

Climate Change: Policy & Mitigation

The Challenge

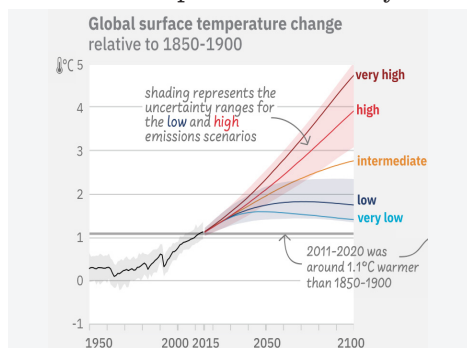
Climate change is a global problem that requires global cooperation to address. The objective of the United Nations Framework Convention on Climate Change (UNFCCC), which virtually all nations, including the U.S., have ratified, is to stabilize greenhouse gas (GHG) concentrations at a level that will not cause “dangerous anthropogenic (human-induced) interference with the climate system.”¹ Due to the persistence of some GHGs in the atmosphere, significant emissions reductions must be achieved in coming decades to meet the UNFCCC objective. In 2023, the Intergovernmental Panel on Climate Change (IPCC) published its Sixth Assessment Report. The report details the impacts of climate change and mitigation and adaptation strategies. To limit warming to 1.5°C, global carbon dioxide (CO₂) emissions need to be reduced by 48% by 2030 and reach net zero in the early 2050s, followed by net negative CO₂ emissions.² This requires deep and rapid emission reductions in all sectors.² Current national targets under the Paris Agreement would lead to 52–58 Gt CO₂e emissions per year by 2030—too high to meet the 1.5°C target. 2018 GHG emissions were approximately 42 Gt CO₂ and would need to drop to between 25–30 Gt CO₂ per year by 2030 to remain on target.³ In 2022, U.S. GHG emissions were 6.34 Gt CO₂e.⁴

General Policies

Market-Based Instruments

- Market-based approaches include carbon taxes, baseline and credit programs, subsidies, cap-and-trade programs, and clean energy standards.⁵ In a tradable carbon permit system, permits equal to an allowed level of emissions are distributed or auctioned. Parties with emissions below their allowance are able to sell their excess permits to other parties that have exceeded their emissions allowance.⁶ Market-based instruments are recognized for their potential to reduce emissions by allowing for flexibility and ingenuity in the private sector.⁶

Future Global Temperature Pathway³



Regulatory Instruments

- Regulatory approaches include non-tradable permits, technology and emissions standards, product bans, and government investment.
- In 2007, the U.S. Supreme Court ruled that CO₂ and other GHGs meet the Clean Air Act’s definition of air pollutants, which are regulated by the U.S. Environmental Protection Agency (EPA).⁷ After several appeals, the U.S. Court of Appeals upheld the ruling in 2012.⁸ A 2022 U.S. Supreme Court ruling limited the EPA’s ability to regulate GHG emissions.⁹
- In 2024, new vehicle economy standards for model years 2027-2031 were set. Corporate average fuel economy (CAFE) standards will increase to 50.4 mpg for new light-duty vehicles by 2031. New standards will save more than \$23B in fuel costs. For more information, reference the [Personal Transportation Factsheet](#).¹⁰
- State-level climate policies are a primary driver of GHG reductions.¹¹

Voluntary Agreements

- Voluntary agreements are generally made between a government agency and one or more private parties to “achieve environmental objectives or to improve environmental performance beyond compliance.”¹² EPA partners with various sectors to oversee a variety of voluntary programs aimed at reducing GHG emissions, increasing clean energy adoption, and adapting to climate change.¹³

The Kyoto Protocol

- The Kyoto Protocol came into force on February 16, 2005, and established mandatory, enforceable targets for GHG emissions. Initial emissions reductions for participating countries ranged from –8% to +10% of 1990 levels, while the overall reduction goal was 5% below the 1990 level by 2012.¹⁴ When the first commitment period ended in 2012, the Protocol was amended for a second commitment period; the amended reduction goal was 18% below 1990 levels by 2020.¹⁴

The Paris Agreement

- In December 2015, all Parties of the UNFCCC reached a climate change mitigation and adaptation agreement, called the Paris Agreement, to keep the global temperature increase (from pre-industrial levels) below 2°C.¹⁵
- The Paris Agreement entered into force on November 4, 2016.¹⁶ As of May 2023, The Paris Agreement had 198 signatories, 195 of which have ratified the agreement (including the U.S.).¹⁶

Government Action in the U.S.

