Concept Note

NRDC | Strengthening Energy Efficiency Standards and Labels for Major Electrical Appliances in India

Strategic Context

The International Energy Agency (IEA)'s new India Energy Outlook 2021 points to key long-term trends on the evolution of India's energy sector by 2040.[1] It states, buildings yet to be built, and appliances yet to be bought, will drive India's energy future. India's residential energy use is likely to nearly triple, driven by rising appliance ownership and demand for cooling. As more people and businesses in India acquire electricity-consuming products, the potential for energy savings and greenhouse gas emission reductions will continue to increase. Additionally, peak demand reductions due to the cumulative effect of efficient appliances can obviate the need to set up new power plants. Having best-in-class efficiency for appliances is critical for India to meet its own energy needs sustainably, and for the energy future of the world.

In March 2019, India released the India Cooling Action Plan (ICAP), a comprehensive document aimed at meeting the country's rapidly growing cooling needs while addressing climate action. With both the Paris Climate Change Agreement and the Kigali Amendment informing its context, ICAP is one of the first national policy documents that harmonizes two separate policy streams of energy consumption and refrigerant use. It also prioritizes higher efficiency of cooling appliances as an important strategy for reducing the energy demand for cooling. This aligns with our estimates that suggest stronger Air Conditioner (AC) Minimum Energy Performance Standards (MEPS), can avoid 616 TWh of electricity demand and 186 million tons of CO2 emissions cumulatively by 2050. With such reductions in energy demand for ACs, India can avoid nearly 2.7 million tons of power plant emissions (NOx and SOx) from polluting the air, saving thousands of lives. Relatedly, ceiling fans account for nearly 20%[2] of household energy usage and are an important non-refrigerant cooling equipment essential for providing heat relief and ensuring access to cooling.

The Indian government is now focused on ICAP implementation with explicit targets to be achieved by 2038. We have a timely opportunity to develop long-term, best-in-class efficiency levels for two important growing sources of cooling in India, ACs and ceiling fans, and to advance India's efforts to meet its cooling needs. India's Ministry of Environment, Forests and Climate Change (MOEFCC), which released ICAP, has formed an ICAP implementation committee that brings together different government departments. This presents an opportunity to prioritize cross-cutting issue areas of cooling, such as appliance efficiency, to ensure better inter-agency coordination, such as between the Bureau of Energy Efficiency (BEE) and the Ozone Cell (responsible for implementation of the ICAP).

Further, while India has existing programs and policies in place to support energy efficient appliances, there remains a need to strengthen the process of developing robust standards and labels for EE appliances in India. India's Bureau of Energy Efficiency has been running a robust Standards and Labelling (S&L) program since 2006. This Star label program[3] has made a big impact on national energy use, driving down the energy consumption of individual appliances and increasing consumer awareness. BEE's implemented policies and schemes have saved an estimated 300 million tons of CO_2 emissions.[4] However, only 10 of the program's 19 products have MEPS mandates. While successful, the S&L program and the ambition of MEPS for the appliances can be significantly improved to realize their full potential.

Currently, India lacks an active voice to balance industry's voice on improving energy efficiency. The standards process itself has been limited to a few members of BEE's S&L Technical Committee, which has limited participation from civil society organizations (CSOs) and does not represent the industry holistically. Outside the formal standard setting process, there is a need for a consensus-making organization that brings the industry on board, to ease the task of organizations such as CLASP and BEE. The S&L community needs to have a long-term vision aligned with the technology roadmap for equipment and goals in terms of the EE levels they want to achieve by a mutually agreed target year. For example, a vision

[1] IEA (2021), India Energy Outlook 2021, IEA, Paris. https://iea.blob.core.windows.net/assets/1de6d91e-e23f-4e02-b1fb-51fdd6283b22/India_Energy_Outlook_2021.pdf
[2] https://www.clasp.ngo/updates/india-raises-the-bar-on-ceilingfan-energy-efficiency/
[3] https://beeindia.gov.in/content/standards-labeling
[4] https://www.nrdc.org/experts/sameer-kwatra/india-celebrates-energy-conservation-day

that is aligned with India's net zero emissions goal by 2070 in the long term, or 2030 in the medium term. With requested grant funds, NRDC will develop a process that is self-sustaining, inclusive, and comprehensive, and with an eye towards a longer-term vision of significantly reducing the energy consumption of appliances.

