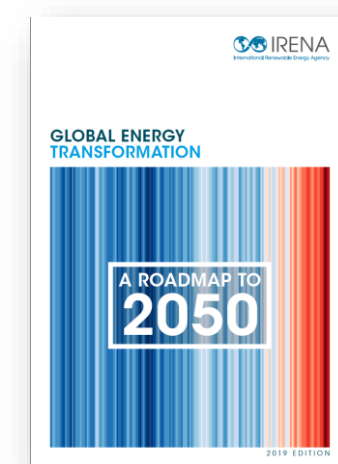


Dolf Gielen

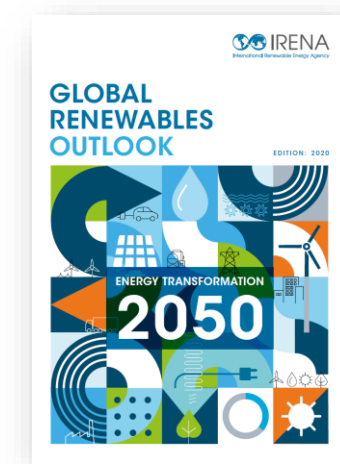
Director, Innovation and Technology, IRENA

The world knows what is needed for energy transition

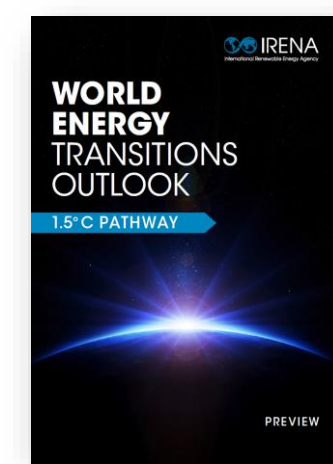
- Phase out coal power rapidly
- Accelerate deployment of renewable power significantly
- Enhance the flexibility of power systems to enable higher solar and wind shares
- Electrify transport & heating
- Use clean hydrogen where direct electrification is not possible
- Deploy bioenergy
- Apply CCS for remaining emissions including CDR/BECCS
- Use energy wisely and efficiently
- *There is a general agreement on these principles amongst experts*



2019
2 degrees scenario
Emissions -70% by 2050



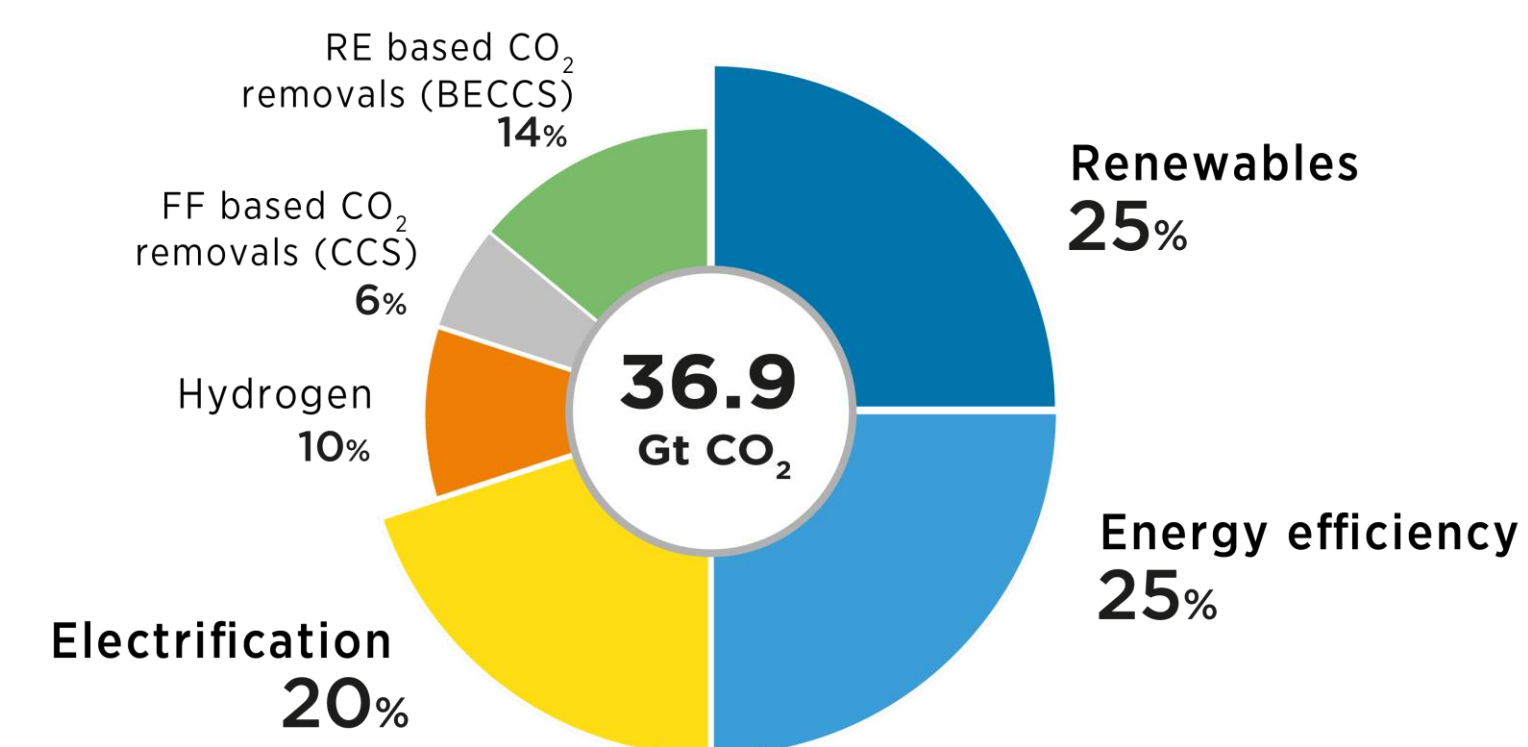
2020
2 degrees scenario
Emissions -70% by 2050



