Delivering Energy Efficient and Climate Friendly Cooling through National Cooling Action Plans

Launch of NCAP Methodology & Regional Capacity Building Workshops For Asia and the Pacific

Wednesday 30 June, 01:00 - 04:00 PM Bangkok Time

Objectives: bring together country representatives and policy makers from Asia and the Pacific to present the Cool Coalition's comprehensive NCAP methodology, outline opportunities for action and best practices from fellow policymakers from the region, link participants with experts to discuss how to develop NCAPs including challenges, opportunities and solutions, identify regional priority activities for implementation.

Workshop materials: Event page

NCAP Methodology: https://coolcoalition.org/national-cooling-action-plan-methodology/

Key messages:

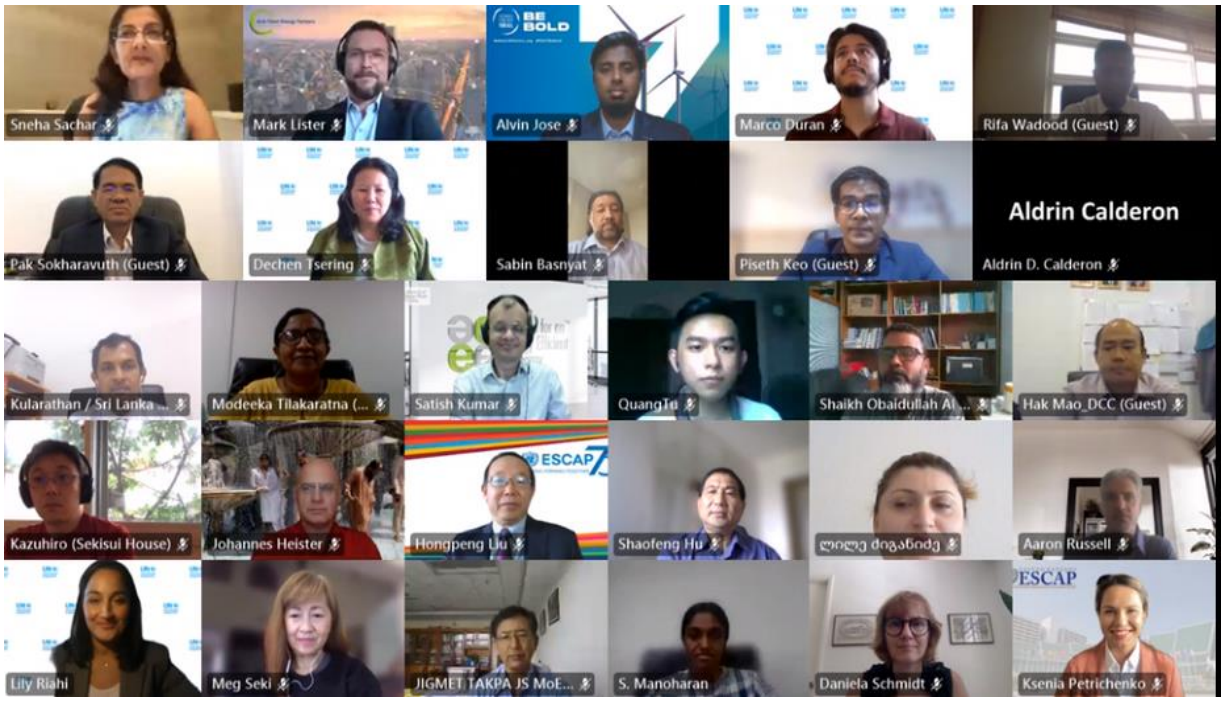
- There is an urgent need to address growing demand for cooling and related social, economic and environmental challenges. With a large portion of the cooling-related emissions coming from energy consumption, energy efficiency improvements of cooling are essential.
- Cooling is essential for many aspects of life, economic prosperity and people's wellbeing. Efficient and climate-friendly cooling is expected to create both financial gains across sectors and improvements in quality of life, while contributing to the achievement of various Sustainable Development Goals (SDGs)
- National Cooling Action Plans (NCAPs) provide roadmaps that pave the way for cross-sectoral collaborations and synergies, enabling a clear policy pathway to facilitate a transition for all sectors involved.
- Data limitations represent one of the major hurdles for the NCAP development. However, using various approaches to bridging the data gaps (desktop research, surveys, interviews, modelling, etc.), as well as engaging various stakeholders from public, private and academic sectors, can help to overcome some of those challenges.
- NCAPs are great policy tools for contributing to achieving sustainable energy and climate change goals at both national and international levels - helping to contribute to the delivery of the Montreal protocol and Paris Agreement.

