



International efforts focusing on Short-Lived Climate Forcers



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Overview

- Short-Lived Climate Forcers (SLCFs)
 - Methane
 - Black carbon
 - HFCs
- Recent International Collaboration to Advance Action on SLCFs
- Looking forward

Short-Lived Climate Forcers

- “Short-lived climate forcers” (SLCFs) refers to gases and aerosols that have a strong impact on climate forcing, but that are not long-lived in the atmosphere compared to carbon dioxide (CO₂).
- Three key SLCFs are methane, black carbon, and hydrofluorocarbons (HFCs).
- Collectively, these SLCFs are responsible for 30-40% of climate warming observed today.
- These SLCFs also have significant impacts on health, air quality, and food security.

Methane, black carbon, and HFCs

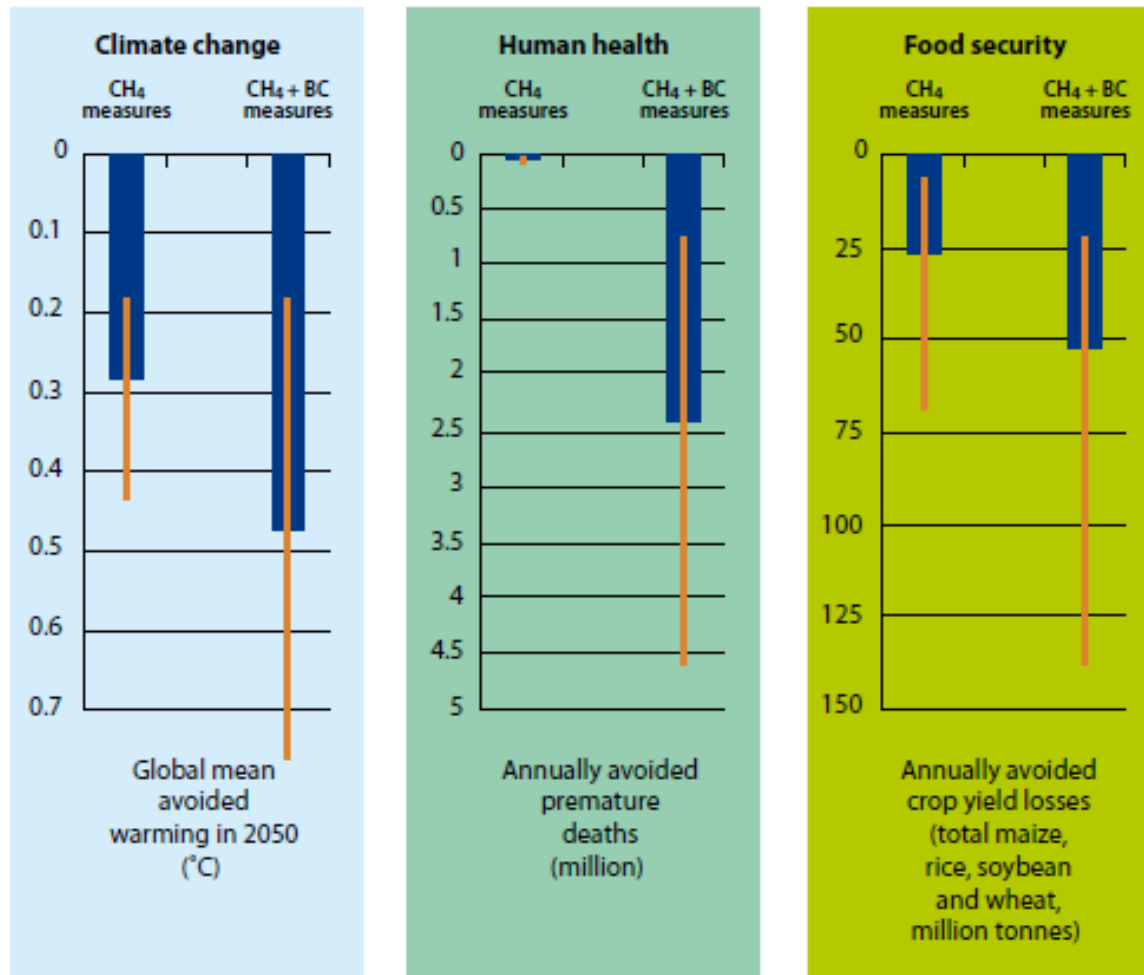
- **Methane:** Anthropogenic and natural emissions sources.
 - Atmospheric lifetime of ~ 12 years; relatively well-mixed in the atmosphere, so emissions reductions anywhere are important.
 - Can be recovered for beneficial use.
 - Very potent greenhouse gas (25 times CO₂).
- **Black carbon:** particulates; major component of soot.
 - Not a greenhouse gas; rather, warms the atmosphere by intercepting sunlight and absorbing it.
 - Produced from incomplete combustion of fossil fuels, wood, and biomass.
 - Atmospheric lifetime is days to weeks; not well-mixed in the atmosphere.
 - Important health impacts.
- **HFCs:** Growth in use of HFCs (e.g., refrigerants and air conditioning) are a direct result of phasing out of ozone-depleting substances.
 - Majority of commercial HFCs have short atmospheric lifetimes (~ 1 to 29 years) but are very potent GHGs (hundreds of times more potent than CO₂).

