Climate Actions through ICAP Implementation

Setting priorities for the Decade of Action

Date: 25th November 2021

About the Event

'Cooling' has been linked with economic growth. It is defined as a catalyst for good health, well-being, and better productivity for the occupants residing in hot climate zones, along with being one of the essential cornerstones for achieving the sustainable development goals (SDG), as per India Cooling Action Plan (ICAP) 2019. The Alliance for an Energy Efficient Economy (AEEE) is hosting a one-day-event "**Climate Actions through ICAP Implementation:** *Setting priorities for the Decade of Action"* under the project SHEETAL-Alliance for Sustainable Habitat, Energy Efficiency and Thermal Comfort for All, supported by Children's Investment Fund Foundation (CIFF). This event was hosted on **25th November 2021.**

The event **"Climate Actions through ICAP Implementation:** *Setting priorities for the Decade of Action***"** envisions setting priorities for a decade of action from 2021-2030. This event aims to unravel the key challenges and opportunities across the sectors, which would be instrumental in moving ahead towards a sustainable future for all through ICAP implementation. The event will also showcase work done by AEEE, under the SHEETAL project in the thematic areas of Cold-Chain, Buildings, Behaviour Change and Appliances while providing a platform to deliberate discussions to arrive at priorities for the decade via plenary sessions with businesses, government and the civil society organisations.

AGENDA

10:30-11:00 Hrs	**Registration and Welcome Tea and Coffee**
11:00-11:45 Hrs	**Inaugural Session** ● Keynote address by Mr. Jigmet Takpa, Joint Secretary, Ministry of Environment, Forest and Climate Change (MoEF&CC) ● Special address by Shri Arijit Sengupta, Director, Bureau of Energy Efficiency (BEE) ● Thematic address by Dr. Shirish Sinha, Director, Climate Children Investment Fund Foundation (CIFF)

	● Setting the context by SHEETAL consortium partners: ○ Dr. Satish Kumar, President and Executive Director, Alliance for an Energy Efficient Economy (AEEE) ○ Dr. Vibha Dhawan, Director General, The Energy and Resource Institute (TERI) ○ Dr. Arunabha Ghosh, Chief Executive Officer, Council for Energy, Environment and Water (CEEW)
11:45-12:00 Hrs	**TEA BREAK**

Plenary 1: The Ins and Outs of Cold-chain in India – Through the Governance and Policy lens

Globally, India has emerged as the world's second-largest producer of vegetables and fruits. However, the country faces several challenges, which includes a rapidly growing population facing undernutrition, hunger, food loss and wastage at multiple levels. These challenges can be mitigated up to a certain extent by developing a sustainable cold-chain in India. The pathway to develop sustainable cold-chain in India will require a concerted effort from diverse actors, which includes the government by providing a policy push, industries to enable innovative and affordable technology for agriculture, civil society organizations, and ground-level actors such as farmer groups for conducting research and development, creating awareness and capacity development. This webinar is a step to provide a platform for a diverse stakeholder group from governance to academia to initiate a dialogue on the urgency to develop a more climate-friendly and affordable cold chain in India, which employs energy-efficient technologies. Additionally, the cold-chain's impact on farmers' livelihood and food loss in the country.

AEEE will also present the significant findings from the report titled "Enabling Cold-chain Infrastructure Development in India: Evolution and Assessment of Policies and Institutional Mapping," prepared under SHEETAL. This session is structured as a report launch and a brief discussion on:

- Role of actors and government initiatives to further cold-chain development in India
- Integrating energy efficiency in Indian cold-chain
- Way forward to advance energy efficiency in cold-chain development in India
- The positive impact of cold-chain development on reducing food loss and improving farmers' livelihood

12:00-12:10 Hrs	**Report Presentation:** Enabling cold-chain infrastructure development in India: Evolution and assessment of policies and institutional mapping **Presenters:** Mr. Tarun Garg, Program Lead and Dr. Khushboo Gupta, Senior Research Associate, Alliance for an Energy Efficient Economy (AEEE)
12:10-12:45 Hrs	**Panel Discussion**

	Moderator: Dr. Satish Kumar, President and Executive Director, Alliance for an Energy Efficient Economy (AEEE) **Panellists:** ● Mr. Asheesh Fotedar, Chief Operating Officer, National Centre for Cold-chain Development (NCCD) ● Mr. Angshuman Siddhanta, Sustainable Cold Chain Expert, United Nations Environment Programme (UNEP) ● Dr. Vijay Yadav Tokala, President, Postharvest Education Foundation (PHEF)
12:45-13:00 Hrs	**Q&A Session**
13:00-14:00 Hrs	**LUNCH**

Plenary 2: Getting Down to Action: Implementing Eco-Niwas Samhita

SHEETAL intends to work towards the implementation of ICAP recommendations and reduce the space cooling requirements in buildings. Administering building Energy codes developed by BEE in the building approval process can become the very first step towards this. Understanding the administrative process, barriers in the implementation of code compliance becomes an inevitable process towards ensuring its implementation.

