



Global emissions of fluorinated greenhouse gases until 2050: technical mitigation potentials and costs

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The anthropogenic fluorinated (F-gases) greenhouse gas emissions have increased significantly in recent years and are estimated to rise further in response to increased demand for cooling services and the phase out of ozone-depleting substances (ODS) under the Montreal Protocol. F-gases (HFCs, PFCs and SF₆) are potent greenhouse gases, with a global warming effect up to 22,800 times greater than carbon dioxide (CO₂). This study presents estimates of current and future global emissions of F-gases, their technical mitigation potential and associated costs for the period 2005 to 2050. The analysis uses the GAINS model framework to estimate emissions, mitigation potentials and costs for all major sources of anthropogenic F-gases for 162 countries/regions, which are aggregated to produce global estimates. For each region, 18 emission source sectors with mitigation potentials and costs were identified. Global F-gas emissions are estimated at 0.7 Gt CO₂eq in 2005 with an expected increase to about 3.6 Gt CO₂eq in 2050. There are extensive opportunities to reduce emissions by over 95 percent primarily through replacement with existing low GWP substances. The initial results indicate that at least half of the mitigation potential is attainable at a cost of less than 20€ per t CO₂eq, while almost 90 percent reduction is attainable at less than 100€ per t CO₂eq. Currently, several policy proposals have been presented to amend the Montreal Protocol to substantially curb global HFC use. We analyze the technical potentials and costs associated with the HFC mitigation required under the different proposed Montreal Protocol amendments.