Citizens' Climate Lobby

Statement of Citizens' Climate Lobby Concerning Economic Costs of Climate Change

May 15, 2019

Citizens' Climate Lobby (CCL) appreciates the opportunity to submit this written testimony to the House Ways and Means Committee for the May 15, 2019 hearing on the Economic and Health Consequences of Climate Change.

Citizens' Climate Lobby (CCL) is an international grassroots organization that trains and supports volunteers to build relationships with their elected representatives in order to influence climate policy. CCL's key purpose is to create political will for climate solutions while empowering individuals to exercise their personal and political power. CCL has over 120,000 supporters nationwide from every state and congressional district.

Executive Summary

The economic and health costs of fossil fuel emissions have already been substantial, but will rise dramatically if strong action to reduce emissions is not taken. In contrast, the economic cost of reducing emissions through efficient, market-based climate policy is a fraction of the benefits. This testimony will first describe the two primary categories of emissions costs and the ways these costs are evaluated. We then explore current estimates of the health and climate costs of emissions. Finally, we show the value of reduced emissions is multiples of the cost of the climate policy that can achieve them.

Categories of Fossil Fuel Emissions Costs

Costs from emissions fall into two primary categories. The first category reflects damages associated with climate change itself over time, and includes the costs of more extreme weather, wildfires, sea level rise, reduced labor productivity, reduced agricultural yields, and other factors. Costs from these factors have clearly risen over the past 40 years and could either increase greatly in coming decades or stabilize, depending on future emissions paths.

The second category reflects the extensive health damages from fossil fuel emissions. These emissions, especially particulate matter ($PM_{2.5}$) and ozone, are estimated to cause 135,000-200,000 premature deaths, 180,000 non-fatal heart-attacks, 150,000 hospitalizations, 130,000 ER visits for asthma, 18 million lost work days, and 11 million missed school days per year in the US. As an indication of the significance of this, a 2016 World Bank Report estimated that the cost of air pollution for North America was 2.8% of GDP in 2013. These costs are more substantial in the near term but are not expected to grow as fast as climate costs.

Types of Damage Estimates

Health and climate damages from fossil fuel emissions are analyzed in three different ways. First, there are estimates of current or near-term costs. Second, because climate damages become increasingly significant in the decades to come, costs as a reduction to GDP in a specified future year (e.g., 2090) or a future time period (e.g., 2070 – 2099) are estimated. The third, and most comprehensive measure, will estimate the value of damages over time and discount them back to arrive at a current (discounted present) value of projected damages from one ton of emissions. This is referred to as the social cost of carbon, or SCC.

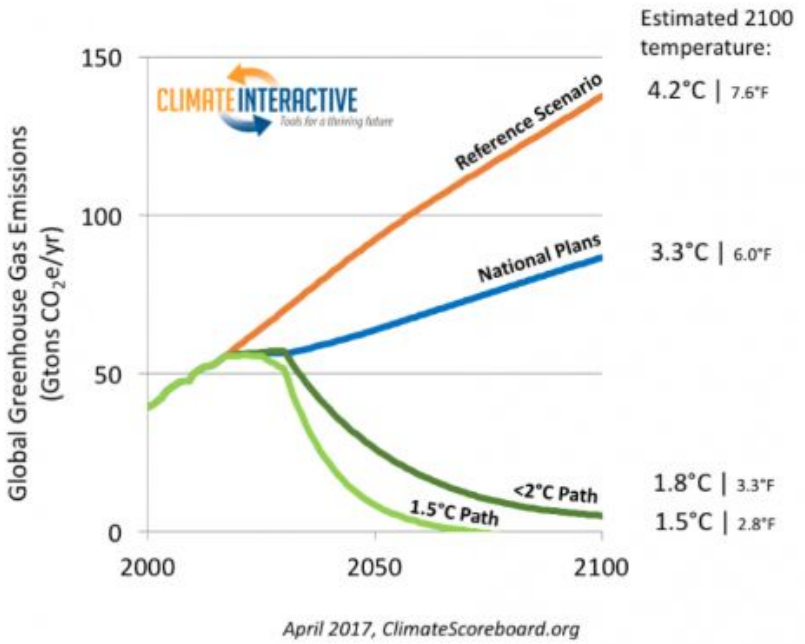
Near-Term Economic Costs of Fossil Fuel Emissions

