Energy
Transitions
Commission

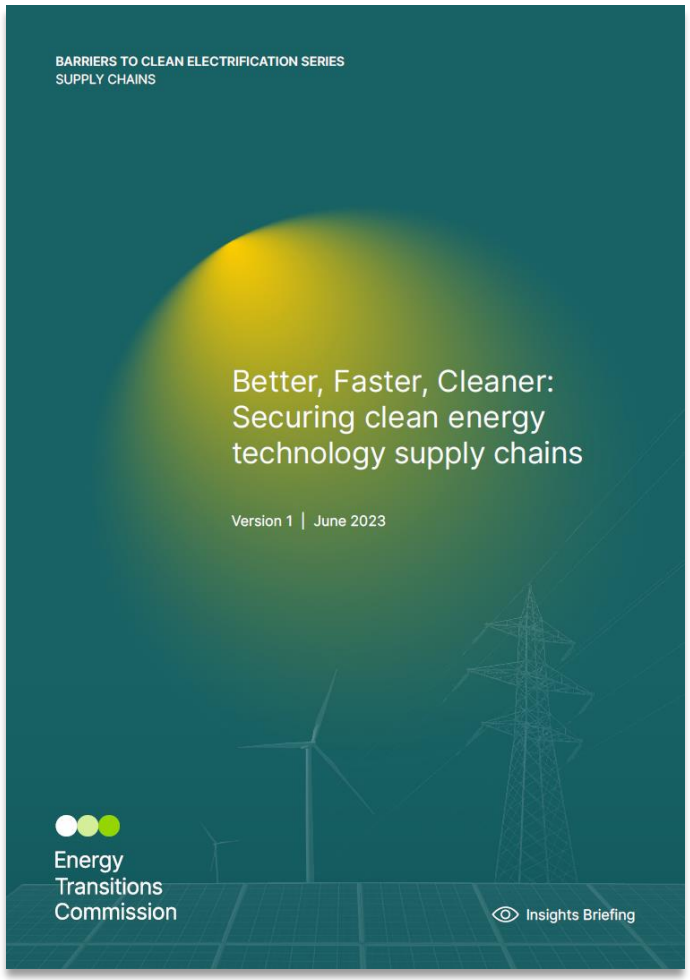
Key Debates

ETC Commissioners meeting

27th June 2024

Key debates 1 – Supply chains

Reminder: the ETC looked at clean energy supply chains in 2023



June 2023

<u>Conclusion</u>: at the global level, there are no inherent barriers to the scale-up of clean energy supply chains.

However, three **cross-cutting risks** require **clear actions** from policymakers and industry:

1. There **could be tight markets for some key input materials**, notably for some raw materials (lithium, copper) as well as shorter-lived volatility or delays for some more complex components.

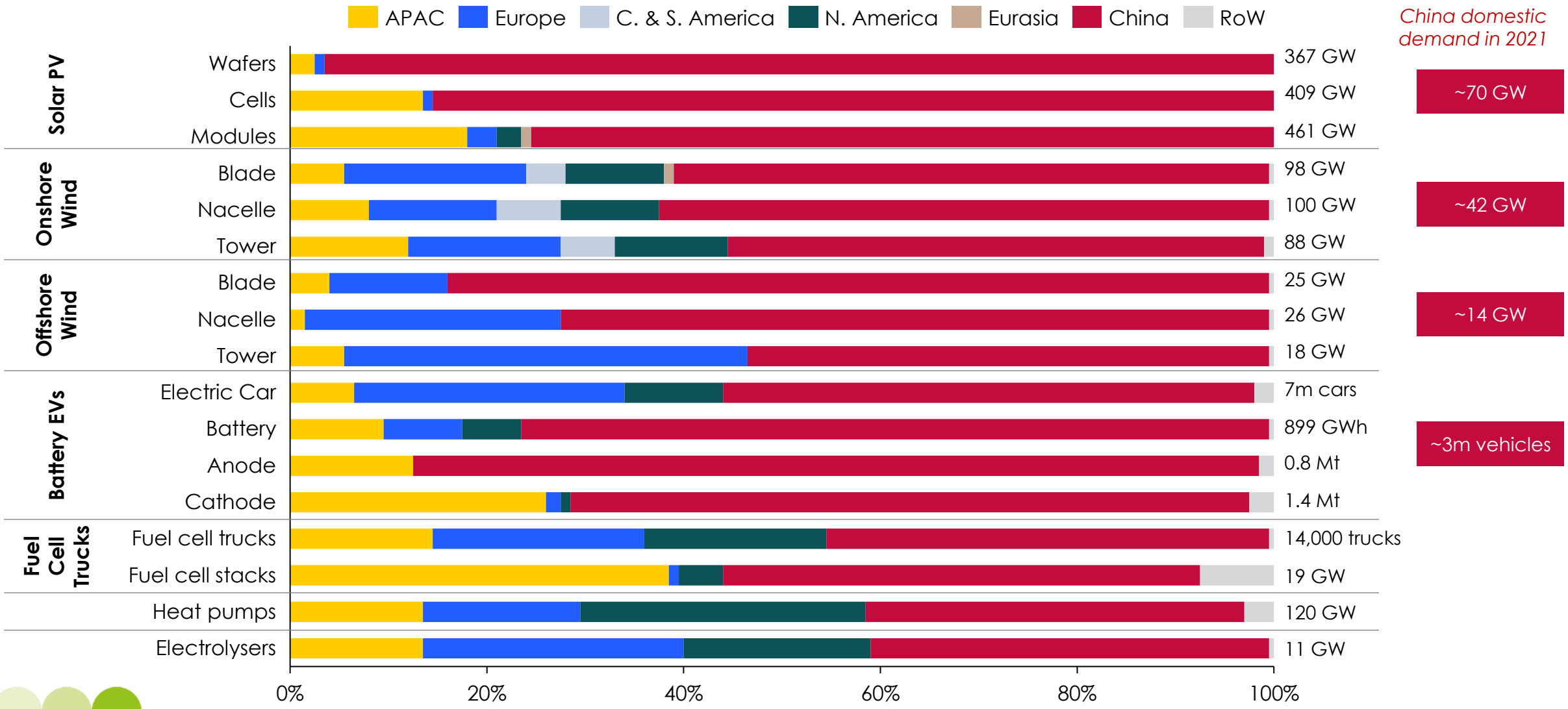
2. There are **specific environmental and social risks** especially relevant to solar PV and batteries.

3. There is a **high degree of concentration of production** across many steps of clean energy technology supply chains.

Focus of this presentation

Today, China dominates many segments of clean energy technology supply chains

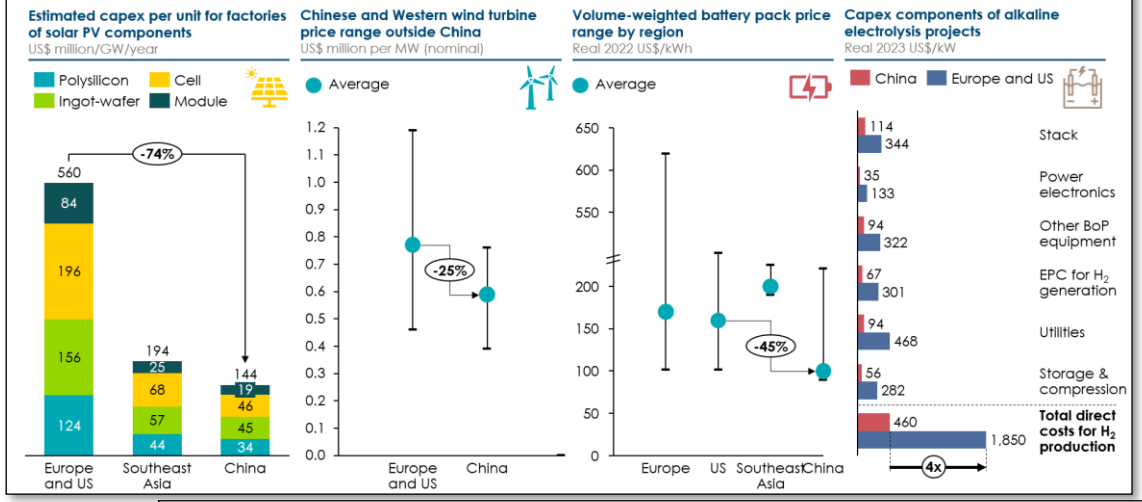
Share of global manufacturing capacity for clean energy technologies and components, 2021, %



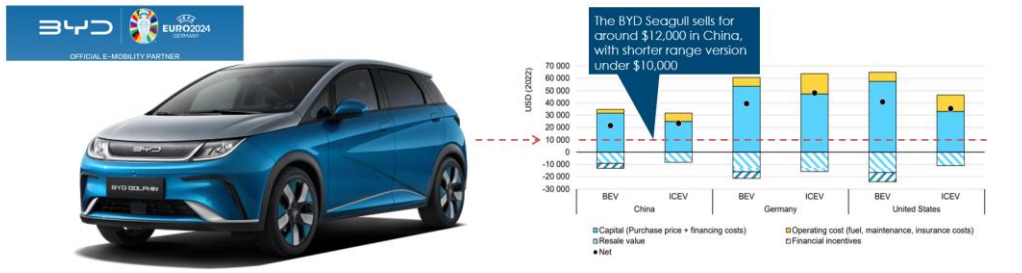
Source: IEA (2023), *Energy technology perspectives*

China has been at the core of cost reductions and technology advancement in key sectors

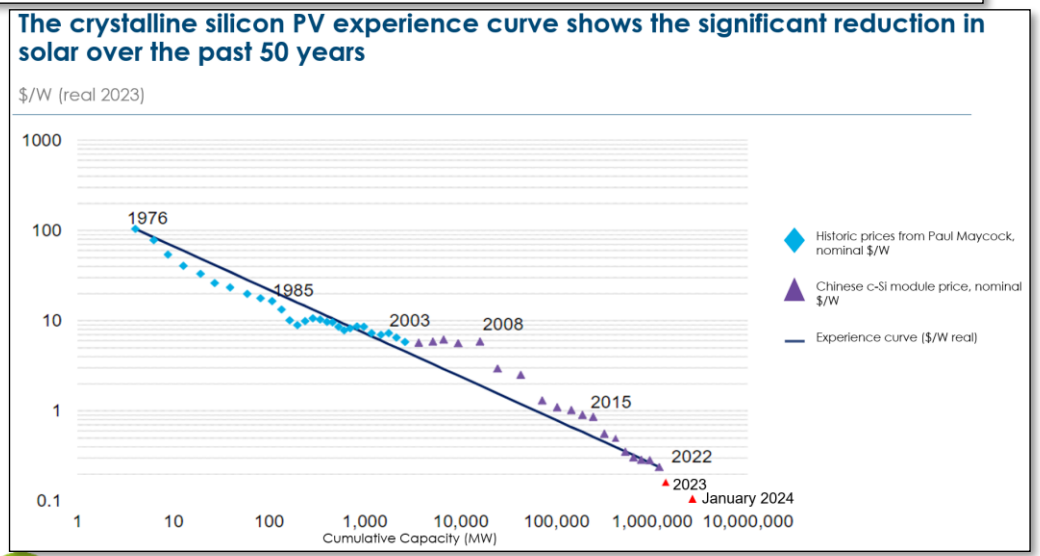
China is more cost competitive than other countries across all major clean energy technologies



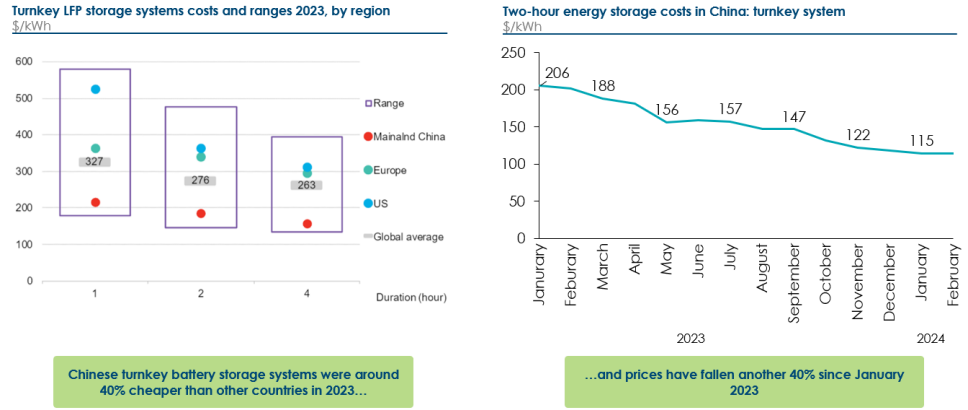
Speed of uptake is dependent on total cost of ownership – the BYD model in China shows that low cost is achievable



The crystalline silicon PV experience curve shows the significant reduction in solar over the past 50 years



In China, battery storage system prices were already the lowest in the world, and have fallen rapidly in the past 12 months



Five major components have driven China's competitive position

Economies of scale	• Larger-than-average scale of manufacturing units enabling lower costs per unit
State & financial support	• Cheap financing • Strong drive for export-led model of development • Clear five-year plans with targets for energy, manufacturing etc
Carbon & environmental costs	• Somewhat neglected historically, e.g. not dealing with environmental impacts of REE[i] mining, no carbon price until v recently for power • Trade-off in favour of economic development
Export infrastructure	• Extensive country coverage with large-scale export infrastructure
Domestic demand	• Growing domestic capacity to meet rising demand • Domestic renewables installations have risen rapidly – largest solar PV, onshore wind, BEV market

Lower manufacturing costs

Note: [i] REE – Rare Earth Elements

Public discourse on this re-balancing varies significantly across key geographies

	**Concerns on national security risks** dominate US government public discourse for challenging supply chain status quo	**Sen. Chuck Schumer Calls for Probe of Chinese Rail Tech Amid Security Concerns** Security experts and members of Congress have raised the alarm about CRRC because it is owned by the Chinese government, warning of prior cyberthreats and hacking attacks linked to Chinese intelligence officials **US House committees investigate Ford Chinese battery partnership** **Biden administration will investigate national security risks posed by Chinese-made 'smart cars'** Officials are concerned that features such as driver assistance technology could effectively be used to spy on Americans.
	The EU's approach is more concerned with **accelerating clean tech deployment whilst ensuring fair-trade practices**	**European Commission wary of trade measures to protect solar industry** The European Commission has warned about the potential impact of trade measures on Europe's renewable energy rollout, but has shied away from outlining emergency measures to address the continent's solar manufacturing crisis. **'Everything has changed': foreign auto groups embrace local technology in China** Mercedes-Benz boss urges Brussels to cut tariffs on Chinese EVs EU does not want to decouple from China but must protect itself, says EU trade chief
LATAM	LATAM countries **welcoming** of Chinese tech., **unsettling neighbours**	'Global China' is a big part of Latin America's renewable energy boom, but homegrown industries are key Lithium, essential for EV batteries, could be South America's white gold. Chinese green technologies are pouring into Latin America That is prompting anxiety in the United States about security, coercion and competition
	India **between** protectionism and deployment	**May 2023:** Exclusive: India considers cutting solar panel import tax to make up domestic shortfall **March 2024:** India to Resume Curbs on Solar Imports to Boost Local Producers

Key policy developments in clean energy supply chains since the publication of the ETC's June 2023 Report

Mapping of existing policies to build-up and protect domestic manufacturers (1 of 2)

Key takeaways:

- *China's strong domestic position enables it to focus on accelerating deployment.*
- *India, looking to boost nascent industry, proactively tries to build-up and protect domestic manufacturers.*

		Domestic manufacturing build-up	Domestic manufacturing protection[i]
	**Solar PV**	• **Central government deployment legislation**: China's central government adopted plan to install 1200 GW of solar and wind by 2030. • **Local government targets**: centralised legislation has been translated into yearly solar and wind installation targets for local governments, which drive project pipeline.	
	Wind		
	EV Batteries	• **Installation mandates**: 26 provinces have mandates for new utility-scale wind and solar projects to include an energy storage system.	
	**Solar PV**	• **Manufacturing subsidy**: production-linked incentive scheme for sales of domestic PV modules[ii].	• **Import tariff**: 40% tariff on modules imported from all geographies. • **Domestic content rules**: eligibility to certain government support schemes dependent on sourcing PV components from domestic sources.
	Wind	• **Concessional custom duty (CCD)**: CCD on the import of critical components for wind turbine production.	
	EV Batteries	• **Manufacturing subsidy**: production-linked incentive scheme (budget of US$ 2.4 billion) for manufacturing of battery components.	

Note: [i] Industry protection consists of trade barriers intended to favour domestic manufacturing. [ii] Production Linked Incentive (PLI) Scheme for High Efficiency Solar PV Modules, introduced in April 2021.

Mapping of existing policies to build-up and protect domestic manufacturers (2 of 2)

Key takeaways:

- *Though available US and EU funding are in theory comparable in size, US has been much more effective at operationalising access to funding than the EU.*
- *US is also taking a more aggressive stance on trade barriers, whereas EU is wary of slowing down pace of deployment.*

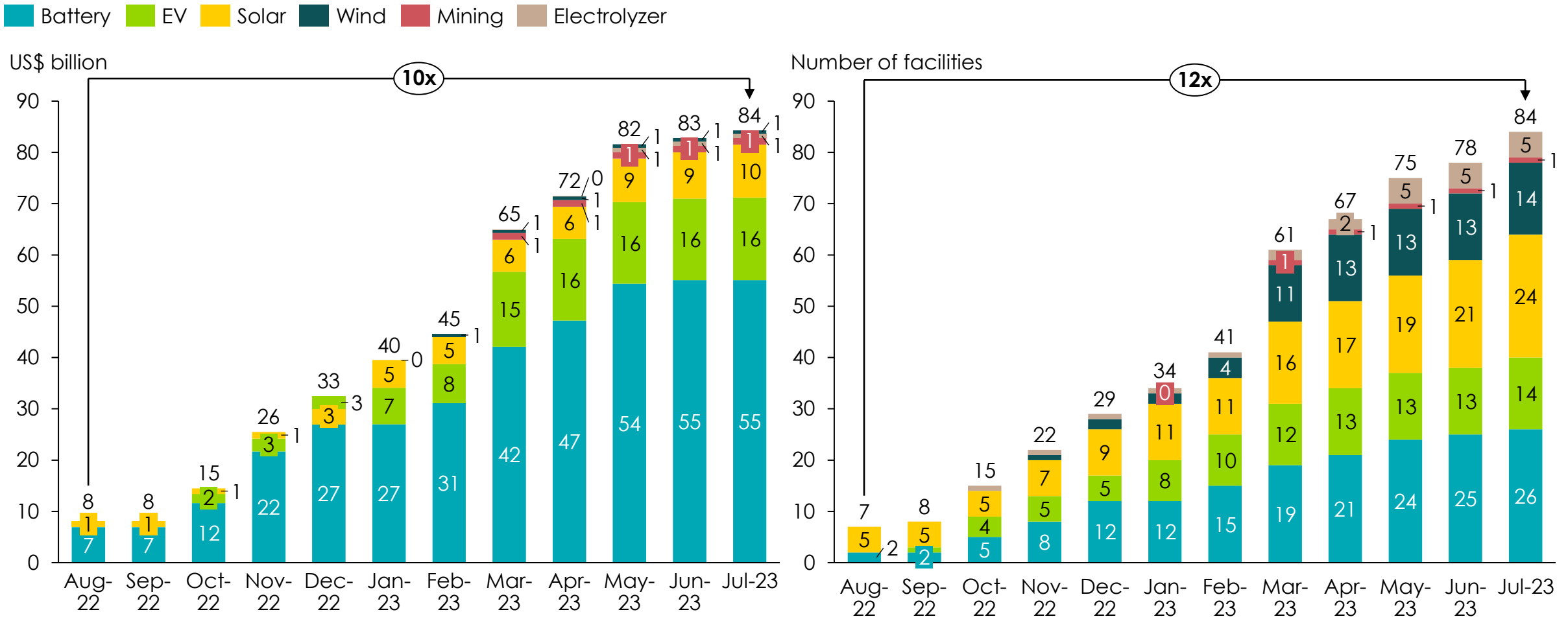
		Domestic manufacturing build-up	Domestic manufacturing protection[i]
	**Solar PV**	• **Grants**: available through ecosystem of EU funds, e.g. InvestEU and Innovation funds. • **Total of ~US$ 40bn** (~€ 37bn) available for clean energy manufacturing, but unclear and difficult access.	
	Wind		• **Anti-subsidy investigation**: EU anti-subsidy investigation into the imports of wind turbines from China
	EV Batteries		• **Anti-subsidy investigation**: EU anti-subsidy investigation into the imports of EVs from China
	**Solar PV**	• **Tax credits**: IRA[ii] offers production and investment tax credits (AMPTC[iii] and AEPITC[iii]) to domestic manufacturers of solar PV components, wind turbines and battery components. • **Total of ~ US$ 35bn** available for clean energy manufacturing, clear and easy access.	• **Import ban**: ban on import of solar PV products with components made in Xinjiang • **Import tariff**:14% import tariffs on PV cells and modules made in China
	Wind		
	EV Batteries		• **Subsidy ineligibility**: battery materials from 'Foreign Entities of Concern' (incl. China) make EVs ineligible for IRA consumer tax credit for purchase of new vehicle.

