CLIMATE POLICY DRIVES SHIFT TO RENEWABLE ENERGY

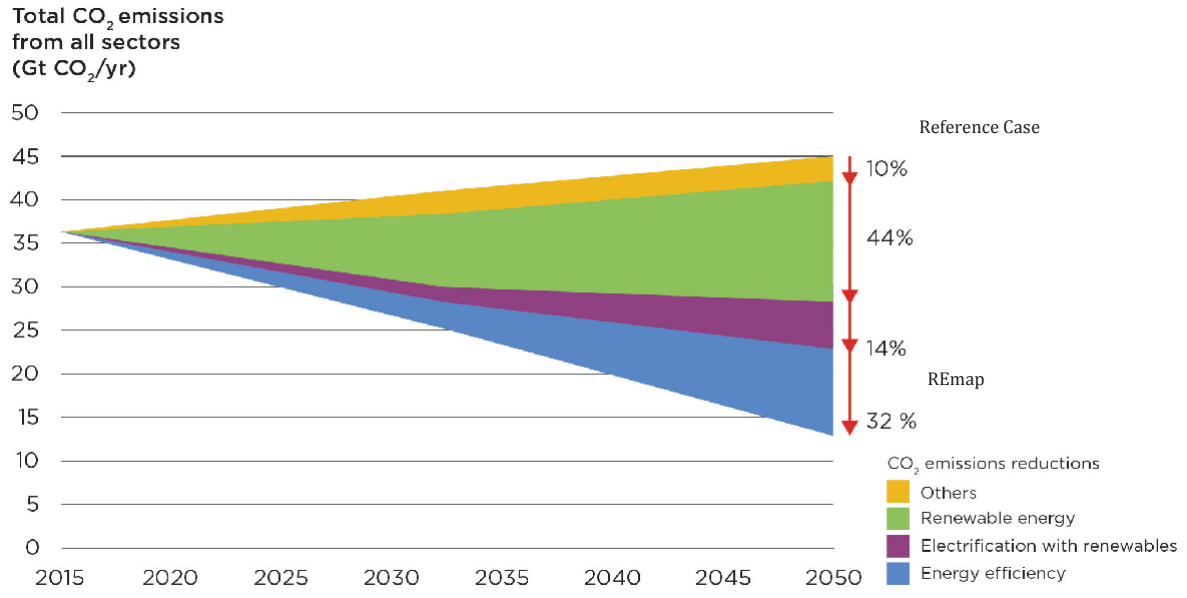
Decarbonisation of the energy sector requires urgent action on a global scale. While a global energy transition is under way, further action is needed to reduce carbon emissions and mitigate the effects of climate change.

The urgent need for action on decarbonisation is apparent, as the world has already experienced nearly 1°C of global warming, with temperatures rising steadily over the past 25 years at 0.03°C per year. Under the Paris Agreement, the global community has agreed to limit temperature rise to well below 2°C, with the aim of limiting it to 1.5°C. Without decisive action, the world will experience the effects of a 2°C rise in temperature in the coming 30 to 40 years.

Energy decarbonisation will be central to the changes needed for a sustainable future.

Around two-thirds of global greenhouse gas emissions can be attributed to the supply and use of energy from fossil fuels. These emissions must be reduced substantially, while at the same time ensuring sufficient energy is available for continued economic growth. This transition process will take decades, as the carbon dioxide (CO_2) emission intensity of global economic activity needs to be reduced by 85% over the next 35 years. The result is a decline in energy-related CO_2 emissions of 2.6% per year on average, or 0.6 gigatonnes (Gt) per year in absolute terms.

Figure 1: Primary CO_2 emission reduction potential by technology, 2015-2050, based on today's plans or with accelerated uptake or renewables



Notes: Includes energy, non-energy use, process and fugitive CO_2 emissions; the Reference Case is the most likely case based on current and planned policies and expected market developments; the REmap case is a low-carbon technology pathway that goes beyond the Reference Case for an energy transition to decarbonise the energy system in line with the goal in the Paris Agreement of limiting global temperature rise to less than 2°C above pre-industrial levels with a 66% probability; yr = year.

