FIFTH NATIONAL CLIMATE ASSESSMENT

Chapter 32 | Mitigation

KEY MESSAGE 1

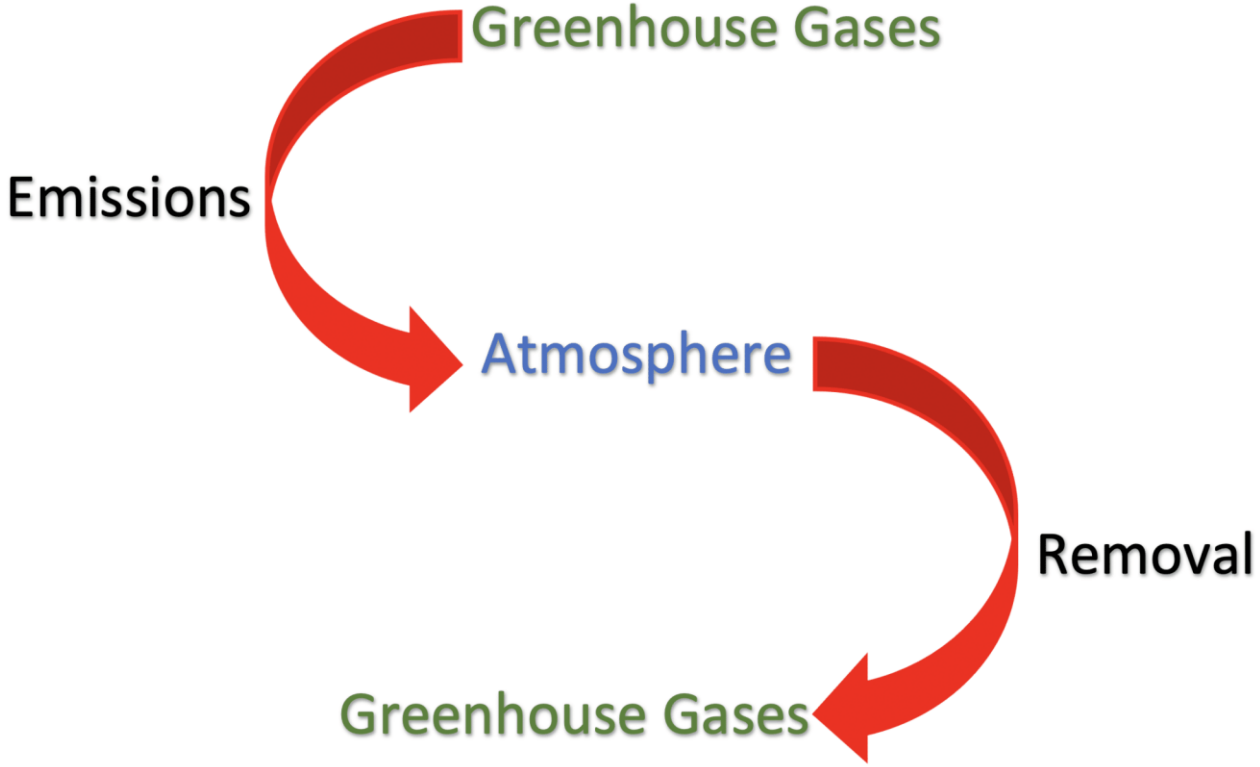
Successful Mitigation Means Reaching Net-Zero Emissions

Greenhouse gas emissions in the United States decreased by 12% between 2005 and 2019, mostly due to replacing coal-fired electricity generation with natural gas–fired and renewable generation (*very high confidence*).

However, US net greenhouse gas emissions remain substantial and would have to decline by more than 6% per year on average, reaching net zero around midcentury, to meet current national climate targets and international temperature goals (*very high confidence*).

What is Net Zero?

Net Zero emissions describe the condition when the greenhouse gases going into the atmosphere is balanced by the greenhouse gases removed from the atmosphere. (netzeroclimate.org)