Note: Excludes policies from individual EU member states. [i] Industry protection consists of trade barriers intended to favour domestic manufacturing. [ii] IRA – Inflation Reduction Act. [iii] AMPTC - Advanced Manufacturing Production Tax Credit; AEPITC - Advanced Energy Project Investment Tax Credit.

US: passage of the IRA has led to an unprecedented boom in clean-tech manufacturing investments

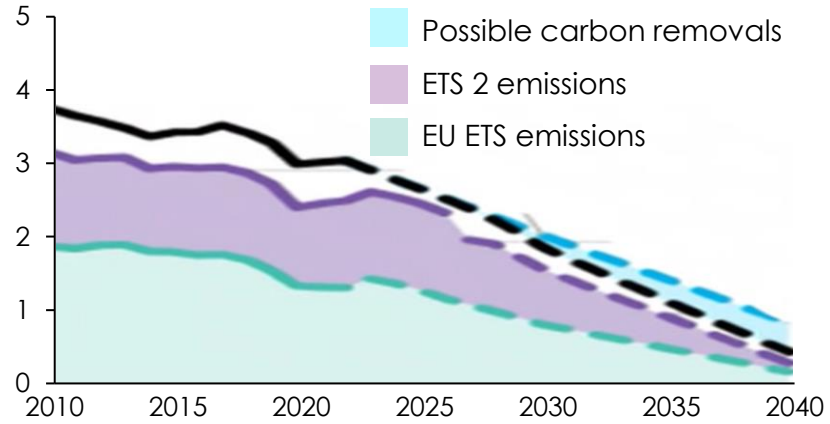
Investments in clean-tech manufacturing capacity since passage of IRA (Aug. 2022)

LHS: value of investments in US$ billions; RHS: number of facilities

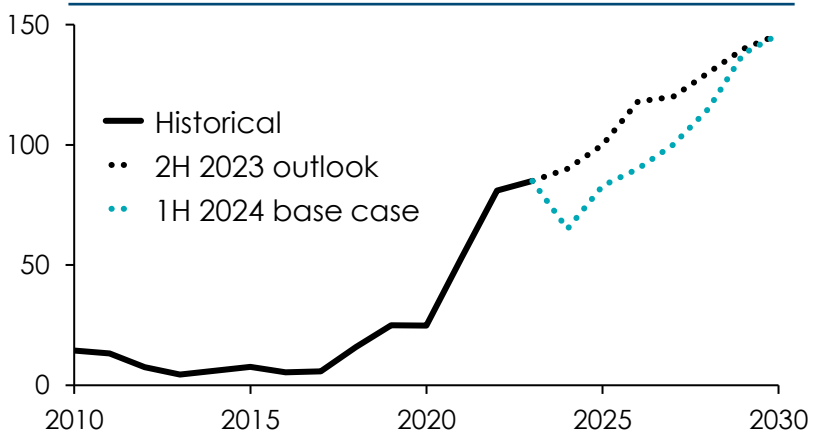


EU CBAM should be a major driver of industrial decarbonisation domestically and abroad

EU ETS emissions caps and possible 2040 target
Billion metric tons of CO2e



Historical and forecast price of EU emission allowances
EUR/metric ton, nominal



Carbon Border Adjustment Mechanism (CBAM)

- A price on the carbon emitted during the production of carbon intensive goods imported into EU
- Current transitional phase lasts between 2023 and 2025. Final phase from 2026
- Aligned with the phase-out of the allocation of free allowances under the EU Emissions Trading System (ETS)

EU Batteries Regulation

- Importers are required to make declarations on performance classes and maximum limits on the carbon footprint of light transport and rechargeable industrial batteries
- Implemented from 2024 onwards

Likely impact

- Accelerated decarbonisation of EU heavy industry
- Accelerated decarbonisation of industry and supply chains in other countries such as China and India?

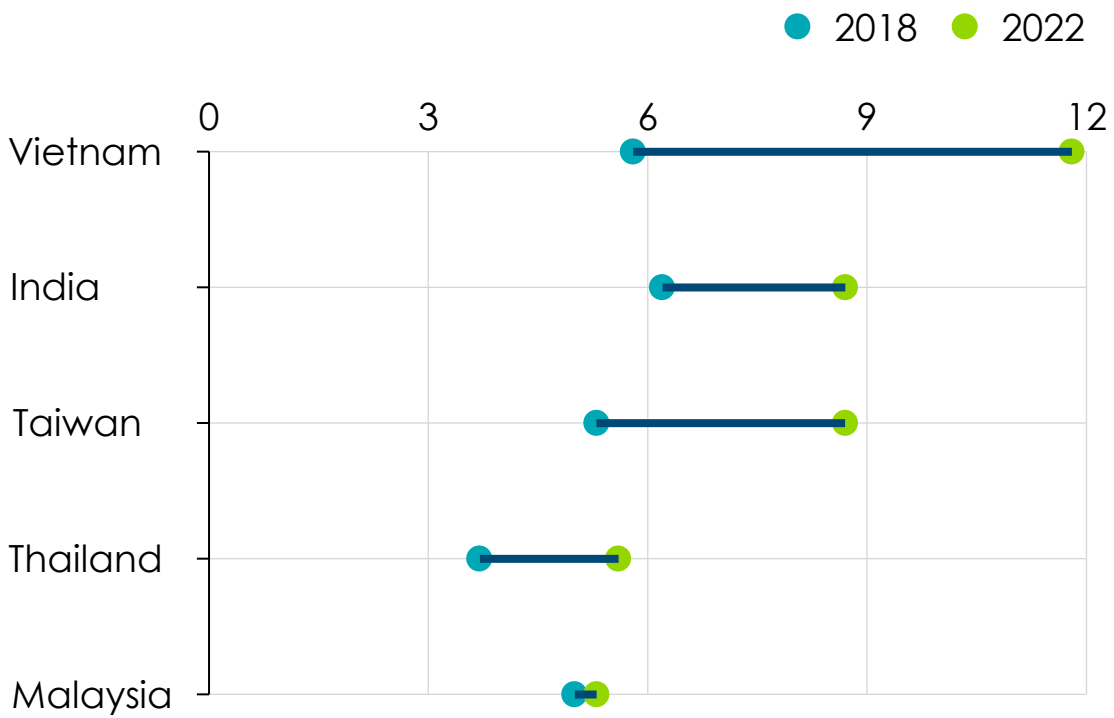
Source: BNEF; Trading Economics (2023) EU Natural Gas; ICE Endex (2023) Dutch TTF Natural Gas Futures (accessed 06/02/24); BNEF (2023), 2H 2023 LCOE Update. European Commission (2024) Carbon Border Adjustment Mechanism, European Commission (2023) Circular economy: New law on more sustainable, circular and safe batteries enters into force

Four potential impacts resulting from tariffs on supply chains and production locations

1. Re-routing of China's supply chains via intermediate countries – which may produce further US policy response
2. Impact on production likely to be smallest where the product is commoditized, and China have a significant cost advantage e.g solar
3. Bigger impact could occur on location of battery / EV production given other advantages of co-location close to customer
4. Chinese overcapacity and low costs will drive low price exports to countries unconcerned by China supply (e.g. solar PV in Africa)

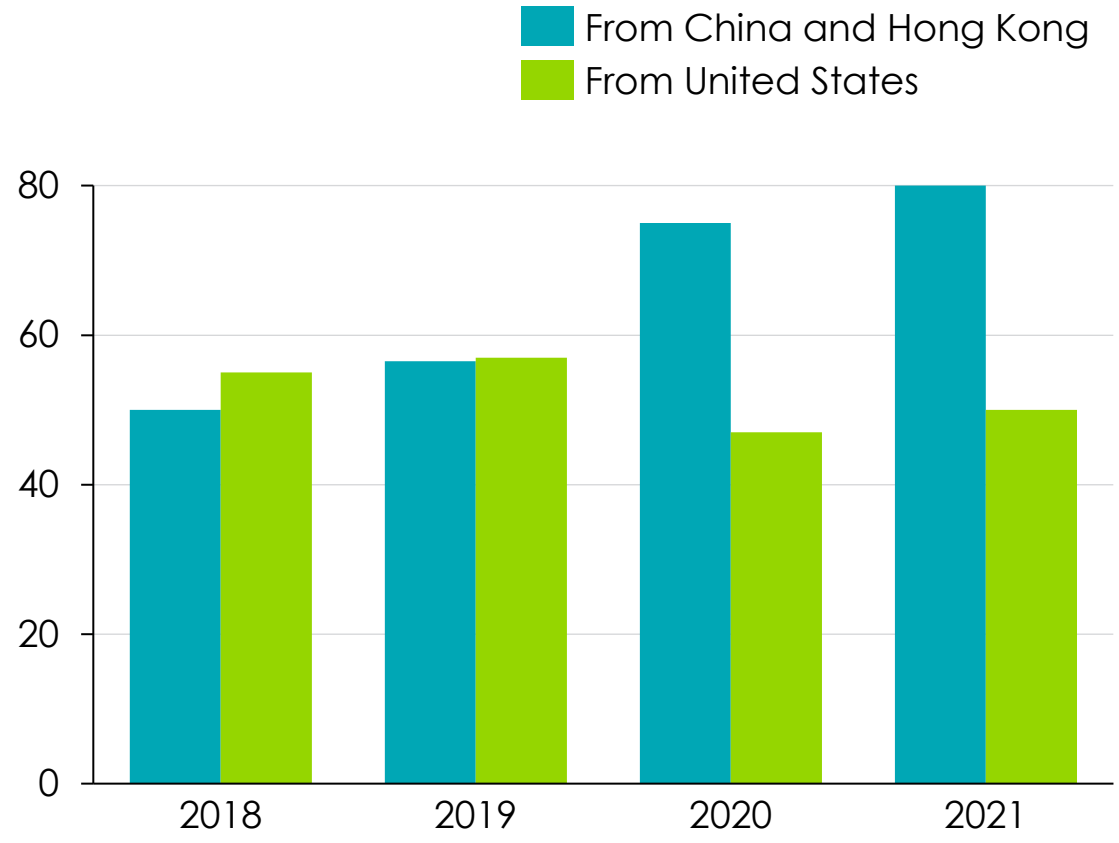
❶ Is China supply rerouting via southeast Asia?

United States manufactured goods
% of total imported from selected countries*



* Bangladesh, Cambodia, China, India, Indonesia, Malaysia, Pakistan, Philippines, Singapore, Sri Lanka, Taiwan, Thailand, and Vietnam
Source ; Kearney

Direct investment in Indonesia, Malaysia, Philippines, Thailand and Vietnam
$bn



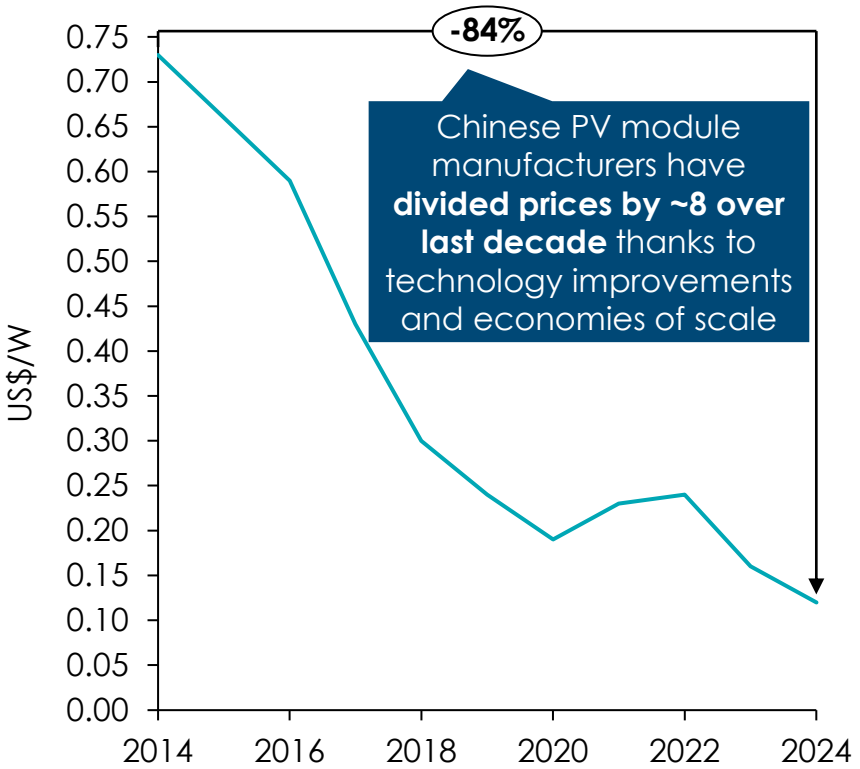
Source ; The Economist , How America is failing to break with China , August 8th , 2023

2

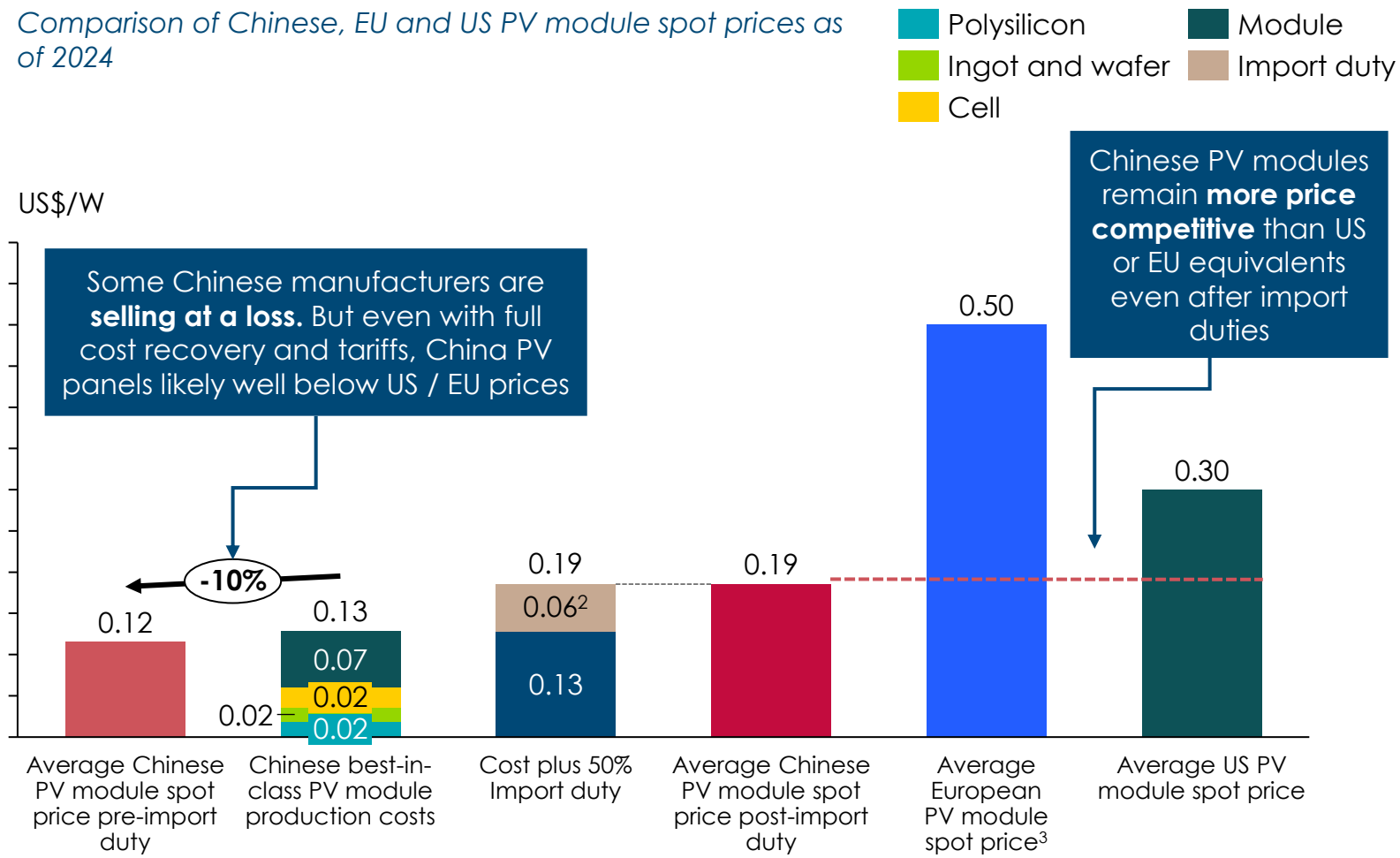
Import tariffs are unlikely to plug the cost gap with low-cost geographies which have achieved steep cost declines over the last decade

Example: consistent cost reductions have made Chinese PV modules more price competitive than EU or US equivalents even after import duties

Annual average spot price of monocrystalline silicon modules (c-Si) from China[1]



Comparison of Chinese, EU and US PV module spot prices as of 2024



Note: [1] Due to lack of China-specific data, BNEF lowest quote spot price data is used as proxy for Chinese manufacturers spot price, reflecting the fact that Chinese manufactures have consistently achieved lowest prices. [2] Assuming an import duty of 40% (highest import duty observed to date in solar industry). [3] Due to limited number of EU- and US-based manufacturers, prices of specific manufacturers are used as proxy for EU and US average PV module prices (First Solar for the US, Meyer Burger for the EU).
Source: BNEF (2024), *Online Data Explorer: Solar – Spot Price Index*; BNEF (2024), Solar Supply Chain Index, March 2024: Pitched Battle; First Solar (2023) *Annual Report*; BNEF (2024), *EU's Solar Onshoring Goal Hit by Possible German Closure*; InfoLink (2024), *Spot Price*.

