International Energy Agency

Energy Technology Perspectives 2020

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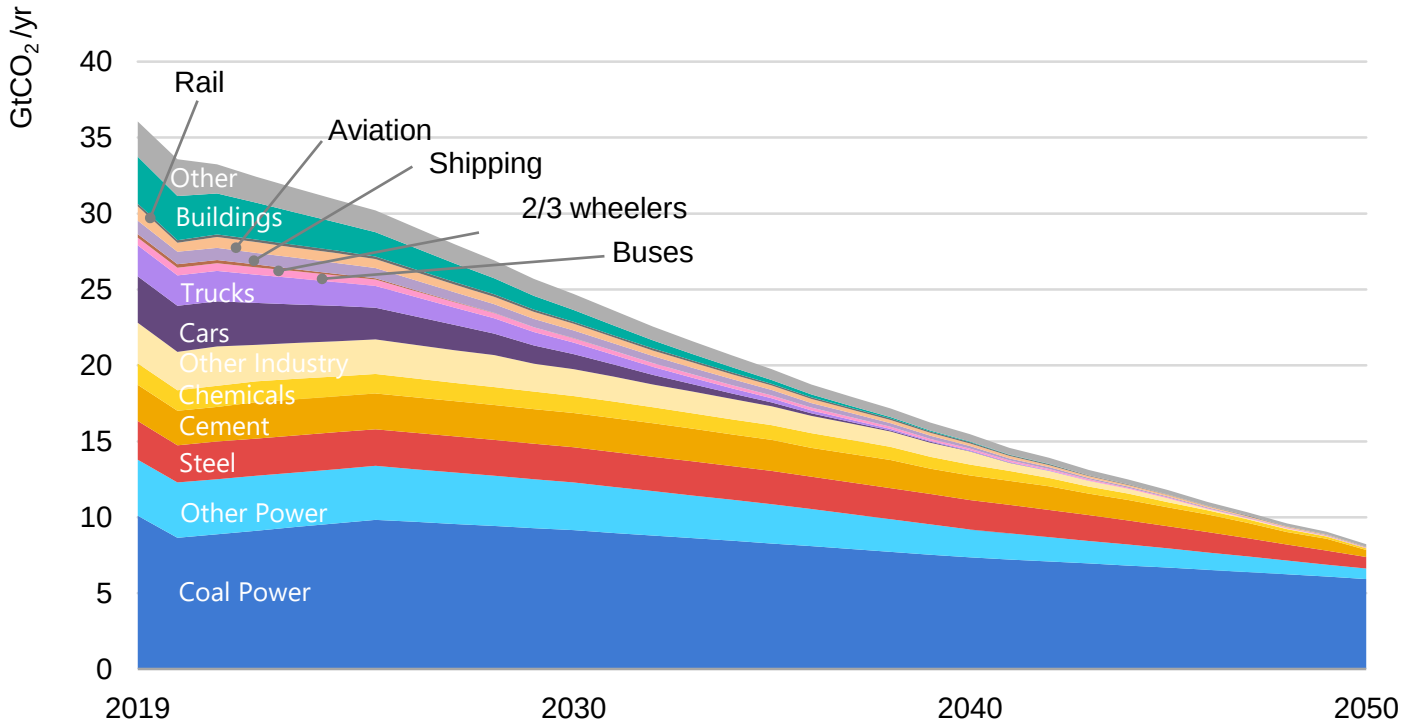
What do net-zero ambitions mean for energy technology?

- A growing number of governments & companies are making ambitious pledges to reach net-zero emissions in coming decades. But achieving those goals & ensuring energy security is a big challenge.

- Major progress has been made: the rise of solar PV, wind and batteries has significantly reduced the costs of renewable electricity and electric cars.

- But transitioning the energy system to net-zero emissions requires broader technology efforts in three critical areas:
  - Existing assets in power generation and industry
  - Clean energy innovation
  - Infrastructure that enables rapid technology deployment

Our existing energy infrastructure is too big to ignore



Reaching net-zero emissions requires tackling emissions from long-lived assets in power generation and heavy-industries. In emerging Asia, 80% of existing coal power capacity was built in the past 20 years.