A recent study, co-authored by Sir Robert Watson (Watson Analysis), a former Chair of the IPCC, makes clear that fossil fuel emissions have already cost the US economy dearly. Relying largely on US government data, it estimates economic losses from weather events influenced by climate change (mostly drought, hurricanes, strong storms and flooding) and health damages averaged $240 billion per year over the last decade. However, the number of extreme weather events costing at least $1 billion (in constant $2017) have more than quadrupled from the 1980's to the most recent decade, and the total expense of such events is up almost three-fold. As a result of the clear upward trend in costs, the economic losses over the next decade are expected to average $360 billion per year.

For context, these losses represent 1.16% and 1.74% of 2018 US GDP ($20,066 billion), and so clearly constrain the growth of the economy. To put them into a familiar context, $300 billion could pay the tuition of all 13.5 million US college students for 4 years. In sum, GHG emissions already exact a heavy toll on the US economy.

Future Costs Under BAU, Paris, and Strong Climate Action Scenarios

The trend of future damages will clearly be driven by the level of emissions and corresponding temperature increases. Temperatures have risen 1.0°C from preindustrial levels[1]. According to the graphic below derived from MIT's C-ROADS model, in a business-as-usual (reference) scenario, the increase in global temperatures will more than quadruple by 2100 to a rise of 4.2°C.



Alternatively, if all countries meet the emission reductions established in their Intended Nationally Determined Contributions (INDCs, or "National Plans" in the graphic above) agreed to as part of the Paris Agreement, the increase in global temperatures will still *more than triple* from 1.0°C to 3.3°C. We should expect these damages to increase in kind or more[2] if emissions are not mitigated and temperatures rise by multiples of the current increase. In contrast, if a climate policy containing a sufficient carbon price, such as that embodied in H.R. 763 (now with 37 cosponsors) were adopted, and if, consistent with the design of the legislation[3], other major emitters adopt strong carbon price policies as well, that action could well constrain the rise to 1.5°C and stabilize climate risk.

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1 See, for example, the IPCC 1.5C report.

2 Research from Kopp indicates damages will grow exponentially with temperatures, which is intuitive, so presuming a linear relationship is quite conservative.

3 This bill contains a border carbon adjustment, which charges a fee on imports from countries that do not have a similar carbon price in order to "level the playing field."

Loss of GDP in a Future Period

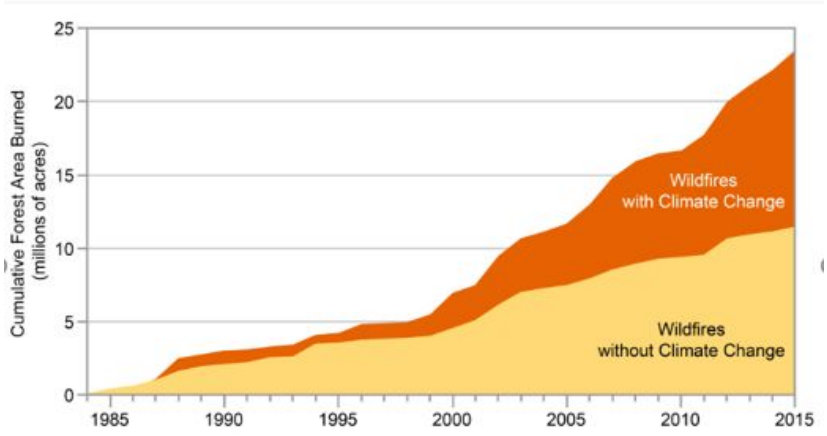
In the Fourth National Climate Assessment Report (NCA4), published in 2018, individual sectors of the economy are evaluated to assess the dollar reduction to GDP in the year 2090. Though the report is clearly compelling and a dire warning to begin mitigation as soon as possible, the final dollar estimates are incomplete as some impacts are not readily quantified.

