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Role of Black and Organic Carbon Emissions in Integrated Assessments

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The most appropriate role for black and organic carbon (BC/OC) emissions in any climate change mitigation strategy is currently unclear. Uncertainties remain large with regard to emissions quantification, temporal and regional atmospheric concentrations, net radiative and other climatic effects, and thus appropriate comparisons with greenhouse gases via metrics such as the GWP. If it becomes desirable to reduce BC/OC emissions not only for human health concerns but also for climate protection, one must consider the extent to which BC/OC emissions are already addressed—directly or indirectly—by existing and forthcoming air quality policies. For example, new PM_{2.5} regulations for U.S. diesel vehicles, estimated to be the most significant source of BC emissions in the U.S., will likely lead to a dramatic reduction in BC over the coming decades. Integrated assessments that project future BC/OC emissions, and use future baselines for BC/OC mitigation analyses, need to account for such evolving air quality policies. Integrated assessments can help address questions about synergies and potential tradeoffs between greenhouse gas and BC/OC mitigation. A new effort among integrated assessment modelers within the Energy Modeling Forum, labeled EMF-22, will be working to improve projections of BC/OC and explore these interactions with greenhouse gas mitigation.