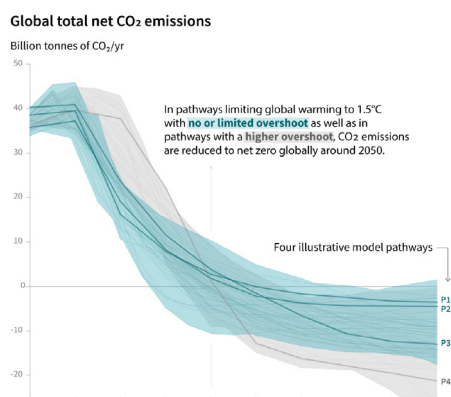
Federal Policy

- According to the U.S. Senate, “...Congress should enact a comprehensive and effective national program of mandatory, market-based limits and incentives on emissions of greenhouse gases that slow, stop, and reverse the growth of such emissions at a rate and in a manner that will not significantly harm the United States economy and will encourage comparable action by other nations...”¹⁷
- Due to the Consolidated Appropriations Act of 2008, large emitters of GHGs in the U.S. must report emissions to the EPA.¹⁸ In 2023, the EPA proposed a new rule that would set limits for GHG emissions from power plants. This rule includes New Source Performance Standards (NSPS) and emission guidelines for new and existing fossil fuel plants.¹⁹
- In April 2021, President Biden announced the U.S. will “target reducing emissions by 50-52% by 2030 compared to 2005 levels.”²⁰
- The Inflation Reduction Act of 2022 provides resources to organizations including businesses, NGOs, and state, local, and tribal governments to accelerate the clean energy transition.²¹

State Policy

- 32 states and D.C. have released climate change action plans.²² 23 states and D.C. have GHG emissions reduction targets. California is targeting GHG emissions 40% below 1990 levels by 2030 and net zero CO₂ emissions by 2045.²³
- 29 states, D.C., and three U.S. territories have Renewable Portfolio Standards, which specify the percentage of electricity to be generated from renewable sources by a certain date. Six states have Clean Energy Standards, which specify the percentage of electricity to be generated from low-and no-carbon sources.²⁴
- A group of governors formed the U.S. Climate Alliance to achieve the GHG reductions outlined in the Paris Agreement. The alliance represents 55% of the U.S. population and 60% of the U.S. economy.²⁵

Global Future Temperature Pathways²



Mitigation Strategies

Stabilizing atmospheric CO₂ concentrations requires changes in energy production and use. Mitigation cannot be achieved without agencies working collectively and immense GHG emission reductions in all sectors.¹³ Stronger mitigation efforts require increased upfront investments, yet the global benefits of avoided damages and reduced adaptation costs exceeds the mitigation expense.²

- **Energy Savings:** Many energy efficiency efforts require an initial capital investment, but the payback period is often only a few years. In 2016, the Minneapolis Clean Energy Partnership planned to retrofit 75% of Minneapolis residences for efficiency and allocated resources to buy down the cost of energy audits and provide no-interest financing for energy efficiency upgrades.²⁶
- **Fuel Switching:** Switching power plants and vehicles to less carbon-intensive fuels can achieve emission reductions quickly. Switching from an average coal plant to a natural gas combined cycle plant can reduce CO₂ emissions by approximately 50%.¹³
- **Capturing and Storing Emissions:** CO₂ can be captured from large point sources both pre- and post-combustion of fossil fuels. Once CO₂ is separated, it can be placed underground depending on the geology of a site. Currently, CO₂ is used in enhanced oil recovery (EOR), but long-term storage technologies remain expensive.²⁷ Alternatively, existing CO₂ can be removed from the atmosphere through Negative Emissions Technologies and approaches such as direct air capture and sequestration, bioenergy with carbon capture and sequestration, and land management strategies.²⁸

Individual Action

- There are many actions that individuals can take to reduce their GHG emissions; many involve energy conservation and also save money. Choose a fuel-efficient or electric vehicle.²⁹ Decrease the amount you drive by using public transportation, riding a bike, walking, or telecommuting. For a 20-mi round trip commute, switching to public transit can prevent 4,800 lbs of CO₂ emissions per year.³⁰
- When purchasing appliances, look for the Energy Star label and choose the most energy efficient model. Energy Star light bulbs use ~90% less energy than standard bulbs, last 15 times longer, and save ~\$55 in electricity costs over their lifetimes.³¹
- Space heating is the largest energy use in residential buildings (33%).³² Ground source heat pumps use 75% less energy than traditional systems. See the [Geothermal Factsheet](#).³³
- Ensure that your house is properly sealed by reducing air leaks, installing the recommended level of insulation, and choosing Energy Star windows.³⁴