



World Energy Transitions – 1.5C Pathway

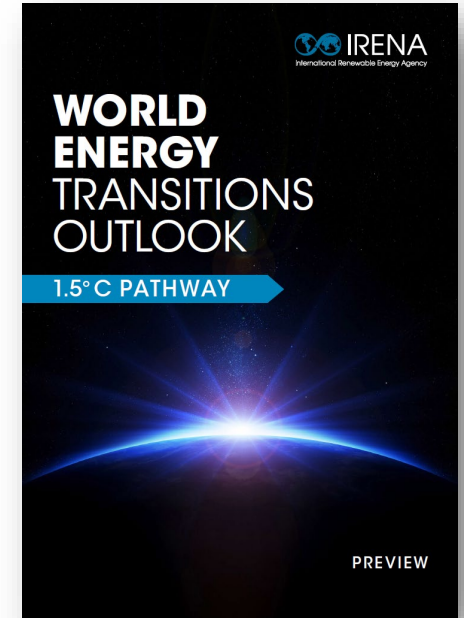
Dolf Gielen

Director, Innovation and Technology, IRENA

SIEW Energy Insights Webinar, 24 August 2021

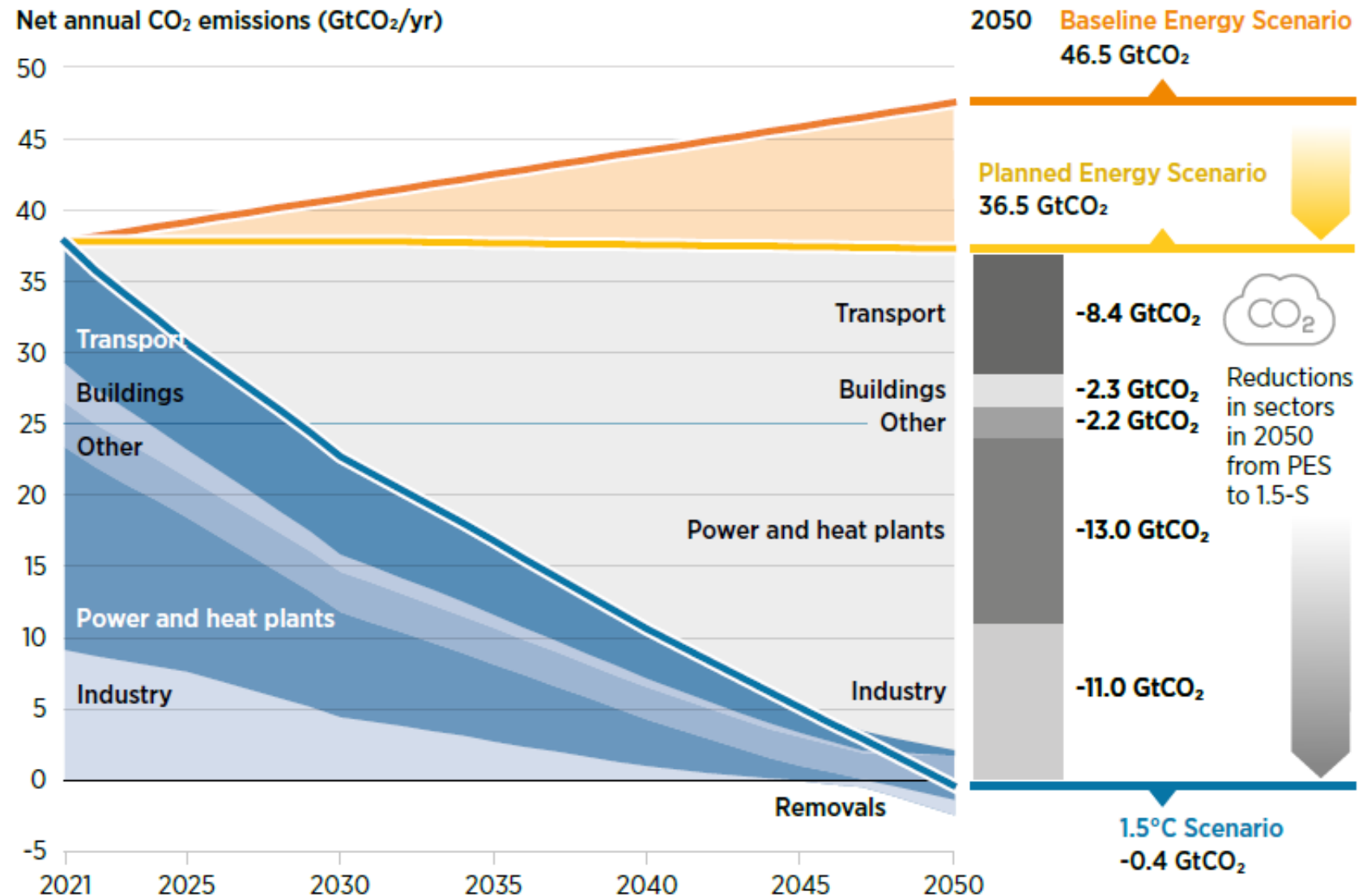
Key messages

- Leading scenarios agree on renewables as the key pillar of the transition
- Renewables to replace fossil power, largely due to falling costs
- Electrification with renewable power to replace petrol and diesel for road transport and fossil fuel heating systems
- Need to increase renewable power capacity additions 3-4 fold this decade
- USD 4.4 trillion needed per year from 2020-2050 for 1.5C
- Every dollar invested in the energy transition brings gains of 2-5.5 dollars
- Business models and markets need to adjust to the new environment



Net zero emissions by mid-century is still within reach, but the 2020s holds the key

- Baseline emissions continue to rise, while the policies of governments (Planned Energy Scenario) result in flatlining of emissions
- For the 1.5°C climate target, global CO₂ emissions need to drop to net zero by 2050
- Steepest decline necessary over the next 10 years – 2020 must be the decade of action

