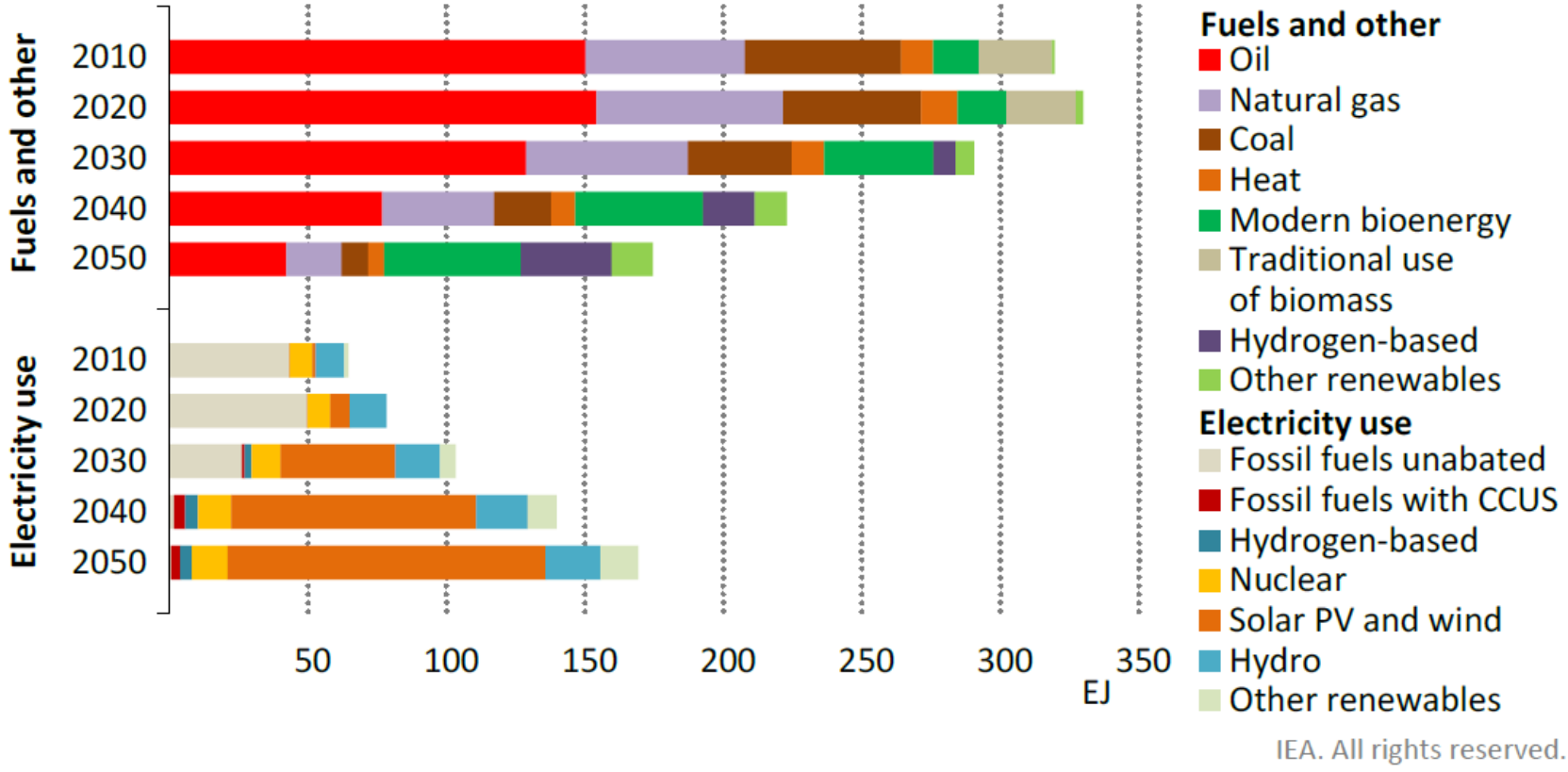
Gas turbines in a carbon-neutral society