DETAILED WORKSHOP REPORT

Agenda

Time	What's on
13:00 ICT	Workshop Overview
13:05 ICT	Welcome Remarks by **Hongpeng Liu, ESCAP and Dechen Tsering, UNEP**
13:15 ICT	Keynote: **Linking NCAP with the Montreal Protocol by Megumi Seki, Ozone Secretariat**
13:20 ICT	Keynote: **India NCAP – Best Practice Experiences by Jigmet Takpa**
13:30 ICT	Presentation: **The NCAP Development Process and Cooling Demand Assessment**
	Presentation: **Access to Cooling in NCAP**
14:00 ICT	Breakout 1: **Sharing Experience on NCAP Development**
	Breakout 2: **Sharing Experiences on NCAP Data Collection and Assessment**
14:50 ICT	Presentation: **Synergizing NCAPs with HFC Phase Out**
15:00 ICT	Presentation: **Mainstreaming National Cooling Plans into National Strategies**
15:10 ICT	Panel: **Scaling up and Financing NCAP Implementation**
15:45 ICT	Q&A
15:55 ICT	Closing

Group Photo of Speakers



Welcome Remarks from Mr. Hongpeng Liu – Director, Energy Division UN ESCAP

Mr Liu started the discussion with a warm welcome to participants and by thanking the collaborative efforts in this project. He highlighted the role that cooling currently plays, and is increasingly set to play, in our daily lives, contributing to both human well-being and economic prosperity, but often coming at a cost for the environment. Currently responsible for 7-10% of global CO2 emissions due to energy use and leakages of hydrofluorocarbons refrigerants, the global energy demand for cooling is expected to experience a 33-fold increase during the 21st century – with most growth to come from developing economies.

Whereas this increase in energy demand is set to increase CO2 emissions and put strains on power grids, growing cooling demand will also impact SDG7 and other SDGs. With heat having negative impacts on health, safety, productivity, education, food and medicinal supply chains (pertinent to current vaccine requirements) – cooling will play an important role in the future in various sectors, which means that managing this demand will require cross-cutting collaborative efforts. Delivering on these collaborative needs cannot be done without in-depth understandings of national contexts.

To provide a best practice approach to deliver on the cooling challenge at national level, ESCAP and UNEP joined forces together with experts within the Cool Coalition framework to develop the first comprehensive methodology for National Cooling Action Plan (NCAP) development. Hongpeng thanked all the partners of the Cool Coalition who contributed to this methodology, as well as the governments of Cambodia, Indonesia and the Alliance for an Energy Efficient Economy who have been piloting this methodology.

Welcome Remarks from Ms Dechen Tsering – Director, Asia and the Pacific Office, United Nations Environment Programme

Ms. Tsering opened with thanks to all the attendees, participants for joining the workshop to discuss a topic all too often neglected in the climate action, energy and sustainable development puzzle. She also thanked all collaborators of the Cool Coalition for their continuous efforts in developing the NCAP methodology.

Contributing with 10% of all greenhouse gas (GHG) emissions – twice the contribution of aviation and maritime transport combined – energy use for cooling must be discussed. Especially within the context of a 3°C temperature increase trajectory, set to occur by the end of the century. Therefore, to avoid a vicious cycle of cooling and warming, a rapid transition to climate-friendly and energy efficient cooling is needed.

Contrary to popular beliefs, a shift to clean energy alone is not sufficient. As even the record-breaking increases of solar energy generation over recent years were not sufficient to offset the increases in energy demand from new AC units. Instead, a variety of additional initiatives would be needed, giving the examples of: smart buildings, urban form, nature-based solutions, super-efficient equipment and appliances, and a shift to lower Global Warming Potential (GWP) refrigerants.

For instance, urban greening done in cities like Hanoi and Dhakka were able to counter some of the local urban heat island effect, lowering ambient temperatures by about 2°C. Additionally, emissions mitigation is essential, notably in the cooling sector, as according to last year's Cooling Synthesis report we can avoid the equivalent of 4 to 8 years of total GHG emissions by 2050, just through energy efficiency and refrigerant improvements in cooling

appliances. Reaching net-zero cooling could reduce the costs of the energy transition by $3.5 trillion by 2030.

NCAPs represent comprehensive approaches to acting on the ground. By developing NCAPs, countries can "deliver efficient and sustainable cooling and bring essential life-preserving services like vaccines and safe food to all people while driving climate action", as stated by the UN Secretary General. Making these NCAPs a part of the "*raison d'être*" for the Cool Coalition, they serve to enable cross-collaborative initiatives that will drive the achievement of SDGs and NDCs. The Cool Coalition brings together three benefits of improved cooling: cutting global warming, improving quality of live for hundreds of million people and realising huge financial savings.

Keynote: Linking NCAP with the Montreal Protocol by Megumi Seki, Ozone Secretariat

Ms Seki welcomed all participants and guests of the workshop and opened with this year's theme for the Montreal Protocol (MP): to keep us, our food and our vaccines cool. The theme was chosen to highlight the links between cooling and various aspects of our lives.

Ozone Depleting Substances (ODS) are powerful greenhouse gases (GHGs) present in refrigerants, which have been managed and reduced under the MP. It has been estimated that under the MP the equivalent of 135 billion tonnes of CO2 equivalent emissions of ODSs have been removed between 1990 and 2010. This is five times larger than the annual emissions reduction target for the first commitment period of the Kyoto protocol. These ODS gases are common within cooling systems and refrigerators, demonstrating the link between the MP and cooling targets. Furthermore, through the phasedown of ODS alone, it could be possible to reduce global temperature increases by 0.4°C by 2100. If energy efficiency improvements were to be implemented alongside this, the climate benefits could double.