NCA4 concluded that "In the absence of more significant global mitigation efforts, climate change is projected to impose substantial damages on the U.S. economy, human health, and the environment. "Under scenarios with high emissions and limited or no adaptation, annual losses in some sectors are estimated to grow to hundreds of billions of dollars by the end of the century. It is very likely that some physical and ecological impacts will be irreversible for thousands of years, while others will be permanent" (Chapter 29, Key Message 2). Models evaluated a subset of the economy and concluded that in the unchecked global warming scenario, climate damages will cost the US around $500 billion per year by 2090 ($2015). In a scenario where policies limit global warming to 2.5–3°C, the associated US economic damages will be around $280 billion per year (see Figure 29.2). Lower temperature increases would further limit damages, but were not evaluated.

However, over 80% of the reduced damages from mitigation come from three specific impacts: decreased labor productivity, mortality from extreme temperatures, and damage to coastal property. In at least some respects, these values may dramatically underestimate the economic damage of climate change. Two key examples are presented.

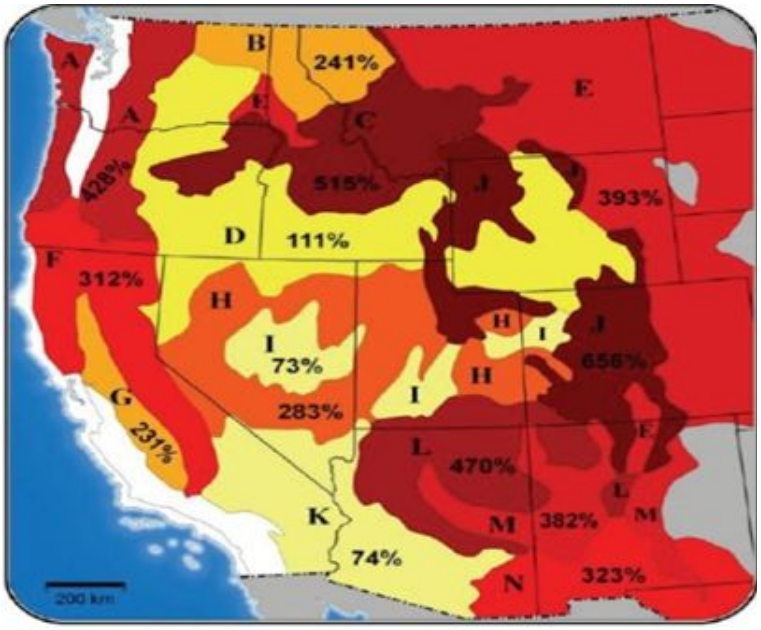
Wildfires

As depicted in the graphic below, NCA4 estimated that about half of the forest area lost in the southwestern US since 1984 is due to climate change (see Chapter 25, figure 4). The cost of fighting wildfires is up 15-fold over this period and annualized damages were estimated at $64 - $285 billion as of 2016. (Damages from wildfire then increased significantly during 2017 and 2018.)



The following graphic from a study evaluating the sensitivity of the American West indicates the risk of wildfires to further temperature increases. The coefficients listed indicate the increase in area burned for each 1°C increase in temperatures. The impacts of the 1°C rise that has already occurred are clearly being felt in substantially greater losses of acreage.