March 2021
1.5 degrees scenario
Net zero emissions by 2050

Renewables, efficiency and electrification dominate energy transition

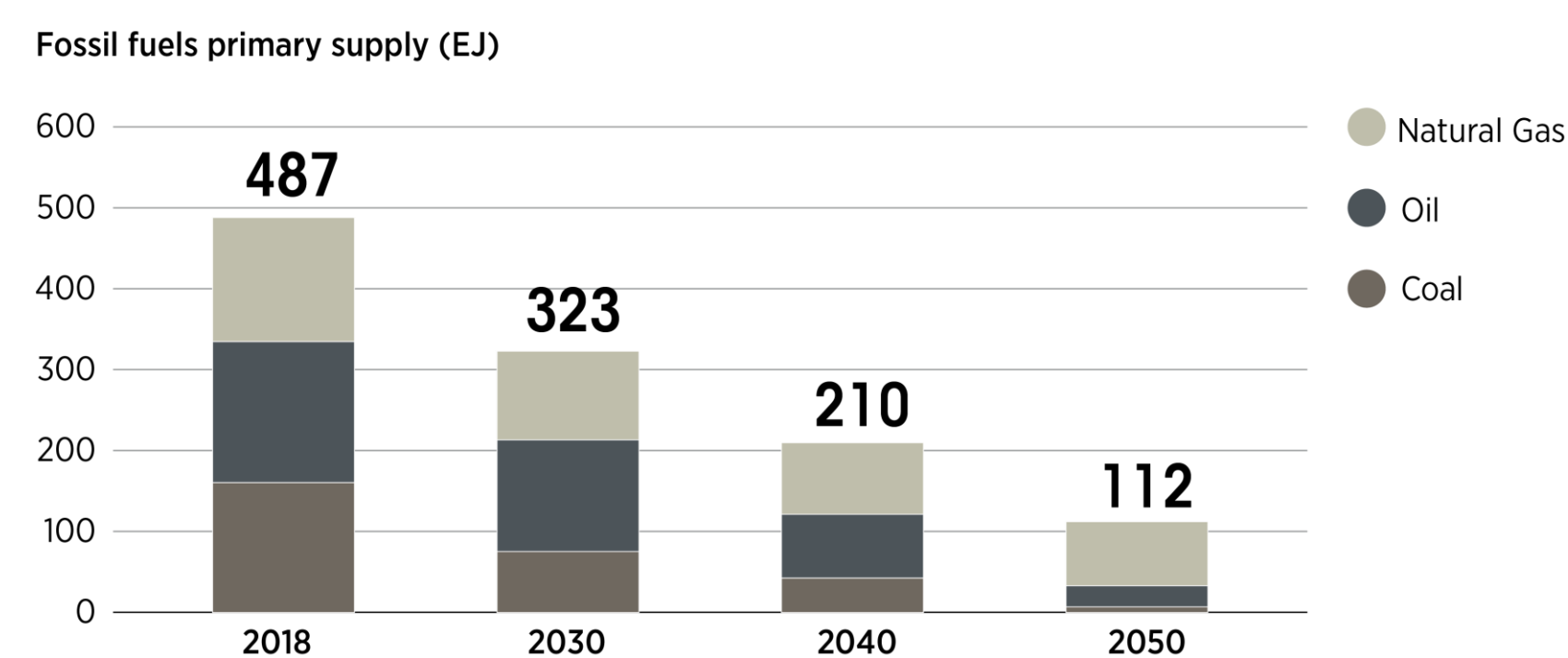
Six components of the energy transition strategy