Change Narrative

Outcomes & Objectives

Initiative statement: By 2030, India achieves energy efficiency market transformation of major electrical appliances (ACs and ceiling fans) through best-in-class efficiency standards and labels. Our estimates suggest stronger Air Conditioner (AC) Minimum Energy Performance Standards (MEPS), can avoid 616 TWh of electricity demand and 186 million tons of CO2 emissions cumulatively by 2050.

Outcome 1: By 2028, India has standards for air-conditioners (ACs) with a minimum of 6% per annum increase in energy efficiency aligned with ICAP suggested pace of improvement

Objective 1: By 2025, achieve an agreement on ambition of efficiency levels for ACs and ceiling fans in strategic discussion with industry, BEE, and other stakeholders

Objective 1.1: By 2023, build consensus and buy-in among key stakeholders including equipment manufacturers, BEE, civil society, consumer organizations, to develop long-term efficiency levels for ACs and ceiling fans. (These levels would go beyond Minimum Energy Performance Standards, MEPS).

Milestones:

- Industry stakeholders including RAMA, ISHRAE, AHRI and others are engaged in learning the current state of play of technology and needs of the industry
- Current standards and international best practices for ACs and ceiling fans are mapped and compared to the current standards in India to understand the gaps and identify areas of improvement
- Efficiency champions within the industry for air conditioners and ceiling fans are identified to understand and encourage the industry with best practices; and a long-term vision for MEPS is drafted

Objective 1.2: By 2023, technology roadmaps for ACs and ceiling fans are drafted, discussed, and released jointly with key stakeholders.

Milestones:

- A technology roadmap for air conditioners and ceiling fans based on global best practices and current state of play in India is developed.
- Knowledge exchange workshop for U.S., China, and India industry stakeholders held to discuss solutions and identify pathways to raise the ambition of MEPS and supportive implementation
- Industry challenges and requirements with current MEPS process and labels, and clear asks and needs are documented and included in the technology roadmap

Objective 2: By 2025, improved compliance of BEE's S&L program for appliances with defined monitoring and evaluation process.

Objective 2.1: By 2023, publish global best practices for monitoring and compliance verification of standards and labels.

Milestones:

- Review of the current process of standards setting based on industry inputs is complete
- Input on updated test procedures and compliance checks is provided jointly with other CSOs
- Targeted outreach such as periodic blogs, and other media opportunities are produced to build momentum for a transparent and inclusive standard setting process in India

To realize its full potential, the existing S&L program itself and the ambition of MEPS for the appliances have much room for improvement. NRDC proposes to partner with BEE and other civil society organizations to develop best-in-class standards and labels for major energy consuming products such as induction motors, ceiling fans, chillers, air conditioners, and distribution transformers. We will do so by broadening the current coalition of stakeholders engaged in appliance efficiency, particularly grassroots organizations that help make more efficient products available to low-income communities in urban and rural settings. In Year 1 of this project, we will focus on ACs and ceiling fans, which connect closely to our existing work around cooling and HFCs. We will engage directly with BEE in the standard setting process and develop a strategy to bring major industry groups onboard through negotiated efficiency levels over a 10-year period. In Year 1, we will collaborate with BEE to review and assess the impact of the S&L Program in relation to India's Cooling Action Plan goals as well as the country's overall climate goals.

