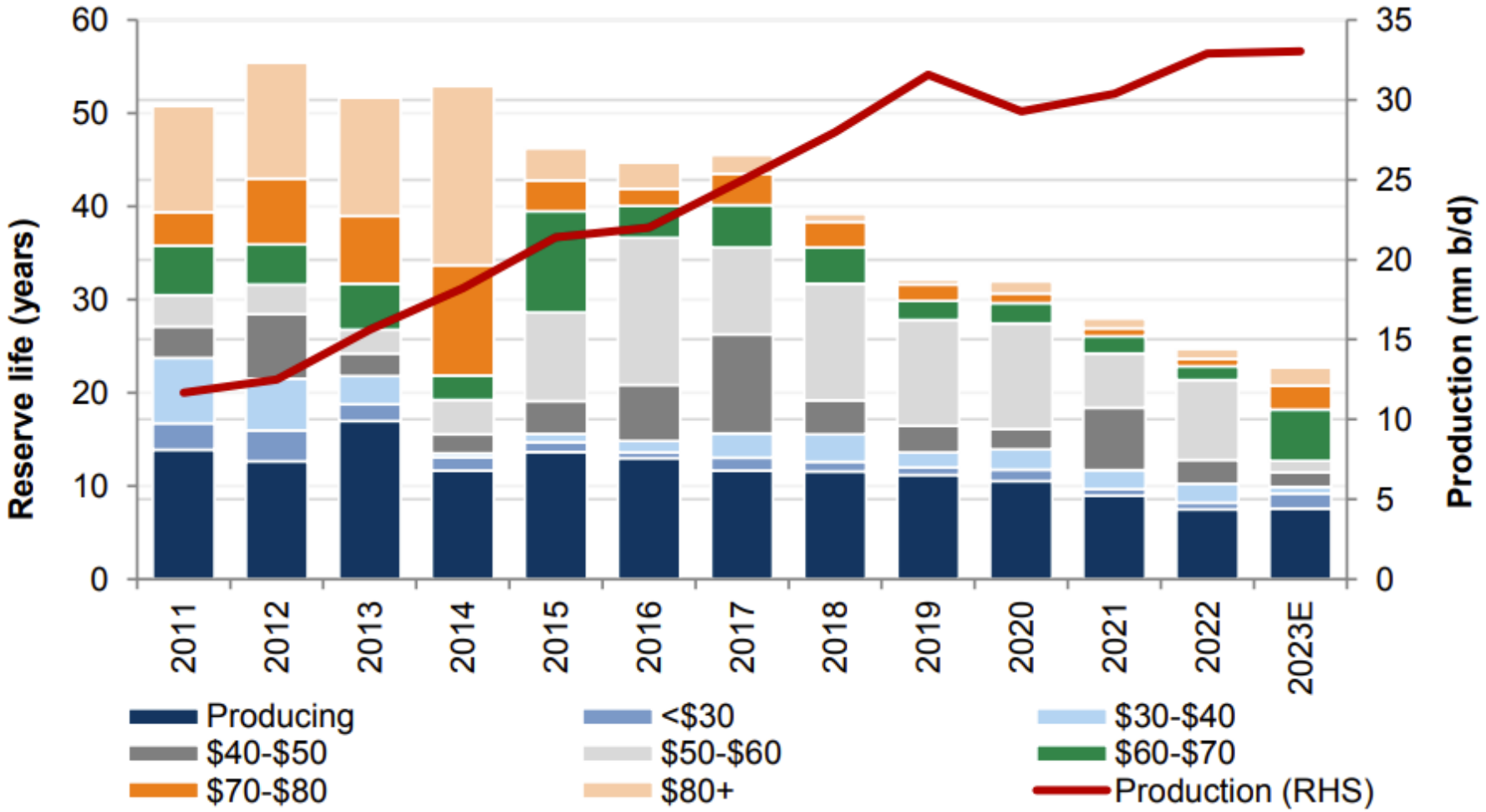
New Boom, driven by LNG and Deepwater

Annual CAPEX in long-cycle oil & gas mega-projects to exceed $150B by 2024, almost 3.0x the level of the trough in 2020, driven by a **strong recovery in LNG and Deepwater**, driving a return of double-digit oil & gas capex growth for the first time in a decade

Source: Goldman Sachs Global Investment Research – Top Projects 2023

1 7 years of energy under-investment have pushed the Oil&Gas industry to more than halve its resource life since 2014

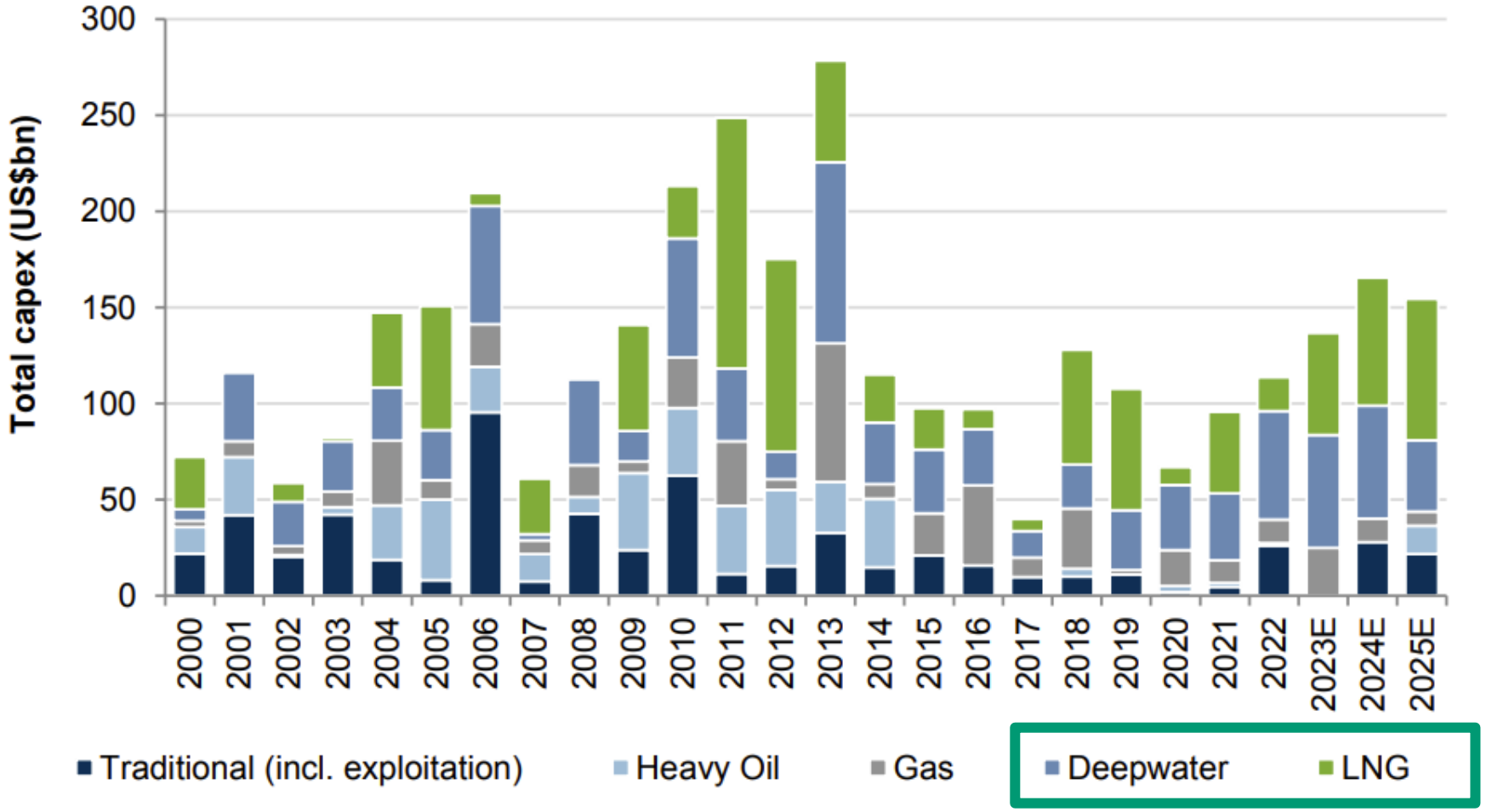
Top Projects reserve life, and year of report



