MINISTRY OF AGRICULTURE AND ENVIRONMENT
BỘ NÔNG NGHIỆP VÀ MÔI TRƯỜNG

TECHNICAL REPORT:

ROADMAP FOR SUSTAINABLE COOLING IN VIET NAM

Context and challenges

Cooling demand in Viet Nam is rising rapidly due to urbanisation, increasing incomes, and more intense heatwaves. Without timely action, the cooling sector will become a major source of greenhouse gas (GHG) emissions, threatening national climate targets and public health.

Projected GHG emissions: Reaching **91.7 $MtCO_2e$** by 2030 (accounting for nearly 10% of total national emissions) and peaking at **116 $MtCO_2e$** by 2045.

Energy consumption: The cooling sector currently accounts for approximately **25%** of the total national electricity consumption.

Food loss: Approximately **8.8 million tons** of food are spoiled annually due to a lack of an efficient cold chain, causing economic losses of nearly **2%** of GDP.

Health impacts: Heatwaves increase hospital admissions for all causes by **7%.**

This technical report was developed under the leadership of the Ministry of Agriculture and Environment, with technical support from:

- Southeast Asia Energy Transition Partnership (ETP), managed by United Nations Office for Projects Services (UNOPS);
- United Nations Economic and Social Commission for Asia and the Pacific (UN ESCAP);
- United Nations Environment Programme (UNEP) Cool Coalition.

(This report is for guidance and reference purposes only)

Directions and commitments

To promote sustainable cooling solutions that combine energy efficiency, the transition to low-GWP refrigerants, and the adoption of passive design, thereby contributing to the net-zero by 2050 target while ensuring social welfare and sustainable economic development.

Key international commitments:

- *Montreal Protocol & its Kigali Amendment*
- *Paris Agreement on climate change*
- *Net-zero target by 2050*
- *Global Cooling Pledge*

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Four strategic pillars

Built upon four main pillars, integrating comprehensive solutions from technology to policy:

1 ENHANCING ENERGY EFFICIENCY

- Increase the minimum average efficiency of new air conditioning units by **50%** by 2030 compared to 2022.
- Tighten minimum energy performance standards (MEPS), enhance energy labeling, and promote advanced technologies.

2 TRANSITIONING REFRIGERANTS

- Phase down HFCs, cutting consumption by **80%** by 2045, and completely phase out HCFCs by 2040.
- Promote the use of low-GWP refrigerants (HCs, HFOs), and strengthen life-cycle management (recovery, recycling, disposal).

3 INTEGRATING PASSIVE COOLING SOLUTIONS

- **100%** of new construction projects in major cities to achieve green/energy-efficient building certification by 2044.
- Integrate passive design (shading, insulation, natural ventilation) into building codes, and reduce the urban heat island effect (green roofs, reflective materials, green spaces).

4 ALIGNING ROADMAP & INSTITUTIONS

- Ensure the effective implementation through a clear roadmap and a solid institutional framework.
- Build a synchronous legal and institutional framework, establish a transparent MRV system, and enhance capacity for technicians and stakeholders.

Key targets and impacts until 2050

97%

EMISSIONS REDUCTION

Reduction from the cooling sector compared to the business-as-usual scenario, reducing 20 $MtCO_2e$ in direct emissions from refrigerants.

>800 TWh

ELECTRICITY SAVINGS

Reduce pressure on the national power grid, equivalent to the output of 4 large power plants.

HEALTH & WELL-BEING

Reduce hospital admission rates due to heatwaves, protect vulnerable groups, and improve living comfort.

ECONOMIC BENEFITS

Promote domestic production of high-efficiency equipment and create opportunities from climate finance and carbon markets.

Expected Roadmap

2024-28

Regulatory & institutional foundations

Finalise standards and regulations on energy efficiency and refrigerants; establish a monitoring and reporting system, and enhance technical capacity.

2029-34

Financing & scaling up

Promote green credit, climate finance mechanisms, encourage domestic production of high-efficiency equipment, and replicate sustainable cooling models.

2035-39

Technology deepening

Widely deploy advanced cooling technologies, low-GWP refrigerants, and mandate regulations for green buildings and sustainable cities.

2040-45

Towards full circularity

Complete the phase-out of high-GWP refrigerants, apply a circular economy in the cooling sector, and mainstream passive solutions in construction.

Sustainable cooling solutions, if implemented holistically and comprehensively, will contribute significantly to the rapid reduction of GHG emissions, energy savings, and public health protection. Furthermore, sustainable cooling is a key link that helps accelerate the realisation of climate commitments, while supporting efforts to keep the global temperature increase within the 1.5°C limit under the Paris Agreement.

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