Energy transition to a global carbon-neutral society

Tom Howes, Head of Energy and Environment Division
11 October 2021

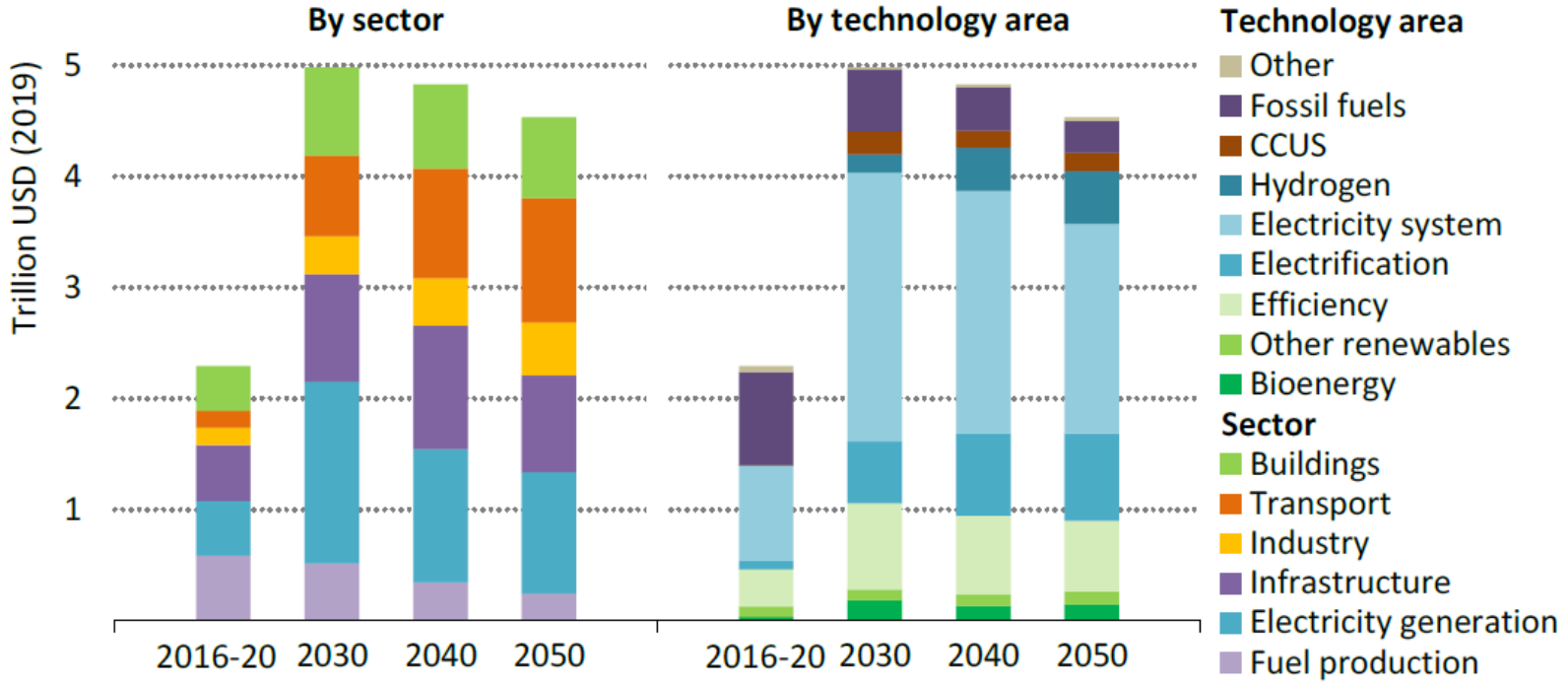
International Energy Agency

