

# **SHORT LIVED CLIMATE POLLUTANTS:**

## *Summary of Recent Findings*

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**Without Actions to mitigate  
emissions of manmade greenhouse gases**

**The planet is likely to warm  
(compared with pre-industrial times):**

**by 3.6 F (2 C) by mid- 21<sup>st</sup> century**

**by 7.2 F (4 C) by end of 21<sup>st</sup> century**

# Pathway for limiting global warming to 2 C (3.6 F)

*Ramanathan and Xu, PNAS, 2010*

## ***IT IS STILL NOT TOO LATE***

***I. Stabilize Carbon Dioxide Concentrations below 440ppm***

***II. Reduce Short Lived Climate Pollutants***

***( contributes 40% of current Global warming):***

***Black Carbon (<2 weeks);***

***Ozone (< 2 months);***

***Methane (<15 years)***

***HFCs & HCFCs (<15 years)***

***25 to 4000 times more effective than CO<sub>2</sub> on century time scale***

*A study led by the Scripps Institution of Oceanography in  
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# Mitigation of short-lived climate pollutants slows sea-level rise

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# *Efficacy of Mitigation Actions*

## FROM NOW TO MID-CENTURY

Mitigation of CO<sub>2</sub> and SLCPs can reduce the warming from now to 2050 by about 1.3F (**0.7C**).

*SLCPs contribute 85% (1.1F/**0.6C**) to warming reduction.*

**Methane Contributes 50%**

## FROM NOW TO END OF CENTURY

Mitigation of CO<sub>2</sub> and SLCPs can reduce the warming from now to 2100 by about 4.3F (**2.4 C**)

SLCPs and CO<sub>2</sub> mitigation contribute 50% (2.2F/**1.2C**) each to warming reduction.

# ***Efficacy of Mitigation on End of 21<sup>st</sup> Century Sea Level Rise***

- ***In the absence of any mitigation:***

***Sea level rise (SLR) is projected to be in the range of  
1.6 ft (0.5m) to 8 ft (2.5m)***

- ***With CO<sub>2</sub> and SLCPs mitigation***

***The end of century SLR can be reduced by 30%.***

***The percent contribution to SLR Reduction are  
CO<sub>2</sub> = 29%; methane (includes ozone) = 41%;  
black carbon = 17%; HFCs = 13%.***

# I. Methane Emission Mitigation Actions [WMO/UNEP 2011]

## **TARGET LEAKS FROM :**

**oil and gas production, long-distance gas transmission, coal mining, etc**

## **TARGET EMISSIONS FROM:**

**municipal waste and landfills, wastewater, livestock manure and rice paddies, etc**

## *II. Black Carbon Emission Mitigation Actions*

### **TARGET EMISSIONS FROM INCOMPLETE COMBUSTION:**

**diesel vehicles, Advanced biomass stoves, brick kilns agricultural waste burning, etc, etc.**

## III. HFCs [Molina et al 2009]: Replace with low GWP gases