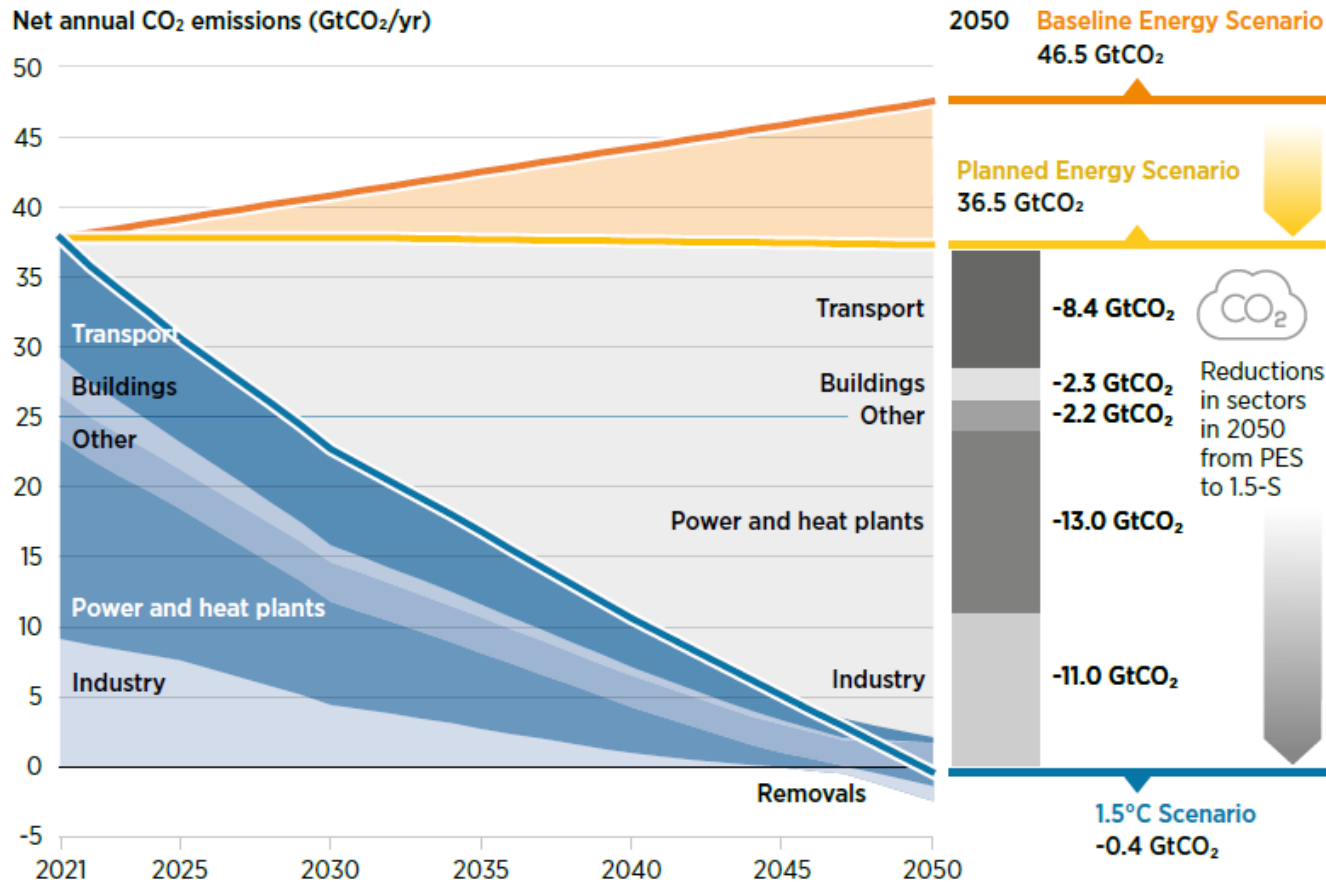




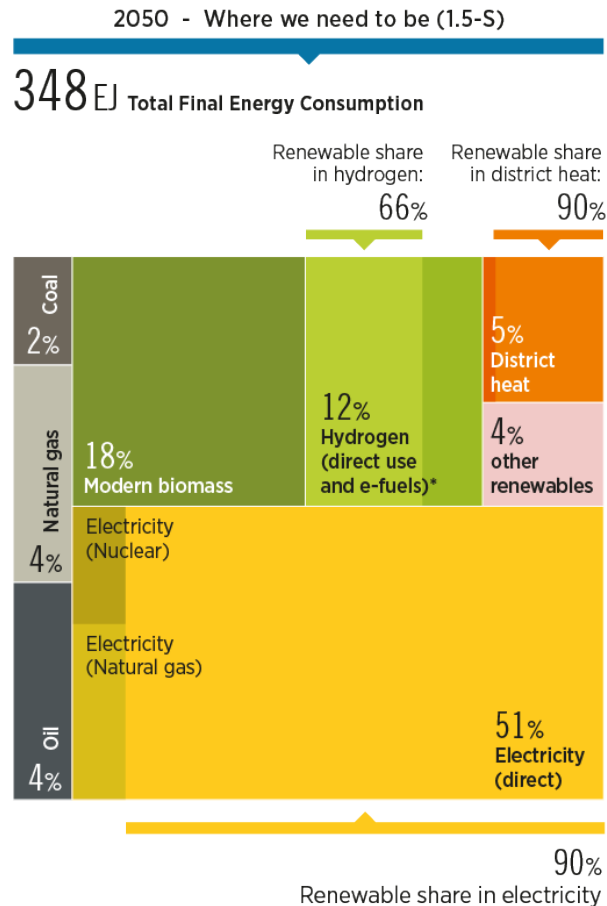