Focusing on Eco-Niwas Samhita, the Residential Energy Conservation Building Code, this session would ponder upon the challenges in its implementation and mitigation strategies that can be worked to ensure effective implementation, considering the quantum of residential floor space that can be covered through the code's mandate.

14:00-14:10 Hrs	**Report Presentation:** Framework for ENS implementation **Presenters:** Ms. Shatakshi Suman, Senior Research Associate, Alliance for an Energy Efficient Economy (AEEE)
14:10-14:45 Hrs	**Panel Discussion** **Moderator:** Mr. Sanjay Seth, Senior Director, Sustainable Habitat Program, The Energy and Resource Institute (TERI) & Chief Executive Officer of GRIHA Council **Panellists:** ● Mr. Saurabh Diddi, Director Bureau of Energy Efficiency (BEE) ● Dr. Umamheshwaran Rajasekar, Head, C Cube, National Institute of Urban Affairs (NIUA)

14:45-15:00 Hrs	**Q&A Session**
15:00-15:30 Hrs	**TEA BREAK**

Plenary 3: Harnessing behaviour change for promoting energy efficiency in space cooling

In leveraging different policy tools for fostering sustainable and efficient energy consumption in the residential sector, individuals' choices and behaviour are vital factors to consider along with the technical efficiency of the products and infrastructure used. Human behaviour has a critical role to play in fostering deeper energy savings. Decisions relating to energy use, including indoor temperature settings, adoption of star-labelled appliances, or participation in demand-response programs, are all intricately linked with human behaviour. The actions and attitudes of individuals play a key role in cumulative energy consumption. Humans are the center of energy efficiency action and behaviour change can be a vital force to generate and sustain energy efficient action.

The session would provide an opportunity to comprehend the need, significance and design of behavioural interventions for promoting energy efficient behaviour in the Indian residential sector. The session intends to have a comprehensive discussion on the following elements:

- Key areas of behavioural interventions for promoting energy efficiency
- Learnings from behavioural science and international best practices
- Building consumer engagement and designing behaviour change communications

15:30-15:40 Hrs	**Report Presentation:** Harnessing behaviour change for promoting energy efficiency in space cooling **Presenters:** Ms. Simrat Kaur, Research Associate, Alliance for an Energy Efficient Economy (AEEE)
15:40-16:05 Hrs	**Panel Discussion** **Moderator:** Mr. Tarun Garg, Program Lead, Alliance for an Energy Efficient Economy (AEEE) **Panellists:** ● Ms. Shikha Bhasin, Senior Programme Lead, Council for Energy, Environment and Water (CEEW) ● Mr. Sabyasachi Pattanaik, Director-Opower, Oracle Utilities ● Mr. Abhishek Ranjan, VP, BSES Delhi
16:05-16:15 Hrs	**Q&A Session**

PLENARY 4: Cool is the New Hot!!

Opportunities and Pathways for transitioning towards Super Energy Efficient Space Cooling Solutions to achieve Thermal Comfort for a Billion Lives (TCBL)

India is one of the fastest-growing economies and the second-most populous country globally with around 4 trillion-person cooling degree days. However, India is also one of the countries with the lowest access to cooling with per capita space cooling energy consumption at 69 kWh compared to the world's average of 272 kWh. In addition to this India's current housing demand is 272 million and is expected to rise by almost 100 million in the coming decade. The rising urban population will exacerbate these problems and affect the quality of life in the urban regions, making cooling a necessity and increasing the demand for climate-resilient housing and thermal comfort for all. As per India Cooling Action Plan (ICAP) 2019, the overall space cooling appliances consume around 135 TWh of which Room Air Conditioners (RACs) contribute to 40%, Fans contribute 30% Fans, and Evaporative air coolers (EACs) contribute 8%. Therefore, space cooling appliances are contributing significantly to India' overall energy consumption. Thus, there is a need for mainstreaming energy efficient, low energy and alternative cooling appliances and technologies in India.

The objective of this panel discussion is to provide insights on the opportunities and pathways for transitioning towards super energy efficient space cooling solutions to achieve thermal comfort for a billion lives (TCBL). This panel will focus on the following:

- Policy Trends: Global trends and initiatives for improving energy efficiency of space cooling appliances.
- Challenges: Limiting factors for the upscale of super energy efficient, not-in-kind and no/low-refrigerant based space cooling technologies.
- Opportunities: Recommendations for reducing space cooling energy consumption and bringing market transformation.

