IEA Roadmap to Net Zero by 2050

20th July 2021

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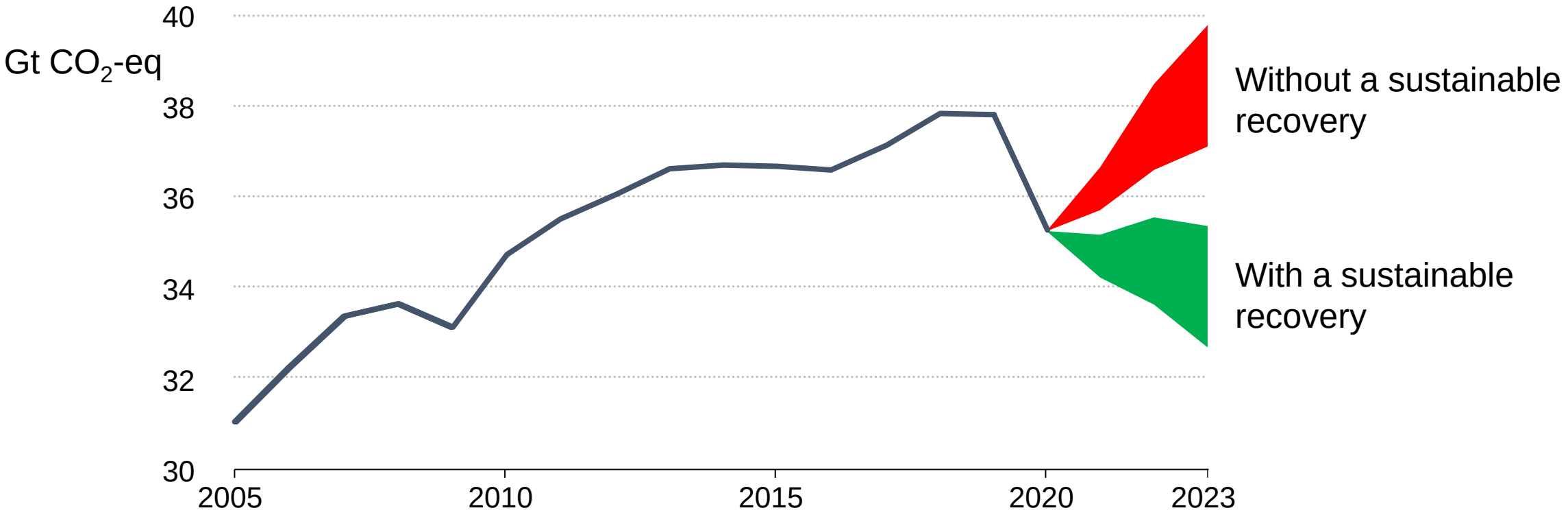
International Energy Agency

Early policy action is essential to avoid an emissions rebound

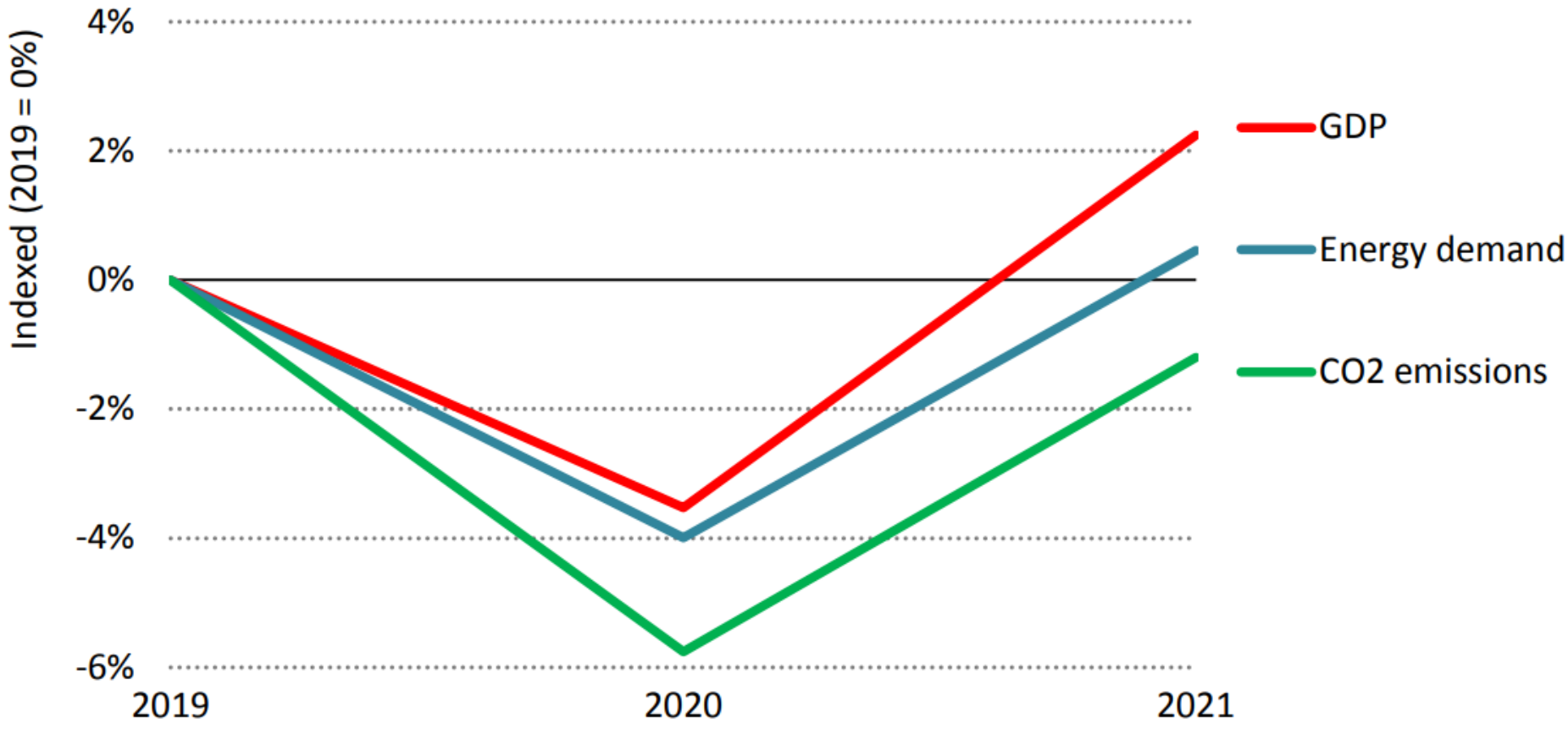
Total energy related CO_2 emissions with and without a sustainable recovery, 2005-2023