This draws a clear path between the MP and NCAPs, of which the first was developed in India in 2019. Ms Seki thanked and congratulated the countries who have completed or are developing their NCAPs, for their efforts and leadership. The MP's Technical and Economic Assessment Panel (TEAP) called NCAP one of the best mechanisms for coordinating strategies based on ozone, cooling and climate – aiding to meet international objectives, such as those set in the MP and the Paris Agreement. Additionally, the resulting improvements towards increased access to efficient cooling systems will have several positive spill-over effects to other SDG targets, namely in relation to health, education and food security. Ms Seki congratulated the Cool Coalition, UN ESCAP and all actors involved in the development of NCAPs, expressing her hope that more parties will join the Coalition.

Keynote: India NCAP – Best practice Experiences by Jigmet Takpa

Mr Takpa welcomed participants and thanked organisers for the invitation before introducing India's context and the effects future changes will have on cooling in his country. India's large, growing and increasingly affluent population is expected to increase its rate of energy consumption for cooling, especially considering global warming. Over the next 20 years, the country's aggregate demand for cooling is expected to increase 8-fold compared to 2017 levels. Mr Takpa emphasized that cooling's effects go beyond individual's comfort, giving the example of future food conservation and food security as areas that need cooling and refrigeration.

India's approach has been formulated in their NCAP, named ICAP, representing the world's first national cooling action plan. The ICAP's road map lays out a 20-year integrated outlook across sectors, encompassing India's cooling demand, technology options, refrigerant use and energy consumption. The initiative utilised a triple-sector approach, developing the plan with multiple stakeholders in the government, private sector and academia/think tanks. Mr Takpa outlined the following ICAP's objectives:

- to assess the cooling requirements over the next 20 years;
- to suggest sustainable solutions in each sector;
- to focus on capacity building for service technicians;
- to map available technologies that can be directly and passively used; and
- to develop an R&D innovation ecosystem for indigenous development of alternative technologies.

In line with these objectives, a series of goals were set by 2037-2038, which ICAP plans to meet through a summarised general approach of maximising synergies across sectors through broad based, cross-sectoral policy advise initiatives. This approach was developed in three stages, commencing with context mapping and ICAP planning, conducting a cooling demand assessment and integrating sector-wide assessments into an ICAP synthesis.

Through these initiatives India was able to derive key lessons and takeaways from the development of ICAP to help other countries wishing to create their own NCAPs. Mr Takpa presented the following recommendations resulted from the NCAP development process:

- to have a leading committee, with the specific task of overseeing the process and directing efforts between the various parties involved;
- to use a multiple stakeholder, triple sector engagement framework to align the diverse interests of various stakeholders participating in this cross-sector initiative;
- to have an implementation framework that leverages interlinkages between national policies, programmes and international commitments;
- to have access to high quality data even if this should not be seen as a "showstopper", as shortfalls in data quality can often be circumvented; and
- to balance comprehensiveness and timeliness.

By following these guidelines, Mr Takpa was confident that NCAP development methodology, which follows ICAPs development process, will help countries conduct holistic assessments of their current and projected cooling demand, create positive externalities for other SDGs and enable synergies that would maximise the socio-economic benefits.

Presentation: The NCAP Development Process and Cooling Demand Assessment by Dr. Satish Kumar and Sneha Sachar

Dr. Kumar started by thanking all participants for attending. He explained that the Alliance for Energy Efficient Economy (AEEE) played an important part in the design of the NCAP methodology, based on the organisation's experience in supporting the ICAP's development. The Methodology aims at providing a holistic but modular guide map for countries, recognising the diverse needs and contexts present in each country.

Moreover, the team developed a methodology that should be applied through cross collaborative efforts whilst aiming to maximise socio-economic benefits. These aspects were central to the development of the NCAP methodology, prioritising adaptability and the ability to simplify, and prioritise according to a country's available resources and constraints.

As part of the methodology, the speakers called for the norm to be an integrated approach, consisting of several steps. The first being the reduction of cooling loads to the extent possible (e.g. efficient building designs, passive cooling practices, etc.). The remaining cooling loads should be met in an efficient and climate-friendly way. Lastly, cooling operations and behaviours should be optimised – ensuring cooling is delivered only where and when it is needed.

To develop this NCAP development process, the AEEE outlined three stages:

1. Contextual assessment and planning
2. Cooling demand assessments
3. Synthesis and creation of the NCAP

Each stage is sub-divided into various steps to aid and provide clarity on how to proceed and effectively achieve the intended outcomes, such as:

- a good understanding of the relevant actors and opportunities present (stage 1);
- baseline and intervention scenarios, with related solutions and strategies (stage 2);
- the design of an integrative, collaborative roadmap to achieve desired goals (stage 3).

To facilitate this process, it is essential to have effective intergovernmental and triple-sector engagement approach. However, this can only effectively work if a nodal, NCAP team is set in place before the start of the process.