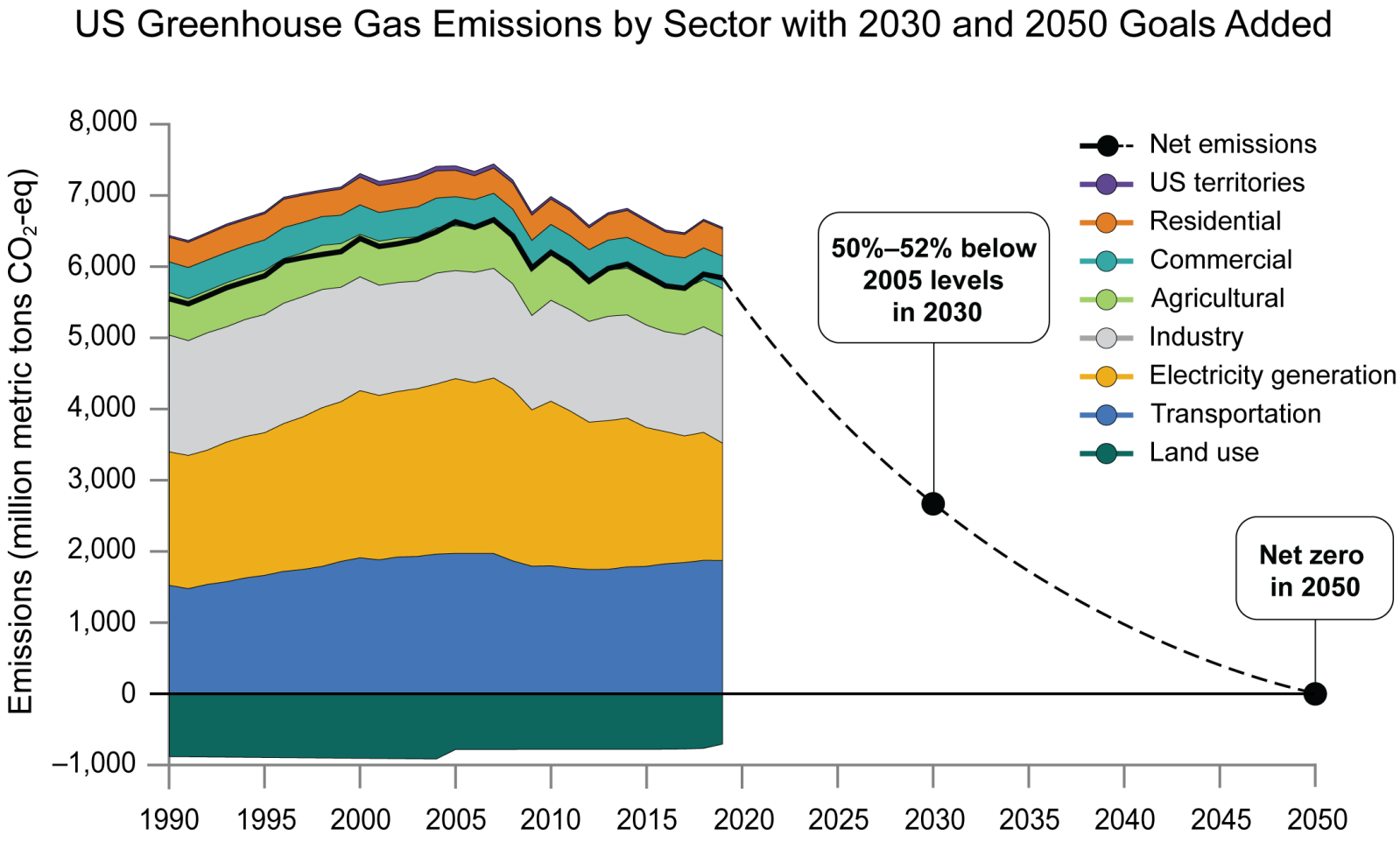


Figure 32.1. US emissions will need to decrease rapidly to reach levels consistent with international climate targets.

KEY MESSAGE 2

We Know How to Drastically Reduce Emissions

A US energy system with net-zero emissions would rely on widespread improvements in energy efficiency, substantial electricity generation from solar and wind energy, and widespread electrification of transportation and heating (*high confidence*).

Low-carbon fuels would still be needed for some transport and industry applications that are difficult to electrify (*high confidence*).

Land-related emissions in the US could be reduced by increasing the efficiency of food systems and improving agricultural practices and by protecting and restoring natural lands (*high confidence*).

Across all sectors, many of these options are economically feasible now (*high confidence*).

Established Opportunities to Reduce Energy-Related Emissions

- Improve Energy Efficiency
- Decarbonize the Electricity Sector, including wind and solar generation
- Electrify Energy End Uses

Established Opportunities to Reduce Land-Related Emissions

- Use Most Productive Land for Agriculture
- Reduce Food Waste
- Shift Diets
- Avoid Conversion and Monitor Carbon Fluxes on Unmanaged Land

KEY MESSAGE 3

To Reach Net-Zero Emissions, Additional Mitigation Options Need to Be Explored

Although many mitigation options are currently available and cost-effective, the level and types of energy technologies and carbon management in net-zero-emissions energy systems depend on still-uncertain technological progress, public acceptance, consumer choice, and future developments in institutions, markets, and policies (*high confidence*).

