

by Gerhard Damm

Global Warming: Methane and Carbon Dioxide

Adapted from articles in The Washington Post and The New York Times

The Washington Post reported in December 2016 on an analysis in Environmental Research Letters. For three years straight, the world's energy-related emissions of carbon dioxide, the most important greenhouse gas, have been flat. The gas has continued to accumulate in the atmosphere, but emissions haven't gone up, even as economies have continued to grow. However, atmospheric concentrations of methane are spiking. This second most important greenhouse gas causes much sharper short-term warming, although effects fade far more quickly than carbon dioxide.

Methane reaches the atmosphere from a complex collection of human and natural sources. It is the main component of natural gas, and can leak from drilling operations. But it also emerges from many biological processes, including the flooding of rice paddies and enteric fermentation in the stomachs of ruminant animals.

There's still far less total methane in the atmosphere than there is carbon dioxide — but, methane packs a much stronger punch. Over a 100-year period, the emission of a given amount of methane is about 28 times as powerful, when it comes to global warming, as the emissions of an equivalent amount of carbon dioxide.

Although there may be some growth in methane emissions from global oil and gas, the new study notes that two thirds of the world's methane releases come from the tropics, leading the researchers to single out the agricultural sector as a more likely cause — a conclusion that may prove contentious, as this remains a matter of major debate. The study authors said some of the rise is “almost certainly” coming from livestock and specifically cattle, and also pointed to rice paddies, landfills and the management of manure in agriculture.

The research thus singles out an often ignored but still major contributor to global climate change: the agricultural sector. However, it's important to note that there remains considerable scientific uncertainty when it comes to accounting for all the complex, global sources of methane, as well as the processes that withdraw it from the atmosphere once it has been emitted. The paper fully acknowledges that these have not all been adequately understood.

Because of methane's high global warming potential and short lifetime in the atmosphere compared to CO₂, its mitigation offers the possibility to slow climate change efficiently in a shorter time horizon, the study argues.

With regard to CO₂ the New York Times said that carbon pollution doesn't cause only long-term damage. It affects everyday life. Carbon emissions cause lung diseases that kill thousands of people a year. The emissions also reduce worker productivity. And the storms and droughts associated with climate change destroy houses, offices, roads and farmland. Scientists and economists calculated that

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the release of each ton of CO₂ into the atmosphere costs society about \$36. If anything, this number is conservative, because it was calculated before recent evidence of the accelerated effects of climate change. Importantly, however, the number allows for a cost-benefit analysis.

President Ronald Reagan started the practice in 1981 when he required federal agencies to analyze the benefits and costs of their regulations; his Democrat and Republican successors have followed his lead. Unfortunately, reducing environmental regulations to limit greenhouse gas emissions, and adopting “free market” policies will probably end the use of the social cost of carbon in U.S. federal rule makings and defy law, science and economics.

Bill McKibben stated in an opinion piece of The New Yorker on January 24th - “The reason we have environmental regulations is because, when we didn’t, the air was filthy and the water sour. Cleaning up our skies and our streams has been an enormous success in every way, including economically: any attempt to tally things like lost work days or visits to the emergency room shows that curbing pollution has huge returns on investment.”

A large majority of Americans want the government to address climate change — 78 percent of registered voters support taxing emissions, regulating them or doing both, according to a Yale survey conducted after the 2016 election.