Source: Goldman Sachs Global Investment Research – Top Projects 2023

1 Renewed focus on energy security is re-igniting Oil&Gas CAPEX commitments

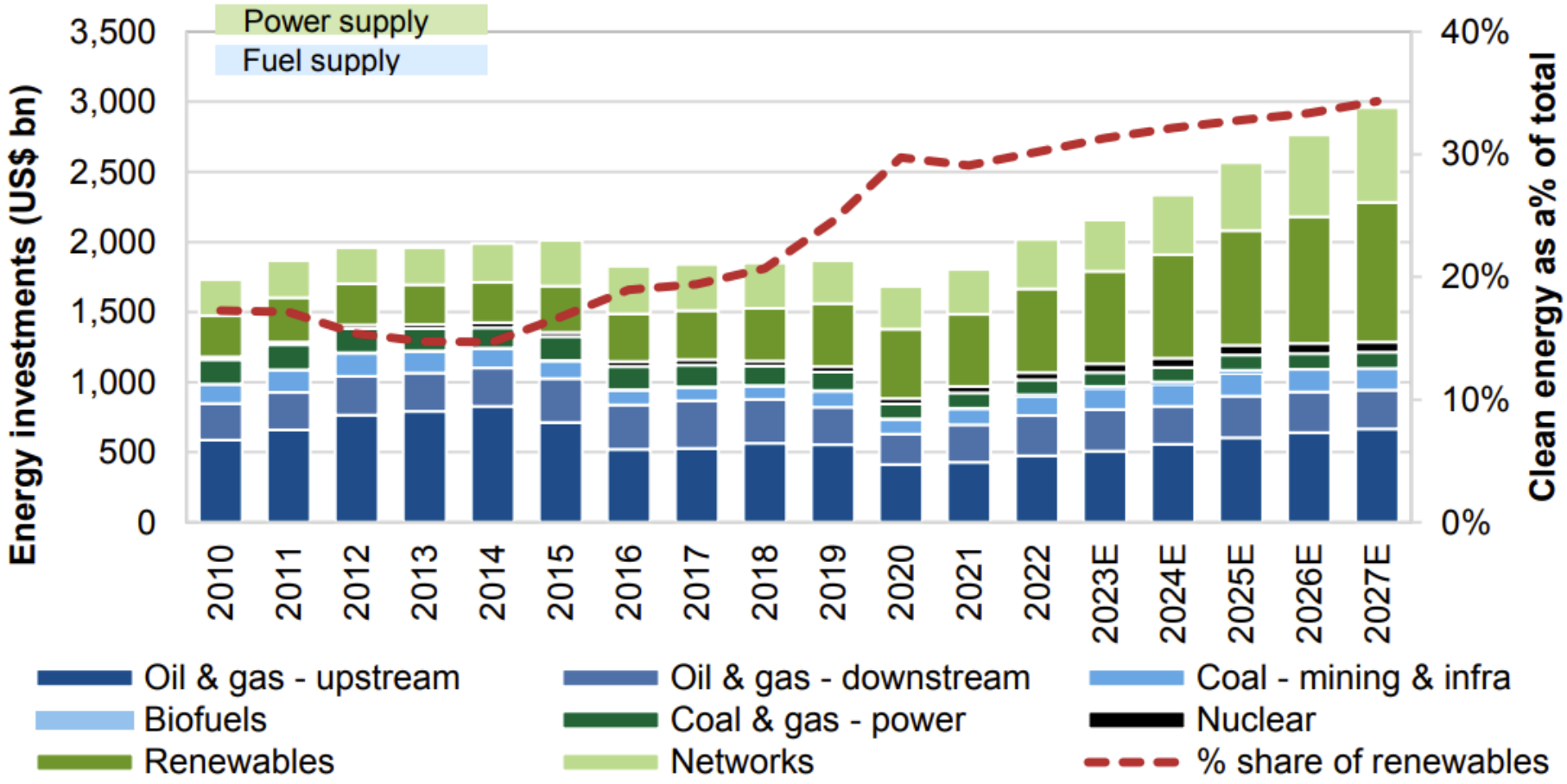
Top Projects CAPEX sanctioned by year, excluding Russia



