

Disruptions and transformation: Innovations in the cooling sector

In the recent past, 2015 has been recorded as the world's hottest year. Rising temperatures have caused an adverse effect on human beings across the globe and it therefore becomes imperative to address the cooling sector. Providing optimum cooling is significant for better health, productivity and overall development.

The first session began with the launch of the pilot platform program- 'Platform for innovative cooling strategies in India'. This platform was launched with the support of the Shakti Sustainable Energy Foundation, NRDC and Honeywell, India. The program intends to identify the techno-economic pilotable ideas customized for Indian conditions.

This was followed by the release of two publications by TERI - the fourth edition of the newsletter, 'News-TRAC' and a policy document on bulk procurement of room ACs supported by Shakti Sustainable Energy Foundation.

The first session was chaired by Mr R R Rashmi, Distinguished Fellow at TERI. He reflected in his opening remarks that the platform was an innovative idea which brings together all the relevant stakeholders to discuss issues and enhance cooling initiatives in India. He pointed out that there is a need for cooperation amongst government agencies, industry, think-tanks, leaders in innovation and other stakeholders. This is also important in the context of meeting global goals and reducing Hydro Fluro Carbons (HFCs).

Mr Abhay Bakre, Director General, Bureau of Energy Efficiency, pointed out that the India Cooling Action Plan, gives directions towards the policies, implementation, research required, and development of new initiatives for energy efficient appliances. He mentioned that a number of studies were carried out by the Bureau and they estimate that the building sector (both domestic and commercial) will have the highest demand for energy by 2030. India will face the same situation as China did with increasing penetration of air conditioning. He pointed out that there will be an increase in electricity demand with economic development and this must be met preferably through renewables. The Ministry of Power has taken keen interest in ensuring this through various programs. Bureau of Energy Efficiency is partnering with Department of Science and Technology in research and development to come up with innovative solutions for the cooling sector.

Mr. Karan Mangotra, Associate Director, Earth Science and Climate Change Division, TERI, gave a presentation on the Platform for innovative cooling strategies in India. With the push toward global innovative cooling solutions, the critical challenge that India faces is that these solutions need to be customised for the Indian context and needs. There is a lack of an institutional platform to provide feasible techno economic options that could be piloted/ customised for India. This platform will invite global innovative ideas but it will be seen as to how this can be customised to Indian conditions. Mr Mangotra laid out the three objectives of this platform: (i) to identify techno-economic options (ii) to assess the financial viability for piloting the options (ii) analyse policy pertaining to cooling sector in India.

Dr. Durwood Zaelke, President, Institute of Governance & Sustainable Development, emphasised on the need to focus on speeding up of climate actions in the face of climate change. As the Special 1.5 degree report by the IPCC estimates that we may have 12 years or less to reach our targets, Dr Zaelke remarked that slow progress is no progress. He pointed out that there is a great opportunity with the cooling sector to take effective and aggressive action. Reducing the Short-Lived Climate Pollutants like methane, tropospheric ozone and HFCs in the air has both climate benefits and can save lives. Aggressive action to reduce Short Lived Climate Pollutants can reduce warming twice as much as aggressive CO₂ mitigation. Transitioning away from HFCs can reduce warming by half a degree more. Coupling this with the use of energy efficient technologies could lead to achievement of the 1 degree target.

He concluded by saying that there is a need for world leaders to join hands to speed up action and achieve the targets set by the Kigali Amendment.

Mr Jake Schmidt, Managing-Director-International Program, NRDC, noted that the estimates of what can be achieved in India, by achieving the Kigali amendment is in the order of 2-6 billion ton of CO₂ equivalent through 2050. There are twin benefits that can be reaped by simultaneously transitioning away from HFCs and achieving energy efficiency. Mr Schmidt remarked that at a recent Kyoto meeting there was a signal to adopt innovative finance that can couple HFC transition with energy efficiency. He concluded by saying that the pilot platform is great opportunity for contextualisation customisation for the Indian context.

Mr Sudipto Chakraborty, Advanced Material Leader, Honeywell India, started off by pointing out that most refrigeration in both the domestic and commercial sectors is HFC based although there are alternatives available in the markets with many companies including Honeywell. The platform that has been launched will enable people to understand what would work for the Indian context. He pointed out that there is a need for pilot runs in India to show users that this is an adoptable and viable option. Honeywell is working on solutions to replace HFCs and make more energy efficient appliances. They are also working on a software that makes appliances more energy efficient.

Mr Krishan Dhawan, CEO, Shakti Sustainable Energy Foundation, pointed out that problems in the cooling sector provide a great business opportunity for innovation in technology. It is also a unique opportunity for the country as this scale is not available to anyone else in the world apart from China. Mr Dhawan reflected that there is a need for technological ideas to be converted to pilot programs which need to be scaled up. Since the country has diverse climatic zones markets, standards need to be devised for the zones. If such a model is successful in India, then it can be applied to other parts of the world with similar necessities.

Apart from this, cooling issues and energy efficiency can be addressed through building design and materials. He concluded by saying that this platform will only be successful with the participation of relevant stakeholders.

