International Energy Agency

Energy consumption in high-energy industries and the path to carbon neutrality by 2050

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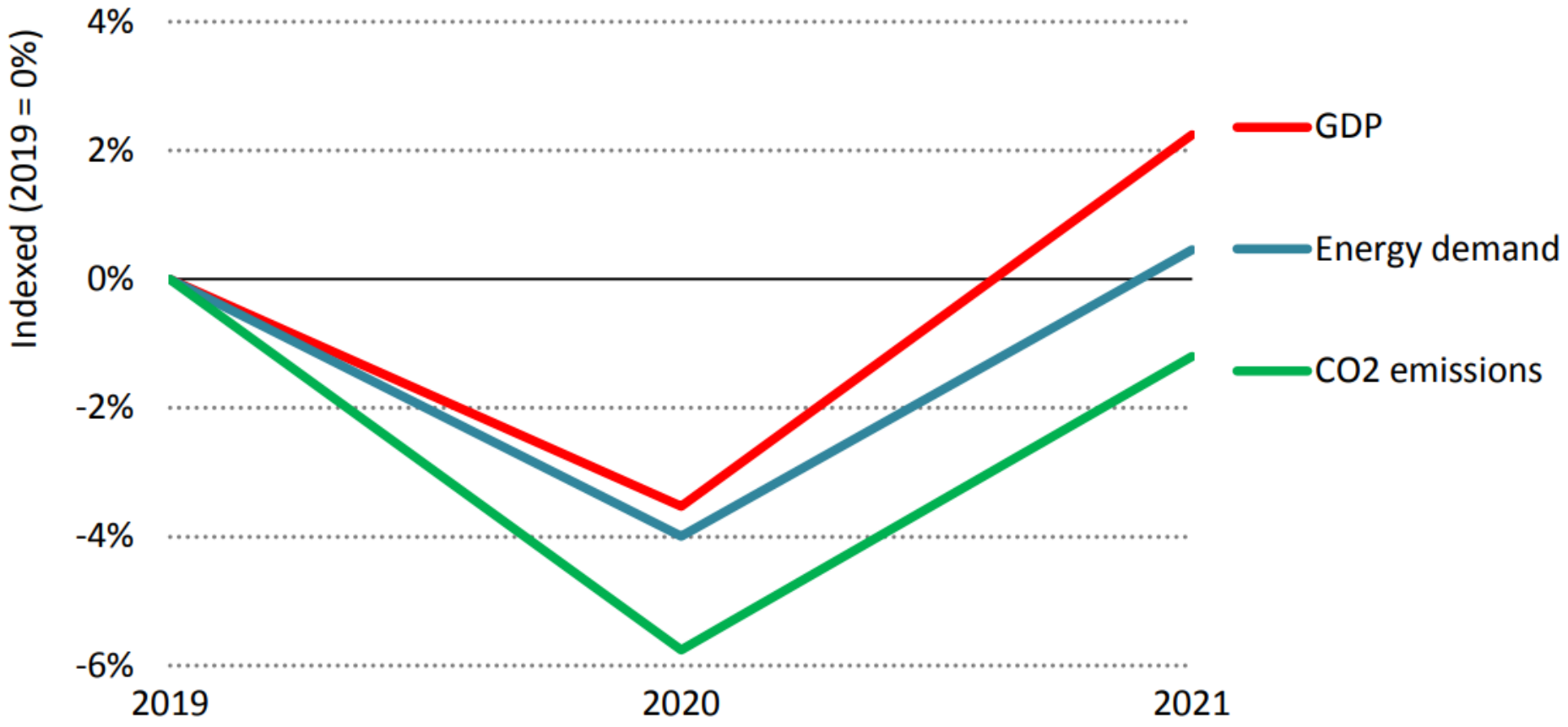
Biogas, Carbon Footprint and Industrial Symbiosis

