State of Net Zero

Cycle Capital ClimateTech Innovation Forum

Nat Bullard

May 16, 2023

BloombergNEF

Status update

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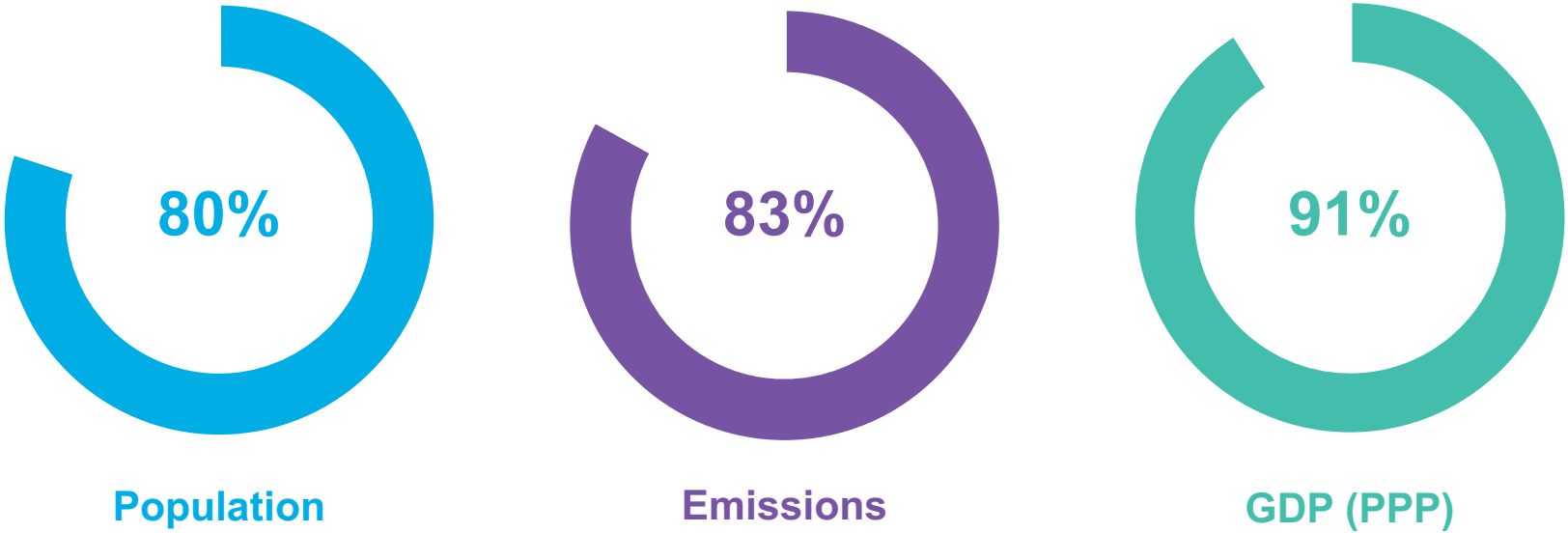
Most of the world has made a net zero commitment

Percentage with net zero target



Source: Net Zero Tracker. Note: As of January 2023.

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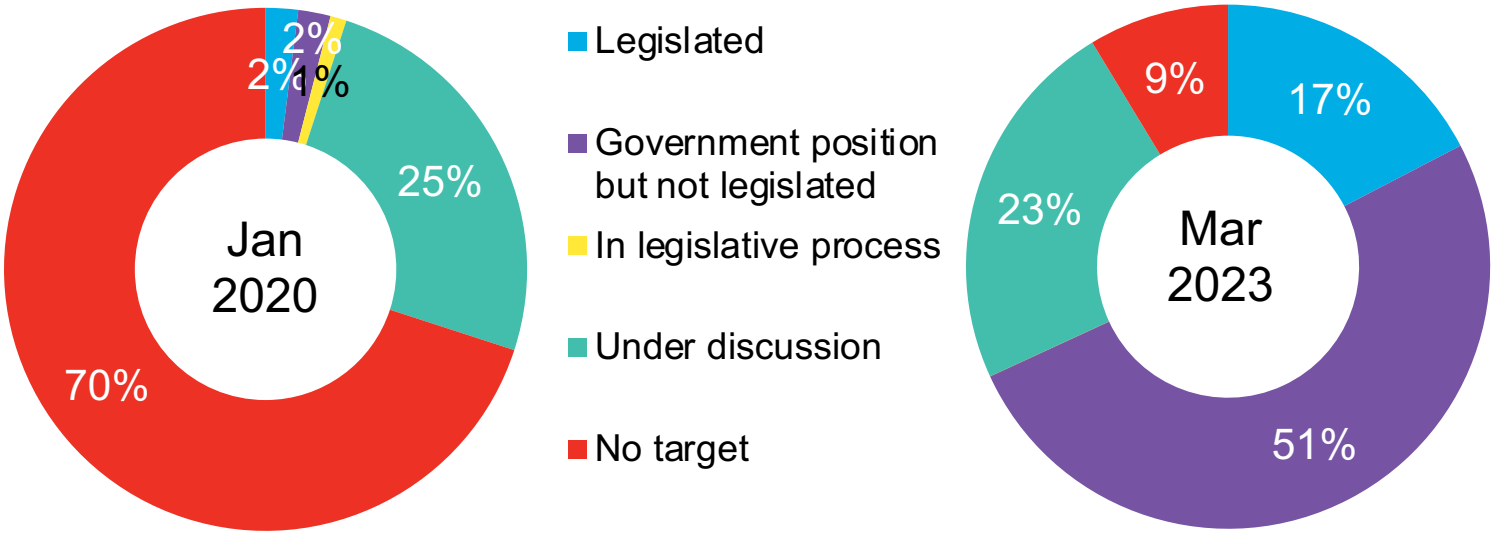
We are starting the net-zero “transition” era

Energy emissions and carbon budget



Source: WRI CAIT, governments, BloombergNEF.

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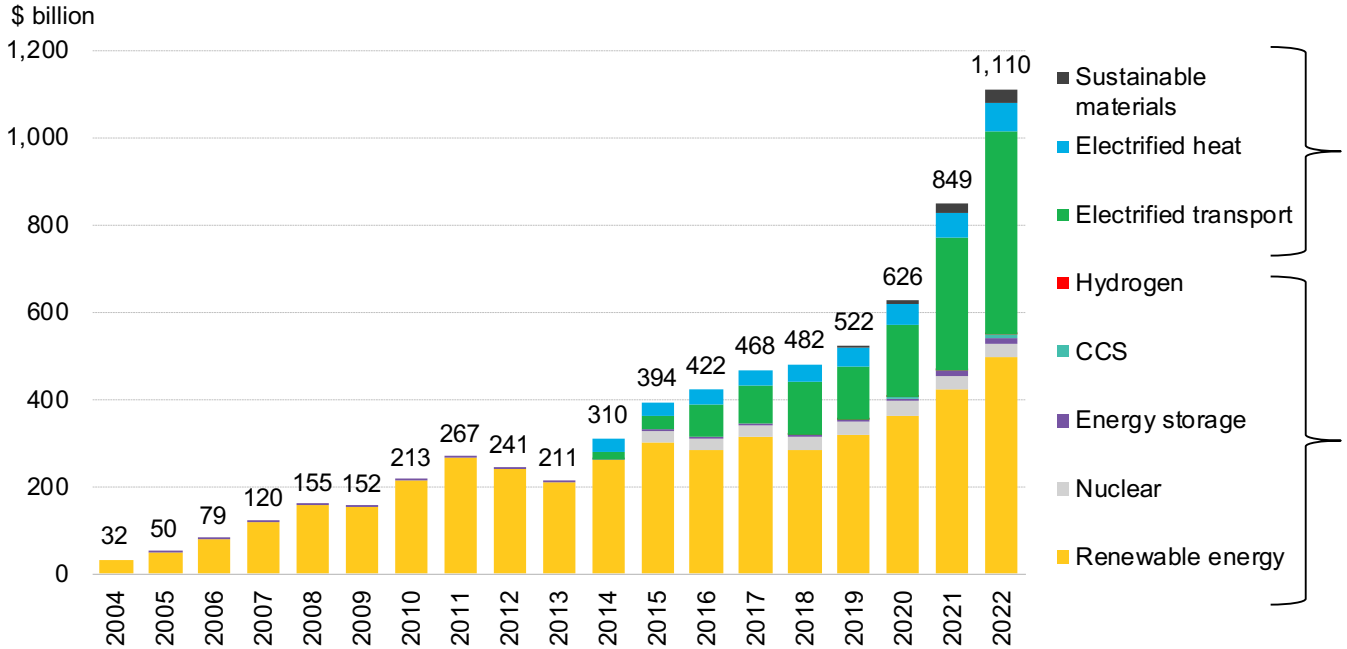
Global energy transition investment topped $1.1 trillion in 2022

Global investment in energy transition by sector



Source: BloombergNEF. Note: start-years differ by sector, but all sectors are present from 2019 onwards; see Appendix for more detail. Nuclear figures start in 2015.

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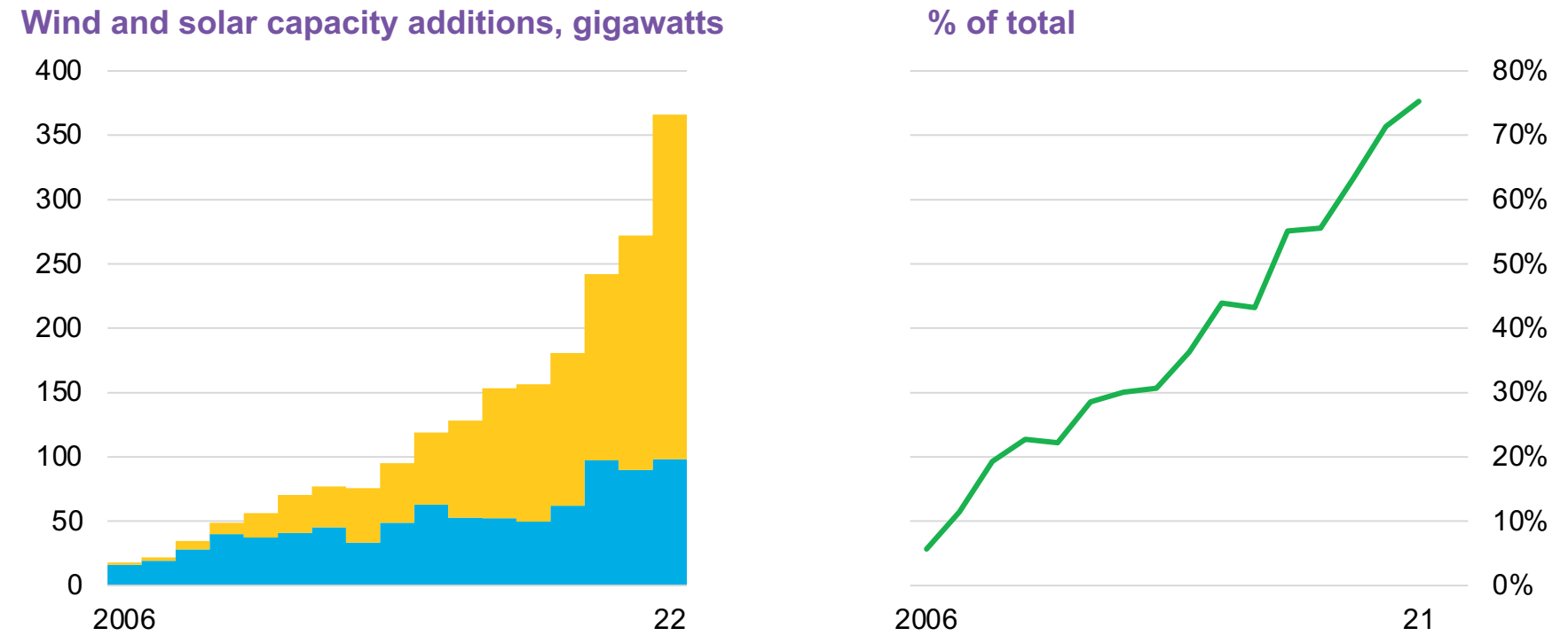
Wind and solar dominate global power capacity additions



Source: BloombergNEF

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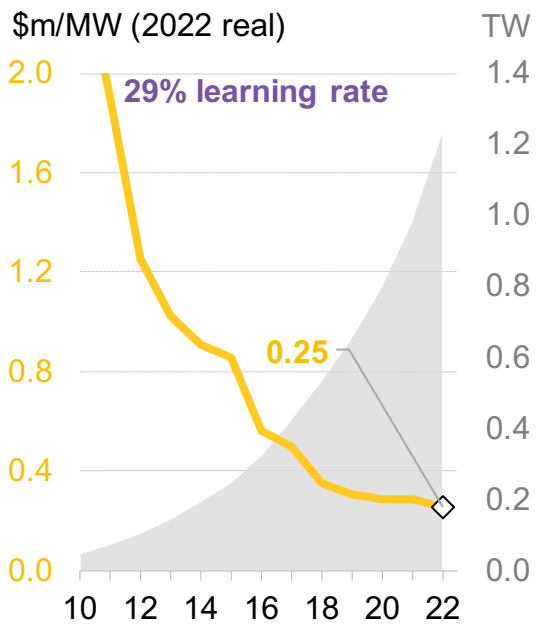
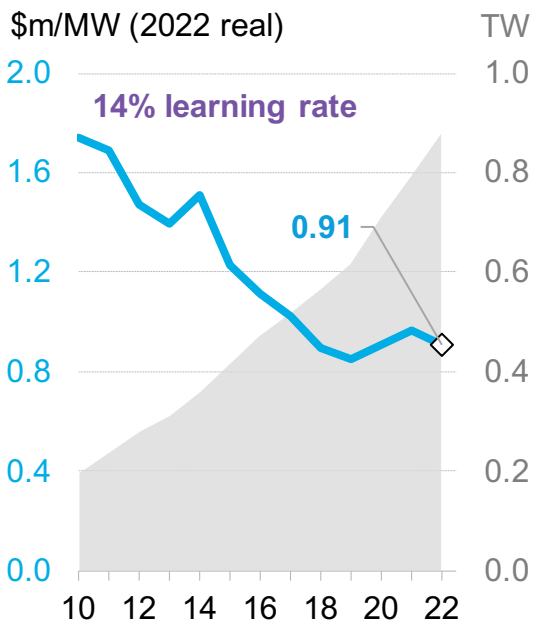
Price benchmark for modules, onshore wind turbines and battery packs

