Cooling: The hidden threat for climate change and sustainable goals

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Credit: Mike Liu from Pexels

Past research suggests growing international demand for cooling has the potential to drive one of the most substantial increases in greenhouse gas emissions in recent history. A new study, led by the University of

Oxford and published today in *Nature Sustainability*, sets out a framework for delivering sustainable cooling. It also examines cooling needs in the context of sustainable development, and finds that this is a global blind spot.

"Cooling is essential to human well-being and health, from the food we eat, to the storage of medicine, to how comfortable and productive we are at home, school or the office," says Dr. Radhika Khosla, senior researcher at the Smith School of Enterprise and the Environment, and principal investigator of the Oxford Martin Program on the Future of Cooling.

But, Dr. Khosla says, "The global community must commit to sustainable cooling, or risk locking the world into a deadly feedback loop, where demand for cooling energy drives further greenhouse gas emissions and results in even more global warming."

The scale of the challenge is immense. Records show September 2020 was the warmest month on record and, under current projections, three-quarters of humanity faces health risks from deadly heat. Research from the International Energy Agency has shown that the energy needed for space cooling alone is projected to triple by 2050—the equivalent of adding 10 new air conditioners every second for the next 30 years. This would require additional electricity generation similar to that of the US, the EU and Japan combined.

Today's analysis finds the unprecedented rise in demand and the potential benefits of sustainable cooling are critical blind spots in sustainability debates. Today's analysis finds cooling is not mentioned in the UN's 2030 Agenda for Sustainable Development, the 17 Sustainable Development Goals (SDGs) or in its 169 targets.

Leader of Oxford's Energy and Power Group, Professor Malcolm

McCulloch says, "Sustainable cooling has been overlooked, but it has transformational potential not just in the fight against climate change, but in improving people's lives.

"Extreme heat without cooling sees productivity suffer, leading to increases in poverty especially in developing countries. Cooling and refrigeration can enable women to undertake small businesses and reduce time spent on household tasks, contributing to gender equality."

The research team examined thousands of peer-reviewed papers which showed conclusively that sustainable cooling would facilitate the achievement of all of the SDGs, from energy and sustainable cities, to gender equality and the elimination of poverty. This suggests that taking bold action on sustainable cooling would benefit not just the global climate, but will fundamentally affect people as well.

The study sets out a framework to help deliver sustainable cooling and maintains everyone, from individuals to businesses to governments, has an opportunity to contribute to sustainable cooling through five key levers of influence:

- lifestyle choices and social interactions, including behavioral choices;
- technological innovation, such as energy-efficient air-conditioning and affordable passive cooling;
- business models, including company value propositions;
- governance, including regulation design and implementation;
- and infrastructure design, which shapes and enables different solutions for cooling.

Dr. Khosla concludes, "Large infrastructure projects have the power to lock-in sustainable or unsustainable practices for decades to come. At this critical junction in global economic development, including in

building back better from COVID-19, there is a unique and fleeting opportunity to center sustainable cooling for the benefit of people and planet."

More information: Radhika Khosla et al. Cooling for sustainable development, *Nature Sustainability* (2020). DOI: 10.1038/s41893-020-00627-w

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