Sustainable recovery action can mitigate rebound effects and put the world on a more sustainable path.

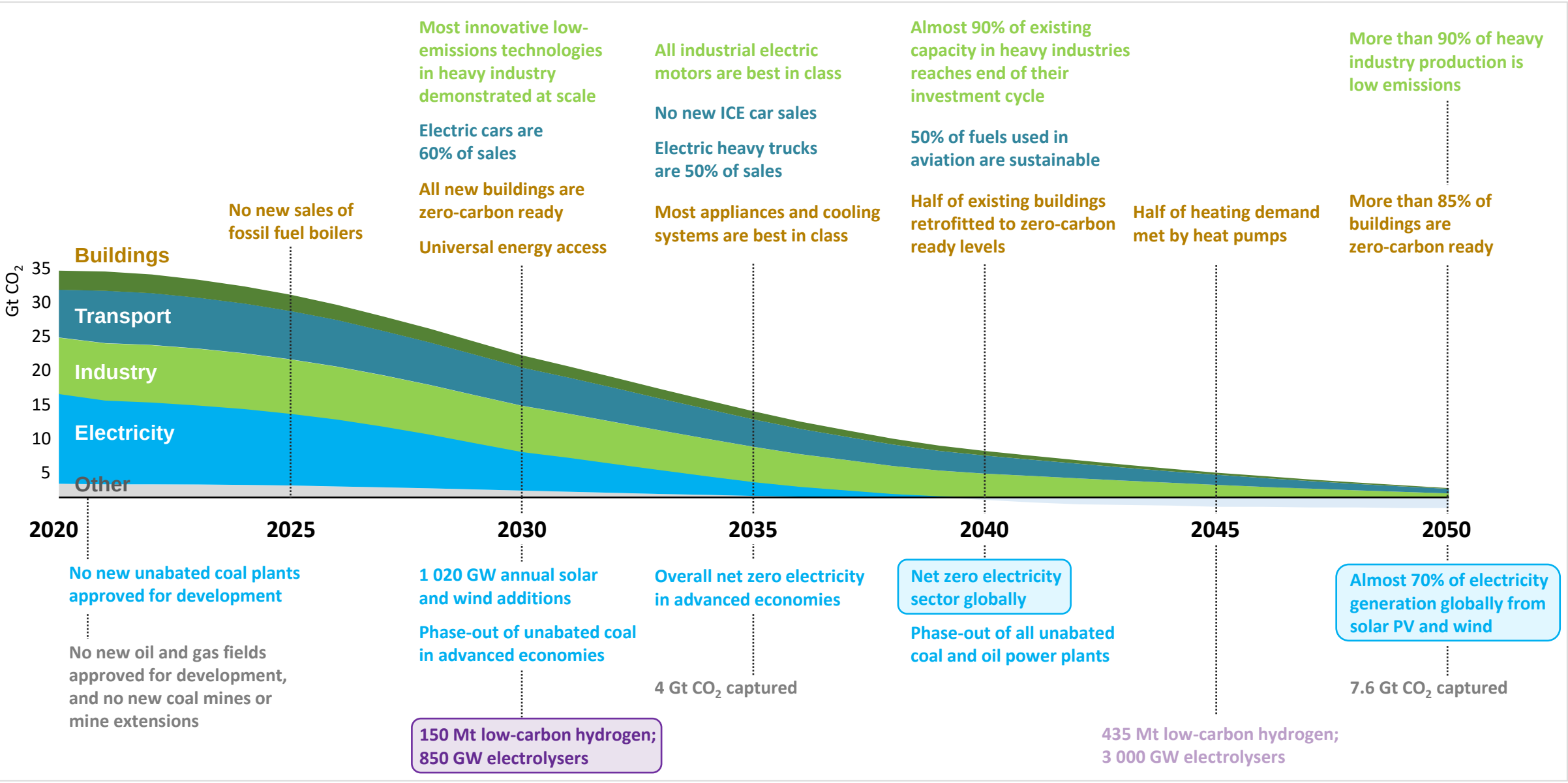
Global CO_2 emissions are already back to growth