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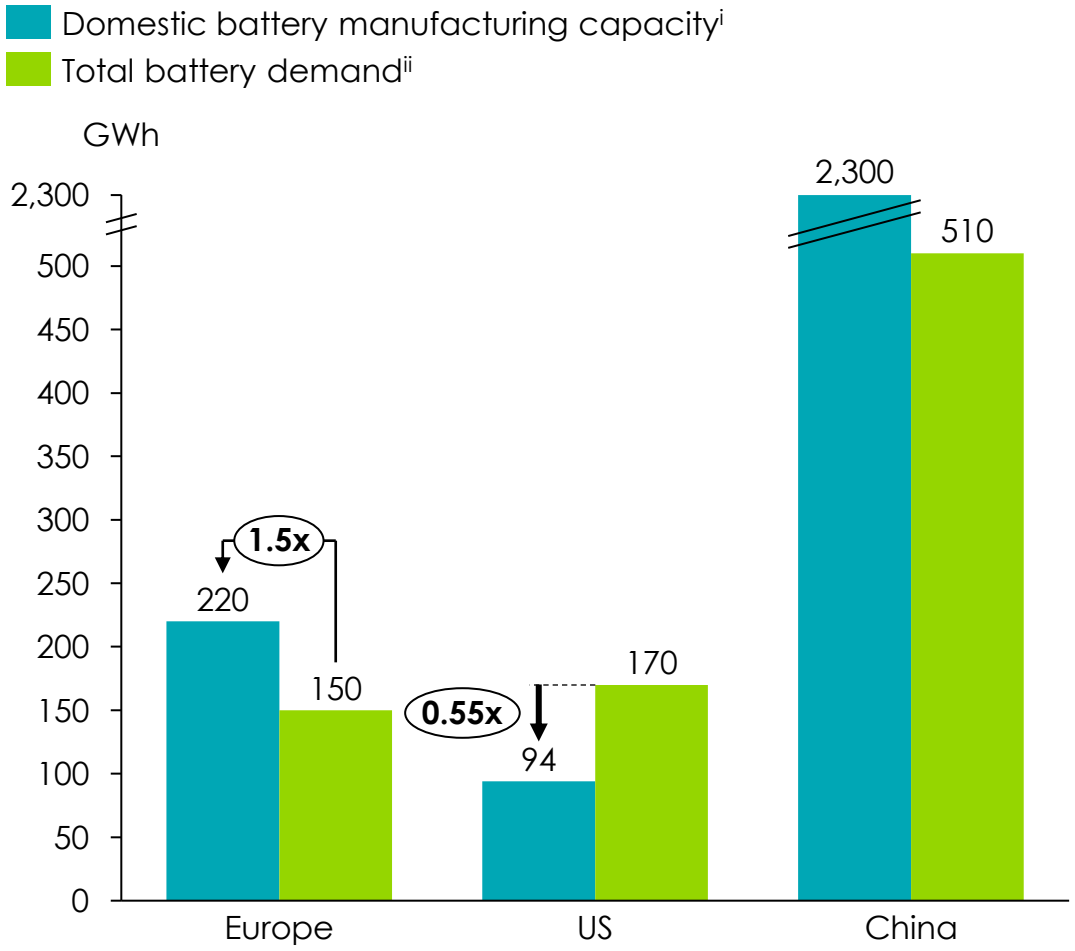
In contrast, the greater market fragmentation visible today in EV batteries is expected to remain prevalent over the coming years

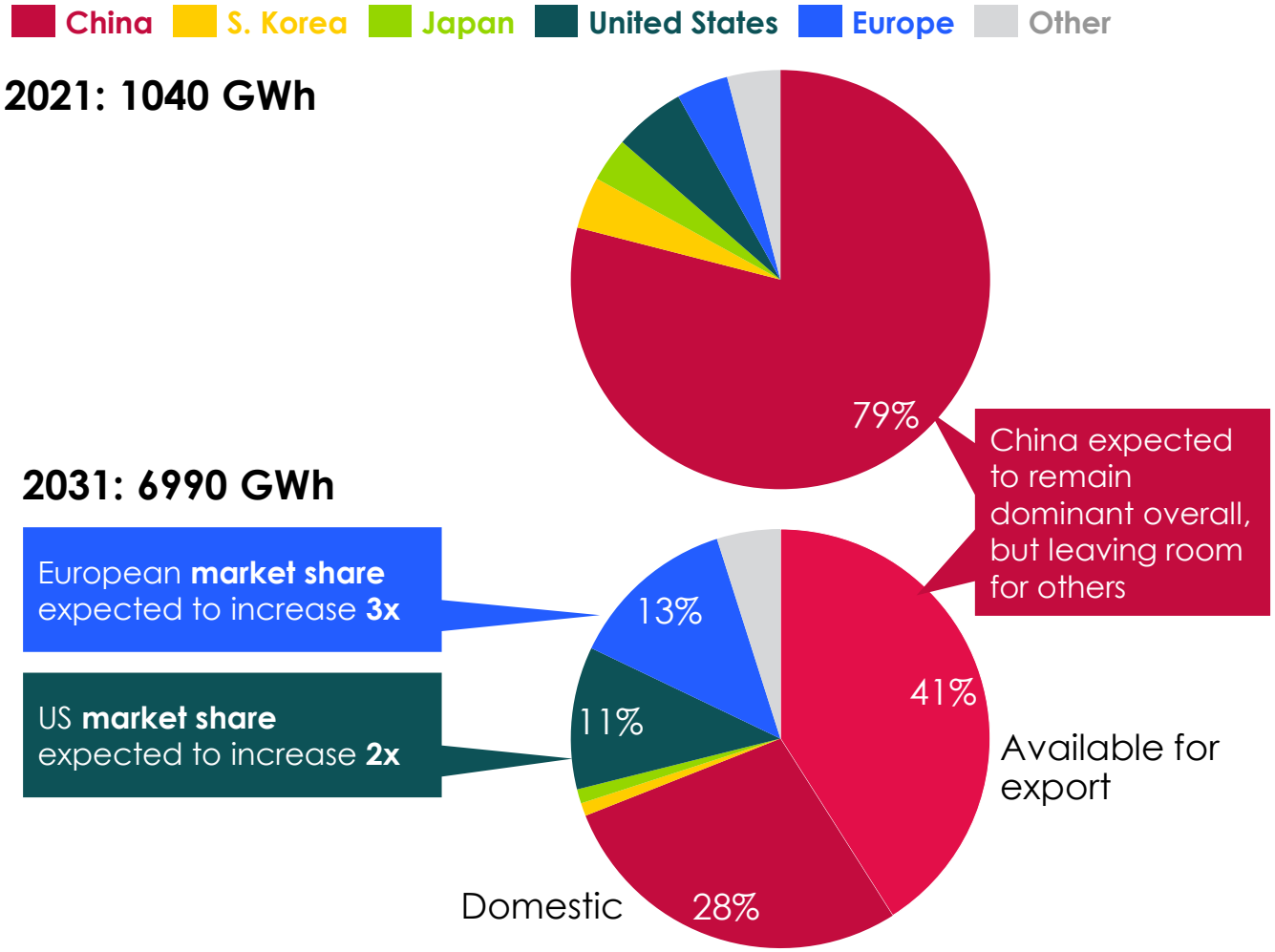
Today, Europe and US are already well placed to meet domestic demand with local production

2023 values



Moving forward, China is expected to remain dominant overall, but Europe and US will gain market share

Country market share of battery production, %



Note: [i] Encompasses capacity of all fully commissioned battery manufacturing plants in designated location. [ii] Encompasses battery demand for passenger vehicles, commercial vehicles, two- and three-wheelers, buses and stationary storage.

Source: BNEF (2023), *Online Data Explorer: Electric Vehicles*; IEA (2022), *Global supply chains of EV batteries*; Benchmark Mineral Intelligence (Aug 2022), *Lithium-ion battery gigafactory assessment*.

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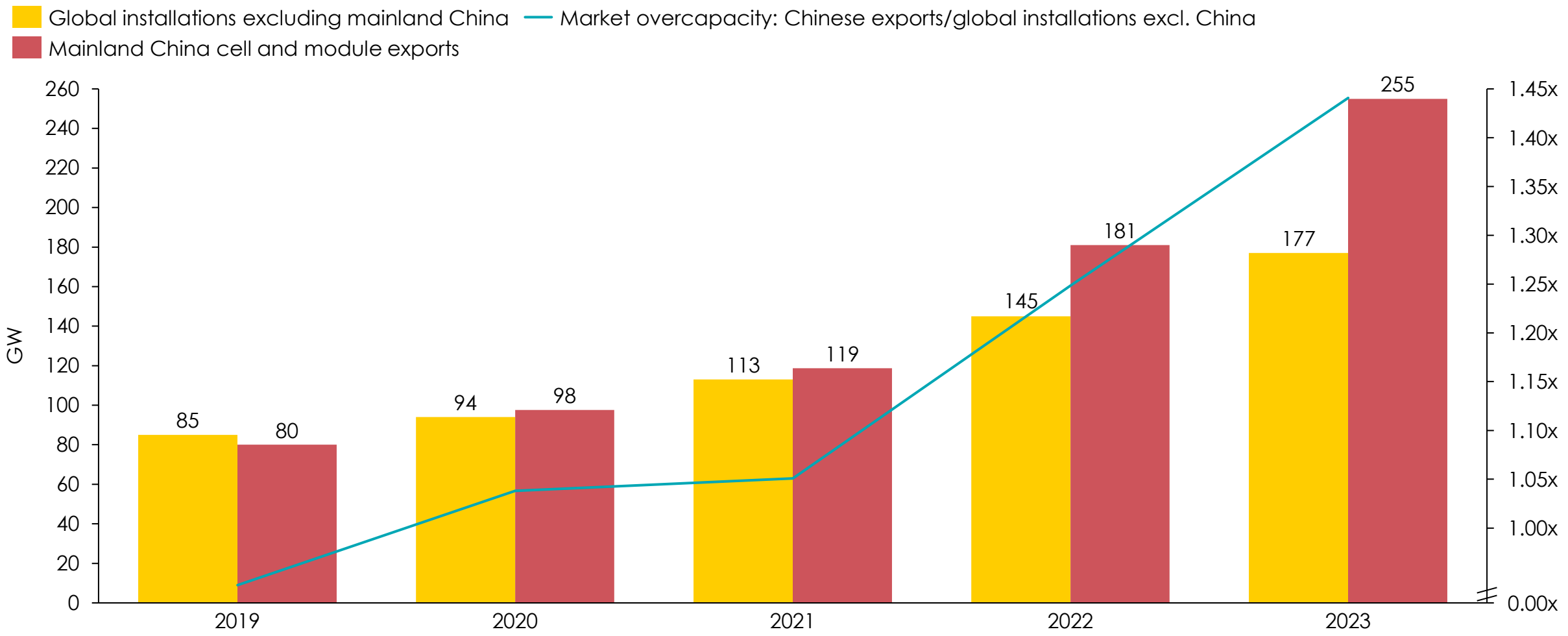
Additionally, market overcapacity leaves little to no room for new entrants, with China's export capacity vastly exceeding global demand

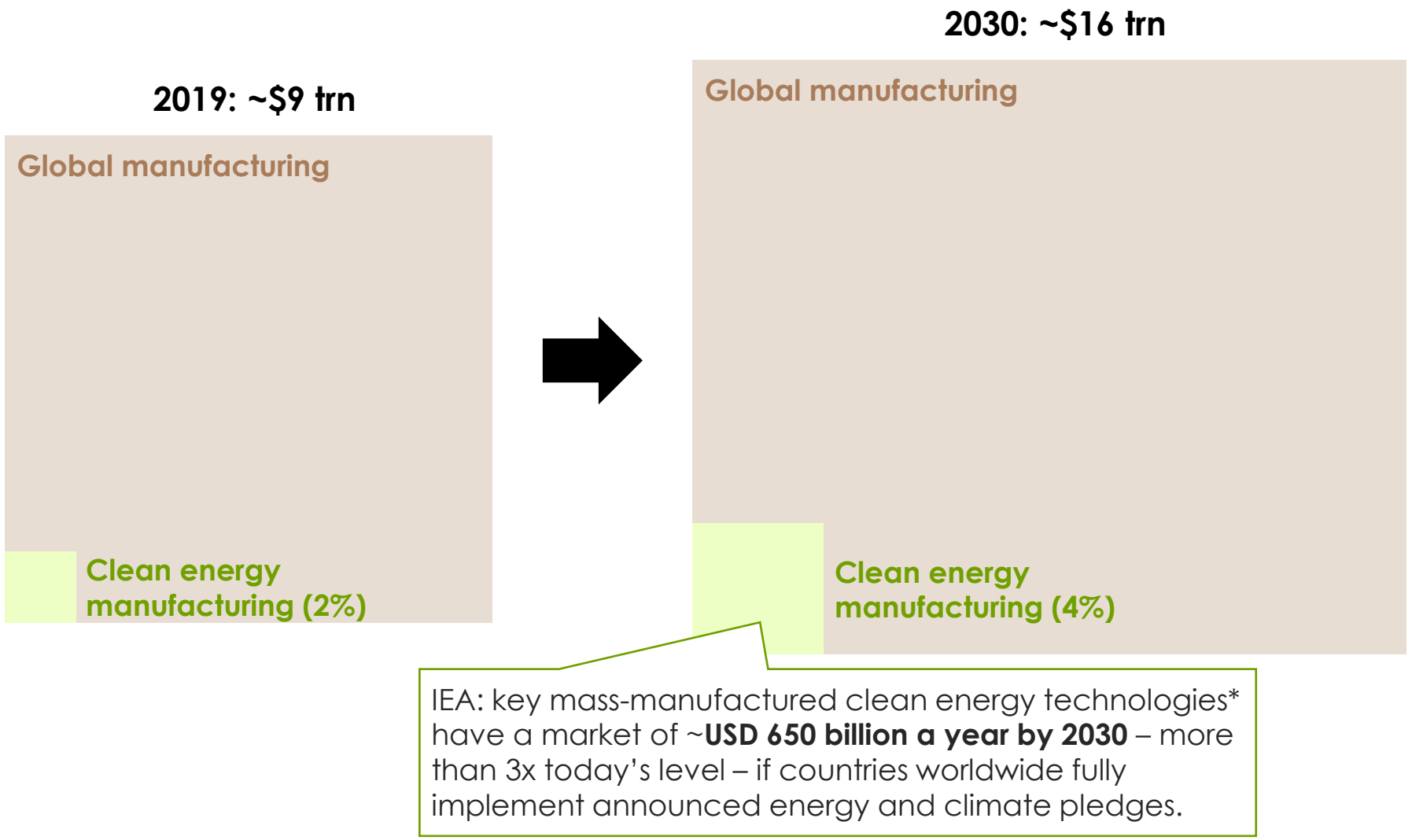
Comparison of global solar installations and Chinese cell and module exports,

GW



Source: BNEF (2024), *1Q 2024 Global PV Market Outlook*

In theory, the growth in clean energy manufacturing presents a strategic and commercial opportunity for all



IEA: key mass-manufactured clean energy technologies* have a market of ~**USD 650 billion a year by 2030** – more than 3x today's level – if countries worldwide fully implement announced energy and climate pledges.

1) **Clean energy manufacturing** will become a bigger part of overall global economy

2) Overall global manufacturing / industry has to become cleaner and more **carbon-competitive**

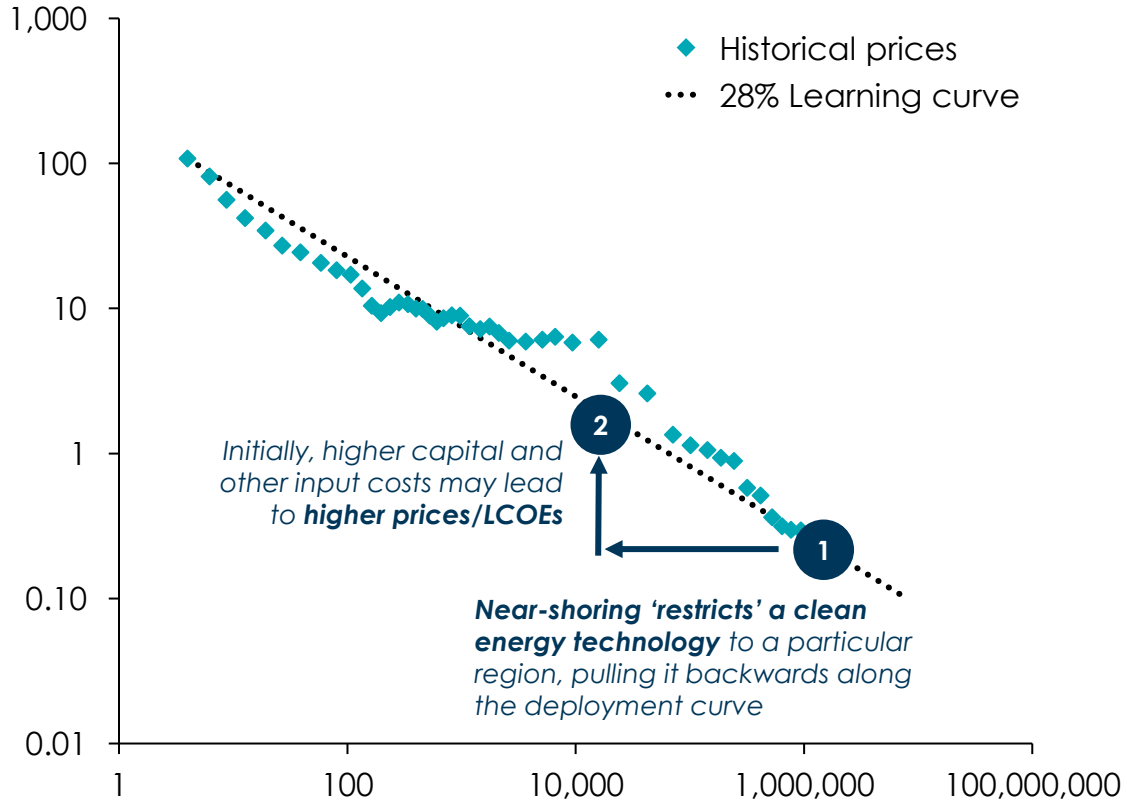
3) Benefits to domestic **political economy of jobs**, productivity growth and export capacity