A common hurdle identified by the AEEE was the limited access to data of sufficient quality and quantity. This was most notably the case when it came to measuring un-met demand, which is much harder to quantify than the met cooling demand. Whilst data provided a general hurdle, a general solution exists in cross collaboration between private, public and academic actors. In cases where this data was not sufficient, it is advised to proceed using logical assumptions and expert advice – until better data becomes available, at which point the cooling demand assessments should be updated.

Presentation: Access to cooling in NCAPs by Alvin Jose

Mr Jose started his intervention by thanking and congratulating everyone for the results achieved by NCAPs so far. He went on to identify the demographic spread of access to cooling in Asia, describing the characteristics and relationships of cooling for Asia's population at risk. The rural poor, lack of access to cooling and the ability to afford cooling options. Mr. Jose particularly emphasized the challenges regarding the food that cannot be preserved due to limited opportunities for refrigeration. The urban poor have less problems accessing cooling technologies but often are unable to afford it. At the lower-middle income level, people can afford inefficient cooling appliances due to financial limitations, giving the evidence for the importance of energy efficiency for the cooling sector. Lastly, middle-income groups can afford cooling technologies but need to manage their finances to do so.

Building upon these observations, Mr Jose stated that NCAPs should include strategies to support those who are lacking the access to cooling. However, a challenge remained in offering cooling options for those living off-grid. Additionally, he pointed out that a special care should be taken, when dealing with un-met cooling demands, which remain more difficult to assess due to data constraints. In this regard Mr Jose proposed to look at cooling through both hard and soft data analysis lenses. With the hard aspect referring to effective policy and decision making, and the soft to flexible solutions to deal with un-met demand.

BREAKOUT SESSIONS

Breakout 1: Sharing Experience on NCAP Development

In the first breakout session moderated by Lily Riahi, Cool Coalition, UNEP, country representatives from the Asia Pacific region shared their experience in developing NCAPs.

Mr Pak Sokharavuth started the conversation by outlining the urgency to create an NCAP strategy for efficient, climate-friendly cooling in Cambodia, a country with an economic growth of 7%, and where electricity consumption is forecast to triple between 2015 and 2030. Considering the steady economic growth and rising income, energy use for space cooling and refrigeration is bound to increase rapidly. Mr Pak added that access to cooling is particularly important for Cambodia: in 2017 the penetration rate for cooling equipment in the country was estimated to be at around 2%. Mr Pak explained that Cambodia is the first country to pilot the Cool Coalition NCAP methodology, a process that started in September 2020, in collaboration with UNEP and ESCAP.

The first stage was to conduct a country mapping, high-level data collection and NCAP planning. This included setting up a multi-stakeholder technical group to support the NCAP development, formed with participation from the government, private sector and academia, including Cambodia's Ministry of Environment, the National Council for Sustainable Development, the Ministry of Mines and Energy, Ministry of Public Works and Transport and the Ministry for Land Management, Urban Planning and Construction, as well as international organizations and experts.

Then, a sectoral data collection was carried out, covering space cooling in buildings, cold chain & refrigeration (food and healthcare), mobile AC and industrial processes. The data collection was carried out by a consultant, supported by the National Ozone Unit in cooperation with local governments. The data was collected from suppliers of refrigerants and cooling appliance, the servicing sector, and cooling equipment owners, including factories, public buildings and commercial buildings. Residential cooling data was estimated.

Thanks to this granular data, a Preliminary Cooling Demand Assessment was modeled. This model suggests that by 2040 building space cooling will constitute 42% of the total cooling carbon emissions in Cambodia. Mobile AC is the second highest contributor (26% of cooling emissions) and food cold chain is third highest sub-sector, with 17% of total carbon emissions by 2040. Further, the NCAP team has identified comprehensive actions to reduce energy use and emissions from cooling aligned with plans related to emissions from refrigerants transition. By this July, the NCAP multi-stakeholder technical group will deliver the finalized version of the NCAP, which will be reviewed and published soon thereafter.

Dr. Keo Piseth, Director of the Asian Vision institute, intervened to outline the links between Cambodia's NDC and NCAP development process. Acting on cooling is key to reach Cambodia's NDC goal of 16% reduction in GHG emissions from the energy sector by 2030, in comparison to a business-as-usual scenario. If left unchecked, energy will become the leading source of emissions in Cambodia by 2030. Action on cooling to meet the NDC targets must include a direct emission reduction, by facilitating the F-gas transition, the reduction of indirect emissions through improved cooling efficiency, the inclusion of performance requirements in building codes, as the implementation of passive cooling measures in cities.

