Clean Energy Technologies in a Changing Energy Landscape

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A 10-Point Plan to reduce the EU's Reliance on Russian Natural Gas

Action 1

No new gas supply contracts with Russia

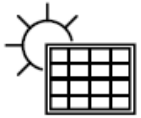
Action 2

Replace Russian supplies with gas from alternative sources

Action 3

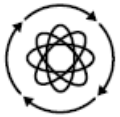
Introduce minimum gas storage obligations to enhance market resilience

Action 4



Accelerate the deployment of new wind and solar projects

Action 5



Maximise generation from existing dispatchable low-emissions sources: bioenergy and nuclear

Action 6

Enact short-term measures to shelter vulnerable electricity consumers from high prices

Action 7

Speed up the replacement of gas boilers with heat pumps

Action 8

Accelerate energy efficiency improvements in buildings and industry

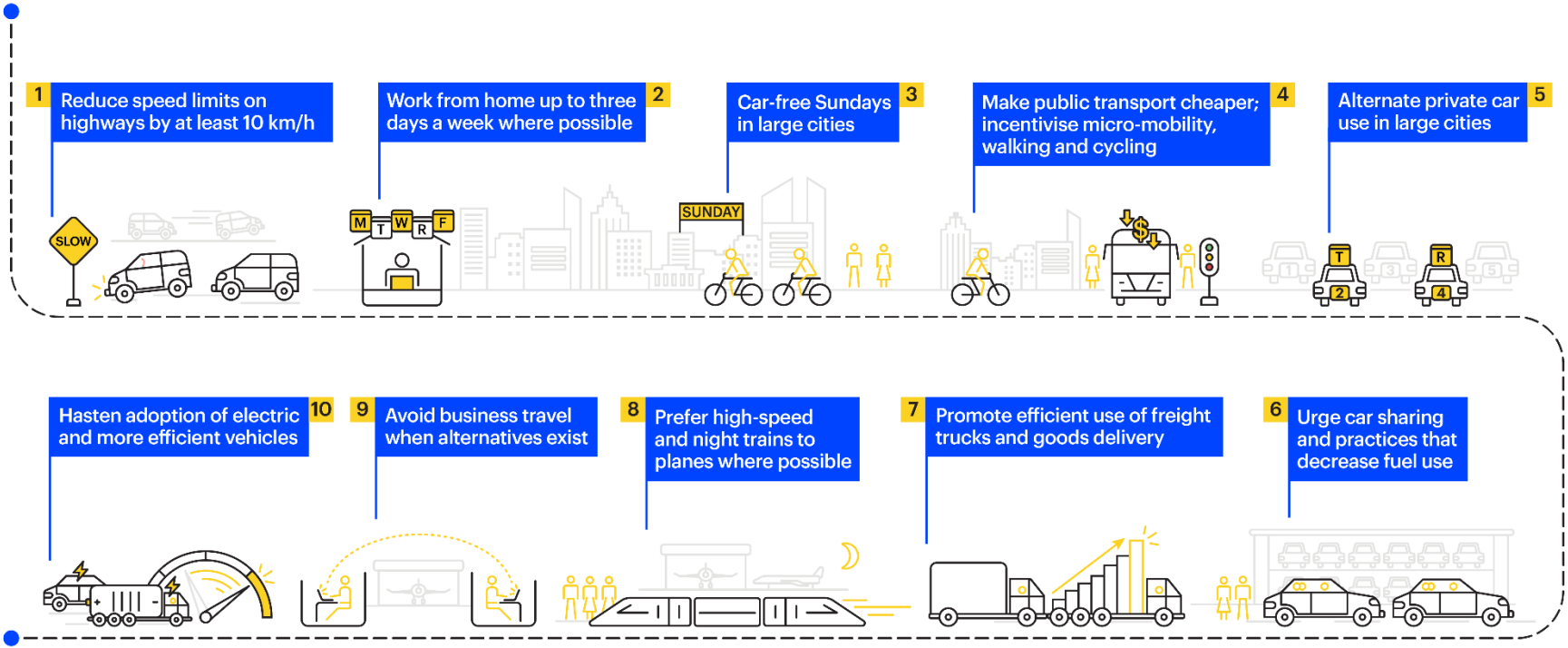
Action 9

Encourage a temporary thermostat adjustment by consumers

Action 10

Step up efforts to diversify and decarbonise sources of power system flexibility

A 10-Point Plan for oil



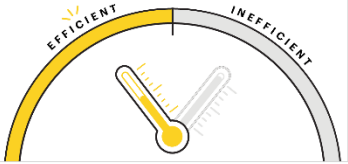
Playing my part:

How to save money, reduce reliance on Russian energy, support Ukraine and help the planet

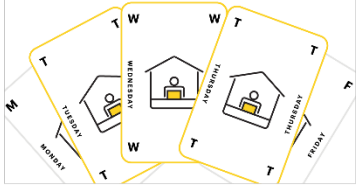
iea.org

1 Turn down heating and use less air-conditioning

2 Adjust your boiler's settings

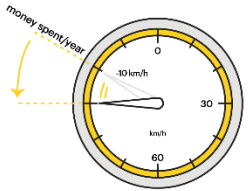


3 Work from home



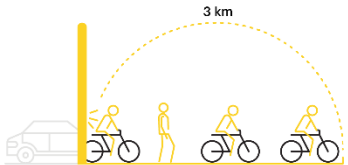
4 Use your car more economically

5 Reduce your speed on highways



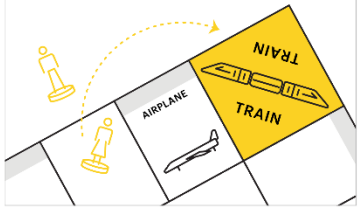
6 Leave your car at home on Sundays in large cities