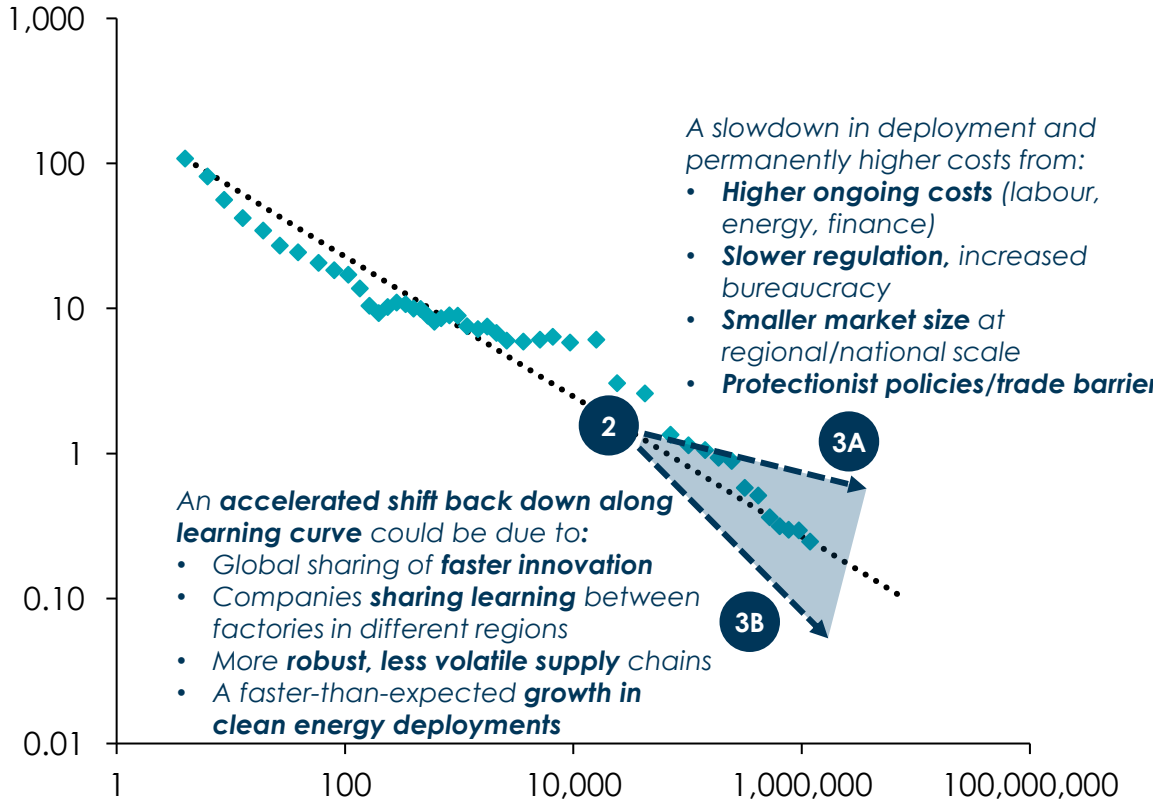
*Excludes installation and construction costs, and not including power grids
Source: Oliver Wyman/Oxford Economics (2020), *Manufacturing industries 2030 – Beyond COVID-19*; IEA (2023), *Energy Technologies Perspective*

The challenge will be to ensure that any policy interventions on supply chains continue to move technologies down cost reduction trajectories

Solar Example: Initially, near-shoring dynamics can be seen as moving back and up a clean energy technology 'learning curve', which is why any such efforts must be accompanied by policies to ensure technology costs continue to go down

Solar learning curve: US$/W (Y-axis); MW (X-axis)





Source: BNEF (2022), *4Q Global PV market outlook*; Helveston et al. (2021) *Quantifying the cost savings of global solar photovoltaic supply chains*; Way et al. (2022) *Empirically grounded technology forecasts and the energy transition*

Additional tariffs aimed at Chinese EV imports, as EU Commission provisionally concludes China value chain benefits from unfair subsidisation

China small EV leadership

China EV OEMs ahead of European in quality and cost, especially small affordable EVs, e.g.

- BYD Dolphin € 29000
- BYD Seagull $10-12000 (in China)

Large scale Chinese exports to Europe beginning

CEO of Stellantis Europe

> The Chinese "*can reduce the price much lower than you even think in your wildest dreams*"

> Many brands sell similar EVs in China for roughly half the price in Europe. They can absorb higher tariffs, cut prices and still make high profits

EU policy considerations

Need for cheap EVs to prevent political backlash against 2035 ICE sales ban

Industry split – Mercedes Benz and VW opposed to tariffs

- Creates good competition
- Fears of China retaliation on EU exports

Anti subsidy investigation – on rules-based approach – with differentiation by specific producer

Additional* tariffs of 17-38 % introduced e.g.

- **BYD + 17.4%**
- **SAIC + 38%**

But no opposition (so far) to Chinese EV / battery companies manufacturing in EU e.g.

- **BYD in Hungary**
- **CATL in Germany**

*Note: * in addition to standard 10% already in place. Tariffs were the result of invest. SAIC = Shanghai Automotive Industry Corporation*
Source: European Commission (2024) Commission investigation provisionally concludes that electric vehicle value chain in China benefit from unfair subsidies

Conclusion: 9 principles to ensure the pace of the transition is fast enough to prevent harmful climate change

From China's perspective

	Principle
1	**Accept that other countries will not be willing to accept a 100% Chinese monopoly** on clean energy supply chains – it is legitimate for them to diversify their supply chains.

From other countries' perspective

	Principles
2	Adopt an **approach to intelligence security that is truly intelligence-based, not paranoid**: semiconductors are militarily important, solar panels are not.
3	Be honest on the fact that **energy security risks of clean tech imports are much smaller than those of fossil fuel imports**: once installed, clean tech assets provide their energy service over their lifetime.
4	Follow a **fact-based approach to unfair competition concerns**: China price advantage was acquired by achieving steep structural cost declines, not through dumping policies.
5	**What matters is location, not ownership**: location drives investments, jobs and technology transfers.
6	Focus policy on **time-bound subsidies to build local industries, not permanent tariffs**: permanently protecting structurally higher-cost industries makes no economic sense.
7	Aiming for **100% autarky is neither realistic nor desirable**: aim for significant local know-how and capacity instead.
8	**Welcome foreign products** where there are **no local substitutes at a good price**, or where **low cost is particularly important at this stage** of the transition.
9	**CBAM and other environmental standards** are **not protectionist** but; • Are essential drivers of **supply chain decarbonisation** • Makes developed countries take **responsibility for imported emissions**

Questions for debate

1. How are changing global supply chain dynamics affecting the energy transition?

2. How to balance local supply chain development versus low cost rapid energy transition ?

3. Do you agree with the proposed 9 principles ?

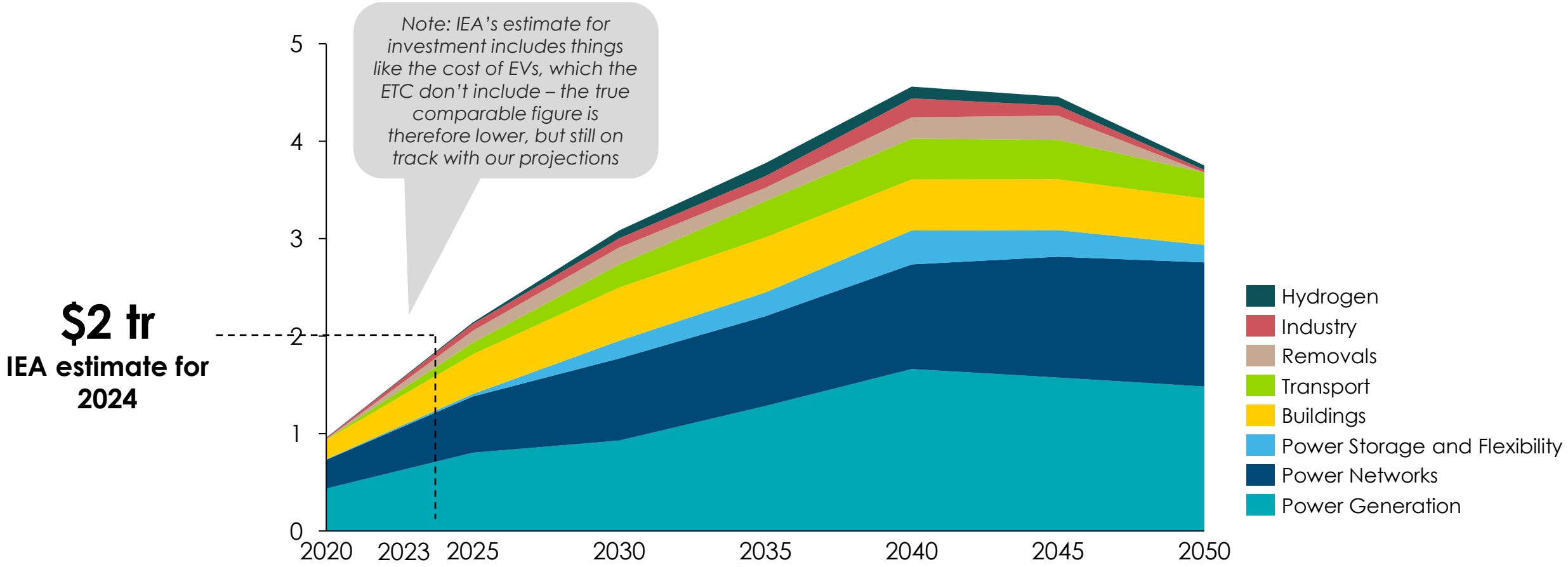
4. Is this a set of issues on which ETC could / should comment ?

Key debates 2 – Finance

The IEA's estimate for low-carbon investment this year is ~$2 trillion – putting global investment on track with the ETC's pathway

Annual capital expenditure in the energy system

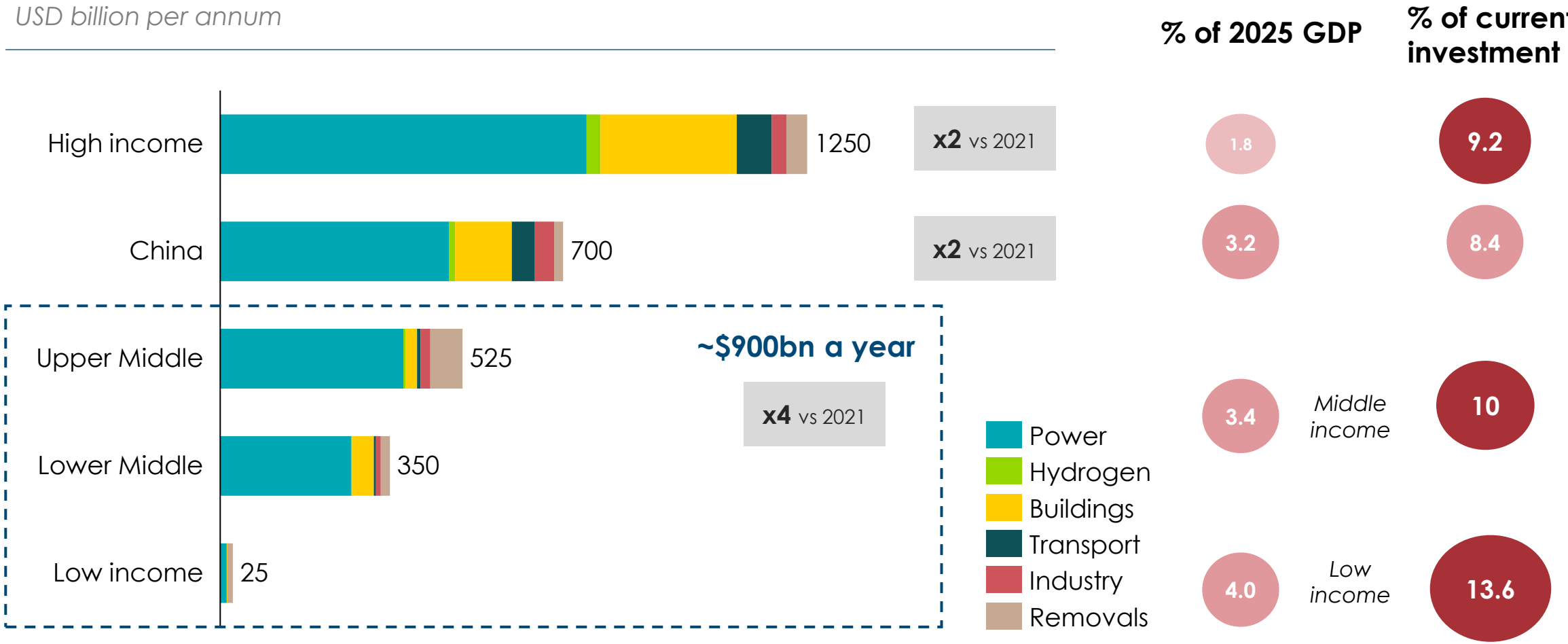
Trillion $



Source: Systemiq analysis for ETC (2023); IEA (2023), *World Energy Investment 2023*.
Note: IEA estimates total clean energy investment will reach $1.7 trillion this year, but this include some categories of consumer spending on EVs and investment in energy efficiency measures that ETC estimates do not include. On a like-for-like basis, the IEA's estimate for this year is around $1.5 trillion.

Capital investment in middle and low income countries needs to reach ~$900 billion a year on average between 2026-2030

Estimated annual investment by region and sector, 2026 – 2030
USD billion per annum

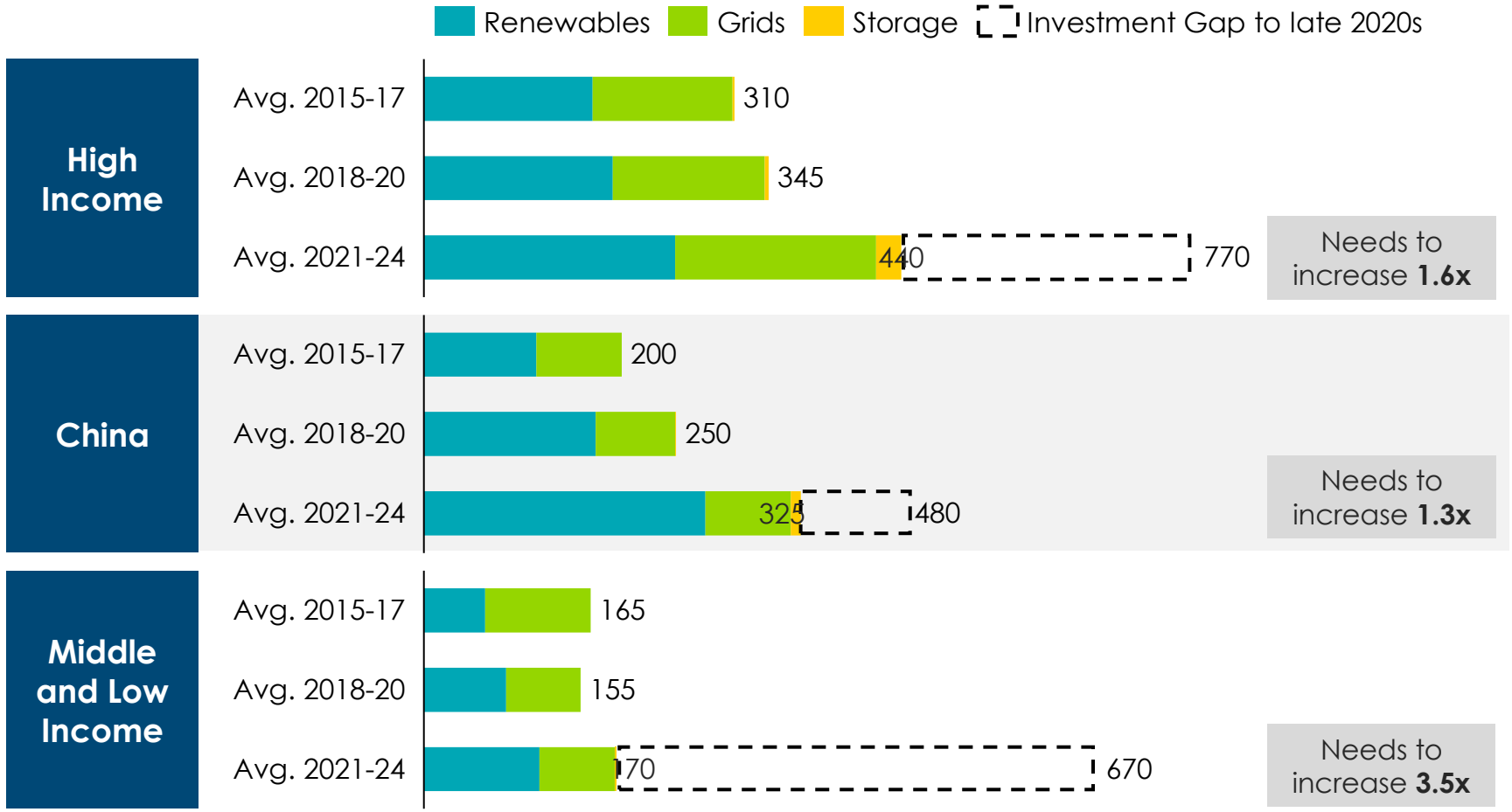


Sources: SYSTEMIQ analysis for the ETC (2022), SYSTEMIQ - *Investments for green recovery and transformational growth 2020–30: Technical Note* (2021), IMF *World Economic Outlook October 2022*
Note: 2025 GDP projection from the IMF, expressed in market exchange rate terms

Global investment levels hide huge disparities across countries – investments in power in middle and low income countries remain low, need to grow 3.5x by late 2020s

Power investment by region, 2015 – 2023

$ billion per annum



Source: IEA (2023), *World energy investment*

Key drivers of growing investment in middle and low income countries:

- Solar in China + India
- Renewable deployment in Africa – double that of 2020
- Rising investment in grids

Key challenges to scaling investment:

- High cost of capital
- Weak grid infrastructure and low/falling spending
- Rising input prices
- Macroeconomic factors (e.g., high interest rates in US/Europe/other key emerging markets)

With the right real economy policies, the vast majority of investment in high-income countries and China can come from the private sector

Real economy policies to unleash investment

Establishing a clear strategic vision to offer certainty to investors through clear medium-term targets and ambitious standards and regulations.

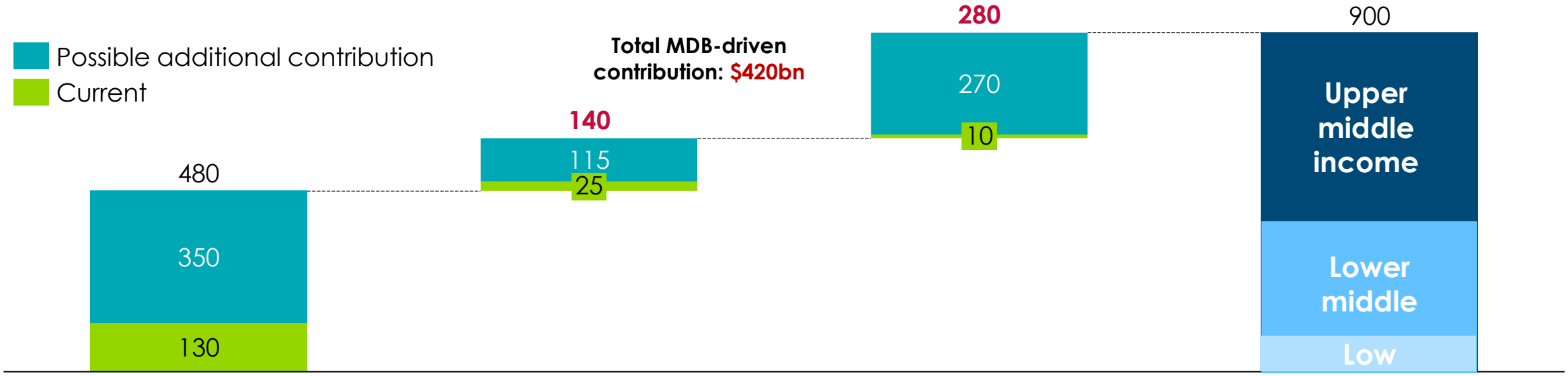
Addressing the green premium challenge through carbon pricing, contracts for difference, quantitative mandates, direct consumer subsidies, and public procurement which creates demand for low-carbon alternatives.

