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Research Paper

From Emissions to Economic Impact

An average American uses around 14-16 metric tons of carbon dioxide equivalent per year. An average American household uses around 48 metric tons of carbon dioxide equivalent per year. America uses around 6.2-6.3 billion metric tons of carbon dioxide equivalent per year.

Carbon dioxide equivalents have an impact on the American economy. The carbon dioxide equivalents influence costs for businesses, and investment shifts regarding green technology. However, they also create new employment

Figure 1-2.

Projected Concentrations of Carbon Dioxide in the Atmosphere Through 2100

Carbon dioxide (in parts per million)

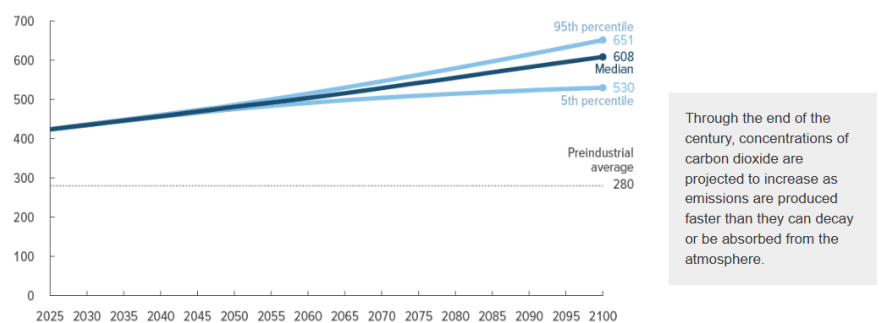


Image from "The Risks of Climate Change to the United States in the 21st Century."

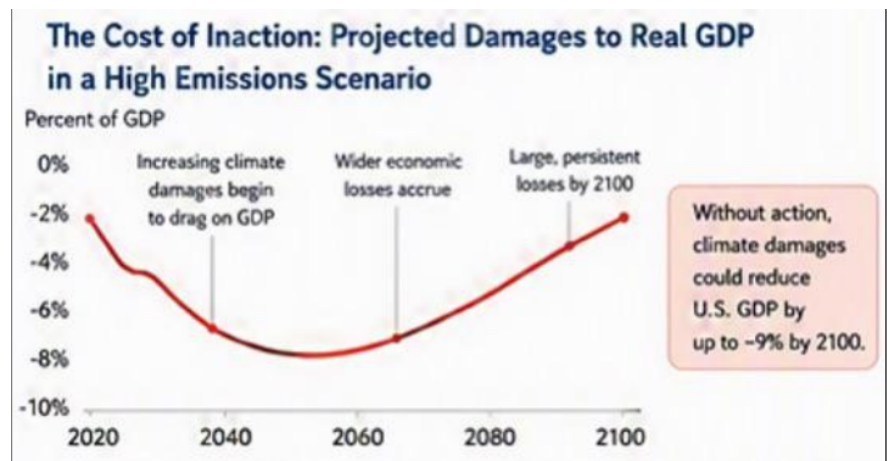
opportunities for renewable energy. This means that an increase in carbon dioxide equivalents directly increases climate change.

"The Congressional Budget Office projects that climate change is likely to reduce the United State's output of goods and services during the 21st century. Climate Change will affect output through its effects on the supply of labor (both the number of people who are working and the number of hours they work), productivity, and the stock of productive capital (also called the

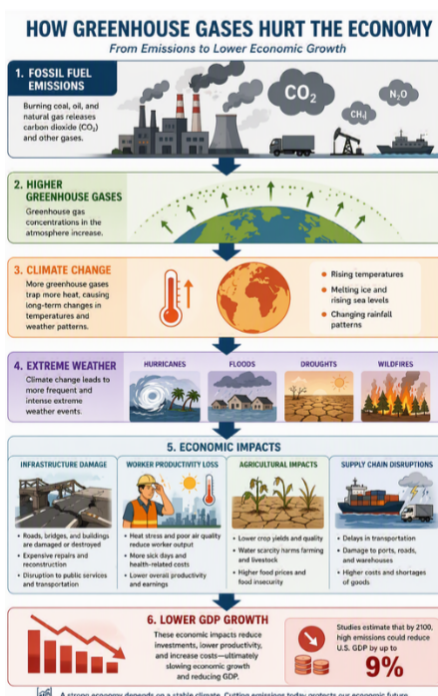
capital stock- machines, structures, and intellectual property used to produce goods and services)” (CBO).

“By the end of the 21st century, in the absence of further climate change, real GDP is projected to be more than three times what it was in 2024. CBO estimated the possible effects of climate change on GDP by 2100. The distribution of effects suggests that climate change is much more likely to reduce that growth in GDP than to increase it. In CBO’s estimation, there is a 5 percent chance that real (inflation-adjusted)