7 Walk or bike short journeys instead of driving

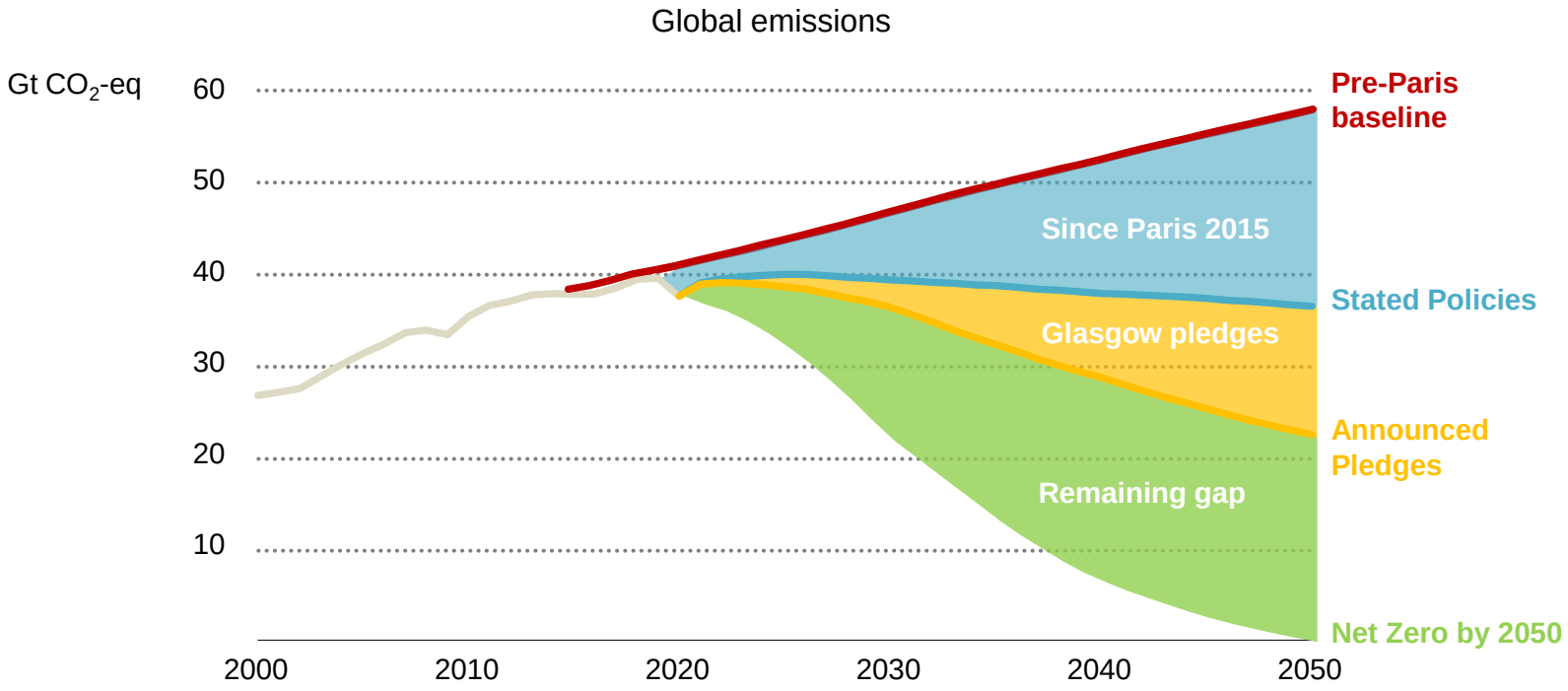


8 Use public transport

9 Skip the plane, take the train



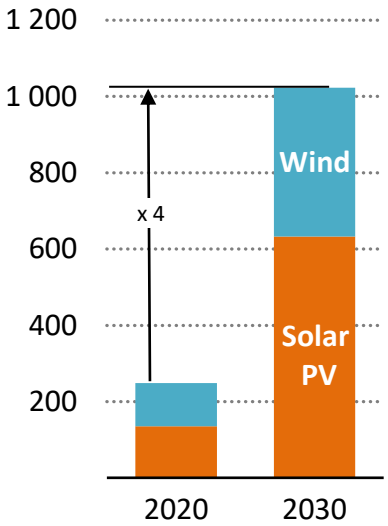
Technology must help to shrink the ambition gap



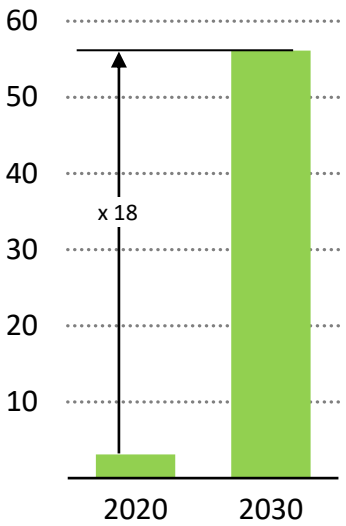
Despite some positive signs, today's pledges close less than 20% of the gap to the Net Zero by 2050 scenario: countries with net zero pledges and countries without each account for about half the remaining ambition gap

Make the 2020s the decade of massive clean energy expansion

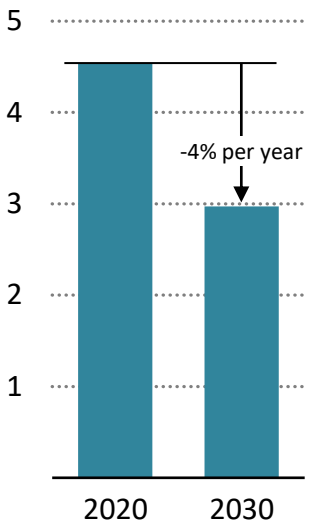
Solar PV and wind capacity additions (GW)



Electric car sales (millions)