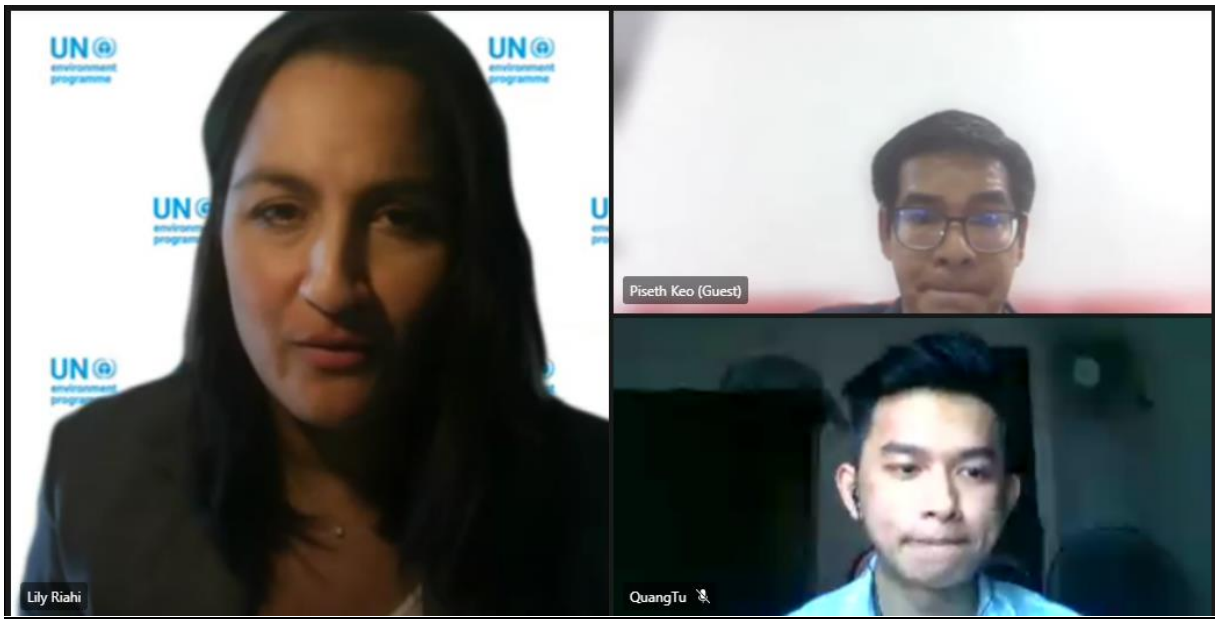
By implementing targeted policies on each of the NCAPs subsector, Cambodia can mitigate 2.33 mTCO2e emissions by 2030, translating to 9.2 % of total expected cooling emissions, and of 5.24 mTCO2e emissions by 2040 (15.6%). These interventions based on NCAP findings are planned in three phases: immediate (2021-2025), medium-term (2025-2030) and long-term interventions (2030-2040). Interventions will be reviewed cyclically to adapt them to technology innovations and changing frameworks of action. Dr. Keo Piseth explained that the Inter-sectoral Working Group for the Implementation of Conventions, Protocols, and International Agreements related to Environmental Protection will act as the coordinator between different stakeholders to enable NCAP implementation in Cambodia, with the support of a pooled financing mechanism of national and international funds, and of a data management system for cooling sector monitoring and evaluation to track progress.

Ms. Nguyen Dang Thu Cuc, National Ozone Coordinator of Viet Nam started her intervention by underscoring the ongoing rapid growth of the RAC sector in the country, estimated at 12% per year between 2011 and 2019. If left unchecked, cooling emissions in the country will double by 2030. This growth is driven by economic development, but Vietnam's geographic and climatic conditions are also significant contributors to cooling demand, with rising temperatures causing increases in cooling needs and GHG emissions. This is why the country has decided to prioritize action on efficient, climate friendly cooling in the enhanced NDC, to ratify the Kigali Amendment in 2019, to ensure KCEP funding support to develop an NCAP, which is in process of being finalized, and to focus additional efforts on urban cooling strategies to build back better from the ongoing pandemic.

Mr Quang Tu took the floor to explain in additional detail the NCAP process of Viet Nam. He explained that the main focus of the NCAP development is to accelerate the AC sector transformation to energy-efficient, "inverter" technologies. The NCAP supports this process by providing context and reasoning for enhanced policy action to complement initiatives to remove or address technical barriers, and by making the case for action by scenario analysis of various energy performance levels and by incorporating findings on technical barriers while describing cooling policy framework in Vietnam and possible areas to enable fulfilling mandates and priorities of two key cooling government focal points: MONRE and MOIT.

Viet Nam's NCAP was developed by conducting an initial literature and desk review of existing information, rules and regulations, and surveys on the room AC market and policy landscape. Then, a gap analysis on legal, institutional, and technical preventing achievement of policy objectives was developed. In 2020, a survey was conducted to collect commercial

and technical parameters and updated data on room AC to provide for detailed analyses and to build a project database which now includes 4,015 AC models from 38 surveyed stores and manufacturers. Thanks to this data collection, a modeling analysis to project the impact of more ambitious MEPS on the future AC market was developed, which allowed for the selection of best policy options for the country. Stakeholder consultations with Ministries, EE Testing Centers, manufacturers, research institutes, suppliers and service shops were then conducted to solidify and share results.



Finally, Dr. Meng Liu from the China National Institute of Standardization presented the China Green Cooling Action Plan. He explained that developing MEPS was a top priority to drive efficiency improvements in the country, with the first ones for cooling appliances being published in 1989 and now extending to 14 categories of cooling products. These standards have been very effective and have helped achieved very advanced levels of cooling efficiency. The latest revision in 2019 will merge EE standards for fix speed and variable speed room AC into one, quickly phase out the fix speed AC, and align Chinese standards with the advance international level.

