eco·cycle
Working to Build Zero Waste Communities

Beyond Kyoto: Why Climate Policy Needs to Adopt the 20-year Impact of Methane

Current accounting protocols for greenhouse gas emissions fail to address the short-term risks and opportunities of methane (CH_4) emissions. Correcting the time horizon—a policy, not scientific decision—launches methane abatement from a climate afterthought to an essential first step forward in the fight against global climate change, and recognizes landfill methane emissions as a source equivalent to 20% of U.S. coal-fired power plants.

The United Nations Intergovernmental Panel on Climate Change (IPCC) developed the concept of global warming potential (GWP) as an index to help policymakers evaluate the impacts of greenhouse gases with different atmospheric lifetimes and infrared absorption properties, relative to the chosen baseline of carbon dioxide (CO_2). Scientific advancements have lead to corrections in GWP values over the past decade, and now our policy decisions sorely need to reflect our new knowledge. In the mid-90s, policymakers for the Kyoto Protocol chose a 100-year time frame for comparing greenhouse gas impacts using GWPs.[i] The choice of time horizon determines how policymakers weigh the short- and long-term costs and benefits of different strategies for tackling climate change. **According to the IPCC, the decision to evaluate global warming impacts over a specific time frame is strictly a policy decision—it is not a matter of science:**

> *"the selection of a time horizon of a radiative forcing index is largely a 'user' choice (i.e. a policy decision)" [and] "if the policy emphasis is to help guard against the possible occurrence of potentially abrupt, non-linear climate responses in the relatively near future, then a choice of a 20-year time horizon would yield an index that is relevant to making such decisions regarding appropriate greenhouse gas abatement strategies."*[ii]

Our knowledge of climate change and its implications have increased exponentially since the Kyoto Protocol was established. Growing political and scientific consensus points to the urgent need to reduce emissions by 50% by 2050, with reductions up to 80% in developed countries, in order to avoid "the likelihood of massive and irreversible disruptions of the global ecosystem."[iii] More than 200 scientists at the U.N. Climate Conference in December 2007 signed the "Bali Climate Declaration by Scientists," calling for policies to reflect the need for global emissions to peak and decline within the next 10-15 years:

> *"Based on current scientific understanding, this requires that global greenhouse gas emissions need to be reduced by at least 50% below their 1990 levels by the year 2050. In the long run, greenhouse gas concentrations need to be stabilized at a level well below 450 ppm (parts per million; measured in CO_2-equivalent concentration). In order to stay below 2°C, global emissions must peak and decline in the next 10 to 15 years, so there is no time to lose."*[iv]

> *"Scientifically speaking, using the 20-year time horizon to assess methane emissions is as equally valid as using the 100-year time horizon. Since the global warming potential of methane over 20 years is 72, reductions in methane emissions will have a larger short-term effect on temperature—72 times the impact—than equal reductions of CO_2. Added benefits of reducing methane emissions are that many reductions come with little or no cost, reductions lower ozone concentrations near Earth's surface, and methane emissions can be reduced immediately while it will take time before the world's carbon-based energy infrastructure can make meaningful reductions in net carbon emissions."*
>
> *– Dr. Ed J. Dlugokencky*
> *Global Methane Expert, NOAA*
> *Earth System Research Laboratory,*
> *March 2008*

To achieve the immediate, substantial greenhouse gas reductions that must occur within the next 10-15 years—not over the next century—we need to revise our analytical tools and adopt the 20-year time horizon for assessing GWP. Methane is a greenhouse gas 72 times more effective at trapping radiant heat than carbon dioxide over a 20-year time period.[v] Methane breaks down in the atmosphere after an average of only 12 years, so the 100-year time frame greatly understates methane's intense, short-term impact by averaging it over a much longer period. Methane is the only major greenhouse gas whose impacts greatly increase over the short-term, and the largest source of human-caused methane in the U.S. is landfills.

Will it make much difference if we assess methane on a 20-year impact period? Consider that when we measure the short-term impact of methane, landfill gas emissions from 2005 rise to 452.6 Tg CO_2 Eq.,[vii] the equivalent to more than 20% of U.S. coal-fired power plants.[vii] Landfill methane results from the anaerobic decomposition of organic materials underground and can be completely prevented by keeping these materials out of the landfill through recycling and composting. Policymakers should prioritize programs that keep organic materials out of landfills and incinerators as a critical first step in immediately curbing greenhouse gas emissions in order to avoid potentially abrupt and dangerous implications of climate change.

About Eco-Cycle

Founded in 1976, Eco-Cycle is one of the largest non-profit recyclers in the U.S. and has an international reputation as a pioneer and innovator in resource conservation. We believe in individual and community action to transform society's throw-away ethic into environmentally-friendly stewardship. Our mission is to provide publicly-accountable recycling, conservation and education services, and to identify, explore and demonstrate the emerging frontiers of sustainable resource management through the concepts and practices of Zero Waste.

---

i U.N. Framework Convention on Climate Change, 1997. "Report of the Conference of the Parties on its Third Session, Held at Kyoto from 1 December to 11 December 2007, Addendum," p. 31. Accessed at http://unfccc.int/resource/docs/cop3/07a01.pdf on March 12, 2008.

ii Intergovernmental Panel on Climate Change, 1994. *Radiative Forcing of Climate Change and an Evaluation of the IPCC IS92 Emission Scenarios*. Cambridge University Press, p. 229.

iii European Union, 2007. Limiting Global Climate Change to 2º Celsius: The way ahead for 2020 and beyond." Accessed at http://ec.europa.eu/environment/climat/future_action.htm on March 17, 2008.

iv Climate Change Research Centre, 2007. "2007 Bali Declaration by Scientists." Accessed at http://www.climate.unsw.edu.au/bali/ on March 17, 2008.

v IPCC, 2007. p. 212.

vi U.S. Environmental Protection Agency, 2007. "U.S. Greenhouse Gas Inventory Reports, p. ES-5. Accessed at http://www.epa.gov/climatechange/emissions/downloads06/07ES.pdf on March 17, 2008.

vii 2006 U.S. landfill emissions were 125.7 Tg CO2 eq., as cited in U.S. EPA, 2007. GWP values were adjusted from 21 to 72 for the 20-year impact. Calculator available at www.ecocycle.org.

viii U.S. EPA, 2008. "Greenhouse Gas Equivalencies Calculator."Accessed on March 13, 2008 at http://www.epa.gov/cleanenergy/energy-resources/calculator.html.