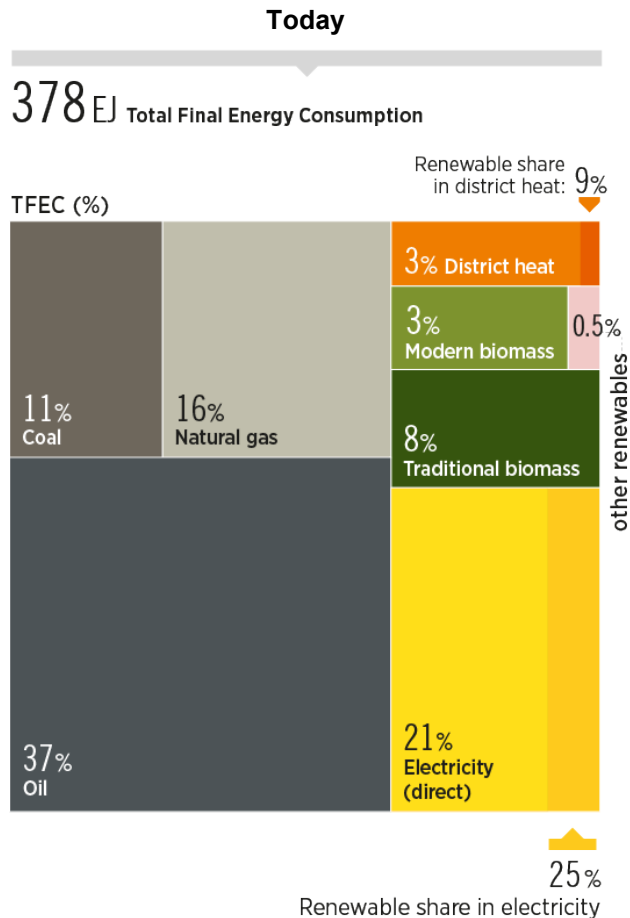
EIA Clean Power Investment Workshop, 23 June 2022