Dr. Liu outlined how on June 13, 2019, seven ministries in China, including NDRC, jointly issued the *Green Cooling Action Plan*. During the G20 Summit on June 29, the Foreign Ministers of China, France and the Secretary General of the United Nations held a meeting on climate change and issued a joint press communique to welcome the release of the GCAP and encouraged countries to take similarly decisive action to tackling the cooling challenge. Dr. Liu explained that the GCAP is market-oriented and government supported, with the major focus being increasing efficiency standards (MEPS) for existing and upcoming technologies, strengthen the implementation of existing standards, the promotion of green cooling products and the sustainable development of the sustainable cooling industry in the country, and ensure international cooperation on this important issue.

The GCAP sets clear goals for the short and medium term: By 2022, increase the energy efficiency level in the market of cooling products such as household and multi-split ACs by more than 30%, increase the market share of green efficient cooling products by 20%, achieve annual electricity savings of approximately 100 billion TWh, which constitutes and immense energy saving. By 2030, the goals are to increase the cooling energy efficiency of large public buildings by 30% and the overall cooling efficiency by more than 25%, toncrease the market share of green efficient cooling products by more than 40%, and to achieve annual electricity savings of approximately 400 billion TWh.

Breakout 2: Sharing Experiences on NCAP Data Collection and Assessment

In this breakout session moderated by Ksenia Petrichenko, UNESCAP, the focus was on data collection methods at national level and practices for NCAP development.

Dr. Kumar, representing the experience from India, opened the discussion by acknowledging the difficulty in quantifying cooling requirements, of both met and un-met demand. He proposed various methods to approach data collection. Using technical expertise from academic and technical experts, it is possible to identify some of the un-met demand by running simulations and creating estimates based on various pieces of information commonly available and extrapolating from them. Regarding food, by identifying total domestic production, local consumption (not needing cooling) and how much is passed on to retail, it is possible to estimate cooling needs in that sector –with the caveat of this being a data intensive process.

Regarding energy infrastructures, it is possible to arrive at important estimates for cooling need per a unit of area by identifying appliances penetration rates, comparing conditioned and not conditioned spaces, estimating technology uptake levels and build up densities. Using the cooling and refrigerator equipment as a base for estimation (used in buildings, transport or storage), it is also possible to evaluate different future scenarios depending on the number, types of products that are likely to be used, and the amount and kind of ODS the products typically utilise. Whilst these methods remain data intense, they represent alternative pathways to form predictions and overcome shortfalls in data availability.

Ms Tilakaratnar described Sri Lanka's NCAP data collection and assessment method, which commenced with a national kick-off workshop organised by the Ministry of Environment (MoE) and relevant stakeholders. They planned to use surveys to collect primary data which would be complemented by secondary data sources. However, the MoE faced many challenges regarding the collection of the primary data, finding it difficult to gain answers to questionnaires and access to the data from companies and institutions. Some barriers included unwillingness to disclose data, lack of time and resources to complete the surveys and a lack of appropriate recording equipment. Following the stakeholder consultations, key thematic areas were identified for further research, including: space cooling in buildings and cooling demand, cold-chain refrigeration, transport refrigeration and mobile air conditioning, refrigeration and air conditioning service sector, indigenous knowledge and research.

Similarly to India, various methods for data gaps mitigation had to be used in Sri Lanka. Mapping appliance use per sector, cross checking information provided from stock/sales inventories, estimating the cooling and refrigeration rates, assessing the development levels of technologies and their energy efficiency rates, the gradual replacement rates of stock and different intervention scenarios – are among some of the strategies used to develop future scenarios for cooling demand and related GHG emissions for the NCAP's preparation.

Mr Supriyadi talked about some of Indonesia's practices for data collection, where this process is still on-going. Mr Supriyadi emphasized that in relation to Indonesia's strong commitment to reduce their CO2 emissions, the cooling sector's largest portion of emissions came from its energy consumption, which brings cooling energy efficiency high on the policy agenda. On the data collection front, Mr Supriyadi referred to the collaboration between Indonesia, UN ESCAP and UNEP for the development of the NCAP. This collaborative effort has been pertinent in delivering results and worked well with the government's inter-ministerial approach, which utilised various sector's know-how and data collection efforts to help provide a complete scene of cooling in Indonesia. Such a collaborative approach enabled the Ministry of Energy and Mineral Resources to lead the NCAP development process and to work alongside various agencies and ministries to develop a comprehensive cooling assessment.

The discussion continued with Ksenia asking the panellists to outline the key barriers to data collection for NCAP development in their respective countries and highlight some successful strategies that were deployed for mitigating those barriers.

Ms Tilakaratnar responded that the main obstacle in Sri Lanka was unwillingness of institutions and stakeholders to share or disclose their data, requiring a lot of active intervention to overcome this. As a response, she suggested using alternative data collection sources, for example, obtaining data from published documents and production side, as well as using the experience and expertise of consultants.

