

# What are the solutions to climate change?

## Current status

China remains the world's largest emitter of greenhouse gases, responsible for approximately 27-30% of global carbon dioxide emissions. However, the country has made significant commitments to address climate change. In 2020, President Xi Jinping announced China's goals to peak carbon emissions before 2030 and achieve carbon neutrality before 2060. These targets have been formalized in China's updated Nationally Determined Contribution (NDC) under the Paris Agreement[1].

China has become the world's largest producer and market for renewable energy. We leads globally in installed solar and wind capacity, with continued rapid expansion in these sectors. As of 2024, China has over 1000 GW of installed renewable energy capacity. In addition, coal still dominates China's energy mix, accounting for approximately 56-58% of the country's energy consumption. However, the share of coal has been gradually declining as China increases its renewable energy capacity. Meanwhile, China has implemented a national emissions trading system (ETS), which initially covered the power sector but has been expanding to include other high-emission industries[1].

## Solutions to climate change

### 1. Ending our reliance on fossil fuels

The single-most important action we can take to combat climate change is to dramatically reduce our fossil fuel consumption. According to the United Nations, the burning of coal, oil, and natural gas in our buildings, industrial processes, and transportation accounts for more than 75 percent of the emissions warming our planet. Beyond altering the climate, these dirty energy sources also create unacceptable impacts on both ecological systems and human health[2].

### 2. Greater energy efficiency

Energy efficiency is often called "the first fuel" for good reason - the more efficient our systems become, the less actual energy we need to consume, regardless of whether it comes from rooftop solar panels or gas-powered plants. From this perspective, efficiency represents our largest energy resource. Over the past four decades, as efficiency technologies have advanced, they've contributed more to meeting America's energy needs than oil, coal, gas, or nuclear power combined[2].

The versatility of energy efficiency is particularly valuable, as it can be implemented across numerous sectors - from power plants and electrical grids to factories, vehicles, buildings, and household appliances. These climate-friendly approaches vary widely in complexity. Some involve sophisticated changes, such as helping utility companies transition to performance-based regulation models where profits are tied to service quality rather than simply selling more energy. Other strategies are remarkably straightforward, including weatherproofing buildings, installing cool roofs, replacing traditional boilers and air conditioners with highly efficient heat pumps, and the simple act of switching from incandescent bulbs to LEDs - all of which can significantly reduce our overall energy consumption[2].

### 3. Renewable energy

Transitioning from fossil fuels to clean energy is the key to winning the fight against climate change. Here are the most common sources of renewable energy—and one source of decidedly nonrenewable energy that often gets included (falsely) in the list[2].

a) Solar energy

The sun's light gets captured by photovoltaic cells which convert it directly into electricity - this is how solar energy works. These cells are combined into the solar panels you might notice on rooftops or ground installations. By 2030, projections indicate that approximately one in seven American homes will have rooftop solar installations. These systems produce no greenhouse gases or pollutants and can generate power throughout the year regardless of temperature, provided there's sunlight available[2].

Currently, solar energy provides slightly less than 3 percent of America's electricity generation, which is sufficient to power 18 million households. However, it's expanding more rapidly than any other energy source. By 2035, solar could potentially supply up to 40 percent of the nation's electricity. Looking at global trends, solar is expected to represent more than half of all new electricity generation capacity added worldwide between 2020 and 2026[2].

b) Wind energy

Wind turbines generate electricity through a more traditional mechanism than solar panels: the wind rotates turbine blades, which then power a generator. Wind energy currently supplies just over 9 percent of electricity in the United States, but it's experiencing rapid growth as more states and utilities recognize its capacity to deliver completely clean energy at impressively competitive prices[2]. As expected, states with abundant open terrain—such as Kansas, Oklahoma, and Texas—have substantial wind power capacity. However, many experts believe the greatest untapped potential lies off our coastlines. Offshore wind offers strategic advantages, often increasing production during evening hours when household electricity demand peaks, and continuing to generate power during rainy or overcast periods when solar production decreases. With thoughtful planning and protective protocols in place, we can harness offshore wind's enormous potential while minimizing or eliminating any adverse effects on wildlife[2].

c) Geothermal and hydroelectric energy

Water, like sunlight and wind, can serve as a renewable energy source under specific conditions. Geothermal energy extraction involves drilling deep beneath the earth's surface to access extremely hot water, which is then brought upward. Once at the surface, this water transforms into steam that, when pressurized, drives a generator's turbines to produce electricity. Hydroelectric power, by contrast, harnesses gravity's effect on water, allowing it to flow downward through conduits at high velocity and pressure. The powerful movement of this descending water rotates a generator's rotor, converting the water's kinetic energy into electrical energy[2].

Reference:

[1] Claude Generated:

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I should note that my knowledge cutoff is October 2024, so I can only provide information about China's climate change situation up to that point.

As of late 2024, China's climate change situation can be characterized by several key aspects:

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China has implemented a national emissions trading system (ETS), which initially covered the power sector but has been expanding to include other high-emission industries.

The country experiences significant climate impacts, including more frequent extreme weather events like severe flooding in southern regions, drought in northern areas, and rising sea levels affecting coastal cities.

China has been investing heavily in adaptation measures, including expanded flood control systems, drought-resistant agriculture, and urban resilience planning.

Would you like more specific information about any particular aspect of China's climate change situation?

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[2] <https://www.nrdc.org/stories/what-are-solutions-climate-change#choices>