Source: Goldman Sachs Global Investment Research – Top Projects 2023

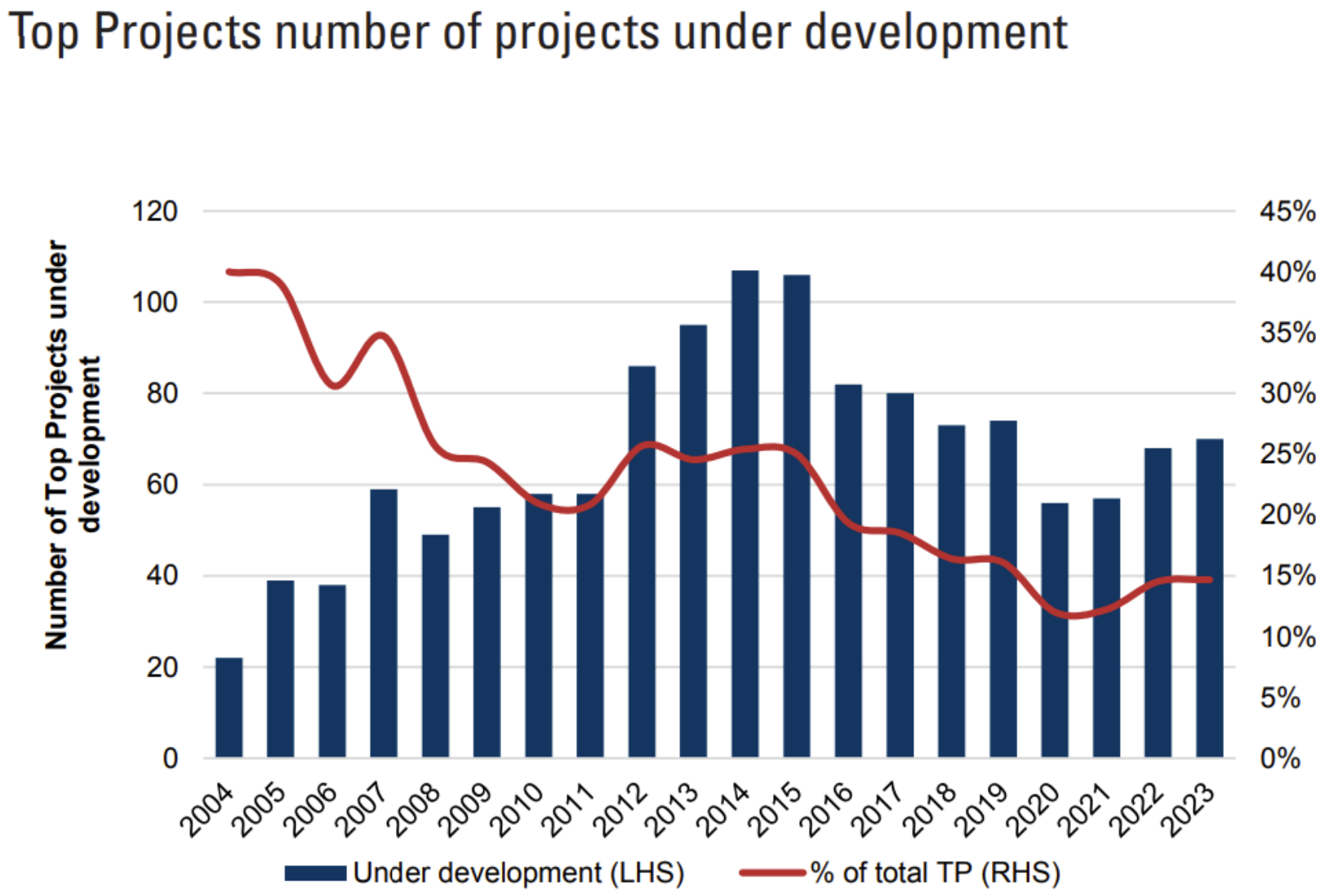
1 Primary Energy CAPEX is expected to grow 48% by 2027

Primary energy supply capex split by source (US$bn) and renewables share as a % of total (%)



Source: Goldman Sachs Global Investment Research – Top Projects 2023

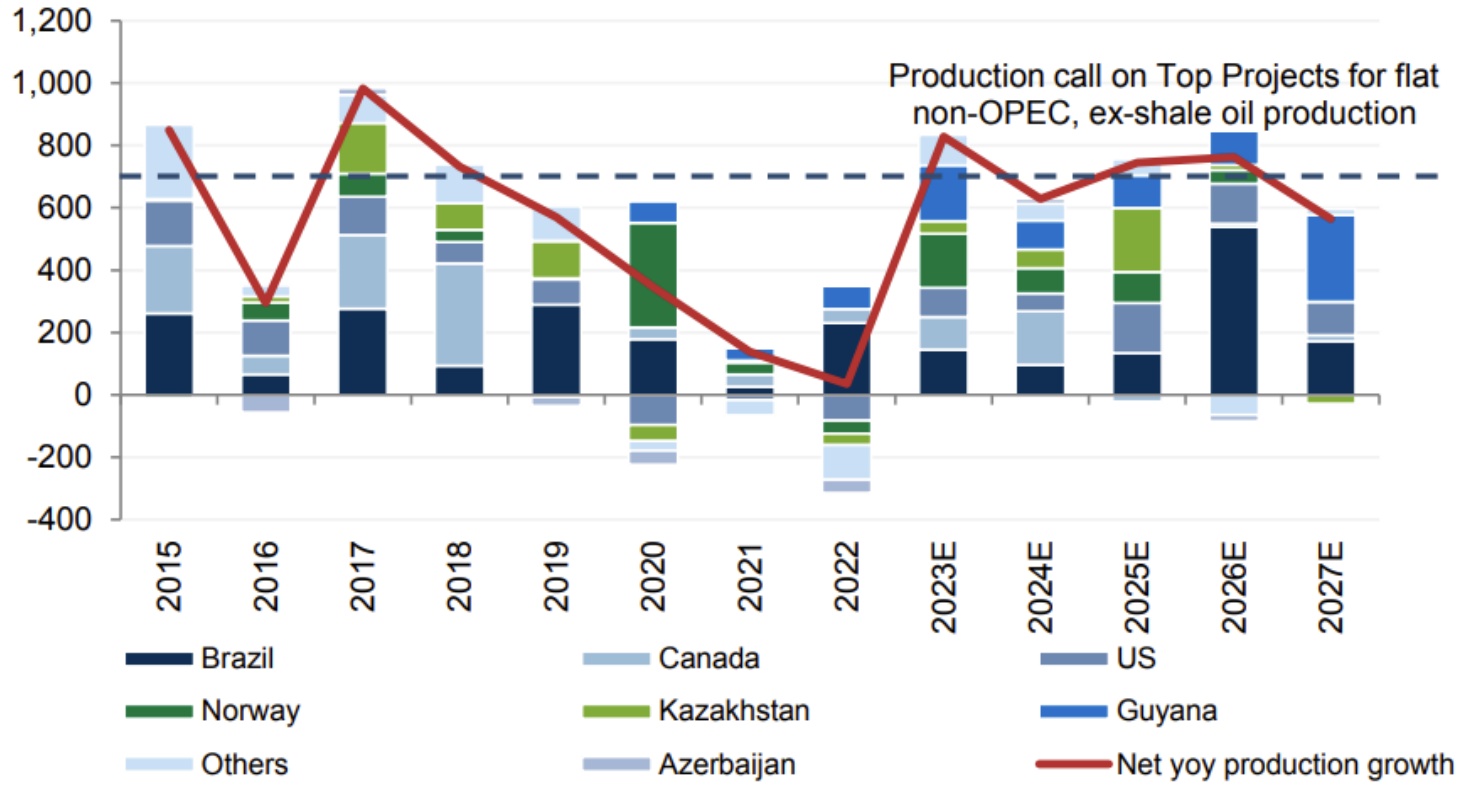
1 Currently, 70 giant projects are under development, 25% more than in 2020



Source: Goldman Sachs Global Investment Research – Top Projects 2023

2 Non-OPEC production expected to be broadly flat

YoY oil production growth (kbl/d) from non-OPEC and ex-Russia, ex-shale, shown excluding and including impact of production shut-ins



