

KEY MESSAGES

Global Cooling Watch

Keeping it Chill: How to meet cooling demands while cutting emissions

Cooling demand is growing rapidly, driven by rising population, increasing incomes, and higher global average temperatures. Cooling is essential for sustainable development, but growth in demand will drive further climate change, creating a vicious cycle of more cooling and emissions. To avoid this future, this report lays out sustainable measures in three areas: passive cooling, higher energy efficiency standards, and a faster phase down of climate-warming refrigerants used in the cooling industry. Getting cooling right with these measures would cut at least 60 per cent off predicted 2050 sectoral emissions, provide increased access to life-saving cooling, take the pressure off energy grids, and save trillions by 2050.

Rapid growth in cooling is necessary for people's health nutrition and livelihoods Cooling protects people from rising temperatures, maintains food quality and safety, and keeps vaccines stable and economies productive. Cooling is critical to meet the sustainable development goals.

- Climate change, population and income growth, and urbanization are increasing cooling demand. Nonetheless, around 1.2 billion people lack access to vital cooling services, disproportionately affecting women.
- Lack of cold chain reduces the income of millions of farmers and drives food loss.
- Lack of cold chain hinders universal vaccine access, contributing to over 1.5 million preventable deaths and significant financial losses from vaccine wastage.

Cooling growth is driving climate change and impeding the energy transition.

- Cooling currently accounts for one fifth of global electricity consumption and is a top driver of generation capacity additions to meet peak power demand.
- Following current trends, the capacity of cooling equipment is expected to triple by 2050 and with current slow pace of energy efficiency improvements, this would result in a more than doubling of electricity consumption.
- GHG emissions from power consumption will increase alongside leakage of refrigerant gases from cooling equipment, most of which have a much higher global warming potential than CO₂.
- Emissions from cooling are predicted to increase to between 4.4 billion and 6.1 billion tons of carbon dioxide equivalent (CO₂e) in 2050, accounting for more than 10 per cent of global projected emissions that year.

- Rising demand for cheap but inefficient equipment, including air-conditioners and refrigerators, will require large investments in electricity generation and distribution infrastructure.
- Inefficient equipment will also result in high electricity bills for end users, particularly in Africa and South Asia, where the fastest growth is predicted.

Following the measures outlined in this report can bring short term and sustained benefits for the climate, human health and prosperity.

- Cooling measures to improve efficiency and passive cooling, and a phase down of climate warming gases used in cooling equipment, could reduce the projected 2050 emissions from business-as-usual cooling by over 60 per cent – around 3.8 billion tons of CO₂e.
- The 60 per cent reduction in cooling emissions would:
 - Make it possible for an additional 3.5 billion people to benefit from refrigerators, air conditioners or passive cooling by 2050;
 - Reduce electricity bills for end users by US\$1 trillion in 2050 [and by US\$17 trillion cumulatively between 2022 – 2050]
 - the peak power requirement by between 1.5 and 2 terawatts (TW) – almost double the EU’s total generation capacity today.
 - Avoid power generation investments in the order of US\$4 to US\$5 trillion.
- Adding in rapid grid decarbonization would add a further emission reduction of 2 billion tons of CO₂e in 2050, bringing the total reduction to 96 per cent
- Importantly, G20 countries represent 73% of the 2050 emission reduction potential, of which 11% is from G7 countries.

To deliver benefits, action is needed in three areas: passive cooling, higher energy efficiency standards and a faster phase down of climate-warming refrigerants.

I. Passive cooling strategies to address extreme heat and reduce cooling demand in buildings and in the cold chain.

- Passive cooling measures – such as insulation, natural shading and ventilation, reflective surfaces – can dramatically reduce cooling loads.
- Insulation and mandating the use of doors on food retail displays also provide an opportunity to reduce cooling load in the cold chain
- These can be provided, in part, by the development and enforcement of building energy codes that incorporate passive cooling, and urban design.
- Such passive cooling strategies can curb the growth in demand for cooling capacity in 2050 by 24 per cent, result in capital cost savings in avoided new cooling equipment of up to US\$3 trillion, and reduce emissions by 1.3 billion tons of CO₂e.