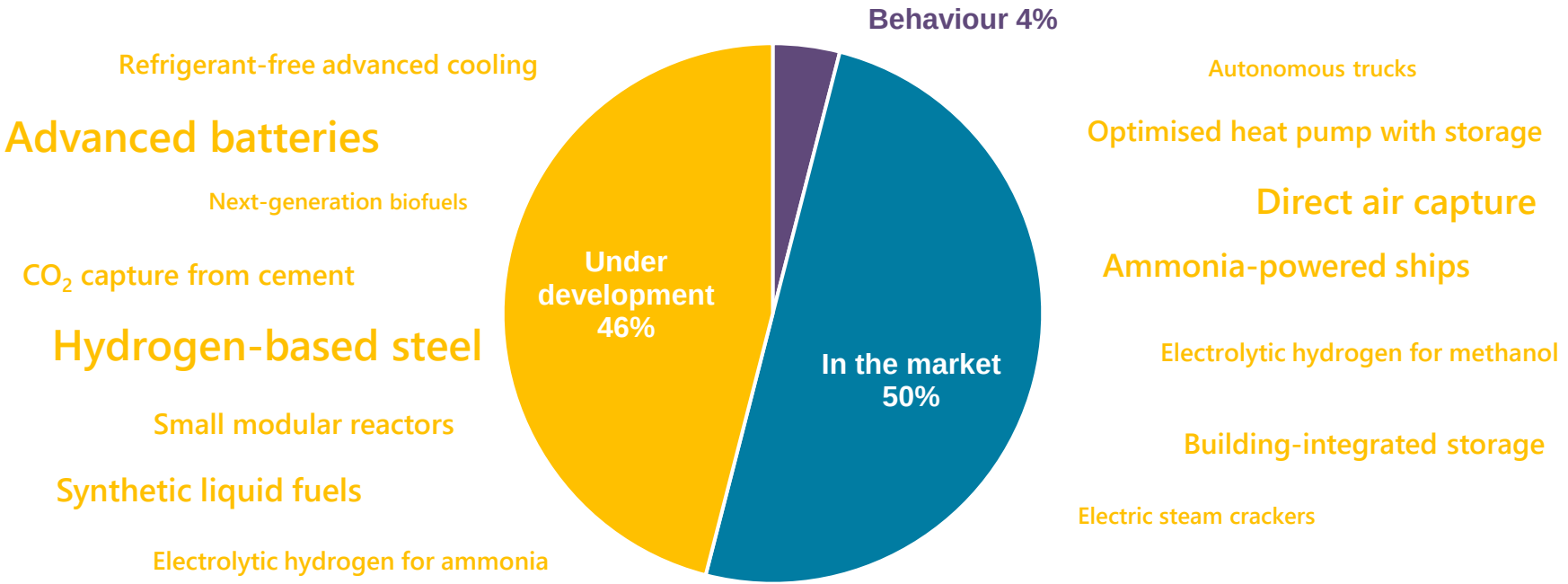
Energy intensity of GDP (MJ per USD PPP)



Technologies for achieving the necessary deep cuts in global emissions by 2030 exist, but staying on the narrow path to net-zero requires their immediate and massive deployment.

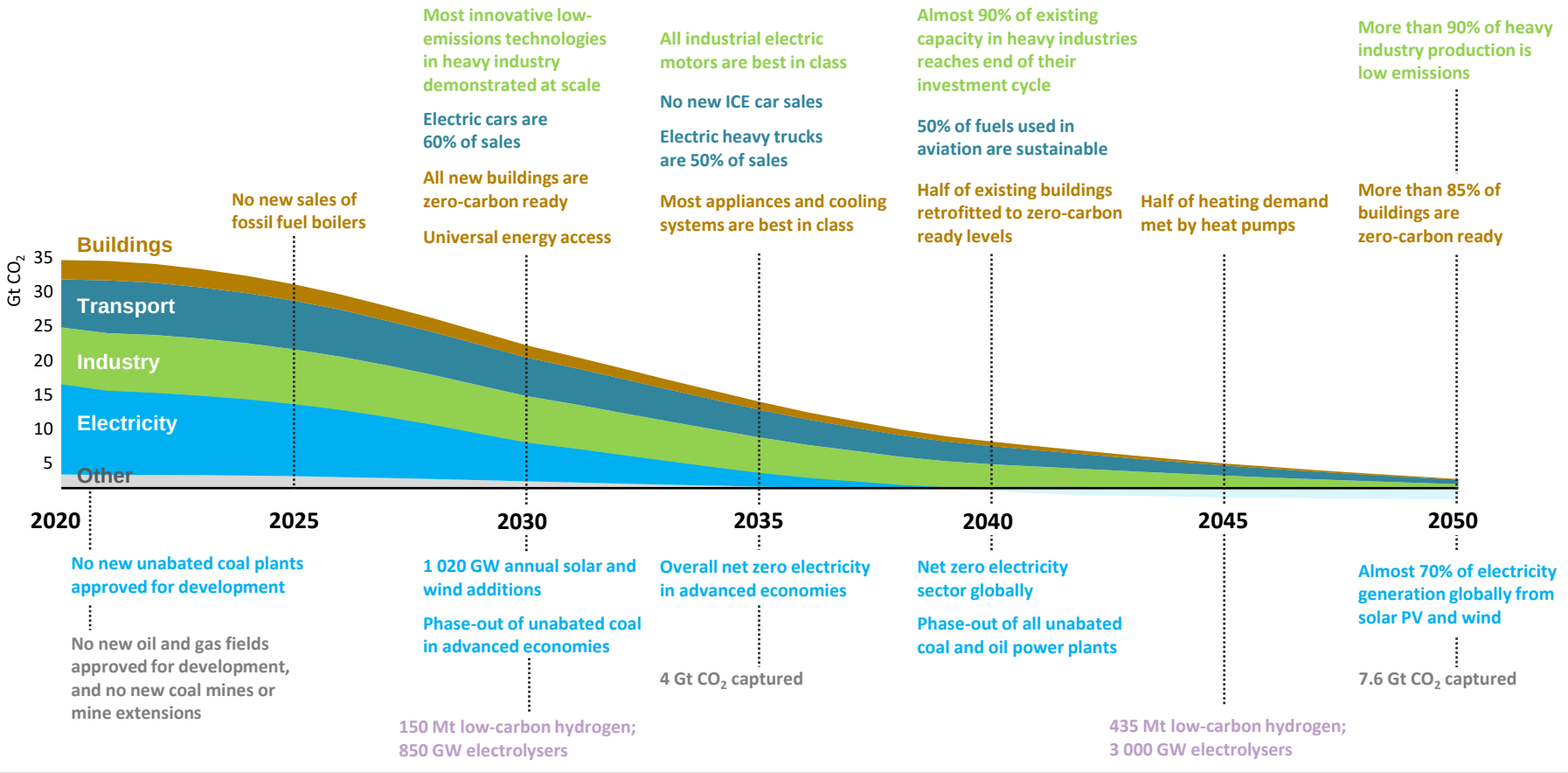
Prepare for the next phase of the transition by boosting innovation

