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An unprecedented opportunity

Rapid and meaningful progress on slowing global warming is achievable if world leaders and policy makers are willing to rethink and broaden their strategy, in view of recent findings. It turns out that global warming is caused by two different types of pollutants. The first is the long-lived gases, which we have known about for decades, and which, stay in the atmosphere for a century or longer — most notoriously carbon dioxide (CO₂) released by fossil fuel combustion. Most climate policies have focused on CO₂, but it will take decades and trillions of dollars to reduce emissions significantly. The world cannot afford to lose such decades. The planet has already warmed by more

than 0.8°C and the resulting symptoms are being perceived in rising sea levels, melting mountain glaciers, including in the Himalayas and the Alps, large scale retreat of the Arctic sea ice and warming of the ocean waters penetrating to a depth of 1000 meters or more, and such extreme weather as droughts, floods and heat waves. Worse, humans have already dumped enough greenhouse gases (almost 1000 billion tons of CO₂ alone) in the atmosphere to warm the planet by more than 20°C. So, even if we were to replace half of all fossil fuel use with renewables, the warming will continue to increase for decades, because CO₂ molecules live for a century or more once released.

Fortunately, the world can get out of this seemingly hopeless predicament by broadening its focus to the second type of pollutants. Roughly half of total global warming is due to the release of four of these: dark soot particles called black carbon; and the gases methane, lower atmospheric ozone, and the halocarbons (CFCs, HCFCs and HFCs). These pollutants (except CFCs, which are already banned and a few other halocarbons) stay in the atmosphere for only weeks to a few decades and hence are referred to as Short Lived Climate Forcers. Cutting these short-lived climate warming pollutants levels in half, which is feasible with current technologies — as UN Environment Programme (UNEP) report on Black Carbon and Ozone has recently demonstrated — would quickly reduce their warming effect and give the world two to four decades for the effects of CO₂ reductions to take hold. If we were to eliminate black carbon emissions by diesel vehicles today, for example, their warming effect would disappear within weeks to a month. And the cost of such reductions, while not negligible, would not cripple economies; between 1989 and 2007, for example, California reduced its black carbon emissions by as much as 50 per cent.

Black carbon and ozone, two potent short-lived climate forcers, are also great targets for developing nations because they have other known consequences apart from their warming potential. Inhaling indoor smoke (containing black carbon and ozone precursors) from open fires used for cooking and heating around the world — the World Health Organization reports — leads to over 1.5 million deaths each year. Exposure of plants to high levels of ozone leads to damage to millions of tons of crops annually. And black carbon and ozone in the atmosphere have regional climate effects, including melting the Himalayan glaciers and decreasing monsoon rainfall, as recognized in a recent report by the Pontifical Academy of Sciences.

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The world has an unprecedented opportunity to mitigate some of the disastrous effects of black carbon and ozone on climate, agriculture, water and health with a simple act: replacing traditional cook stoves with energy efficient and pollution-free cooking technologies. This work has already begun with international initiatives like the Global Alliance for Cook Stoves, but challenges remain. The numerous cook stove initiatives that have taken place all over the world have demonstrated time and again that catalyzing widespread adoption of such clean cooking technologies will require innovative and affordable solutions.

This is where Project Surya, an internationally recognized cook stove project sponsored by UNEP, comes in. Its goal is to demonstrate scientifically the environmental and health benefits of introducing clean cooking technologies — and, ultimately, to provide a rigorous evidence base for large-scale action. It aims to deploy improved cooking technologies in a contiguous region with a population of approximately 50,000, thus creating a “black carbon hole” in the otherwise omnipresent pollution cloud which will be measured across space and time to quantify the multi-sector impacts of better cooking technologies. Project Surya will use cell phones, instrument towers, and satellites, and will empower village youth to work with

world-class experts in documenting the impacts.

A pilot phase was successfully completed in 2010 in a village in one of the poorest and most polluted regions in the Indo-Gangetic plains. It has already achieved some ambitious and measurable outcomes including: documenting the connection between indoor air pollution from cooking and ambient outdoor pollution levels; identifying improved cooking technologies that reduce pollution significantly; deploying improved cook stoves in all the 500 or so households in the pilot village; and verifying that we will be able to measure the impacts of a larger-scale intervention. Another, parallel pilot test has been started in Nairobi, Kenya.

Our recent data has also shown that the measured black carbon concentrations are three to five times higher than the concentrations simulated by climate models, making it all the more urgent to take action now to target it and other short lived climate forcers. Fortunately, there is a great success story to draw upon. The enormous greenhouse effect of CFC-11 and CFC-12 was discovered only in 1975. CFCs were regulated by the 1987 Montreal Protocol, because of their negative effects on stratospheric ozone, but if this had not happened they would have added enough heat energy to warm the planet by about 1°C or more.

China and India have a common interest in cutting the black carbon and ozone that is melting their shared glaciers, killing millions and destroying millions of tons of crops — and the United States and Europe share common interest in the Arctic where black carbon along and other short-lived pollutants are responsible for almost half of the melting ice. Modest steps that attack these short lived climate forcers, with fast and measurable responses, are the best way to jump-start the stalled climate mitigation actions.