Cooling and Climate Change

Cooling is an important component of modern life and economies. **Refrigeration prolongs the shelf life, safety and quality of everything from food to vaccines,** while air-conditioning makes for comfortable homes, schools and businesses, in many cases raising productivity. Precise cooling conditions are essential for **high-tech manufacturing, research, and data centres.**
Demand for mechanical cooling equipment is growing rapidly, unlocking benefits, but also driving up greenhouse gas emissions and air pollution. In the years to come, the world will need to expand cooling access while switching from outdated, electricity-intensive approaches. Implementing and enforcing energy-efficiency standards, switching to less environmentally harmful refrigerants, and using of low-carbon energy will be critical.

Key messages

- **Making cooling systems more environmentally friendly** is key to realizing the targets of the Montreal Protocol, Paris Agreement and Sustainable Development Goals. Under the Kigali Amendment, hydrofluorcarbons are being phased down by over 80 per cent by 2047. Simultaneous improvements in energy efficiency could double climate benefits. Nationally Determined Contributions should address cooling adaptation and opportunities for greenhouse-gas mitigation, such as efficiency, alternative cooling solutions, low-carbon electricity opportunities.
- There needs to be more uptake of **non-mechanical methods for cooling buildings,** such as shading, solar reflective coatings, insulation and natural ventilation. Fans provide a lower-electricity alternative to air conditioners. Smart technology, like timers and occupancy sensors, can conserve electricity, while shifting cooling demand can reduce the burden on electric grids, lowering costs, limiting pollution and enhancing resiliency.
- **Comprehensive cold chains that maintain food** from farm to plate and preserve vaccines from production to injection can help address employment, climate and health challenges. Inadequate cold chains can lead some countries to lose nearly 40 per cent of food production and improving cold chains in Africa could help households and smallholder farmers save US $ 4 billion worth of food annually.
- **Cost-effective, energy-efficiency improvements of over 50 per cent are possible for refrigerators and air conditioners.** Robust efficiency standards and product labels are needed for air conditioners, whose numbers are forecast to rise to 1.5 billion in 2030 from 900 million in 2019. Housefold refrigerator stocks will rise from 1 billion to 2 billion in the same period

Key data

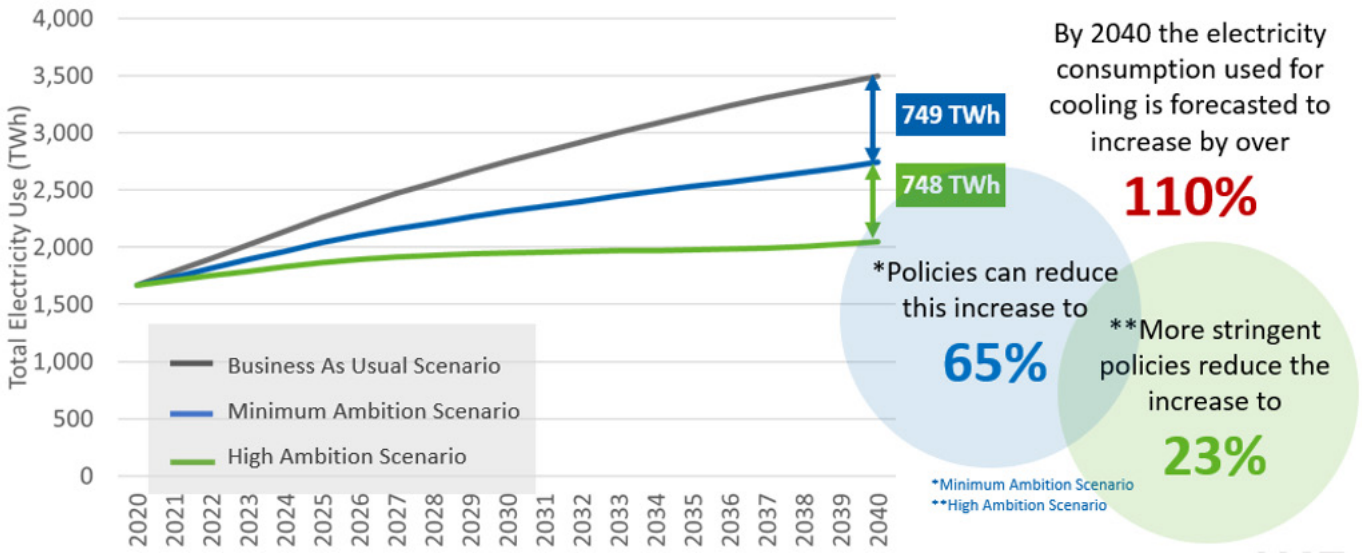
- **20 per cent of electricity used in buildings** is for space conditioning and cooling energy demand is anticipated to triple by 2050.
- 1.3 billion tonnes of food – a third of total food produced for human consumption – is lost or wasted annually, including **475 million tonnes due to insufficient cooling.**
- **30 per cent of the world's population is exposed to deadly heatwaves** more than 20 days a year.

Further Reading

The Technology and Economic Assessment Panel to the Montreal Protocol
Cooling Emissions and Policy Synthesis Report
United for Efficiency Model Regulation Guidelines for Refrigerators and Air Conditioners
OzonAction Kigali Amendment Fact Sheets
Energy Efficiency Literacy for Air-Conditioning and Refrigeration Systems

UNEP contact: Brian Holuj, brian.holuj@un.org | **Jim Curlin**, jim.curlin@un.org

Cooling and Climate Change



UNEP contact: Brian Holuj, brian.holuj@un.org | **Jim Curlin**, jim.curlin@un.org

我们的产品

大数据平台

国内宏观经济数据库

国际经济合作数据库

行业分析数据库

条约法规平台

国际条约数据库

国外法规数据库

即时信息平台

新闻媒体即时分析

社交媒体即时分析

云报告平台

国内研究报告

国际研究报告