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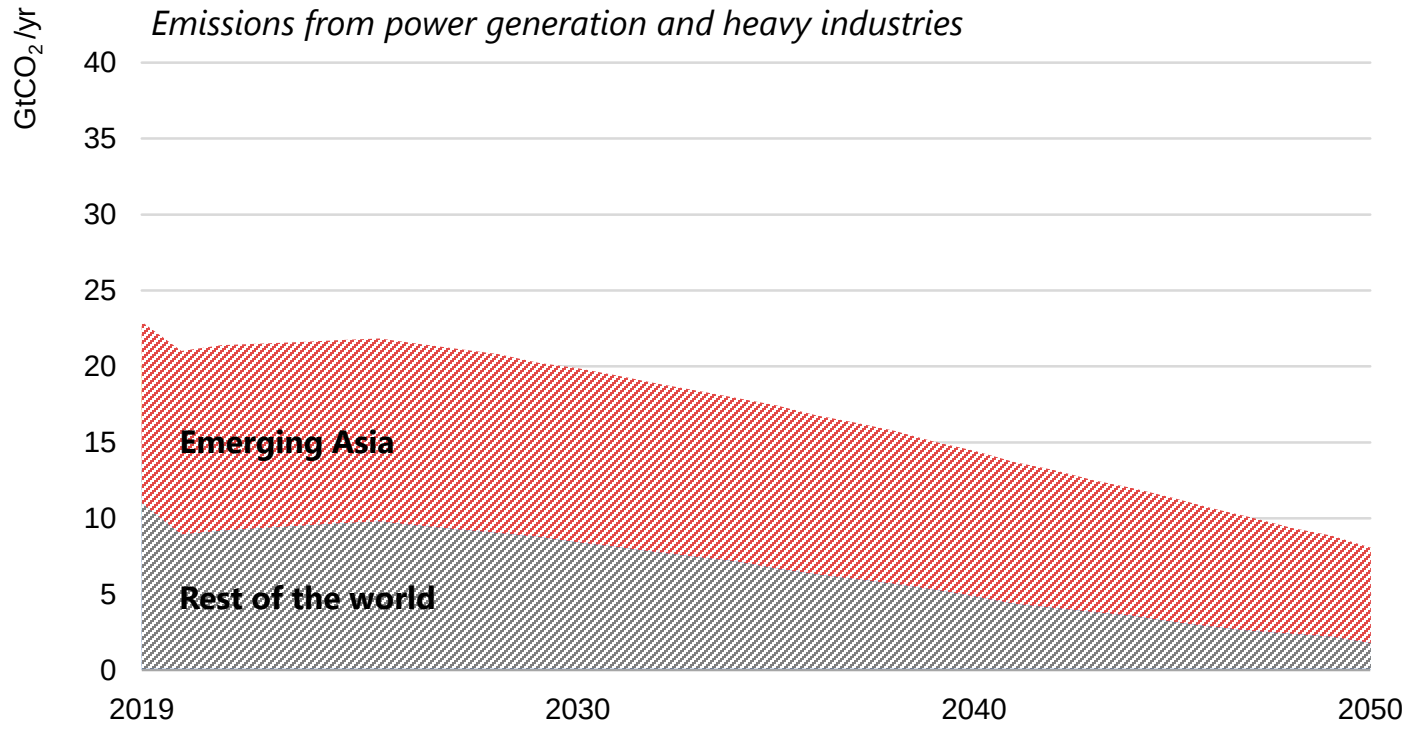

