

CLIMATE CHANGE

Slow coolant phaseout could worsen warming

As countries crank up the AC, emissions of potent greenhouse gases are likely to skyrocket

By April Reese

In the summer of 2016, temperatures in Phalodi, an old caravan town on a dry plain in northwestern India, reached a blistering 51°C—a record high during a heat wave that claimed more than 1600 lives across the country. Wider access to air conditioning (AC) could have prevented many deaths—but only 8% of India's 249 million households have AC, Saurabh Diddi, director of India's Bureau of Energy Efficiency in New Delhi, noted at the World Sustainable Development Summit there last month. As the nation's economy booms, that figure could rise to 50% by 2050, he said. And that presents a dilemma: As India expands access to a life-saving technology, it must comply with international mandates—the most recent imposed just last fall—to eliminate coolants that harm stratospheric ozone or warm the atmosphere.

“Growing populations and economic development are exponentially increasing the demand for refrigeration and air conditioning,” says Helena Molin Valdés, head of the United Nations's (UN's) Climate & Clean Air Coalition Secretariat in Paris. “If we continue down this path,” she says, “we will put great pressure on the climate system.” But a slow start to ridding appliances of the most damaging compounds, hydrofluorocarbons (HFCs), suggests that the pressure will continue to build. HFCs are now “the fastest-growing [source of greenhouse gas] emissions in every country on Earth,” Molin Valdés says.

HFCs, already widely used in the United States and other developed countries, are up-and-coming replacements for hydrochlorofluorocarbons (HCFCs) found today in most AC units and refrigerators in India and other developing nations. HCFCs are themselves replacements for chlorofluorocarbons (CFCs), ozone-destroying chemicals banned under the 1987 Montreal Protocol on Substances that Deplete the Ozone Layer. But HCFCs are potent greenhouse gases, as well as a threat to ozone, and they are now being phased out under a 2007 amendment to the protocol. Developed countries are to

ditch them by 2020; developing countries have until 2030.

To meet those deadlines, manufacturers have turned to HFCs, which do not destroy ozone. But they are a serious climate threat. The global warming potency of HFC-134a, commonly used in vehicle AC units, is 1300 times that of carbon dioxide. Clamping down on HFCs, a 2014 analysis found, could avoid a full 0.5°C of future warming.

As with the HCFC phaseout, developed countries agreed to make the first move: They must begin abandoning the production and consumption of HFCs next year and achieve an 85% reduction by 2036. In the United States, the transition is off to

ant emissions. An analysis done before the HFC phase-down agreement predicted that if no action were taken, HFC use in AC units would rise 2% a year in developed countries and 5.6% annually in the developing world through 2050. The agreement is unlikely to thwart that rise anytime soon: A recent UN report, which summarized studies of HFC use in Bangladesh, Chile, Colombia, Ghana, Indonesia, and Nigeria, found that use of HFCs will spike in all six countries in the coming years.

Some climate experts are more hopeful, pointing out that developing countries have an opportunity to bypass HFCs altogether. “The alternative when developed countries phased out HCFCs was HFCs. But developing countries are in a different position: They're at the beginning of phasing out HCFCs and can leap directly past HFCs” to benign alternatives, says Nathan Borgford-Parnell, regional assessment initiative coordinator for the UN's Climate & Clean Air Coalition.

India is crafting a National Cooling Action Plan that aims to do just that. It will include better city planning and building design, and it will embrace novel coolants, says Stephen Andersen of the Institute for Governance & Sustainable Development in Washington, D.C., who helped develop the plan.

Meanwhile, six AC manufacturers in India have already begun “leapfrogging” to hydrocarbon-based coolants such as R-290—refrigerant-grade propane—that have lower warming potential,

says Anjali Jaiswal, the San Francisco, California-based director of the India Initiative at the Natural Resources Defense Council. Although R-290 is flammable and requires installers to be specially trained, it is one of the most promising alternatives, she adds.

“I'm hopeful,” says A. R. Ravishankara, an atmospheric chemist at Colorado State University in Fort Collins. With many years to make the switch to alternatives, he says, “There's enough time for the free market to work and come up with various options.” ■

April Reese is a freelance journalist in Santa Fe.



Novel hydrocarbon-based coolants could enable India and other developing nations to embrace air conditioning while minimizing a climate threat.

a rough start. Last August, a U.S. federal appeals court rejected an Environmental Protection Agency rule that would have required manufacturers to replace HFCs with more climate-friendly substitutes, saying the agency lacks the regulatory authority to compel companies to make the switch. In January, the court declined to revisit its August 2017 decision.

In part because of rising demand for AC, developing countries negotiated a later deadline for ditching HFCs: They are to start phasing them down in 2029 and complete the process by 2047, about a decade after developed countries. In the meantime, the desire for cool air could drive up cool-

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