Reducing downside risks by minimising the variance of future returns, de-risking investment in early stage technologies, and implementing credible and consistent policymaking.

Removing supply side bottlenecks which can delay or prevent projects, for example streamlining planning and permitting, prioritising clean power generation and key infrastructure development, and supply chain development.

In middle- and low income countries, around half needs to come from domestic finance, and half from MDB lending, policy and capacity building, and de-risking of private capital

Illustrative scenario for financing climate mitigation in middle and low income countries by 2030[1]
USD billions per annum



At least half of the investment should come from:[2]

- Domestic savings + private finance *driven by real economy policy + private finance actions*
- Public finance

Increase in total MDB lending by $600bn (from $230bn)[3] distributed:

- $350bn directed to climate
- Of which $275bn to low/middle income countries
- Of which $140 to climate mitigation[4]

MDB policy and capacity support + de-risking mobilises *at least* $2 of private capital for every $1 of MDB capital

Note: (1) Excludes China; (2) Estimates of current public and private investment cover regions dominated by middle and low income countries but likely overstate the true current amount invested as they do include some high income countries, but exclude China; (3) Literature view of estimates of feasible increases in MDB lending while maintaining a AAA rating; (4) Of total MDB finance, 50% used for climate, 2/3 directed to middle and low income countries, 50% used for mitigation (50% for adaptation).
Sources: SYSTEMIQ analysis for the ETC (2022); Climate Policy Initiative (2021), *Global Landscape of Climate Finance 2021.*

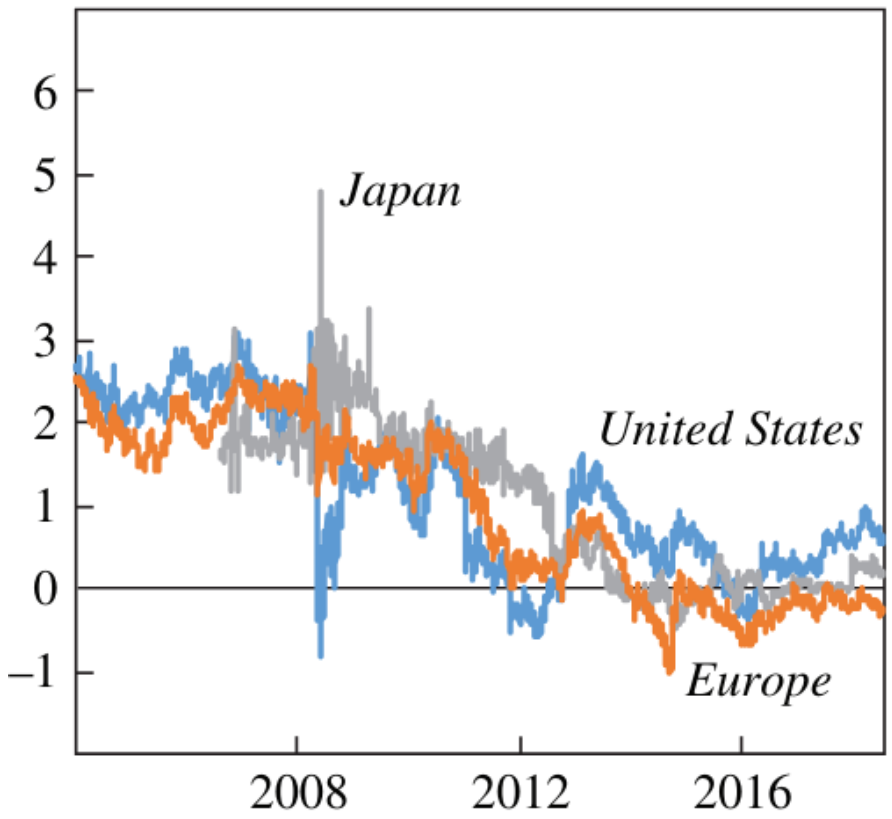
What's changed since we published our Finance report?
Four key recent developments

1. Rise in real interest rates – what are the implications of a change in macro outlook?
2. Reports on MDB reform – is the action actually happening?
3. New Collective Quantified Goal – is this providing greater clarity and action
4. Pull back from ESG / net zero commitments – is this a temporary setback?

Five years ago, the global macro environment was fundamentally different – "secular stagnation"

Real 5 year forward swap rates

%



Core hypothesis: structural excess of ex-ante desired savings over ex-ante required/intended private investment leads to:

- Sluggish growth in aggregate demand
- Very low equilibrium real interest rates

… unless governments run large fiscal deficits

Apparent implications for energy transition

Favourable outlook for:

- Private cost of capital for renewables and other capital intensive projects
- Large fiscal deficits to provide public finance support

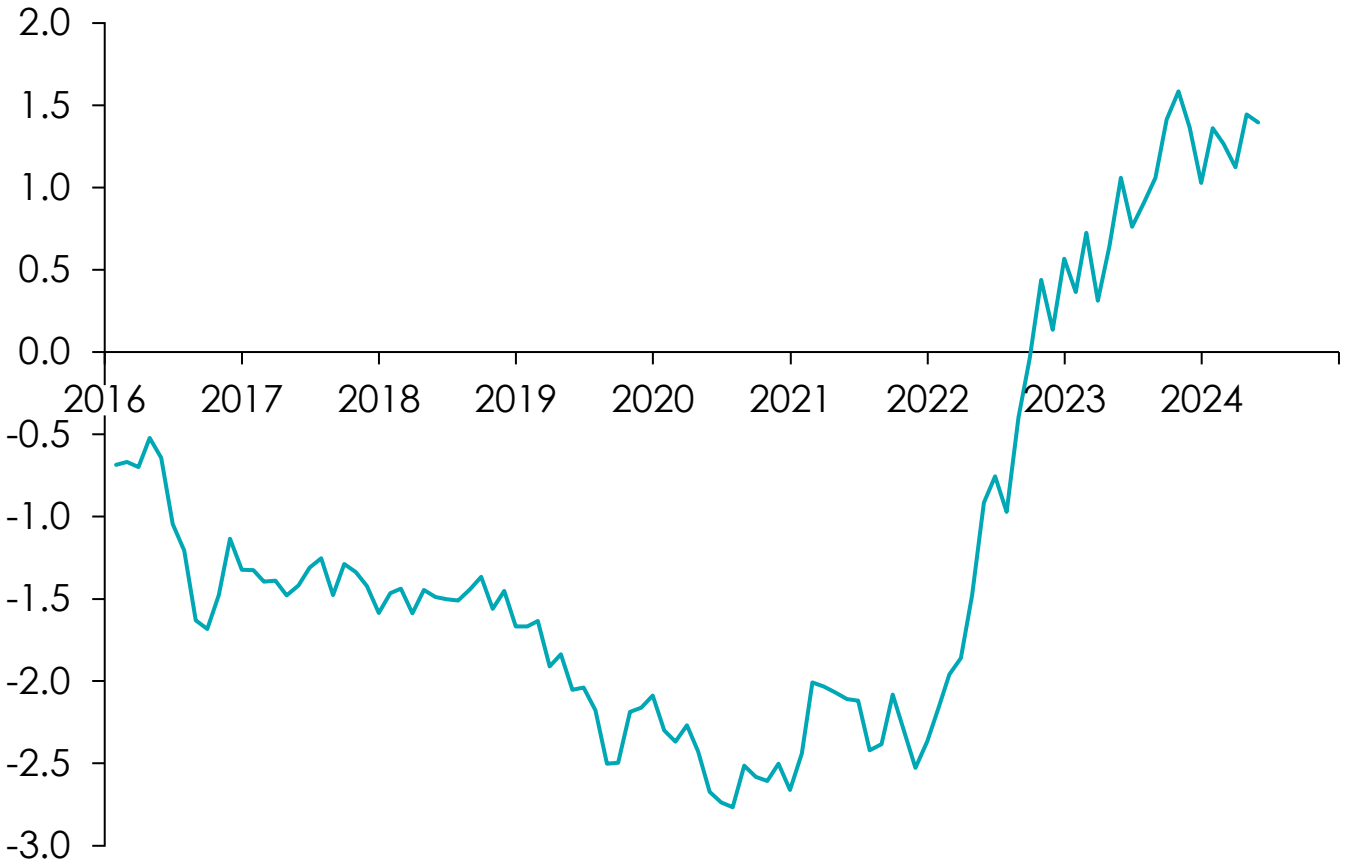
Required energy transitions investments not a challenge….

Source: Rachel, L., and Summers, L. (2019), *On Secular Stagnation of the Industrialized World*

Today, rising real interest rates around the world has implications for the cost of the transition for developers, households and countries

UK instantaneous implied real forward yield curve – 10 year maturity

%



Source: Bank of England

3 key priorities:

1

Reducing cost of capital via risk reduction and better policies

2

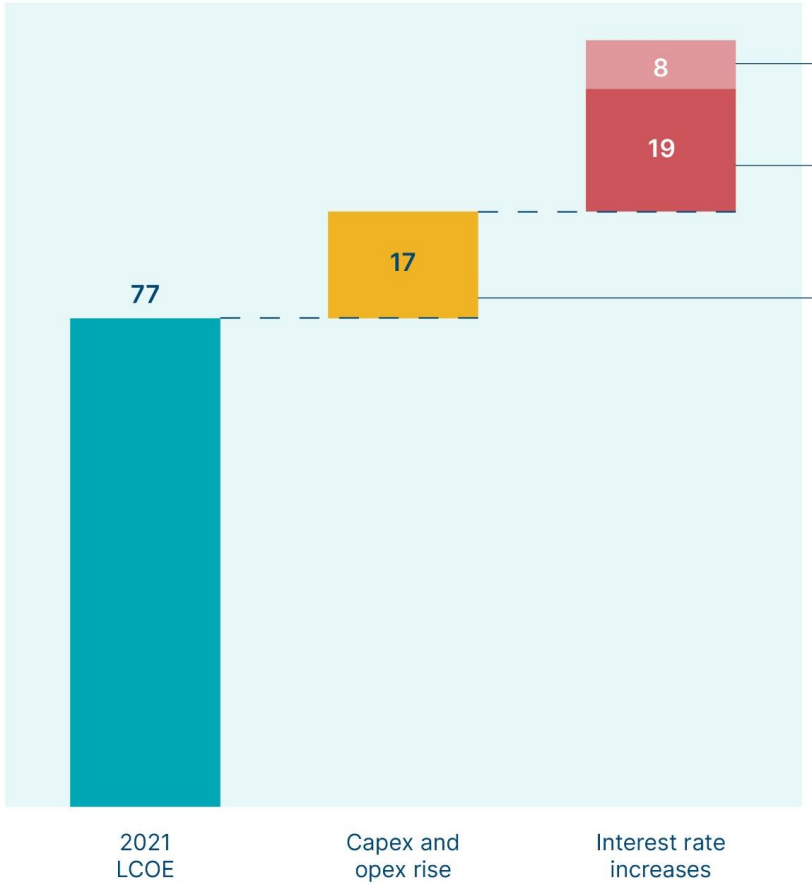
Divergent cost of capital between households

3

Divergent cost of capital between countries

1 Rising interest rates have contributed to higher offshore wind LCOEs

US offshore wind LCOE progression from 2021–2023
$/MWh, 2021 nominal prices



Likely semi-permanent increase in real interest rates (indicated by increased real gilt yields).

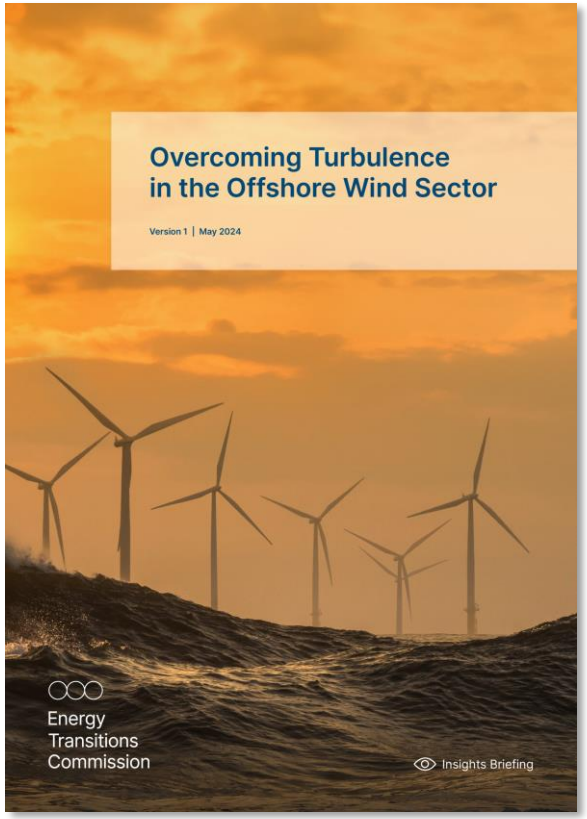
Nominal rises in interest rates not an issue as long as contracts are inflation linked.

Steel costs are 90% of turbine materials cost. Steel prices increased by 200% between 2020 and mid-2022 and are forecast to return to 2019 averages by 2024.

Other key materials forecast to remain above 2019 averages for coming years, but make up lower proportion of turbine cost.

Required higher returns by OEMs could help sustain capex increases.

BUT… Whilst these cost declines appear positive long-term, they do not help companies which bid in 2021/22 and had to contract supply orders in 2023.

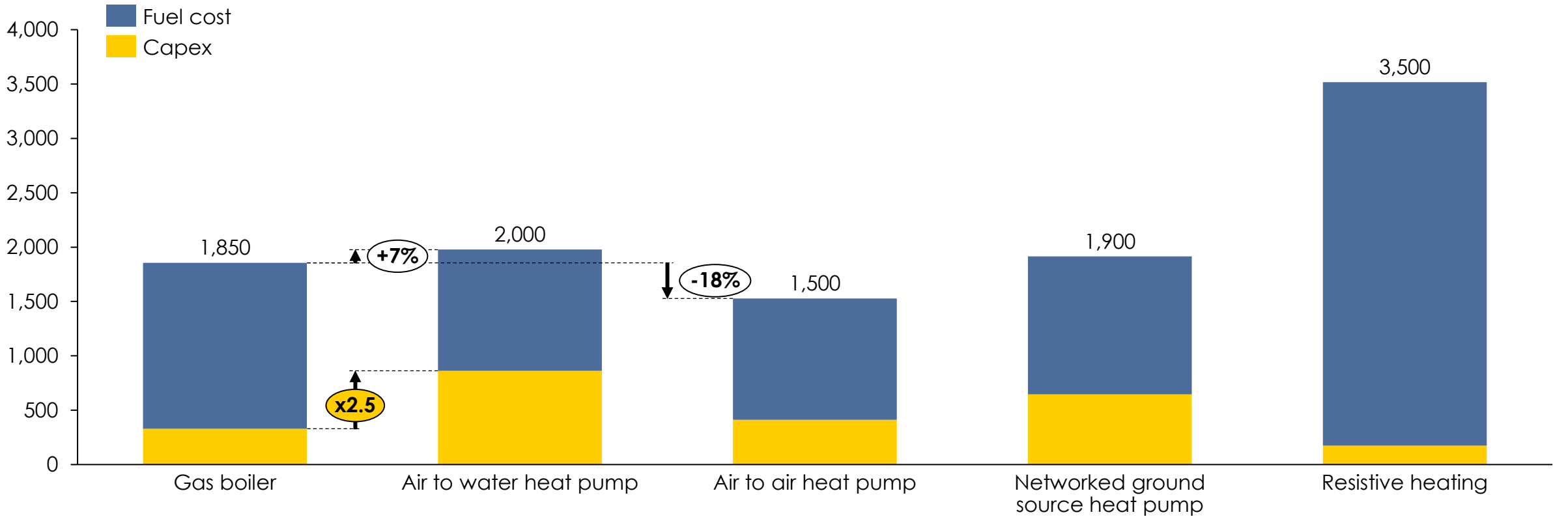


Source: Systemiq analysis for the ETC; BNEF (2023), *The $49 Million Fine That May End More US Wind Deals*; BNEF (2023), *Transition metals outlook*; BNEF (2023), *Industrial Metals Outlook 2H 2023: Heading Into the Storm.*

Note: Real cost effects estimated by modelling a 2% real interest rate rise, from 5% to 7% based on a project cost of $1.8 bn for a 1 GW wind farm with 30% equity, 70% debt. Nominal increases are the net of BNEF interest rate increases minus the real effect.

2 Even though on a total cost of ownership basis, heat pumps are cost competitive with gas boilers, the upfront capex is a barrier; higher interest rates make financing harder

Equivalent annual cost of ownership (technology + installation and running costs – European average)
€ per year



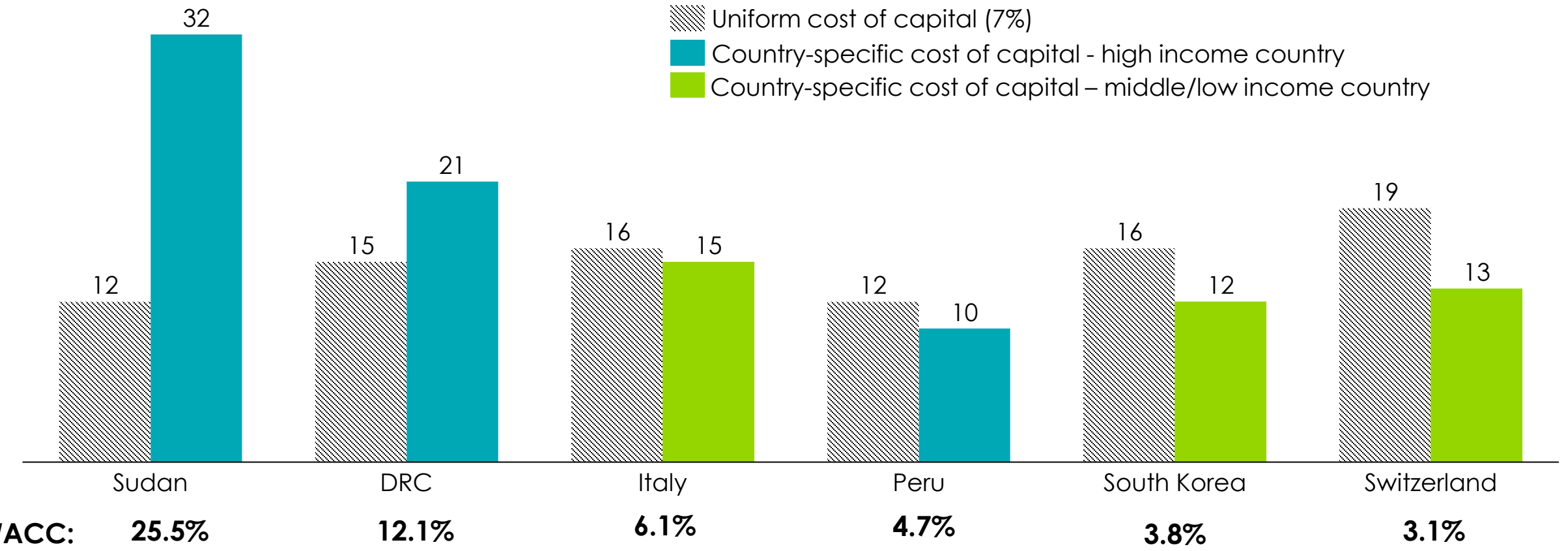
Efficiency assumption	90%	300%	300%	500%	100%

Sources: Systemiq analysis for ETC (2024); Eurostat for Europe electricity and gas prices.
Note: Assumes an average heat demand of 11,500 KWh a year per household, based on an average across the US and select European countries. Fuel prices reflect averages from 2023; no carbon price on gas is assumed. Assumes 5% discount rate.