Net zero emissions by mid-century



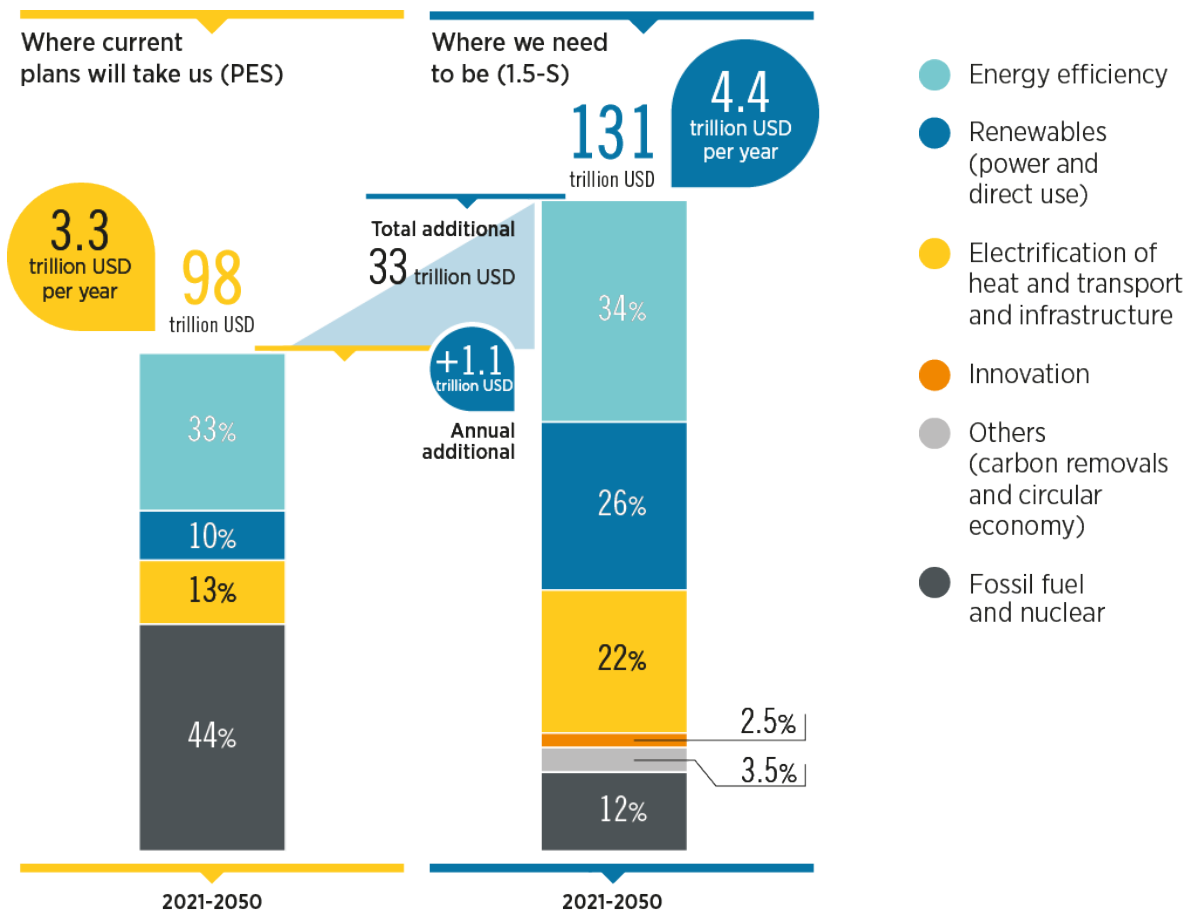
- Baseline emissions continue to rise, while the policies of governments (Planned Energy Scenario) result in flatlining of emissions
- For the 1.5°C climate target, global CO₂ emissions need to drop to net zero by 2050
- Steepest decline necessary over the next 10 years – 2020 must be the decade of action

Where we are and where we need to be (2050)



- By 2050, electricity would be the main energy carrier with more than a 50% direct share of total final energy consumption – up from 21% in 2018.
- By 2050, 90% of total electricity needs would be supplied by renewables followed by 6% from natural gas and the remainder from nuclear.
- Another 8% of final energy would come as indirect electricity in the form of e-fuels and hydrogen.

