

Sustainable cooling



The UN Climate Change Conference (COP30) will take place in Belém, Brazil, from November 10-21. Key expectations include the presentation of new national climate action plans (NDCs), progress on finance from COP29, and discussions on scaling innovative climate finance mechanisms. The conference will also feature the COP30 Action Agenda, a program to engage businesses, civil society, and various levels of government in practical climate solutions.

Overview

As global temperatures rise and urban populations grow, demand for cooling is accelerating.

Without immediate action, this growth will drive increased use of electricity and expand the use of cooling equipment that often relies on refrigerants with high global warming potential.

This not only raises greenhouse gas emissions and places growing pressure on energy systems, but also risks widening inequalities, as many vulnerable communities cannot afford or access efficient cooling solutions.

The UN Secretary-General issued a 2024 global Call to Action on Extreme Heat, elevating the need for inclusive heat resilience and recognizing access to sustainable cooling as a life-saving service that must be scaled urgently.

Key messages

Sustainable cooling is both an adaptation and mitigation solution. Cooling protects people, economies, schools, and health systems from extreme heat while cutting emissions and easing strain on power grids. It must be treated as essential infrastructure, on par with water and energy.

Cooling demand is surging – and emissions could nearly double by 2050. Installed cooling capacity is projected to triple by mid-century, driving emissions up to 7.2 billion tons CO₂e unless rapid action is taken to boost efficiency, phase down refrigerants, and deploy passive solutions.

Over 1 billion people lack adequate cooling – mostly in low-income, high-risk regions. Without urgent action, up to 800 million households could still be without basic residential cooling by 2050, underscoring the need for equitable and affordable solutions, including for off-grid use.

A Sustainable Cooling Pathway can cut emissions by 97%.

New modelling shows that combining passive cooling, low-energy solutions, efficient technologies, and rapid refrigerant transition, with power sector decarbonization can bring cooling emissions close to net zero.

Passive and low-energy cooling are the biggest untapped opportunities could deliver two-thirds of emissions cuts.

Yet few building codes mandate passive measures such as shading, insulation, or ventilation that can, when combined, lower temperatures by 6–9°C. Low-energy fans and evaporative coolers offer low-cost, scalable relief, while hybrid systems that combine AC with fans can cut energy use by up to a third.

Global action and local leadership must align with the Global Cooling Pledge. 72 countries and 80 non-state actors have signed the Pledge to reduce cooling-related emissions by 68% by 2050. But countries must move quickly to reduce emissions by 18% by 2030 and 55% by 2040 to stay on track.

Beat the Heat is turning ambition into action. Led by the COP30 Presidency and UNEP's Cool Coalition, the Beat the Heat / Mutirão Contra o Calor Extremo initiative is helping countries and communities translate global commitments into local cooling solutions – from mapping heat risks to reimagining the way we build our cities.

Key data

More than 70% of the global workforce is now at high risk of extreme heat.

2024 was the warmest year on record, surpassing 2023.

By 2050, 1.6 billion people in over 970 cities are projected to be regularly exposed to extreme high temperatures.

Extreme heat causes more deaths than any other form of extreme weather.

Heatwaves worsen air pollution, which causes 7 million premature deaths annually and ranks as the fourth-largest global health risk.

A single tree can transpire several hundred litres of water per day, producing a cooling effect equivalent to two domestic air conditioners running for 24 hours.

Global installed cooling capacity is projected to surge from 22 terawatts in 2022 to 68 terawatts by 2050, nearly tripling electricity demand under business-as-usual.

Without policy change, cooling-sector emissions could nearly double, reaching 7 billion tons CO₂e per year by 2050.

Africa and South Asia face the steepest growth in cooling demand, with high exposure and limited affordability increasing vulnerability.

By 2030, heat stress could eliminate work equivalent to 80 million full-time jobs.

Over 1 billion people currently lack adequate cooling, a figure that could triple by 2050 without urgent action.

By mid-century, up to 800 million low-income households could remain without access to adequate cooling Global Cooling Watch 2025.

The Sustainable Cooling Pathway could cut cooling-related emissions by 64% through passive cooling, low-energy solutions, efficient technologies, and rapid refrigerant transition,, and by 97% when combined with power sector decarbonization.

What to expect at COP30?

Launch of Global Cooling Watch 2025 - the second edition of UNEP's biennial publication on sustainable cooling revisits the trends from the 2023 inaugural edition and presents new insights focused on extreme heat and equitable access across buildings, cities, and cold chains.

High-level Session on Beat the Heat/Mutirão Contra o Calor Extremo.

Ministerial Dialogue on "Delivering on the Global Cooling Pledge".

The Global Alliance for Buildings and Construction (GlobalABC) and the UNEP-led Cool Coalition are continuing their successful collaboration, hosting in the Blue Zone a pavilion that highlights the nexus of the built environment and sustainable cooling by bringing together policymakers, business, financing and implementation partners.

What's UNEP doing?

UNEP Cool Coalition. Launched as a flagship initiative of the UN Secretary-General's Climate Action Summit in 2019, the UNEP Cool Coalition brings together over 250 governments, cities, companies, and financial institutions to advance integrated, equitable solutions. The Coalition also serves as the Secretariat to the Global Cooling Pledge and co-leads the Beat the Heat implementation drive with the COP30 Brazilian Presidency.

The Montreal Protocol and the Multilateral Fund. The Ozone Secretariat, Multilateral Fund Secretariat and OzonAction are leading in terms of convening Parties, and funding and supporting developing countries with the transition and helping them with compliance with the phasedown targets.

Climate and Clean Air Coalition. The UNEP-convened Climate and Clean Air Coalition (CCAC) promotes early and complementary actions on HFCs, supporting strategic actions to minimize HFC emissions throughout the lifecycle of cooling equipment, and reducing the energy demand associated with new and existing cooling equipment.

United for Efficiency (U4E). U4E is a global initiative accelerating the transition to energy-efficient and climate-friendly cooling products in emerging and developing economies through national and regional implementation projects.

Further Reading

UN Secretary-General's Call to Action on Extreme Heat

Global Cooling Pledge

Global Cooling Watch 2025

Global Cooling Watch 2023

Beat the Heat expression of interest

NDC Cooling Guide

Cooler Finance: Mobilizing Investment for the Developing World's Sustainable Cooling Needs

U4E Model Regulations for Cooling Products

U4E Policy Guide for Accelerating the Adoption of Air Conditioners

U4E Resource for Sustainable Procurement of Cooling Products

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