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



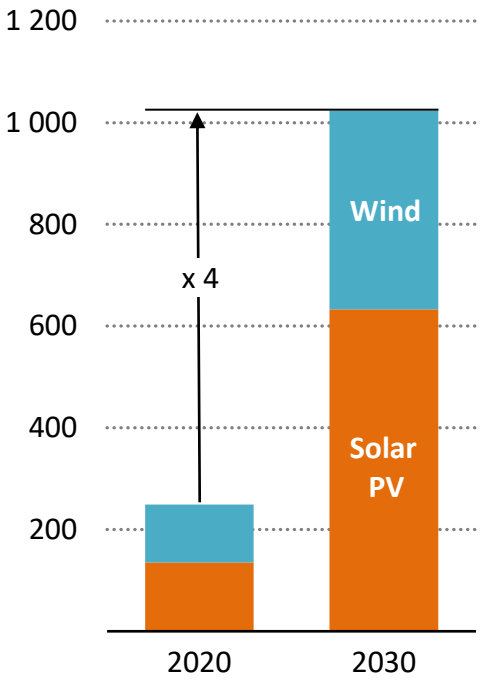
Global energy demand is set to increase by 4.6% in 2021, surpassing pre-Covid-19 levels.

Milestones on the path to Net Zero by 2050

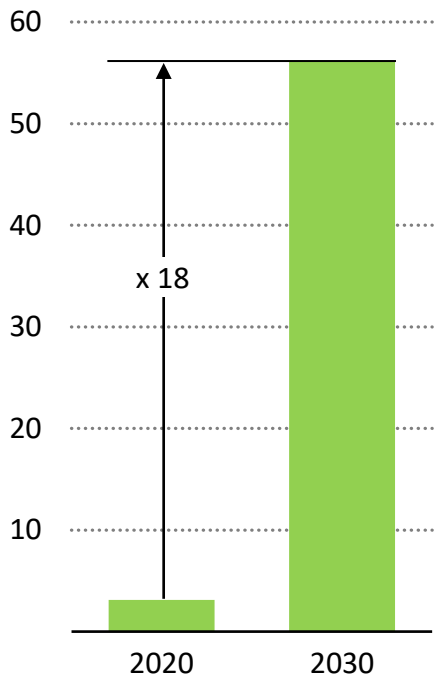


Make the 2020s the decade of massive clean energy expansion

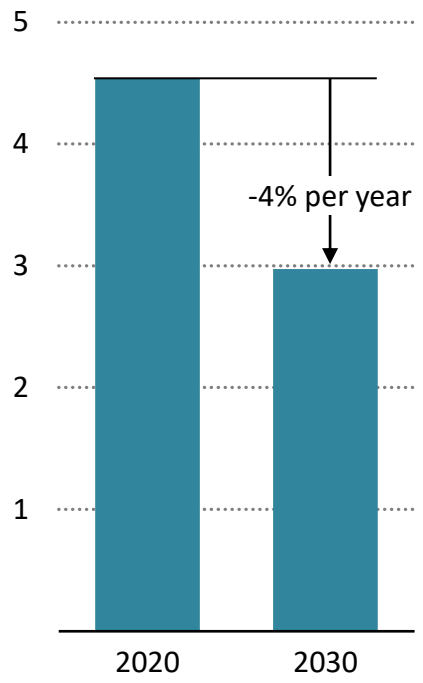
Solar PV and wind capacity additions (GW)



Electric car sales (millions)