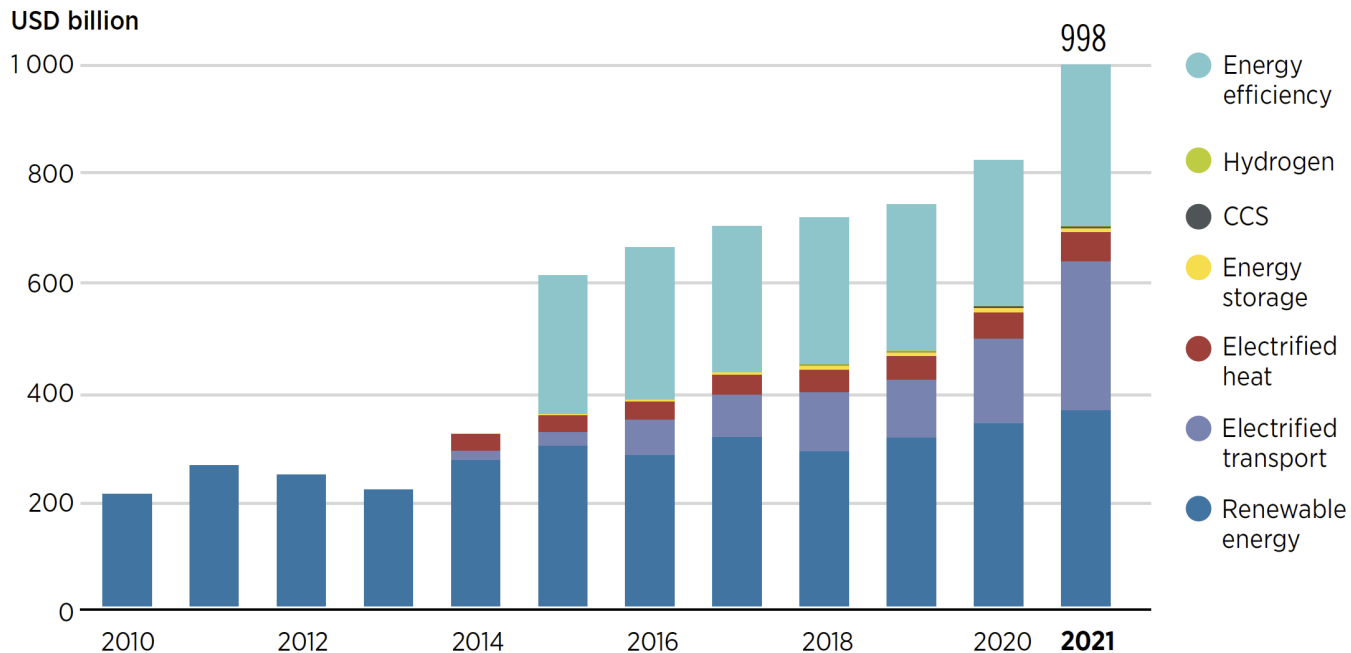
New investment priorities: renewables, efficiency and electrification



- Energy efficiency
- Renewables (power and direct use)
- Electrification of heat and transport and infrastructure
- Innovation
- Others (carbon removals and circular economy)
- Fossil fuel and nuclear

- A climate-safe future calls for the scale-up and redirection of investments towards energy transition technologies, away from fossil fuels.
- Accelerating the pace of the energy transition and scaling up investments in energy transition technologies in all sectors hinges on what the world does between 2021 and 2030. Setting the right investment priorities is key.

Investments in energy transition technologies continue to grow



Source: BNEF, 2022; IEA, 2021.

In 2021, energy transition-related investment was just shy of USD 1 trillion, a 21% increase from the year before

Renewable energy was still the largest sector as it attracted USD 366 billion (excluding large hydro), up 77% from the previous year

Despite their relatively steady growth, investments remain concentrated in a handful of regions and countries

Deployment and integrating policies

Key Indicators	Historical	Where we need to be (1.5°C Scenario)	
	2018	2030	2050

TECHNOLOGY OUTLOOK

Total power generation	26 379 TWh	42 189 TWh	78 698 TWh
Total installed capacity	7 109 GW	14 266 GW	30 229 GW
RE share in power generation	25%	65%	90%
VRE share in power generation	7%	42%	63%
RE share in installed power capacity	33%	76%	92%
Renewables, total installed capacity	2 353 GW	10 771 GW	27 799 GW
Wind, onshore	540 GW	2 955 GW	6 172 GW
Wind, offshore	24 GW	382 GW	2 002 GW
Solar PV	481 GW	5 221 GW	14 036 GW