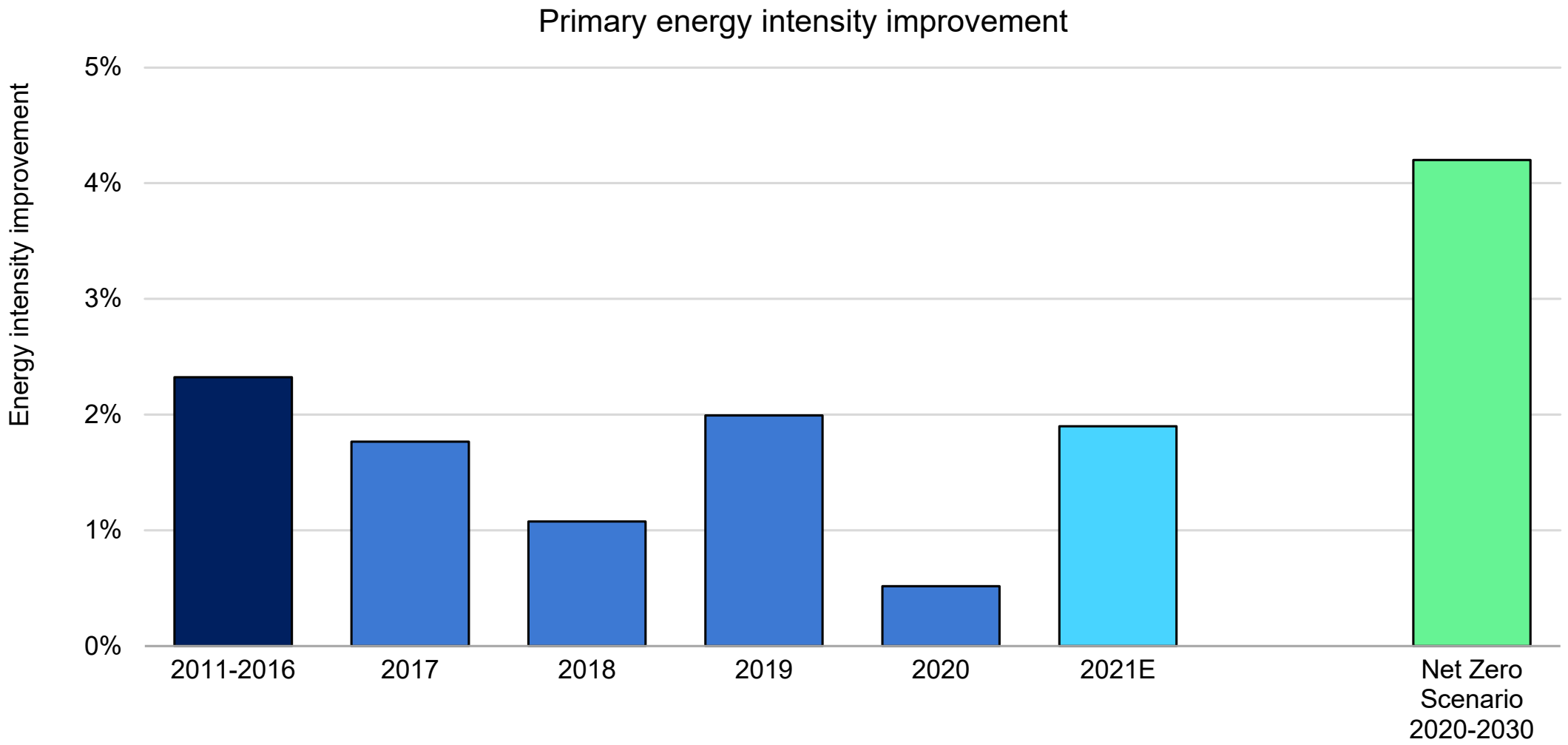
Global CO_2 emissions are on the rebound

Evolution of global GDP, total primary energy demand, and energy-related CO_2 emissions, relative to 2019



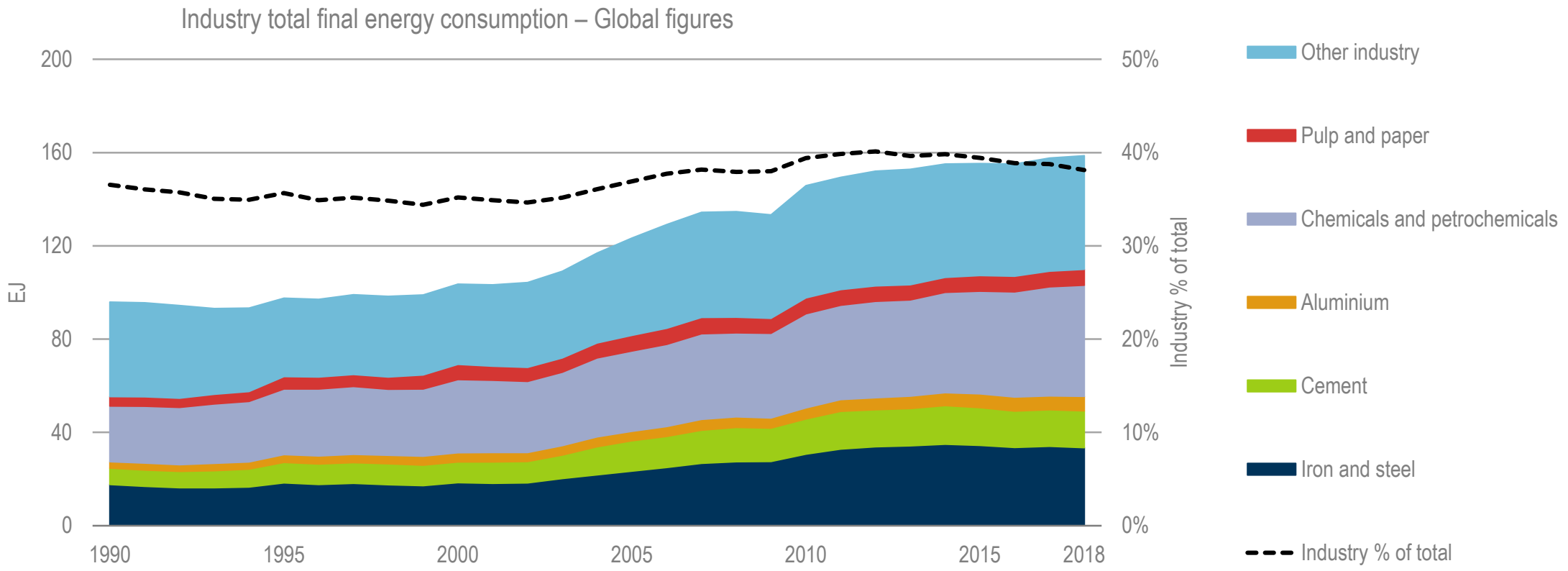
Global energy demand is set to increase by 4.6% in 2021, surpassing pre-Covid-19 levels.

