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# EMISSIONS: Study calls for cuts in more potent greenhouse gases to limit climate damage

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Cutting carbon dioxide won't be enough to keep the Earth's climate under the 2-degree-Celsius "guard rail" agreed to by G-8 nations and endorsed in the Copenhagen Accord, according to a new study.

Researchers at the Scripps Institution of Oceanography say that the world must also slash emissions of methane, hydrofluorocarbons and other short-lived -- but potent -- greenhouse gases.

Veerabhadran Ramanathan and Yangyang Xu also recommend ensuring that environmental laws balance cuts in pollutants that cool the atmosphere, like sulfate, with those that warm the atmosphere, like black carbon.

"The overarching principle that emerges from the present analyses is that we have to evolve from the CO2-based management ... into one that integrates the management of the carbon budget" with the radiant energy budget of the planet, the scientists write.

To put it another way, Ramanathan and Xu say limiting warming to 2 degrees Celsius or less above preindustrial levels means limiting the amount of energy humans add to the atmosphere to just 2.5 watts per square meter.

That will be difficult, they say, given that greenhouse gases already in the atmosphere produce a warming of 3 watts per square meter, 20 percent above the target.

Reducing CO2 emissions will help. The scientists propose stabilizing the concentration of CO2 in the atmosphere below 441 parts per million during this century -- about 50 ppm above the current level.

But because CO2 persists for hundreds or even thousands of years in the atmosphere, cutting humans' energy contribution to the 2.5 watts per square meter goal will require cutting substances like methane and black carbon that pack a potent, but short-lived, warming punch.

"Without an integrated approach that combines carbon dioxide emission reductions with reductions in other climate warmers, and without climate-neutral air pollution laws, we are certain to pass the 2 C threshold during this century," Ramanathan said in a statement. "I am delighted by the availability of several 'low-hanging fruits' that can help us avert unmanageable climate changes."

The study will be published this week by the Proceedings of the National Academy of Sciences.