CO_2 savings by technology maturity in 2050, NZE scenario



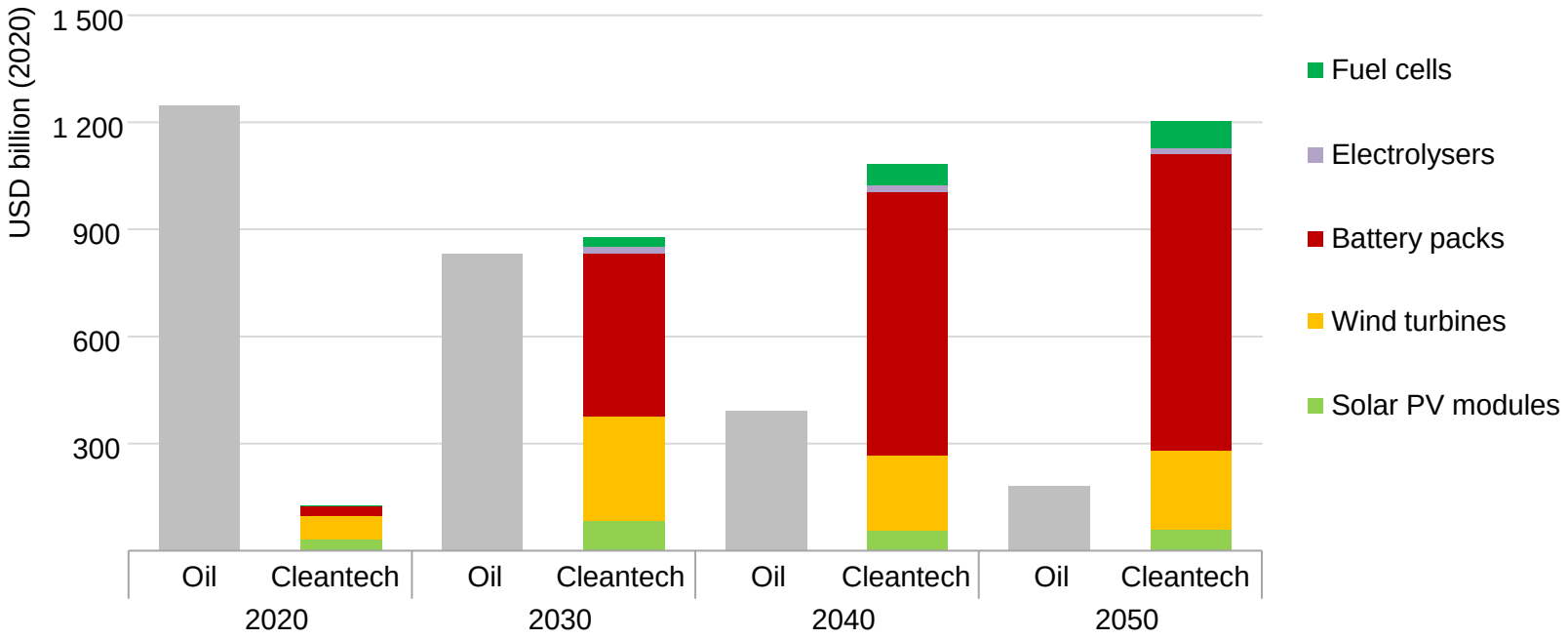
Unlocking the next generation of low-carbon technologies requires more clean energy R&D and $90 billion in demonstrations by 2030; without greater international co-operation, global CO_2 will not fall to net-zero by 2050.

Set near-term milestones to get on track for long-term targets



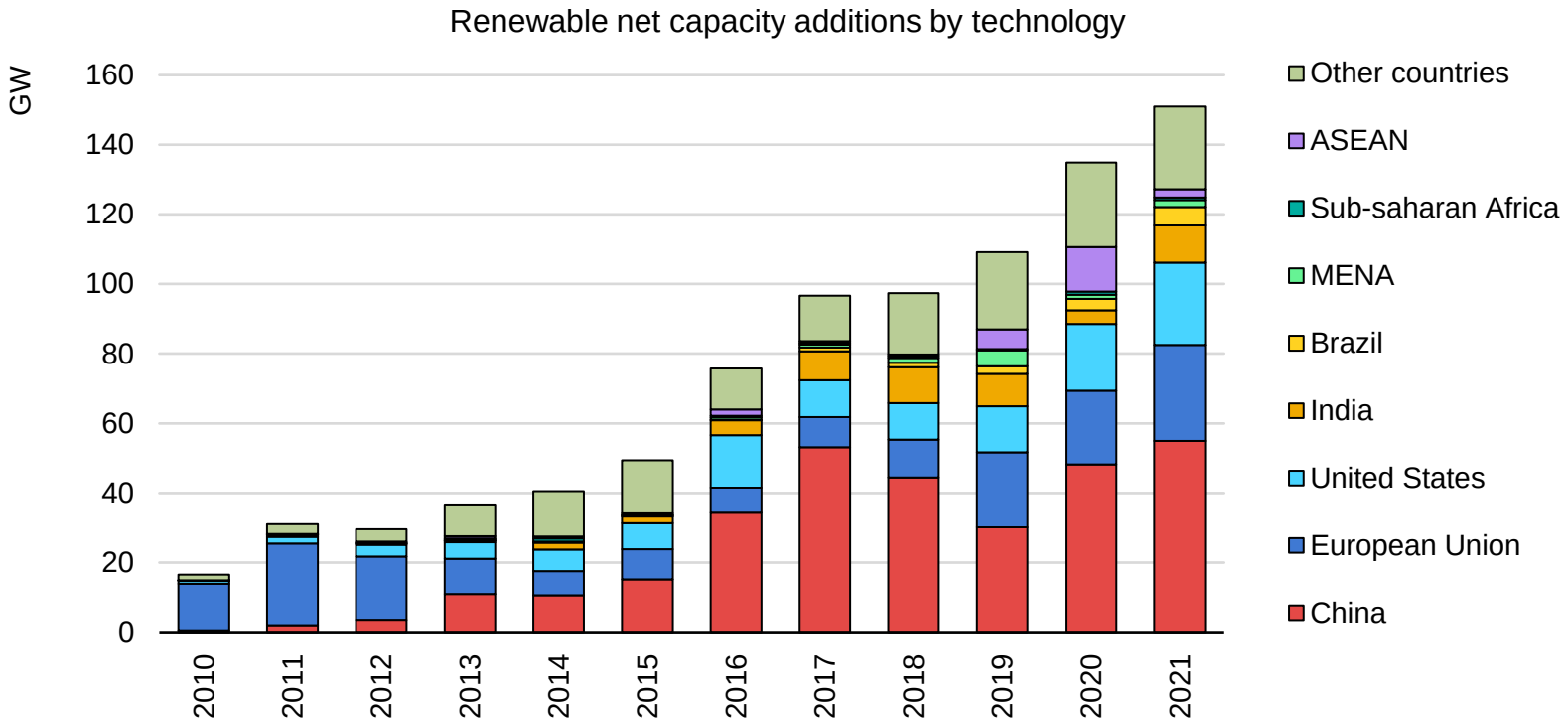
A new global energy economy is emerging

Estimated market sizes of oil and selected clean energy technology equipment in the Net Zero Scenario