Dr Kumar started off by saying that the Montreal Protocol (MP) made it relatively easy to access refrigerant data, but that stock data (of cooling appliances and refrigerants) was more difficult to access. His proposed solution was to start gathering data where it was readily available, as the first step is often the hardest. Alternatively, he agreed with the stakeholder engagement approach to use the expertise of other ministries and consultants as potential data sources.

Mr Supriyadi also identified data gaps as major barriers and highlighted the importance of inter-ministerial collaboration to fill those gaps. He further suggested the use of international best practices, approaches and assumptions to help identify data proxy for utilisation in a particular country.

Mr Supriyadi asked panellists if they had any advice for synergising data collection process. Dr Kumar's answer highlighted the importance of working closely with the entity collecting the data from the start, as well as identifying alternative and secondary sources of data and being aware that any data collection process is unlikely to be flawless. Ms Tilakaratnar answered that the accuracy of the data was very important and there should therefore be special care to maintain high standards for the collection of the data.

Presentation: Synergising NCAPs with HFC phase out by Shaofeng Hu

Mr Hu introduced refrigerant management as an integral part of the cooling sector's transformation, due to its role in the phaseout of ODS and phasedown of hydrofluorocarbons (HFCs) as part of the MP. Within this sector, the main areas of focus moving forward include refrigerant's cooling systems, their efficiency, and their safety concerns. Safety issues relating to ODS and HFC are due to them being highly flammable, toxic and highly pressurised. The servicing sector can therefore represent a challenge in the sector if not monitored and maintained well.

This is often the case in developing countries, where the servicing sector is often informal - with lack of formal training and expertise, low demand for servicing work and the high costs for relatively simple tools required, being key barriers to effective servicing.

Mr Hu also identified market and policy barriers in the sector, such as patents, high initial costs, first mover risks and regulatory barriers that hinder the innovation in the sector. Other barriers include: various forms of competition (safety standards, no economies of scale etc.), lack of access to essential parts and a difficulty to develop technical and individual capacity due to the lack of formal standards in the sector.

Mr Hu discussed current solutions that can help to overcome some of these barriers. Under multilateral funds, international efforts have been made to improve the training of technicians, focusing on aspects of safety and energy efficiency. Furthermore, efforts have been made to standardise teaching methods and technical interventions internationally. NCAPs could be used to reflect on current challenges and pave a path that highlights the role of energy efficiency and safety during training. NCAPs should also encourage the development of country/context specific agencies to aid with the abovementioned problems. These could act as basis to set up cross-country collaborative platforms of agencies specialised in different areas of cooling (regulatory, training etc.) that could help one another.

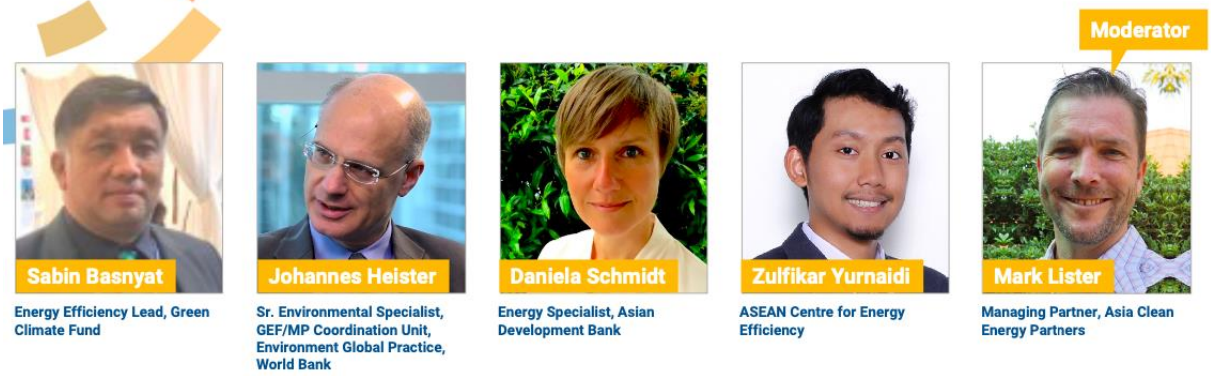
Presentation: Mainstreaming National Cooling Plans into National Strategies by Anderson Alves, UNDP

Working at UNDP and in collaboration with K-CEP to support countries developing their NCAPs, Mr Alves described the role of NCAPs at the international level, contributing to international policy frameworks such as the Paris agreement (NDCs and roadmaps for reducing GHGs), the Montreal Protocol (phasing out of ODS and phasing down of HFCs) and national frameworks. NCAP can exist as a standalone document, specifically tailored for the cooling sector only, but can also serve as a linkage to other international processes.

The reason that NCAPs are so important in the international context, is that cooling affects various sectors. In fact, under the efficient cooling scenario, USD 3 trillion could be saved between now and 2050 through lower running costs and reduced required investments, making space for crucial investments in other areas.

In practical terms, Mr Alves gave the examples of the policy framework actions for Lebanon, Panama and Trinidad and Tobago who are currently developing their NCAPs. Whilst still in the early development stage, several goals have been set for each country, laying out roadmaps to identify challenges, opportunities, policy guidance and long-term cooling plans within their respective context.