UNEP, WMO *Integrated Assessment on Black Carbon and Tropospheric Ozone*

- Black carbon and tropospheric ozone are harmful air pollutants with substantial regional and global climate impacts.
- Black carbon's darkening of snow and ice surfaces increases their absorption of sunlight, which along with atmospheric heating exacerbates melting of snow and ice around the world, including the Arctic, the Himalayas, and other glaciated, snow-covered regions.
- Reducing black carbon and tropospheric ozone now will slow the rate of climate change within the first half of the century. Climate benefits are achieved by reducing emissions of methane (an ozone precursor) which is also a powerful greenhouse gas.
- The identified emissions reducing measures complement but do not replace anticipated CO₂ reduction measures.

Source: UNEP and WMO (2011): *Integrated Assessment of Black Carbon and Tropospheric Ozone – Summary for Decisionmakers*

Global Benefits from implementation of Black Carbon, methane measures (2030)



Source: UNEP and WMO (2011): *Integrated Assessment of Black Carbon and Tropospheric Ozone – Summary for Decisionmakers*

- National Approaches
 - Voluntary Programs (technical assistance, capacity building)
 - Regulation (i.e., EU-US landfills)
 - Financial Incentives (i.e. tax credits)
- International Efforts
 - Global Methane Initiative
 - UNFCCC (CDM and JI mechanisms)

Black Carbon Efforts

- **International Maritime Organization (IMO)**
 - Investigating appropriate control measures to reduce the impact of Black Carbon emissions from international shipping
- **Global Alliance for Clean Cookstoves**
 - New \$250 million 10-year public-private partnership led by UN Foundation to save lives, improve livelihoods, empower women, and combat climate change by creating a thriving global market for clean and efficient household cooking solutions
- **Heavy Duty Diesel**
 - U.S. National Clean Diesel Campaign sets stringent diesel PM standards for new diesel engines: on-highway trucks as of 2007, non-road equipment as of 2011, and new locomotive and marine diesel engines as of 2015
 - Projected to reduce black carbon emissions by 90% or more through use of diesel particulate filters
- **Arctic Black Carbon Initiative:** USG \$5M program to address Russian BC
- **Other initiatives such as work under Arctic Council can greatly contribute to reducing black carbon emissions**

HFCs Reduction Efforts

National and Regional Approaches

- European F-Gas regulations (e.g., limits motor vehicle air conditioners to refrigerants with less than 150 GWP)
- U.S. Significant New Alternatives Policy (SNAP) Program lists 400+ substitute alternatives with lower overall risks considering:
 - ODP & GWP, Flammability, Toxicity, Air Quality, Ecosystem Eff., Health & Safety
 - Next generation substitutes are alternatives for both ODS & HFCs
- U.S. regulations prohibit intentional venting of HFCs and require specific servicing practices for motor vehicles

Bilateral Approaches

- U.S.-Indo Task Force seeks to provide industry & government dialogue
 - Report on the suite of available alternatives to HFCs
 - Domestic and international action to phasedown use