Through our efficiency efforts in India, China, and the U.S., NRDC works closely with research groups and engages frequently with the appliance industry on evolving technologies, and methods to strengthen MEPS in the U.S. and China. We will leverage our deep expertise on efficiency standards in the U.S., China, and globally to make a strong case for best-in-class efficiency in India and provide regular updates on technology development and conduct required research such as a comparative assessment of India's equipment MEPS vis-à-vis other countries and develop a technology roadmap for India. We will identify or develop platforms for engagement within the industry and for industry with other stakeholders. We will also leverage our active involvement in global climate finance discussions to identify opportunities for additional financing that the industry can tap into for capital expenditures for innovative super-efficient appliances.

NRDC will facilitate and engage in constructive dialogue, information sharing, and international knowledge exchanges to move the industry to a longer-term consensus on Indian appliance standards and labels. Specifically, in Year 1, we will host a knowledge exchange workshop for U.S., China, and India industry stakeholders to discuss solutions and identify pathways to raise the ambition of MEPS and support implementation. NRDC brings to this work, our staff experts who are engaged globally on efficiency standards, such as United 4 Efficiency (U4E) Initiative. With this global connection and reach with the appliance industry, we anticipate success in moving forward dialogue for stronger and more efficient standards long term.

Depending on Year 1 progress, we anticipate focusing on the following activities in Years 2 and 3 of the project:

- Developing a plan to address industry asks including a policy toolkit, market-based mechanisms to increase uptake, training and capacity needs, finance, communication etc.
- Implementing an outreach strategy to amplify BEE's S&L program within India and globally to leverage support for the long-term vision of the program and get inputs to strengthen the program. For instance, engage with Climate and Clean Air Coalition (CCAC), Energy Efficiency Taskforce at the Montreal Protocol, U4E, and Sustainable Energy for All (SE4ALL)
- Engaging with BEE on the industry asks to design a way forward to implement prioritized asks
- Exploring additional appliances to include in the project

Budget Estimate:

The estimated total project budget for 3 years is $1.4M (Year 1: $358,000; Year 2: $492,000; Year 3: $640,000). We kindly request $275,000 from the Sequoia Climate Foundation for Year 1 activities. The Project budget factors in anticipated increase in operating expenses and post-registration associated fees, which are subject to change. We anticipate NRDC institutional funds to support the bulk of increased operating expenses.

Concept Note

Strategic Context

Phasing down hydrofluorocarbons (HFCs) by implementing the Kigali Amendment of the Montreal Protocol (MP) is a global priority for NRDC because HFCs are climate pollutants that are, pound by pound, hundreds to thousands of times more potent than carbon dioxide (CO_2). Our estimates suggest Kigali Amendment implementation worldwide can avoid HFC use equivalent to as much as 70 billion tons of CO_2 between now and 2050 and can prevent up to one half a degree Celsius of climate warming over this century. NRDC and our partners, Institute for Governance and Sustainable Development (IGSD) and The Energy and Resources Institute (TERI), have been working with a broader coalition of organizations on the business case for phasing down HFCs in India since 2011. Over the past few years, our team has worked through domestic and international venues to move India to ratify the Kigali Amendment. India ratified the Kigali Agreement in September 2021 and announced it would develop a national strategy for phasing down HFCs in the coming year, a process that will involve collaboration with industry and conclude by 2023. The government also plans to update its existing legal framework used for the ongoing phaseout of ozone-depleting substances to reflect the HFC phasedown by mid-2024. Currently, India is slated to begin its phasedown in 2028, so NRDC is focused on promoting early action on HFCs in the national strategy development for HFC phasedown. Refrigerants, including HFCs, are in some of the most energy-intensive appliances used in homes and buildings, such as air conditioners (ACs), cars, and refrigeration appliances. India can avoid 2-3 billion tons of CO2e of HFCs by 2050 (half from ACs), by fulfilling the Kigali Amendment. An additional 300-400 million tons of HFC use through 2050 can be avoided if India phases down faster.