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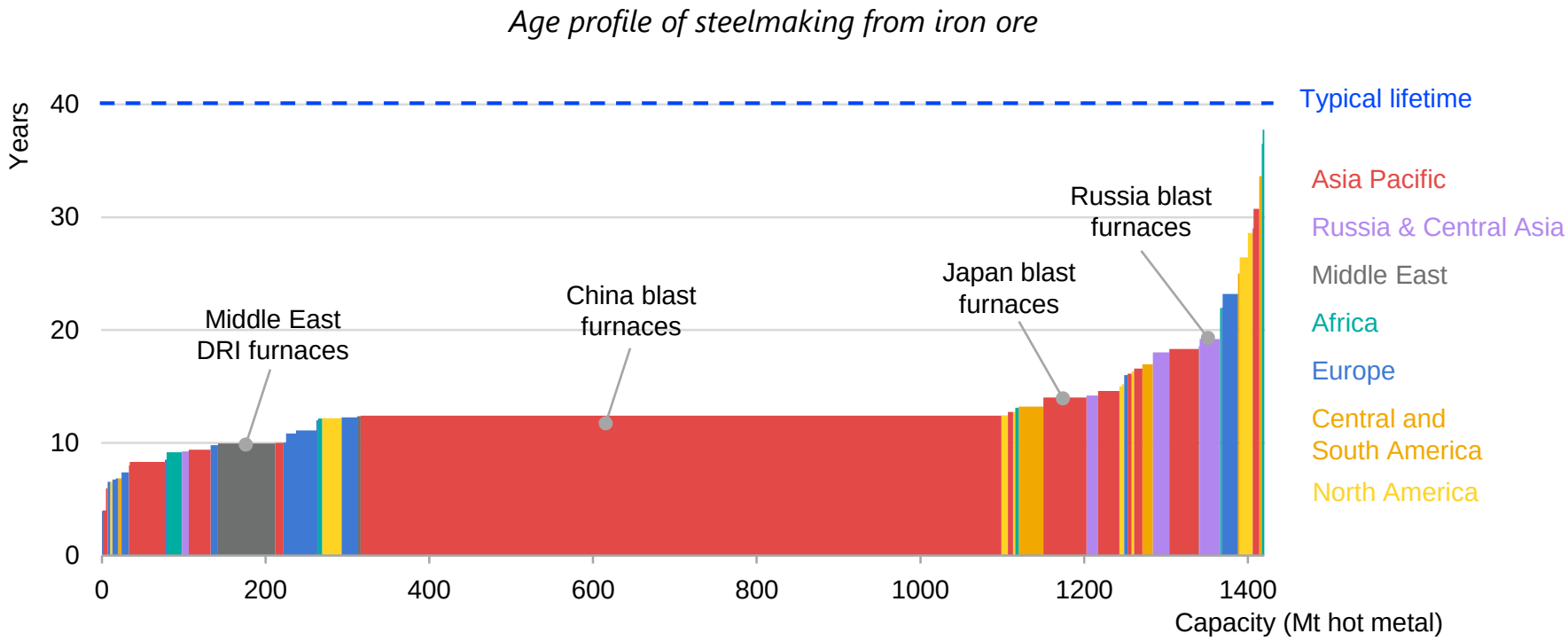
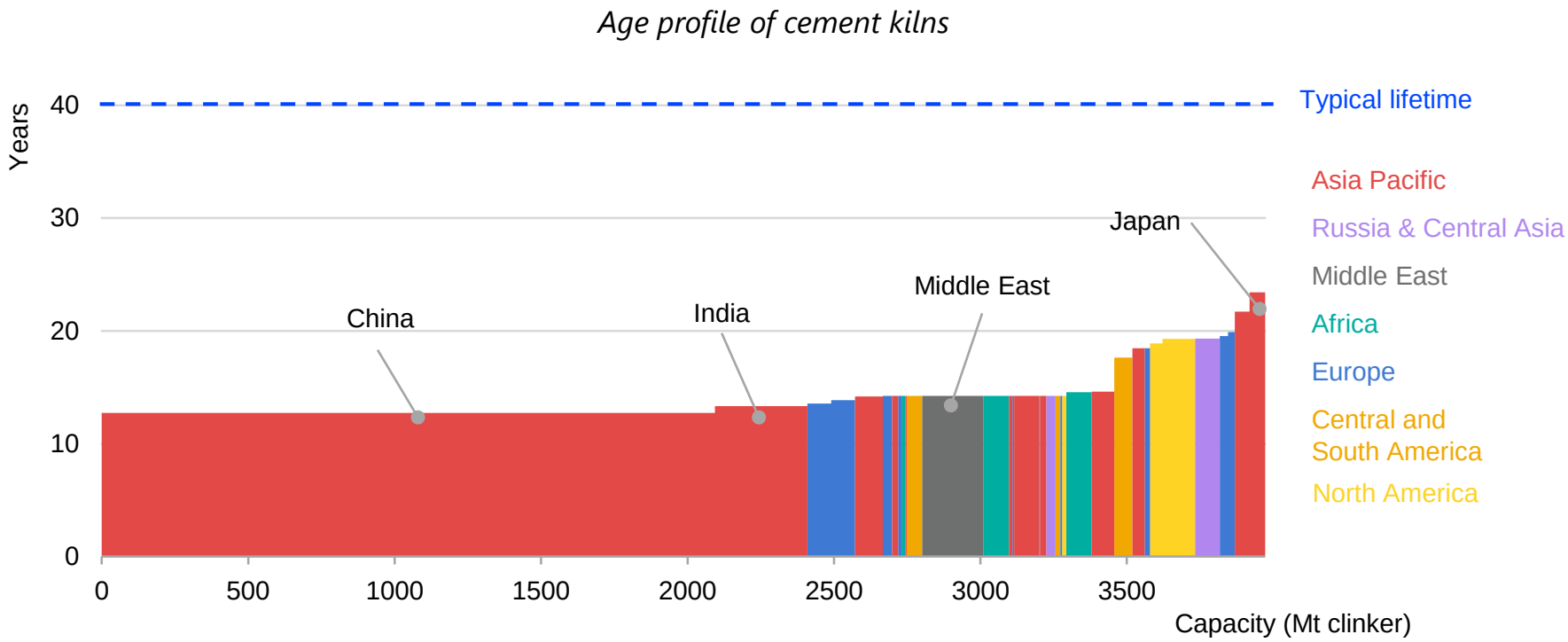
Many industry assets are still young – iron and steel production