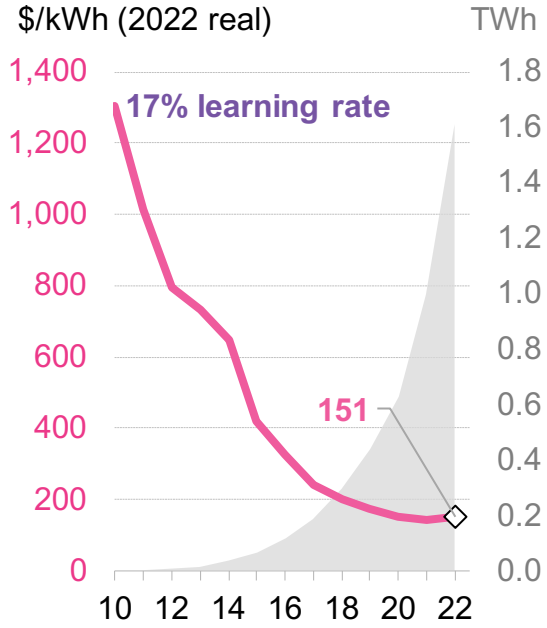
PV module price



Onshore wind turbine price



Li-ion battery pack price



Source: BloombergNEF

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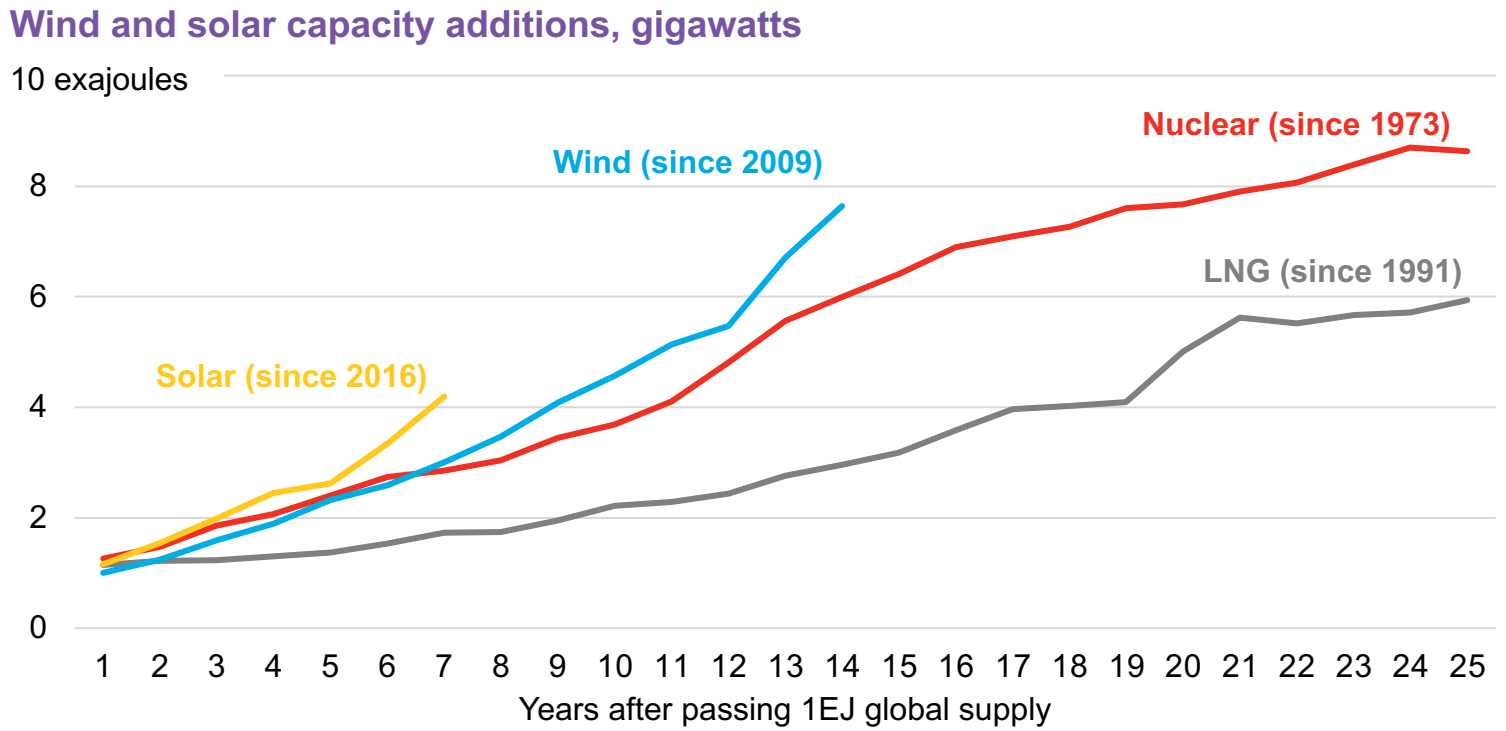
Wind and solar are also adding final energy faster than any source in 50 years



Source: Shell

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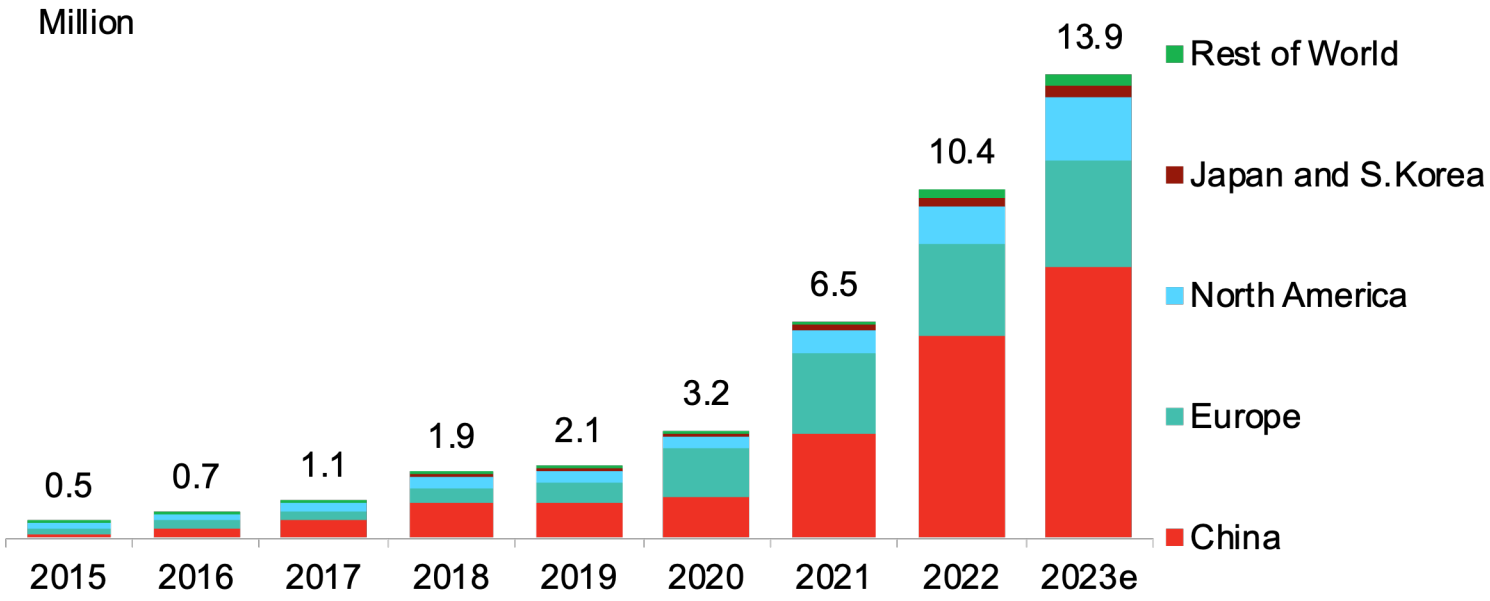
Electric vehicle sales will rise 30% in 2023

Passenger electric vehicle sales



Source: BloombergNEF, Marklines, Jato

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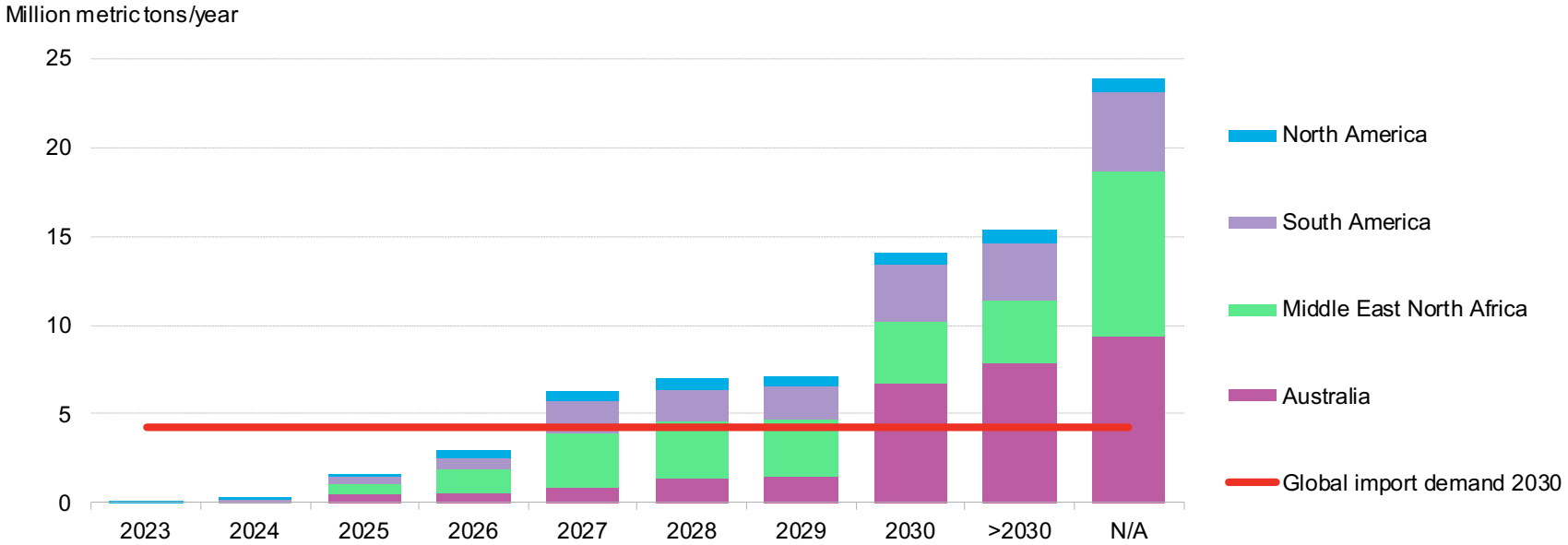
Hydrogen export projects are still waiting for buyers

Planned hydrogen exports by region and year versus import demand



Source: BloombergNEF. Note: Capacity estimated using the methodology in BNEF Hydrogen Supply-Demand Model: Supply. Import demand includes EU, Japan and South Korea, estimated based on the import terminal and ammonia demand from these countries. Data as of September 2022.

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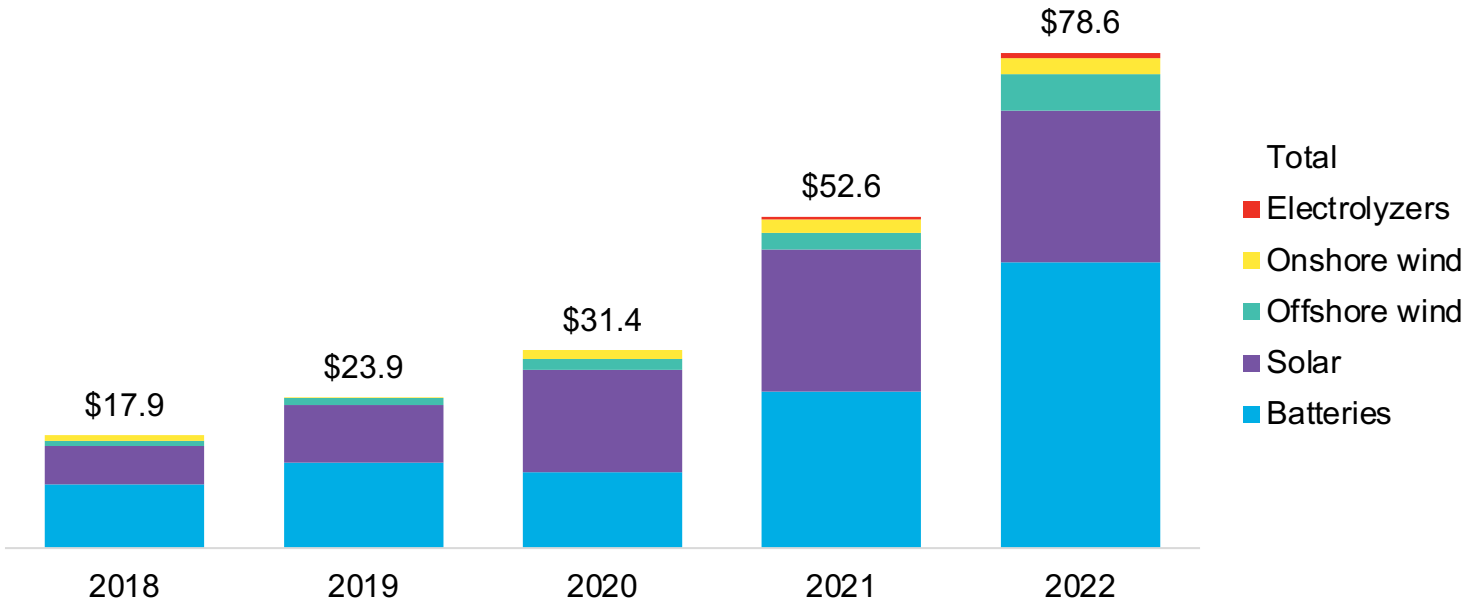
Clean technology manufacturing is booming

Global clean energy factory investment by technology, $ billion



Source: BloombergNEF. Sectors include upstream inputs and components. No electrolyzer investment recorded before 2022.