RENEWABLES (POWER)

Key Indicators	Historical	Where we need to be (1.5°C Scenario)	
	2017-2019	2021-2030	2031-2050

INVESTMENTS

Renewable power generation capacity	253 USD billion/yr	1 045 USD billion/yr	897 USD billion/yr
Power grids and energy flexibility	275 USD billion/yr	648 USD billion/yr	775 USD billion/yr

RENEWABLES (POWER)

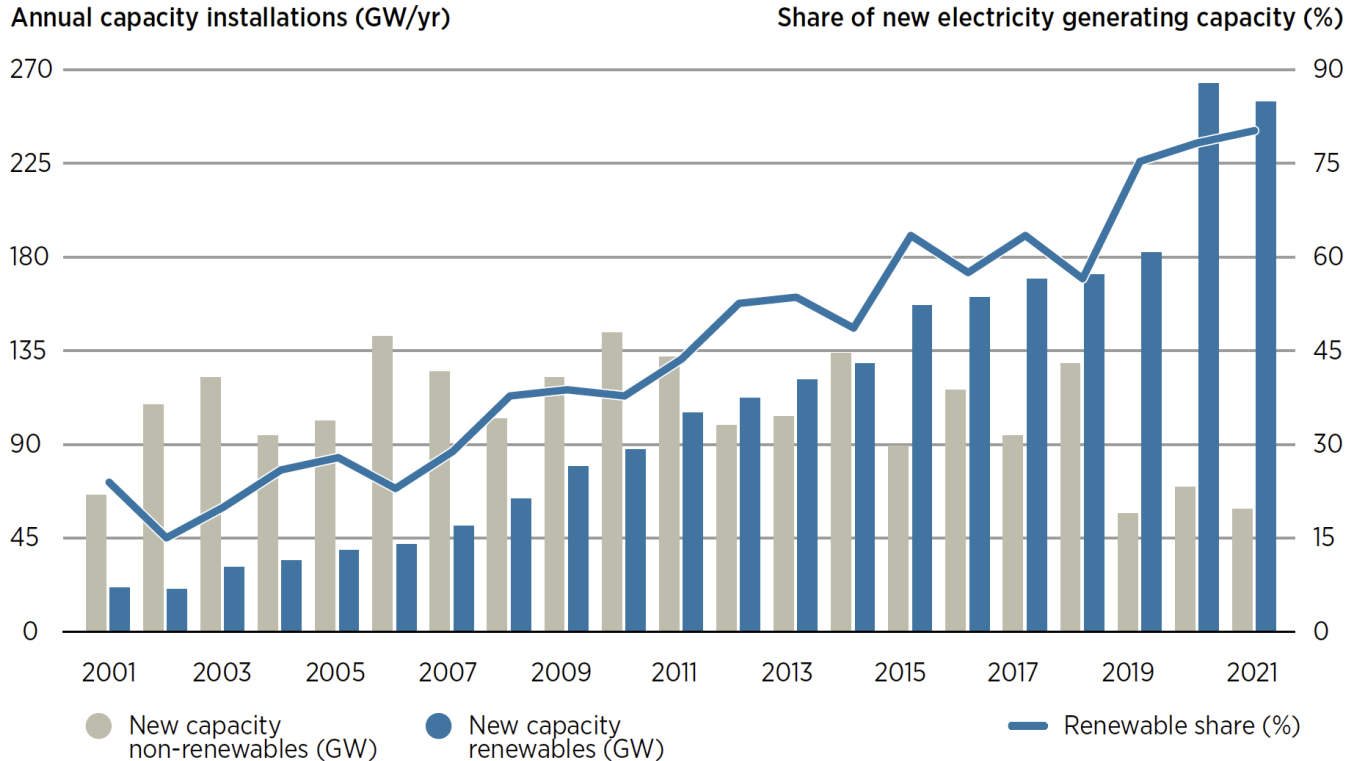
Avoided CO₂ emissions in the 1.5°C Scenario compared to the PES in 2050:

Contribution to total energy sector avoided CO₂ emissions in the 1.5°C Scenario compared to the PES in 2050:

CO₂ EMISSION ABATEMENT

Renewables (power)	6 Gt CO ₂ /yr	Renewables could decarbonise 90% of the power sector by 2050. 16%
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Share of new electricity capacity, 2001-2021

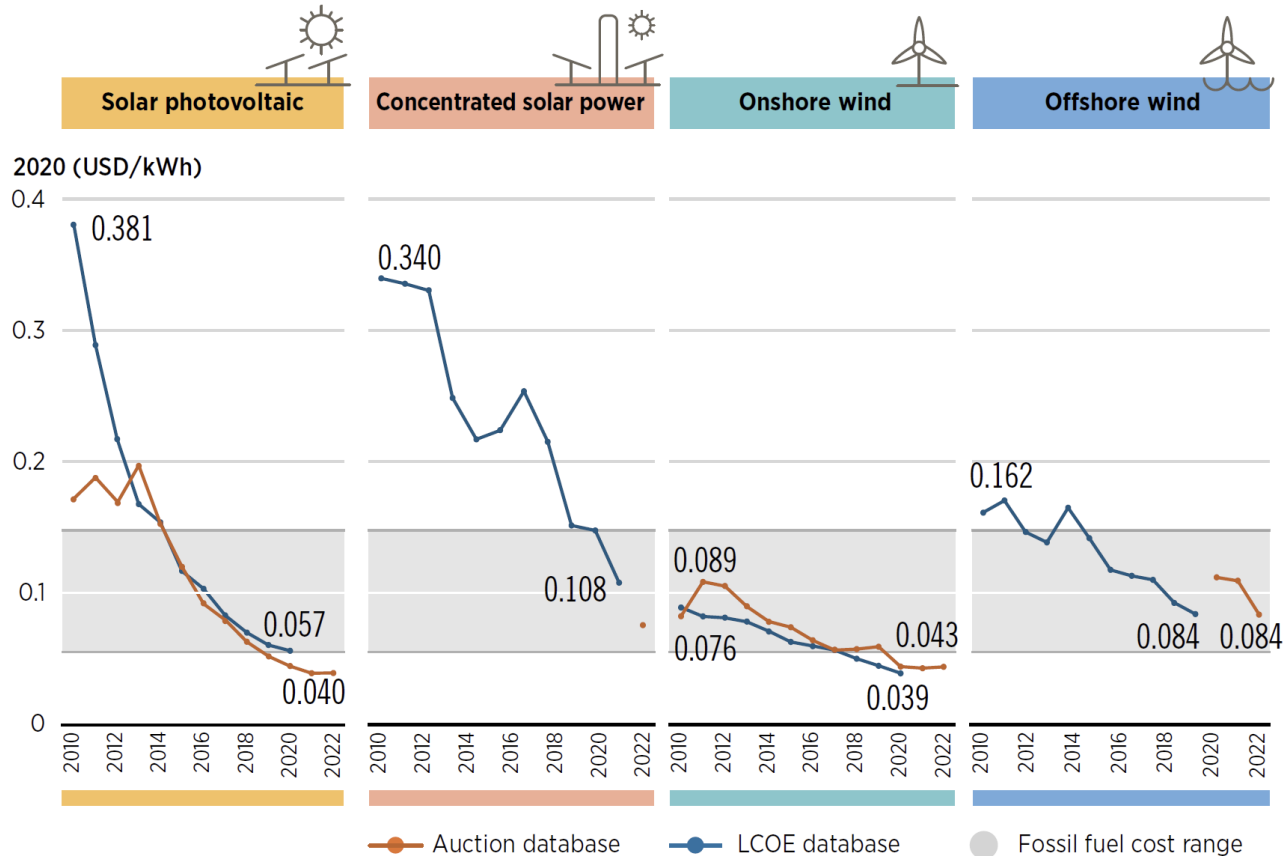


Over the past decade, renewables capacity increased by 130%, while non-renewables only grew by 24%

Renewable electricity capacity additions have been outpacing those of non-renewables since 2014, with solar PV and onshore wind power dominating the growth

To meet the 1.5°C Scenario, installed capacity will have to more than triple by 2030