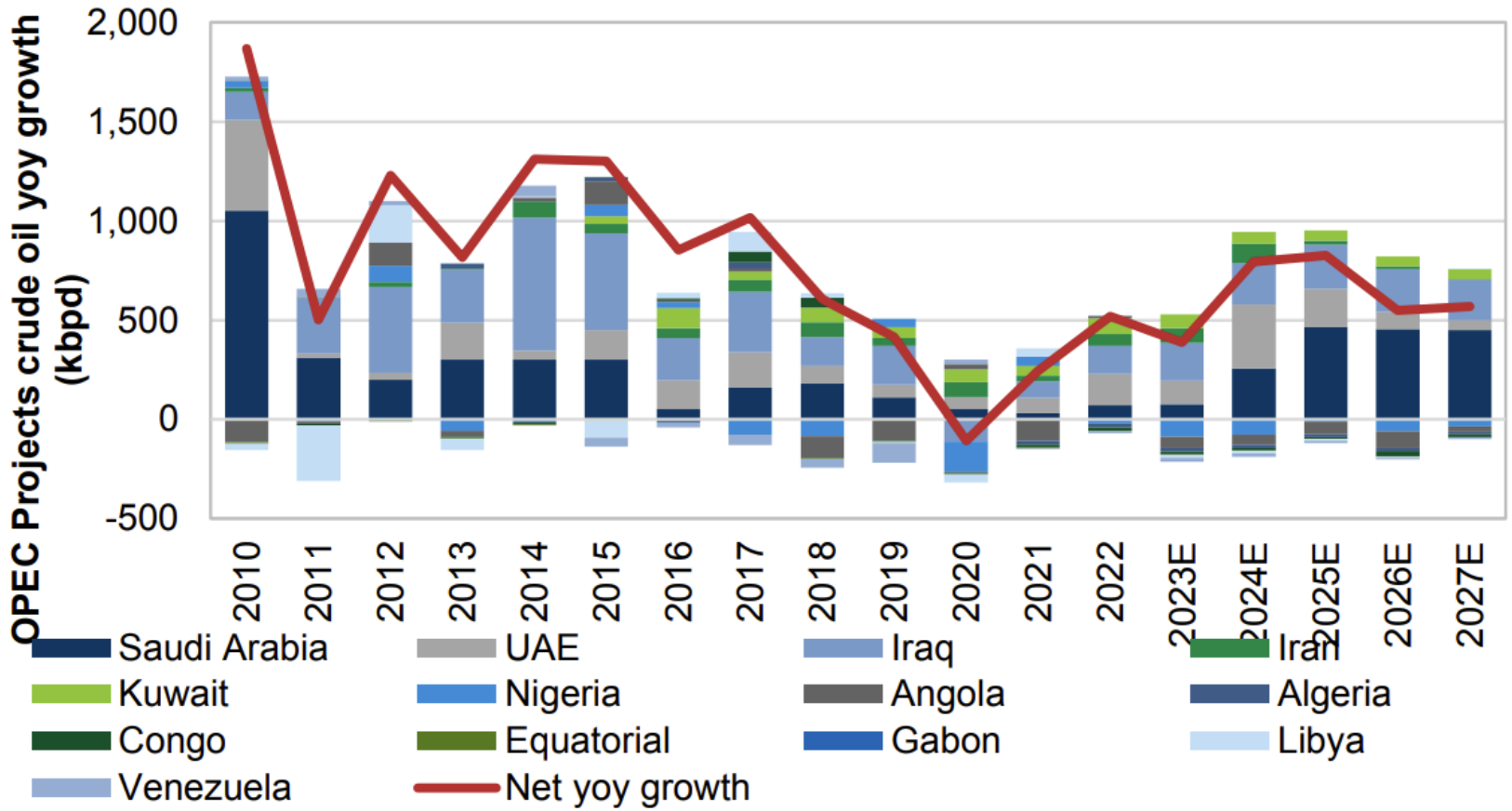
Main non-OPEC Countries with 2023-2027 Oil&Gas CAPEX

- BRAZIL
- CANADA
- USA
- NORWAY
- KAZAKHSTAN
- AZERBAIJAN
- GUYANA

Source: Goldman Sachs Global Investment Research – Top Projects 2023 – Excluding Russia

2 OPEC capacity growth, mostly in KSA and UAE

OPEC projects yoy oil production growth (kbl/d)



Main OPEC Countries with 2023-2027 Oil&Gas CAPEX

- KSA
- UAE
- QATAR
- IRAQ
- IRAN
- KUWAIT

Source: Goldman Sachs Global Investment Research – Top Projects 2023

3 Local Content comes in multiple shapes

Main Countries with LC policies

- KSA
- UAE
- QATAR
- OMAN
- BRAZIL
- GHANA
- KAZAKHSTAN
- INDONESIA
- MALAYSIA
- VIETNAM
- NIGERIA

…

- **LC regulations** differ from country to country, requiring a tailored approach
- The real Local Content to be delivered requires all the **key sub-supplies and sub-works to be performed locally**
  - foundries
  - forges
  - heat treatment
  - mechanicals works


IN-COUNTRY VALUE CERTIFICATE

Certificate ID:
Issue Date: 21.03.2021
Valid Until: 14.09.2021

LLC

%

Company General Information
License No.: CN-
Company Type: SME in UAE
Financial Year End Date: 31.12.2019
Company based in: Within UAE
Company Business: SERVICE PROVIDER

For Cases of Re-Certification
Re-Certification (*) No.:

Reason for this Re-Certification

Signed By
On behalf of Supplier
Name:
Designation:
CEO/Managing Partner

Verified as per ICV Agreed Upon Procedures (AUP)
On behalf of Certification Body
Name: Electronically signed by
Designation:
Company:

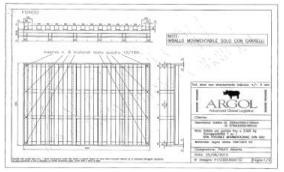
Certificate Issued Based on ICV Version: 3.0