Explosive growth in clean energy deployment over the next decades could create a market opportunity for manufacturers of key equipment worth a cumulative USD 27 trillion through to 2050

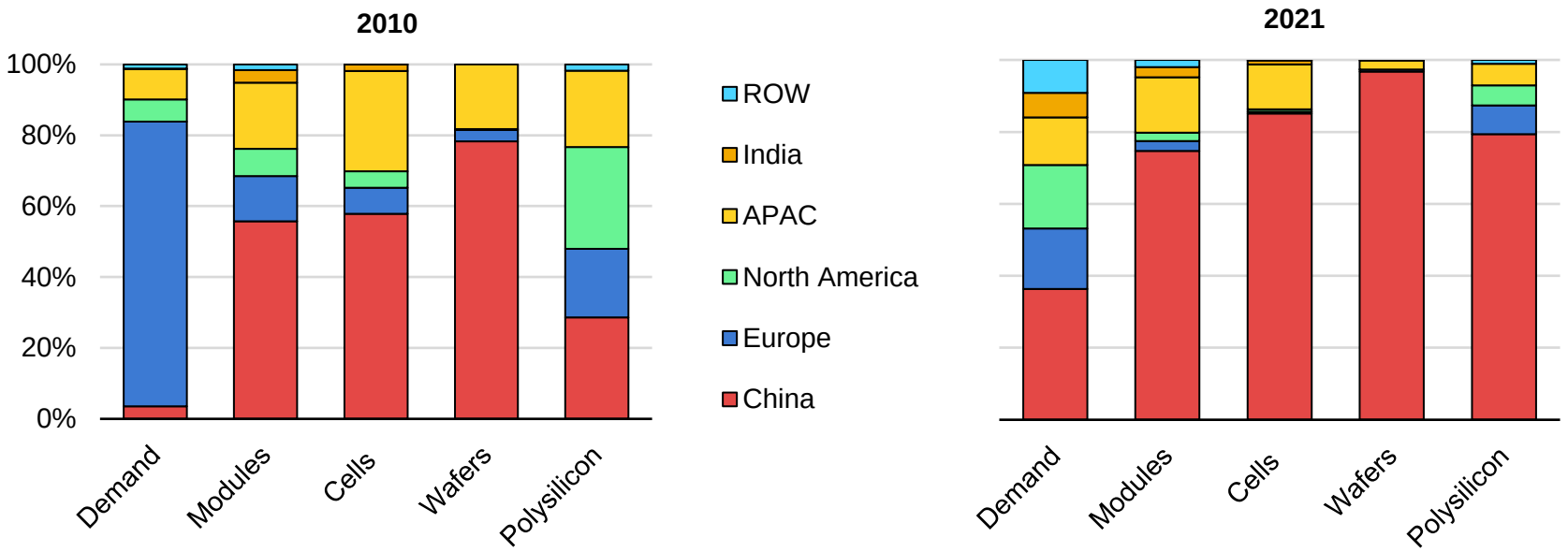
Solar PV additions marked another record in 2021



Despite logistical challenges and increasing prices, solar PV annual capacity additions increased 12% led by China, the EU and the United States

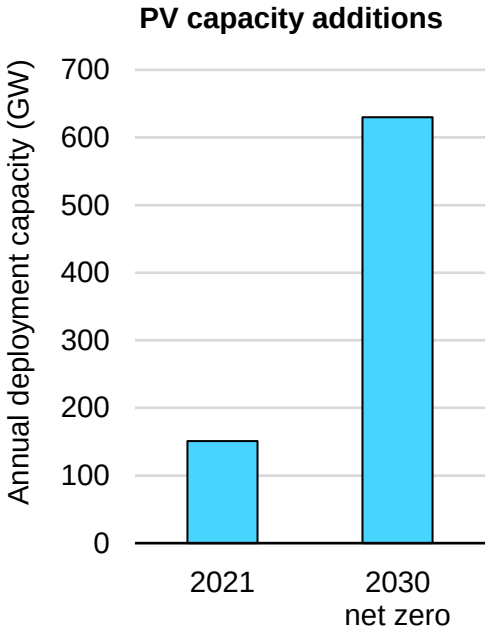
China currently dominates global solar PV supply chains

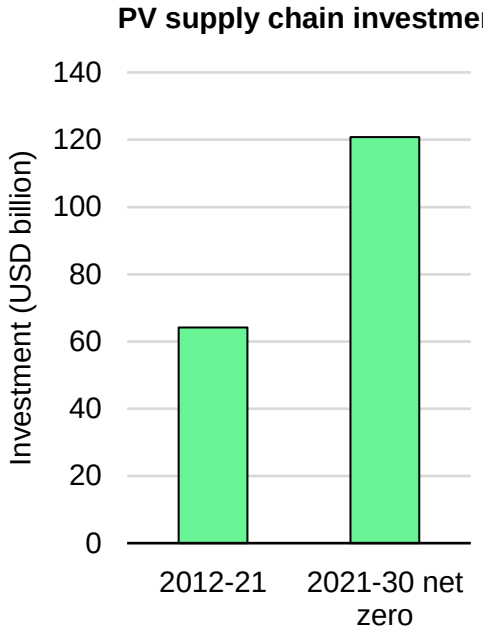
Solar PV manufacturing capacity by country and region, 2010-2021

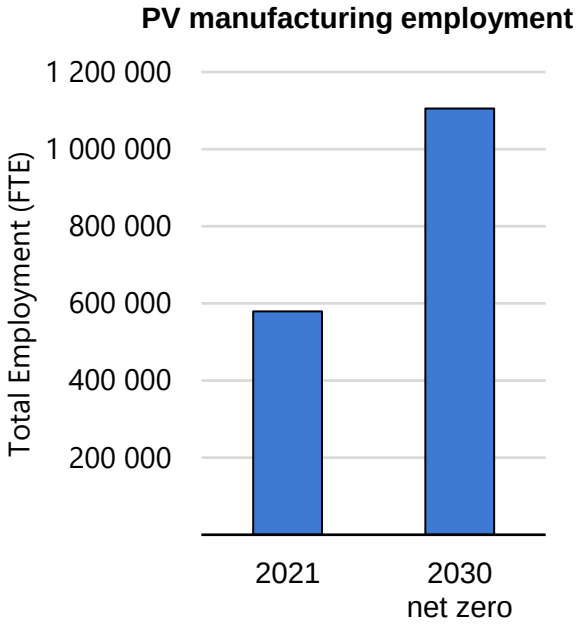


Chinese policies have enabled economies of scale and supported innovation across the supply chain, resulting in 80% cost declines and helping solar PV to become the cheapest electricity generation source globally.