16:15-16:20 Hrs	**Session Brief Presentation:** Opportunities and pathways for achieving thermal comfort for a billion lives (TCBL) **Presenter:** Ms. Srishti Sharma, Research Associate, Alliance for an Energy Efficient Economy (AEEE)
16:20-17:00 Hrs	**Panel Discussion** **Moderator:** Dr. Bhaskar Natrajan, Senior Advisor, Alliance for an Energy Efficient Economy (AEEE) **Speakers:** ● Mr. Markus Wypior, Dy. Programme Coordinator, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) ● Mr. Amit Kumar, Executive Director and Group Chief Executive Officer, Symphony Ltd. ● Mr. Mayur Karmarkar, Managing Director, International Copper Association (ICA)

17:00-17:15 Hrs	**Q&A Session**
17:15-17:20 Hrs	**Closing Remarks** by Dr Satish Kumar
17:20-18:00 Hrs	**High Tea**

Event Proceedings

Session Title	**Inaugural Session**
Session timing	**11:00 am to 11:45 am**

Session Speaker(s) and their Role	• Mr. Jigmet Takpa, Joint Secretary, Ministry of Environment, Forest and Climate Change (MoEF&CC) • Shri. Arijit Sengupta, Director, Bureau of Energy Efficiency (BEE) • Dr. Shirish Sinha, Director, Climate, Children Investment Fund Foundation (CIFF) • Dr. Vibha Dhawan, Director General, The Energy Resource Institute (TERI)

- Dr. Arunabha Ghosh, Chief Executive Officer, Council for Energy, Environment and Water (CEEW)
- Dr. Satish Kumar, President and Executive Director, Alliance for an Energy Efficient Economy (AEEE)

Key takeaways

Mr. Jigmet Takpa

- Cooling requirement is cross-sectoral and essential for economic growth. Cooling demand is expected to grow in tropical regions due to low ownership of RACs.
- The Montreal protocol is the most successful environmental agreement. All the targets are completed.
- India is the first country to launch its Cooling Action Plan. Based on the recommendations of India Cooling Action Plan (ICAP), **Ozone cell has come up with the following reports:**
    - To improve energy efficiency and use alternative technologies for cold-chain.
    - A report on public procurement that highlights data on state procurements of refrigerators and RACs through the Government e-Marketplace (GEM) portal. The report emphasizes the savings in the cost of cooling with efficient product procurements.
    - Ozone cell is preparing a draft report (yet to be finalized) on taking passive cooling strategies for upcoming housing stock.
- There is an urgency for building synergies and collaboration for implementation of ICAP and it requires utilization of market enablers, capacity building and moving towards low GWP refrigerants. sustainable cooling.

Mr. Arijit Sengupta

- Space cooling demand from the Building sector roughly represents 50% of the total cooling demand in the country. It is expected to increase to upto 70% by 2037-38.
- BEE is implementing the goals and objectives of ICAP - developed under the aegis of MoEF&CC.
- BEE started its energy efficiency journey with the most successful and popular programme on Standards and Labelling (in 2006) for ACs and Refrigerators. Efficiency improvements in the two equipment has limited the energy demand to a great extent.
- To address the passive cooling demand, ECBC and ENS have been launched. Buildings is a state subject and building codes can be implemented by incorporating them in the municipal bylaws. Good progress is being made in this respect. So far 8 states are in the process of incorporating them and 48 Urban Local Bodies (ULBs) have already done it.
- EC Act doesn't give legal power to promote energy efficiecny in the residential sector to BEE and this is what is being recommended to be incorporated in the latest amendments to the act.
- BEE is working with GIZ to promote DCS in the country.
- COP-26's 3 out of 5 ambitions sits very well with the topic of the event's discussion.

Dr. Shirish Sinha

Dr. Sinha appreciated the following as crucial steps that have been recently announced by GoI:

- Ratification of Kigali Amendment
- Net Zero announcement
- ICAP implementation

Despite imminent progress, Dr. Sinha addressed the gap that exists in terms of adoption of cooling solutions by communities. He also iterated the following statements:

- IEA estimates 45% of India's electricity consumption will come from space cooling.
- SHEETAL Alliance is built on the principles of ICAP.
- CO2 reduction in near time will come from cooling. It will improve livelihoods and food security.

Dr. Vibha Dhawan

- Talking with respect to the COP 26 event, Dr. Vibha highlighted that the climate threat is real and becomes even more apparent with extreme weather events such as floods, hurricanes, and cloud bursts becoming even more frequent.
- The Montreal Protocol to regulate the production and consumption of Ozone-depleting substances and phase-down of Hydrofluorocarbons (HFCs) is a key example of global economies collaborating towards climate mitigation efforts. India has been able to demonstrate leadership at the global stage through net-zero commitment and ratification of the Kigali Amendment.
- Dr. Vibha highlighted that India's corporate sector started taking steps towards net zero even before the commitment was made by India's honorable PM at COP 26.
- TERI is leading the SHEETAL consortium for facilitating the implementation of the India Cooling Action Plan (ICAP) which takes a multi-disciplinary approach along with the provision of technical solutions.
- Dr. Vibha stressed the need for capacity building and enhanced cooperation for achieving ICAP goals. She underlined that there is a need for trained manpower for the up-gradation of the technology as well the adoption of technology.

Dr. Arunabha Ghosh

- Dr. Arunabha Ghosh highlighted that the Montreal Protocol has been the most impactful environmental agreement of all time as it brought together three things - science, technology, and funding. With time, the science and technology is becoming clearer and the funding has been what has been holding back the efforts towards climate change mitigation.
- Talking with respect to sustainable cooling, Dr. Ghosh commented that **"If India stays cool, the rest of the world stays cool".** Sustainable cooling can positively contribute to people, the planet,

and even profits. A recent CEEW report highlights that 463 Indian districts are *highly vulnerable* to climate change and 56% of the cooling demand is coming from these districts.