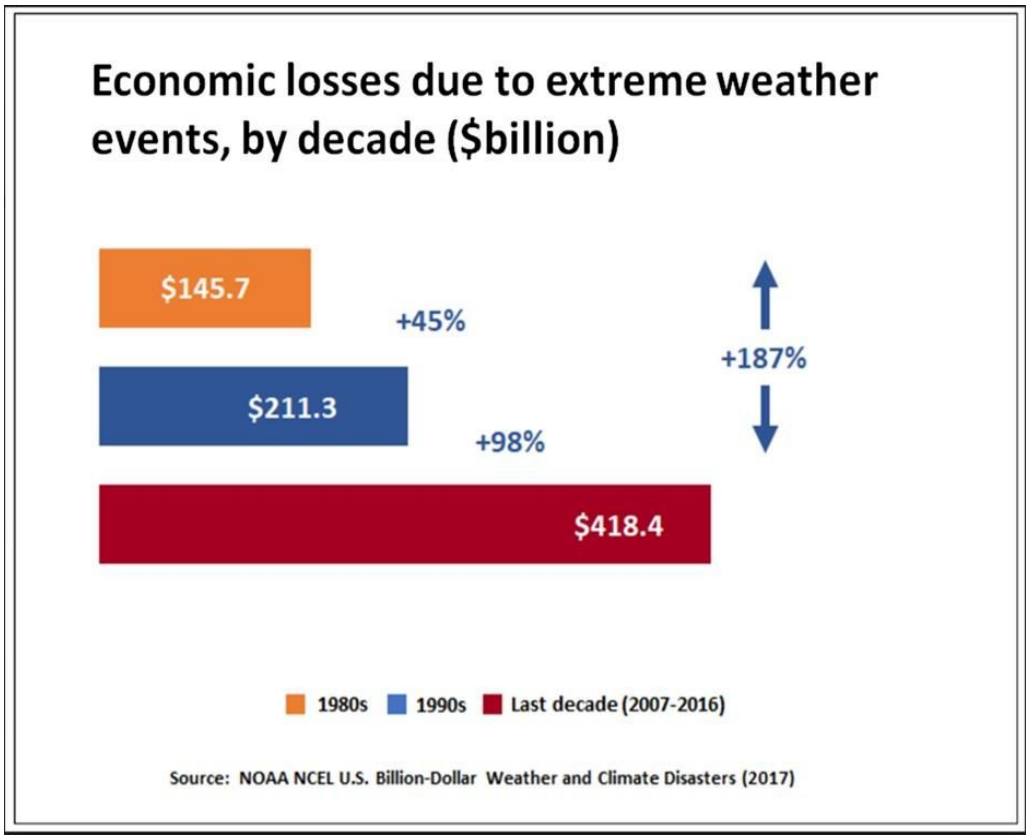
It is simply terrifying to imagine the transformation of the American West that would occur over the coming decades under a scenario in which temperatures were allowed to increase even 3.3°C. The analysis indicates we would lose approximately 10 times the acreage annually to wildfire (e.g., 312% multiplied by 3.3 equals 10.3) in much of the West. Lives would be devastated and lost, and costs of doing business, such as insurance, would skyrocket.



Ironically, the estimates of economic damage quoted in the NCA4 analysis above actually show a net gain from the higher temperature scenario because, essentially, by 2090 there is much less fuel left to burn. Of course, that means that our western forests would have been severely diminished, taking thousands of structures and many lives with them, and no price tag has been assigned to that.

Extreme Weather

A second area poorly captured by the analysis is the increased cost of extreme weather. If we look back at the Watson Analysis of NOAA data (see graphic below), costs have increased 187% over a period in which temperatures rose less than 1°C. It is almost unfathomable to consider the ravages of extreme weather on our daily lives, much less the cost, should we allow temperatures to rise 3.3°C or 4.2°C. What will the ferocity of drought, heat waves, stronger storms, flooding and sea level rise with 3 or 4 times the temperature rise? How will we and our children cope, and what strain would this place on civil society, much less government finances? These are unacceptable outcomes that must be avoided.



Another estimate of economic loss in a future period comes from a working paper published in 2018 by the Federal Reserve Bank of Richmond. This estimated that if we meet the Paris target of limiting global warming to 2°C above pre-industrial temperatures, US economic growth will be approximately 0.2% a year higher (e.g., 2.2% vs. 2.0%) for the period from 2070-2099 than in a higher carbon pollution scenario (4°C global warming by 2100). This is substantial: it indicates US GDP would be roughly 5.4 percentage points higher by 2099 under the 2°C scenario, and this does not include the impact of climate on the economy prior to 2070. For context, a loss of 5.4% of GDP in today's economy would amount to $1,072 Billion, or $3,480 per person per year in the US. This indicates climate change is expected to have a dramatic and adverse impact on the economy in the last half of the century.

