The Sectoral Solution to Climate Change

Energy systems

According to the UNEP Emissions Gap report GHG emissions must be cut by **at least 28 to 42 per cent** compared to current policy scenarios to get on track for the below 2°C and 1.5°C goals of the Paris Agreement Implementing a just, equitable and clean energy transition could cut greenhouse gas emissions and create millions of jobs, reduce energy poverty, and keep net zero within reach.

As highlighted in the Global Stocktake outcomes, Parties are called on to **triple renewable energy capacity** globally, **double** the global average annual rate of **energy efficiency** improvements by 2030, accelerate efforts towards the phase-down of unabated coal power, net zero emissions energy systems, zero and low-emissions technologies, transition away from fossil fuels, substantially reducing non-carbon-dioxide emissions globally, accelerate the reduction of emissions from road transport on a range of pathways, and phase out **inefficient fossil fuel subsidies** that do not address energy poverty or just transitions, as soon as possible.

The global energy sector, with its multifaceted infrastructure – from power plants to transmission lines – is highly susceptible to potentially devastating impacts of extreme weather events. Ensuring resilience in the energy sector will be important to help the world adapt to the impacts of climate change.

Key messages

- The world needs to **triple renewable energy capacity and double global annual rate of energy efficiency progress**, propelling the global move towards energy systems free of unabated fossil fuels to put countries on track to achieve net-zero emissions by mid-century.
- Renewable energy, especially distributed solutions, are vital to protect communities from climate change.
- The financing gap for renewable energy is **USD 724-774 billion** per year. International financial assistance will have to be significantly scaled up, with new public and private sources of capital restructured through financing mechanisms that lower costs of capital.
- Energy efficiency is a crucial and cost-effective action that enhances energy availability while reducing externalities.
- The installed capacity of refrigeration and air conditioning equipment is **predicted to triple by 2050**. To avoid a similar growth in GHG emissions, we need to **adopt strategies to reduce cooling demand**, introduce improved passive cooling designs, introduce higher energy efficiency standards, and support accelerated phasedown of hydrofluorocarbon in cooling equipment.
- Accelerated reduction of emissions by high income countries is an urgent priority. However, this will not be sufficient, given that low- and middle-income countries already account for more than **two thirds of global GHG emissions** today.
- It is essential that energy sector transformation in these countries are **aligned with meeting pressing development needs**.
- Energy transitions in low- and middle-income countries can help to provide universal access to energy for the **733 million people who lack access to electricity**, lift millions out of poverty, improve healthcare and education, create new jobs, meet the basic energy needs of people and this would have a limited impact on global GHG emissions.
- Over the past decade **mitigation technologies have become increasingly available**, unit costs of several low-emission technologies have fallen continuously, notably wind power and solar power and storage, while recognizing the need to increase the affordability and accessibility of such technologies.
- The energy transition will significantly increase the demand for specific and often **rare minerals and metals** needed for production of wind, solar and energy storage technologies.
- Methane emissions from the energy sector must be reduced significantly. –As a minimum be aligned with the goal **30 per cent reduction of the Global Methane Pledge**, which was signed by more than **150 countries**.

Further Reading

Emissions Gap Report 2023

Production Gap Report 2023

Country Savings Assessments

Cooling Emissions and Policy Synthesis Report

An Eye on Methane: International Methane Emissions Observatory 2023 Report

Theme Report on Energy Transition (IRENA, UNEP, ESCAP, 2021)

Renewables 2023 Global Status Report (GSR)

Global Methane Assessment

The Imperative of Cutting Methane from Fossil Fuels

Methane Roadmap Action Programme (M-RAP)

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Key data

- Energy is the dominant source of GHG emissions, currently accounting for **86 per cent of global CO_2 emissions** (EGR 2023).
- CO_2 emissions should be **halved by 2030** to have a chance of meeting the objectives of the Paris Agreement (EGR 2023).
- Global primary energy consumption expanded in 2022 – an expansion mainly met by a growth in coal, oil and renewable electricity supply (EGR 2023).
- More than **50 per cent of electricity worldwide** is consumed by just five product groups – lighting, refrigeration, room air conditioners, electric motors, and distribution transformers (UNEP, 2022).
- The world requires **three times more renewable power capacity** by 2030 (EGR 2023).
- **Solar and wind energy** have grown dramatically, but global shares remain low relative to other sources. Electricity from solar and wind is now cheaper than electricity from fossil sources in most regions (IPCC, 2022).
- Investment in clean energy has risen by **40 per cent since 2020**. But to reach net zero emissions by 2050, annual clean energy investment worldwide will need to more than triple by 2030 to around $4 trillion (IEA,2023).
- **Cooling measures** to improve efficiency and passive cooling, and a phase down of climate warming gases used in cooling equipment, could reduce the projected 2050 emissions from business-as-usual cooling by over 60 per cent – around 3.8 billion tons of CO_2e (UNEP, 2023).
- Anthropogenic methane emissions drive roughly **30 per cent of the global warming** that we experience today (UNEP, 2023).
- The total spending required to deploy all **available methane mitigation strategies** in the fossil fuel sector until 2030 is less than two per cent of the net income earned by the industry in 2022 (UNEP, 2023).