- Three institutions - AEEE, CEEW, and TERI have come together under the aegis of the SHEETAL consortium, which in turn effectively brings together institutional capabilities. While working on the different thematic areas of ICAP, there is a need to ensure the up-gradation of educational curricula and upskilling of technicians.
- Talking about the role of innovation, Dr. Ghosh underlined that the technologies that are developed in India, need to be deployed elsewhere and similarly, technologies developed elsewhere should be able to be deployed here and this applies to housing, appliances, and even consumer behaviour change.
- Dr. Ghosh ended his address by highlighting that India's net zero target for 2070 requires complete economic transformation.
- Sustainable cooling has benefits across several SDGs including SDG-1 No poverty, SDG-2 End hunger, achieve food security and improved nutrition and promote sustainable agriculture, SDG-4 Quality Education, SDG-7 Affordable and Clean Energy, SDG-8 Decent work and economic growth. SDG-12 Responsible Consumption and Growth, SDG-13 Climate Action and SDG-17 Partnership for Goals.

Dr. Satish Kumar

- Dr. Kumar began his address by highlighting that India recorded a peak cooling demand of 60GW this summer, around 300 million MT of horticulture output produced and INR 11000 crore worth of horticulture losses (incurred only in the state of Bihar). He mentioned that the contribution of cooling in the peak summer demand can go up from 20-25% currently to 40-45% in the next two decades.
- In managing this growing cooling demand, while supply-side measures including an increase in renewable energy are important, the role in energy efficiency as a demand-side measure is equally important.
- The food losses between the farm and the kitchen not only impact the farmers, but also the vegetable sellers/vendors. The factors contributing to these losses include lack of proper infrastructure and transport and missing market linkages.
- The SHEETAL alliance brings together different partners and many such collaborative programs are much needed. He also acknowledged MoEF&CC's desire to work with Civil Society Organisation (CSOs).
- Building the sustainability of cold-chain infrastructure in India requires working with states, vegetable federations, and farmer cooperatives. Providing subsidies can have unintended consequences. Specifications on how cold storages need to be designed must be provided.
- Talking about ENS, he highlighted that CSOs and the government need to work together. MoHUA and NIUA should be allowed to take ownership. In order to provide thermal comfort for a billion lives, a complete transformation in how buildings are designed is needed.

After setting of the context, the following knowledge products of AEEE were laucnhed by the key digantories:

[Read report here >>]

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Key Takeaways

- There is an urgent need for building synergies and collaboration for implementation of ICAP and hence the promotion of sustainable cooling solutions for the larger set of communities. SHEETAL Alliance is one such program and many other similar collaborative programs are needed.
- Sustainable cooling is linked with multiple SDGs and hence needs to be addressed and implemented with extreme rigour. The impact will be substantial in ensuring livelihoods and food security.
- Net-zero commitment by India implies complete economic transformation and hence there is a need for overhaul of the exploration, production, consumption and disposal systems in the country.

Session Title	**Plenary 1: The Ins and Outs of Cold-chain in India – Through the Governance and Policy lens**
Session timing	**12:00-1:00 PM**

Session Moderator & Speaker(s)	**Presentation** by **Dr. Khushboo Gupta, Senior Research Associate, Alliance for an Energy Efficient Economy (AEEE)** **Moderator: Dr. Satish Kumar,** President and Executive Director, Alliance for an Energy Efficient Economy (AEEE) **Speakers:** ● **Dr. Vijay Yadav Tokala**, President, Postharvest Education Foundation ● **Mr. Asheesh Fotedar**, Chief Operating Officer, National Centre for Cold-chain Development ● **Mr. Angshuman Siddhanta**, United Nations Environment Programme

Report Presentation	**Presented by Dr. Khushboo Gupta** Key Highlights from the presentation: ● Provided a brief horticulture/agriculture context- The sector contributes to 70-80% GDP and around 50% of the population is working in the value chain. ● Discussed evolution and the cold-chain journey of India. ● Highlighted the major policies and schemes that led to the current cold-chain development in India such MIDH and Pradhanmantri Kisan Sampada yojana. ● Emphasised on very recent developments such as ICAP and draft national logistic policy that provide a way forward to integrate energy-efficiency and to look at cold-chain in a holistic manner, respectively. ● Way forward based on the report: ○ Break down the silos between the multiple agencies working in the cold-chain sector ○ Develop policies that will enable integrating energy-efficiency in the cold-chain industry ○ Put more emphasis on academia to R&D on how to develop a sustainable cold-chain
Panel Discussion: Key Highlights	**Dr. Vijay Yadav Tokala** ● Overview of India's cold-chain sector Dr. Tokala started discussing the need to focus on the cold-chain development by mentioning that the cold-chain has been one of the key areas discussed in the India Cooling Action Plan to reduce the GHG emissions produced in the nation and is also linked with Doubling of the farmers income and livelihood. He emphasised that there is a need to develop cold-chain infrastructure suiting the produce and the growers as: ● The cooling requirements for different products are different and should be taken into account to develop an energy-efficient cold-chain infrastructure. ● Cooling requirements also depend on the farmer we deal with. The type and scale of farmers we deal with defines the technology we should use. Cold-chain is going to decrease post-harvest losses as it is going to increase the holding life of the produce. But there is a limitation of electricity supply. He mentioned that we need to understand that the supply chain doesn't end at transport, it ends at refrigeration at household level. We need a good market strategy also because the time period for which a product is kept at a cold