3 Higher cost of capital in lower-income countries has a significant impact on the cost competitiveness of renewables

LCOE of solar PV based on country WACC

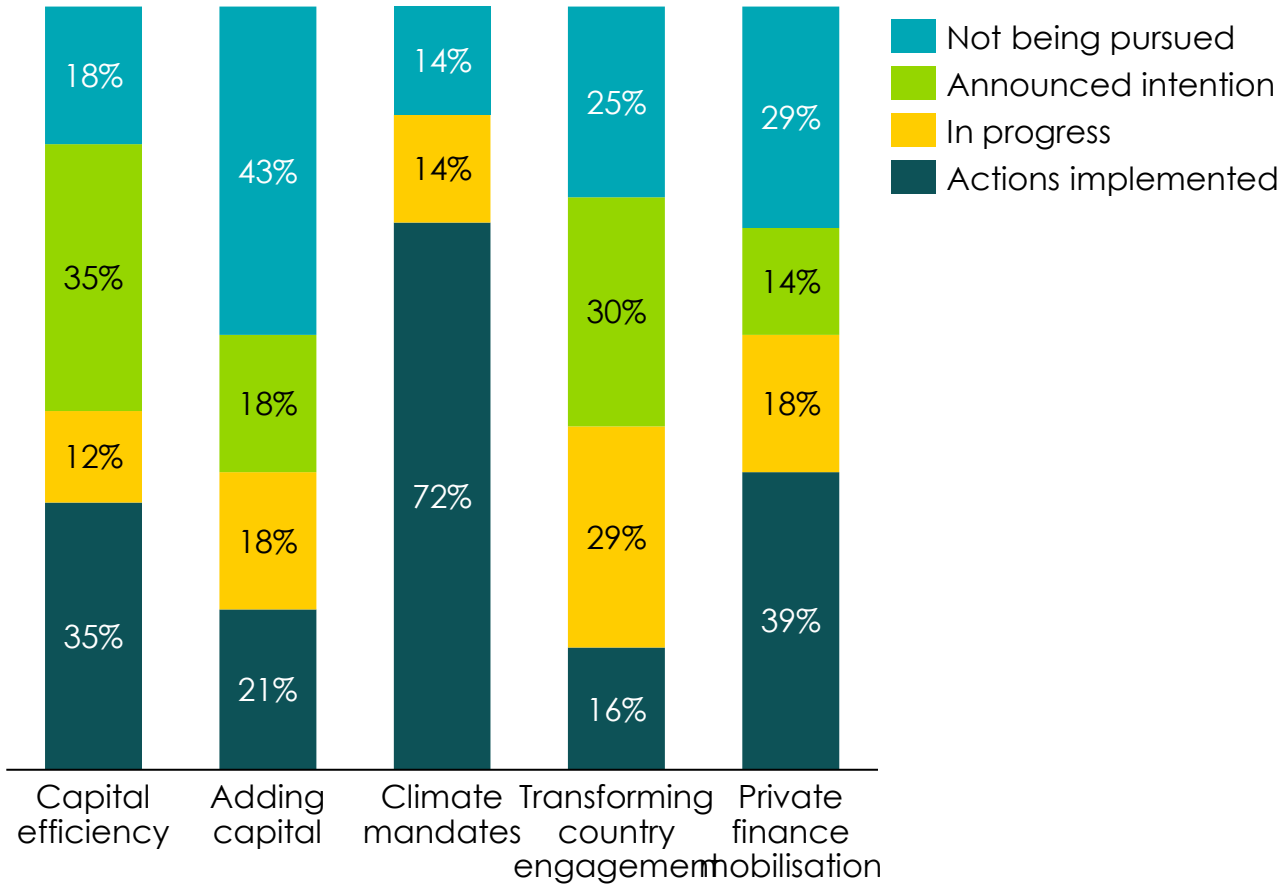
€/MWh



Sources: Egli et al. (2019) *Bias in energy system models with uniform cost of capital assumption.*

Despite many reports and commitments, delivering actual MDB reform remains slow

Assessment of MDB progress
% of criteria met

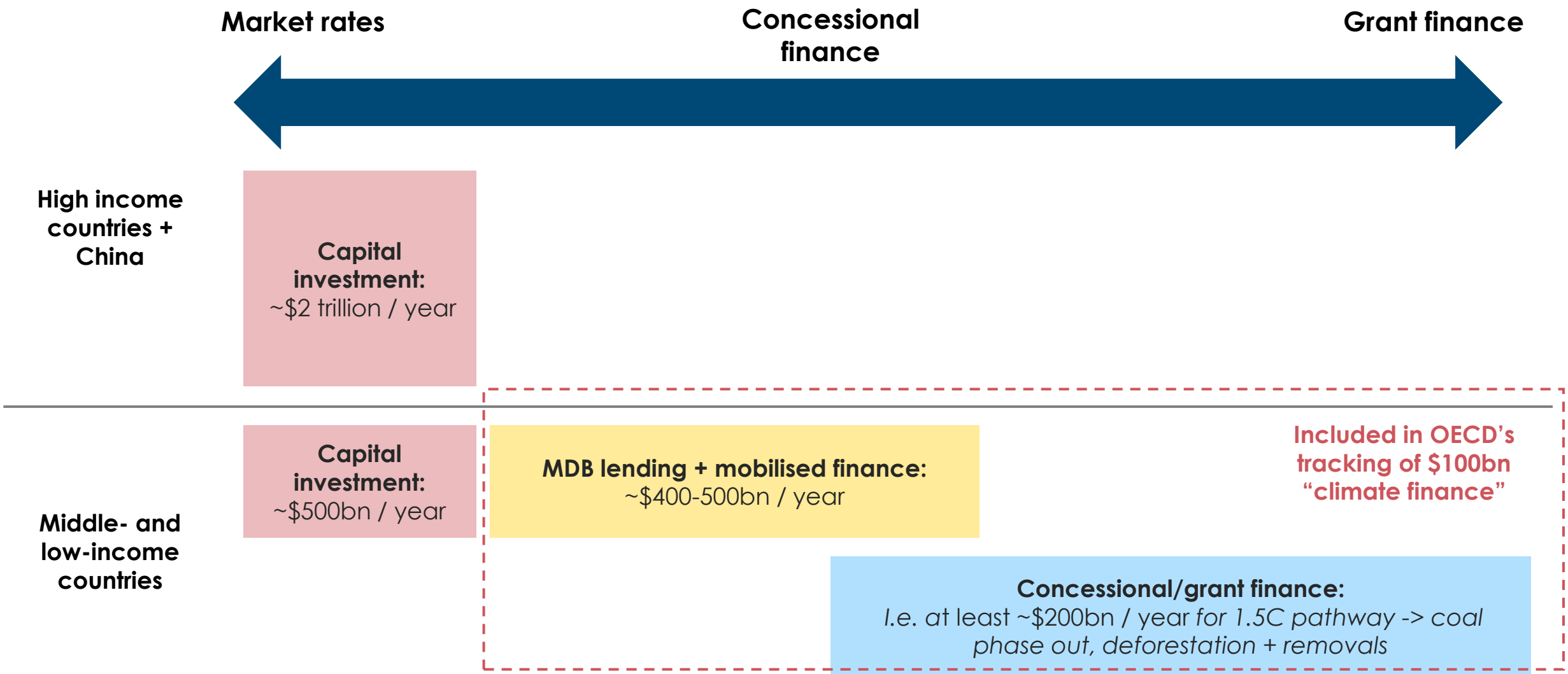


Key recent developments:

- **JET-Ps in Indonesia, Vietnam, South Africa and Senegal**
  - Challenges securing the pledged funding
  - Unclearly defined role for MDBs
  - Lack of in country technical support
- **World Bank reform**
  - World Bank's call to replenish International Development Association
  - Small reduction in leverage ratio – but only freeing up $50bn in new lending over 10 years
  - Potential to increase callable capital?
- **Debt relief** is increasing up the agenda
- Increased focus on nature (e.g. through **TNFD**)

Sources: Centre for Global Development (2024), *Are MDBs Actually Implementing Reforms?*
Note: seven of the major MDBs: the African Development Bank (AfDB), the Asian Development Bank (ADB), the Asian Infrastructure Investment Bank (AIIB), the European Bank for Reconstruction and Development (EBRD), EIB Global, the InterAmerican Development Bank Group (IDBG), and the World Bank Group (WBG).

Discussions around "climate finance" for lower income countries suffer from a lack of clarity about what this should include and the sources of finance



In our *Finance* report, we outlined 3 priorities for concessional/grant payments

EARLY COAL POWER PHASE OUT

Payments required where coal remains competitive with renewables

CO_2 p.a. avoided by 2030	$ bn p.a.
2 Gt	$25-50

AVOIDING DEFORESTATION

Payments required to protect the forest frontier and address root causes of deforestation

CO_2 p.a. avoided by 2030	$ bn p.a.
4.6 Gt	$130 at least

could be significantly higher without diet change

CARBON DIOXIDE REMOVALS

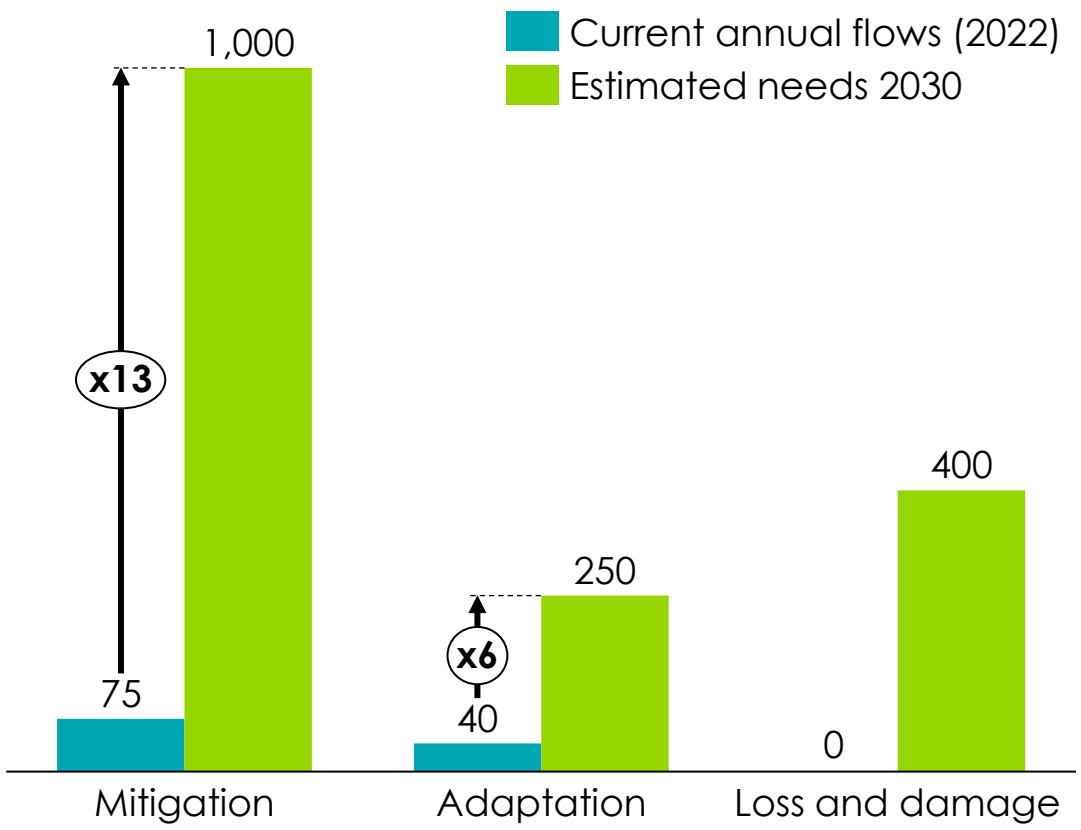
Removals only possible if someone pays for them

CO_2 p.a. avoided by 2030	$ bn p.a.
3.6 Gt	$100

to fund CDR through natural climate solutions (NCS)

At COP28, there were two significant finance developments – agreement to replace the $100bn climate finance target, and establishing a loss and damage fund

Current and required "climate finance" needs for developed countries $bn



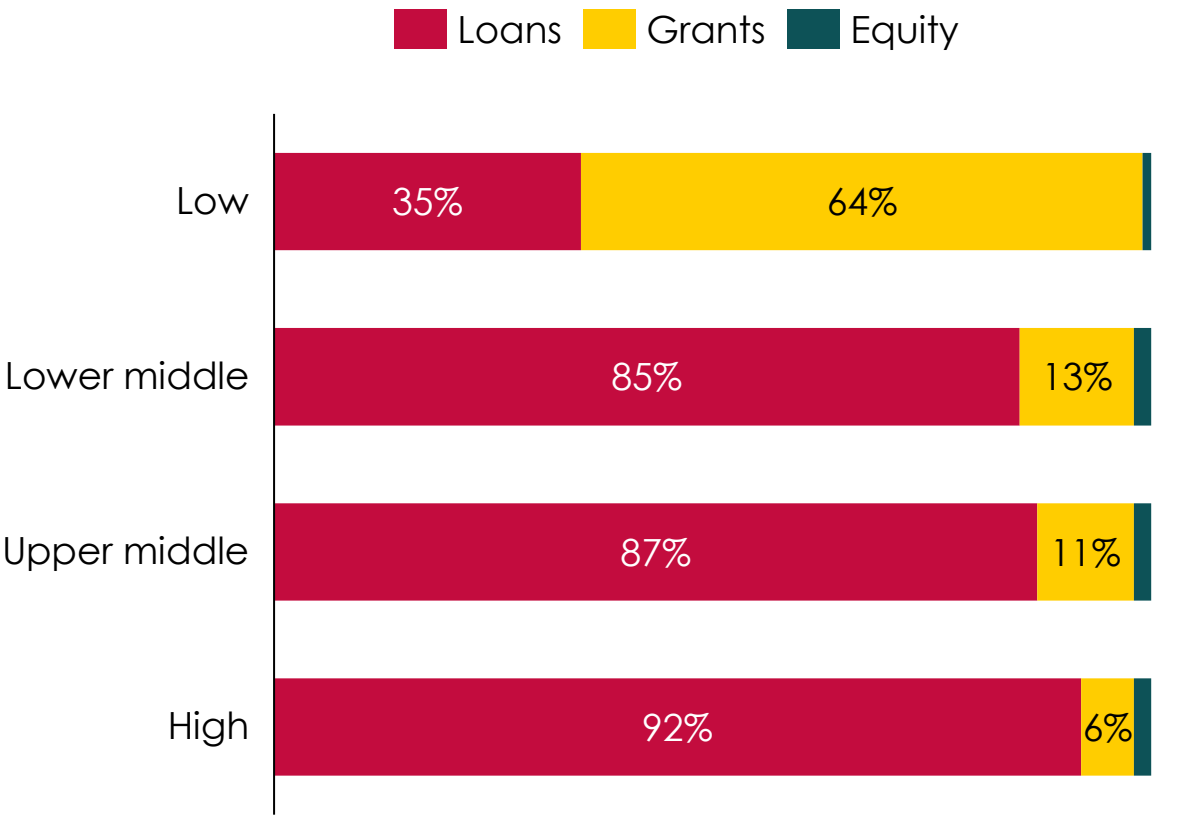
Outcomes from COP28

- **New collective quantified goal** – replaces previous $100bn political goal; $100bn will be the floor
  - Will be grounded in quantification of actual need + gaps in private sector investment
  - Details and terms to be finalised – focal point of COP29
  - India calling for at least $1 trillion a year
- **Loss and damage fund** – officially recognised the impact climate change will have on developing countries
  - $770m pledged → would cover less than 1% of estimated annual needs
  - No obligation to pay into the fund – target may not be delivered
  - Lack of clarity on how money will be distributed

Sources: Stern-Songwe (2022), *Scaling up Investment for Climate and Investment;* OECD (2024), *Climate Finance Provided and Mobilised by Developed Countries in 2013-22.*

While a very important step in the right direction, there remain key uncertainties surrounding delivery

Public climate finance provided and mobilised 2016-2022 by developing country income group and financial instrument
% of total



Key questions for COP29:

- What does "climate finance" mean?
  - Overseas aid budgets vs bilateral finance
- How will the new goal be calculated and regularly assessed?
- What share will go towards mitigation vs adaptation?
- What share should be loans or grants finance?
  - Concessional finance vs non

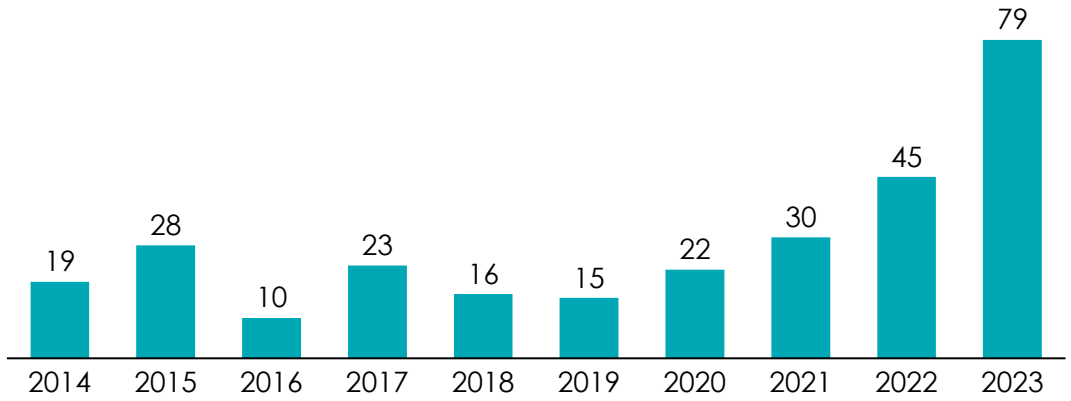
Critical that improvements in NDCs is not conditional on NCQG finance – NDCs will improve in large part because of tech developments

Sources: OECD (2024), *Climate Finance Provided and Mobilised by Developed Countries in 2013-22.*

Financiers and business are facing pushback on climate initiatives

ESG backlash and ESG Funds facing increasing restrictions in the U.S.[2]

Anti-ESG proponent Resolutions & Outcomes, 2023



- Number of **anti-ESG shareholder proposals doubled within the past 3 years**.
- ESG criticisms often stem from **perceptions of subjectivity, sacrificed returns, redundancy, distraction from key issues, and virtue signaling**

GFANZ faces scrutiny, members exit Net-Zero banking and insurance alliances

- **GFANZ**, under Mark Carney, **faces scrutiny for its disaffiliation from Race to Zero** and member **commitment to stricter policies**.
- In 2023, **significant insurers withdrew from the Net-Zero Insurance Alliance** – which was then disbanded in April 2024

Source: Systemiq analysis from (1) The New Climate Institute and MIT (2023), *Inside the little-known group setting the corporate climate agenda*, (2) Sustainable Investments Institute (Si2), as of 31 May 2023; internet research

Questions for debate

1. Will a changing macro environment have lasting implications for low-carbon finance?

2. What role does the private sector and financial institutions need to play to:

   - Mobilise more low-carbon finance in lower income countries?