Attractive targets for further research, development and demonstration include carbon capture, utilization and storage; long-duration energy storage, low-carbon fuels and feedstocks; demand management; next generation electricity transmission; carbon dioxide removal; modern foods; and interventions to reduce industry and agricultural emissions.

KEY MESSAGE 4

Mitigation Can Be Sustainable, Healthy, and Fair

Large reductions in US greenhouse gas emissions could have substantial benefits for human health and well-being (*high confidence*).

Mitigation is expected to affect pollution, the use of land and water resources, the labor force, and the affordability, reliability, and security of energy and food (*high confidence*).

An equitable and sustainable transition to net-zero-emissions energy and food systems in the United States could help redress legacies of inequity, racism, and injustice while maximizing overall benefits to our economy and environment (*high confidence*).

Rarely Represented But Important Issues in Mitigation Scenarios

- Air Pollution
- Siting and Land Use
- Water Use
- Labor
- Supply Chains, Energy Security, and Geopolitics
- Energy Equity and Environmental Justice

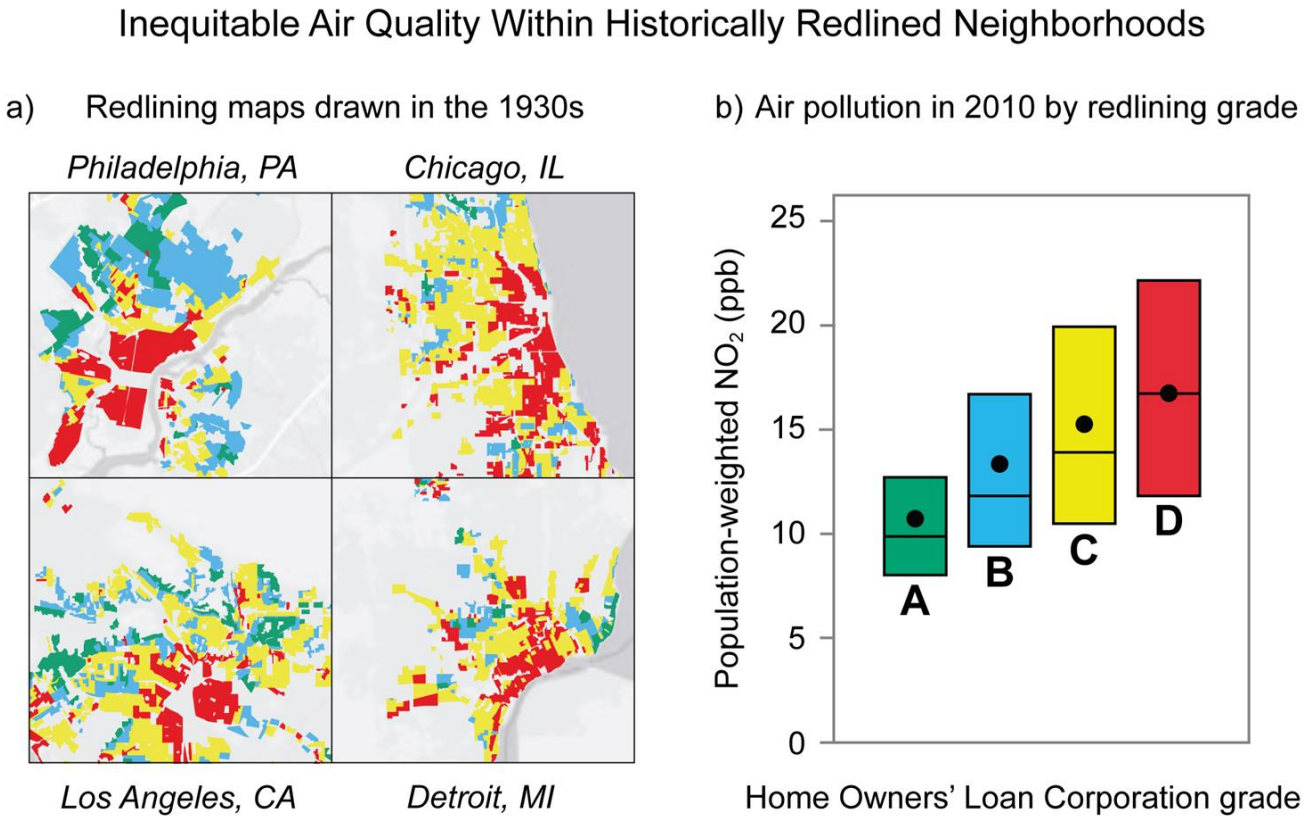


Figure 32.18. Communities redlined in the 1930s experience more air pollution today.