storage, it needs to be weighed on the opportunity cost. There is a need to utilize the extended holding time. Non-refrigerants technologies are already there, the implementers need to upscale them and use them instead of introducing new one.

He concluded by saying that the Indian government is providing several subsidies through MIDH and other schemes. However, PPP has a really good scope which is yet to be explored (or less explored).

Mr. Asheesh Fotedar

- Role of refrigerants in the cold-chain sector and scope of energy-efficiency in the sector

Mr. Fotedar discussed that the cold-chain is not underdeveloped in India. Yet, it's not fully developed. The cold-chain sector is facing two challenges:

- The sector isn't equipped in terms of technologies and the right machinery. Technology propagation is happening at a very slow pace. The government support in the form of the grants for setting cold-chains and other incentives can define the future and the majorly the grants have reached even the remotest village where the policy gets implemented.
- There is no basis for designing cold chain infrastructure. The basis of design depends on the product, post-harvest time of the product, shelf life of product, treatments, design temperature, humidity constraints, respiration rates, modification to the atmosphere, type of injury that can happen to the product, cyclomatic-air state of cold chain, etc. However, the present BAU style of designing cold-chain infrastructure does not focus on these specifications. Additionally, optimisation of design to run the cold chain in other seasons is also not considered.

At present, there is a rush to copy paste the practices successful in the other countries without localising them to the geographical context and crop type. Moreover, it is important that the design of such infrastructure should be done by someone who understands the project. The consultants should function like mentors. The policy makers can try to bring in some orientation in the system by trying to rope in engineering students. The students can design new technologies for the system.

He concluded his discussion by highlighting the need for awareness and training programs to be imparted to the people. Mr. Fotedar emphasized the role of NCCD in providing these advisory services. Further, he mentioned that NCCD is currently focusing on two aspects, acting as a knowledge hub for the cold-chain

industry and providing consultancy services to the point of hand holding them in constructing cold-chain infrastructure.

Mr. Angshuman Siddhanta

- Role of sustainable cold chain in reducing food loss and improving livelihood

  Mr. Siddhanta briefly discussed the cold chain, still at a nascent stage and the sort of infrastructure gap required to be developed in the cold-chain sector. As per ICAP, right now there are only 500 packhouses. There is a 99% gap in pack houses. By 2037, there will be a requirement of around 1.25 lakhs packhouses. Pack-house is a vital connection for farmers as the packhouse becomes the collection point of produce, which is missing.

  He emphasised on the need to involve the ground-level actors such as the farmers and provided an example of the pack-house facility being developed at Villupuram, Tamil Nadu (by UNEP in collaboration with AEEE, Tabreed and Auroville Consulting). Further, he mentioned that It is essential to develop these facilities with the villagers (including the farmers) who are involved in day to day activities like sorting, grading, and trading at packhouses. Farmers are gaining their livelihood. Moreover, involving them in the inception of the project will bring ownership amongst the community members towards the facility being developed for their betterment.

  Mr. Siddhanta pointed out that we have been constructing static storage. Cold chain is not about storing, it's about moving to the market. Average cluster produces 15 metric tonnes a day. We need to coordinate with line ministries and departments to synergize efforts and harmonize the policies. Moreover it is important to bring the global perspective as well in developing cold-chain infrastructure in india.

Moderated discussion: Key Highlights

Rapid-fire recommendation/action by each panellist

Mr. Asheesh Fotedar-

Design and Technology is the way: The sector needs to move ahead with the best possible practices. A 30% reduction is already ensured in the running cost by NCCD. We definitely need to design well and use appropriate technology.

Mr. Angshuman Siddhanta-

- Talk about mobility in cold-chain and not just static infrastructure
- Need to harmonize the various policies formulated and ensure synergies being improved while working together

	Dr. Vijay Yadav Tokala: Product specific technologies to be developed by engineers with expertise of agriculture experts.
Call for action from Dr. Satish Kumar	Let us all aim to reduce the food loss **to 50% by 2030** and to act upon that ● we need to build synergies amongst the various stakeholders and ● develop policies not as an afterthought but should proactively integrate the energy-efficiency aspect in formulating policies/schemes/initiatives supporting cold-chain development.
Noteworthy questions/comments from the audience	Some questions that were raised/discussed in the lunch break included: ● Where are the consumers in this development that we foresee happening in the next decade? Are we not focusing on the demand side while developing these infrastructures ● Where is the funding coming from? What about the role of private players in this game?
Key Takeaways	● The supply chain doesn't end at transport, it ends at the refrigeration at household level. ● Product specific technologies to be developed by engineers with expertise of agriculture experts. ● Need to focus on seamless mobility because the cold chain is not just about storage, it's about product's movement too.