Multilateral Approaches

- Montreal Protocol – North American Proposal
 - Control HFC Production and Consumption - *Phasedown*, not *Phaseout*
 - Complement UNFCCC

International Coordination on SLCFs

- On August 29-30, the United States hosted a working-level brainstorming discussion on the need to address SLCFs and possible paths forward
 - 12 countries & UNEP participated, broadly agreed that action is a priority
- On September 12, Mexico and Sweden hosted a Ministerial meeting in Mexico City to discuss potential international cooperation on SLCFs.
 - The Ministerial meeting was preceded by two days of technical discussions about methane, black carbon, and HFCs.
 - 23 countries participated, with Minister-level participation from Bangladesh, Canada, Mexico, Sweden, and the United States.
- **Key outcomes:**
 - Participants acknowledged that any effort on SLCFs mitigation must be done in tandem with long-term mitigation efforts, including CO₂.
 - Strong support was expressed for a strengthened, concerted approach for national and regional measures and for an action-oriented initiative at the global level that engages the private sector and civil society.
 - Actions on SLCFs should be complementary to work under the UNFCCC, particularly long-term mitigation.

U.S. supports broader international initiative on SLCFs

- At the conclusion of discussions at the Mexico Ministerial meeting, Todd Stern, the U.S. Special Envoy for Climate Change and the head of the U.S. delegation, expressed strong US support for an initiative on short-lived climate forcers.
- **“It is clear to the U.S. that the issue of near-term climate change merits its own initiative.”**
 - The need to reduce emissions of short-lived climate forcers is clear and it is urgent.
 - There is no existing forum that addresses this need systematically or strategically.
 - There are mitigation options available that can be accelerated and incentivized through coordinated action.

U.S.-proposed guiding principles

- **First**, we need to be explicit and specific about the relationship between a new short-lived climate forcers initiative and existing efforts.
- **Second**, efforts to reduce short-term forcers produce benefits on multiple fronts – on climate, but also health, food security, and energy security. It is important to highlight both climate and other co-benefits.
- **Third**: the initiative should be light on its feet. It should draw in private sector participation, and be able to launch new initiatives where there are gaps, but we don't need a large institution.
- **Fourth**: A new initiative should be inclusive, but not at the price of ambitious actions. It should be open to anyone who wants to engage, but should not be encumbered by having to be all things to all people or to engage in endless political debate.
- **Fifth**: Most importantly, any initiative will require resources. Partnership in strategy and political message can go a long way, but partnership with funds—funds to enhance existing efforts and funds to fill gaps where we find them—will go a lot further.

Key Points on a Potential SLCF Initiative: U.S. Perspective

- Efforts on near-term warming are complementary to and supportive of our shared commitment to action on carbon dioxide.
 - The UNEP-WHO integrated assessment vividly illustrates the importance of a close link between the scientific community and policymakers.
- Defining the mandate and terms of international SLCF cooperation in a way that demonstrates support for the goals of the UNFCCC while avoiding any competition with the UNFCCC scope of work.
- Establishing a mutually beneficial relationship with existing technical institutions.
 - The new partnership should strive to elevate the profile of those organizations, such as GMI, not to compete with them or to dictate to them.
- The United States looks forward to working with all interested countries to bring to fruition an initiative that raises the profile of the benefits of SLCF mitigation, and incentivizes and accelerates international action.

Looking forward for GMI

- A new international initiative on SLCFs effort could ultimately greatly benefit our efforts through the Global Methane Initiative (GMI).
- While the initiative is still under development and no formal announcements have been made, this is an exciting new potential opportunity.
- The Steering Committee will have a chance to discuss some of the implications and our perspectives at our meeting today.