NRDC and TERI recently completed an analysis of potential HFC demand reduction scenarios for India, including a recommendation for acceleration. The data was collected from partners in India and our data analysis has been published in *Environmental Research Letter*, a high impact environmental policy journal.[i] The analysis evaluates various demand trajectory scenarios, considering likely control obligations under the Kigali Amendment as well as current and projected future markets for equipment that uses HFCs, refrigerants used now, and refrigerants projected to be used in the future.

In addition, the climate benefits of phasing down HFCs can yield greater CO2e emissions gains when energy efficiency (EE) during refrigerant transitions is prioritized.[ii] This is because transitions to new refrigerants requires retooling of the cooling equipment, opening a chance for improving energy efficiency.[iii] The Indian government has historically supported taking an integrated HFC-energy efficiency approach, including it as part of the Montreal Protocol's implementation of the Kigali Amendment. Domestically, there are new avenues to pursue the joint agenda of EE and HFCs that are typically managed by different government departments. The implementation committee of the India Cooling Action Plan (ICAP) comprises various government departments, such as the Bureau of Energy Efficiency, Ministry of Environment, Forests and Climate Change, presenting a unique opportunity for collaboration to achieve both EE and HFC objectives.

With its soon to skyrocket cooling demand, India is at a crossroads to ensure every cooling equipment (beyond room ACs) expected to be used in the coming decades is best in class in terms of EE and uses the best available low or zero GWP refrigerant. This moment offers an opportunity to work towards India success in sustainable and climate friendly cooling.

Change Narrative

Outcomes & Objectives

Outcome 1: By 2030, through early-action measures, India is on track to meet its HFC phasedown reduction targets under the Kigali Amendment ahead of its schedule. For more information on phasedown schedule for various country groupings, please reference Appendix A: Kigali Amendment Phasedown Schedule.

Objective 1: By November 2023, India has released its national strategy for Kigali Amendment implementation and is on track to amend the existing legislation framework, the Ozone Depleting Substances (Regulation and Control) Rules to allow appropriate control of the production and consumption of HFCs by mid-2024.

Milestones:

- Analysis and evidence base for coordinated sectoral action on refrigerant transitions supporting development of India's Kigali Amendment baseline and national strategy on HFCs is presented (through factsheets, blogs, and focused roundtables) to cooling stakeholders in India, including equipment manufacturers, refrigerant suppliers, ozone cell, other civil society groups etc.
- Interventions and actions taken internationally for HFC phasedown are mapped as potential lessons for India and are documented in a factsheet and submitted to the Ozone cell
- Policy tools and regulations for effective implementation of the Kigali Amendment implementation plan are recommended to the Ozone Cell
- Energy efficiency and HFC phase down discussions at Montreal Protocol meetings are tracked and opportunities for India (financing, technology transfer, etc.) are identified in a briefing note for the Ozone cell

Objective 2: By 2023, major Indian cooling industry players commit on climate friendly cooling, for e.g., by signing up for the Race to Zero Campaign[iv] ideally at COP28

Milestones:

- Industry champions, with progressive targets and actions on promoting climate friendly cooling in India and internationally, are identified to engage in dialogue at MP meetings and focused in-country roundtables with the larger industry on accelerating action on climate friendly cooling, through peer-to-peer learning
- Policy, regulatory, training, and capacity building support that industry and other stakeholders need to implement the national strategy on HFC phasedown are identified, based on international experience and through interactions with industry in India

Objective 3: By 2024, the U.S. and India are collaborating more closely through the Montreal Protocol process as well as bilateral discussions to advance climate-friendly cooling and Montreal Protocol goals on energy efficiency, financing energy efficiency, and (potentially) atmospheric monitoring

Milestones:

- Focused action on climate friendly cooling is highlighted at COP27 and COP28 through work with global and domestic cooling stakeholders
- Discussions on building monitoring capacities for HFCs in India, enhancing financing for EE are initiated by leveraging U.S.-India climate and clean energy partnership, interactions at Montreal Protocol meetings, by organizing focused bi-lateral discussions between the U.S. and India cooling experts, government agencies, and US-India Track II