Session Title	**Plenary 2: Getting Down to Action: Implementing Eco-Niwas Samhita**
Session timing	**14:00-15:00 Hrs**

Session Moderator & Speaker(s)	**Presentation** by Ms. **Shatakshi Suma**, Senior Research Associate**,** and Ms. **Arzoo Kumari**, Research Trainee, Alliance for an Energy Efficient Economy (AEEE) **Moderator: Mr. Sanjay Seth,** Senior Director, Sustainable Habitat Program, The Energy and Resource Institute (TERI) & Chief Executive Officer of GRIHA Council **Speakers:** ● **Mr. Saurabh Diddi**, Director Bureau of Energy Efficiency, (BEE) ● **Dr. Umamheshwaran Rajasekar**, Head, C Cube National Institute of Urban Affairs, (NIUA) ● **Dr. Satish Kumar,** President and Executive Director, Alliance for an Energy Efficient Economy (AEEE)
Report Presentation	**Presentation by: Shatakshi Suman and Arzoo Kumari** Key Highlights from the presentation: Probable routes of ENS implementation: ● Energy Conservation Act, 2001 ● Inclusion in Municipal Act ● Provision in Model Building ByeLaws and URDPFI ● Enforcement through Environmental Impact Assessment, 2006 ● Requirement in RERA (Real Estate Regulatory Authority) Act ● Inclusion in Government Missions and Programs (PMAY, Smart Cities Mission, etc.)

Panel Discussion: Key Highlights

Mr. Saurabh Diddi

What are the biggest challenges and opportunities in terms of the implementation framework for ENS code?

Mr. Diddi commented that the code development team had tried to keep the ENS code simple and precise. 3 billion sq. m of area will be added to the total floor space through the PMAY implementation. Implementation of ENS code can save around 20% of the energy consumption. There are challenges in implementing the code, however, the government can implement ENS through methods discussed in the presentation given by AEEE. To make it easier, documents can be submitted to authority after ensuring compliance through self-certification by an energy auditor or any other facilitator.At the end housing is state subject and the states need to decide the framework for the implementation of code in their jurisdiction.The process may increase the cost but it will be reliable and may help in the enforcement of the code.In Telangana state, third party assessors award certificates and get certified by the authority.

Being a regulator how would you sensitize the customer to green buildings?

Mr. Diddi highlighted that the building is not as easy as appliances. There are a plethora of documents. Yet there are several factors like split interest and benefit. The process is cost sensitive. People believed that the green building or GRIHA rated building would be expensive. People can rather think and question the payback time period of green buildings. The ITC Kohinoor building in Hyderabad hasn't paid a single extra penny for making the building energy efficient. 3000 TR of energy requirement came down to half. If our buildings are designed in an efficient way, one might not need ACs at all. Requirements of other loads will come down. Moreover, the government has to sensitize people that's why there are programs like star rated homes. A day will come when all the registration will happen in star rated homes.

Dr. Umamheshwaran Rajasekar

The CSCAF framework (which is formulated for Smart Cities) includes the compliance to building code. Now that the first round of assessment is done, what is your experience and how ULBs are responding to it in contributing to the compliance?

Dr. Rajasekar highlighted that NIUA had done a market assessment in which they found out that 88 cities had at least 1 green building. The number seems to look big, but isn't because out of 88 only 35-36 had more than one green building. States are enforcing these codes but one should learn from the past challenges. In 2002, Tamil Nadu implemented rain water harvesting by making it mandatory for every building but it is not maintained over the years with proper monitoring. People have modified the houses and they did not consider rain water

harvesting. Similarly, when it comes to ECBC, all 4 options are important and need to be implemented and maintained with proper monitoring. The buyer should be sensitized similar to Namami Gange that why it is important to have a green building. Before buying a house, people should think about what they can save if they buy the house. Government needs to plan digital outreach and connect with administrative bodies for implementation of code. Now that thermal scanners are widely popular because of CoVID, one can use that to check the temperature of buildings and make a case. In the end, cities are state subjects, even if the central government takes any step, its state's decision to implement it.

Are there still challenges? What kind of help does NIUA need in CSCAF?

Dr. Rajasekar commented that cities need more help than the NIUA. Even though the revenues of cities have increased, the budget that is allocated to municipalities hasn't increased. Also, the cities grew but the total number of employees in the municipal bodies are almost the same hence there is burden on officials. The budgets are not always dedicated to buildings and roads. Some smart cities have taken a budget for roads, digital transformation whereas only a few have allocated a budget for energy efficiency. Most of the municipal bodies do not have allocated budget for any intervention related to ENS or energy efficiency. The government needs to ensure the budgetary allocation for the same. There is an additional challenge of shadow ownership and split incentive. Moreover, data is a bigger question and having valid data is still an issue. Cities need cells and committees to guide them and help them out. There is a requirement for consensus in the decision making. We don't need data but we need a framework. Even if the leader of the municipal body changes, the new appointed person should be aware about the strategy and framework to go ahead with. There is a need to have a committee which will have representations from local government bodies, architect associations, and builder associations to develop the desired strategy.

