

A male technician wearing an orange hard hat, safety glasses, and a high-visibility orange safety vest over a light-colored long-sleeved shirt and blue jeans. He is crouching on a metal walkway in an industrial facility, holding a red handheld device. The background shows large industrial fans and pipes under a bright sky.

SUMMARY OF UNDP'S NATIONAL COOLING PLANS



INTRODUCTION

Rising global temperatures and more frequent heat waves are driving an increase in demand for cooling. Increased cooling causes more climate change, which then creates the need for even more cooling¹.

In hot climate countries, cooling is a significant contributor to greenhouse gas emissions². Air conditioners and electric fans currently consume 20% of the electricity used in buildings around the world and their use is expanding more rapidly than any other building appliance³. According to projections by the International Energy Agency, global energy demand for cooling is expected to triple by 2050⁴. If cooling efficiency is not improved significantly, an increase in greenhouse gas (GHG) emissions from energy consumption and refrigerants will ensue.

While cooling is essential to human health, food security and economic productivity, inefficient cooling services worldwide can threaten the 2030 sustainable development agenda, since all the sustainable development goals (SDGs) are impacted by energy and climate change.

Recognizing the importance of sustainable cooling, UNDP, with the Clean Cooling Collaborative (CCC) (formerly known as the Kigali Cooling Efficiency Programme (K-CEP)), supported twelve countries in developing their National Cooling Plans (NCPs): Bangladesh, Chile, Costa Rica, Cuba, Ghana, Lebanon, Mexico, Nigeria, Panama, Philippines, Sri Lanka, and Trinidad and Tobago.

This publication presents the key findings from the eleven countries that have developed and published their NCPs with UNDP's support⁵.

The NCPs are important instruments to promote sustainable and smart cooling practices in countries. They cover regulatory, technical and operational areas through which countries can contribute towards the targets of the Paris Agreement and the Kigali Amendment under the Montreal Protocol. The NCPs identify potential energy demand reduction and energy efficiency interventions, suggest pathways for synergies between efficiency improvements and the transition from high global warming potential (GWP) refrigerants and propose a framework for the implementation of these actions in an integrated national cooling plan.

¹ www.cleancoolingcollaborative.org/the-challenge

² IEA report, The Future of Cooling, 2018

³ www.cleancoolingcollaborative.org/the-challenge

⁴ IEA report, The Future of Cooling, 2018

⁵ All countries have completed and published their NCPs, except for the Philippines.



ROUGHLY
2 billion
AC UNITS ARE NOW IN OPERATION AROUND THE WORLD, MAKING SPACE COOLING ONE OF THE LEADING DRIVERS OF RISING ELECTRICITY DEMAND IN BUILDINGS



ENERGY CONSUMPTION FOR SPACE COOLING HAS MORE THAN
tripled
SINCE 1990.



BY 2050,
IT IS ESTIMATED THAT
14 billion
COOLING DEVICES WILL BE NEEDED TO MEET DEMAND, FOUR TIMES AS MANY PIECES OF COOLING EQUIPMENT THAN ARE IN USE TODAY.

Source: www.iea.org/reports/cooling



The development of NCPs is a multi-stakeholder consultative process. Given its cross-cutting nature, addressing cooling holistically requires engaging public entities involving multiple governmental departments and agencies, as well as private sector stakeholders, whose interests may not always align. Ultimately this multistakeholder process of NCP development is intended to harmonize them with existing HCFC Phaseout Management Plans (HPMPs) and future HFC phasedown plans, and with countries' wider climate mitigation plans as set out in their regular reviews of Nationally Determined Contributions (NDCs).

The benefits of this multistakeholder process have already been realized in some countries whose NCPs have been supported by UNDP. For example, the World Bank's Cooling Facility, through which funds from Green Climate Funds (GCF) will be channeled, is one of the world's first multi-country financing initiatives to focus on cooling and in Bangladesh, Panama and Sri Lanka (among other countries), the facility will support energy efficient buildings, providing thermal comfort with both passive measures and low carbon cooling solutions⁶.

The NCPs have been developed and endorsed by national governments and represent their views on long-term and sustained action in the cooling sector. They indicate a government's willingness to address efficient, climate-friendly cooling through the policies and programs that are included within the plans. They are also intended to be complementary with other national plans and strategies and can inform the latter. For example, an NCP process will be considered as successful if its components can be integrated into the review of the country's national NDC targets, as was the case, for example, in Lebanon soon after the completion of their NCP.