Outcome 2: By 2026, there are established financing mechanisms for energy efficiency along with HFC phasedown within Montreal Protocol's Multilateral Fund and other climate finance opportunities for such funding, such as carbon trading, are explored

Objective 1: By 2024, India is in advanced stages of receiving financing for energy efficiency through climate finance sources along with the HFC phasedown

Milestones:

- Regular briefings, research memos, etc. shared with Ozone Cell and MOEFCC in preparation for Montreal Protocol meeting discussions on energy efficiency financing

Depending on year 1 outcomes, in years 2 and 3, we anticipate the following activities:

- Identify climate financing opportunities through Multilateral Fund and other sources
- Outreach (bi-lateral government meetings, MP side events, engagement with other groups, and blogs etc.) for evidence-based analysis of EE benefits of HFC phasedown and need for financing and knowledge exchange on HFCs phasedown with industry sectors within India and internationally
- Work with major HFC use sectors for respective phaseout plans identified in India's national strategy on HFCs

Change Narrative

NRDC has a three-pronged approach to accelerating HFC phasedown in India: supporting India's national strategy, announced in September 2021, for HFC phasedown; integrating EE; and mobilizing U.S.-India collaboration. Our ongoing efforts utilize the evidence from our analysis to work with partners to shape the development of India's national HFCs strategy, including pushing for early action within this decade to avoid significant unnecessary HFC use, as well as the higher transitions costs of delay.

NRDC will bring in international expertise and knowledge sharing, integrating our activities in the U.S., China, and India, to engage with industry and government in India. We will identify and recommend specific regulatory, policy, financial, and technological solutions to expedite the HFC phasedown; support national strategy implementation; and engage with industry. Ultimately, our goal is to provide these interventions as recommendations to be considered by the Ozone Cell and MOEFCC to be included in India's strategy for Kigali Amendment implementation.

Tactics will include factsheets and blogs that will draw on the analysis, and roundtables to discuss and disseminate key findings and inform national strategy development. Along with our partners, TERI and the Council on Energy, Environment and Water (CEEW), as well as through the India Cooling Action Plan (ICAP) thematic working group, we will conduct outreach for early action on HFCs to the Ozone Cell, Ministry of Environment, Forests and Climate Change (MOEFCC), and other ministries. Once India releases the strategy on HFC phasedown by 2023, we will work with the Ozone Cell and other stakeholders in instituting the identified policy interventions in the strategy. In addition to IGSD and TERI, in the past, NRDC has worked with CEEW on HFCs in India. We will continue these partnerships and will also work with the members of the India Cooling Coalition (ICC) and Alliance for Energy Efficient Economy (AEEE) as we focus on broader outreach and buy-in from stakeholders on the HFC demand scenarios in India and development of India's national strategy on HFCs.

Throughout this process, we will draw on our deep engagement with industry for insights into current innovations, feasibility of policy measures proposed, and political support. In the past, we have identified industry champions that helped draw greater visibility to solutions that are possible. We will continue this, tapping into our similar engagements in the U.S. as part of a global push to advance HFC phasedown. Our aim here is to ensure a robust implementation of India's Kigali implementation strategy through continuous industry engagement, understanding concerns that emerge, and working with policymakers to find solutions. We will also encourage industry to move faster to adopt low-GWP refrigerant technologies and potentially secure commitments on climate friendly cooling such as joining the Race to Zero campaign.

It will be critical to move forward the agenda of EE with HFCs with MOEFCC and MP, including financing energy efficiency. Expanding on NRDC's HFCs work over the years, we will pursue opportunities to increase the EE of cooling appliances being transitioned away from HFCs in India and beyond. We will track the Kigali Implementation Plans (KIPs) of other developing countries (Article 5) as well as the U.S.'s and China's HFC phasedown plans to keep MOEFCC informed of the policy, technological, financial, and regulatory actions and progress other countries are implementing. We will work with MOEFCC to pursue this diplomatic agenda, in lock step with our efforts to advance EE investments in HFC phasedown with the U.S. government and at the treaty level. At the treaty level, we will move forward the EE agenda, working with the Indian government on identifying opportunities ahead of MP meetings and supporting MP preparation. We will also identify and amplify opportunities for India on financing EE along with HFC phasedown, either though the Protocol's MLF or other climate finance opportunities as they emerge. We also aim to advance U.S.-India engagement on cooling, such as strengthening atmospheric monitoring and EE financing.