90% of all decarbonisation in 2050 will involve renewable energy through direct supply of low-cost power, efficiency, electrification, bioenergy with CCS and green hydrogen.

IRENA analysis of leading scenario studies shows robustness of renewables based solutions:
<https://energypost.eu/18-energy-transition-scenarios-to-watch-where-they-agree-and-disagree/>

Declining importance of fossil fuels



Fossil fuel use could decline by more than 75% by 2050, based on the rapid transition measures starting now.

Global power supply projections in a 1.5C scenario

Growing electricity demand for green hydrogen production

By 2030, coal generation would halve and eventually would be phased out by 2050.

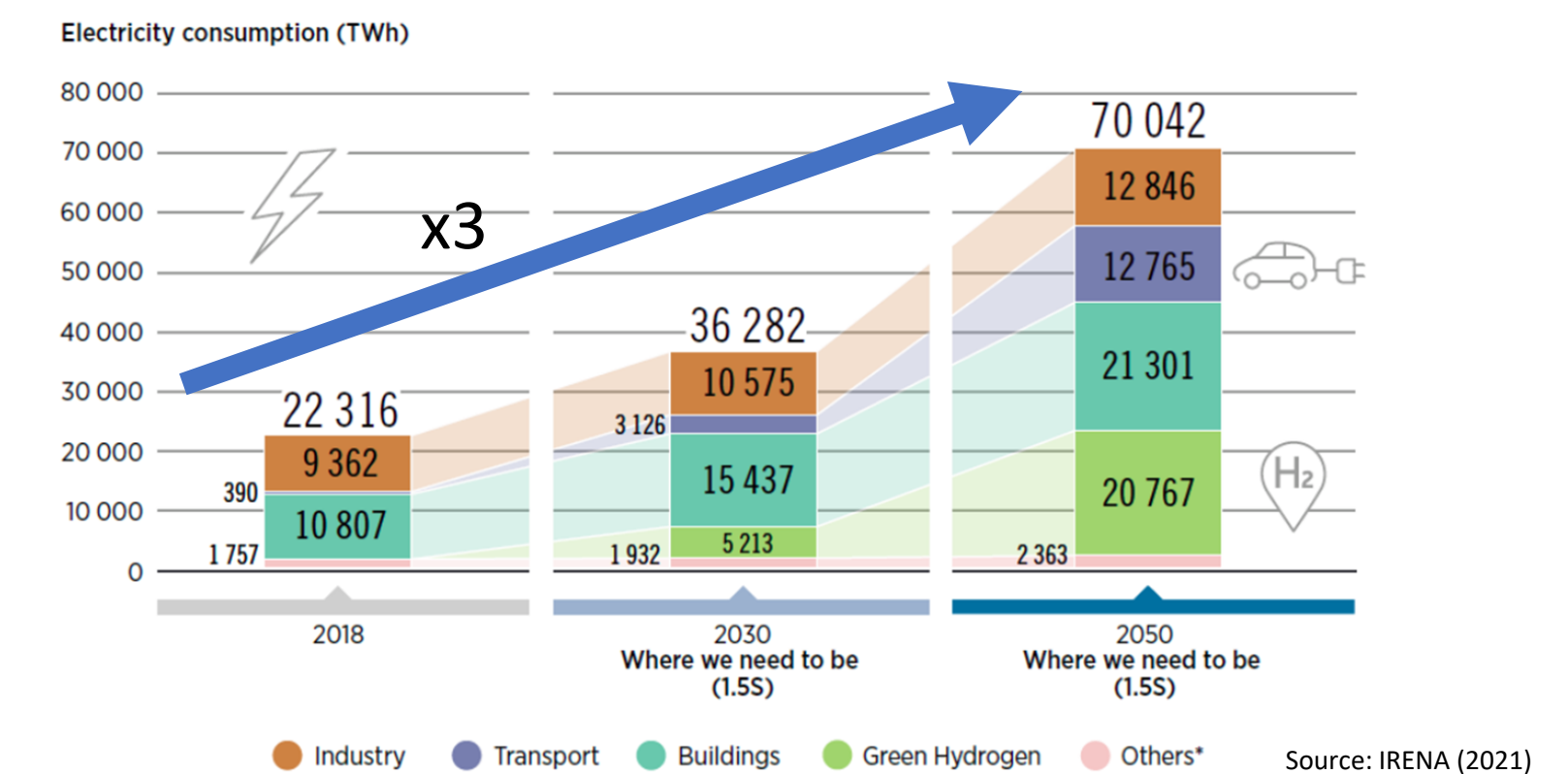
Global renewables capacity additions need to increase four-fold this decade.