Source: clippings

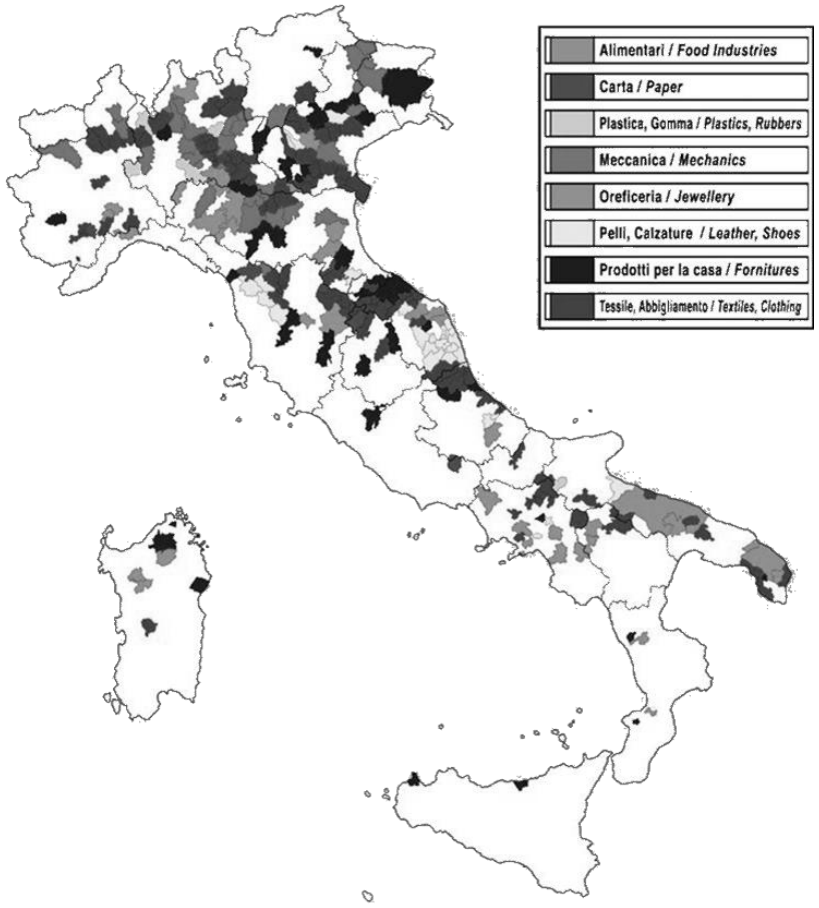
3 The menu for «Local Content» creation

«Light» **Activities for Local Content** «Heavy»

SHARED INFRASTRUCTURE

Workshop	Painting and Coating 	Sandblasting and Welding 	Assembling 	Testing 	Machining 	Manufacturing 
Office space & resources	Co-Working for commercial offices 	"Staff" (Admin, Finance, HR, Document Controller, …) 	Training to local resources 	Expediting & Inspection 	After-Sale Assistance 	Engineering & Project Mgmt 
Traditional Logistics	Logistics Documentation 	Shipment 	Packaging 	Warehouse 	Stock / after-market 	Material Management 