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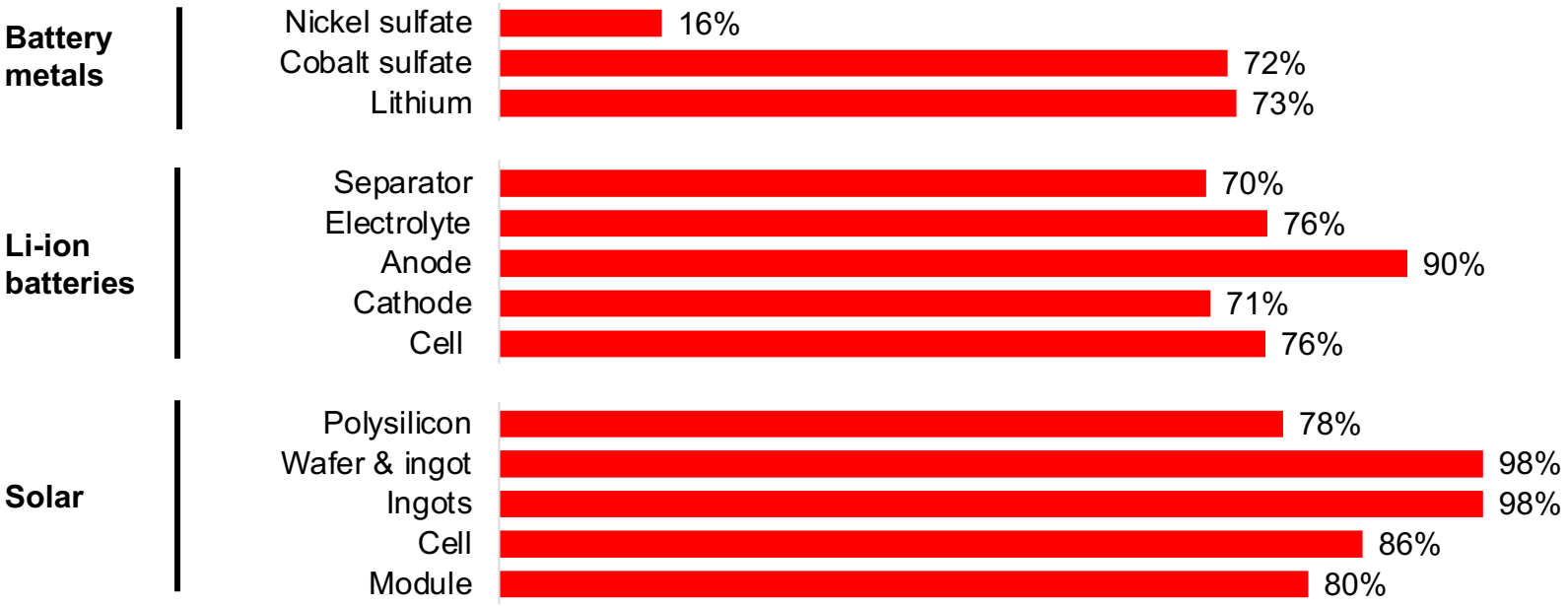
China dominates manufacturing

China energy manufacturing capacity, share of total



Source: BloombergNEF

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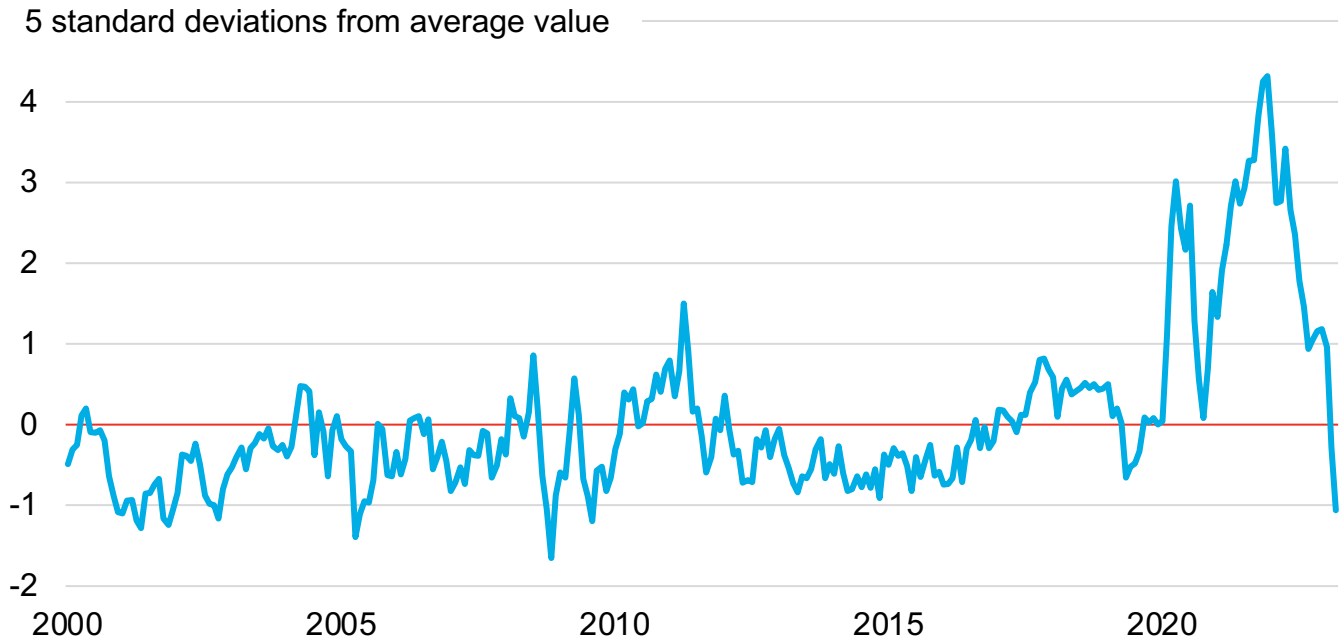
Supply chain pressures have eased

Federal Reserve Bank of New York Supply Chain Pressure Index



Source: Federal Reserve Bank of New York

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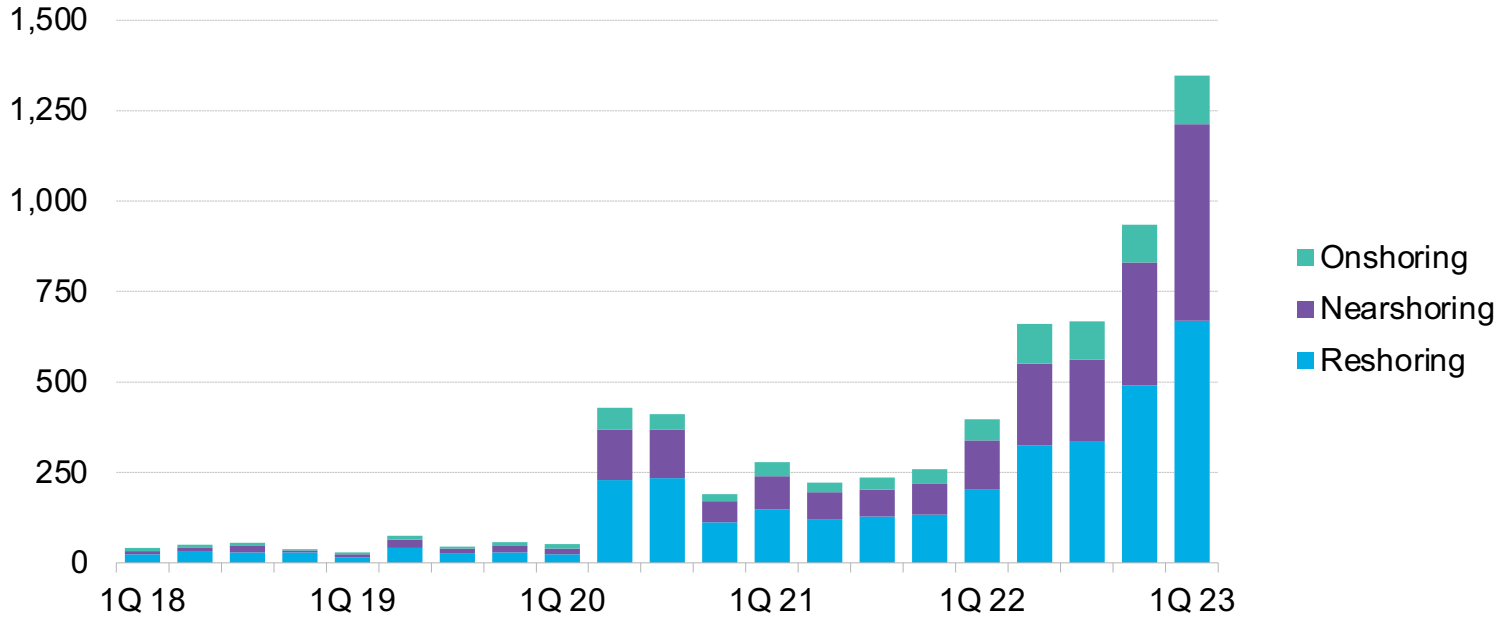
Companies are planning to bring manufacturing in, back, or near

Mentions of key terms in earnings calls and transcripts



Source: Bloomberg

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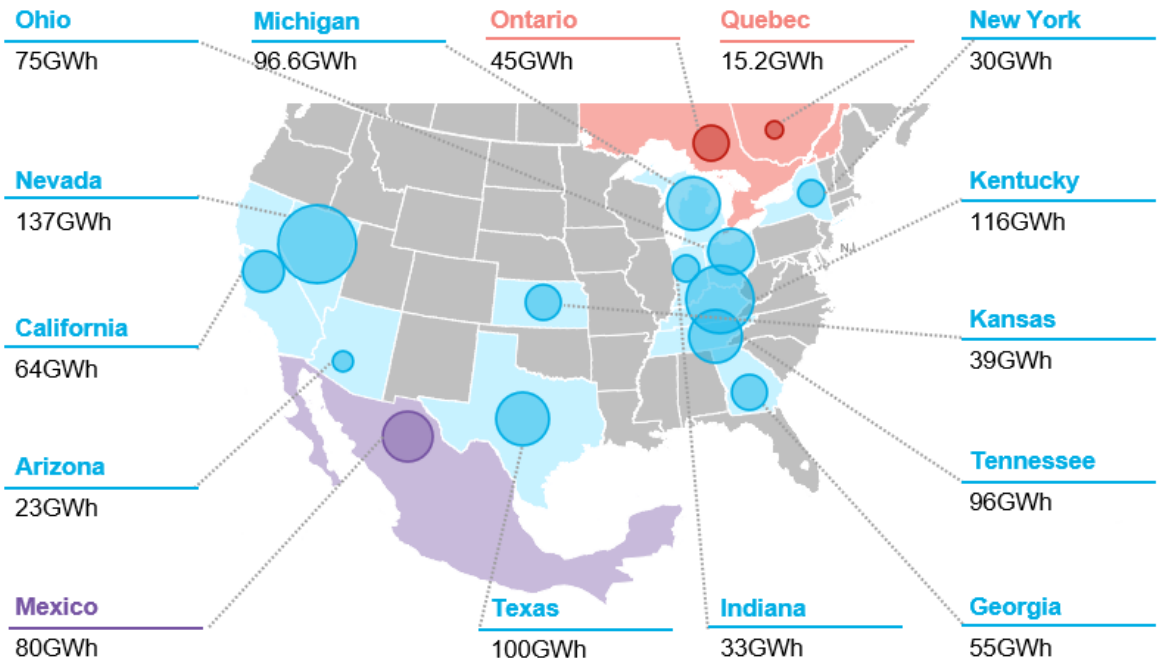
North American battery manufacturing is emerging – before and after the IRA



Source: BloombergNEF. Note: Capacity includes fully commissioned, under construction and announced battery manufacturing plants. Bubble size corresponds to total capacity commissioned, under construction and announced.