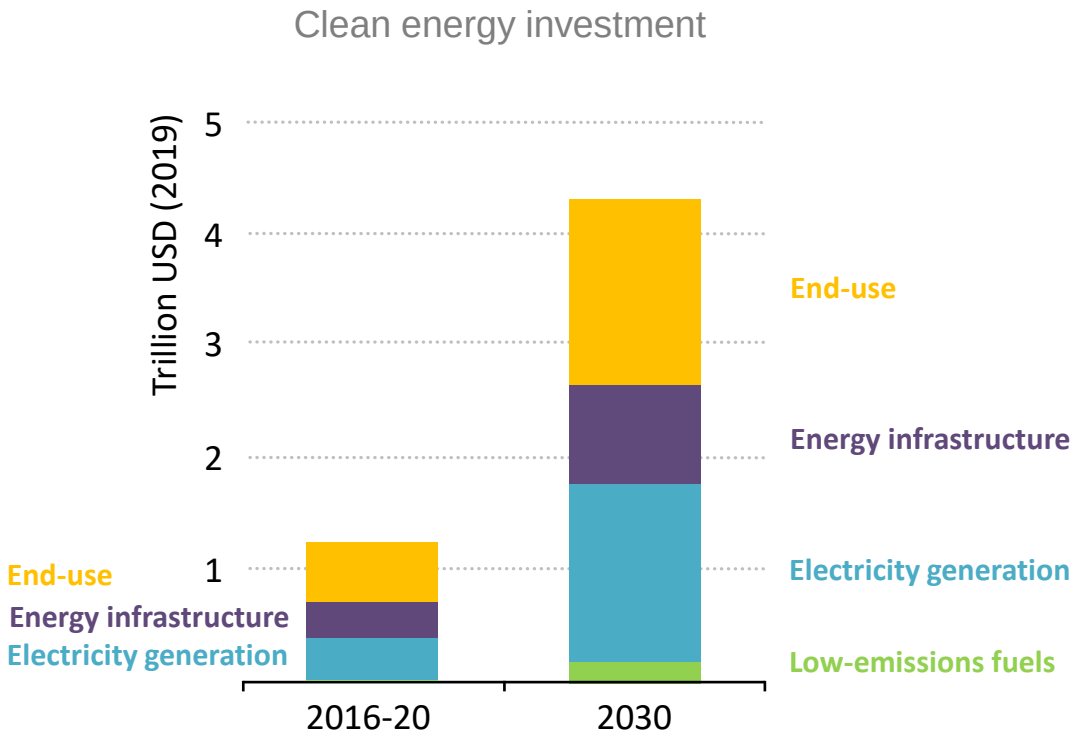


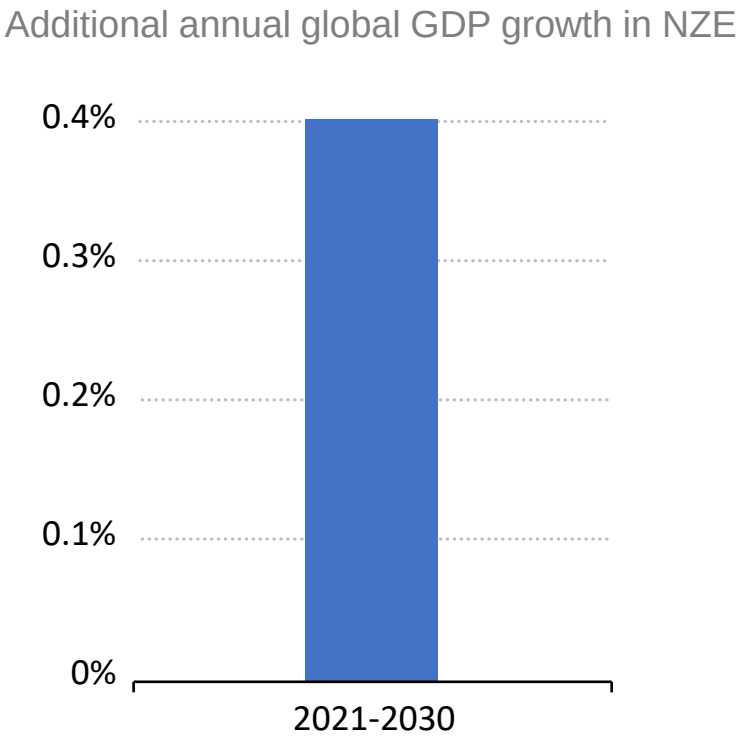
Energy intensity of GDP (MJ per USD PPP)



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.