BACKGROUND

Co-Benefits: Methane Mitigation

- **Air Quality Improvement**

- Methane contributes to ground-level ozone: reducing methane emissions by 20% could avoid 370,000 premature deaths over 20 years
- Reduction of local emissions of VOCs and HAPs from landfills, agriculture, and oil and gas systems
- Odor reductions for landfill and agriculture

- **New Sources of Clean Energy**

- Methane is primary component of natural gas
- Mitigation makes methane available for energy

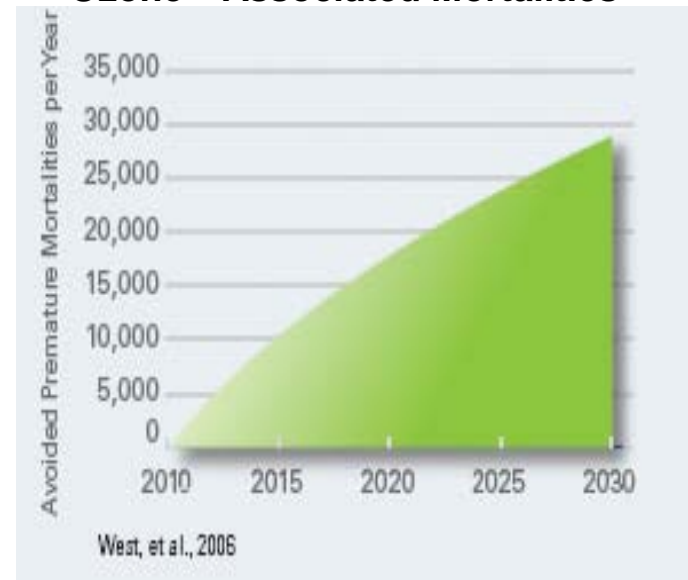
- **Water Quality Benefits**

- Local water quality improvements due to improved management of agricultural wastes & leachate in landfills

- **Industrial Safety**

- Reducing methane, an explosive gas, improves worker safety in coal mining, oil & gas