Transition to Net Zero offer supply chain diversification opportunities

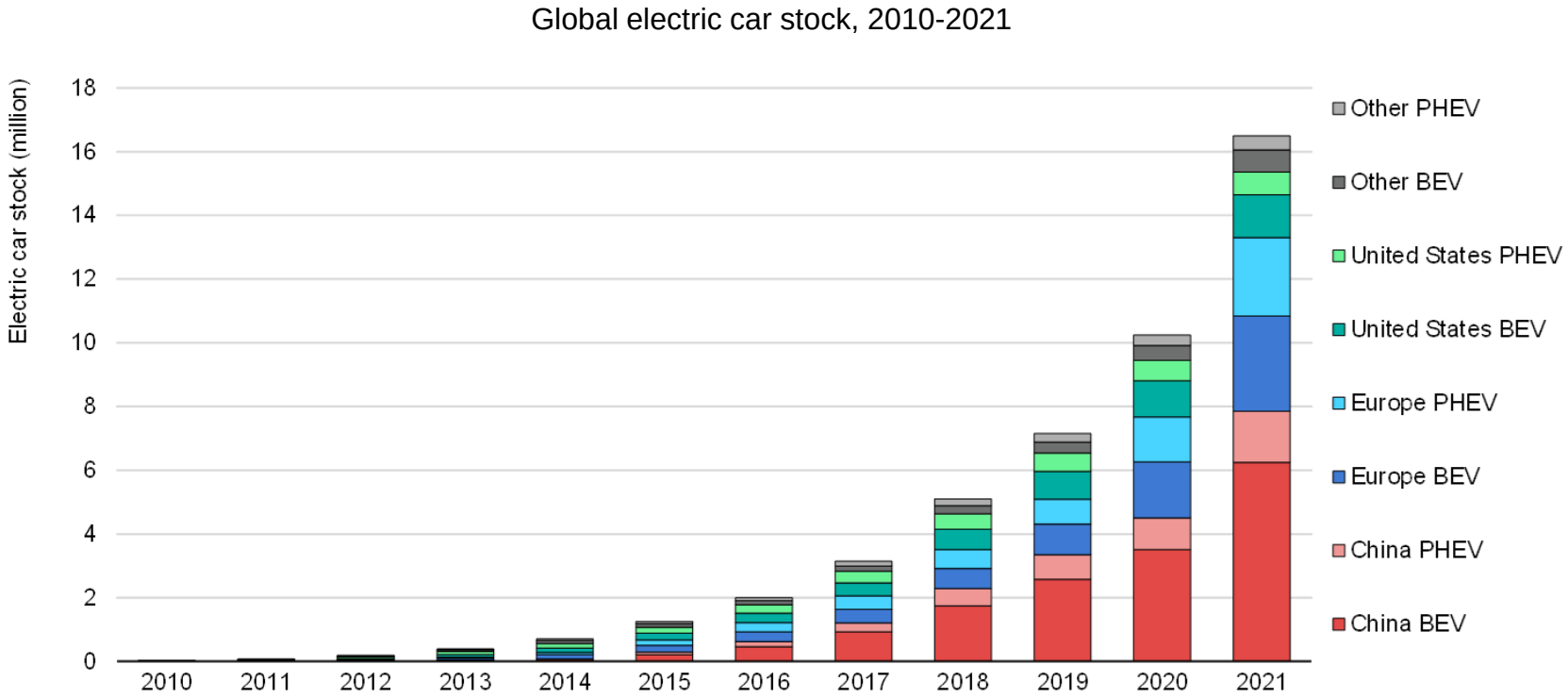






As countries accelerate their efforts to reduce emissions, they need to ensure that their transition towards a sustainable energy system is built on secure foundations

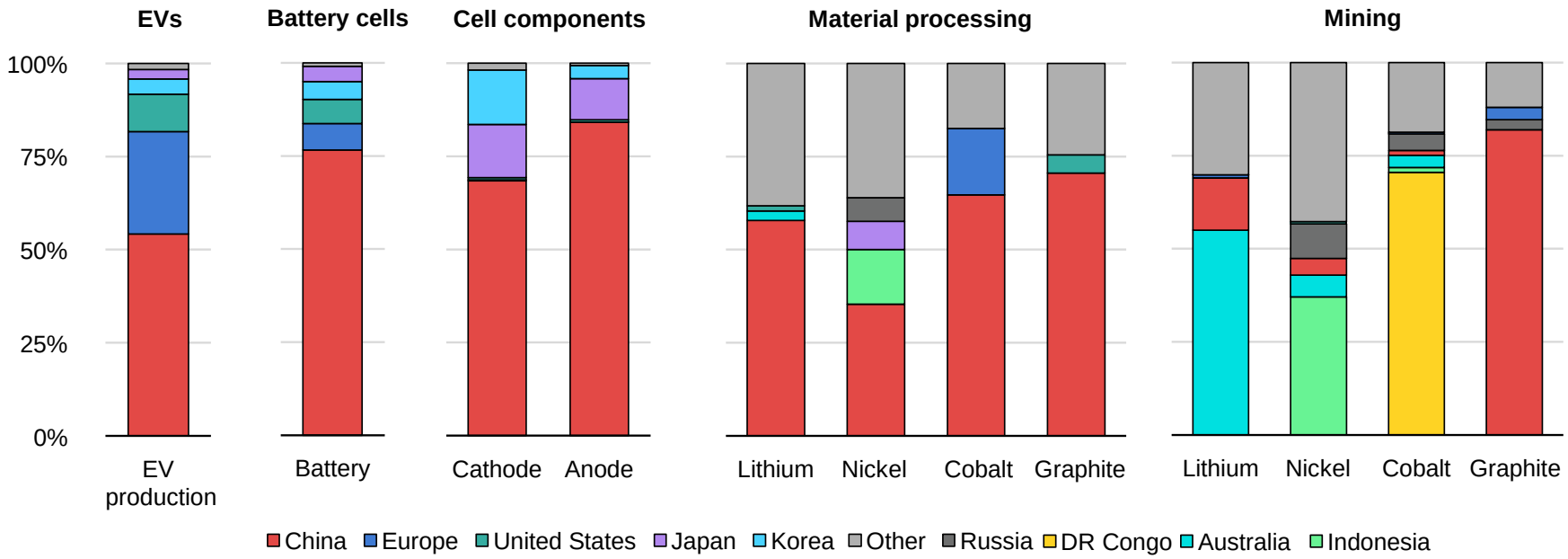
Over 16.5 million electric cars on the road in 2021, tripling from 2018



Sales of electric vehicles (EVs) doubled in 2021 from the previous year to a new record of 6.6 million. Global sales of electric cars have kept rising strongly in 2022, with China leading.

