

MITIGATING CLIMATE CHANGE THROUGH RENEWABLES

HOW DOUBLING THE RENEWABLE ENERGY SHARE CAN KEEP GLOBAL TEMPERATURES IN CHECK

Renewable energy and energy efficiency are the world's best chances to avoid catastrophic climate change.

According to REmap 2030 – the plan to double the global share of renewables by 2030 – reducing current levels of carbon dioxide (CO₂) emissions requires a fundamental change of course from today's path. REmap also shows that reducing CO₂ levels through increased deployment of renewable energy is already affordable now and would result in significant economic benefits.

CO₂ is a greenhouse gas that causes the atmosphere to heat up and global temperatures to rise. The largest source of human-caused CO₂ emissions is the burning of fossil fuels to generate electricity, power transport and heat buildings.

REmap 2030 shows that keeping CO levels below 450 parts per million (ppm) – the level beyond which catastrophic climate change could occur – is still possible.

At the start of 2014, the annual average concentration of CO₂ in the atmosphere was 398 ppm. The Intergovernmental Panel on Climate Change (IPCC) estimates that a CO₂ concentration of 450 ppm would result in a global temperature rise of 2 degrees Celsius (°C) above pre-industrial levels by 2100. Beyond 2 °C, experts predict serious consequences for the earth's climate (we are currently 0.7 °C above pre-industrial levels). Since the Industrial Revolution, the atmospheric concentration of CO₂ has increased at an accelerating rate, rising by 1 ppm annually during the 1960s and by 2 ppm annually from 2000 to 2010.

At current rates of emissions, we will reach 450 ppm in 26 years, i.e., in 2040. If emission rates continue to grow, we will reach this level even faster.

More than 80% of human-caused CO₂ emissions come from burning fossil fuels. Of that, 44% comes from coal, 36% from oil and 20% from natural gas. An estimated 40% of CO₂ emissions are stored in the oceans and soil, and 60% in the atmosphere. To avoid a further buildup of atmospheric CO₂ we need to lower energy-related CO₂ emissions by 60% from today's levels, to 12.5 gigatonnes (Gt). Given the remaining emissions space we have before reaching 450 ppm, this should be achieved by 2050 at the latest.

If we carry on as usual, current annual global CO emissions of 30 Gt in 2010 will rise to over 40 Gt by 2030.

Assuming a constant pace of reduction, we would need to lower annual energy-related CO₂ emissions to 20.8 Gt by 2030, to keep CO₂ levels at 450 ppm. The International Energy Agency (IEA) projects that 25 Gt of CO₂ would be enough; this would require an acceleration in emission reductions after 2030.

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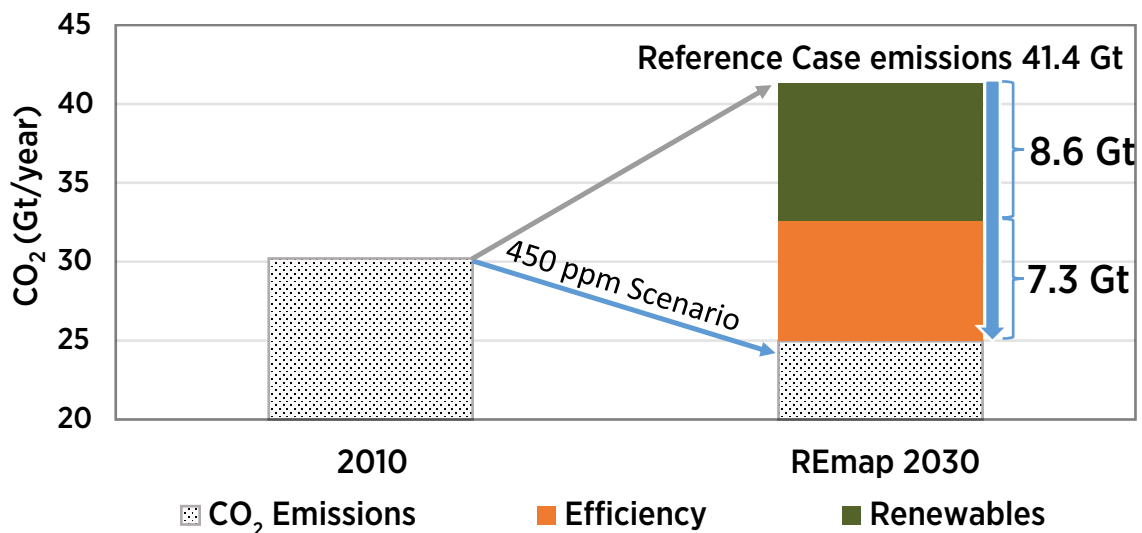
Energy efficiency and renewable energy are the most viable options for reducing energy-related emissions. Renewable energy production generally emits no or negligible amounts of CO₂.

There are four ways to reduce CO₂ emissions from energy use: energy efficiency, renewable energy, nuclear energy, and carbon capture and storage (CCS, or the process of capturing of CO₂ emissions before they are released into the atmosphere). New options may emerge in the future, such as nuclear fusion, but they are in their infancy. It is unlikely that nuclear and CCS will play a substantial role in CO₂ reduction between now and 2030. Typically, it takes a decade to build a new nuclear plant, and CCS development has lagged far behind needed levels (most countries have stopped its development).

The total CO₂ reduction from increased deployment of renewable energy plus energy efficiency - 15.9 Gt - would result in emissions of 25.5 Gt in 2030, in line with a long-term stabilization of atmospheric CO₂ at 450 ppm.

Under business as usual, CO₂ emissions will rise to 41.4 Gt in 2030. Doubling the global share of renewable energy – as outlined in REmap 2030 – would reduce emissions by 8.6 Gt (21% savings compared to the business as usual), to 32.8 Gt. Based on the IEA estimates, energy efficiency gains could yield a further 7.3 Gt reduction, for a total emissions reduction of 15.9 Gt under REmap 2030 (see Figure 1).

Figure 1: Emission mitigation benefits of the REmap Options



For more details, please visit www.irena.org/remap.

The International Renewable Energy Agency (IRENA) is an intergovernmental organisation promoting the widespread and increased adoption and sustainable use of all forms of renewable energy worldwide, including bioenergy, geothermal energy, hydropower, ocean energy, wind energy and solar energy.