3 How to localize our tradition in Industrial Districts?



COLLABORATION

+

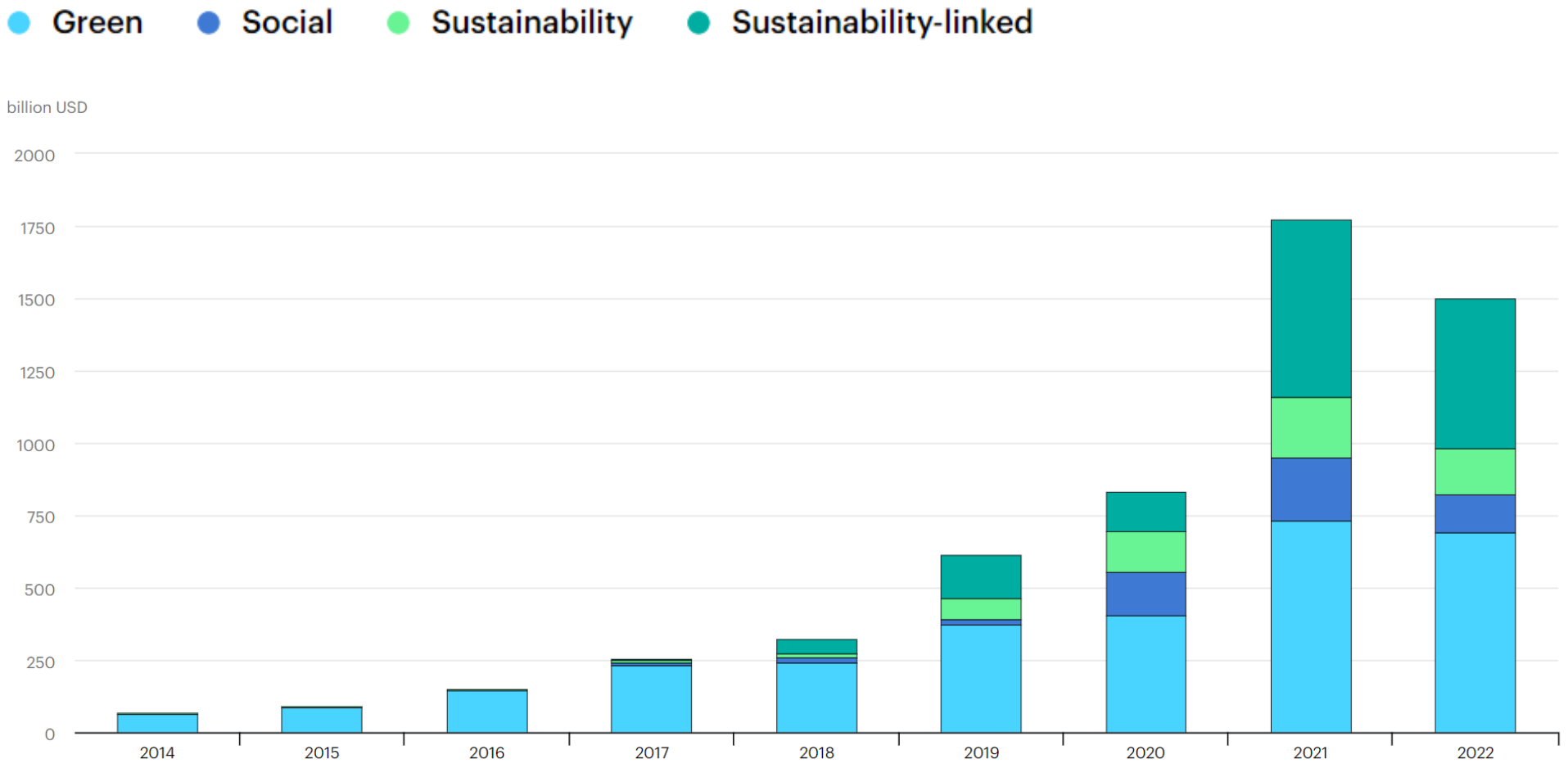
SHARED INFRASTRUCTURE

+

SPECIALIZATION

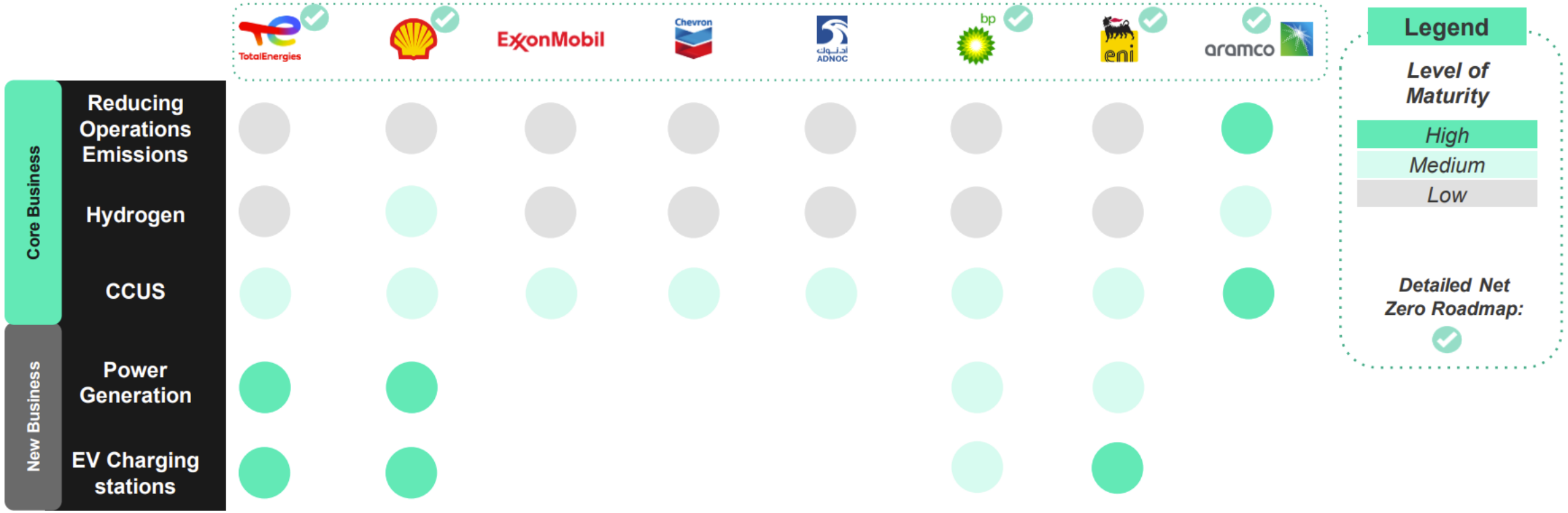
4 Finance is always Greener

Sustainable debt issuances by theme, 2014-2022



Source: IEA analysis (2023) based on Bloomberg and Environmental Finance, October 2023

4 Not all Major Oil Co. have fully disclosed their Net Zero Roadmap

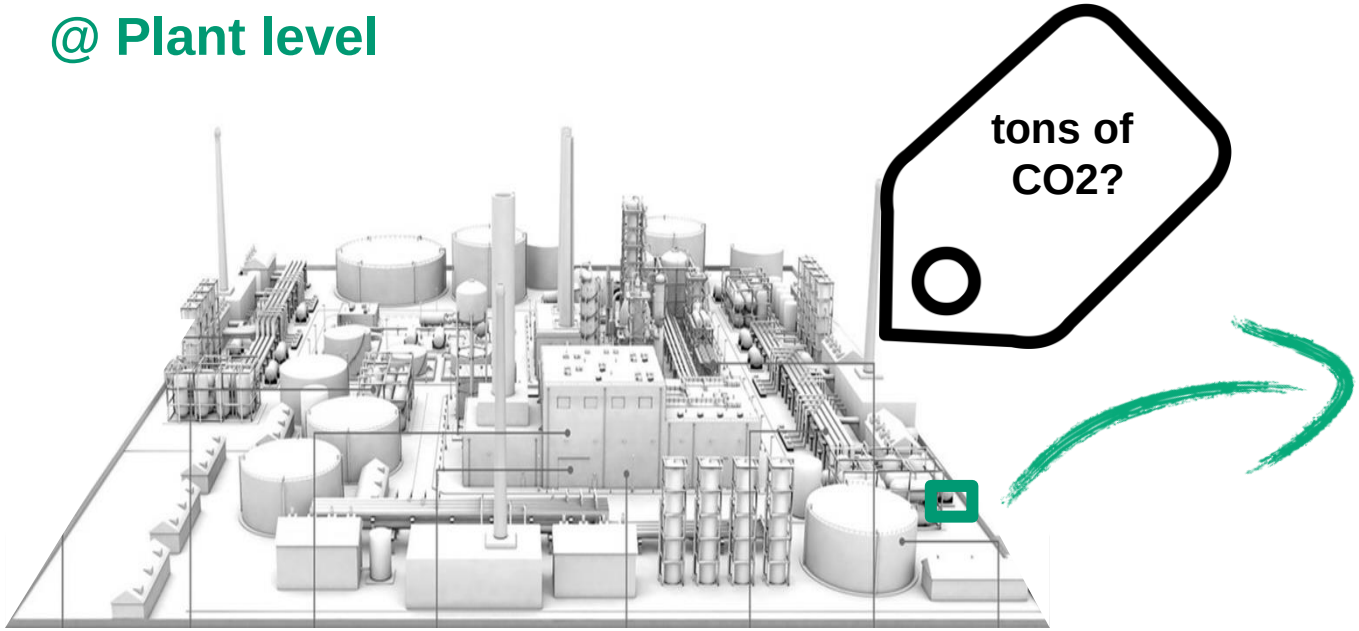


- Not all companies have fully disclosed their Net Zero Roadmap
- Hydrogen & CCUS are two technologies that make consensus between the studied companies
- European supermajor diversify in electrification unlike extra-European which focus on their core business

Source: SIAPartners, “Achieving Net Zero: Strategies in the Oil & Gas Industry” March 2023