Global total final consumption by fuel in the NZE scenario



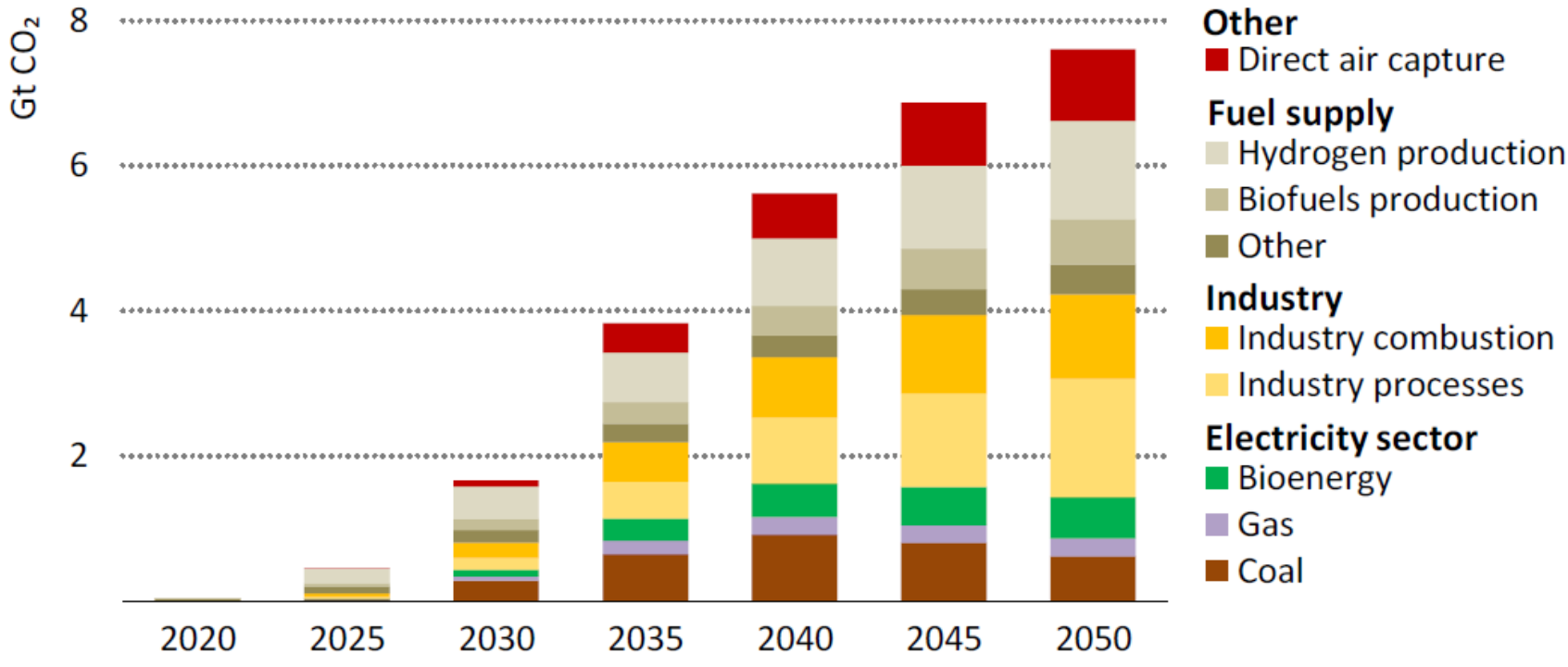
The share of electricity in final energy use jumps from 20% in 2020 to 50% in 2050