Renewables are the lowest-cost sources of electricity in many markets



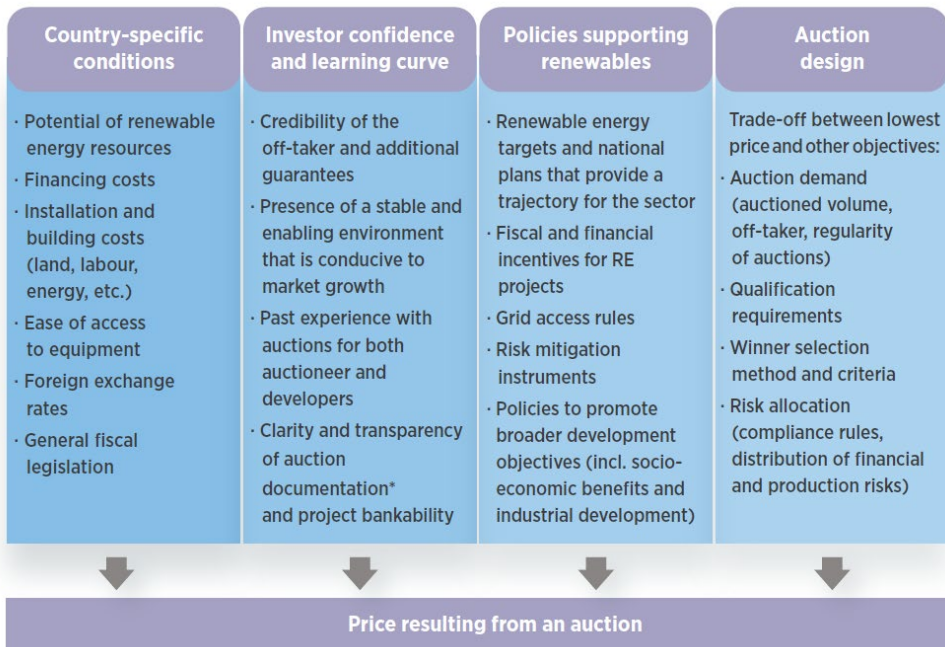
The global weighted-average LCOE of newly commissioned utility-scale solar PV projects fell by 85% between 2010 and 2020

CSP by 68%, onshore wind by 56% and offshore wind by 48%.

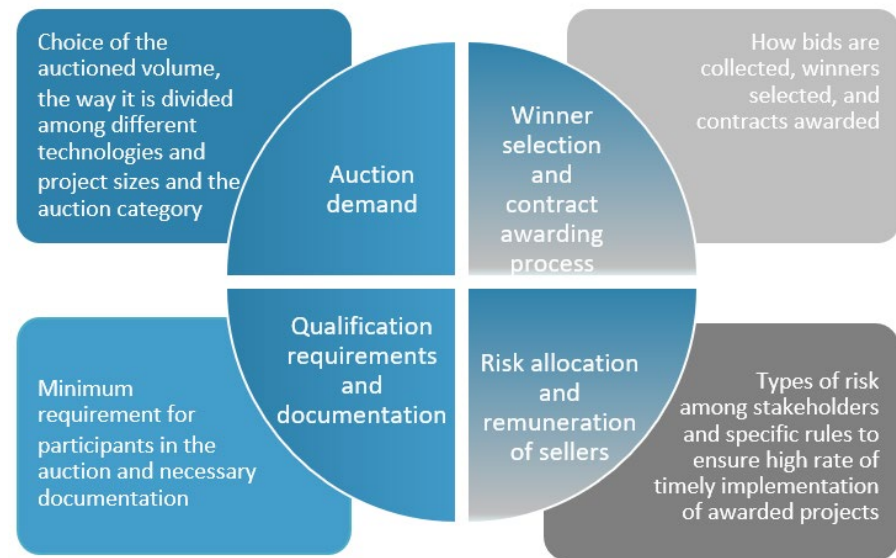
All commercially available solar and wind technologies fall in the range of, or even undercut, the cost of electricity from new fossil-fuel plants.