Each country's NCP is unique in terms of its scope. Some countries' NCPs describe ambitious and high-level goals, while others are grounded in specific policies and programs that are already being implemented⁷. All the NCPs include a focus on the key cooling sectors, including the building and residential sector, supermarkets and cold chain, to a varying degree. But each country's NCP is nationally driven, reflecting its own unique situation and priorities.

The NCPs also all include detailed action plans, which provide more detailed recommendations, required actions, timetable, the responsible agency within government, other stakeholders to be involved, indicative costs, and the key existing policies to link to. These action plans will be instrumental in shaping countries' future climate and energy policies.

⁶ <https://coolcoalition.org/world-bank-mobilizes-usd157-million-for-clean-cooling-from-green-climate-fund/#:~:text=In%20North%20Macedonia%2C%20Panama%2C%20Bangladesh%20and%20Sri%20Lanka%2C,an%20additional%20USD%24722.8%20million%20in%20World%20Bank%20co-financing.>

⁷ www.cleancoolingcollaborative.org/wp-content/uploads/2021/08/K-CEP-Phase-I-Impact-Report.pdf

A few key highlights from the country NCPs supported by UNDP include:

- **Bangladesh's** limited post-harvest cold storage infrastructure, with current cold storage capacity of 5.5 million tonnes in 427 cold storages all over the country, has led to primary producers and retailers suffering losses and damages of up to 60 percent of their seasonal fruits, vegetables, fish, milk and meat items.
- In **Ghana**, energy demand for the RAC sector is estimated to triple by 2050 and corresponding GHG emissions will increase to 13 Mt CO₂eq in 2050. Unitary ACs, MACs and Domestic Refrigeration are the major contributors to current/future total RAC emissions with the largest share (58%) being the split AC units.
- Despite its large market penetration for refrigerators and air conditioners, **Lebanon** does not yet have a Minimum Energy Performance System (MEPS) and labelling system in place and the appliances in use have a low energy performance in comparison with other countries. Without MEPS and labelling, end-users

are lacking clear guidance on energy-efficient appliances. Importers, sellers and manufacturers have little incentive to place more energy-efficient appliances on the market, since uninformed end-users tend to purchase the appliances with the lowest up-front costs.

- In general, the **Mexican** standardization system has made it possible to have a relatively updated inventory of equipment with good energy performance. This is the main legal tool in Mexico used to adopt energy efficiency in the RAC sector.
- In **Nigeria**, the stock of air conditioners is projected to increase from 8 million units in 2020 to 71.4 million units by 2050. Nigeria's increasing population and increasing access to electricity will result in a large market for air conditioners in the next 30 years.
- **Sri Lanka** aims to promote indigenous knowledge on climate-sensitive building architecture and will identify traditional practices adopted by ancient Sri Lankans for food conservation and storage.





The NCPs of the eleven countries supported by UNDP show that several countries are planning and implementing key policy measures such as stringent **Minimum Energy Performance System (MEPS) and labels** for room air conditioners and refrigerators. These measures will greatly assist in reducing the energy consumption of these appliances and the need to build new electricity infrastructure to meet rising demand. Making cooling more efficient will also yield multiple benefits, making it more affordable, more secure, and more sustainable, and saving as much as trillions in investment, fuel and operating costs⁸. In addition, there is huge potential to build sustainable cooling infrastructure coupled with renewable energy, particularly in the cold chain sector. In Small Island Developing States (SIDS), district cooling could potentially address cooling demand in buildings if upfront investments can be secured.

Furthermore, many of the NCPs also highlight the need for **additional financial investments** for cooling. In general, the challenges and market barriers facing the cooling sector can be categorized as economic, legal, and technical. While there are relatively few risk

mitigation mechanisms that are traditionally applied for cooling projects, global entities are joining forces to create innovative financial instruments to incentivize and catalyze energy efficiency investments. Some of these innovative financing models provide safety nets to cover uncertainties in lending risks from the bank's perspective and mitigate high upfront capital expenditure (CAPEX) risks from an investor's view. These financing models mainly target small and medium-sized enterprises (SMEs) since they play a strategic role in economic growth and development globally.