Efficiency progress recovering after slowest year in a decade



Annual efficiency improvements would need to double to match the ambition of the IEA Net Zero by 2050 Scenario

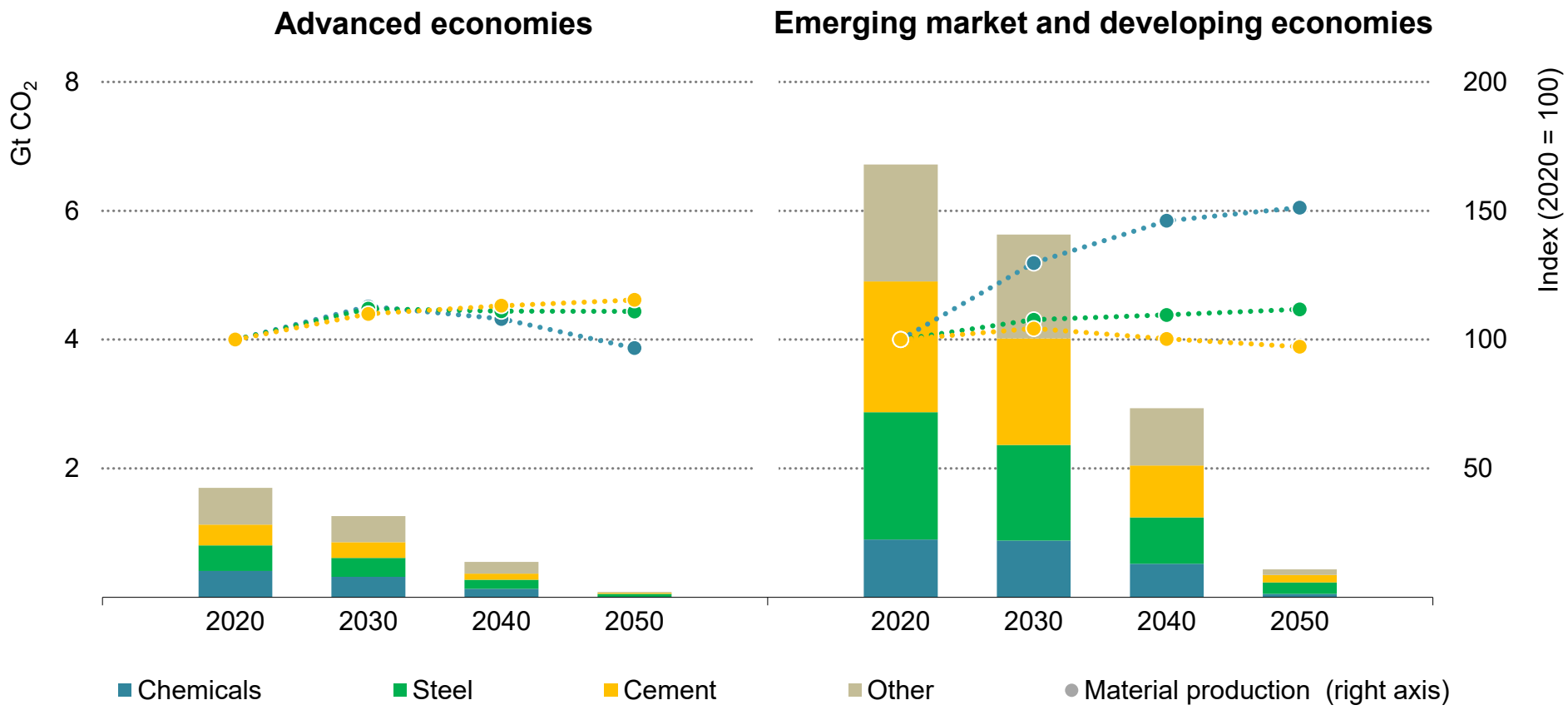
Industry contributes to a large share of global energy use



Globally, industry total energy use has grown more than one and a half times over the last 25 years driven by the doubling of energy use from the chemical and petrochemical and iron and steel sectors which represent more than 60% of that growth.

