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## **Complementary Action to Curb 'Soot' and 'Smog' Pollution Could Help Limit Global Temperature Rise to 2 Degrees or Less**

**Multiple Benefits Include Improved Air Quality and Human Health, Higher Crop Yields,  
Reduced Rate of Climate Change in the Near-Term and a Chance to Slow Serious  
Melting of the Arctic**

### **New UNEP-WMO Assessment Complements Urgent Action Needed to Cut CO<sub>2</sub> Emissions Under UN Climate Treaty**

**Bonn, 14 June 2011** - Fast action on pollutants such as black carbon, ground level ozone and methane may help limit near term global temperature rise and significantly increase the chances of keeping temperature rise below 2 degrees C --and perhaps even 1.5 degrees C—a new assessment says.

Protecting the near-term climate is central to significantly cutting the risk of “amplified global climate change” linked with rapid and extensive loss of Arctic ice on both the land and at sea.

Fast action might also reduce losses of mountain glaciers linked in part with black carbon deposits while reducing projected warming in the Arctic over the coming decades by two thirds.

The scientists behind the assessment, coordinated by the United Nations Environment Programme (UNEP) and the World Meteorological Organization (WMO), also point to numerous public health and food security opportunities above and beyond those linked with tackling climate change.

Big cuts in emissions of black carbon will improve respiratory health; reduce hospital admissions and days lost at work due to sickness, says the assessment whose Secretariat is provided by the Stockholm Environment Institute. Indeed close to 2.5 million premature deaths from outdoor air pollution could on average be avoided annually world-wide by 2030 with many of those lives saved being in Asia, it is estimated.

Big cuts in ground level ozone could also contribute to reduced crop damage equal to between one to four per cent of the annual global maize, rice, soybean and wheat production.

Cutting these so-called 'short-lived climate forcers' can have immediate climate, health and agricultural benefits, the report concludes. This is because, unlike carbon dioxide (CO<sub>2</sub>) which can remain in the atmosphere for centuries black carbon for example only persists for days or weeks.

The researchers however also underline the fact that while fast action on black carbon and ground level ozone could play a key role in limiting near-term climate, immediate and sustained action to cut back CO<sub>2</sub> is crucial if temperature rises are to be limited over the long-term.

It is the combination of action on short-lived climate forcers and long-lived greenhouse gases which improves the chances of keeping below the 2 degree target throughout the 21<sup>st</sup> Century.

The findings, released today in Bonn, Germany during a meeting of the UN Framework Convention on Climate Change (UNFCCC) have been compiled by an international team of more than 50 researchers chaired by Drew Shindell of the National Aeronautics and Space Administration (NASA).

Achim Steiner, UN Under-Secretary General and UNEP Executive Director, said: "There are now clear, powerful, abundant and compelling reasons to reduce levels of pollutants such as black carbon and tropospheric ozone along with methane: their growing contribution to climate change being just one of them".

"This assessment underlines how the science of short lived climate forcers has evolved to a level of maturity that now requires and requests a robust policy response by nations. The experts spotlight how a small number of emission reduction measures--targeting for example recovery of methane in the coal, oil and gas sectors through to the provision of cleaner burning cook stoves; particle traps for diesel vehicles and the banning of open burning of agricultural wastes-- offer dramatic public health, agricultural, economic and environmental benefits," he added.

The UNEP/WMO *Integrated Assessment of Black Carbon and Tropospheric Ozone* suggests that action could be catalyzed through not only the UN climate convention process but also via, for example, strengthening existing national and regional air quality agreements.

Michel Jarraud, Secretary-General of the WMO, said: “Most attention is focused on reducing the main greenhouse gas, CO<sub>2</sub>, to combat climate change. However recent years it has become clear that a range of other pollutants such as black carbon and tropospheric ozone are aggravating the challenge”.

“This report underlines the need for a stronger observational basis and research effort to increase scientific understanding of the role of these other pollutants in the changing climate system. WMO’s Global Atmosphere Watch Programme is addressing these challenges as a priority,” he added.

Drew Shindell of NASA’s Goddard Institute for Space Studies said: “This report has brought clarity to the complexity of the heating and cooling effects of a range of pollutants and uses the science to show that there are clear and concrete measures that can be undertaken to help protect the global climate in the short to medium term”.

“Perhaps the most intriguing link is between emissions of methane and the formation of tropospheric ozone. Methane is a powerful greenhouse gas in its own right, but it has emerged that it is also triggering a great deal more global warming by contributing to the formation of significant levels of ground level ozone—indeed more than was previously supposed. The win-win here for limiting climate change and improving air quality is self-evident and the ways to achieve it have become far clearer as a result of this assessment,” he added.

Today the Government of Sweden announced support for a comprehensive and forward-looking policy assessment to assist governments on the next steps towards fast action on short lived climate forcers. This is line with Sweden's strategy on SLCFs and its policy to integrate climate change and air pollution policies.

The work, to be coordinated by UNEP, is expected to be ready in advance of the next Climate Convention meeting scheduled later in the year in Durban, South Africa.