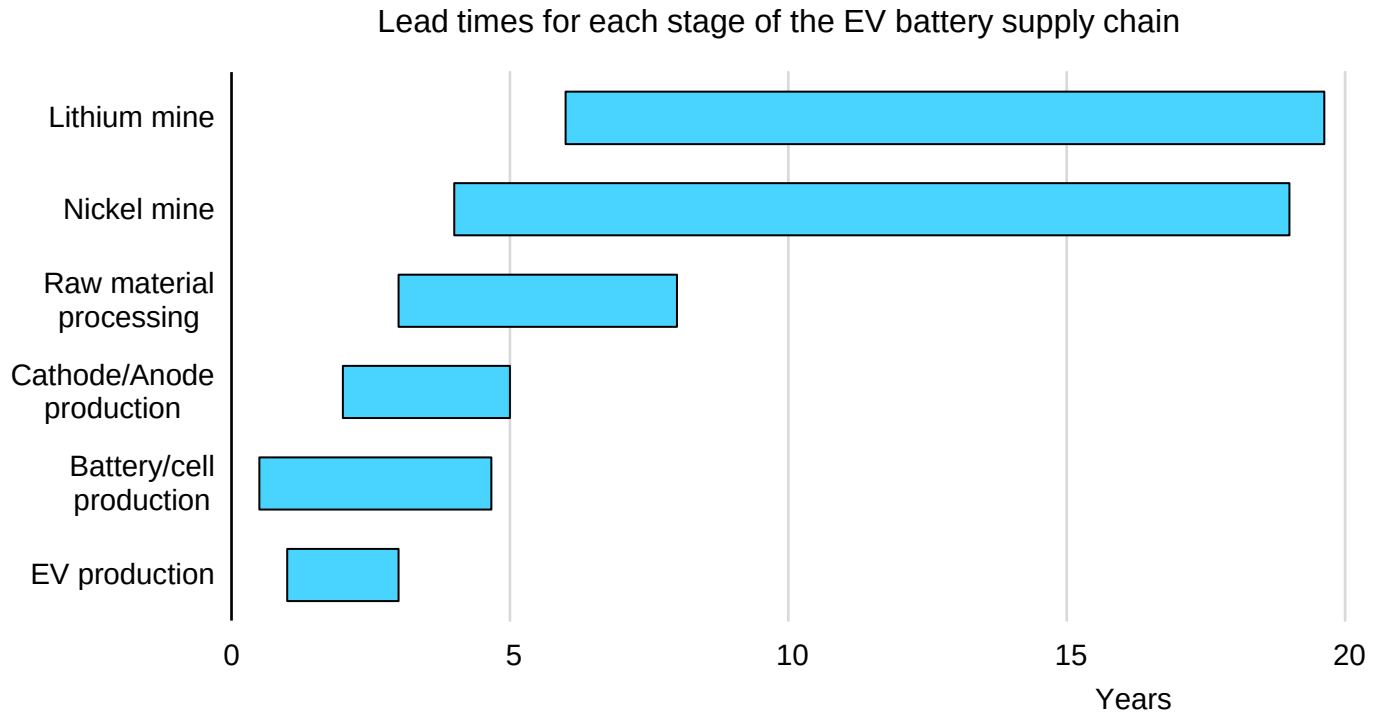
Today's EV value chain is centred around China

Geographical distribution of production/capacity by element of the supply chain



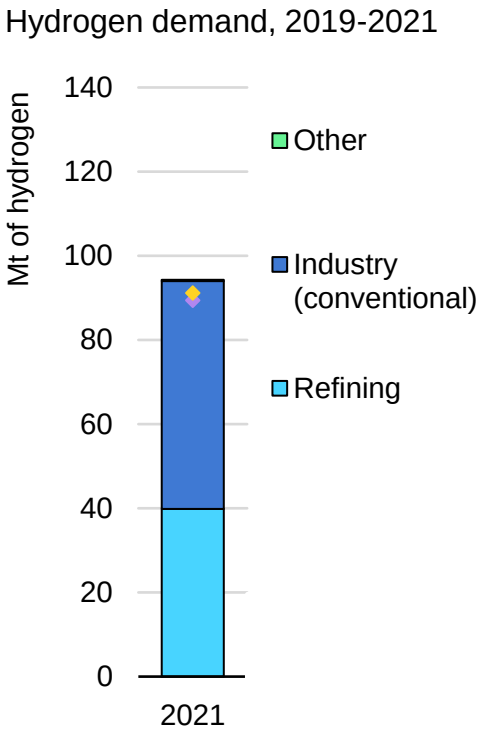
China is home to most of global lithium-ion battery production capacity and that of its key components. Over half of lithium, cobalt and graphite processing & refining capacity is in China.

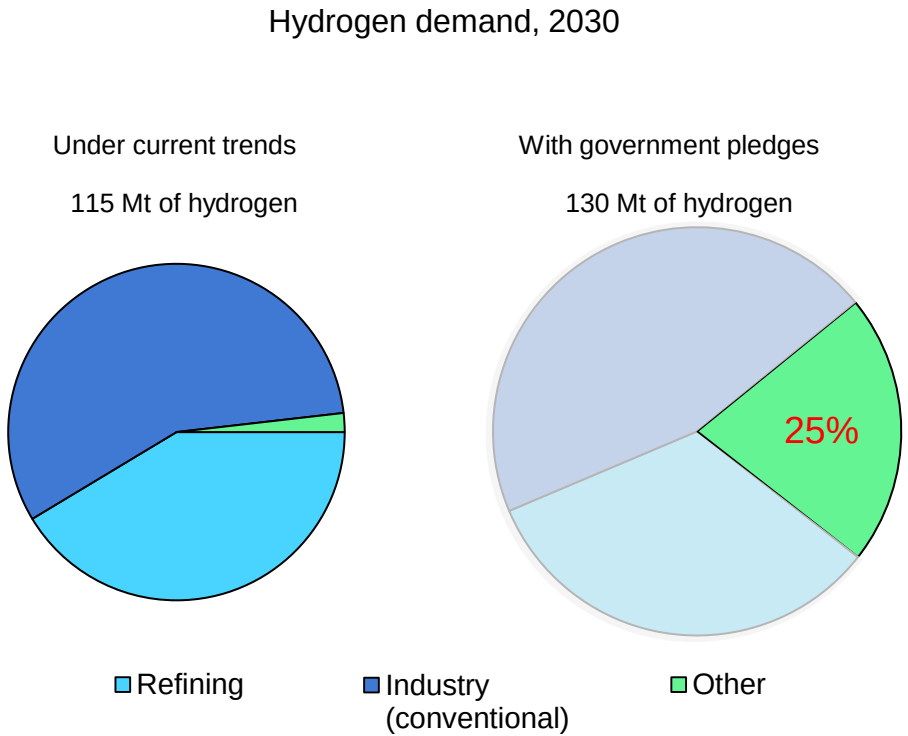
Mining has the longest lead times in the EV battery supply chain