Average annual capital investment in NZE scenario



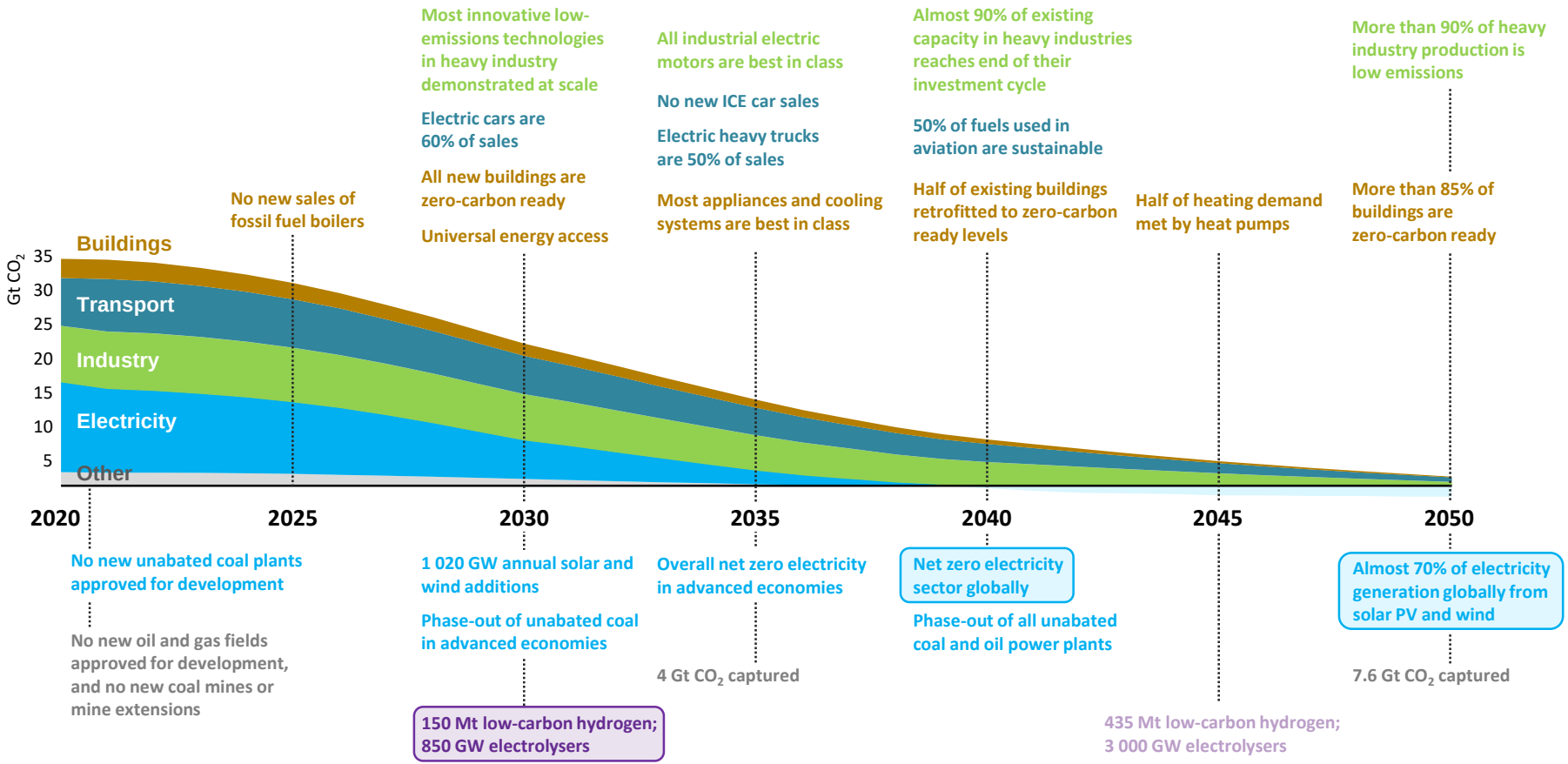
Capital investment in energy rises from 2.5% of GDP in recent years to 4.5% by 2030; the majority is spent on electricity generation, networks and electric end-user equipment