### **The Pollutants Assessed**

Black carbon is a major component of soot and is formed from the incomplete combustion of fossil fuels, wood and biomass. Key sources include emissions from cars and trucks; cookstoves; forest fires and some industrial facilities.

It affects the climate by intercepting and absorbing sunlight and darkens snow and ice when deposited, while also influencing cloud formation. It is also a health hazard.

Tropospheric ozone is a major component of urban smog, is a powerful greenhouse gas and air pollutant harmful to human health and ecosystems.

The threefold increase in concentrations in the northern hemisphere in the past 100 years has made it the third most important global greenhouse gas.

Tropospheric ozone is formed from other gases including methane—itsself a potent greenhouse gas emitted from sources such as waste tips, livestock and the oil and gas industry.

### **How the Study was Carried Out**

Both black carbon and the gases that form tropospheric or ground level ozone are typically co-emitted with other gases and particles, some of which cause warming and others that cause cooling.

A relatively small selection of policy measures were chosen from around 2,000 separate measures. The impact of measures likely to reduce global warming, which have a large potential for emission reductions and provide air quality and other benefits were modeled out to 2070.

### **Measures for Significantly Reducing Black Carbon and Ground Level Ozone**

Nine actions are pin pointed in the assessment for black carbon, all of which could be undertaken today including:-

- Diesel particle filters for vehicles as part of combined standards on vehicle emissions and fuels
- Replacing wood burning stoves in developed countries with pellet stoves and boilers using fuel from recycled wood and sawdust
- Clean-burning biomass stoves for cooking and heating in developing countries
- Banning open burning of agricultural wastes
- Replacing traditional brick kilns with vertical shaft and Hoffman kilns

Seven actions are pinpointed for addressing ground level ozone which hinge on addressing methane emissions including:-

- Encouraging composting and other measures to curb organic wastes going to landfill
- Upgrading water treatment works to include gas recovery

- Measures to cut methane emissions from the coal, oil and gas industries, including Cutting leaks from long distance gas pipelines Promoting anaerobic digestion of manure from cattle and pigs
- Intermittent aeration of continuously flooded paddy fields

## **Notes to Editors**

### **Key Findings from the Integrated Assessment of Black Carbon and Tropospheric Ozone Assessment in Detail**

Without measures to curb climate change emissions, temperatures are projected to rise on average by a further 1.3 degrees C by mid-century “bringing the total warming from pre-industrial levels to about 2.2 degrees C.

#### **Arctic**

“Near term warming may occur in sensitive regions and could cause essentially irreversible changes such as loss of Arctic land-ice, release of methane and CO<sub>2</sub> from Arctic permafrost and species loss,’ says the assessment.

“Reducing the near-term rate of warming hence decreases the risk of irreversible transitions that could influence the global climate system for centuries,” it adds.

- Fully implementing the measures outlined in the assessment in respect to black carbon, tropospheric ozone and methane could roughly halve (around 0.5 degrees C) the projected global temperature rise between now and the 2030s
- Such measures could reduce warming in the Arctic by around 0.7 degrees C in 2040, or roughly two-thirds of the estimated warming

#### **Glaciers**

Cutting black carbon levels in high mountain regions such as the Himalayas and the Tibetan Plateau could slow the melting rates of glaciers--in part because soot deposits increase the absorption of sunlight-- and reduce the risk of the formation of glacial lakes and associated catastrophic outburst floods.

- In the high valleys of the Himalayas, for example, black carbon levels can now be as high as in a mid-sized city

#### **Impacts on the Asian Monsoon and Africa rainfall**

Increasing concentrations of particles like black carbon may also affect the timing and patterns of the Asian monsoon with important implications for “human well-being because of changes in water supply and agricultural productivity, drought and flooding,” says the assessment.

- Implementation of black carbon measures could also lead to a considerable reduction in the disruption of traditional rainfall patterns in Africa

### **Health Benefits**

Ground-level ozone and fine particles, including black carbon, are linked with premature deaths, primarily heart disease and lung cancer alongside other illnesses such as bronchitis and low birth weight

- Implementing the recommended measures would benefit public health especially in Asia and also in Africa.

### **Crop Benefits**

Both ground-level ozone and black carbon can affect the health, growth and productivity of crops, trees and other plants.

- Implementing the measures to reduce methane and thus ground-level ozone would assist in avoiding annual yield losses of about 25 million tonnes of four staple crops
- Significantly curbing black carbon emissions would account for a further 25 million tonnes of avoided crop losses annually

The summary for decision makers and full UNEP/WMO Integrated Assessment of Black Carbon and Tropospheric Ozone report can be found at [www.unep.org](http://www.unep.org)

The UN Climate Change Conference June 2011 <http://unfccc.int/2860.php>

UNEP’s work on climate change <http://www.unep.org/climatechange/>

WMO, the U.N. system’s authoritative voice on weather, water and climate, is at [www.wmo.int](http://www.wmo.int)

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