Long lead times mean that any gap in mining capacity for meeting 2030 demand must be addressed now

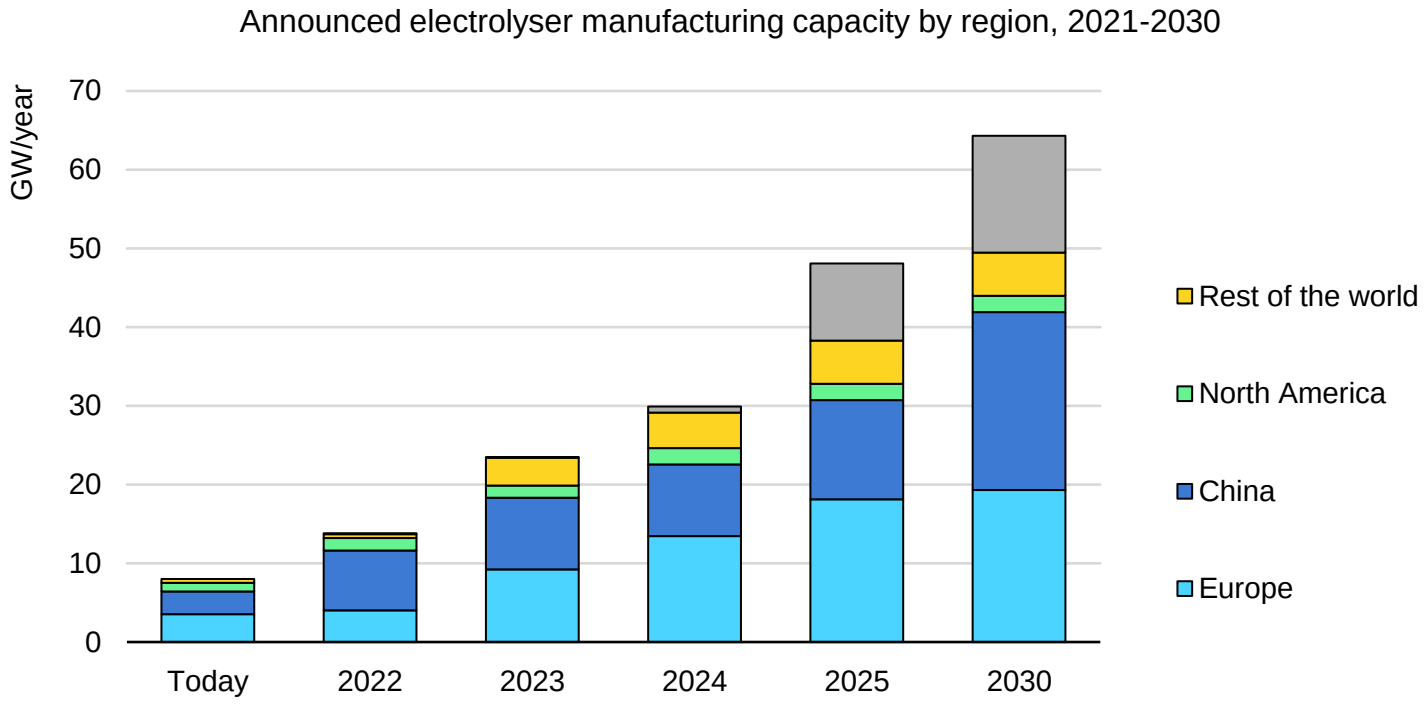
Demand is growing, with positive signals in key applications





There are plans to increase hydrogen use in heavy industry, transport and power generation, but ambitious policies are needed for hydrogen to play its role in meet government climate pledges

A new energy economy: the case of electrolyser manufacturing



Electrolyser manufacturing capacity could exceed 60 GW per year by 2030. This would be more than enough to support planned electrolyser projects and government targets.

Tracking Clean Energy Progress 2022

Cross-cutting

Energy system overview

- Energy efficiency
- Behavioural changes
- Electrification
- Renewables
- Bioenergy
- Hydrogen
- Carbon capture & storage
- Innovation
- Digitalisation
- International collaboration

Technology deep dives

- Direct air capture
- Bioenergy with carbon capture & storage
- CO_2 capture & utilisation
- Electrolysers

Infrastructure deep dives

- CO_2 transport & storage
- Data centres & transmission networks
- District heating

Electricity

Subsectors

- Renewable electricity

Technology deep dives

- Coal-fired electricity
- Gas-fired electricity
- Solar PV
- Wind
- Hydro
- Nuclear
- Demand response

Infrastructure deep dives

- Grid-scale storage
- Smart grids

Oil & natural gas supply

Subsectors

- Methane emissions from oil and gas operations
- Flaring

Low-emission fuel supply

Subsectors

- Hydrogen supply
- Biofuels supply

Transport

Subsectors

- Cars and vans
- Trucks and buses
- Rail
- Aviation
- International shipping

Technology deep dive

- Electric vehicles

Industry

Subsectors

- Steel
- Chemicals
- Cement
- Aluminium
- Paper
- Light industry

Buildings

Subsectors

- Heating
- Space cooling
- Lighting
- Appliance & equipment

Technology deep dives

- Buildings envelope
- Heat pumps

IEA Clean Energy Demonstration Projects Database

Clean Energy Demonstration Projects Database

The most comprehensive database of clean energy technology demonstrators

Last updated 22 Sep 2022

Cite Share

About the database

The IEA Demonstration Projects Database seeks to map major demonstration projects of clean energy technologies, globally. For each project, it provides information on location, sector and technology grouping, status, capacity, timing and funding, when available. Please get in touch with the IEA to submit more information.