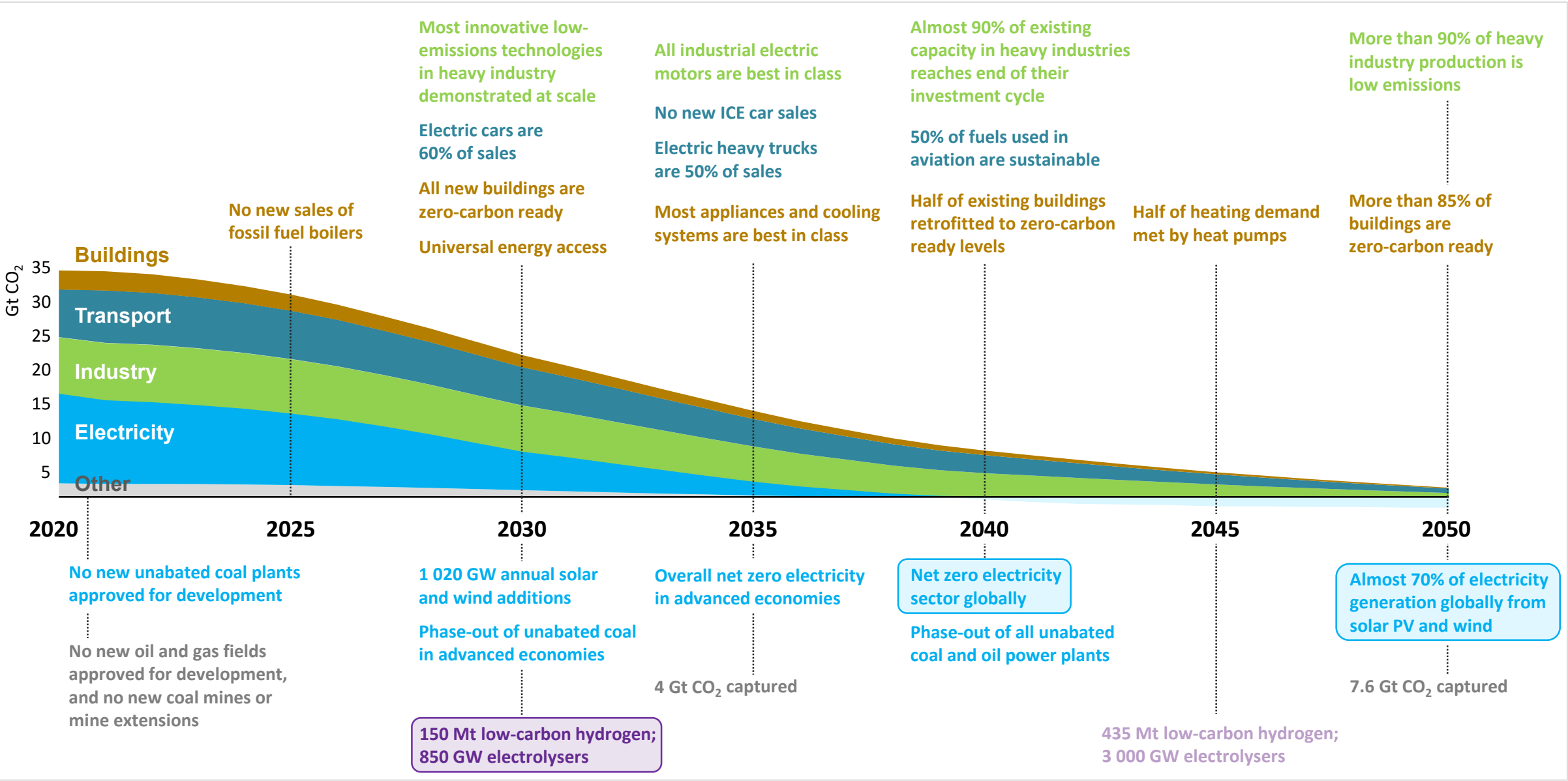
Dramatic reductions in industrial CO_2 emissions are required