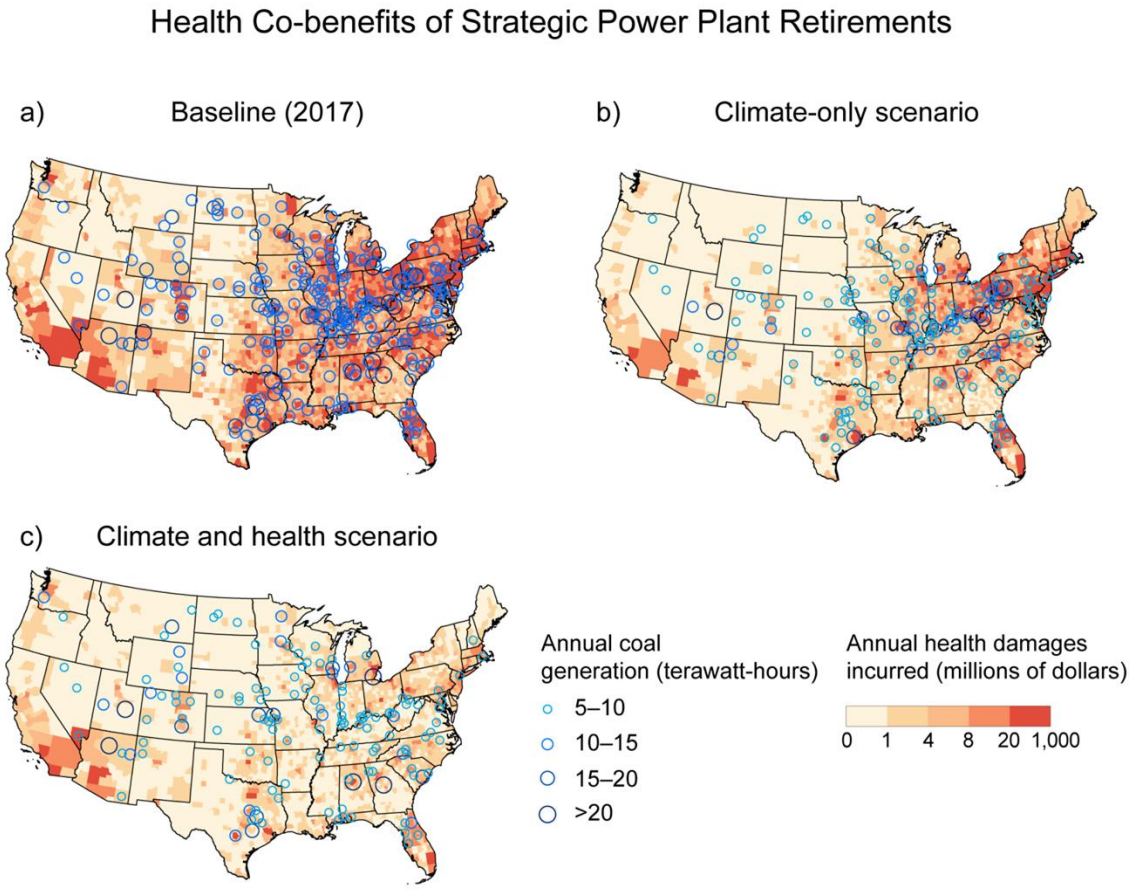


Figure 32.15. Shutting down coal-fired power plants would produce both health and climate benefits.

KEY MESSAGE 5

Governments, Organizations, and Individuals Can Act to Reduce Emissions

Mitigation efforts can be supported by a range of actors and actions, from choices made by individuals to decisions made by businesses and local, Tribal, state, and national governments (*high confidence*).

Actions with significant near-term potential include sector-based policies accelerating deployment of low-carbon technologies, city-level efforts to promote public transportation and improve building efficiency, and individual behavioral changes to reduce energy demand and meat consumption (*high confidence*).