Panel: Scaling up and Financing NCAP implementation



Mr Basnyat from the Green Climate Fund (GCF) opened the panel discussion with the clear statement that cooling is part of the GCF's strategy plans for 2023. The GCF is a financial organisation aimed at getting climate action to happen. Cooling fits under GCF's framework, providing various business opportunities and benefiting from three GCF financial pathway options. For these initiatives to be effective, countries will have to be ready for climate finance initiatives. These preparations would synergise well with the roadmaps set in the NCAPs, setting up collaboration opportunities. With this in mind, the role of financing will not just be for technological innovation, but also for enabling sustainable business initiatives to occur – only possible under the right policy framework. Mr Basnyat concluded his intervention by calling for countries to apply to GCF funds to act on cooling.

Mr Heister from the World Bank (WB) shared his optimism for the number of NCAPs being developed, as in his opinion, they are important tools to aid countries in meeting international commitments such as the 2050 COP21 goals. Mr Heister pointed out that WB can help countries in four ways through categories labelled: strategy, knowledge, operations and financing. Through the strategy category, the WB finished its Second Climate Action Plan, which discusses the roles of efficiency, building designs, cold chains and other areas relating to cooling. Moreover, the WB works to develop climate change and development plan reports. These can allow countries to work on their development plans within a climate change context, serving as instruments to enable countries to develop their NCAPs, with the support from international organisations.

As for the knowledge category, the Energy Sector Management Assistance Program (ESMAP) of the WB have released 2 publications on Space Cooling and Cold Cities. The WB also has programmes for technical assistance and project preparation, organised with the help of K-CEP. WB is supporting India in conducting a context implementation study for their ICAP. Mr Heister shared that the operations category is still in the preparation stage, but intends to offer programmes to facilitate technical improvements, work on the phasing down and phasing out of ODS and HFCs, as well as on efficiency and on cities with smart cooling, transport and vaccine solutions among others. In terms of finance, Mr Heister highlighted the fact that cooling is one of the components of climate action that can be operated with positive returns, as the gains in efficiency can be leveraged to generate gains. The WB is also working on sustainable cooling facilities to support such projects and opportunities for climate finance. Another project that they are working on is energy efficiency financing solutions for the future.

Ms Schmidt from the Asian Development Bank (ADB) talked about a financing opportunity for countries, through an ADB initiative to improve the financing options of households when purchasing air conditioners. Currently, 7 out of 10 households choose inefficient air

conditioners due to high upfront costs (with a good air conditioner being twice as expensive). At current rates in Thailand (ADB's pilot country for the project), energy production would have to increase by 6% each year just to respond to additional demand from inefficient cooling. The impact of such trends are high costs, strains on energy sectors and increasing GHG emissions. As a solution, the ADB proposed a platform with credit options for air conditioners, which operate similarly to telecoms contracts. By spreading the upfront costs over time and using the savings from lower energy bills (due to higher efficiency appliances), it is possible to provide cheaper air conditioner units of higher efficiency ratings to households. Consequentially, Ms Schmidt called out to countries and proposed for them to work with the ADB if they wish to apply this solution in their country. Ms Schmidt also suggested that this solution could be integrated into countries' NCAPs.

Mr Yurnaidi from the ASEAN Centre for Energy (ACE) reminded the audience that ASEAN is in its second phase (2021-2025) of its plan of action for energy cooperation, which focuses on energy efficiency and conservation, under the regional target of reducing energy intensity by 32% by 2025. ACE also works to harmonise regional and national actions to share knowledge, best practices and encourage private sector actions. ACE works on promoting higher efficiency purchases of air conditioners in ASEAN countries through the harmonisation of standards, by strengthening market regulations and verification capabilities, as well as by supporting higher testing standards and creation of required laboratories. One of ACE's current goals is to set and implement a sustainable building and cooling roadmap, which they are currently working on with the IEA. This would require various actions to enforce higher construction standards, as well as a series of incentives in various formats (e.g. grants) to support and push improvements in the sector. Mr Yurnaidi emphasised the importance of transferring regional objectives to national levels in efficient and climate-friendly cooling as well as of encouraging more countries in ASEAN to develop and finalise their NCAPs.

Closing

Ms Lily Riahi from UNEP and Ms Ksenia Petrichenko from ESCAP delivered joint closing remarks as co-hosts of the workshop. They emphasized that cooling is a complex and cross-cutting phenomenon. NCAPs are effective plans for tackling cooling challenges to meet cooling needs of people and economic growth in a sustainable manner. NCAPs require wide collaboration as well as cohesive solutions. Methodology launched during the workshop aims at guiding countries through the process of the NCAP development.

UNEP and ESCAP have been working together with various Cool Coalition's partners to ensure that this methodology is comprehensive and captures all important aspects of efficient and climate-friendly cooling. It was made as flexible and adaptable as possible to enable any country to use it in its unique context. More workshops and capacity building activities are being planned to take place in other regions to continue sharing knowledge and expanding collaboration on NCAP development.