Global CO_2 emissions from industry by sub-sector in the NZE



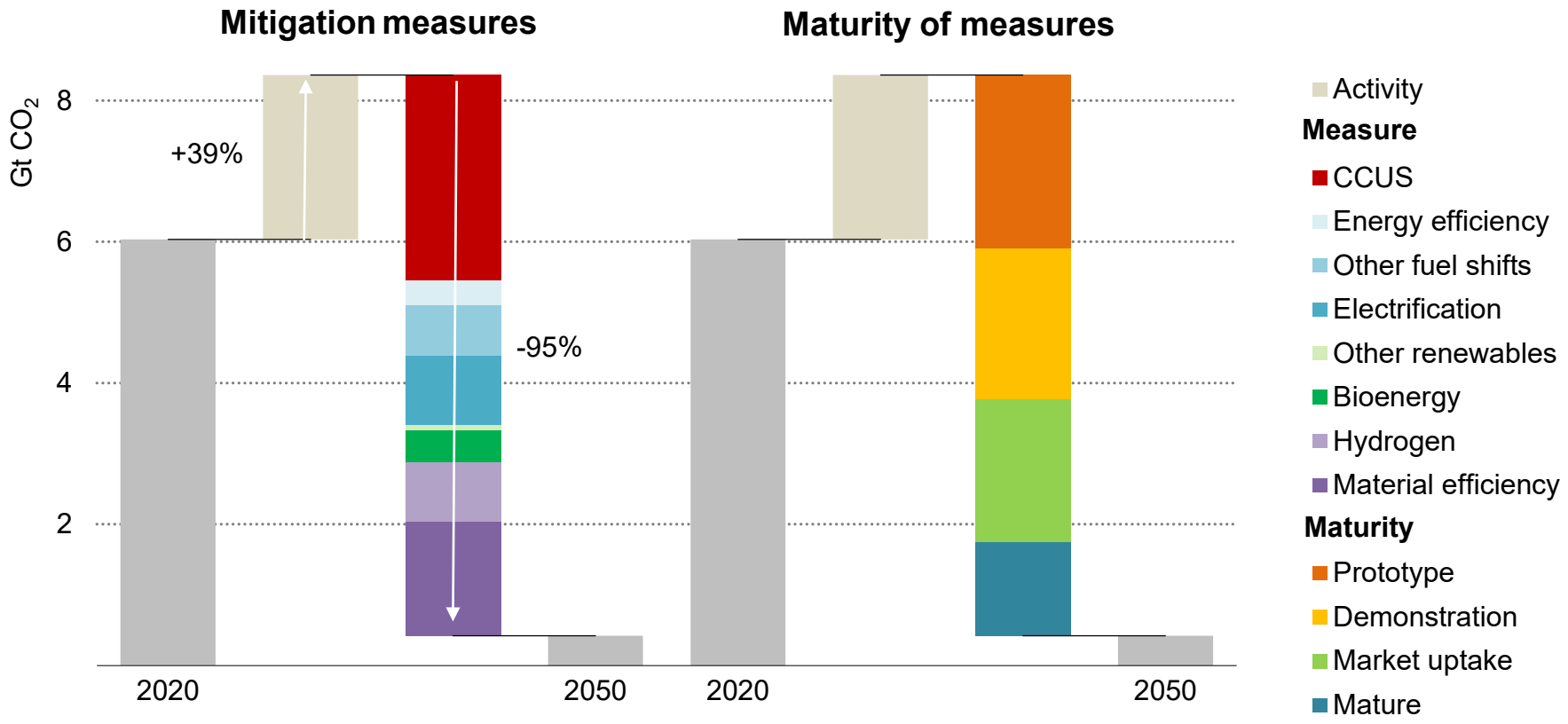
The majority of residual emissions in industry in 2050 come from heavy industries in emerging market and developing economies

Milestones on the path to Net Zero by 2050



Addressing CO_2 emissions from heavy industry

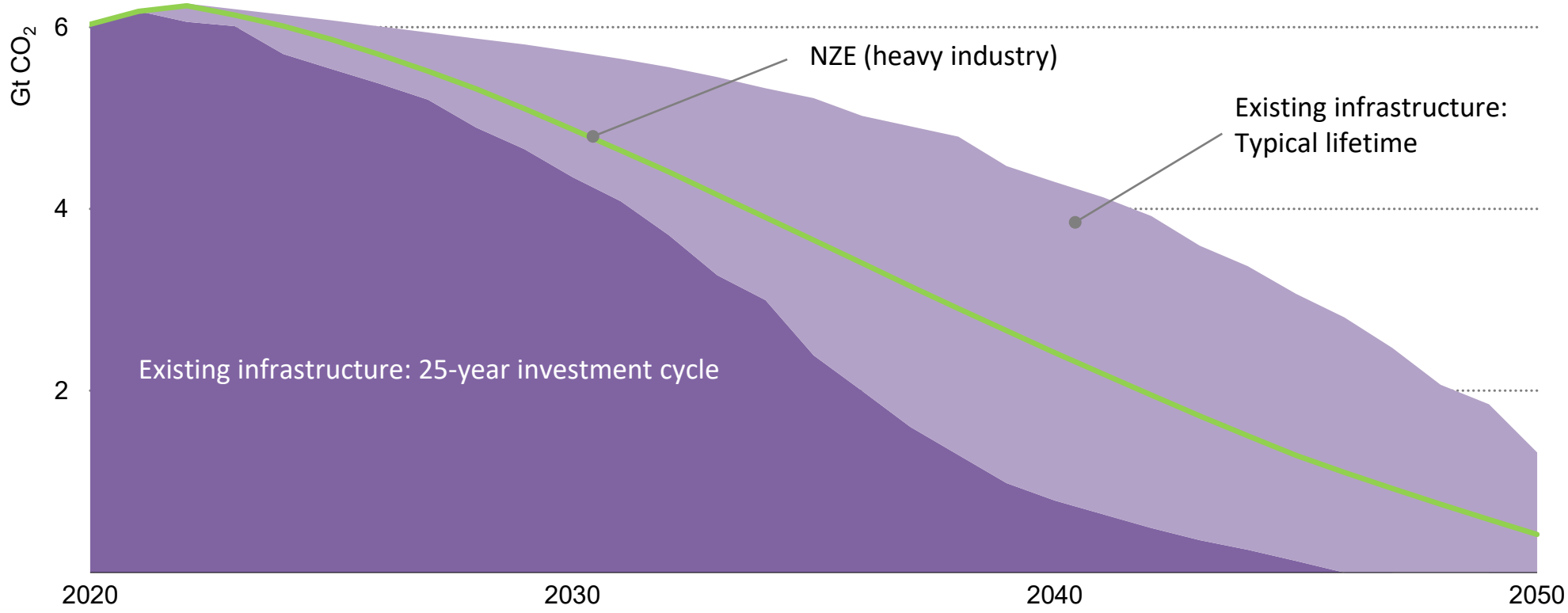
Global CO_2 emissions reductions in heavy industry by mitigation measure and technology maturity category in the NZE