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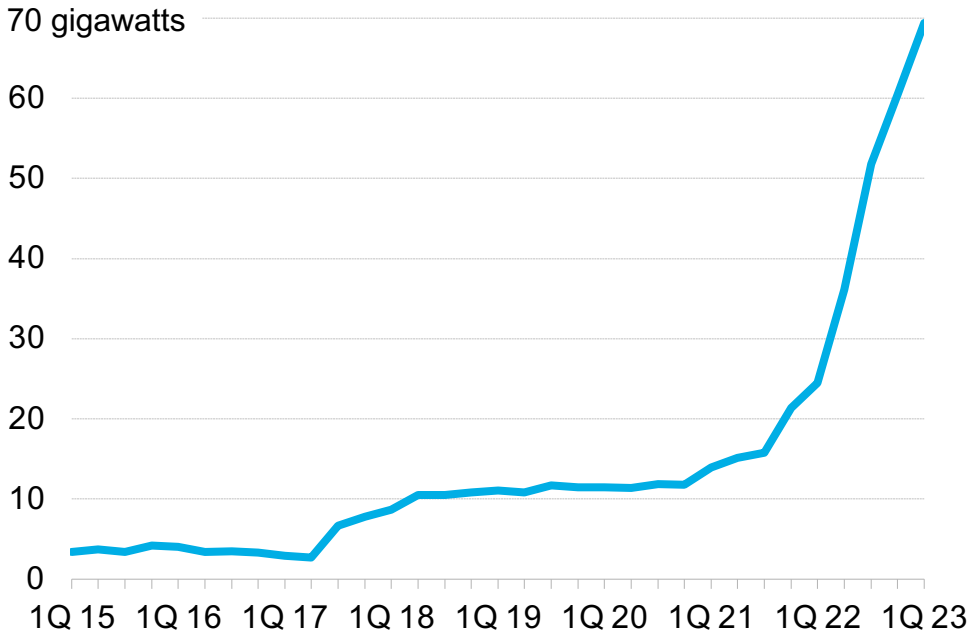
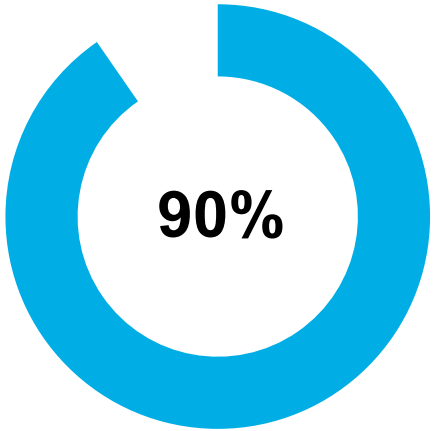
First Solar's backlog is soaring, and 90% of it is in North America

First Solar quarterly closing order book





North America

Source: Bloomberg Intelligence. Note: majority of orders for 2024 and 2025. First Solar says "excluding India, we are now sold out through 2026".

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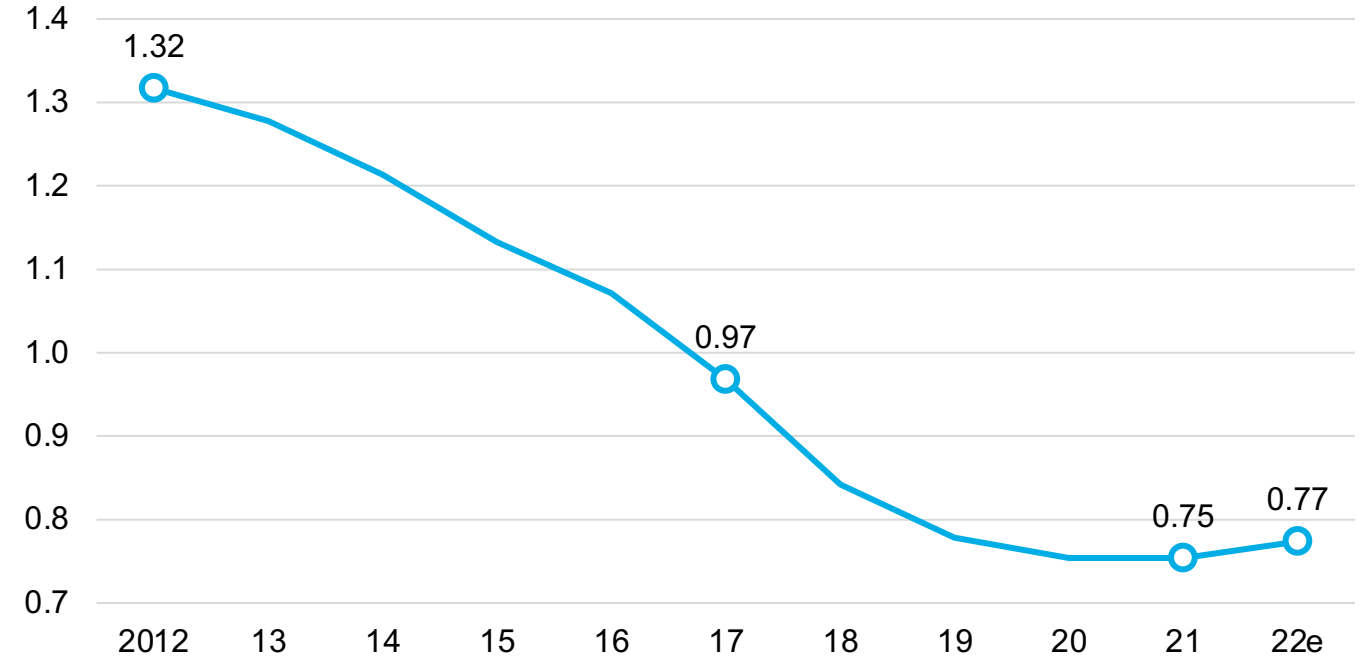
Electricity access moved backwards

Global population without access to electricity, billions



Source: IEA

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Levers and Leverage

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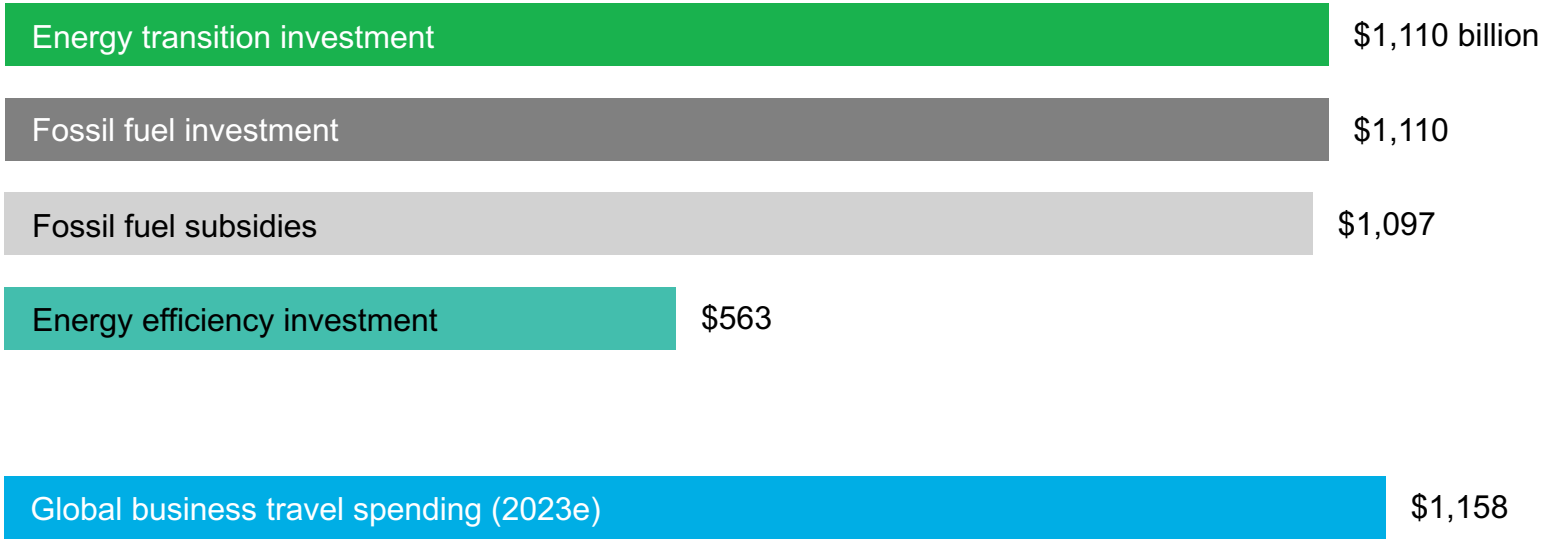
First Solar quarterly closing order book



Sources: IEA, BloombergNEF, Global Business Travel Association

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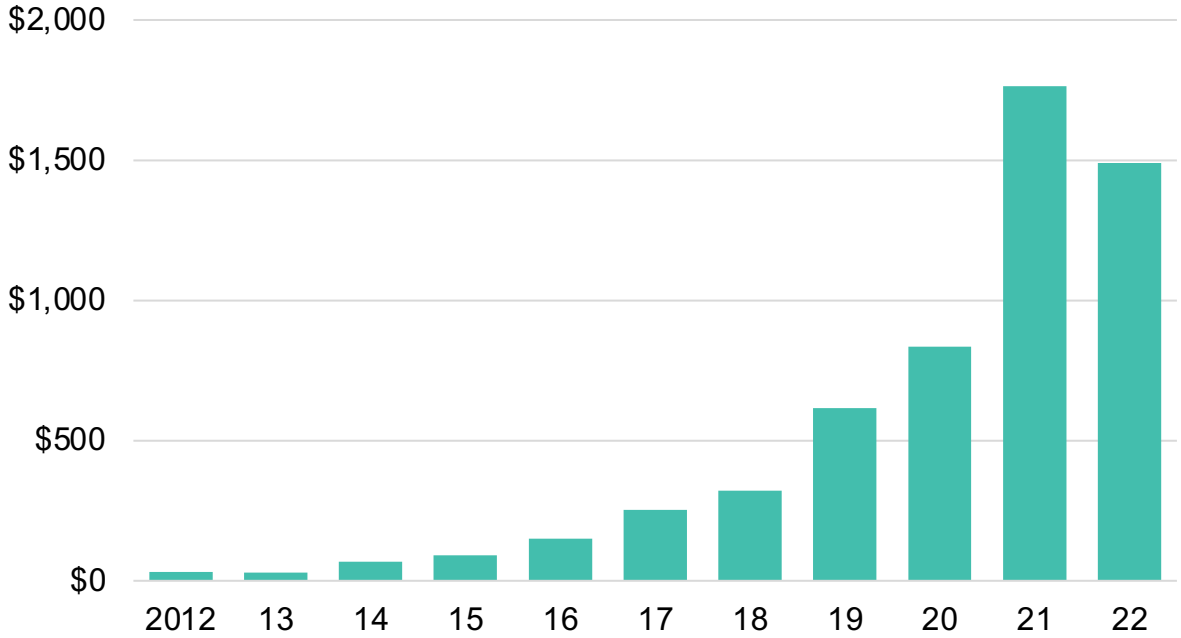
Sustainable debt issuance declined in 2022

Annual sustainable debt issuance, $ billion



Source: Bloomberg

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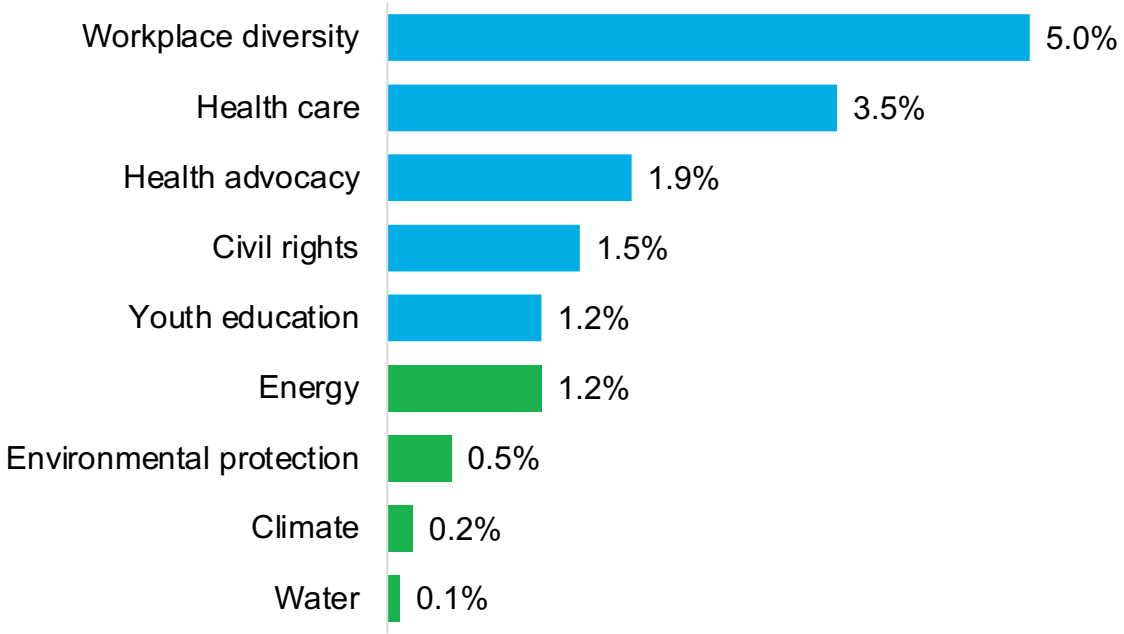
Climate change is a boardroom challenge

Fortune 100 boardroom ESG qualification (select)

Of the Fortune 100 board has some ESG qualification



Source: Tensie Whelan, NYU-Stern School of Business. Note: 1,188 total board members.