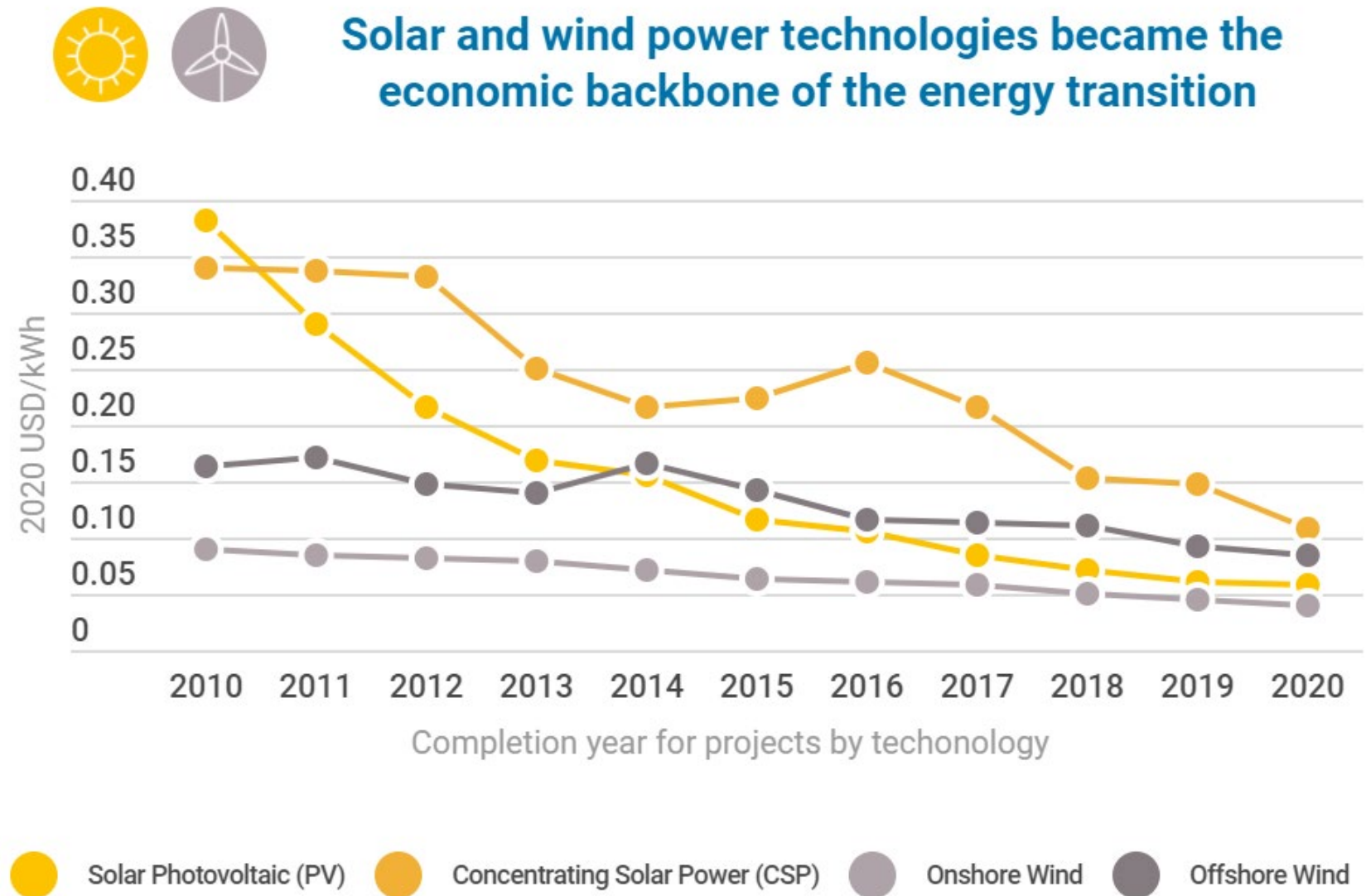




Falling power generation costs

Renewable energy costs declined rapidly over the last 10 years (2010-2020)

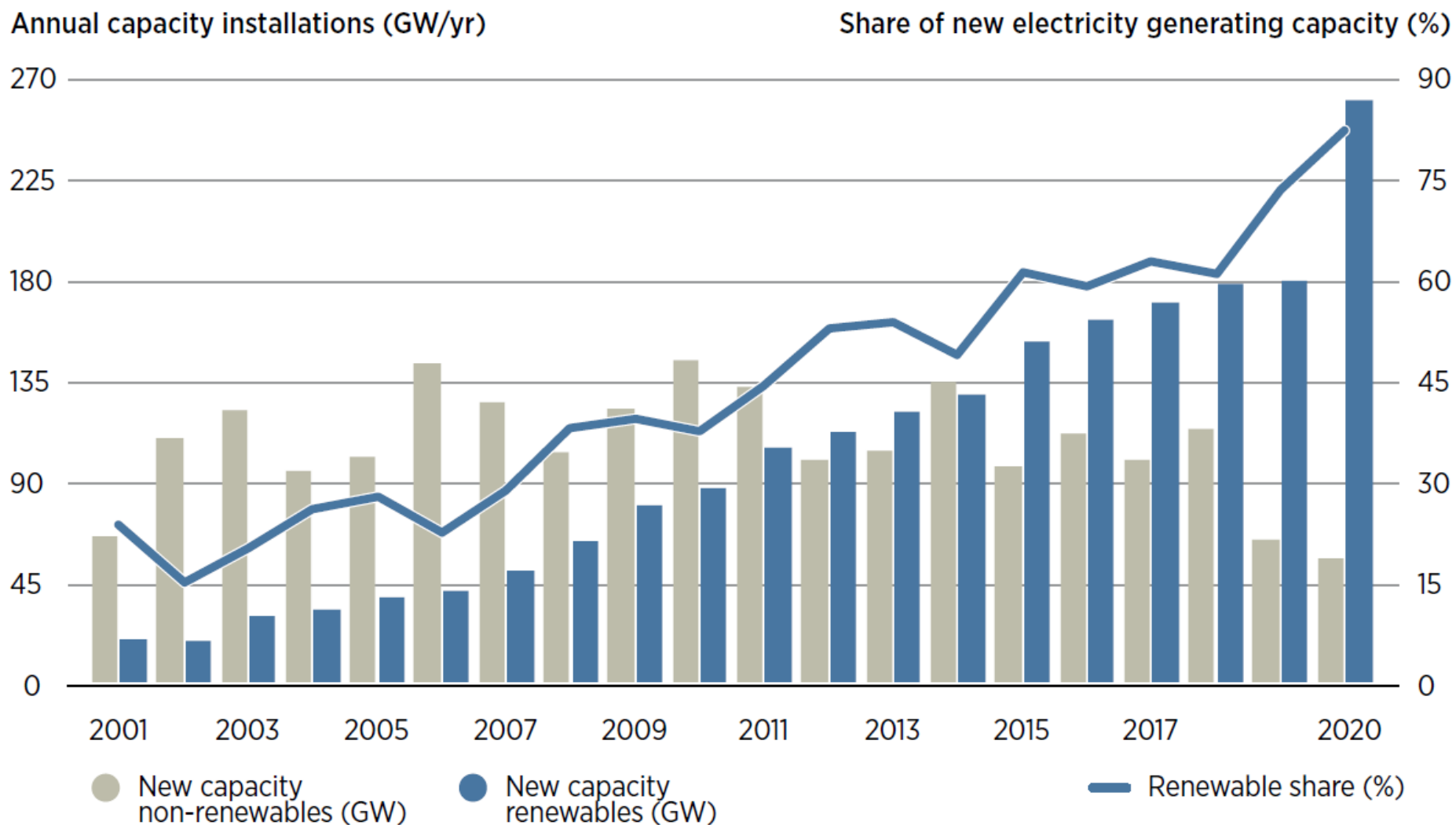
- RE generation cost decrease and increasing competitiveness
 - 2020 costs continued to fall
- Pledges from countries to reach net zero by 2050/2060
- Revolution ongoing in the transport sector
 - EVs
 - Shipping
 - Aviation