China's middling-to-young production capacity accounts for upwards of 50% of the global total in key industrial sub-sectors. India and the Middle East are also key regions.

Many industry assets are still young – cement production



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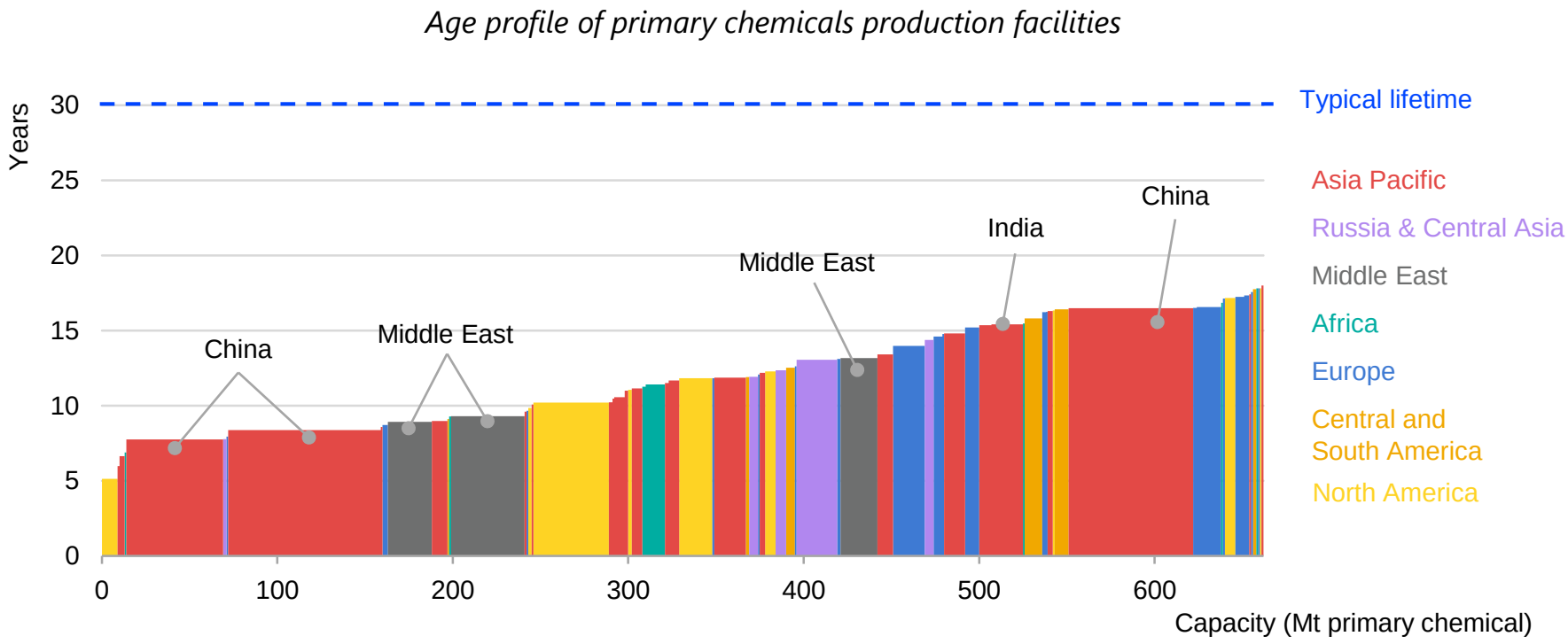