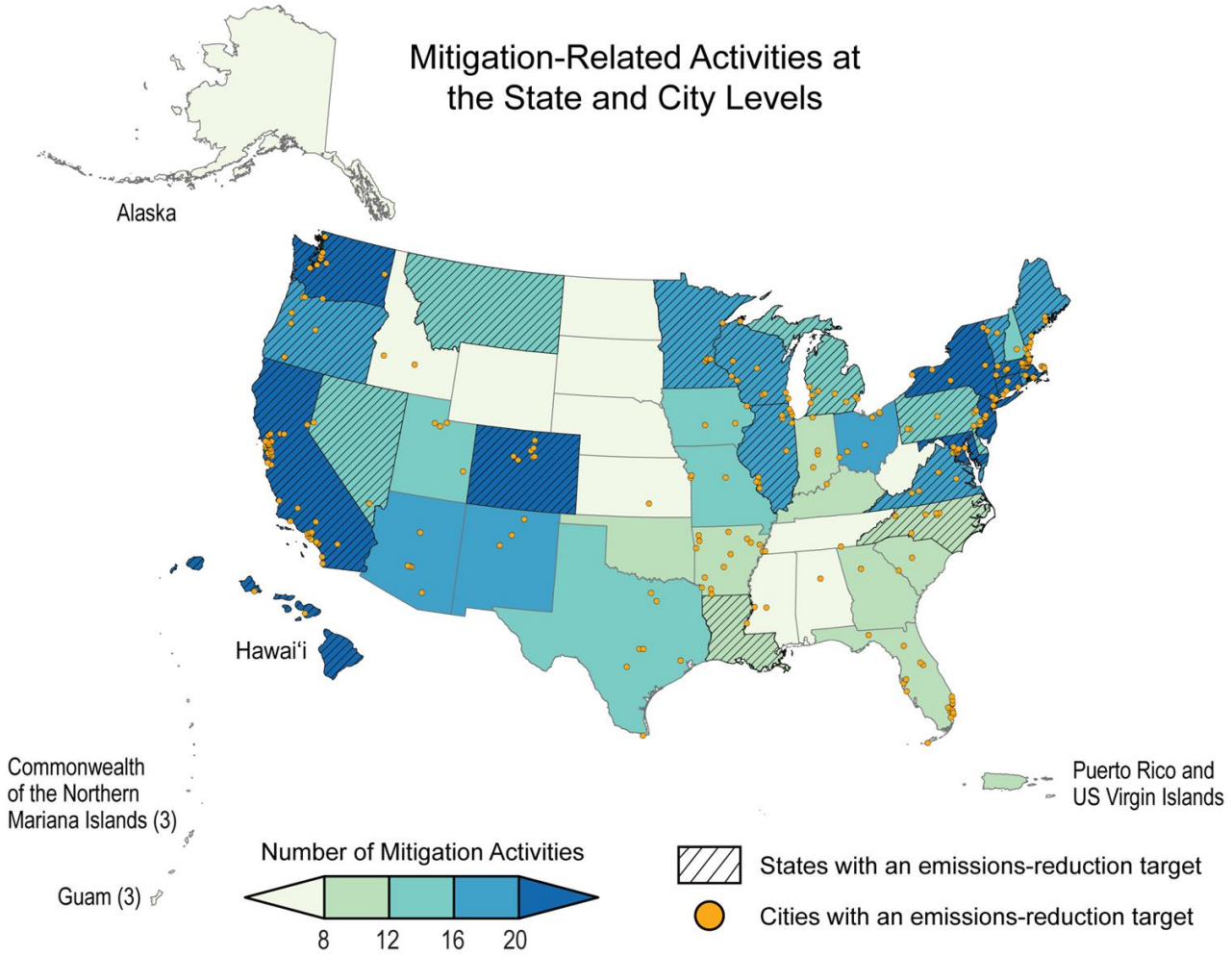


Figure 32.20. Many states and cities have taken action to reduce greenhouse gas emissions.

Let's Summarize!

US GHG emissions have declined in recent decades, but must decrease at a faster pace to meet mitigation targets and goals.

Reaching net-zero emissions will involve improvements in energy efficiency, greater reliance on solar and wind energy, widespread electrification, and reliance on emerging technologies.

Large reductions in emissions could improve human health and redress legacies of inequity. in energy efficiency, greater reliance on solar and wind energy, widespread electrification, and reliance on emerging technologies. Large reductions in emissions could improve human health and redress legacies of inequity.

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Recommended chapter citation

Davis, S.J., R.S. Dodder, D.D. Turner, I.M.L. Azevedo, M. Bazilian, J. Bistline, S. Carley, C.T.M. Clack, J.E. Fargione, E. Grubert, J. Hill, A.L. Hollis, A. Jenn, R.A. Jones, E. Masanet, E.N. Mayfield, M. Muratori, W. Peng, and B.C. Sellers, 2023: Ch. 32. Mitigation. In: *Fifth National Climate Assessment*. Crimmins, A.R., C.W. Avery, D.R. Easterling, K.E. Kunkel, B.C. Stewart, and T.K. Maycock, Eds. U.S. Global Change Research Program, Washington, DC, USA. https://doi.org/10.7930/NCA5.2023.CH32

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