Renewable power outpacing fossil fuels

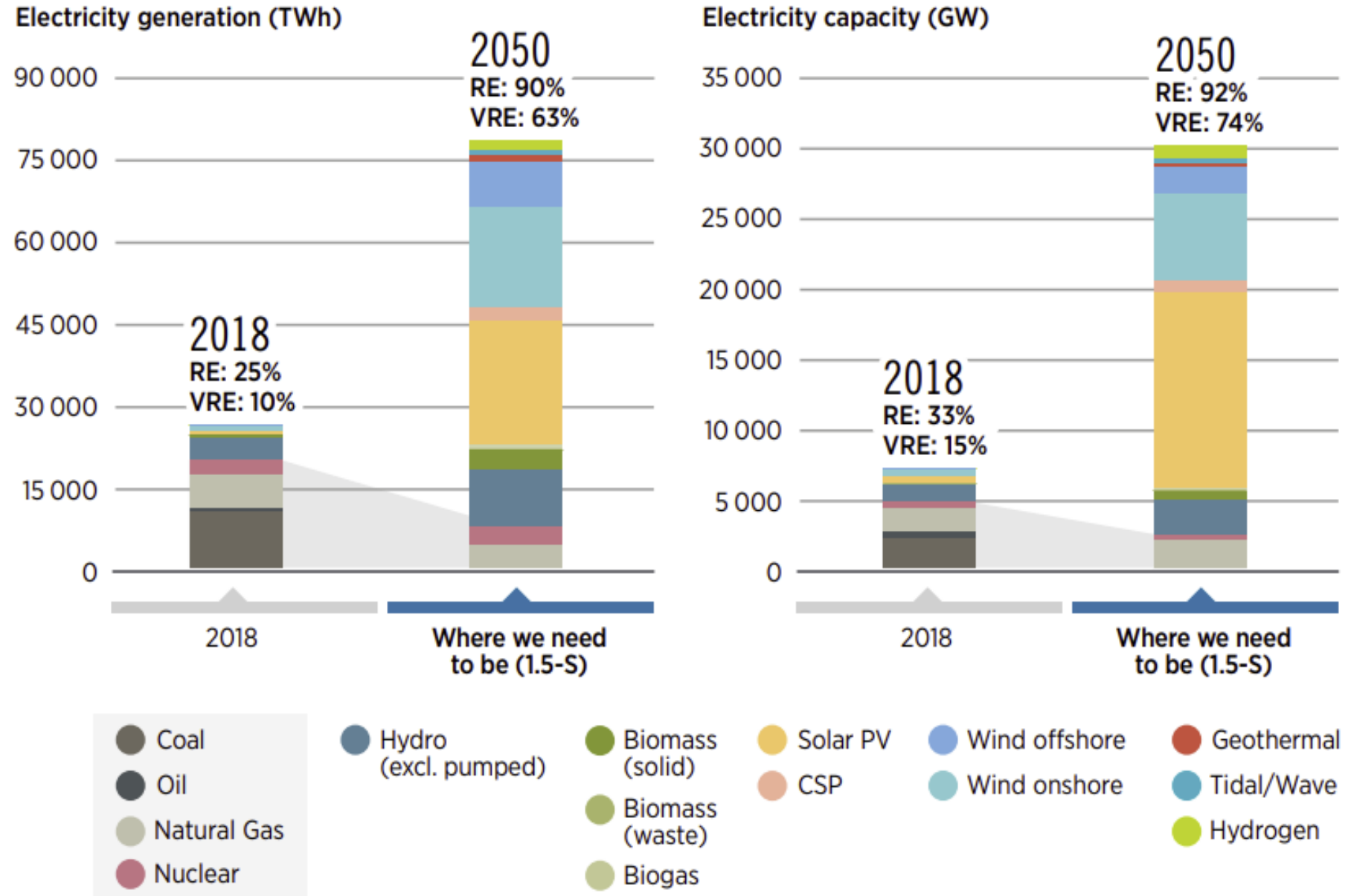
FIGURE S.1 Share of capacity, 2001-2020



For the past seven years, more renewable power was added to the grid annually than fossil fuels and nuclear combined.