Drive a historic surge in clean energy investment

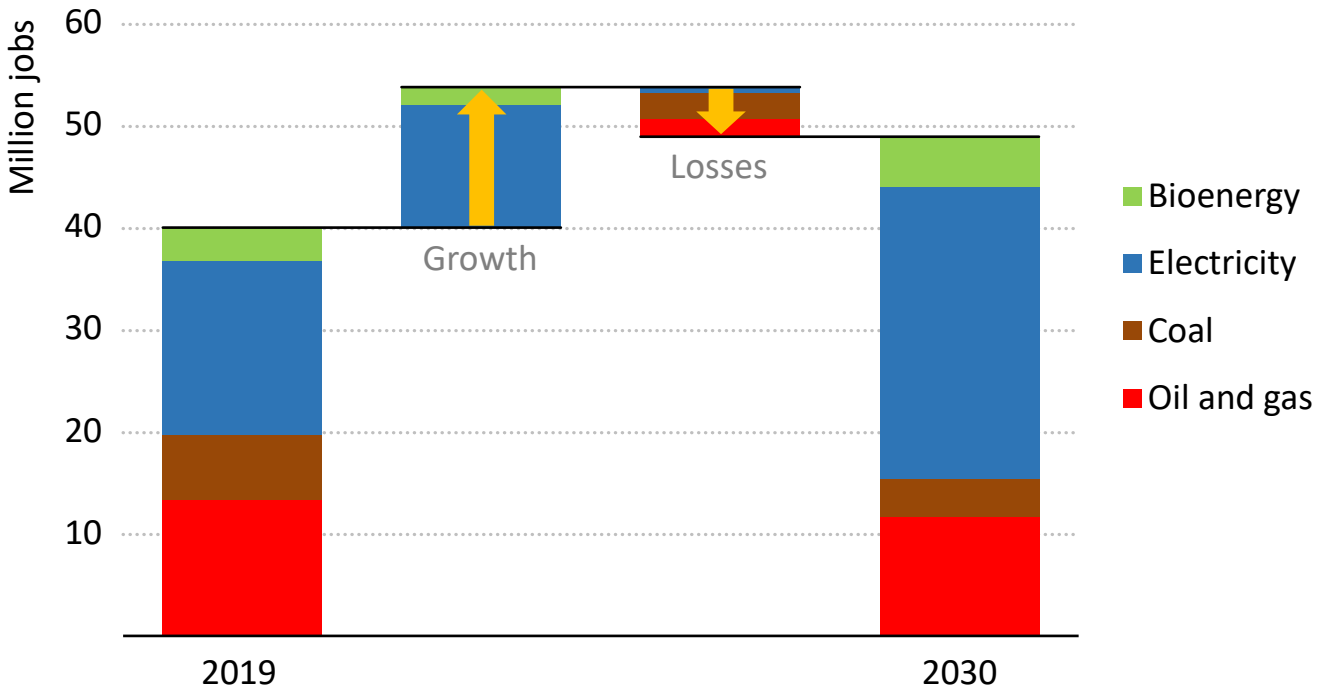




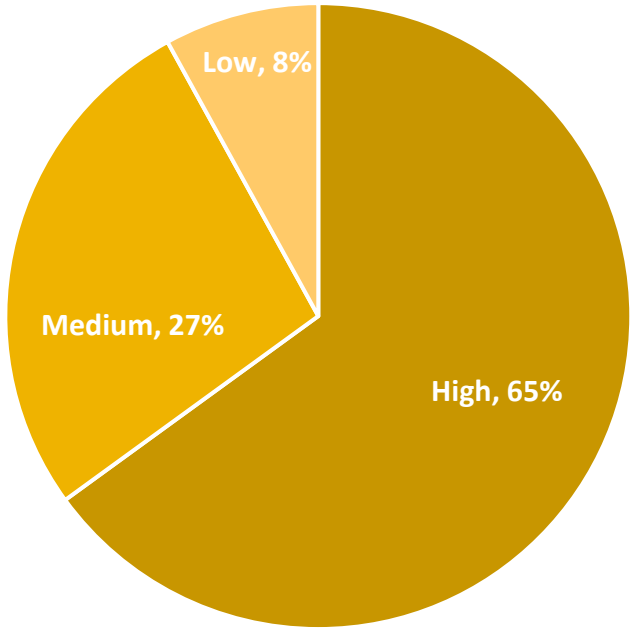
Annual clean energy investment more than triples by 2030 in the NZE scenario, driving an average 0.4% per year increase in global GDP to 2030 & speeding the recovery from the COVID-19 shock

Clean energy jobs will grow strongly but must be spread widely

Jobs in energy supply in the NZE

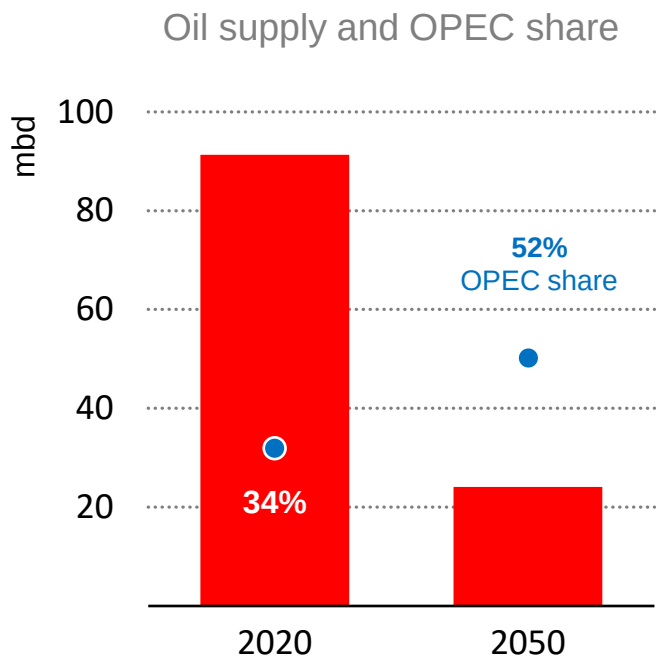


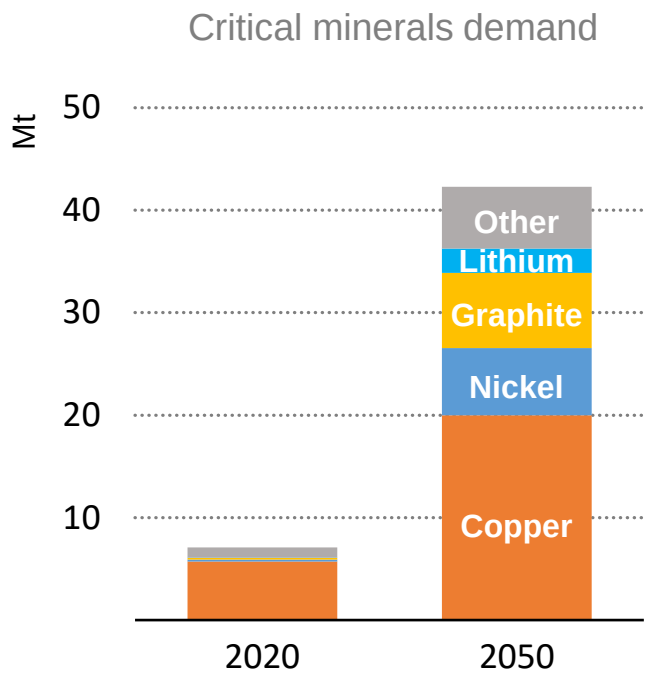
Skill level of new workers in the NZE, 2030