II. Higher energy efficiency standards for cooling equipment:

- Higher efficiency standards and better labelling of all cooling equipment would triple the global average efficiency of cooling equipment in 2050 from today’s levels, delivering 30 per cent of modelled energy savings, lowering energy bills and improving the resilience and financial viability of cold chain.
- Achieving higher energy efficiency requires little new technology. Critical implementing policies include:
 - Regularly updated Minimum Energy Performance Standards (MEPS) that establish minimum energy efficiency requirements for new products.

- Labelling of products to inform consumers.
- Financial instruments to encourage demand for higher efficiency products.
- MEPS that integrate criteria for phasing down refrigerants with a high global warming potential and that are incorporated into building energy codes.
- Regulations to avoid the dumping of low efficiency cooling equipment with high Global Warming Potential (GWP) refrigerants into developing countries.

III. A faster phase down of climate-warming hydrofluorocarbon (HFC) refrigerants through the Kigali Amendment to the Montreal Protocol.

- Most HFCs used in cooling equipment are greenhouse gases that are thousands of times more potent than CO₂.
- The world committed to phasing down HFCs through the Kigali Amendment to the Montreal Protocol - a global deal designed to protect the ozone layer and slow climate change.
- HFC emissions in 2050 can be halved over the Kigali phase down timetable through rapid uptake of better technologies in new equipment, and better refrigerant management, coupled with stronger national enforcement.

A joined-up approach to policies that back action in all three areas is essential.

- Aligning policies that support and integrate passive cooling, energy efficiency and faster refrigerant phase down is needed to maximize benefits and accelerate the transition.
- Governments should deepen efforts on regulatory development and enforcement, incorporate cooling into legislative frameworks, develop National Cooling Action Plans and build cooling into climate strategies, net zero plans and/or other policy frameworks.

Many countries have cooling policies in place, but few are integrated or well implemented.

- While more than 80 per cent of countries of the 193 UN member states analysed have established at least one of three main regulatory instruments needed to move the cooling sector to near-zero emissions. Most are incomplete, siloed, in pilot phase, or inadequately implemented.
- Only 53 countries (27 per cent) have established regulations or regulatory frameworks to enable action on MEPs for cooling and refrigeration, mandatory building energy codes and ratification of the Kigali Amendment.
- 35 countries, 18 per cent globally, have adopted framework policies such as National Cooling Action Plans. Others have included cooling in climate action plans.

Finance needs to be streamlined, scaled up and better targeted.

- The life-cycle cost savings of US\$22 trillion and the societal benefits of deep emissions cuts in cooling will make the sustainable cooling transition affordable.
- Existing business models need to be scaled to use these savings to reduce upfront costs and make the transition affordable for all.
- Other financial tools include on-bill financing (when a utility pays for an upgrade and recovers the cost through monthly power bills), risk-sharing facilities, public and private investments and partnerships, green mortgages, incorporating sustainable cooling into environmental, social and governance (ESG) safeguards for multilateral banks, protecting smallholder farmers in developing economies with seed financing, and tracking cooling finance and its impacts as the market grows.
- For many developing countries, dedicated concessional finance will be needed to support these models and ensure finance goes to the most vulnerable.

The Global Cooling Pledge provides an opportunity to commit to sustainable cooling with concrete actions.

- The Global Cooling Pledge is a joint initiative between the Cool Coalition and the United Arab Emirates as host of the 2023 United Nations Climate Change Conference (COP28).
- The pledge aims to raise ambition and international cooperation through collective global targets to reduce cooling related emissions by over 60% drawing on the modelling in this report. It provides a strong political push to take immediate steps to increase passive strategies, bring back nature to cities, enhance building energy codes, improve energy efficiency standards, and phase down HFCs in the cooling sector.