4 Scope 3 GHG Emissions require Transparency

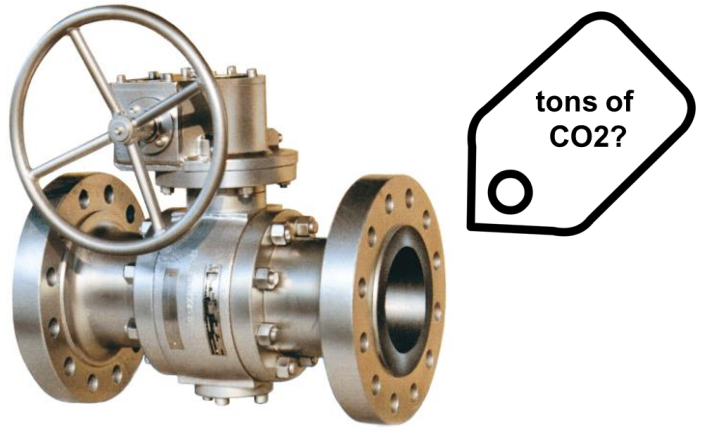
@ Plant level



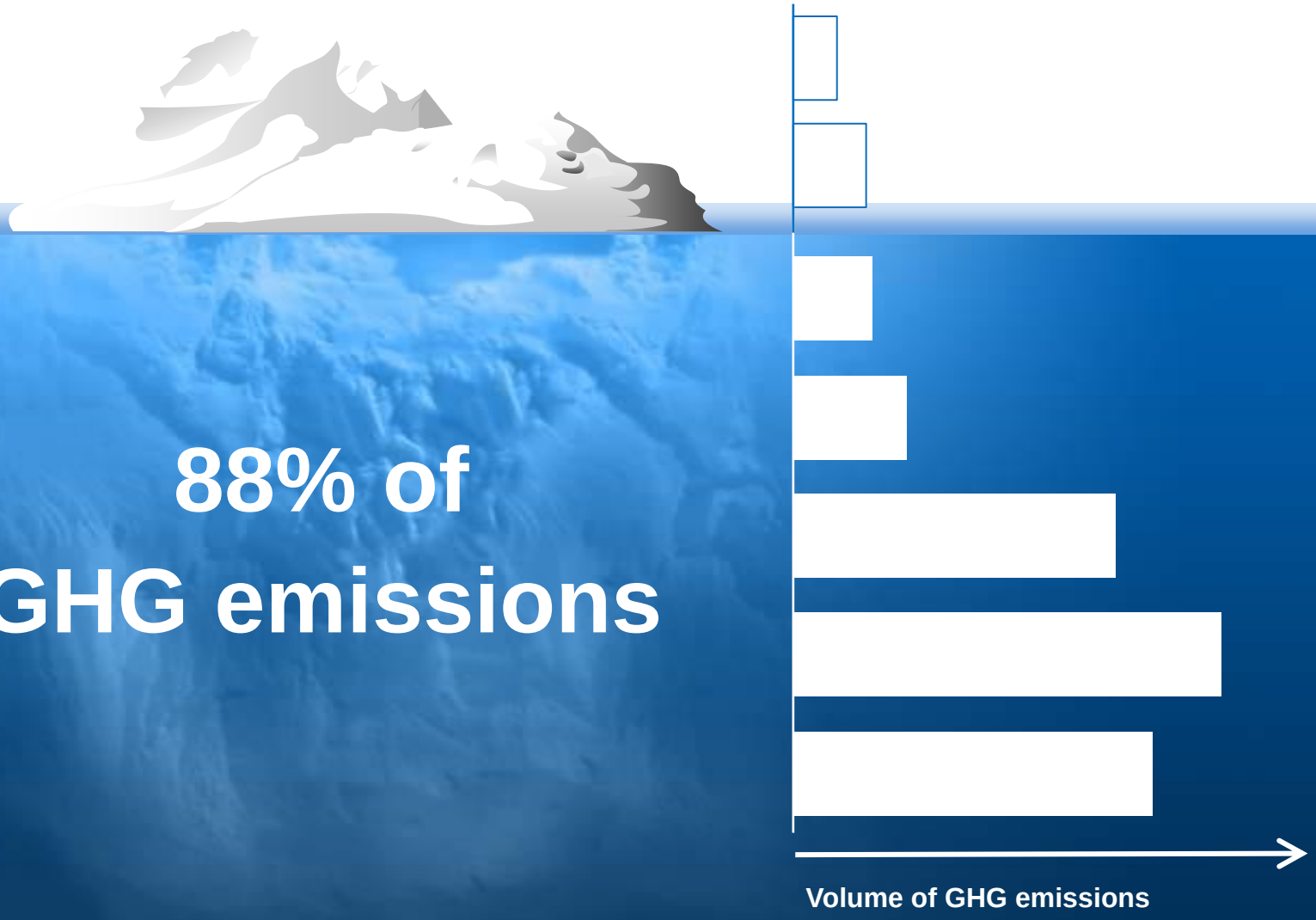
Each project to have its own Carbon Footprint certificate over its entire lifetime:

- Production of raw materials
- Fabrication of equipment
- Logistics
- Installation
- Usage