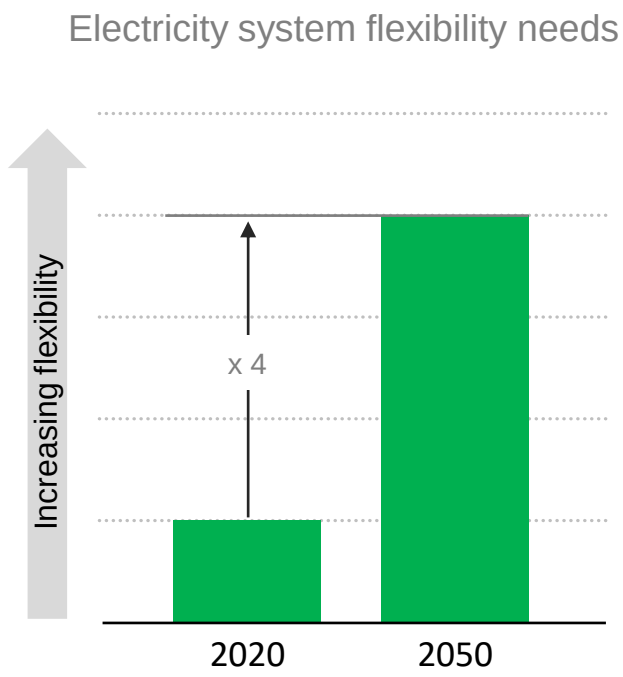


By 2030 there are 14 million jobs created in global energy supply, and a further 16 million in clean energy end-uses; but inclusive policies are needed to support reskilling & diversification in fossil-fuel dependent communities