Budget Estimate:

The estimated 3-year total project budget is approximately $2.4M (Year 1: $600,000; Year 2: $883,000; Year 3: $1,013,000). This includes NRDC's HFC experts and India based staff, new India positions, and support for on-the-ground partners in India. The project budget also factors in expected increases in operating expenses and post-registration associated fees. NRDC institutional funds are anticipated to support the bulk of this increase. We kindly request $300,000 from the Sequoia Climate Foundation for Year 1 efforts.

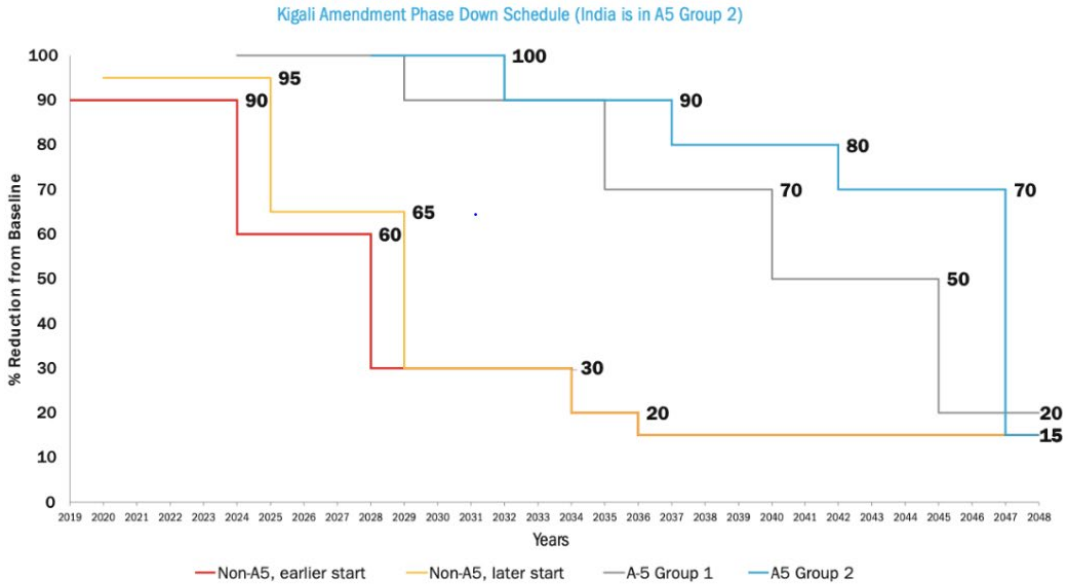
[i] https://iopscience.iop.org/article/10.1088/1748-9326/ac7538

[ii] Park YW, Shah N,Vine E, Blake P, Holuj B, Kim HJ and KimHD 2021 Ensuring the climate benefits of the Montreal Protocol: global governance architecture for cooling efficiency and alternative refrigerants *Energy Res. Soc. Sci.* **76** 102068

[iii] IEA 2018 *The Future of Cooling- Opportunities for Energy-efficient Air Conditioning* (France: International Energy Agency) and UNEP and IEA 2020 United Nations Environment Programme and International Energy Agency *Cooling Emissions and Policy Synthesis Report* (Paris: UNEP, Nairobi and IEA)

[iv] https://racetozero.unfccc.int/wp-content/uploads/2021/02/Race-to-Zero-Breakthroughs-Transforming-Our-Systems-Together.pdf

Appendix A: Kigali Amendment Phasedown Schedule



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