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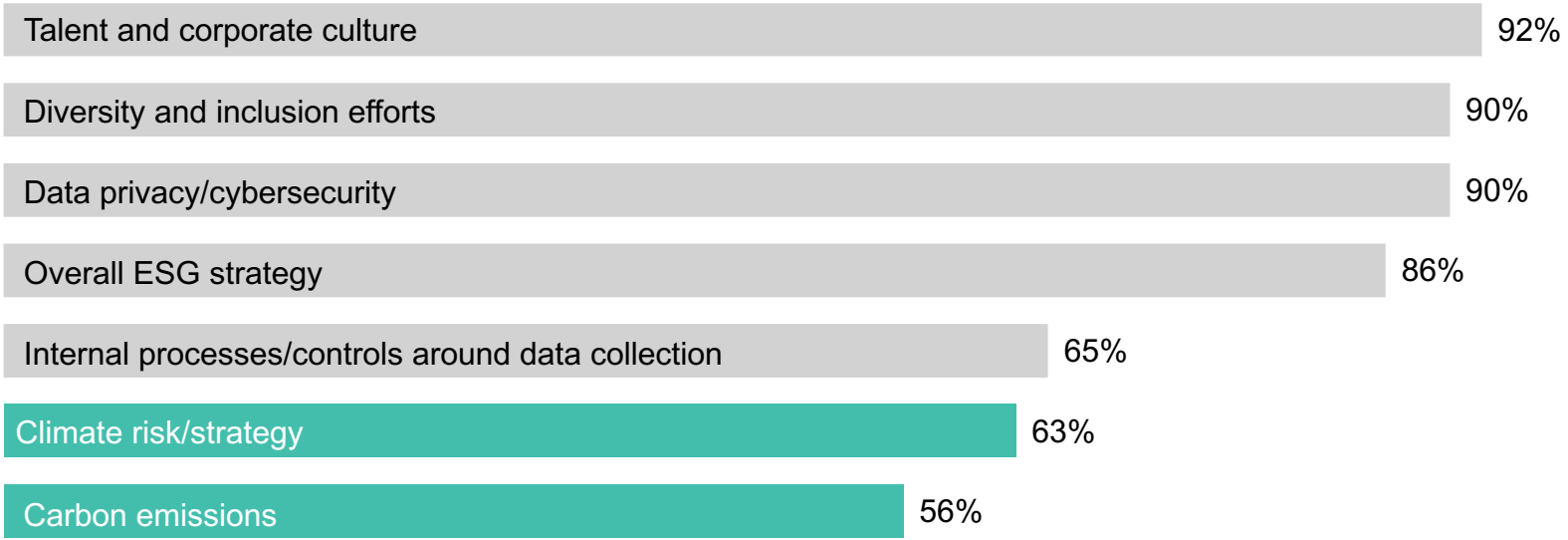
Climate change is a boardroom challenge

"How well do you think your board understands the following as they relate to your company?"



Source: PwC

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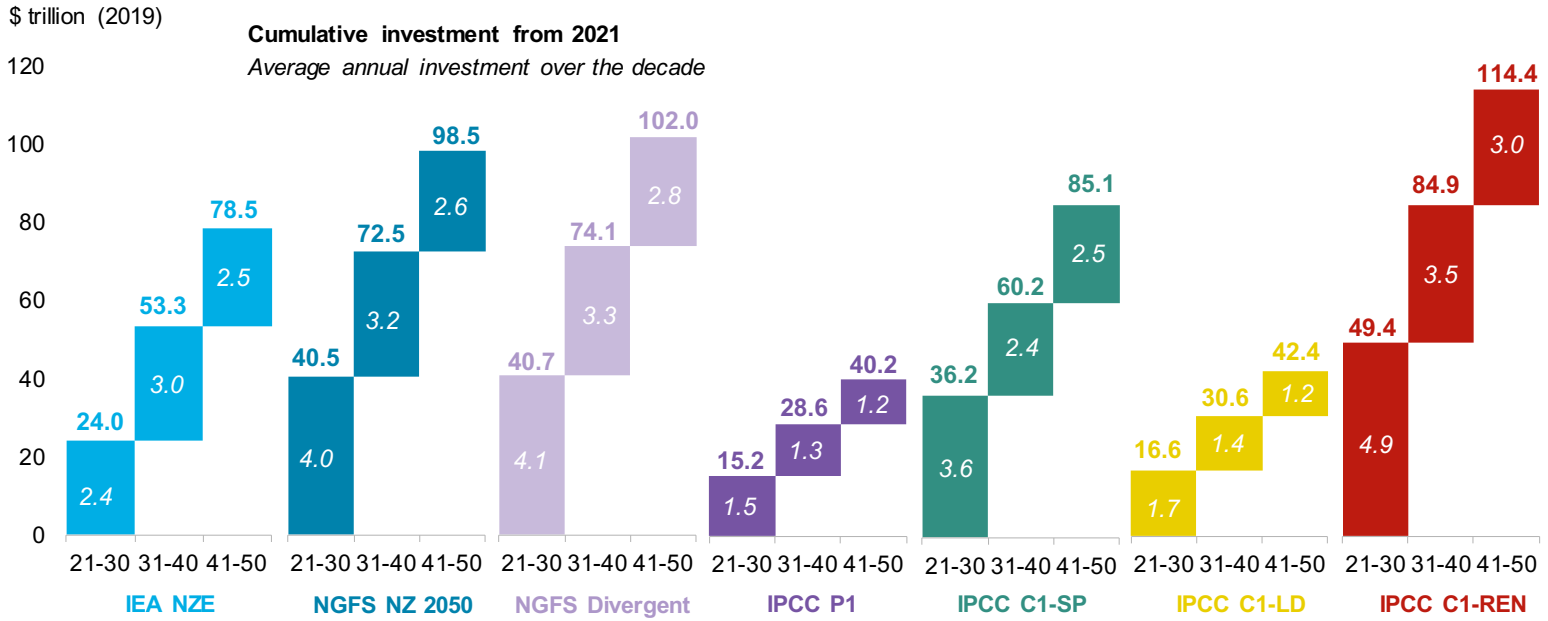
Total investment varies greatly by decade and scenario narrative

Total energy supply investment



Source: BloombergNEF, IEA, IPCC, NGFS. Note: Total energy supply investment constitutes of low-carbon power supply, hydrogen infrastructures, carbon capture and storage, upstream, midstream, and downstream for oil, gas, and coal and unabated fossil fuel power generation.

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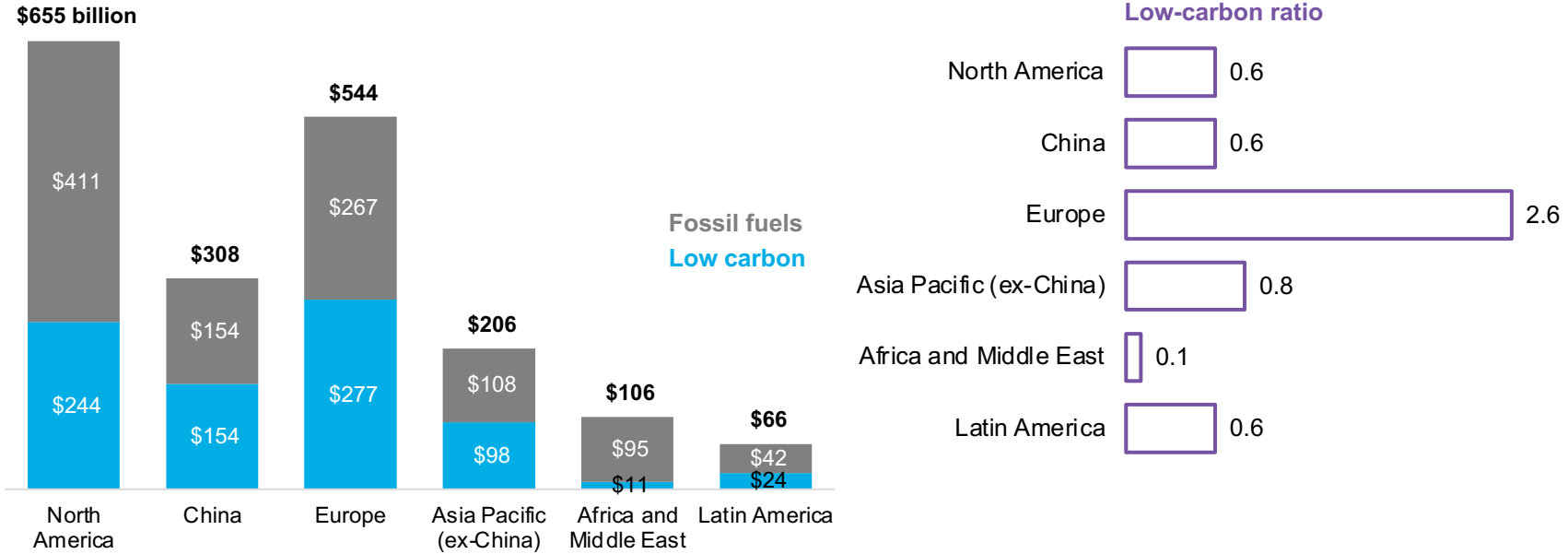
All regions except Europe have an Energy Supply Banking Ratio below 1:1

Energy supply financing by issuance region of risk in 2021



Source: Bloomberg LP, BloombergNEF, IEA, Urgewald, Rainforest Action Network, IJGlobal

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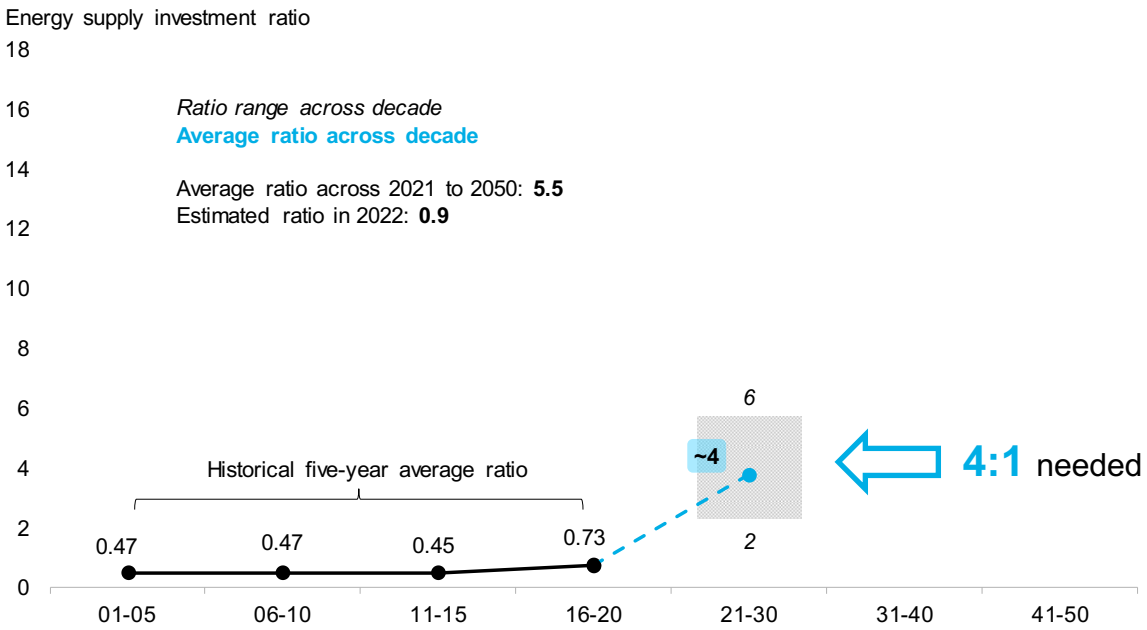
The ratio needs to rise to an average 4:1 in the 2020s

Energy supply investment ratio by decade



Source: BloombergNEF, IEA, IPCC, NGFS. Note: The decadal average values and ranges have been rounded to the nearest whole number.

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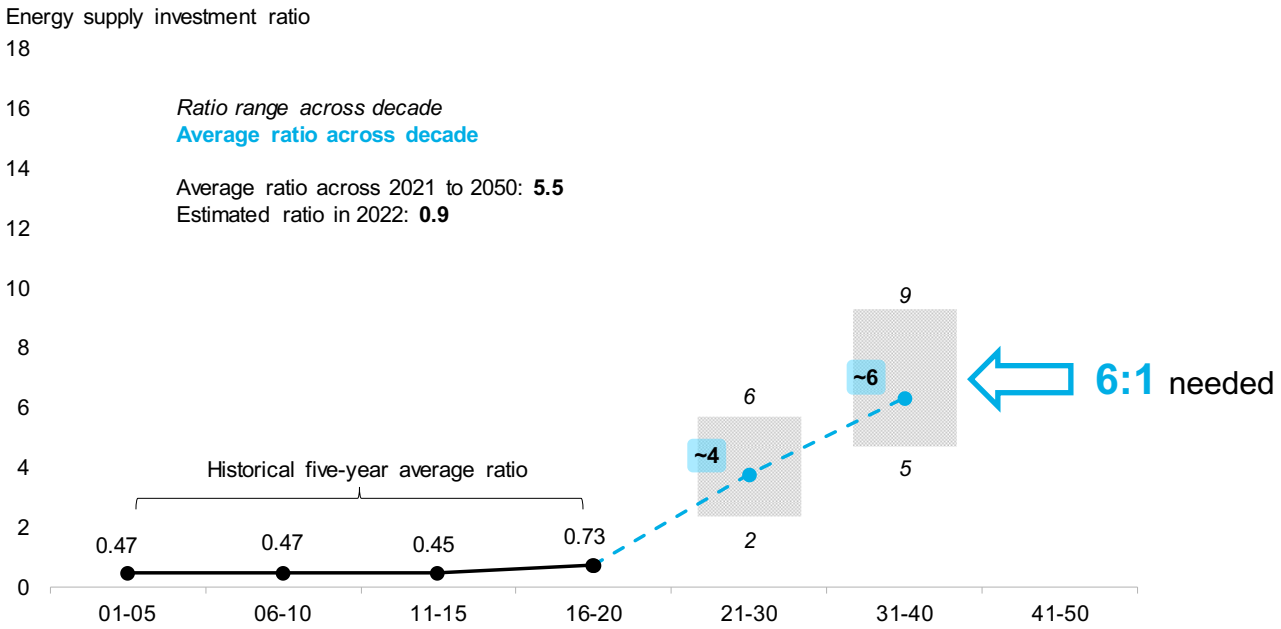
The ratio needs to rise to an average 6:1 in the 2030s

Energy supply investment ratio by decade



Source: BloombergNEF, IEA, IPCC, NGFS. Note: The decadal average values and ranges have been rounded to the nearest whole number.