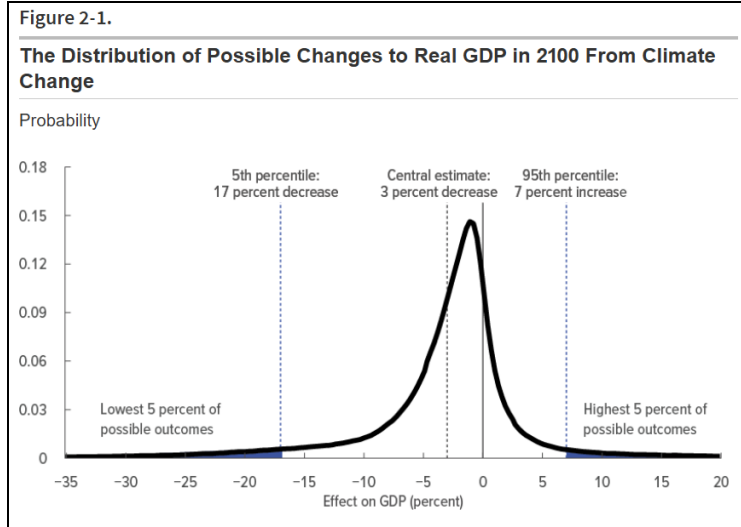
GDP will be at least 17 percent lower in 2100 than it would have been in the absence of additional climate change and a 5 percent chance that it will be at least 7 percent higher (see Figure 2-1). In 2023, changes in GDP



of that size would have amounted to a \$4.7 trillion decrease and a \$1.9 trillion increase. The



agency’s central estimate is that climate change will cause real GDP to be 3 percent lower than it would have been if temperatures remained stable after 2024. Climate change is expected to have a larger negative effect on GDP in some other countries, particularly those that are less developed or have a hotter climate” (CBO).



According to The Congressional Budget Office, climate change has a chance to reduce the United State's output of goods and services. The actual effects and outputs are not certain but it is known that supply of labor and the stock of productive capital will be

affected. There isn't enough study done to predict the effects that increasing carbon dioxide equivalents can have on the United States economy.

As seen from The Congressional Budget Office, the supply of labor is affected by an increase in climate change, and this is important to note because this essentially means that climate change will impact the number of lost workdays. The supply of labor would be smaller with no additional climate change.

This isn't even the end of the problems caused by climate change. Climate change is occurring in several different ways and it is vital to be able to track and predict the economic outcomes for the United States if the average person and their families continue to increase their carbon dioxide equivalents.

Delving further specifically to the effects on the capital stock. "Natural disasters and other aspects of climate change are expected to reduce the capital stock—and therefore GDP—through several channels. In the short run, factories that lose productive capital will no longer be able to produce the same amount of output, and GDP will fall to the extent that other U.S. factories cannot make up the difference. If the lost capital is replaced, those investments

will contribute to GDP in the year the purchases are made. Nevertheless, the economy's capital stock will be smaller than it would have been otherwise—either because capital that was destroyed is not replaced or because replacing it diverts funds from investments in new productive capital. With a smaller capital stock, production will be lower than it would have been otherwise, and so will GDP” (Congressional Budget Office 2).

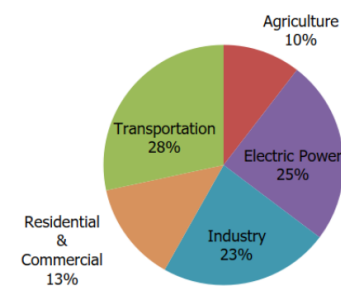
The EPA is the United States Environmental Protection Agency and the EPA conducts an annual report for the U.S. greenhouse gas emissions and sinks by source.

From the EPA, “This annual report, provides a comprehensive accounting of total greenhouse gas emissions for all man-made sources in the United States, including carbon dioxide removal from the atmosphere by ‘sinks,’ (e.g., through the uptake of carbon and storage in forests,

vegetation, and soils) from management of lands in their current use or as lands are converted to other uses. The gases covered by the Inventory include carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride, and nitrogen trifluoride” (EPA 2).

The image below is from the EPA in 2022. Based on the 2022 report for each economic sector there are the impacted sectors economically of transportation, electricity production industry, commercial and residential, agriculture, and land use and forestry. The transportation sector is the largest source of direct greenhouse gas emission. Indirect emissions from electricity

Total U.S. Greenhouse Gas Emissions by Economic Sector in 2022



Total U.S. Greenhouse Gas Emissions by Economic Sector

are less than 1 percent of direct emissions. From the EPA, “In 2022, 60% of our electricity comes from burning fossil fuels, mostly coal and natural gas” (EPA 3). Industrial emissions are the third largest source of direct emissions. The EPA also states, “If indirect emissions from electricity use are allocated to the industrial end-use sector (e.g. to power industrial buildings and equipment), industrial activities account for a much larger share of U.S. greenhouse gas emissions as shown above” (EPA 4).

Lower production levels can contribute to reduced GDP growth, and so the economy’s capital stock will be lower. This also means that factories will lose productive capital and again won’t be able to produce the same amount of output. This can lead the economy’s capital stock to be smaller. As a result of this the capital could be destroyed or replaced by diverting funds into a different section/capital.

A submissive conclusion that can be derived from this research is that the rise of carbon equivalents decreases America’s GDP. GDP or the Gross Domestic Product is essentially the market value of finished goods and services. When carbon equivalents, which is also known as carbon dioxide, increases it can cause several sections to lower in their production rates. These sections include those used daily such as transportation and eventually with the production rate lowering the GDP will also lower. In the long run, the GDP could continue a decreasing trend to the point where factories wouldn’t be able to bring the GDP into an increasing trend. This is caused by the production being lower means that the GDP will lower and so the economy’s capital stock will be lower. This also means that factories will lose productive capital and again won’t be able to produce the same amount of output. This can lead the economy’s capital stock to be smaller. As a result of this the capital could be destroyed or replaced by diverting funds into a different section/capital.

Works Cited

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"Table VM-1 - Highway Statistics 2022 - Policy | Federal Highway Administration."

Www.fhwa.dot.gov, www.fhwa.dot.gov/policyinformation/statistics/2022/vm1.cfm.
www.bea.gov