   - Help households overcome the upfront costs of low-carbon alternatives and higher cost of capital?

3. Can COP29 maintain progress and demonstrate the implementation of COP28 promises?

4. How can the ETC contribute to this debate, building on last year's *Finance* ?

Key debates 3 – Carbon credits

Potential changes to corporate climate guidance re-open debate on carbon credits

Statement from the SBTi Board of Trustees on use of environmental attribute certificates, including but not limited to voluntary carbon markets, for abatement purposes limited to scope 3

9th Apr 2024

SCIENCE BASED TARGETS

DRIVING AMBITIOUS CORPORATE CLIMATE ACTION

"SBTI has decided to extend [the use of carbon credits] for the purpose of Scope 3 related emissions beyond the current limits."

'Existential crisis' at SBTi inflames rift over future of net-zero organization GreenBiz

Staff "deeply concerned" over board's new policy allowing carbon offsets for net-zero goals.

THE SBTI BOARD'S STATEMENT ON CARBON CREDITS IS NOT GROUNDED IN SCIENCE OR DUE PROCESS

NEW CLIMATE INSTITUTE

Analysis: Offsets row at net-zero standards body SBTi exposes schism over corporate climate action REUTERS

SBTi Issues Official Clarification To Its Scope 3 Statement Carbon Herald

April 15th 2024

Agenda

- Background of past developments in carbon markets
- SBTi's past position and the proposed change in treatment of Scope 3
- Past ETC analysis and position
- Recent developments in integrity certification
- Issues for debate

Clarity on key terms – offsets & removals

- **Offsets** – paying somebody else to reduce emissions in another country, company or sector:
  - *Key issue: is it really additional, would reductions have occurred in any case?*

- **Removals** - paying someone to remove carbon from the atmosphere either via engineering (DACCS) or nature based solution (e.g. reforestation)
  - *Key issue: certainty and permanence of removal.*

Initial assumptions were that voluntary carbon markets would grow substantially over time

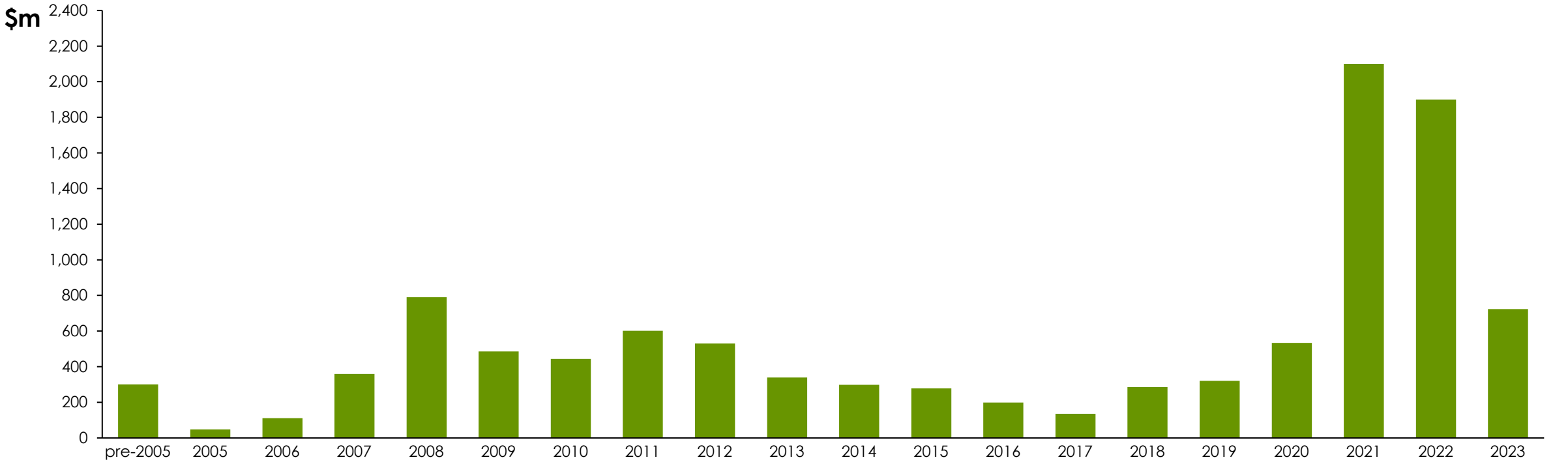
Pre-Paris, at Paris and soon after, a lot of focus on the potential positive role of carbon markets in achieving emissions reductions at lowest cost:

- **Clean Development Mechanism (CDM)** allowances within the initial EU ETS scheme (2005 onwards).
- Some **companies making early net zero commitments and buying carbon credits** (almost entirely offsets and usually at a very low price)
- **CORSIA aviation industry initiative** (launched in 2016, active from 2021) relying on credits to achieve 50% reduction versus BAU emissions pathway for aviation sector
- **Article 6 of Paris treaty** – idea of trading between countries, and a reference also to private market developments.

Carbon credit volumes have not scaled significantly over time

Traded value under selected carbon credit mechanisms over time (2005-2023)

$m/year



Key schemes

- Clean Development Mechanism (CDM), incl. in EU ETS
- CORSIA
- Corporate purchases
- Article 6 trades

Source: Ecosystem Marketplace (2024) State of the Voluntary Carbon Market

Evolution of carbon credit markets has underperformed relative to expectations

Lots of momentum around carbon credits, pre and post Paris, but since then market development has been slow and confidence in both the principle and practice of carbon credit markets has declined.

- **CDM market** in retrospect seen as a failure which weakened the EUETS: ETS now excludes any purchase of credits from outside the EU
- **Article 6**: details still not wholly resolved: controversies about double counting. No trading so far.
- **Wider Voluntary Carbon Market (VCM)** – total volumes still minimal.

Two reasons for slow progress:

1) Move towards 100% net zero targets

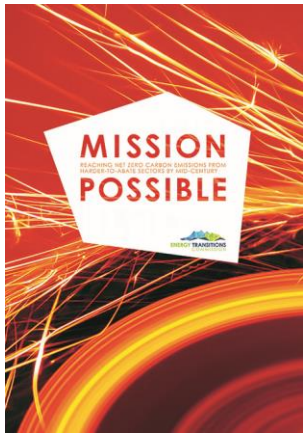
2) Lack of confidence in supply

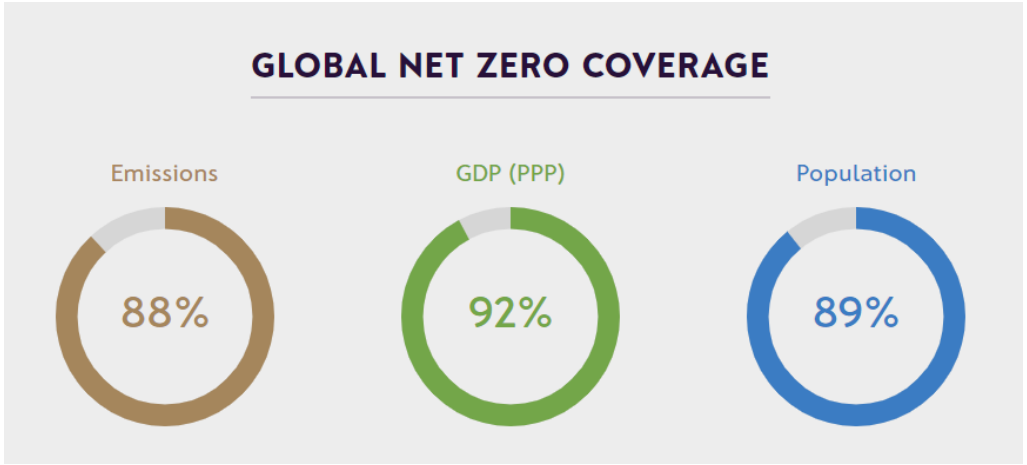
1) Increasing ambition for in sector, in country, in company reductions

2018

Move from 60-80% to 100% emissions reduction targets.

2024





Rising ambition towards net-zero, driven by:

- Technological progress and rising confidence in the potential to decarbonise even in the hard to abate sectors
- Rising ideal climate ambition towards 1.5°C target: need to get **all** sectors and countries to net zero by 2050/60
- Increasing set of net zero by mid-century commitments by countries and companies with only the last 5 to 10% assumed to require offsets

➢ When all sectors are aiming for dramatic reductions the potential to rely on offset purchase is reduced – <u>at least at the end of the transition.</u>

2) Decreasing confidence in the integrity of carbon credits

Two key reasons for decreasing confidence:

- **Additionality**:
  - Most CDM credits now seen as non-additional and in many case little more than scams
  - Carbon credits for renewables in developing countries unlikely to be additional if (i) renewables are already cost competitive (ii) developing countries have net zero mid-century and intermediate reduction targets.
  - Questions over impact of deforestation credits

- **Certainty/permanence**:
  - Natural disasters threaten permanence of forestry projects

Green group accuses China of climate blackmail

The Guardian

The row over hydrofluorocarbon-23 offsets has intensified

Dozens of the biggest global companies — from banks to industrial heavyweights — have made bold climate claims justified by cheap renewable-energy offsets that don't counteract global warming

Bloomberg Green

Revealed: more than 90% of rainforest carbon offsets by biggest certifier are worthless, analysis shows

The Guardian

Wildfires destroy almost all forest carbon offsets in 100-year reserve, study says

Carbon released by US forests burnt in recent blazes expected to wipe out most of the buffer in Californian trading system

FT

Agenda

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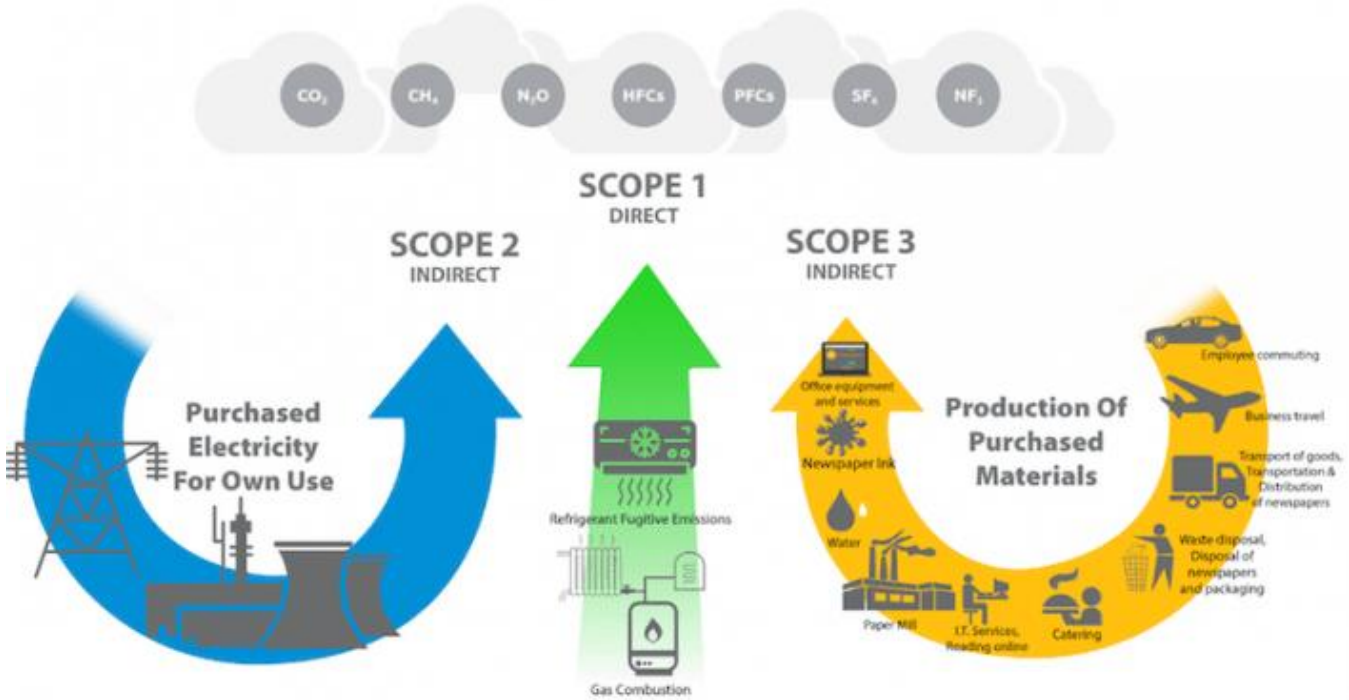
Issue with scope 1/2/3 emissions is that someone's scope 3 is someone else's 1 & 2



Example of steel emissions accounting

Steel producer's emissions

Steel purchaser's emissions (e.g. automaker)

GHG Protocol, Scopes 1, 2, and 3 emissions. Adapted by Compare Your Footprint.

Definitions

Scope 1: Direct emissions, often resulting from combustion of fossil fuels.
Scope 2: Indirect emissions from electricity use
Scope 3: Production of purchased materials (e.g. business travel)

Overlap

BUT key issue is that all scope 1 and 2 emissions are someone else's scope 3 emissions (either upstream or downstream)

In principle one might say focus just on Scope 1 and 2 , but:

- Large companies can be very powerful drivers of emissions reduction in supply chains in their upstream scope three (e.g. automaker purchasers of steel),
- And oil and gas companies need to own some responsibility for downstream Scope 3 not just scope 1 &2

Potential changes to SBTi guidance re-open carbon credit debate

Initial guidance

- Nearly 3,100 organizations have set or committed to set a net-zero target as part of SBTi to date, which means they intend to fully reduce and offset their emissions by 2050 or earlier.

- As part of its guidance for net zero, SBTi mandates that companies must reduce their emissions across the value chain by at least 50% in 2030 and 90% in 2050. **Only then can they neutralize any remaining emissions with carbon offsets, which strongly limits both demand and the near-term viability of credits.**

- SBTi insist that emission reduction targets **are inclusive of scope 1, 2 and 3 emissions for all companies for which scope 3 emissions are 40% or more of total scope 1,2 and 3 emissions**.

- Pathways developed on a sector-by-sector basis – Mission Possible Partnership and ETC a key input to the process.

Proposed changes & subsequent developments

- "Extend [the use of carbon credits] for the purpose of Scope 3 related emissions beyond the current limits"

- This caused two issues:
  1) Lack of consultation
  2) Re-ignited debate over use of carbon offsets for decarbonisation

- **SBTi will now launch a public consultation in July based on a draft proposal, subject to its usual governance and approvals processes**

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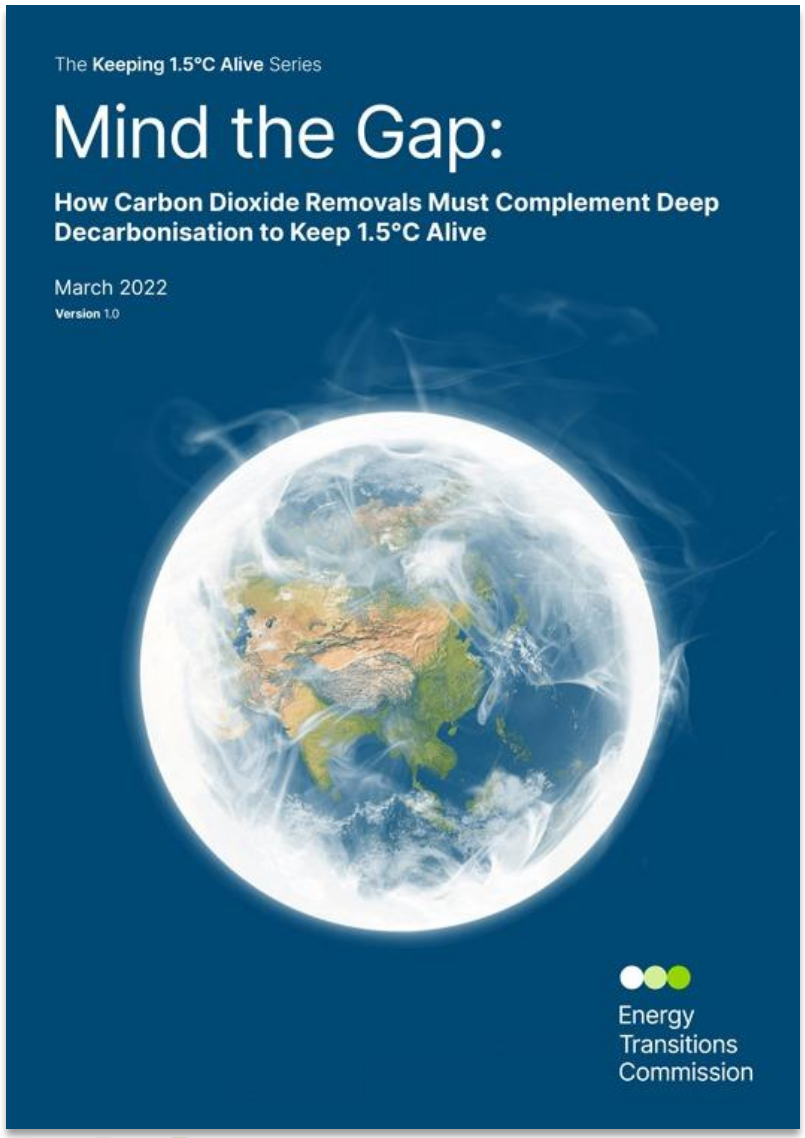
ETC (2022) Carbon Dioxide Removals report



Key conclusions:

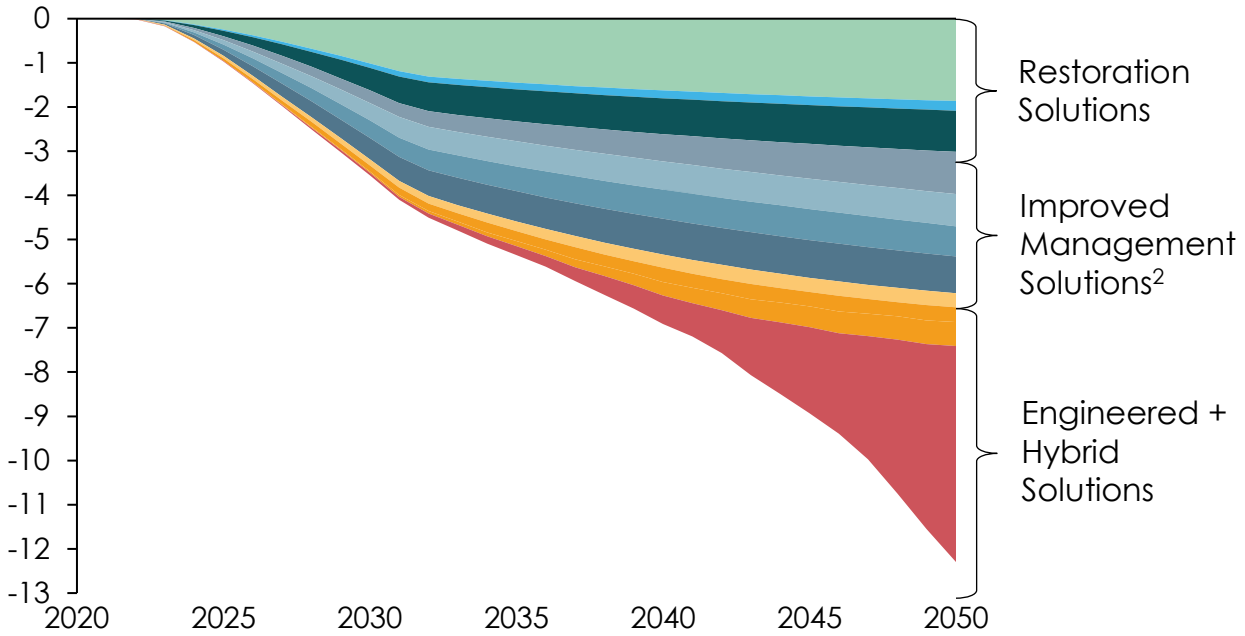
- Even with fastest feasible reductions in fossil fuel use and emissions, there would be a need for removals to meet climate objectives
- Mix of engineered and nature solutions in principle possible: but need strong standards to ensure integrity in terms of both additionality and permanence
- Significant flows of finance required to finance these removals
- These flows of finance could come from these categories of buyers: compliance markets, governments, voluntary markets
- Discussion of whether appropriate approach should vary by type of company
- Need for additionality, and the need for removals, led us to strongly favour **removals not offsets** – argument that the role of offsets should disappear over time.
- Strong insistence that removals purchase had to be **as well as not instead of** in company emissions reductions, but purchases of "the area under the curve" desirable.