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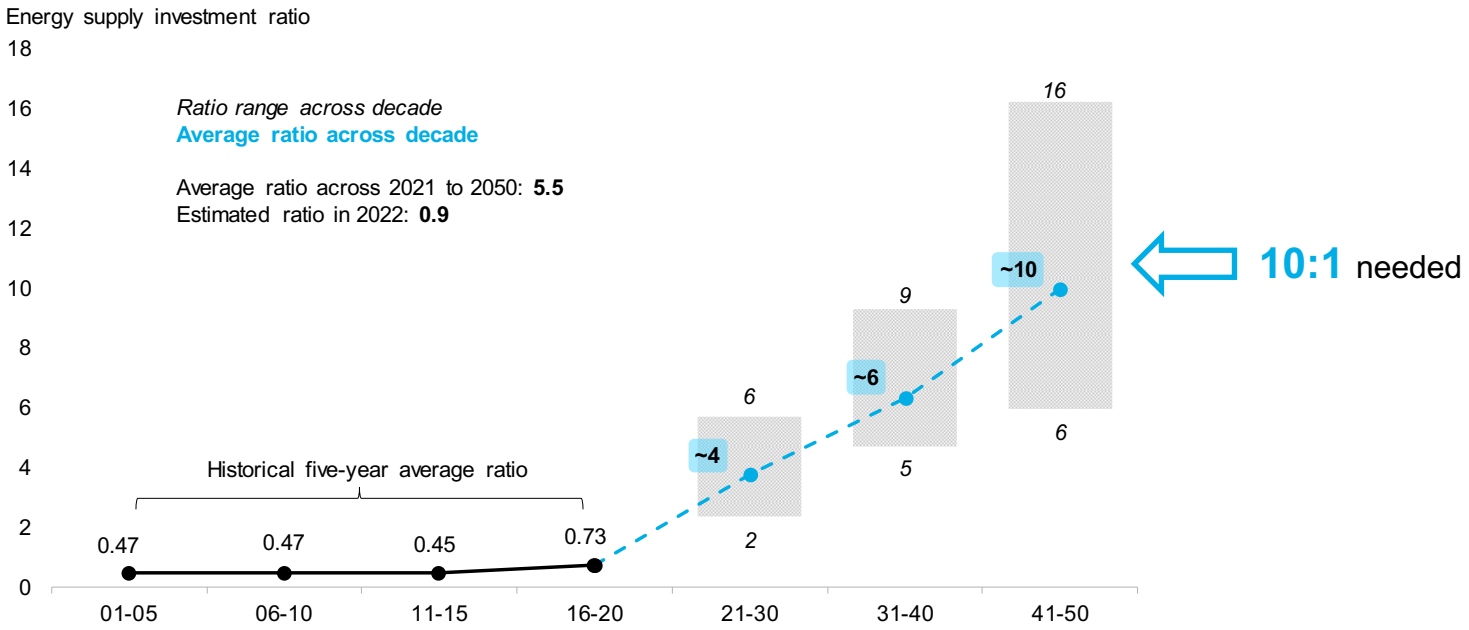
The ratio needs to rise to an average 10:1 in the 2040s

Energy supply investment ratio by decade



Source: BloombergNEF, IEA, IPCC, NGFS. Note: The decadal average values and ranges have been rounded to the nearest whole number.

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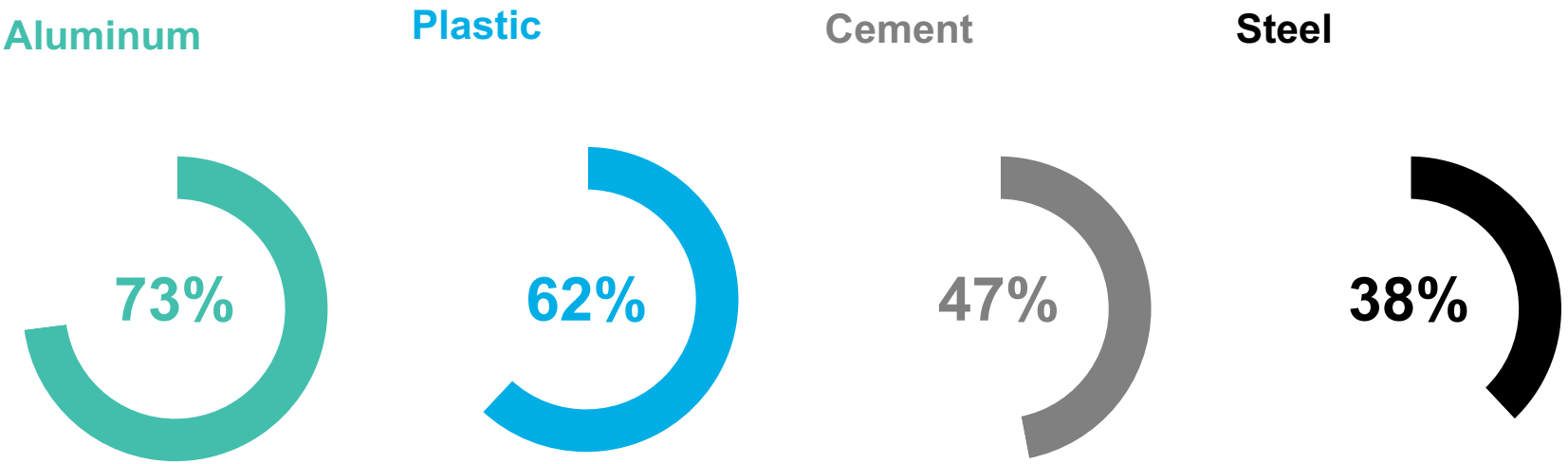
Hard industries have hard targets

Share of global capacity covered by net zero target



Source: BloombergNEF

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Net Zero

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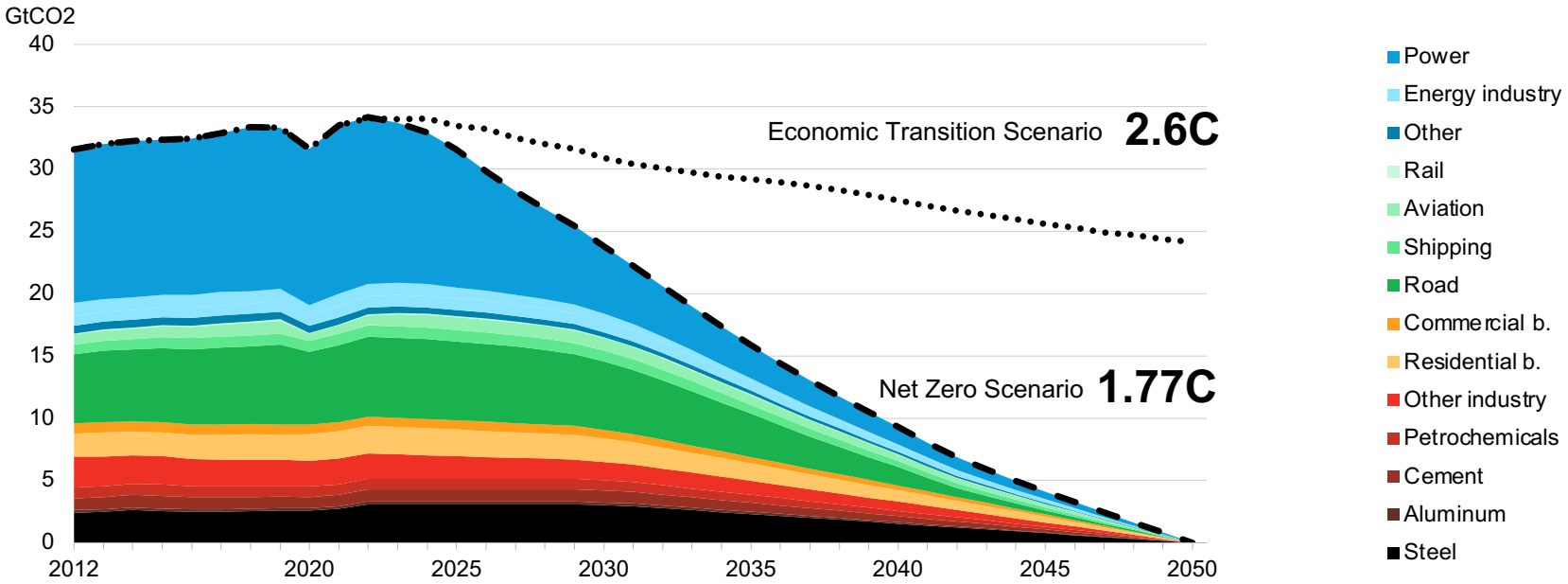
There are still plausible pathways to stay within 1.77 degrees of warming

Energy emissions and carbon budget



Source: BloombergNEF New Energy Outlook 2022

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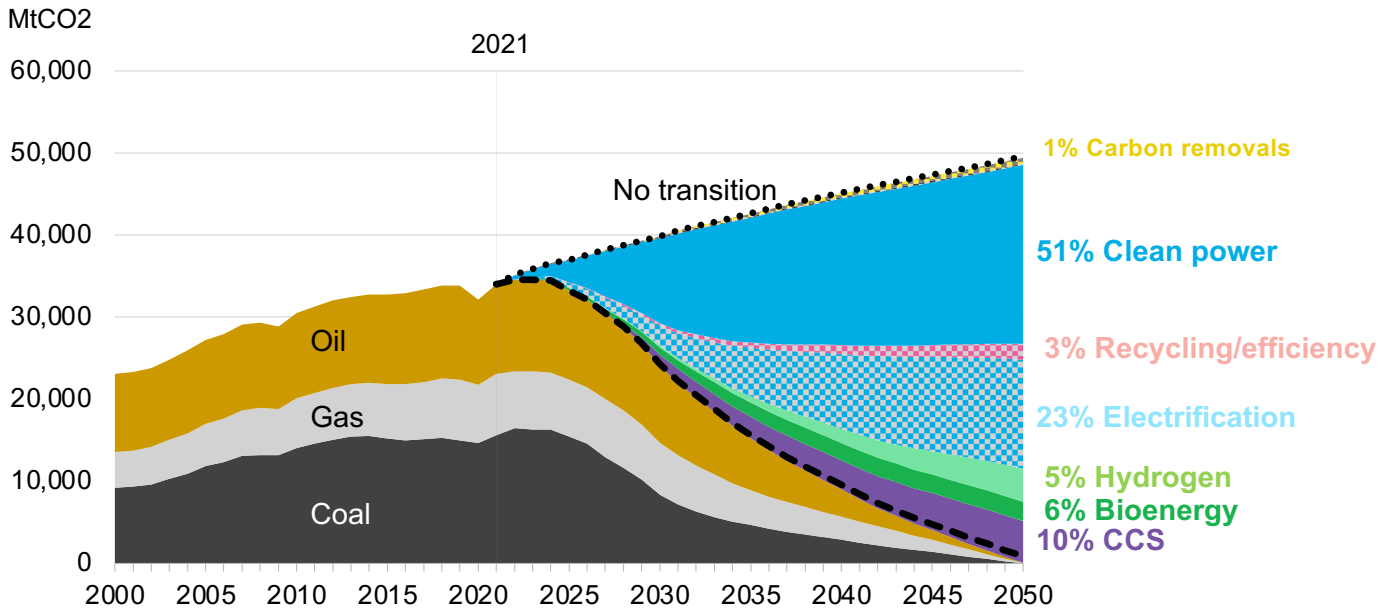
Clean power and electrification are the main drivers of emissions abatement

CO2 abatement by technology/type, Net Zero Scenario



Source: BloombergNEF. Note: Abatement also includes fuel switching and other abatement technologies. Values show total abatement in 2023-50.

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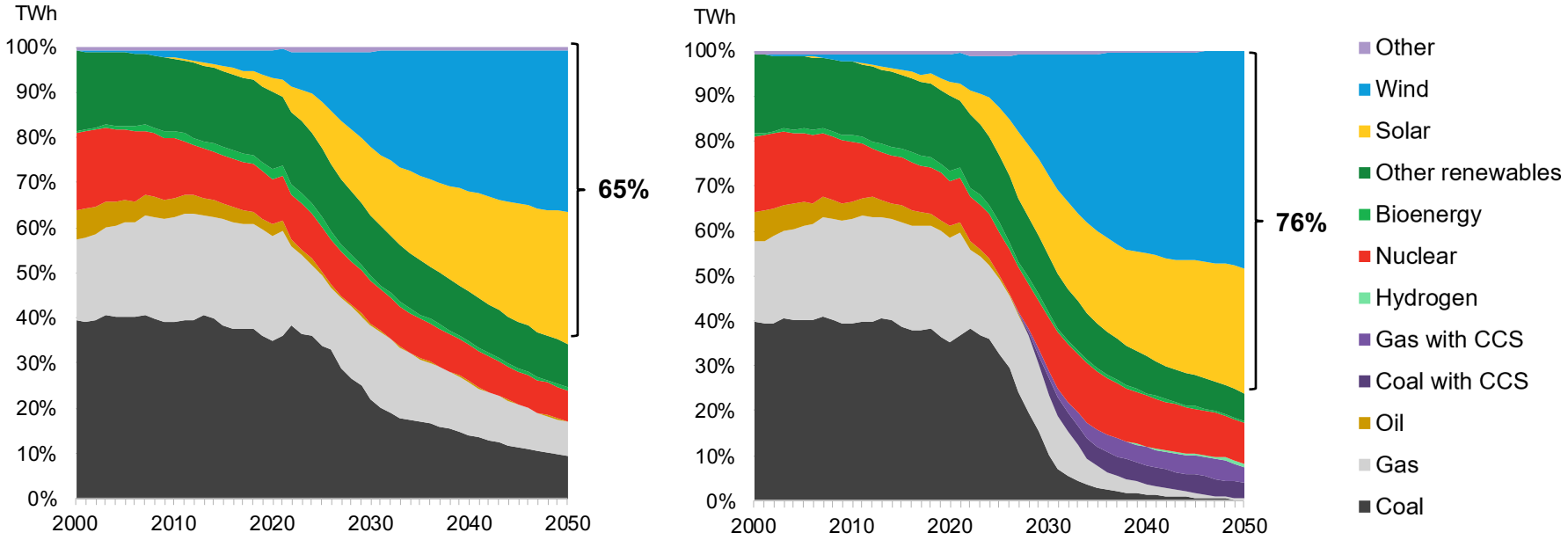
The power system will be built around renewables

Global electricity generation by fuel, ETS and NZS



Source: BloombergNEF New Energy Outlook 2022. Note: 'Other renewables' includes hydro, geothermal and solar thermal.