Address emerging energy security risks now

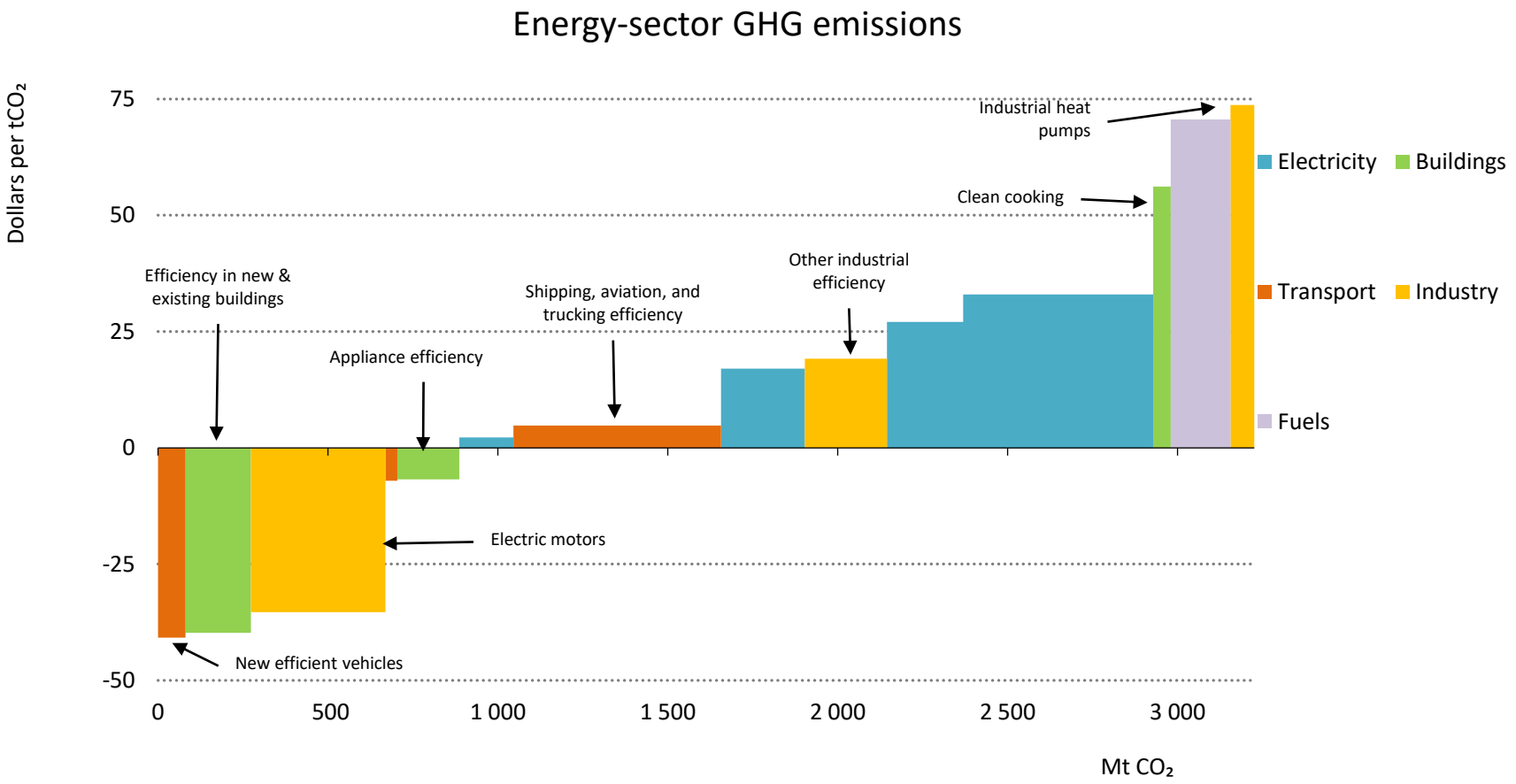






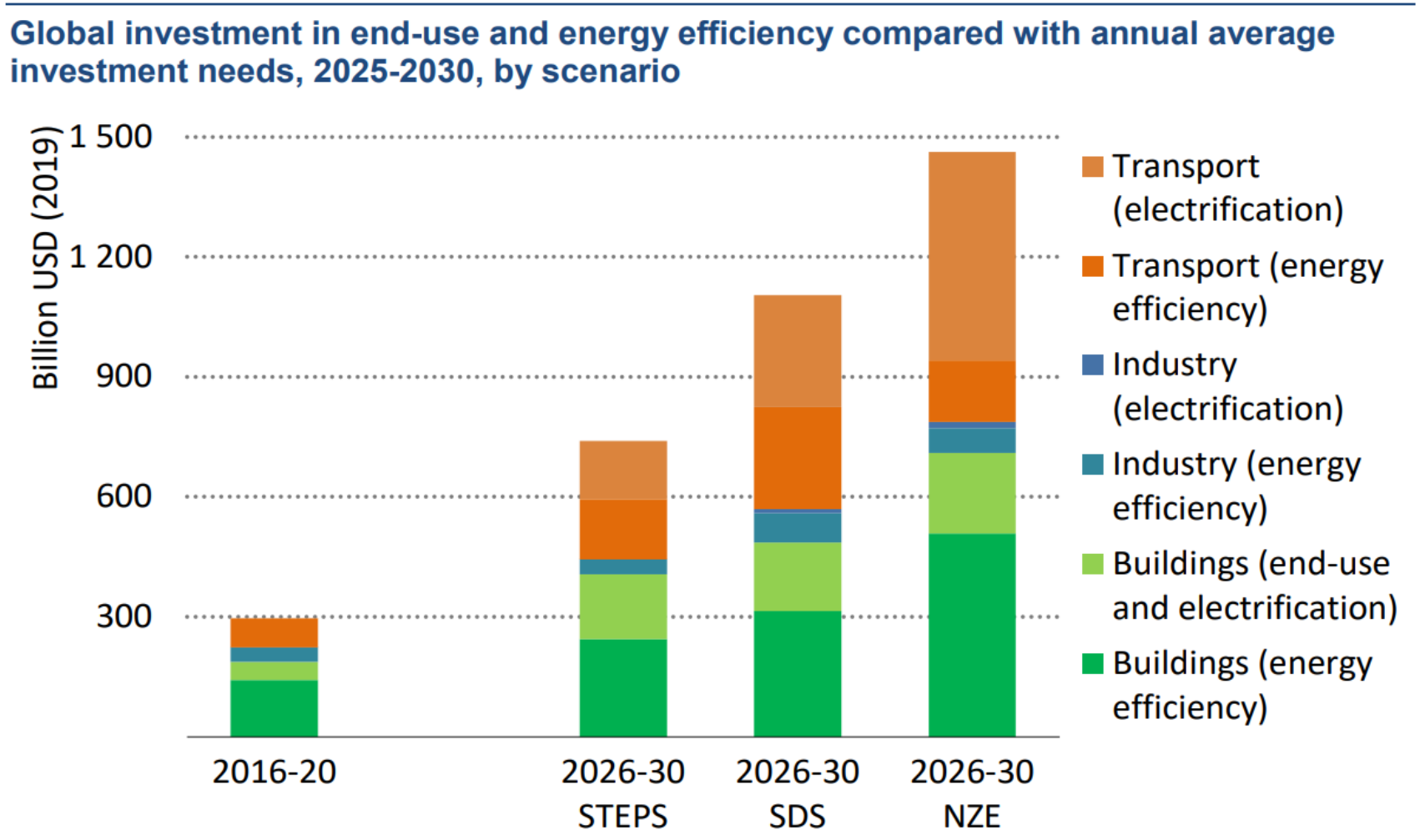
New energy security concerns emerge, and old ones remain; governments need to proactively plan for energy security risks related to market concentration, critical minerals and electricity systems.

Efficiency contributes the most emissions and cost reductions



Annual CO_2-eq emissions would be nearly 4.3 Gt lower, air pollution improves by 5%, and customer energy costs would be 2-3% less due to these measures.

