



Action on air pollution benefits both climate and health

Measures designed to reduce levels of methane and black carbon in the atmosphere could help bring climate change under control more quickly than CO₂ targeting measures alone, according to a new study. The researchers also predict wider benefits for human health and food security from methane-targeted measures.

The **International Energy Agency (IEA)** has examined options for keeping the global temperature increase to 2°C above preindustrial levels, based on measures to stabilise CO₂ equivalent concentrations at 450 parts per million¹. As well as CO₂ focused approaches, international organisations, including the G8 Nations, are interested in climate mitigation measures that target air pollutants. Methane is a more potent greenhouse gas (GHG) than CO₂, so strongly influences climate change.

The researchers looked for measures that could mitigate both air pollution and global warming. They modelled the effects of 400 air pollution control measures on GHG emissions for 2030. After leaving out those measures that only reduced air pollution, they ranked the remainder by their potential climate impact.

The top 14 of these measures accounted for 90% of the total potential emissions reductions, with seven targeted at methane and another seven targeted at black carbon. Methane-related measures included those that affect the coal mining, oil and gas production, and waste sectors. Black carbon arises from incomplete combustion, and measures to curb emissions include bans on burning agricultural waste, eliminating high-emitting vehicles, and encouraging modern cooking and heating.

Through climate simulations, the researchers revealed that implementing all 14 measures could have a more immediate impact on warming than the CO₂ targeted measures outlined in the IEA's plans. CO₂ stays in the atmosphere for a long time, and action to reduce emissions would not start to have an impact on temperatures until around 2040. However, measures designed to reduce methane and black carbon could start to slow the temperature rise 10-20 years earlier.

The researchers assumed a scenario in which only presently agreed policies affecting emissions are implemented. Under this, global temperatures would rise by nearly 3°C by 2070, whereas CO₂ limiting measures, or the 14 methane and black carbon limiting measures, are predicted to keep the increase below 2.3°C until that time. By combining CO₂ and 14 methane and black carbon limiting measures the researchers predict that in 2070 the temperature increase would be below the 2°C target. Without the CO₂ measures, however, the effects of methane and black carbon reductions would not prevent temperatures from rising steeply in the future.

The study also examined the benefits of improved air quality for human health, agriculture and the global economy. Methane is directly involved in reactions that produce ozone, a GHG that is also a main component in smog. Thus, methane reductions in particular would play a role in reducing crop losses caused by ozone, while the black carbon focused measures would have the greatest impact on human health by reducing particulates. According to the simulations, the 14 measures identified could avoid up to five million premature deaths a year related to air pollution, and increase crop yields by up to 135 million metric tons. The economic value of the benefits associated with methane reductions would be worth around €818.35 per metric ton of methane.

1. See: www.iea.org/weo/docs/weo2009/climate_change_excerpt.pdf

Source: Shindell, D. Kuylenstierna, J.C.I., Vignati, E. *et al.* (2012). Simultaneously mitigating near-term climate change and improving human health and food security. *Science*. 335, 183-184.

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