Global CO_2 capture by source in the NZE scenario



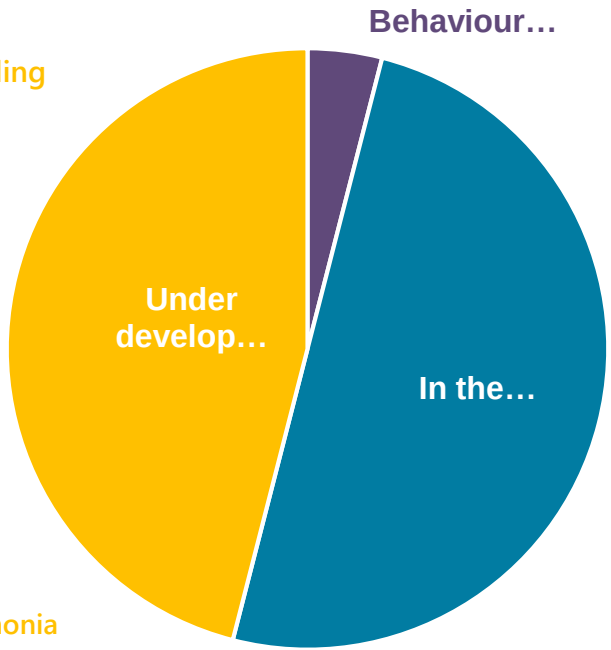
By 2050, 7.6 Gt of CO2 is captured per year from a diverse range of sources. A total of 2.4 Gt CO2 is captured from bioenergy use and DAC, of which 1.9 Gt CO2 is permanently stored.

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



Prepare for the next phase of the transition by boosting innovation

CO_2 savings by technology maturity in 2050, NZE scenario



Refrigerant-free advanced cooling

Advanced batteries

Next-generation biofuels

CO_2 capture from cement

Hydrogen-based steel

Small modular reactors

Synthetic liquid fuels

Electrolytic hydrogen for ammonia

Autonomous trucks

Optimised heat pump with storage

Direct air capture

Ammonia-powered ships

Electrolytic hydrogen for methanol

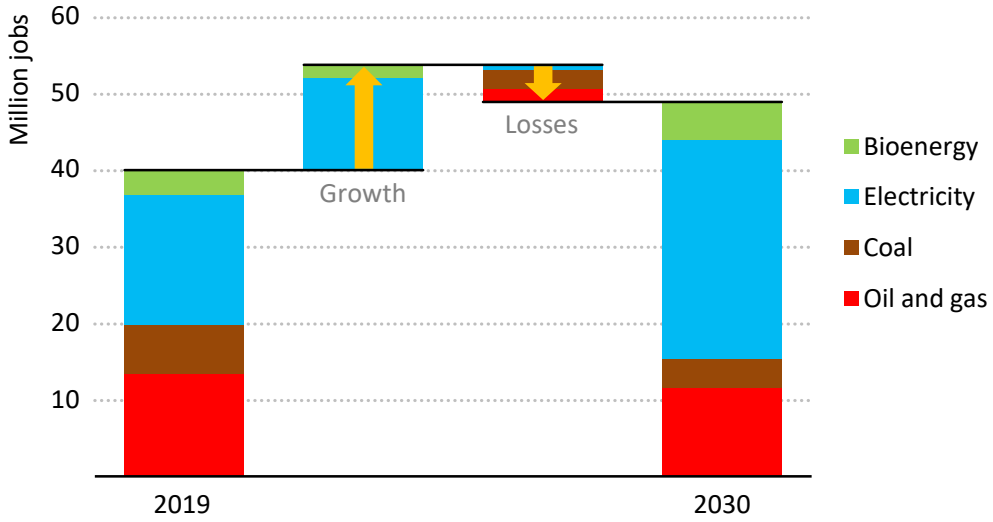
Building-integrated storage

Electric steam crackers

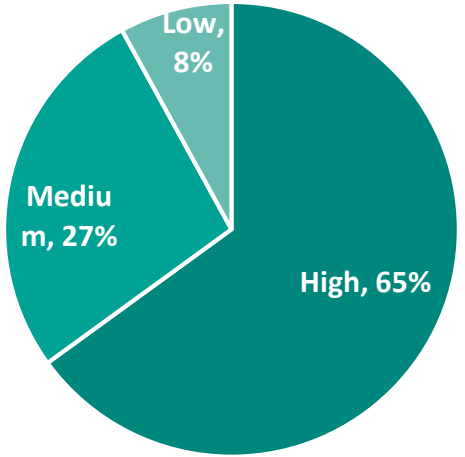
Unlocking the next generation of low-carbon technologies requires more clean energy R&D and $90 billion in demonstrations by 2030; without greater international co-operation, global CO_2 will not fall to net-zero by 2050.

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