Mitigation

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Key Message 32.1

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*).

Key Message 32.2

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*).

Key Message 32.3

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 (*medium confidence*).

Key Message 32.4

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*).

Key Message 32.5

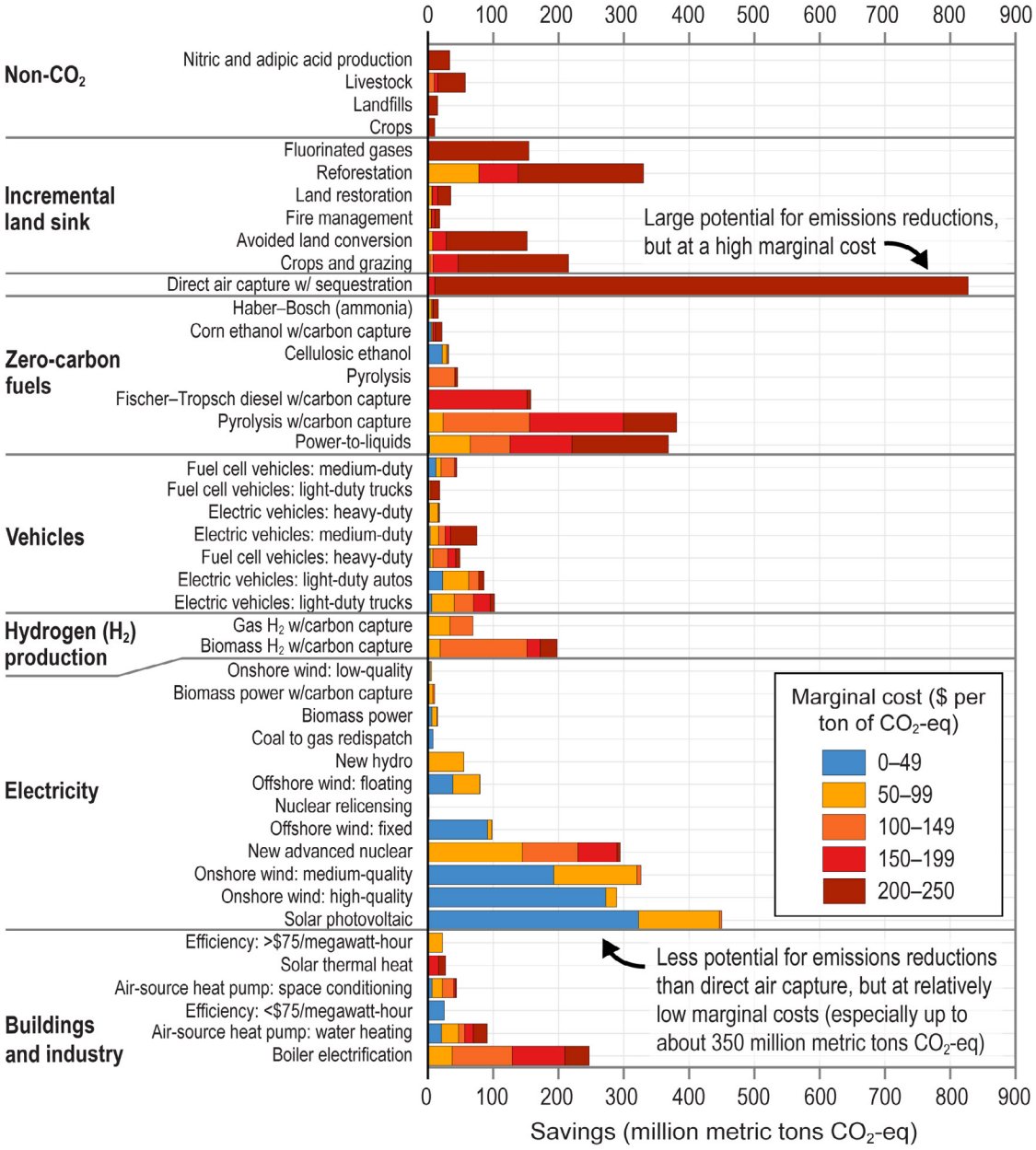
Governments, Organizations, and Individuals Can Act to Reduce Emissions

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*).

Potential Emissions Reductions by Action, for the Year 2050

The size and cost of emissions reductions depend on available technologies and the source of related emissions.

Figure 32.22. Energy system, land-sector, and non-CO_2 (carbon dioxide) mitigation options for the year 2050 are shown along with estimated marginal costs, excluding the impact of policy incentives. The sum of the mitigation options shown results in net-negative CO_2-eq (carbon dioxide equivalent) emissions in the United States, not only demonstrating the possibility of reaching net-zero emissions using a combination of these actions but also highlighting a large range of costs for such actions (costs as of 2021). Mitigation options from conservation and lifestyle change are not assessed due to the difficulty in assessing costs for these measures. H_2 = hydrogen. Adapted with permission from Farbes et al. 2021 and Figure SPM.7 in IPCC 2022 (see full chapter for detailed citations).



Recommended 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