@ Equipment level

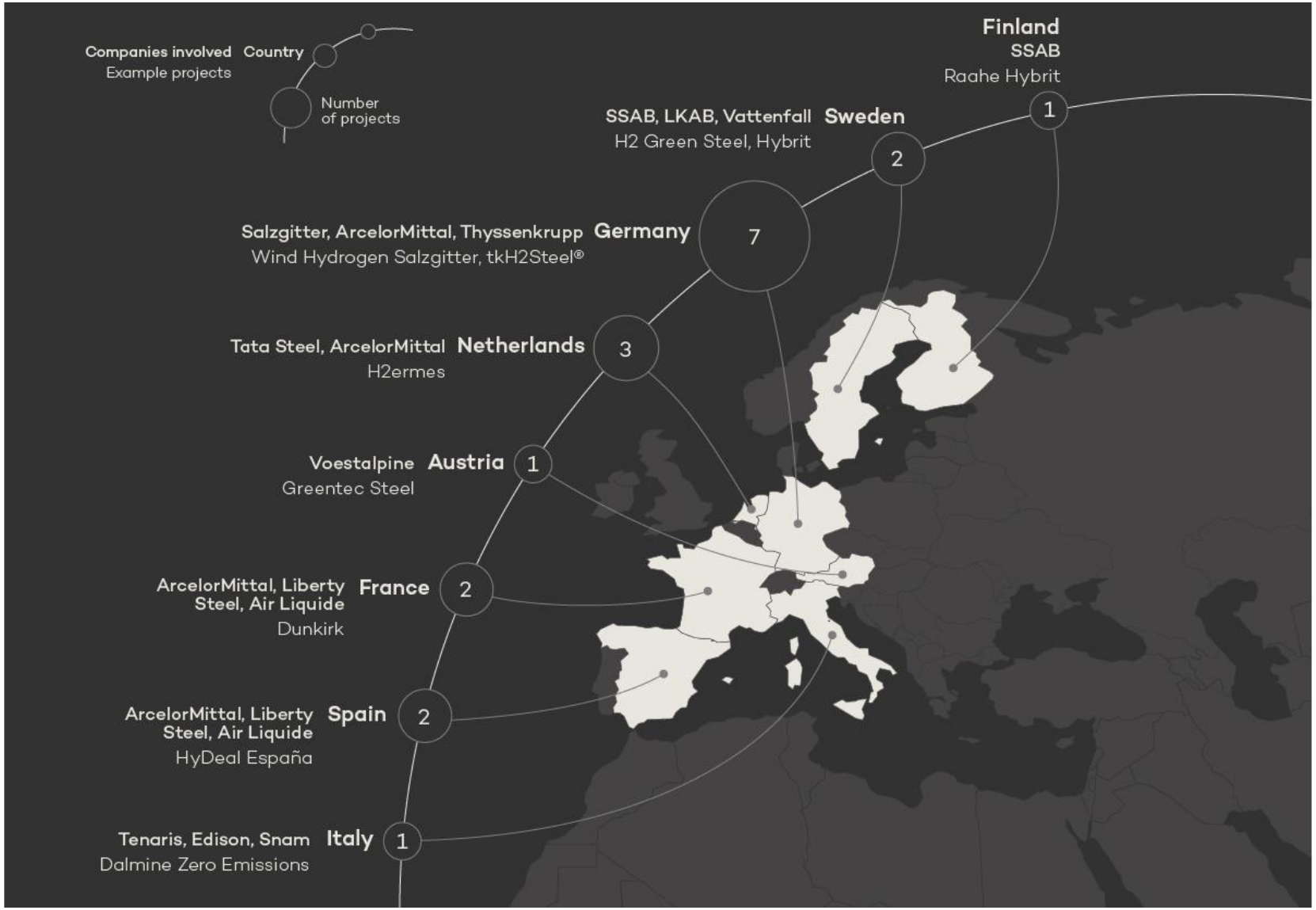


4 GHG Emissions are deep in the Supply Chain



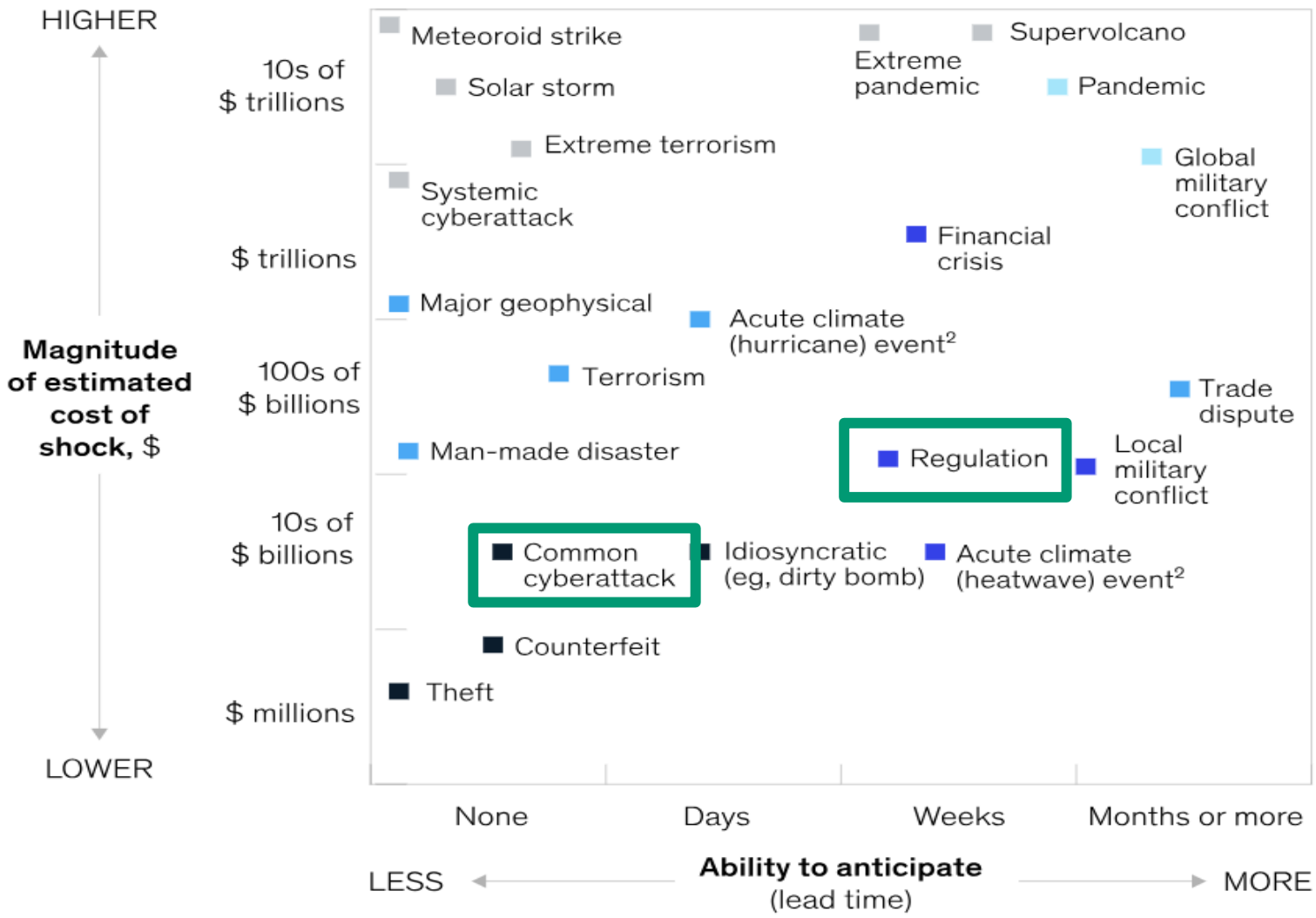
Source: SupplHi *Carbon Tracker*

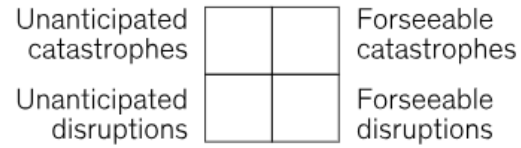
4 Europe is leading the way in Green Steel production



Source: Visual Capitalist

5 Disruptions are calling for risk monitoring & resilience in supply chains …





More frequent ■■■■ Less frequent

■ Has not (yet) occurred at scale[1]

Source: McKinsey – Risk, resilience and rebalancing in global value chains

5 … also driven by the expectation of more frequent and severe disruptions

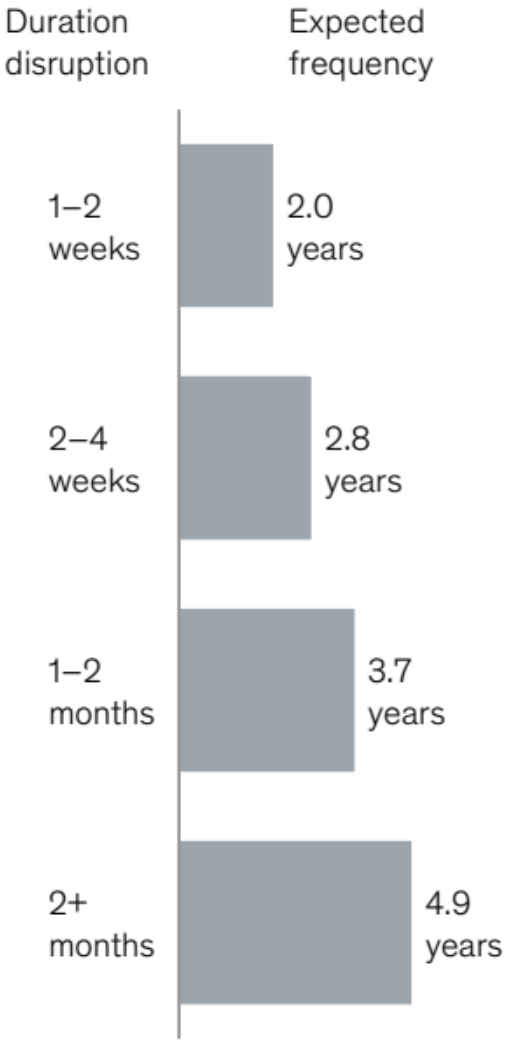
Firms can expect a supply chain disruption lasting a month or longer to occur every

3.7 years

Source : McKinsey

Expected frequency of a disruption, by duration, years

Based on expert interviews, n = 35



Source: McKinsey – Risk, resilience and rebalancing in global value chains

Opportunities for the Italian Supply Chain

GIANT PROJECTS	**How to better collaborate to work & deliver together?**
MIDDLE EAST	**What's next after the Large EPC Contracts recently awarded to Italian Contractors?**
LOCAL CONTENT	**How to collaborate and differentiate in LC delivery?**
NET ZERO	**How to support a Net Zero plant with a reduced Environmental impact of products and services?**
RISK RESILIENCE	**How to achieve higher transparency in supply chain for a deeper Risk Monitoring?**

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Sezione Componentistica D'impianto

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November 7th, 2023

Thank you for your attention