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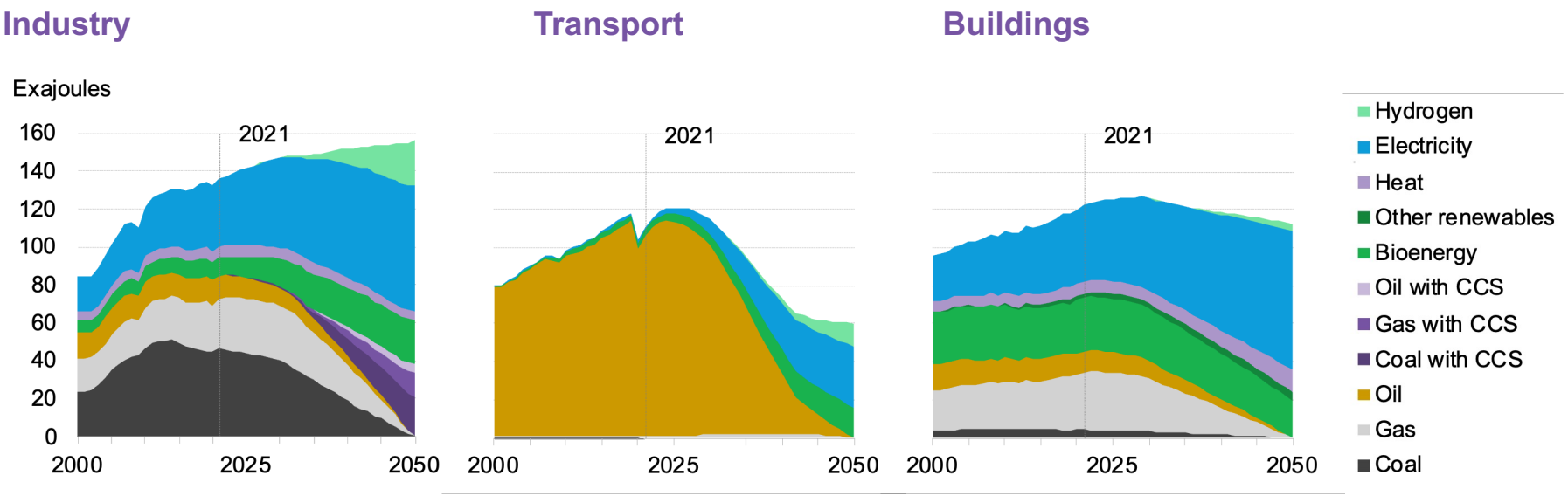
The final energy will vary by sector to reach net zero



Source: BloombergNEF New Energy Outlook 2022

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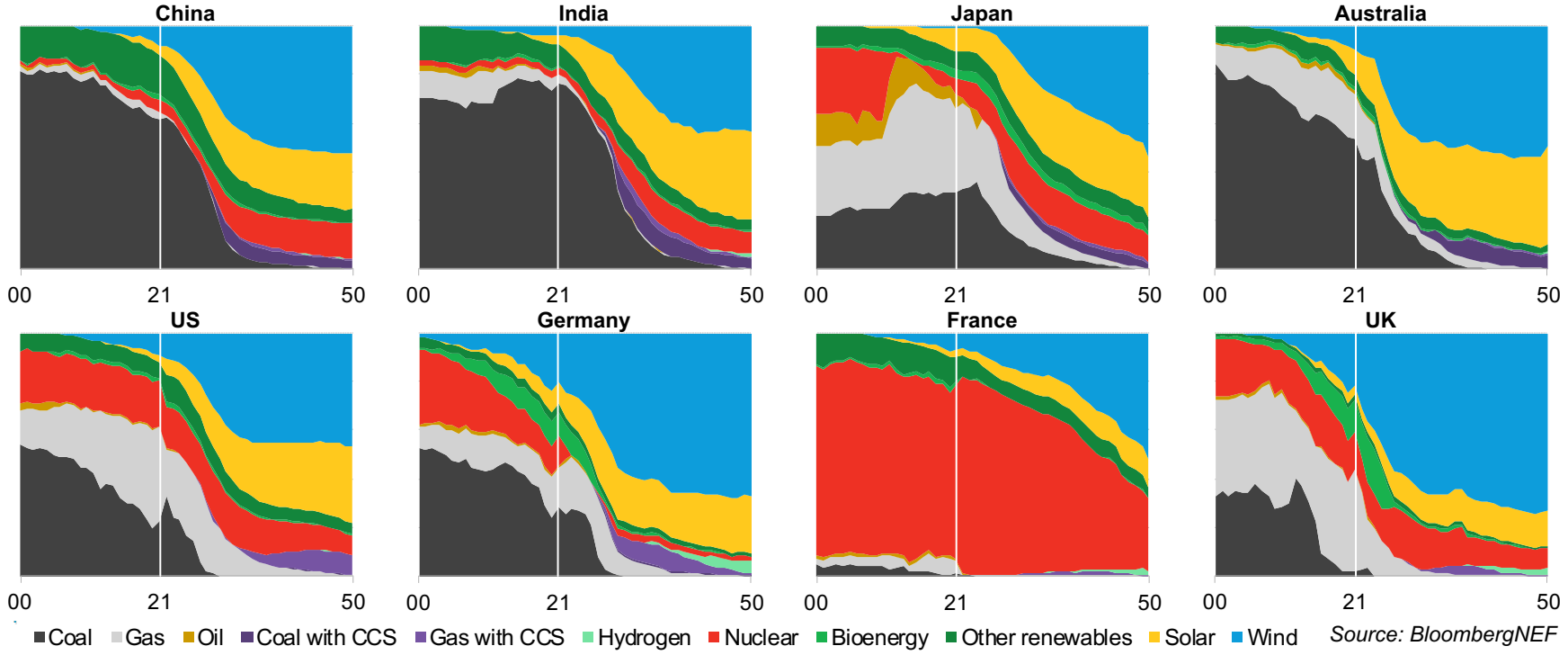
Renewables dominate, but firm capacity balancing requirements vary by country

Power generation mix, Net Zero Scenario



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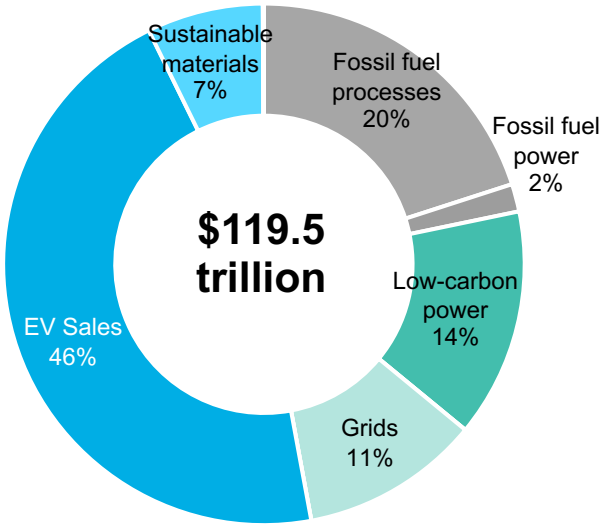
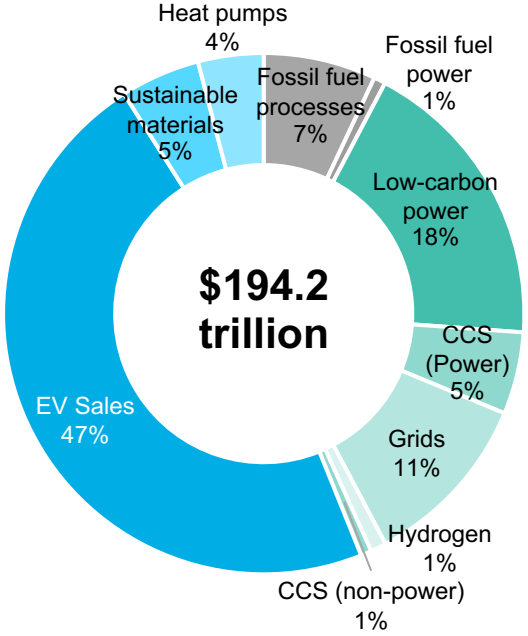
Investment required will be between $120 trillion and $195 trillion by 2050

Energy Transition Scenario



Net Zero Scenario



Source: BloombergNEF New Energy Outlook 2022

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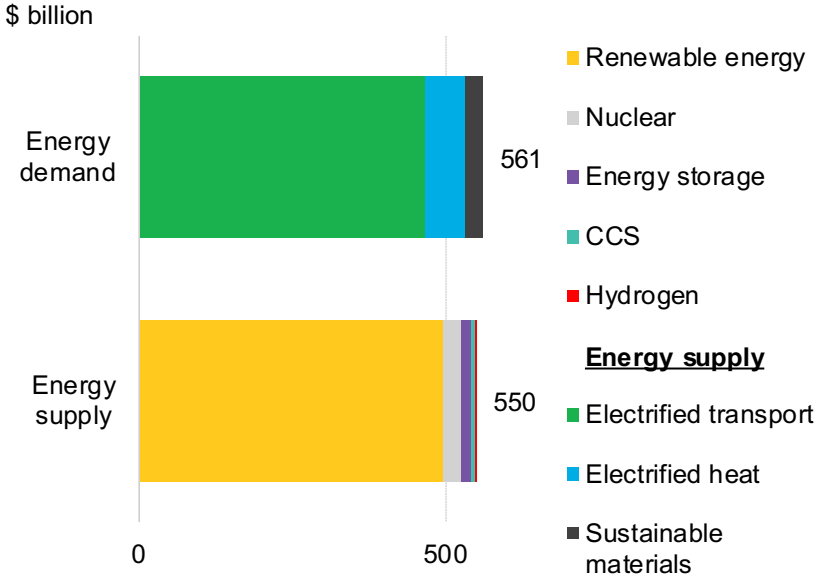
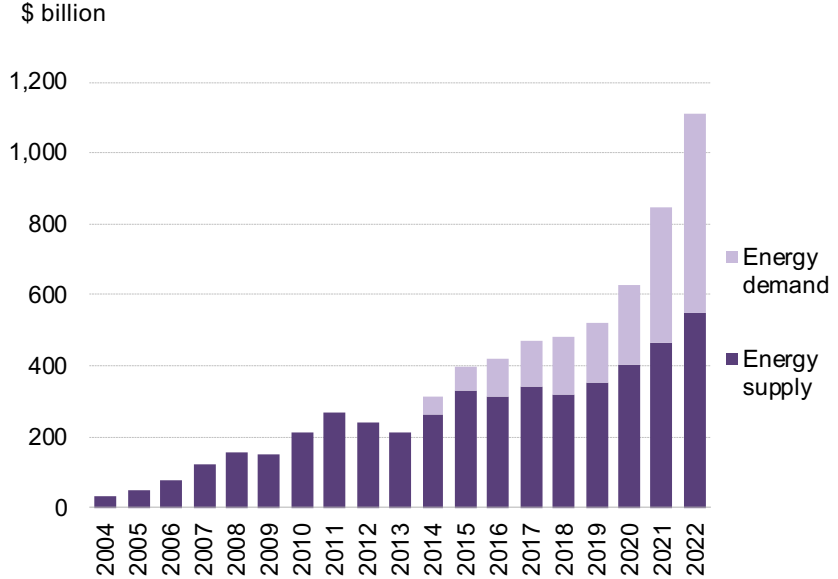
Today's investment is an even split between supply- and demand-side assets

Investment comparison: supply- and demand-side, 2022



Global energy transition investment by supply / demand split



Source: BloombergNEF. Note: for this chart, we define 'energy demand' as the categories where energy users are likely to have committed the capital, or where the technology is mainly energy-consuming (not producing).