Dr. Satish Kumar

Dr. Kumar commented that ENS is relatively simpler code and no need to spend time in explaining. However, the implementation is complex. Inclusion of ENS in CSCAF gives hope that one might not have to wait for 10 more years for its implementation.

India committed to reduce the emission intensity by 45% by 2030. This can not be achieved without energy efficiency. Renewable energy production is important but ensuring energy efficiency is also another vital factor. There are very simple things that everyone working for implementation are required to understand, there is a need to have awareness that efficiency is also important along with production of new renewable energy. ICAP implementation isn't any new document, it is amalgamation of different policies. It mapped policies and distributed roles and responsibilities to various authorities.

	In cold climatic regions, the inside surface temperature is 8-10 degree and the skin's surface temperature is 35-37. In cold climates, it becomes important to put in insulation. If we have to meet the twin objective of designing the building well and ensuring the thermal comfort. He concluded by saying that the building program is supported by multilateral and bilateral companies and so much of work is already done in the sector of materials and design. Despite that, the implementation isn't happening. Consumers play a big role in scaling up the process.
Moderated discussion: Key Highlights (questions/comments that stand out)	Since housing is state subject, there should be an allotted amount in the municipal budget for the monitoring of implementation purposes. There are some smart cities that have allocation for energy efficiency but most of the municipal bodies don't have that. Residential buildings are complex to work upon as they have multiple buyers and the upfront cost is way higher than the appliances.
Noteworthy questions/comments from the audience	**Why aren't we integrating ECBC with RERA?** The government is working to integrate ECBC in RERA. **We are looking at uncontrollable things, what about the factors that we can control?** There is a public policy tool called energy use disclosure. This should go into mandatory phase. Once this is mandatory, there would be a behavioral change. **We have star labeling for appliances and buildings. The consumers might get confused to understand the difference. How are we planning to deal with it?** The star labelling's details are majorly of developers' interest. The developers need to go through all the procedures and the consumer only needs to know how much energy they will be saving through buildings. **How are we looking at the bottoms up approach?** Cities want to implement but they are stressed in multiple aspects. The taxes paid to cities do not come back to cities. There is a lot that can happen at the bottom level but we need to work with the mixture of top down and bottom up approach. **Why haven't people started doing what we have done?** The government needs to change the approach of reaching out to people. Unified and just two languages aren't going to work. Hence there is an urgent requirement of changing how we are trying to reach people. **What if we certify builders instead of certifying houses?** It is challenging in India as builders don't have a track record. Builders may exploit the rating.

Next steps if applicable/Way forward	We need to focus on the following aspects: ● Preparation of strategy documents for guiding the ULBs. ● Allocating the finance and budget to ULBs for implementation and monitoring. ● Have committees which will discuss the policy and strategies.
Key Takeaways	● Consumers should start demanding energy efficient houses. Most people look up the mileage of vehicles but don't pay attention to the efficiency of housing. Once there is demand from the consumers, the market will respond to it accordingly. ● There is a myth going around that the energy efficient buildings are cost intensive. However, with proper design and planning, there is evidence that no additional cost is needed for making a building energy efficient. ● There should be a strategy document for the ULBs that will act as a guiding document for the ULBs.
Session Title	**Plenary 3: Harnessing behaviour change for promoting energy efficiency in space cooling**
Session timing	**15:30-16:15 Hrs**

Session Moderator & Speaker(s)	**Presenter: Ms. Simrat Kaur,** Research Associate, Alliance for an Energy Efficient Economy (AEEE) **Moderator: Mr. Tarun Garg,** Program Lead, Alliance for an Energy Efficient Economy (AEEE) **Speakers:** ● **Ms. Shikha Bhasin,** Senior Programme Lead, Council for Energy, Environment and Water (CEEW) ● **Mr. Sabyasachi Pattanaik,** Director-Opower, Oracle Utilities ● **Mr. Abhishek Ranjan,** Vice President , BSES Delhi
Report Presentation	Name of the presenter: **Ms. Simrat Kaur** **Key Highlights from the presentation:** ● Decisions relating to energy use, including indoor temperature settings, adoption of star-labelled appliances, are all intricately linked with human behaviour and are important drivers of energy consumption. ● Integrating behavioural insights into the policy-making process requires assessing the various biases that affect the way individuals perceive, process, understand, ignore information, prompts and incentives. ● People's tendency to abide by social norms can be leveraged to influence individual decisions and bring behaviour change. For instance, comparative informational intervention by informing people about how their energy use compares with their neighbours can have a significant effect on behaviour. ● Home Energy Reports (HERs) are the most widespread and successful form of behavioral intervention used in the field of energy efficiency. ● Direct feedback through in-home displays is a promising means to enhance the 'visibility' of energy consumption. Users are informed about their energy usage, energy costs, most energy-guzzling appliances as well as how energy use can be optimized. ● Social interaction programs can also serve as a good starting point for inducing larger behaviour change as they can initiate discussions among peers and subsequently snowball to increase participation beyond the targeted group. ● Smartphone applications and smart home assistants such as Alexa or Google Assistant opens up a world of possibilities to nudge consumers to smartly use their appliances. ● The work undertaken in the preparation of this report shall be taken forward and further strengthened by undertaking formative research to design culturally appropriate BCC for promoting optimum AC setpoint temperature settings.