Dr Amit Love, Joint Director/ Scientist 'D', Ozone Cell, Ministry of Environment Forest and Climate Change, began by saying that there is an agreement that cooling issues are cross-sectoral in nature and have been linked with the SDGs. With much of the cooling in the country being still refrigerant based, the cooling sector becomes hinged on the Montreal Protocol. The Ozone Cell was established to develop an integrated pan-India Cooling Action Plan to address cooling issues in various sectors across the country. Dr Love remarked that the platform needs to recognise the linkage between environment and trade.

He concluded by saying that the intervention scenarios in the India Cooling Action Plan show that in 20 years the country would be able to reduce energy consumption by 30% in various sectors.

Mr Paul Salvaire, Counsellor for Global Issues, French Embassy, remarked that France has a special role to play in implementing the Paris Agreement and its targets. He noted that the French President is aware that there is a need to scale up initiatives and scale up actions. The President is also of the firm belief that public finances are insufficient and that there is a need for private finance to be able to achieve Paris targets. The One Planet Summit aims to do just the same with its 12 commitments that need to translate into concrete action. This Summit, chaired by Dr Ajay Mathur and Dr Durwood Zaelke, aims to speed up action in the world by bringing together governments and private organisations.

The 2nd session was on accelerating the transitions to super efficiency and low GWP refrigerants. It was moderated by Dr Zaelke and Mr Mangotra.

Dr Durwood Zaelke, President, Institute for Governance and Sustainable Development, emphasized that we need speed and we have the opportunity to bring that at the One Planet Summit, initiated by President Macron. The Kigali agreement provided Ministries and their ozone cell a unique opportunity to come to an agreement that requires them to maintain or enhance energy efficiency. Lately, the Montreal Protocol made it deliberate to capture the energy efficiency benefits as a provision in the amendment itself. One planet summit aims to achieve efficiency by 2050 and for that we need to squeeze out inefficiency and promote a clean energy future. He mentioned that India has released the world's first cooling action plan, in draft, at country level, that has ideas for new types of cooling and district cooling. This plan may become the template for the rest of the world.

Mr Karan Mangotra initiated the discussions by mentioning the need for inputs and the need to solicit ideas from different stakeholders within the cooling sector.

Mr Ashish Jindal, EESL, acquainted the audience with the condition of the UJALA scheme program. EESL is now coming up with a pilot demonstration in Mumbai and Delhi. Besides the cost issue, the problem of market awareness also acted as a barrier which is now being addressed through online procurement based on customer needs. EESL has designed a unique financial model, including multi-lateral and bilateral funding in the pilot program.

Mr R K Mehta, RAMA, mentioned that comparison of LED bulb with Air conditioner is not worthwhile, as one is consumer good item which can be replaced time and again whereas the other is a durable consumer good where the consumer is more conscious of his buying decisions. In LED bulb, we can reduce the cost and the price as well as the technology and there is a huge demand. There is a need to interact with the manufacturers whether they can act as agent to sell or the online sales through Amazon etc., keeping in mind that the consumer is also concerned about the after-sale service.

Mr Aster Tiger, TORO Cooling Systems, mentioned that there is an issue of disruption and there can be a possibility of incremental improvements on air conditioners. It is not possible to make drastic changes in energy or refrigerant, barring the new synthetic material or natural refrigerants. According to him, we are immune to thinking beyond conventional air conditioners and today there are three possibilities that are being examined. One was done by NREL which is suitable for America or European countries because the ambient temperatures are low. The other two technologies are - radiant cooling, which is suitable for India, and the dual path technology on which TORO has been working, which is based on separating the sensible and latent cooling. The latter is the only way by which anyone can cut 30 to 40% of energy cost and the refrigerant in the long haul, according to Mr Aster.

Prof R Saravanan, Anna University, stated that there is a limit on Carnot efficiency and the efficiency cannot improve beyond certain limit in a conventional system. But he also mentioned that there are all kinds of losses in the energy system, for which we can generate energy on site that can be used for cooling and other purposes. Hence, decentralisation is the key, and also creating awareness for the all the stakeholders in building design. He also emphasised on the training of technicians within the service sector and the importance of providing better service.

Mr. SHM Adil, GEED, encouraged us to think beyond Carnot efficiency, into more efficient ways of delivering the cooling. According to him, air is not an efficient medium for delivering cooling and we need to phase out air in our cooling system and focus on multilateral engagement. We need a multi-level strategy in which we need to engage various stakeholders like the designers, contractors, technicians, users and understand the performance liabilities.

Mr Vaibhav Chaturvedi, CEEW, mentioned that there is a need for a robust articulation certification system, training architecture, and lastly, costumer awareness - which is important for a vastly populated country like India.

Mr Shubhashis Dey, SSEF, cited an example from the food industry that can help remove the financial hump within the cooling sector. This can be primarily be dealt with by designing models like the FPO model in the food sector. The FPO (Farmer Produce Organisation), is the hub of excellence and acts as an aggregator within the food industry. He emphasised that there is a need for such models in the cooling sector as well.

Mr Michael Rantil, Swedish EPA, talked about district cooling in India which reduces leakage of HFC, and totally eliminates the need for HFC which reduces the energy needs for sustainable power production.

District cooling with a central cooling unit is much more efficient than stand alone units. The energy gains are high, and it has the capacity to replace a 500 MW power plant. The district

cooling system is not only efficient but promotes alternative use of energy. While district cooling is not applicable for all the parts of India, a few parts have high potential.