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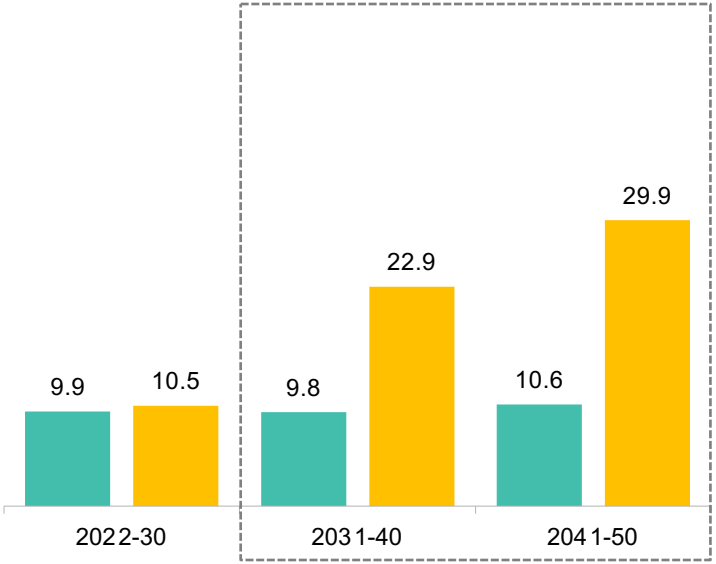
Demand-side energy transition investment dominates after 2030

Energy Transition Scenario

$ trillion (2021)



Demand
Supply

Net Zero Scenario

$ trillion (2021)

Source: BloombergNEF New Energy Outlook 2022

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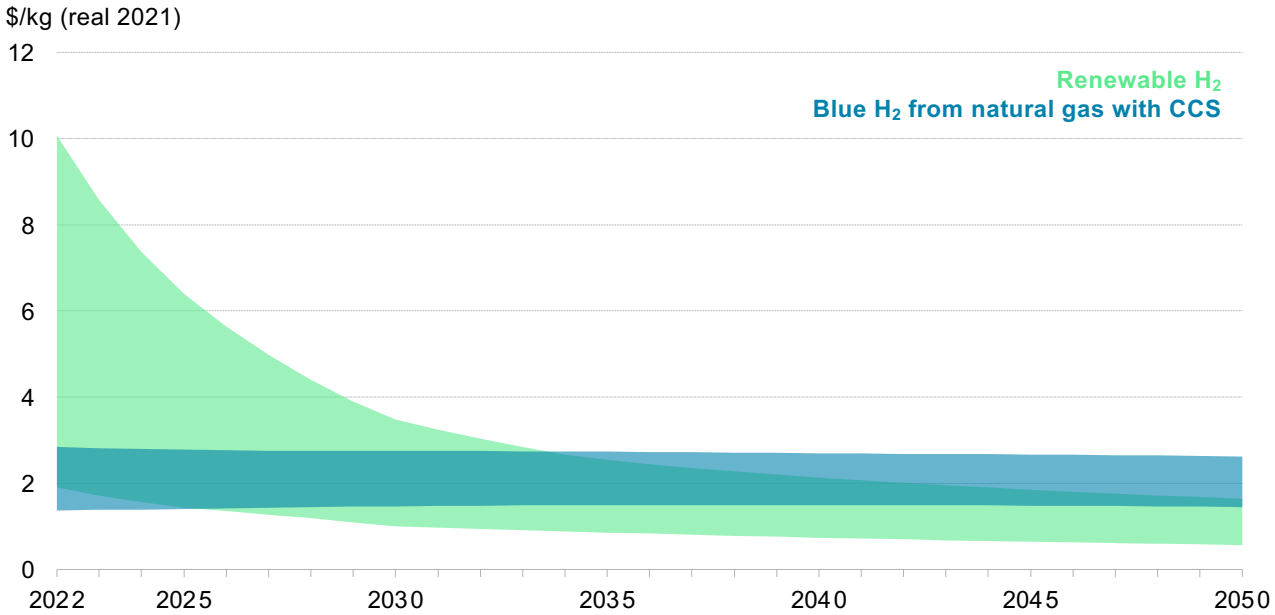
Hydrogen economics will be favorable in the 2030s

Global range of green and blue $LCOH_2$ in 25 countries



Source: BloombergNEF New Energy Outlook 2022. Note: 'LCOH$_2$' refers to the levelized cost of hydrogen.

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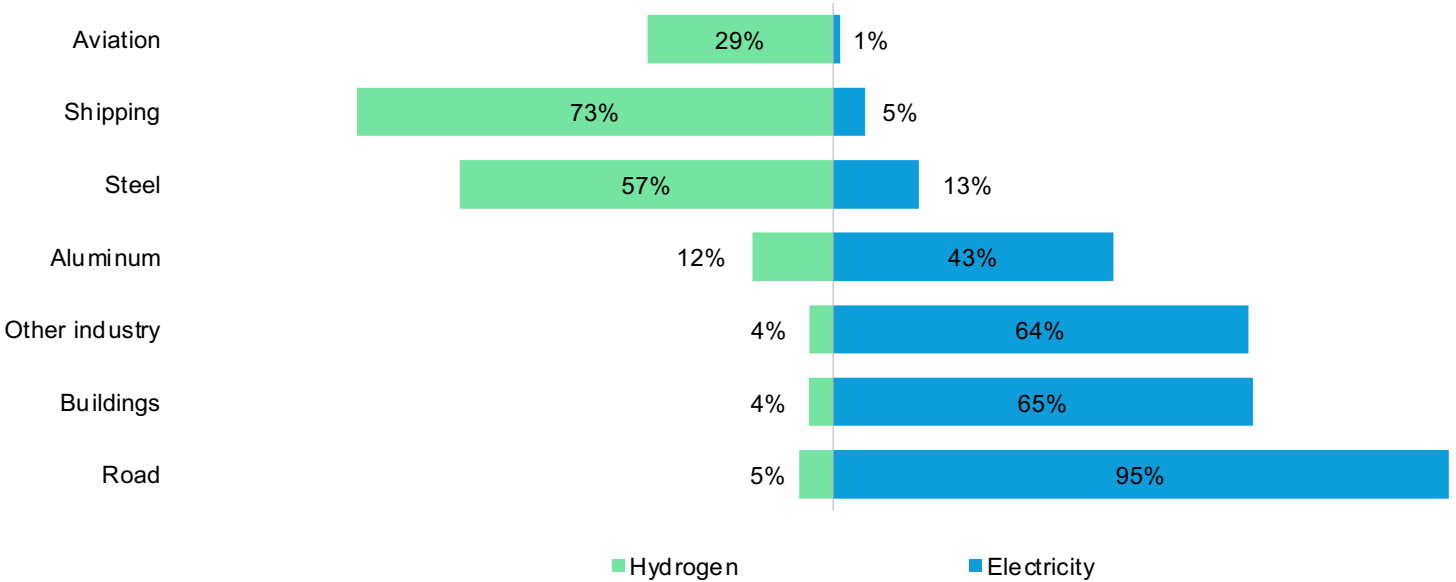
Hydrogen and electricity will generally not compete

2050 final energy demand by sector, Net Zero Scenario



Source: BloombergNEF New Energy Outlook 2022

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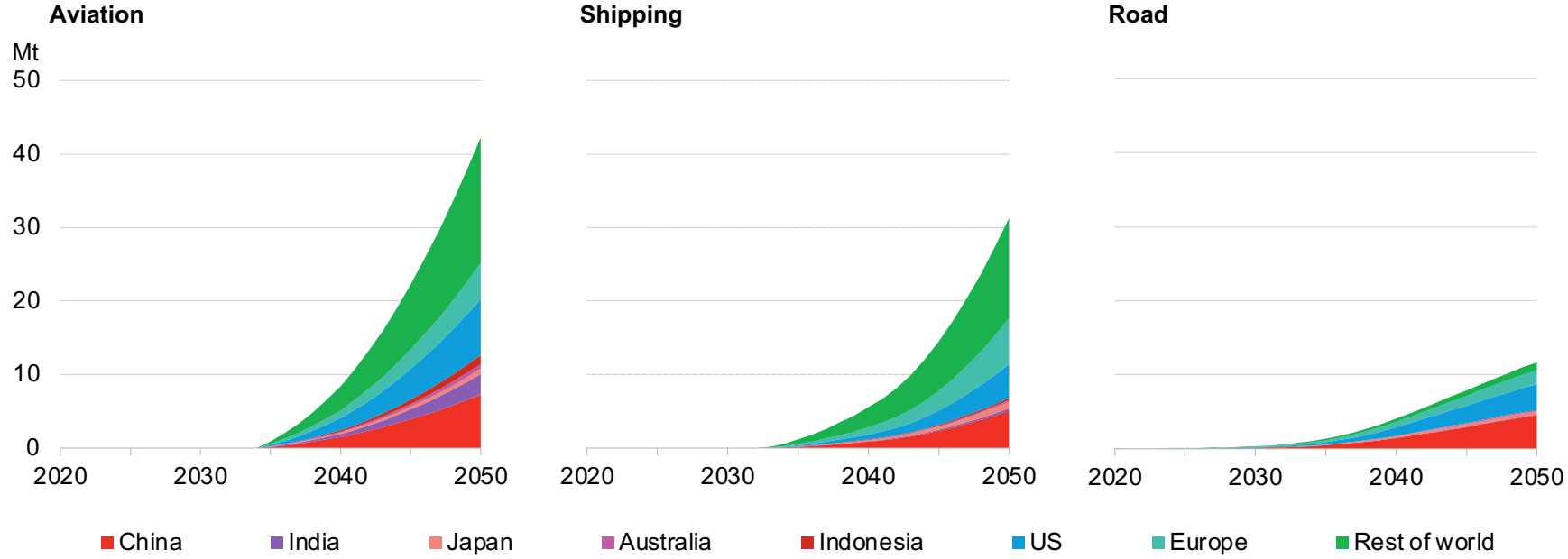
Hydrogen demand for transport will be primarily aviation and shipping

Hydrogen demand for transport, Net Zero Scenario



Source: BloombergNEF New Energy Outlook 2022

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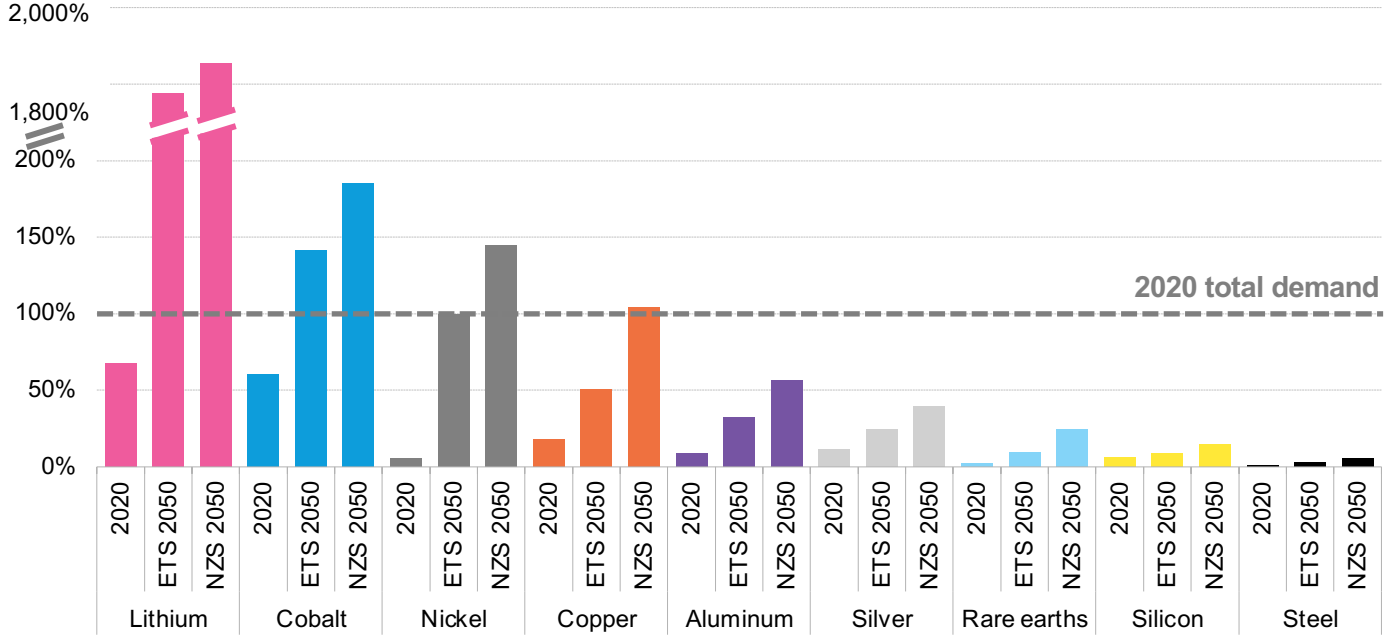
Energy transition-related metals demand will soar

Demand as a proportion of total 2020 demand by metal



Source: BloombergNEF New Energy Outlook 2022

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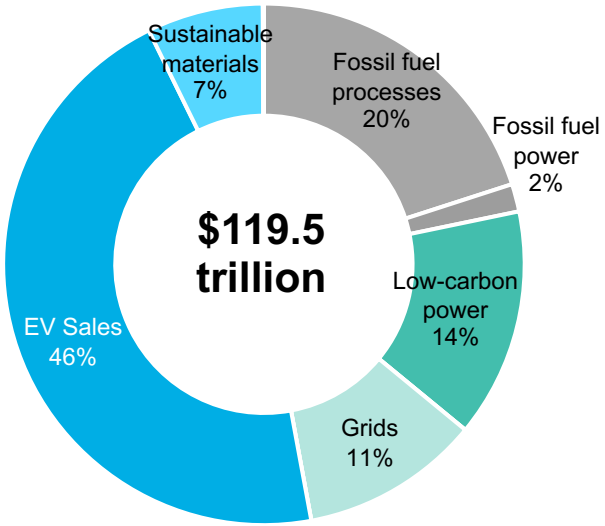

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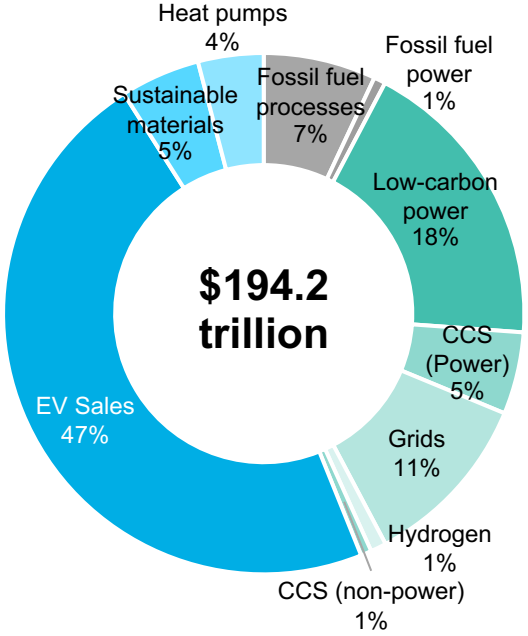

Source: BloombergNEF New Energy Outlook 2022

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Our expert coverage assesses pathways for the power, transport, industry, buildings and agriculture sectors to adapt to the energy transition.

We help commodity trading, corporate strategy, finance and policy professionals navigate change and generate opportunities.

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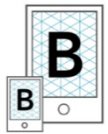

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