We did not really set out an explicit point of view of how this framework related to Scope 3 emissions

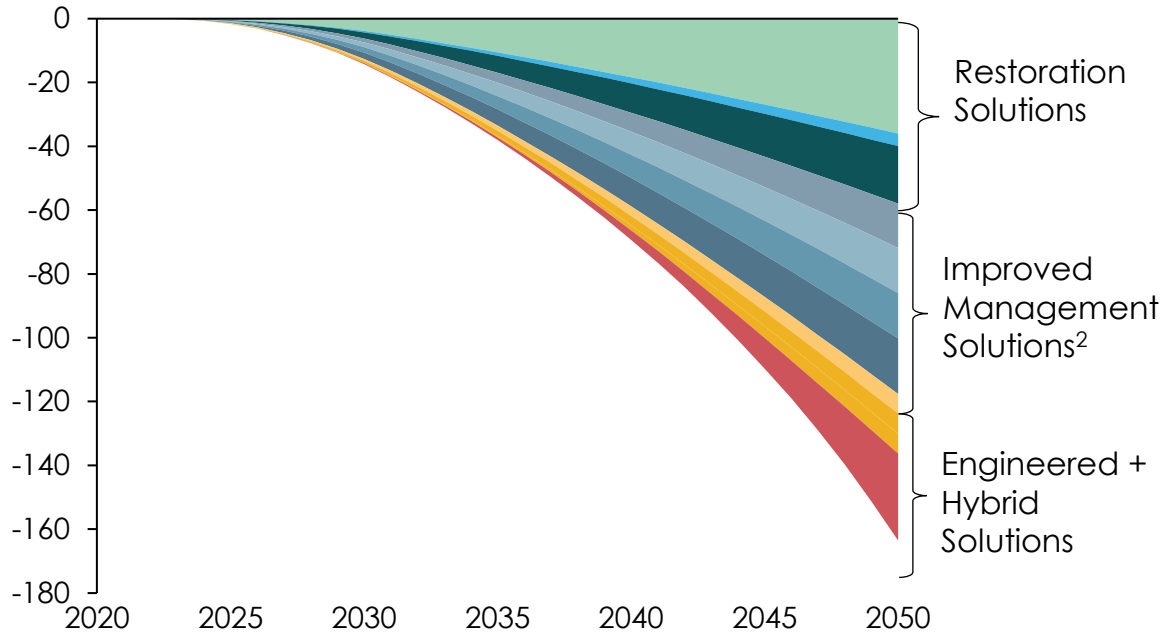
Ambitious and rapid scaling of a CDR portfolio could deliver cumulative sequestration of ~165 $GtCO_2$ by 2050

CO_2 ONLY

Potential ramp-up of CDR, $GtCO_2$/year, global



Cumulative CDR 2020-2030, $GtCO_2$, global



NCS: Restore

- Restore forests
- Restore Blue carbon[1]
- Restore drained peatlands

NCS: Manage

- Improve forest management
- Agroforestry
- Enhance soil carbon sequestration in croplands
- Enhance soil carbon sequestration in grazing lands

Hybrid and engineered approaches

- Apply biochar
- BECCS
- DACCS

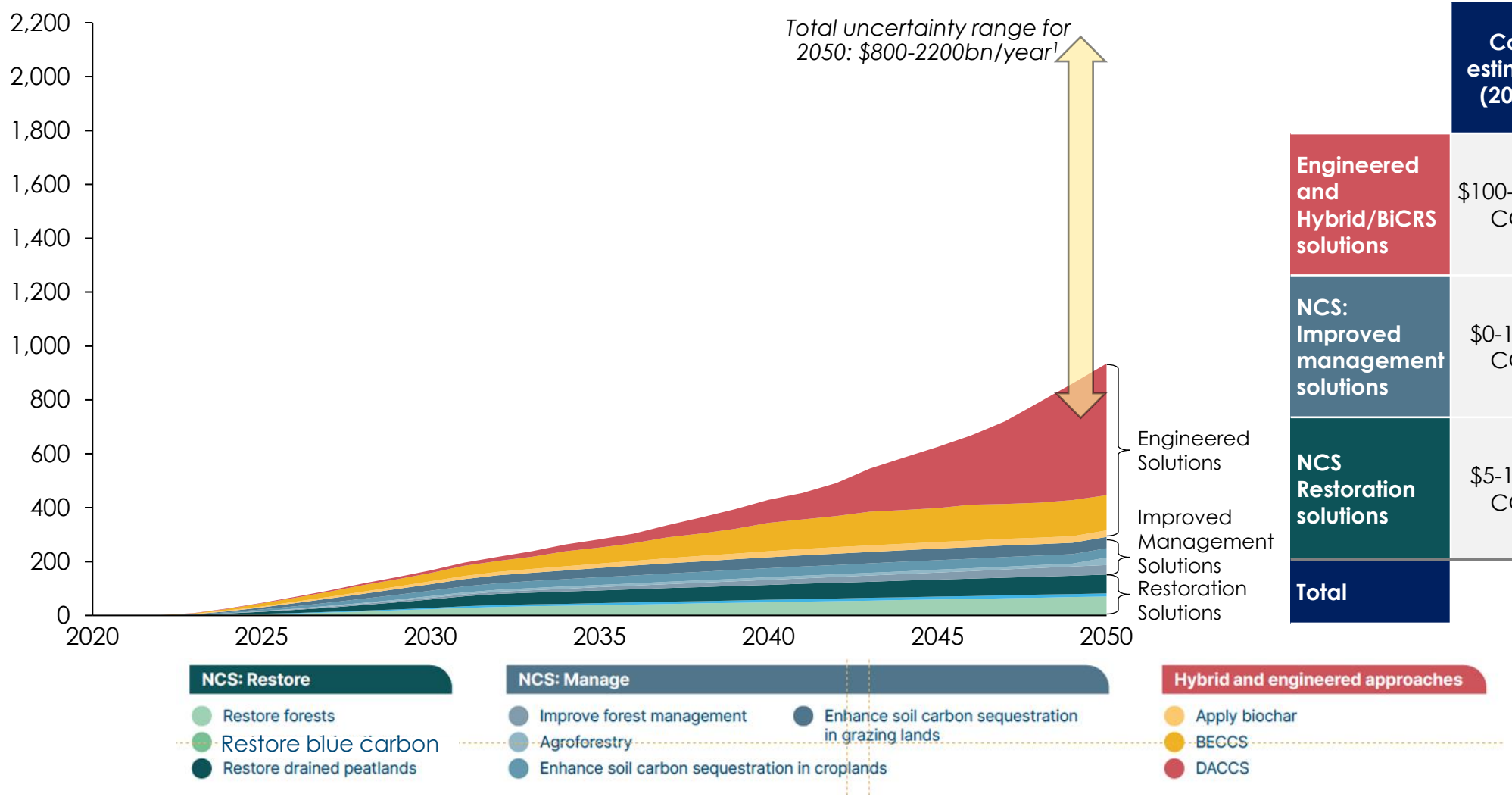
Notes: The analysis was designed to avoid potential double-counting of emissions reductions, and is adjusted from annualised average potential estimates for 2020-2050 period. The models reflect land use & management changes, yet in some instances can also reflect demand-side effects from carbon prices, so may not be defined exclusively as 'supply-side'. (1) 'Blue Carbon' is defined as ocean-based biomass sequestration including mangroves, seagrasses, and tidal marshes. (2) Improved management solutions have been adjusted for feasibility on a country-by-country basis. Overall average reduction is ~50%.

Source: SYSTEMIQ analysis for the ETC (2021), based on Roe et al. (2021), Hannah et al. (2021), Griscom (2017), ETC (2021) *Bioresources for a Sustainable Net-Zero Economy*, High Level Panel for Oceans (2020)

Total market for CDR could reach $200bn/year by 2030; $1000bn/year by 2050

Expected annual cost of CDR solutions

USD bn/year, global



	Cost estimate (2030)	Cost estimate (2050)	Cumulative potential (2020-2050)
Engineered and Hybrid/BiCRS solutions	$100-600/t CO_2	$100-300/t CO_2	45 Gt CO_2
NCS: Improved management solutions	$0-100/t CO_2	$0-100/t CO_2	60 Gt CO_2
NCS Restoration solutions	$5-100/t CO_2	$25-100/t CO_2	60 Gt CO_2
Total			160 Gt CO_2

Offsets should prioritise vital reductions and shift towards removals over time

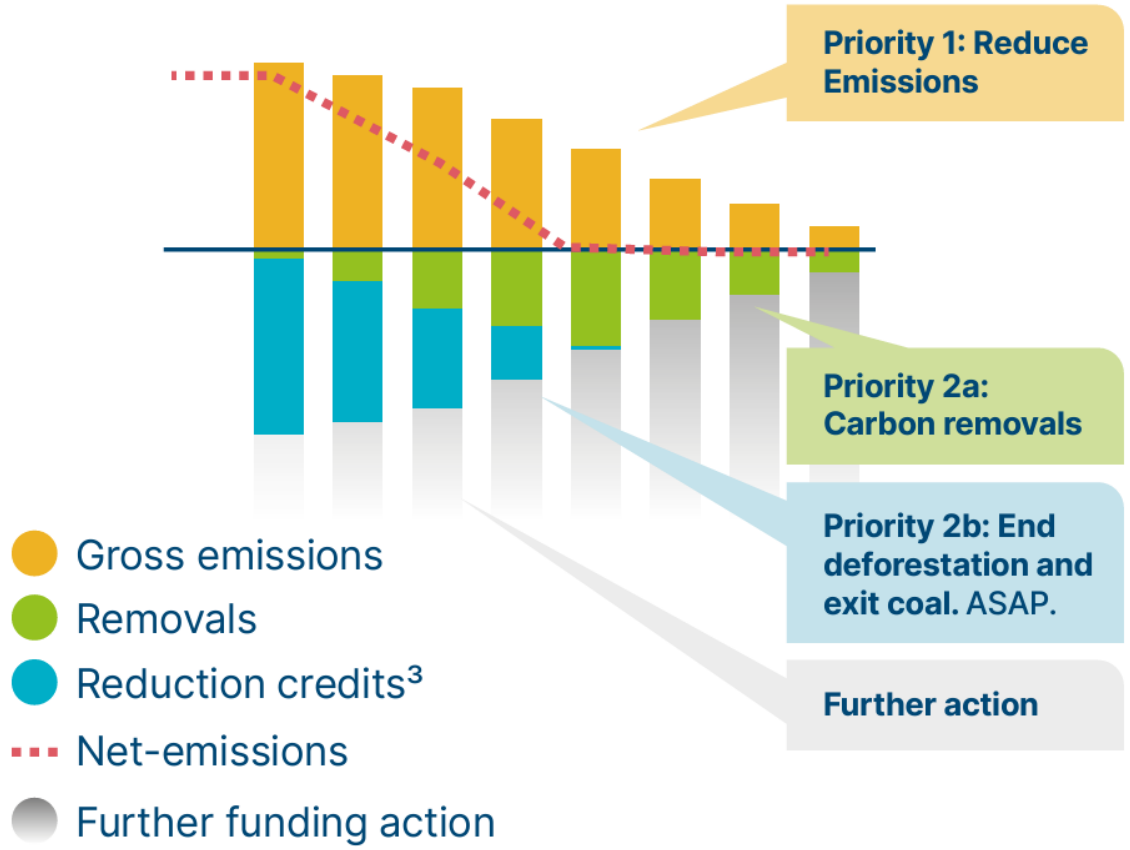
- While strongly favouring **Carbon Dioxide Removals**, we identified 2 specific **categories of offsets** which were more likely:
  - to meet criteria on additionality
  - and unlikely to occur without financial flow

- In particular, the ETC's 2021 report on *Keeping 1.5°C Alive*, showed that to make a 1.5°C pathway viable the world must both:
  - **Reduce deforestation** – including through setting aside risk-adjusted 'buffer pools' of carbon credits, and setting larger geographic 'jurisdictional approaches' to avoiding deforestation, to ensure additionality.
  - **Accelerate the closure of existing coal power plants** before the end of their useful life categories (e.g., by bringing forward the closure of an existing coal plant to 2030 or earlier)

- If time-limited, **both are more likely to be additional than many other forms of emission reduction.**

Our 2022 report therefore offered a definition of 'high ambition' corporate action, recognizing strategies will need to differ by type of company

Illustration of a high ambition strategy towards Net Zero



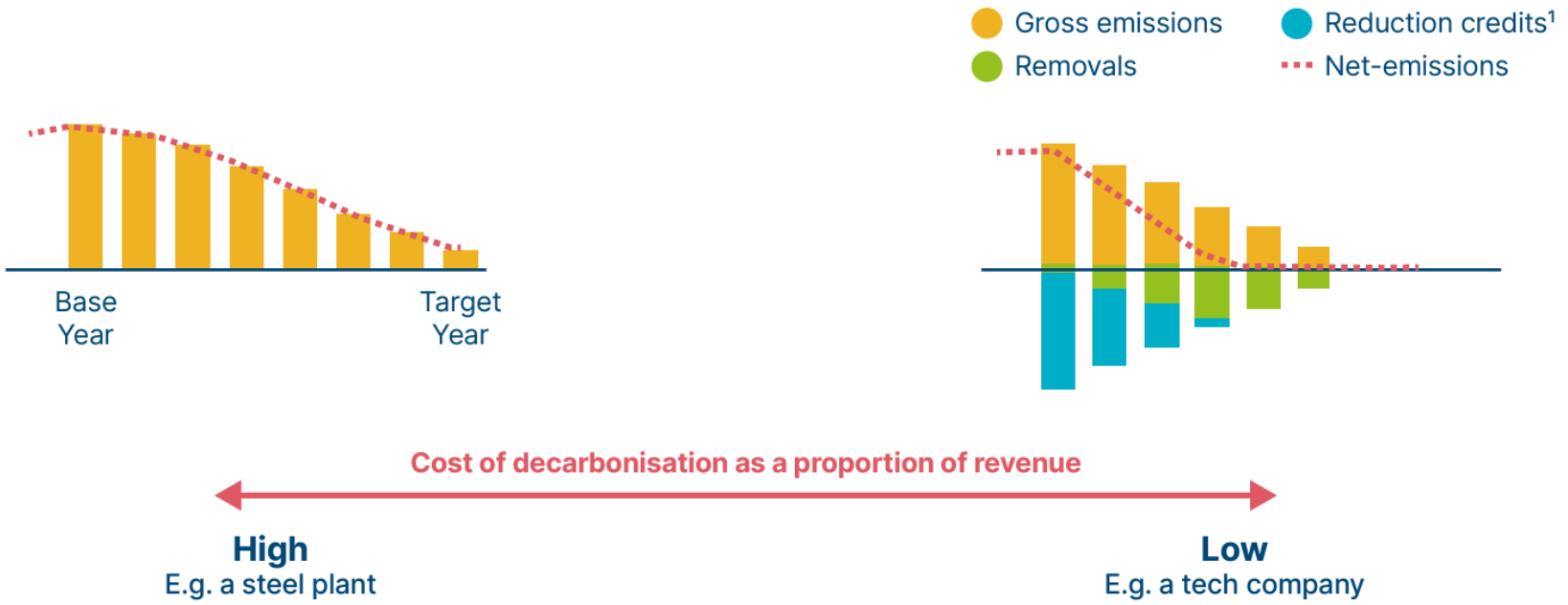
Key points:

- In addition to sector decarbonisation, we highlighted the opportunity in offsetting emissions 'under the curve'
- Opportunity to be 'net-zero' during the transition, and not just at the end-state
- Recognise high priority offsets (early coal exit, avoided deforestation) but clear shift towards removals over time

Notes: Assuming time needed to scale up removals market in the 2020s, especially for BECCS and DACCS. Offsetting strategies should transition towards removals over time. (3) Likely to be restricted to time-limited credits for avoided deforestation and possible 'exit credits'. For the purposes of this illustration reduction credits don't contribute to net emissions.

Ambition should follow a continuum of action, based on cost as a proportion of revenue

Emissions and removals pathway by company type



Key points:

- Companies with high decarbonisation costs can make most meaningful contribution by focusing on within sector decarbonisation
  - *Though this doesn't exclude the possibility of further action*
- Companies with low decarbonisation costs OR with high Scope 2/3 emissions should fund removals alongside decarbonisation

Notes: Assuming time needed to scale up removals market in the 2020s, especially for BECCS and DACCS. Offsetting strategies should transition towards removals over time. (1) Likely to be restricted to time-limited credits for avoided deforestation and possible 'exit credits'. For the purposes of this illustration reduction credits don't contribute to net emissions.

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- Past ETC analysis and position
- **Recent developments in integrity certification**
- Issues for debate

Other carbon market developments on integrity & demand

Voluntary markets

- **Supply side integrity:** Integrity Council on Voluntary Carbon Markets' Core Carbon Principles (CCP) apply to carbon crediting programs and the methodology behind them. As of COP28, the 5 major carbon crediting programs they've approved represent 98% of existing markets[1].
- **Demand-side integrity:** Bodies such as Voluntary Carbon Markets Initiative emerging as recognized standard setters alongside SBTi – ranking claims for carbon integrity based on company action and credit quality.
- **US rules and standards:** White House endorsement of high integrity carbon credits as a means of voluntary corporate action

Compliance markets

- **EU Commission** is set to report, by 2026, on how negative emissions could be accounted for and covered by emissions trading in the EU ETS
- **Article 6 of the Paris agreement**:
  - Negotiations still taking place on key points, meaning no trading can yet take place
  - Controversies include debates over 'avoided emissions' (i.e. not extracting fossil fuels), though likely these are now excluded
  - Growing recognition that these trades should be used in addition to, not instead of within country decarbonisation (as reinforced in recent ETC NDC paper).

1) Incl. Gold Standard, CAR (climate action reserve) and ACR (American Carbon Registry), Verra and ART (Architecture for REDD+ Transactions) recently

Agenda

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Issues to discuss

Clear points ?

- Scope 1 & 2 have to get to net zero **in all** sectors and countries around mid-century: limited role if any for offset purchases at the end of transition
- Need for removals and for high priority offsets (e.g. early coal exit) still remains
- Progress on integrity standards creates potential for relaunch of VCMs on firmer base

Issues to discuss

- Appropriate approach to Scope 3
- How to encourage "area under the curve" purchases without reducing pressure for gross emissions reduction
- Possible points for potential ETC input to SBTi consultation