Renewables will dominate the power generation mix

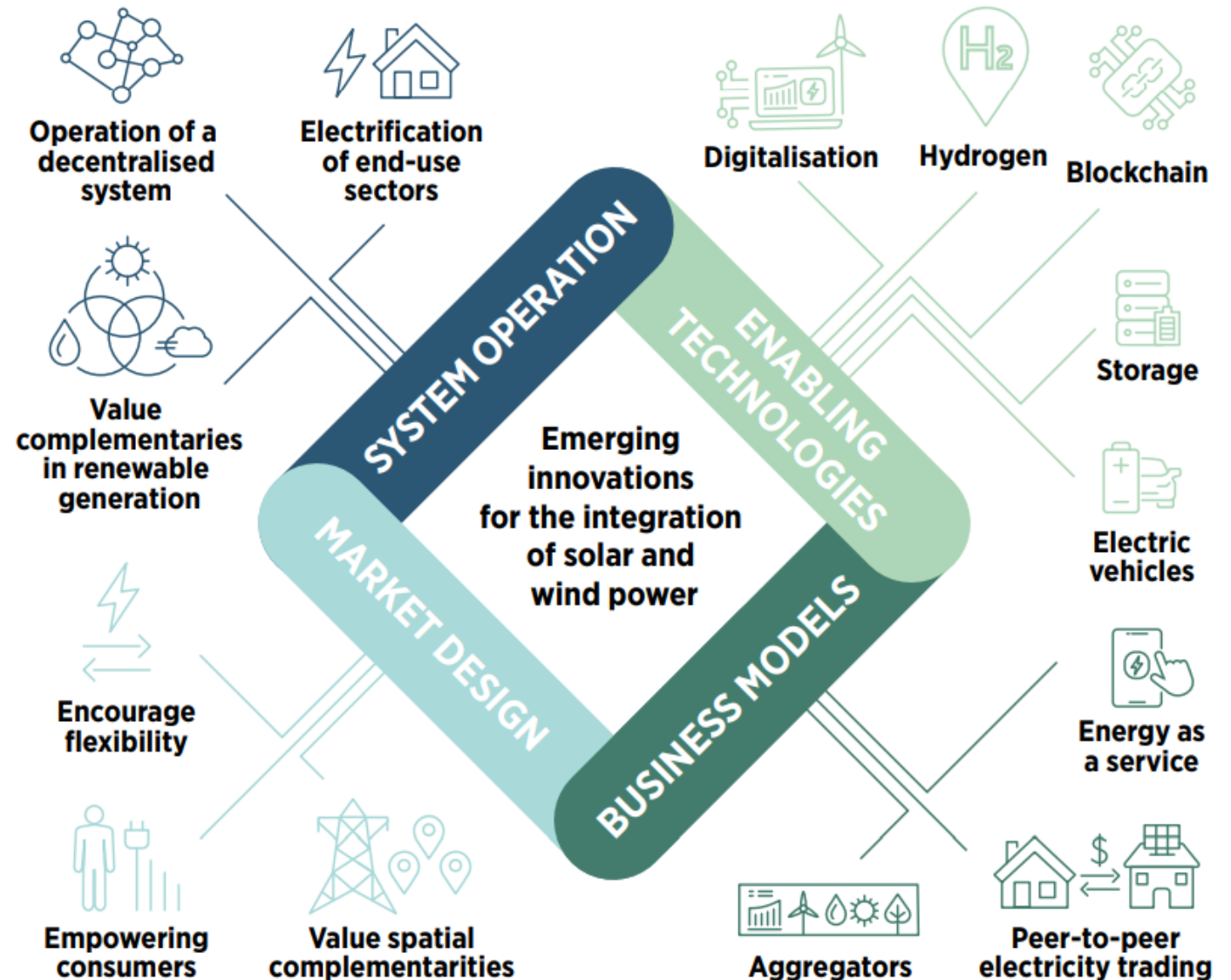
- By 2050, power generation triples compared to today's level, and renewables supply 90% of total electricity up from 25% in 2018.
- Limited role for nuclear as it is not least-cost zero carbon electricity.
- Fossil fuels in power will be greatly diminished, but natural gas will still exist and need to be combined with CCS.