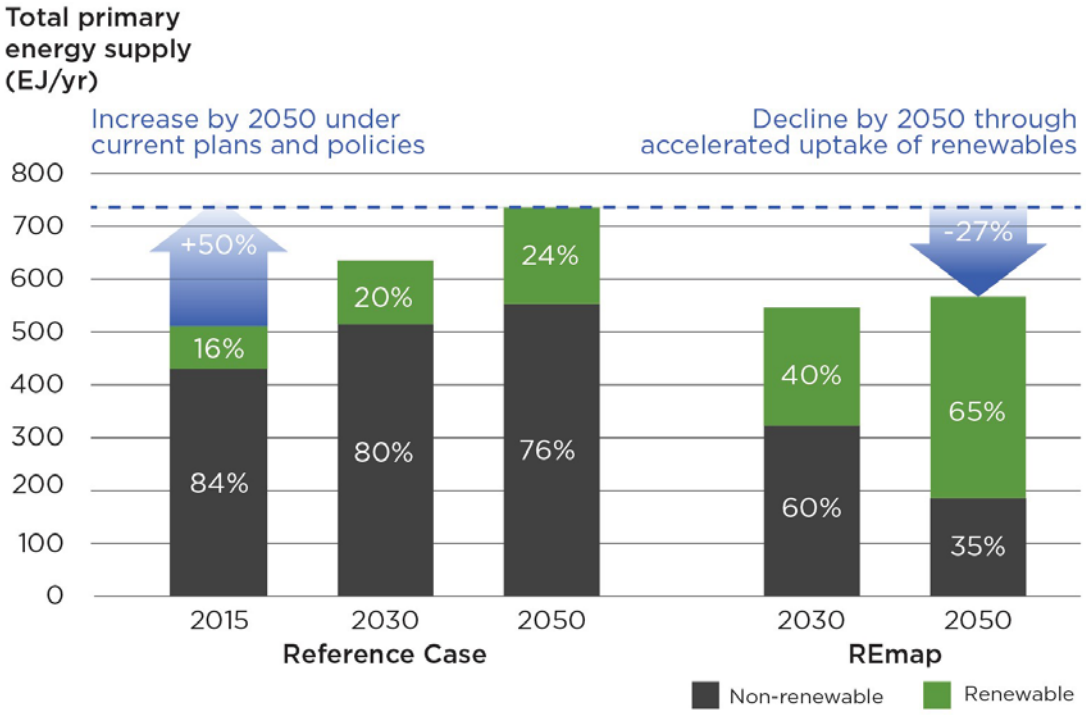
Decisive emission reduction potential

Reducing energy-related CO_2 emissions to limit climate change is at the heart of the global energy transition. Renewable energy and energy efficiency measures can potentially achieve 90% of the required carbon reductions, with two-thirds coming from renewable energy alone.

Energy efficiency and renewable energy will propel the global energy transition.

By 2050, 90% of the emission reductions foreseen under the REmap case come from the use of energy efficiency and renewables. The remainder will be achieved by fossil fuel switching, continued use of nuclear energy and carbon capture and storage (CCS). Two-thirds of total energy CO_2 emission reductions (20 Gt per year in 2050) can be directly attributed to renewables, as illustrated in Figure 1. Achieving a global energy transition that limits global temperature rise to less than 2°C is technically feasible on the basis of today's good level of understanding of how the energy transition could look, from a technical, policy and business perspective. Accelerated deployment of renewable energy and energy efficiency measures are the key elements of the energy transition towards decarbonisation.

Figure 2: The world's total primary energy supply, 2015-2050, based on today's plans or with more renewables



Notes: Data include energy supplied in the electricity generation, district heating/cooling, industry, buildings and transport sectors; these sectors accounted for 85% of the global total primary energy supply in 2015; non-energy use of fuels for the production of chemicals and polymers is excluded; EJ = exajoule.

Renewables coming to the fore

Renewable energy would be the largest source of energy supply under REmap in 2050, representing two-thirds of the energy mix. This requires an increase in renewables' share of about 1.2% per year in final energy terms, an eightfold acceleration compared to recent years.

Under REmap – the International Renewable Energy Agency (IRENA) view of how decarbonisation of the energy sector can be realised – energy demand in 2050 would be similar to today's level, thanks to significant energy efficiency improvements. The supply mix, however, would change substantially with the share of renewable energy in the total primary energy supply increasing to two-thirds by 2050. This represents a significant acceleration compared to what would be achieved in the Reference Case. Renewables contribute around half of the improvement in incremental energy intensity seen under REmap between now and 2050.

Global energy decarbonisation has begun

Renewable energy currently accounts for 19% of global energy supply, having risen by 0.17% per year over the past five years. This growth rate needs to accelerate sevenfold in order for renewable energy to reach a 60% share of total global final energy consumption by 2050. Global energy intensity improvements have also accelerated from 1.3% to 1.8% per year during the past five years, with a further acceleration to 2.5% per year needed by 2050.

In respect of power generation, renewables have accounted for more than half of all global capacity additions over the past five years, with the share of renewables in power generation increasing by 0.7% per year. While substantial, this growth rate needs to double. At the root of this renewable power acceleration are substantial reductions in the cost of renewable technologies. In 2016 the lowest cost offers for utility-scale solar photovoltaics (PV) and onshore wind were below USD 0.03 per kilowatt hour (kWh), with those for offshore wind including grid connection below USD 0.07/kWh. The average cost for solar PV has fallen by more than a factor five in only five years, with further significant cost reductions foreseen for the coming decade.

Efforts, however, must be strengthened in end- use sectors, particularly in buildings, industry and transport. Enabling technologies such as electric vehicles (EVs), which have seen breakthroughs with many gigawatt-scale battery factories coming online in China, United States and elsewhere, also require increased focus. Global EV capacity doubled to 2 million in 2016 alone. In combination with renewable power supply, this offers the prospect of decarbonised transport. Heat pumps can play a similarly important role for heating applications. The electrification of buildings, industry and transport must be combined with accelerated deploymentof bioenergy.

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