The share of renewables would grow to 90% in 2050 from 25% in 2018.

VRE like wind and solar would grow to 63% of all generation in 2050, compared to 10% in 2018.

Such power systems will require increased flexibility.

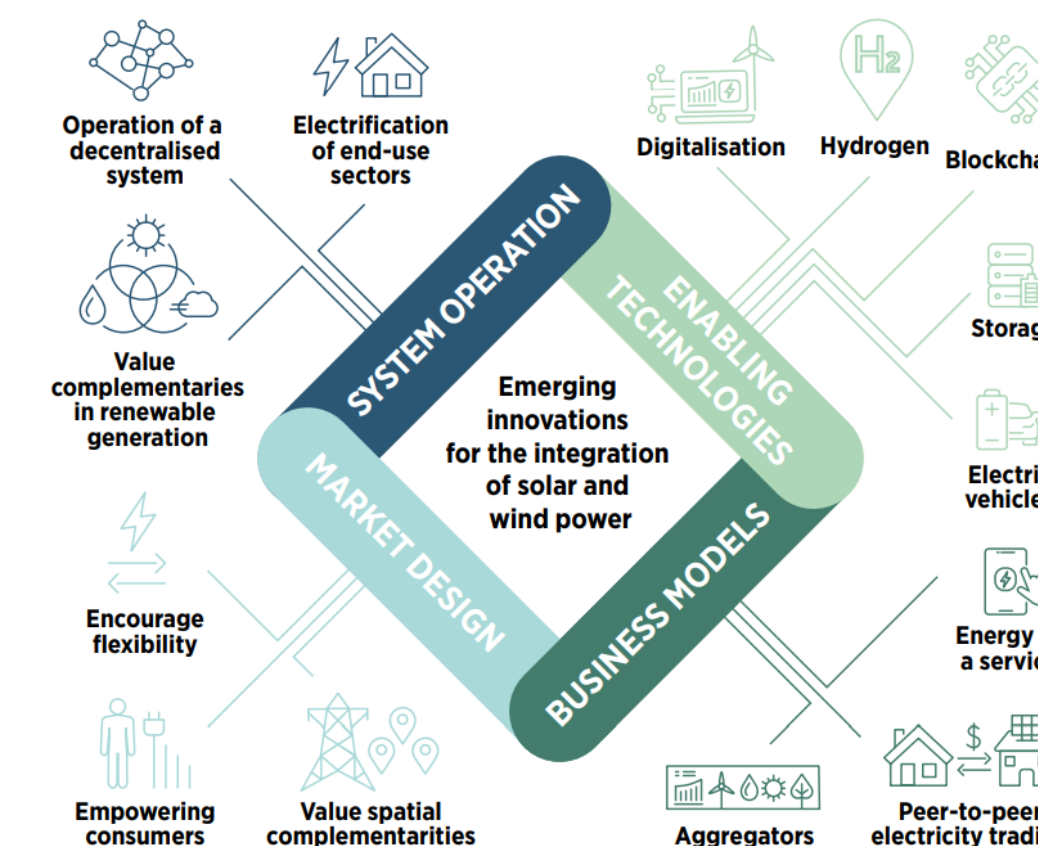
Electricity consumption by sector, 2018, 2030 and 2050 (TWh/yr) in the 1.5°C Scenario



Need for a systemic innovation approach

Increasing flexibility through:

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



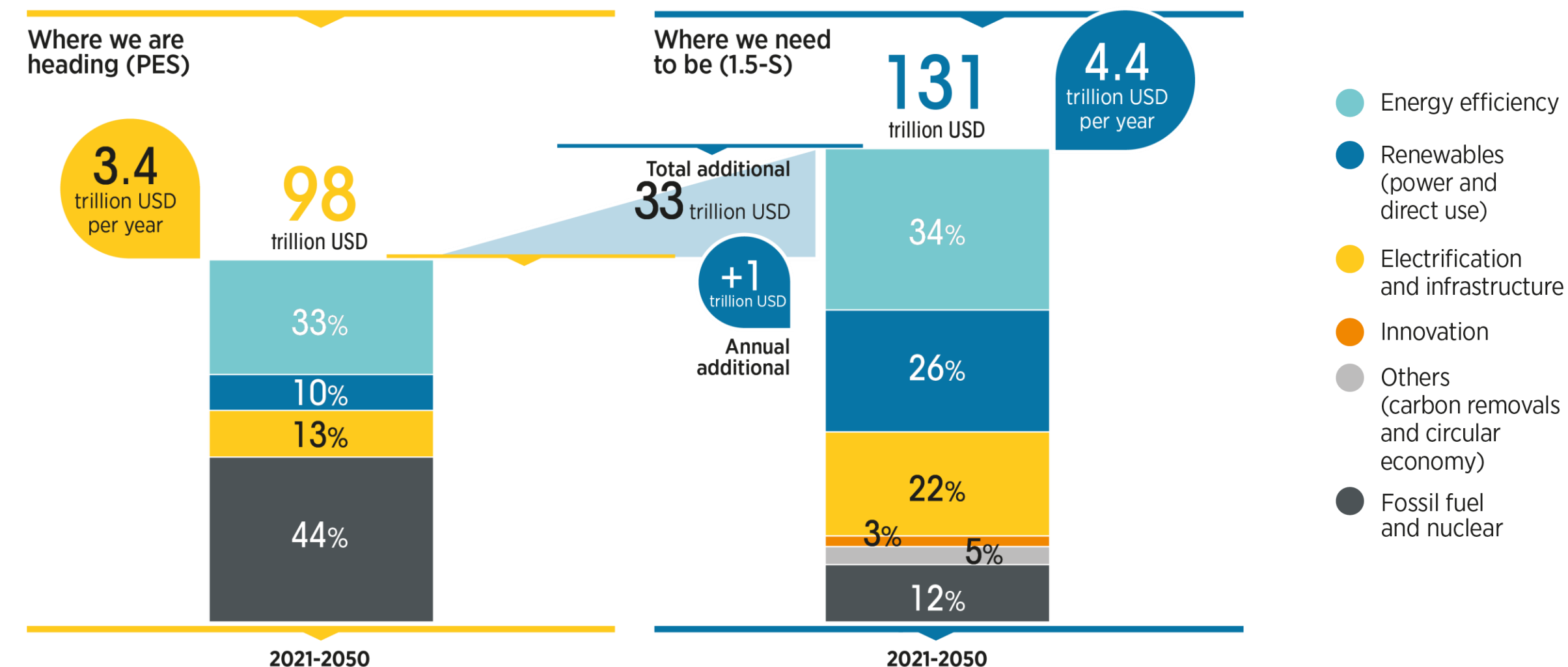
Based on IRENA (2019), Innovation Landscape for a Renewable-Powered Future: Solutions to Integrate Variable Renewables, International Renewable Energy Agency, Abu Dhabi.

Key takeaways

- Leading scenarios agree on renewables as the key pillar of the solution
- Reduce fossil fuel use significantly
- Renewable power to replace fossil power
- Electrification with renewable power to replace petrol, diesel and fossil fuel heating systems
- Need to increase renewable power capacity additions 3-4 fold this decade
- Need for a systemic innovation approach for power systems transformation
- Governments to streamline planning and roll-out of enabling infrastructure

Financing needs, socioeconomic and policy implications of IRENA 1.5 C Pathway will be released later this month see www.irena.org

New investment priorities: renewables, efficiency and electrification



A climate-safe future calls for the scale-up and redirection of investments towards energy transition technologies, away from fossil fuels.

Further reading

- <https://www.irena.org/newsroom/expertinsights/2021/April/Leaders-Summit-The-Energy-Transition-Priorities-Needed-for-a-1-5C-Future>
- <https://www.weforum.org/agenda/2021/05/net-zero-carbon-future-2050-irena-energy-transition/>
- <https://www.weforum.org/agenda/2021/05/china-decoupling-gdp-growth-rising-emissions-climate-change-economics/>
- <https://www.weforum.org/agenda/2021/04/why-renewables-are-the-cornerstone-of-the-energy-transition/>
- <https://www.smart-energy.com/renewable-energy-irena-no-successful-global-energy-transition-without-innovation/>
- <https://energypost.eu/18-energy-transition-scenarios-to-watch-where-they-agree-and-disagree/>