Need for a systemic approach to enhance flexibility

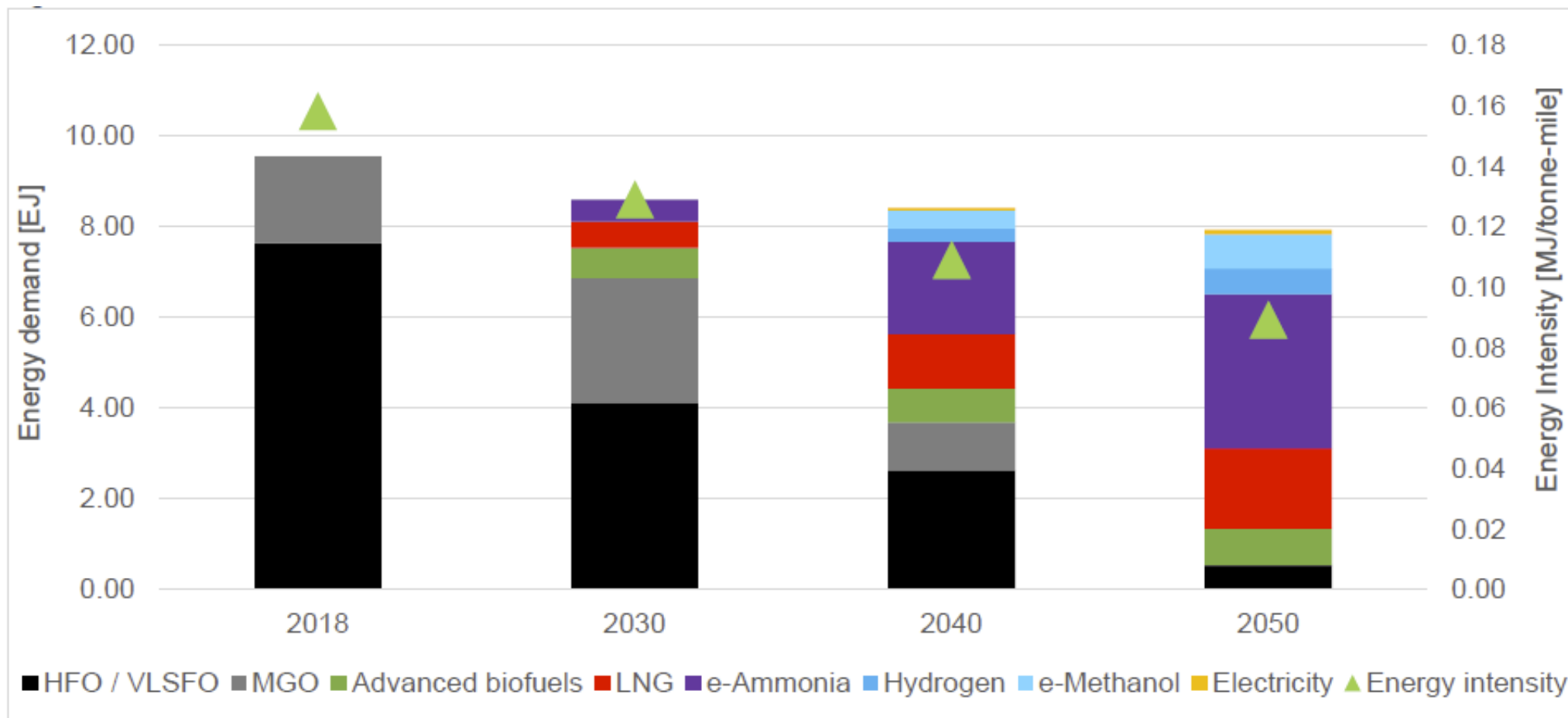
Increasing energy system flexibility

- Governments to create the enabling infrastructure (grids, EV recharging etc.)
- This creates new investment opportunities
- A key role for digitalisation and smart systems
- Changing supply and demand patterns and more variable electricity pricing create new business cases
- More attention for demand side flexibility

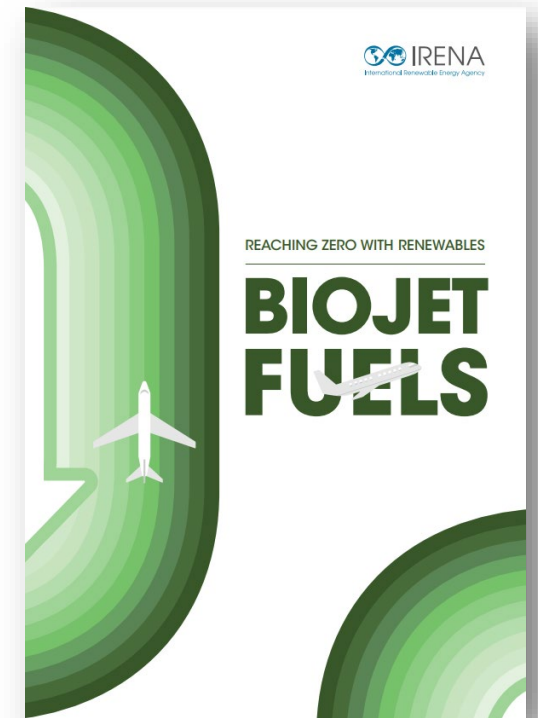




RE Ammonia to represent 43% of supply by 2050 (1.5C scenario)



- Biofuel and synfuels from renewables are a key part of the solution
- The aviation sector's emission reduction target of 50% is likely to require in excess of 100 billion litres per year of available biojet by 2050
- IRENA's 1.5°C Scenario estimates that about 200 billion litres per year of biojet fuel will be required
- Currently biojet fuel is 3-6 times more expensive than conventional jet fuel and is likely to be so for some time



July 2021



WORLD ENERGY TRANSITIONS OUTLOOK

1.5°C Pathway

Thank you!