REMARKS AS DELIVERED

Technical Expert meeting on mitigation (TEM-M): Cool Buildings for All

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TAKEAWAYS:

1. As global temperatures increase, Cooling demand is growing rapidly worldwide with significant negative implications for climate, but solutions to reduce emissions in the sector exist and Montreal Protocol is a powerful driver to change how we cool
2. Action on Cooling offers many climate and development benefits. Energy-efficient and climate-friendly cooling strategies can avoid equivalent 8 yrs of emissions.
3. Need to think in terms of a progressive ***pathway*** -- deploy best available technologies now while reducing demand by improving urban and building design and operations. As technology and practice evolve, we bring them on board.
4. Managing growth in cooling demand critical to meeting climate objectives, while also supporting pandemic and economic recovery.

- It's my pleasure to provide framing and context for why cooling demand in buildings is critical to meeting our climate and development objectives.
- According to the 2020 *United in Science* report, there is a 1-in-5 chance that we will exceed 1.5°C before 2024.[i]
- This warming, together with growing populations, incomes, and urbanization, is driving a rapid increase in demand for cooling.
- In fact, in the next 10 years, we are on track to add a billion more room air conditioners to our current stock, and another 3.5 billion by 2050.[ii] That's about 3 ACs every second.
- As a result, overall global energy use for air conditioning will triple, adding almost as much electricity demand for cooling alone as the entire US generated in 2018.[iii] Yes, as much as one of the highest energy consuming and emitting countries in the world.
- Furthermore, As the demand for electricity increases, so does the gap in access to cooling – an injustice that can increase health risks and heighten vulnerability. – Sustainable Energy for All finds that over 1 billion people currently lack access to sustainable cooling, and a further 2.2 billion are burdened by costly and polluting inefficient cooling technologies.[iv]
- These are among the reasons that the International Energy Agency calls cooling a "blind spot" in the energy debate.
- I consider getting cooling right both the greatest challenge and opportunity for climate and development.
- Because if we continue to cool our societies as we have been -- with the same inefficient technologies and super-greenhouse gas refrigerants -- we will blow through 1.5C.

- But there is good news: we have the solutions and the policy drivers to get cooling right.
- By taking advantage of the next refrigerant transition driven by Montreal Protocol, we have the opportunity to transform how we cool.
- According to the UNEP and IEA Cooling Synthesis released in July, adopting best available technologies for energy-efficient and climate-friendly cooling could avoid 210–460 Gt CO2e by 2060 – that is the equivalent of 8 years of current global emissions.[v]
- Improving cooling equipment alone is not enough. An early and yet critical component to is to reduce cooling load in the first place by better designing buildings and cities.
- Over the next 40 years, we are projected to build 230 billion square meters in new construction. That's equivalent to the area of Paris being built every week.[vi]
- Managing growth in cooling demand is also a key factor in maintaining electricity reliability and lowering costs of decarbonizing the electricity sector.
- Cooling demand drives peak load, making up 50% or more of peak during heat waves.[vii] Electricity generation and grids are sized to meet peak demand.
- Consider that more cooling capacity was added in 2018 in GW than total added solar generation capacity.[viii]
- As the other speakers will highlight, nature-based solutions, such as increasing urban forest canopies and smarter reflective surfaces can reduce the effects of urban heat islands, which disproportionately impact vulnerable populations.
- Passive cooling and better building design, materials, and operations, including use of district heating and cooling, are also essential to reducing cooling demand.
- The Kigali Cooling Efficiency Program and the Cool Coalition will soon release a brief on the benefits of passive cooling.
- With this context, I would argue that getting cooling right requires a ***pathway*** approach -- this begins with deploying available technologies with least climate impact now, as we develop the skills and know-how to adopt newer technologies and systems, together with improving urban and building design and operations.
- This includes using Lifecycle Climate Performance as a metric to identify the most climate-friendly solutions for given context.[ix]
- Managing growth in cooling demand is critical to meeting climate objectives, while also supporting pandemic and economic recovery.
- The UN Secretary General and others are calling for a green recovery that directs economic stimulus packages towards policies and programs that address pandemic and economic recovery sustainably.
- Energy efficient cooling is a powerful green recovery strategy. A recent report by the Economist Intelligence Unit identifies the impacts of including energy efficiency within stimulus packages, such as enhanced job creation: every US$10 million spent in improved

building efficiency generates 90–300 jobs, compared to 27 jobs in the fossil fuel sector for the same amount of spending.[x]

- And there are additional multiplier effects from governments and consumers turning savings on energy bills into additional spending in the economy.

Q&A: What is the most important challenge to tackle regarding sustainable cooling for buildings?