Design of deployment policies integrated with public investments – Auctions

Auctions - Factors that impact the price of renewable power



Auction design elements – trade off between price and other objectives



Enabling policies and international collaboration

Enabling policies

Commitments and targets

- Renewable energy targets and NDCs
- Institutions
- Commitments to curb investments in fossil fuels

Measures to eliminate distortions

- Phase out fossil fuel subsidies
- Carbon pricing

Public investments

- Infrastructure
- R&D, pilot projects and innovation
- Education and training
- Risk mitigation and access to finance
- Other

Measures to increase energy efficiency

- Targets
- Quotas and mandates
- Appliance specifications

Measures to raise awareness

- Publicly funded campaigns

International collaboration

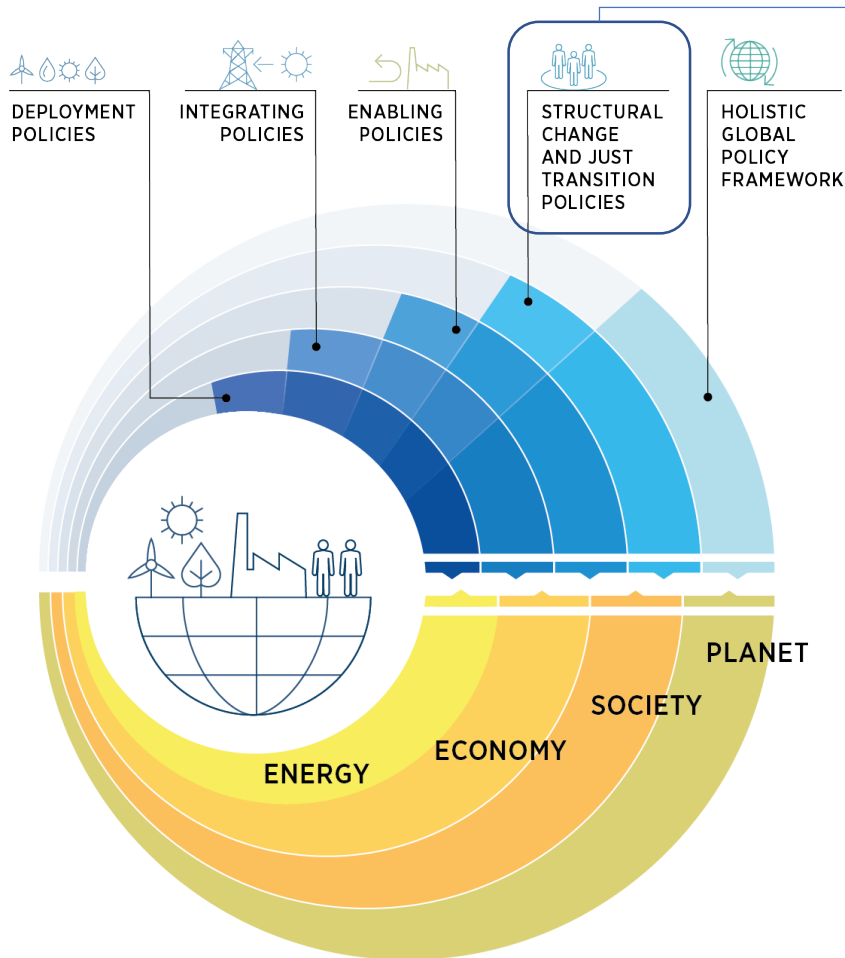
Commitments and targets

- Commitments made by the international community including halting FF investments

Public investments

- International flow of public financing including for technology transfer and capacity building
- Multilateral development banks
- Risk mitigation

Comprehensive policy framework for a just energy transition



Challenges and potential misalignments

Finance	Power system structures
Structural dependencies	Labour markets
Fossil fuels and commodities	Job misalignments
Technology	Decent jobs agenda
Supply chains	Diversity needs
Trade	

- Costs are not always what they seem to be
- How to account for externalities
- How to account for public policy and investments
- If we continue to depend on markets, investments will continue flowing to the same technologies and countries
- How are the benefits measured (e.g., welfare)



WORLD ENERGY TRANSITIONS OUTLOOK

1.5°C Pathway

Thank you!