Energy efficiency investments need to triple by 2026-30 for NZE



Annual clean energy investment more than triples by 2030 in the NZE scenario

The Super Efficient Equipment and Appliances Deployment Initiative

- A global initiative on appliance efficiency, co-led by the UK, European Commission, India and Sweden, and co-ordinated by the IEA
- Working with COP26 Presidency to double global efficiency ambition for:

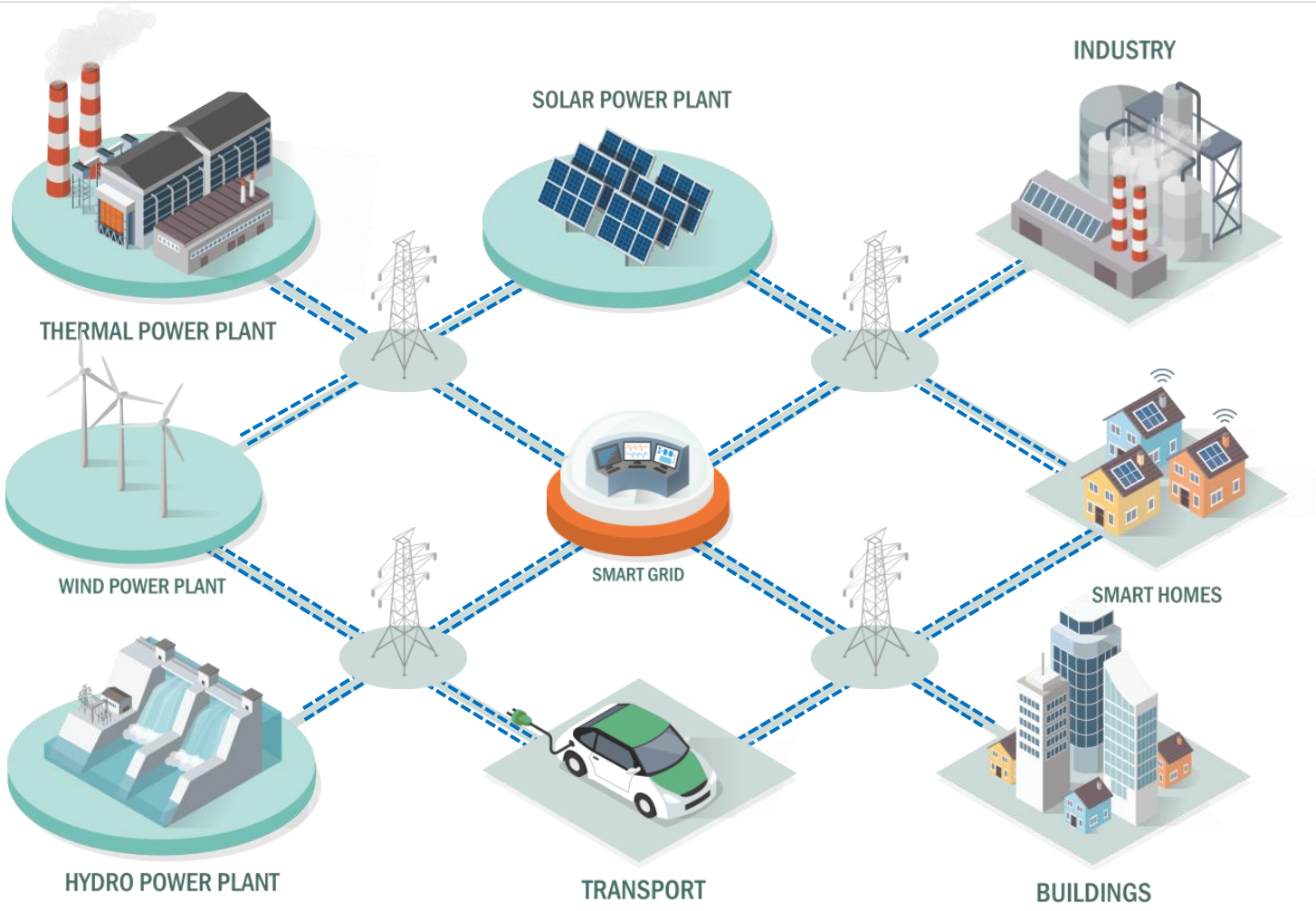
1) **Electric motors**
2) **Air conditioners**
3) **Refrigerators**
4) **Lighting**




- SEAD members will publish plans for doubling the efficiency ambition of products being sold by 2030 following a consistent measurement approach

- G7 Leaders endorsed this in their final Communique this weekend

The digital transformation of the energy system



Pre-digital energy systems are defined by unidirectional flows and distinct roles, digital technologies enable a multi-directional and highly integrated energy system

Examining the opportunities for digital transformation

Electricity systems are transforming → More flexibility is needed, with active participation of consumers → Digitalisation is key; enabling policies are crucial

- **Digitalisation** can help leverage opportunities:
  - Create a more interconnected and responsive electricity system
  - Support carbon emissions reduction
  - Help to minimise system cost and need for new investment
  - Improve stability, resilience and security

Digital Demand-Driven Electricity Networks Initiative (3DEN)

The IEA is providing actionable guidance to policy makers on the policy, regulatory, technology and investment context needed to accelerate progress on power system **modernisation** and effective **utilisation** of demand side resources.

Global Commission on People-Centred Clean Energy Transitions

Ministers and policymakers from: Austria, Belgium, Canada, Chile, China, Colombia, Denmark, France, India, Indonesia, Italy, Japan, Mexico, Oman, Norway, Panama, Poland, Senegal, South Africa, Spain, Switzerland, United States, European Commission, and Prime Minister of Guyana

Representatives from labour, youth, access, civil society

Honorary Patron is Mette Frederiksen, Prime Minister of Denmark
Members representing all geographies and perspectives.

Emerging themes on people-centred clean energy transitions