- We are connecting on average 3 air conditioners every second to the grid. We absolutely need to design and build better, but we also need to take advantage of the policy lever of the Montreal Protocol to make sure new air conditioners are as energy efficient and climate-friendly as possible.

- A final thought on COVID and proper ventilation for reducing risk of transmission – increased ventilation and filtration both increase energy demand for HVAC systems.

- With low occupancy in commercial buildings, now is the time to upgrade HVAC systems for high EE and low GWP and better indoor air quality.

- A recent study in Sweden found 16% decrease in grid reliability projected for high RE integration scenarios due to extreme weather, especially heat waves.[xi]

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[i] World Meteorological Organization (WMO), Global Carbon Project (GCP), UNESCO Intergovernmental Oceanographic Commission (UNESCO-IOC), Intergovernmental Panel on Climate Change (IPCC), United Nations Environment Programme (UNEP), & Met Office (2020) *United in Science 2020: A multi-organization high-level compilation of the latest climate information*. 3 ("There is a growing chance of annual global mean near surface temperature temporarily exceeding 1.5 °C above the 1850–1900 pre-industrial level, being ~20% in the 5-year period ending in 2024.").

[ii] IEA Future of Cooling (2018)

[iii] IEA Future of Cooling (2018) reference scenario projects energy demand for ACs to jump from 2 020 terawatt hours (TWh) in 2016 to 6 200 TWh in 2050 (p. 61). US electricity production in 2018 from utility-scale generation facilities totaled 4,178 TWh (EIA, https://www.eia.gov/tools/faqs/faq.php?id=427&t=3).

[iv] Sustainable Energy for All (2020). *Chilling Prospects: Tracking Sustainable Cooling for All*. ("Across 54 high-impact countries, 1.02 billion people among the rural and urban poor remain at high risk in 2020. This includes 318 million people living in poor rural areas and 699 million living in poor urban areas. A further 2.2 billion lower-middle income people pose a different kind of risk: limited purchasing choices mean they are likely to favour cooling devices that are typically inefficient and could cause a dramatic rise in energy demand and associated emissions.").

[v] International Energy Agency (IEA) & United Nations Environment Programme (UNEP) (2020) Cooling Emissions and Policy Synthesis Report.

[vi] Global Alliance for Buildings and Construction (2017). "As building floor space increases, time running out to cut energy use and meet climate goals." Press release 11 December 2017. ("Over the next 40 years, the world is expected to build 230 billion square metres in new construction - adding the equivalent of Paris to the planet every single week," said Fatih Birol, Executive Director of the International Energy Agency. "This rapid growth is not without consequences.").

[vii] Dreyfus G., Borgford-Parnell N., Christensen J., Fahey D.W., Motherway B., Peters T., Picolotti R., Shah N., & Xu Y. (2020) Assessment of Climate and Development Benefits of Efficient and Climate-Friendly Cooling, Molina, M., and Zaelke, D., Steering Committee Co-Chairs. Accessed at https://ccacoalition.org/cooling-policy.

[viii] Sachar S., Campbell I., & Kalanki A. (2018) Solving the Global Cooling Challenge: How to Counter the Climate Threat from Room Air Conditioners, ROCKY MOUNTAIN INSTITUTE. Accessed at www.rmi.org/insight/solving_the_global_cooling_challenge.

[ix] Andersen, S O., Wolf, J., Hwang, Y. and Ling, J. (2018). Life-Cycle Climate Performance Metrics and Room AC Carbon Footprint. *ASHRAE Journal*. 25. ("Total Equivalent Warming Impact (TEWI) is the summation of carbon-equivalent direct refrigerant and indirect power plant GHG emissions, while the more comprehensive Life-Cycle Climate Performance (LCCP) adds carbon-equivalent embodied emissions to the TEWI figure. . . . With no barriers of data, computation, or programming, Enhanced Localized LCCP (EL-LCCP) will ultimately account for: (1) local climate conditions, including high temperature and humidity; 2) local seasonal and time-of-day carbon intensity of electricity sources, including backup electricity generation; 3) electricity transmission and distribution losses, including through the application of any voltage stabilizers; 4) energy embodied in water used for power plant cooling. . . ."); *see also* SAE International (2009). *Standard J2766, Life Cycle Analysis to Estimate the CO_2-equivalent Emissions from MAC Operation*.

[x] Economist Intelligence Unit (2020) *The economic benefits of a clean recovery: the case of energy-efficient cooling*.

[xi] Perera A.T.D., Nik V.M., Chen D., Scartezzini J.-L., & Hong T. (2020) *Quantifying the impacts of climate change and extreme climate events on energy systems*, NATURE ENERGY. Accessed at http://www.nature.com/articles/s41560-020-0558-0.