An array of measures reduces emissions in heavy industry, with innovative technologies like CCUS and hydrogen playing a critical role

Addressing CO_2 emissions from heavy industry

CO_2 emissions from existing heavy industrial assets in the NZE



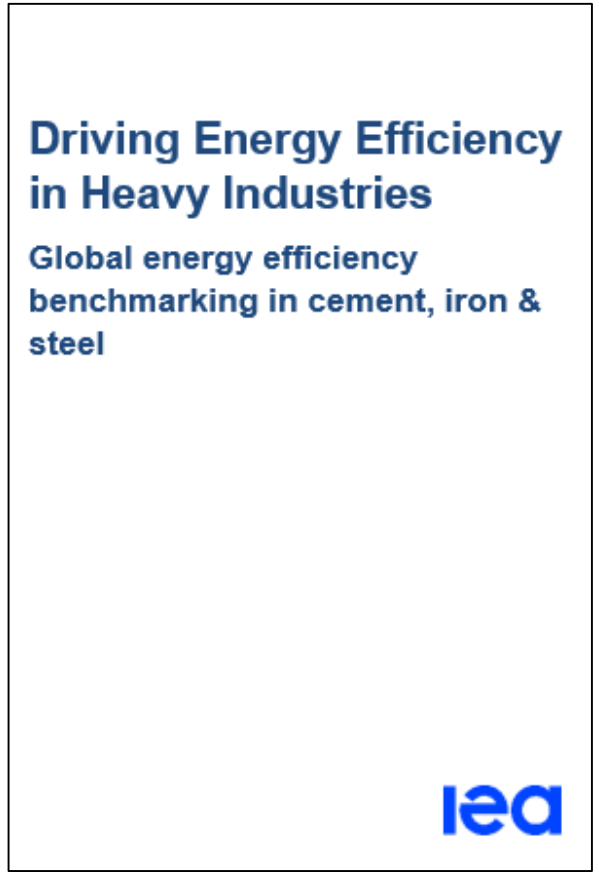
Intervening at the end of the next 25-year investment cycle could help unlock 60 Gt CO_2, around 40% of projected emissions from existing heavy industry assets

Global partnerships to advance efficiency gains

- At the request of Japan, the Agency benchmarked efficiency levels in G20 countries, focusing on key industrial sectors- iron, steel and cement.