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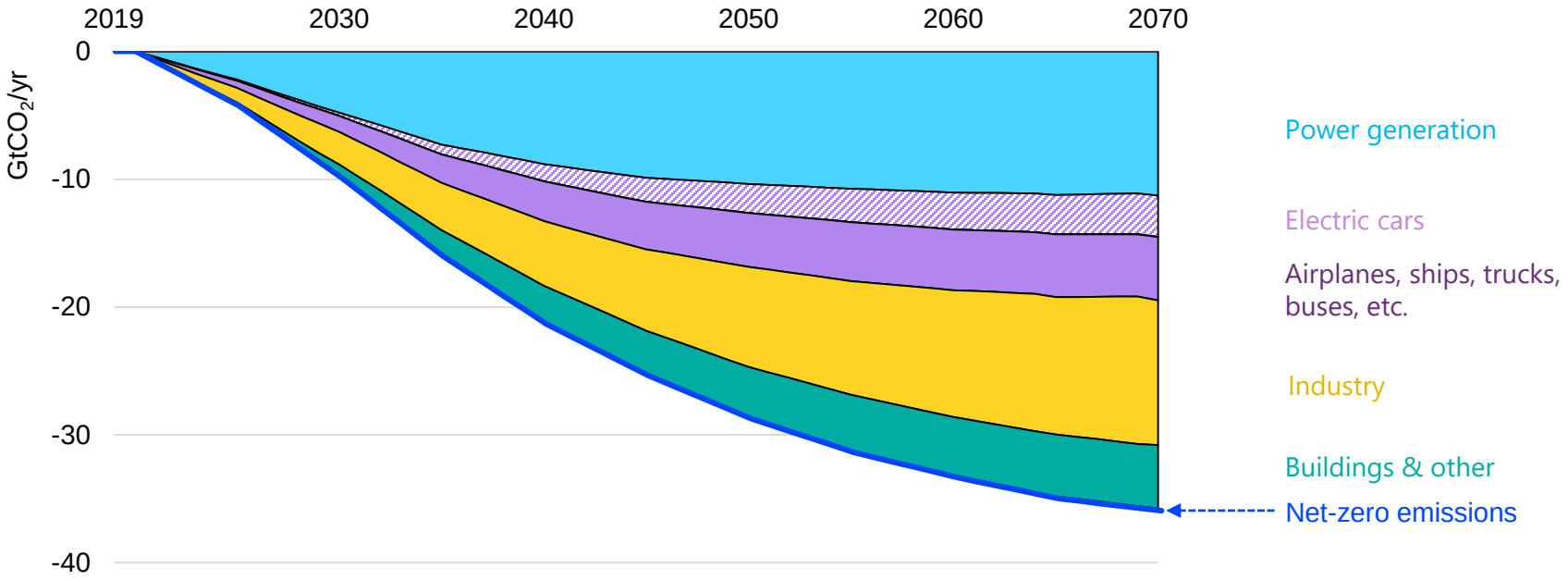
Focusing on the power sector is not enough to reach climate goals

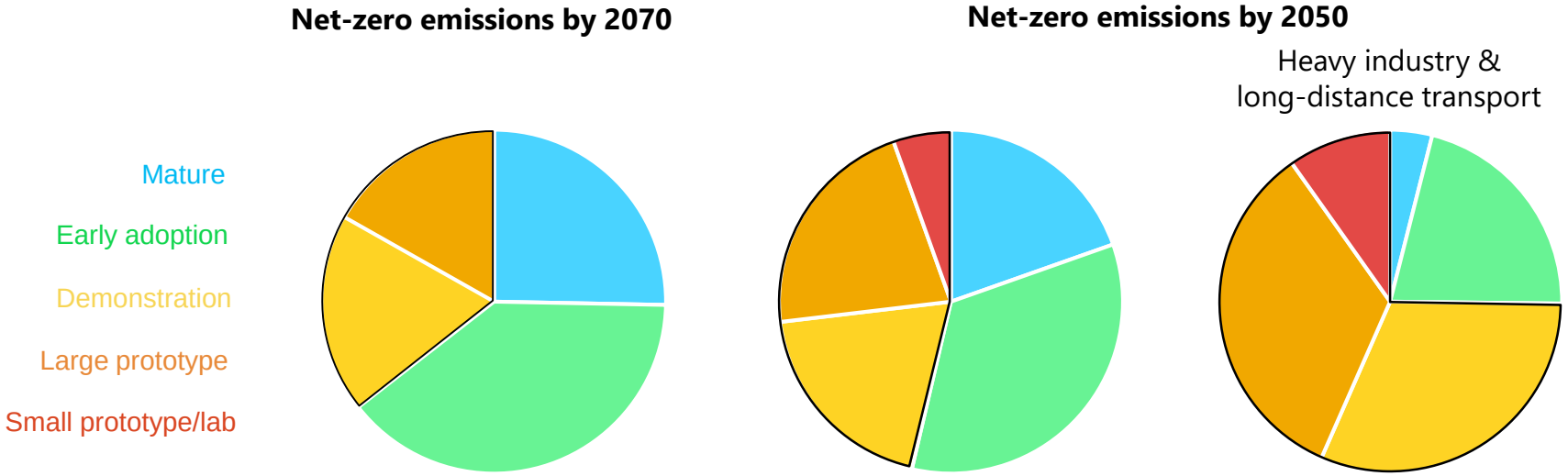
Global CO_2 emissions reductions in the Sustainable Development Scenario, relative to baseline trends