Reducing Methane Emissions can Avoid Ozone – Associated Mortalities

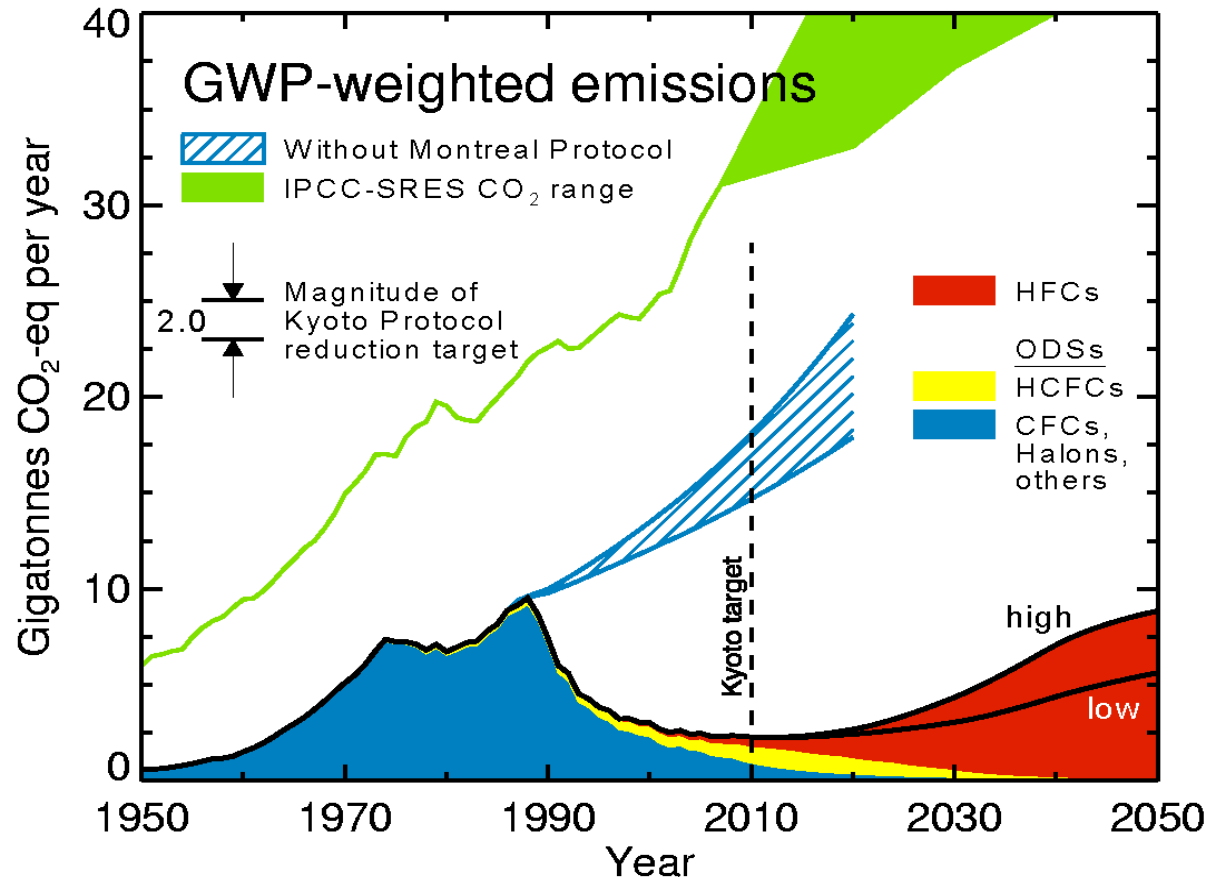


Co-Benefits: Health Effects of Black Carbon

- Black Carbon is comprised of fine particles ($PM_{2.5}$), which are strongly associated with adverse effects on cardiovascular and respiratory systems
 - **Ambient** $PM_{2.5}$ exposures linked to premature death, heart attacks, strokes, hospital and emergency room visits, bronchitis, asthma, and cancer
 - In the U.S. $PM_{2.5}$ associated with 130,000-320,000 premature deaths in 2005 (5.4% of all deaths nationwide)
 - According to WHO, urban $PM_{2.5}$ linked to 800,000 premature deaths annually; more recent health studies suggest estimates likely significantly higher, linking total $PM_{2.5}$ (urban and rural) to ~3.7 million premature deaths
 - **Indoor** $PM_{2.5}$ exposures associated with respiratory impacts, e.g., acute lower respiratory infections (ALRI) in children, chronic obstructive pulmonary disease (COPD) in women, cardiovascular impacts i.e., high blood pressure
 - WHO estimates indoor smoke from cookstoves leads to 2 million premature deaths annually, ~64% occur in low-income countries
- Hundreds of thousands of premature deaths, millions of illnesses can be prevented annually through SLCF mitigation efforts reducing indoor and outdoor pollution

HFCs: Potential Growth, If Unmitigated

- HFC growth directly linked to the Montreal Protocol's ODS phaseout and expanding availability of refrigeration and air conditioning
- HFC emissions could reach 19% of projected global CO₂ emissions by 2050 if left unchecked



Proposed amendment would:

- Control HFC Production and Consumption
- Phasedown, not Phaseout of HFCs
- Control By-Product Emissions of HFC-23 excluding CDM projects
- Complements but Leaves Unchanged UNFCCC Obligations
 - Supports Global Efforts to Reduce GHGs
 - Leaves HFC Emissions in UNFCCC Basket

Why the Montreal Protocol?

- More Than 20 Years Experience With These Sectors
 - Air-conditioning, refrigeration, solvents, foams, aerosols, adhesives, coatings & inks, and fire suppression
- Multilateral Fund, Technology and Economic Assessment Panel (TEAP), Scientific Assessment Panel (SAP), Environmental Effects Assessment Panel

Conclusions: Near Term Opportunities for SLCFs

Action on SLCFs can be taken now and will have significant climate benefits

- Methane:
 - Enhanced global cooperation through the GMI can have dramatic impact on methane mitigation efforts
 - Financing alone is not enough, significant need for training, technology transfer, and capacity building to establish a “pipeline” of projects
- HFCs:
 - Montreal Protocol optimum vehicle for HFC phasedown, sector experience, existing financial mechanism, tied to ODS phaseout, potential 98 gigatons
 - National and regional actions offer significant opportunities for transition – key is to act now to prevent growth
- Black Carbon:
 - Global Alliance for Clean Cookstoves offers significant opportunity for large-scale replacements, addressing public health and climate challenges
 - Arctic Black Carbon Initiative: \$5M program focused on near-term mitigation in Russia
 - Other global, regional and national initiatives e.g., IMO, Arctic Council and domestic actions provide opportunities
- Co-benefits: SLCFs offer co-benefits for human health, improved air and water air quality, and better energy efficiency