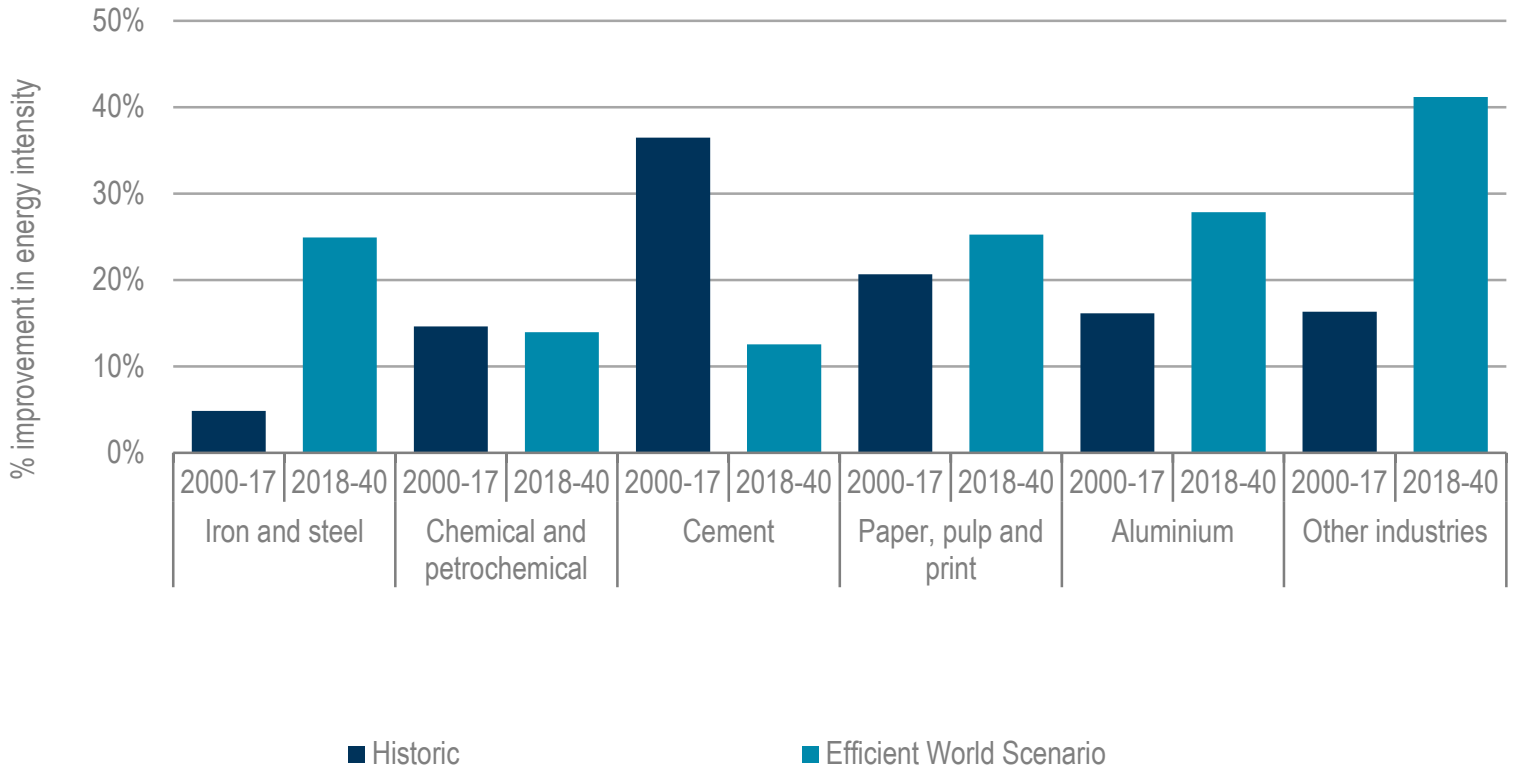
- Our project report sets out key findings.
  - Untapped efficiency potentials are indicated in many G20 countries.
  - Stronger policy actions can help capture those potentials.
  - Further data can enhance global energy efficiency benchmarking

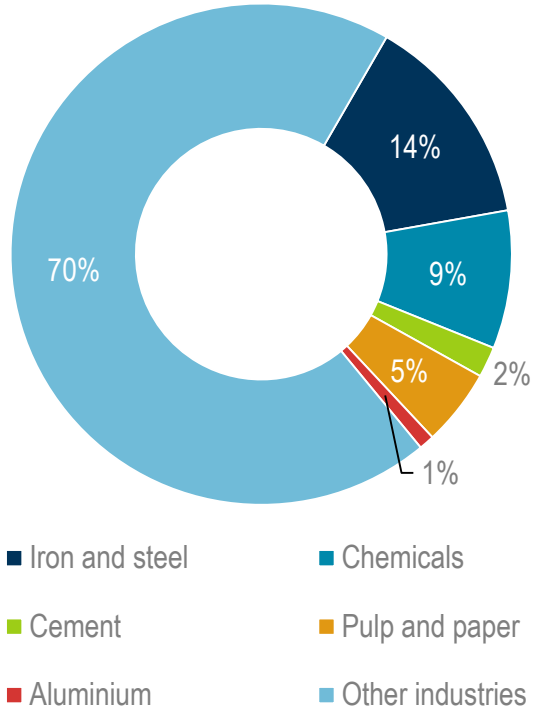
- Countries are already using the benchmarking approach to design and implement effective efficiency policies.



Efficiency can improve across all industry sub-sectors

Percentage improvement in energy intensity by industry sub-sector (left) contribution to total energy savings in 2040 (right)





Energy efficiency improvements are possible across all sub-sectors.
Light industry (e.g. food beverage and textile manufacturing) represent the bulk (70%) of savings.