Cost of Fossil Fuel Emissions per Ton: the Social Cost of Carbon – The SCC is the net cost incurred by the economy and society over time as a result of the climate damages caused by each ton of carbon pollution, including health costs. Estimates of the SCC range widely for a number of reasons but have risen over time as models begin to include the impact of climate change on economic growth, such as those described in the Federal Reserve paper above.

A comprehensive 2018 study published in Nature Climate Change was able to break out the damage done from a ton of emissions by country. It concluded that the US domestic SCC (damages affecting only the US) is the second-highest in the world, behind only India, primarily because a wealthier country has more to lose.

The study estimated that a ton of carbon pollution costs the US $48 and costs the world $417. So if the US considers itself responsible only for the harm it does to itself, it may focus on the lower end of the range, though we would likely not appreciate it if other countries assumed no responsibility for damage done to us. If we took a more responsible approach, the higher figure would represent the appropriate SCC.

Total Health and Economic Cost of Fossil Fuel Emissions

Given that the US emitted 6.5 billion metric tons of GHGs in 2017, the total long-term cost of US fossil fuel emissions today is approximately $312 billion (US only, $48 times 6.5 billion tons) to $2.7 trillion (global costs, $417 times 6.5 billion tons) per year. This represents between 1.6% and 13.5% of 2018 US GDP. However, it is critical to understand that actual benefits will be far greater than this if the US policy encourages other emitters to reduce emissions, which it certainly should. Finally, it is best not to get too lost in the numbers: this represents an estimate of damages wrought by the future strong storms and flooding, droughts, wildfires, coastal land and property losses, crop losses, lost work days, and premature deaths made far, far worse by the climate change that results from the emissions.

Cost vs Benefit of Reducing Fossil Fuel Emissions

The peer-reviewed economic literature concludes that, depending on its design, there may be a minor economic cost from a climate policy that reduces emissions, though the benefits are many times greater. Specifically, one comprehensive analysis from 2018 utilized 11 different peer-reviewed economic models to evaluate several revenue-neutral carbon tax (RNCT) policies. They concluded that, setting climate and health costs aside, GDP may be reduced as a result of shifting to cleaner, but slightly more expensive sources of energy. However, this cost would generally be less than 0.05% of GDP per year, and never more than 0.10% a year.

In contrast, the RNCT embodied in H.R. 763 is estimated to reduce US emissions approximately 40% within 12 years, reducing health and climate losses in kind, amounting to long-term savings of between 0.6% to 5.4% of GDP. Specifically regarding health benefits alone, in a 2016 article published in *Nature*, Dr. Drew Shindell, a leader in this field, estimated the value of a policy that would likely constrain global temperature increases to 2°C[4]. The study found that such policies would prevent approximately 295,000 premature deaths from 2015 through 2030 and 36,000 deaths per year thereafter. This co-benefit was valued at $250 billion per year, and his team considers their results to be "broadly consistent with other work" in the literature (see page 7)[5]. Clearly, the benefits of an efficient climate policy that reduces GHG emissions dramatically outweighs the costs many times over.

This explains why, on January 16, 44 eminent economists from across the political spectrum signed onto a statement in the Wall Street Journal urging Congress to pass legislation that puts a price on carbon pollution and returns all funds to the American household. They note that "by correcting a well-known market failure, a carbon tax will send a powerful price signal that … will steer economic actors toward a low-carbon future." They also state that returning all funds will "maximize the fairness and political viability" of the policy and that "the majority of American families, including the most vulnerable, will benefit financially by receiving more in carbon dividends than they pay in increased energy prices." The five principles espoused in this statement are fully embodied in H.R. 763.

[4] This emission reduction pathway would be met or exceeded by the Energy Innovation and Carbon Dividend Act, HR 763, if other major emitters instituted similar carbon prices, consistent with the design of the bill.

[5] This co-benefit value should be considered quite conservative as it includes only premature deaths, and explicitly does not include the estimated 29,000 children's ER visits for asthma, 15 million lost adult work days prevented, or other health co-benefits resulting from the policy.