Clean energy technology progress in the power sector and with electric cars is encouraging, but alone not sufficient to reach climate goals. About half of all CO_2 emissions today are from industry, transport and buildings.

Clean energy technology progress hinges on innovation

Cumulative emissions reductions relative to baseline trends by technology maturity

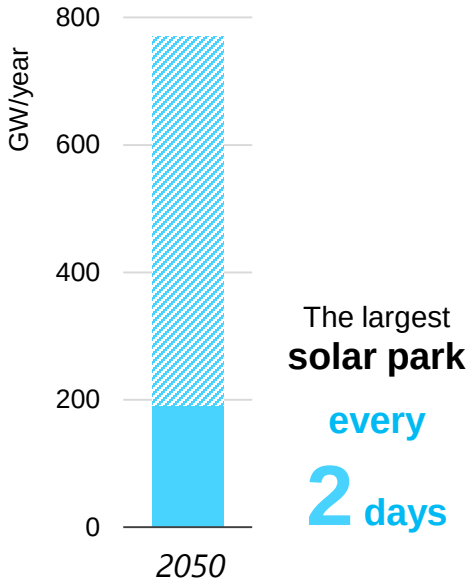


Almost half of the emissions reductions required to reach net-zero by 2050 rely on technologies that are not yet commercial today. The share jumps to three-quarters for heavy industry and long-distance transport.

Net zero requires a major push to build clean energy infrastructure

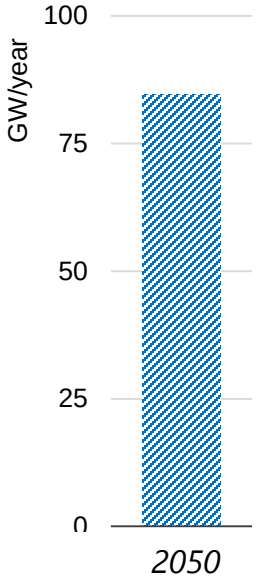
Selected indicators to reach net-zero emissions by 2050 through technology

Renewable capacity additions



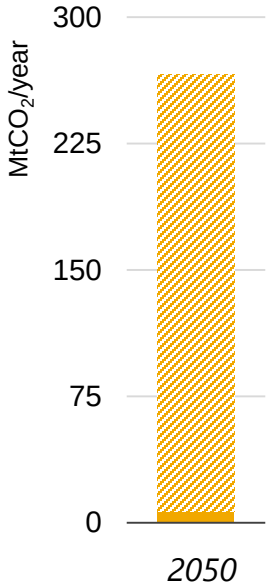
The largest **solar park** every **2 days**

Electrolyser capacity additions



The largest **electrolyser** in operation today every **hour**

Additional CO_2 captured



1 Northern-Lights project every **week**

Reaching net-zero emissions by 2050 would require a roll out of clean energy technologies & enabling infrastructure at unprecedented scale. Significant changes to consumer behaviour can moderate – but not eliminate – the needs.

Governments will need to play the decisive role

Markets are vital for mobilising capital and catalysing innovation, but they will not deliver net-zero emissions on their own. Effective policy toolkits must address five core areas:

1. Tackle emissions from existing assets
2. Strengthen markets for technologies at an early stage of adoption
3. Develop and upgrade infrastructure that enables technology deployment
4. Boost support for research, development and demonstration
5. Expand international technology collaboration