Do climate policies need a ‘pollution safety margin’?

A recent analysis suggests climate change policies may have to include a ‘pollution safety margin’ which accounts for the warming impact of many air pollutants. Available evidence suggests that policies to reduce the harmful effects of air pollutants could accelerate climate change over coming decades by cutting emissions that currently contribute to cooling the climate.

Debate continues as to whether air pollution policies support efforts to tackle climate change or whether they effectively enhance climate change. Air pollutants have a complex relationship with climate change. Some pollutants, such as black carbon and ozone, increase warming by trapping heat in the atmosphere, while others, such as sulfur dioxide forming light reflecting particles, have a cooling effect on the climate.

Since some air pollutants clearly increase warming, there is considerable interest in understanding the co-benefits of managing air pollution and climate change. Air pollutants are relatively short-lived, particularly compared with long-lived greenhouse gases, such as carbon dioxide (CO₂), and measures to control air pollutants could have an effect on climate change in the short-term. However, whether air pollution control measures will always work in harmony with climate change mitigation is still an open question.

The problem is that the models used to predict the effects of reductions in air pollutants do not adequately capture the complex interactions between air pollutants themselves and between air pollutants, other gases, and climate change. Many other interactions which are not adequately captured in current models could affect the impact of air pollutants on climate, such as the interactions between, land ecosystems and air pollutant chemistry. As an example, far-reaching measures to control air pollution that would significantly reduce the cooling pollutants might worsen climate change in the short-term. In the long-term though, the long-lived climate forcers, such as CO₂, will dominate by their heating effect.

Recent chemistry-climate modelling studies have attempted to account for geographical differences in patterns of air pollution emissions and to consider the way these pollutants interact in the atmosphere. These models which explored the effects of a variety in projected future changes in short-lived air pollutants suggest that these species are likely to contribute to further warming by 2050. For example, studies considering pollution aerosol particles and air pollution abatement strategies in the energy and transport sectors suggest that, even with maximum abatement strategies, changes in air pollution patterns are likely to contribute to an increase in temperatures.

Given the negative human health impacts of air pollutants, the question is not whether to implement air pollution policies but rather, what impact these policies will have on climate change. Increasingly, research indicates that future air pollution, even with maximum feasible abatement, is likely to contribute to increasing temperatures. This suggests that climate change policies may need to seek greater reductions in greenhouse gases to provide a ‘pollution safety margin’ that can accommodate the potential warming effects of air pollution control measures.


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