The financing schemes might vary from one country to another based on its financial landscape and cooling sector's needs, but the outcomes can be optimized if the financial instrument is well designed and/or customized to fit the various parameters existing in different countries, economies, and sectors. This may help to create the conditions needed to ensure an adequate supply of private finance for energy efficiency investments, motivate demand, and induce sustainability. Some of the innovative financial models that can be deployed include energy savings insurance

⁸ https://economictimes.indiatimes.com/industry/energy/power/global-energy-demand-for-air-conditioners-to-triple-by-2050-iea/articleshow/64175009.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppstf

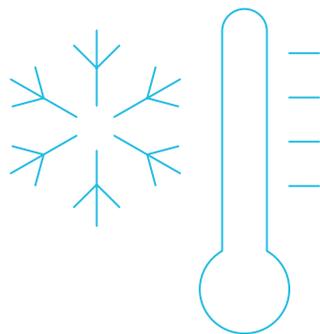
(ESI) models, revolving loans to the public sector, cooling as a service, leasing models, on wage models and on bill models, and energy service companies (ESCO) models. The NCPs have also identified additional financial mechanisms, such as import levies, carbon credit-based incentives, and other climate financing instruments, to address the first cost barriers.

Once realized, the eleven NCPs supported by UNDP will cumulatively avoid over **140 MT CO₂-equivalent emissions** and will save consumers over **\$21.6 billion** by 2050, both as a result of reduced electricity consumption (see Table 1)⁹.

TABLE 1. Estimated energy savings and CO₂ reduction with the proposed NCP actions

COUNTRY	ENERGY SAVINGS (TWH)	TO-BE-AVOIDED MT CO ₂ -EQ EMISSIONS
BANGLADESH	9.45	6.75
CHILE	4.90	3.50
CUBA	3.15	2.25
COSTA RICA	6.80	2.60
GHANA	4.20	4.30
LEBANON	3.10	3.20
MEXICO	42.66	29.17
NIGERIA	70.50	72.50
PANAMA	0.80	0.57
SRI LANKA	19.43	13.88
TRINIDAD AND TOBAGO	1.60	1.20
	167	140

⁹ The estimates are based on the NCP projections of energy savings and CO₂ emissions reduction potentials in line with NCP recommendations. Where year-2050 projections do not exist in the NCP, the earlier year (usually 2030) projections were extended with similar growth rate to the year-2050. World average electricity price was taken as 0.130 US\$ per kWh (Sep-2021), which is the global average price for households/businesses, according to GlobalPetrolPrices.com. The calculation only includes indirect emissions due to electricity usage and doesn't include emission reductions due to replacement of refrigerants.



**UNDP IS ALREADY
SUPPORTING MORE THAN
50 Countries
TO PROMOTE SUSTAINABLE COOLING
SOLUTIONS THROUGH PROGRAMMES**

UNDP is ready to provide technical and financial support to countries to develop and implement their NCPs. Building on existing initiatives and partnerships with governments, bilateral donors, vertical funds, and other UN agencies, UNDP explores broader cooperating opportunities and business models with private sector partners, development banks, financial institutions offering green bonds, urban design institutions, and academia to develop integrated solutions to scale up innovation and impact on sustainable cooling. UNDP promotes the development of systemic solutions in cold chain systems, energy-efficient buildings, district cooling and heating, among other measures such as MEPS and low-GWP alternatives, which are linked to our extensive programming experiences under the Multilateral Fund for the Implementation of the Montreal Protocol (MLF), Global Environment Facility (GEF), and other bilateral projects.

These eleven NCPs build upon the already extensive experience of UNDP in the cooling sector and will play a critical role in implementing UNDP's new sustainable

cooling offer. UNDP is already supporting more than 50 countries to promote sustainable cooling solutions through programmes supported by the Multilateral Fund, GEF, bilateral donors such as Germany, Canada, New Zealand, France, Italy, as well as platforms such as Cool-Coalition, SE4ALL, CCAC, and Clean Cooling Collaborative. Energy is also an important priority in UNDP's 2021-2025 Strategic Plan, where our focus is on increasing energy access for those furthest behind and expanding the use of renewable sources and energy-efficiency measures (by replacing inefficient energy technology and practices with lower-consuming versions in cooling, infrastructure, transport and other sectors). It also intends to speed up investment in distributed renewable energy solutions, especially for those hardest to reach and in crisis contexts, and by working in partnership, aims to increase access to clean and affordable energy for 500 million people¹⁰. Finally, UNDP's integrated programmes (Climate Promise and Sustainable Energy Hub) and enabling platforms (SDG finance, Innovation and Digital) can help to unlock innovation and scale up actions in the cooling sector.

¹⁰ <http://web.undp.org/evaluation/evaluations/thematic/energy.shtmlf>





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