The ideal energy efficiency policy packages

Regulations

Information

Incentives

Pulp and paper: energy intensity indicators and benchmarking

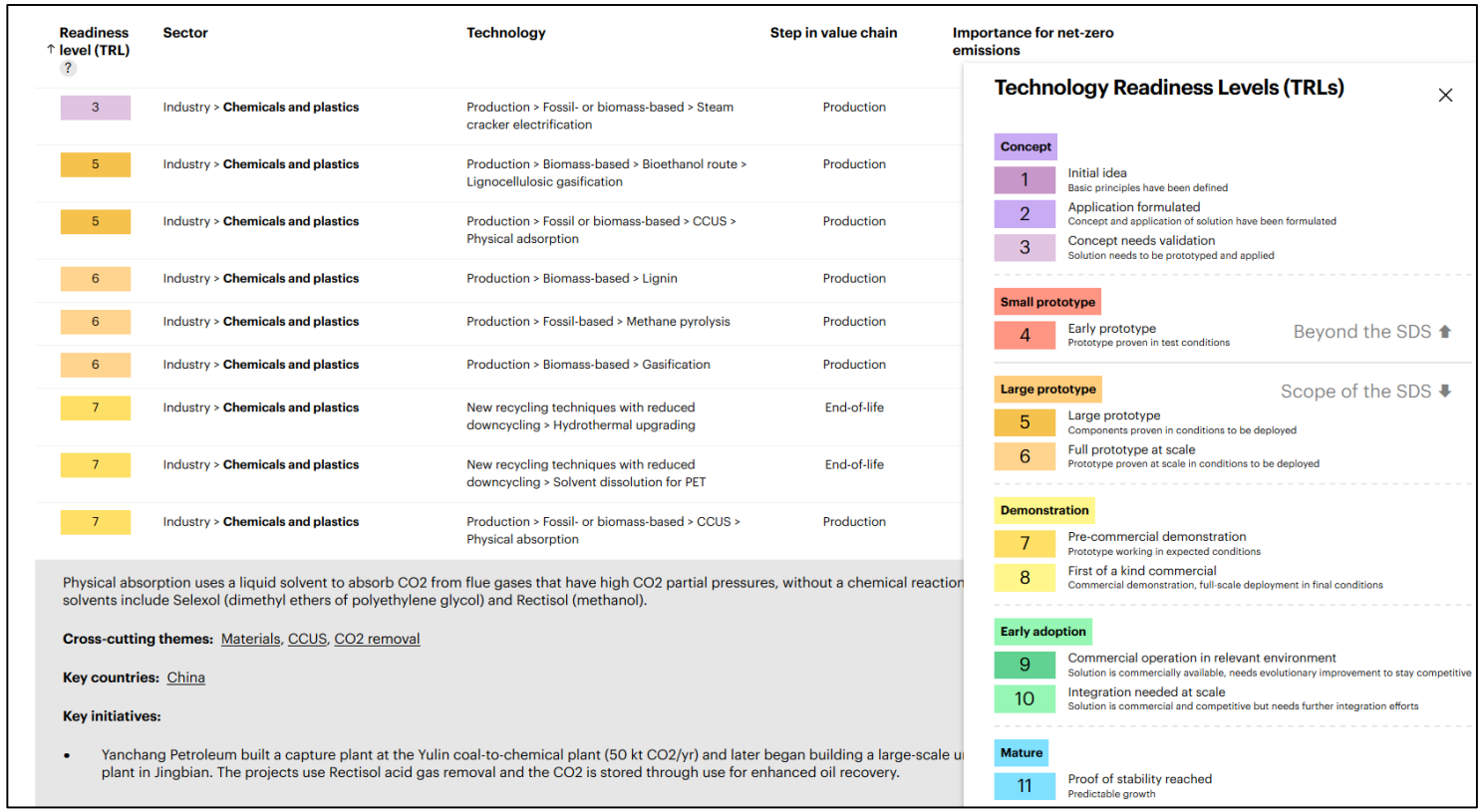
- The IEA is currently working to develop specific work in the pulp and Paper sector. Main work streams consist in :
  - Developing key indicators:
    - Specific thermal energy by tonne of pulp
    - Specific electric energy by tonne of paper
    - Benchmarking against BAT and international best practices
    - Indicators to measure auto production of electricity (use of black liquor)
    - Reuse of paper to reduce energy intensity
  - What are the main opportunities for energy efficiency and what policies could be developed to unlock them

Data availability is still a main limiting factor. A key area of progress is to encourage global partnership between governments and the industry to share data and best practices.

ETP Clean Energy Technology Guide

- The ETP Clean Energy Technology Guide is an interactive framework that contains information for over 400 individual technology designs and components across the whole energy system that contribute to achieving the goal of net-zero emissions.

- For each of these technologies, it includes information on the level of maturity (or Technology Readiness Level, TRL) and a compilation of development and deployment plans, as well as cost and performance improvement targets and leading players in the field.



https://www.iea.org/articles/etp-clean-energy-technology-guide

Exploring key “spots” in global energy

Recent publications

The IEA is shining a light on the major areas of the energy system that need to be combined to ensure a clean transition, with considerable focus on the industry sector.