Panel Discussion: Key Highlights

Mr. Abhishek Ranjan

What has been your Experience with programmes like UJALA? How Perceptible do you feel Indian consumers are with respect to such Behavioral Interventions?

Initially, the lighting solution proved to be very successful due to the volume aggregation and reduction in prices. There were large numbers of manufactures pitching in, thereby increasing the availability. Also the targeted efforts to convert street lighting to smart street lighting proved beneficial to the program.

Gradually increasing the programme reach to AC's and BLDC(Brushless Direct Current) Fans received mixed response. The AC's had more visibility as compared to the BLDC fans, due to:

- Less vendors who had certified products.
- Asymmetry Information like fan inertia etc.

Mr. Sabyasachi Pattanaik

Can you please talk a little bit about the Oracle Utilities pilot programme on Home Energy Reports? What have been the learnings from the pilot programme on Home Energy Reports in Delhi? What is the potential of scaling up this programme at a national level?

The Structural Energy Efficiency, i.e; the replacement of less efficient equipment with more efficient ones, does not altogether solve the issue of wastage or inefficient operations.

This is where the "Behavioral Energy Efficiency Programme" comes into picture - Combining AI with Behavioral pattern. The findings of the Oracle Utilities pilot programme on Home Energy Reports - 82% of programme adaptability was realised, along with a 17% decrease in call volume to the customer care, depicting the customer satisfaction within this ambit.

"No Price No Device for the consumer" - Philosophy of Opower.

	Ms. Shikha Bhasin **How do you think BEE's existing programmes including Star Labelling programme, 24 degrees Celsius campaign can be further strengthened from the consumer behavioural standpoint?** ● The RCT (Randomised Controlled Trial) on AC servicing by CEEW is a document available in the public domain. The findings from the report indicates that awareness on star labelling has proliferated but the uptake behavior with respect to EE appliances/practices has not changed. ● The new alternatives to refrigerants that need to be transitioned are either more flammable or more toxic, hence Formalization of the Servicing Sector is essential. Also there is scope for giving more attention to the servicing sector like upscaling, certification etc. Customers need to pay more heed to their servicing needs and servicing technicians. ● From the supply side of the servicing sector the key problem is "how do we differentiate between a good or a bad technician?" Hence there is a need to take the fair technical information and break it down in a manner which is easy for the consumers to interpret and comprehend.
Moderated discussion: Key Highlights	The panel of speakers/leaders from the triple sector (government, industry and CSOs) that AEEE proposes should be a part of the EE policy debate.
Noteworthy questions/comments from the audience	Mr. Amit Kumar, Executive Director and Group Chief Executive Officer, Symphony Ltd. ".....we need to dissect the whole segment and ascertain the areas where awareness is the issue and where cost-effectiveness and energy efficiency is the issue and build our strategies around them…"
Next steps if applicable/Way forward	When CEEW interviewed more than 400 households in the Tier-2 cities, it found that: ● More than 75% of them had awareness about the star labelling Programme. All of the 75% focused on the label when doing their purchase, 95% deemed trustworthy, 93% found it useful, but only 14% bought it because of the financing difference. ● Although, consumer behaviour has been influenced through an effective awareness programme but behaviour hasn't changed a lot due to the barriers. There is a need for the industry and the policy to come together to solve this issue. Which is very much essential as far as star labelling programmes are concerned.

Key Takeaways	Within the lower-middle income group countries, awareness is still a pragmatic issue in the non-residential and unorganised industrial sectors. Whereas, in the residential and the organised sectors, the practice of Energy efficiency and knowledge on cost effectiveness of EE transition is a major issue that needs to be tapped in. Further: ● There is a need to look at the areas where the technological providers lack such as focus on Energy Efficient mandates and the Behavioural Energy Efficiency issues. ● "Focus on Neighbour's envy is the owner's pride policy." Hence social norm based experiments need to be conducted as they reveal good insights and encourage policy designs. ● "The cheapest KWH which one wishes to have is one which you don't consume and the lowest KWH is the one which you don't emit". ● Make use of scientific research to drive behavior change campaigns.

Session Title	**Plenary 4: Cool is the New Hot !!** **Opportunities and Pathways for transitioning towards Super Energy Efficient Space Cooling Solutions to achieve Thermal Comfort for a Billion Lives (TCBL)**
Session timing	**16:15-17:15 Hrs**

Presenter: Ms. Srishti Sharma, Research Associate, Alliance for an Energy Efficient Economy (AEEE)

Moderator: Dr. Bhaskar Natrajan, Senior Advisor, Alliance for an Energy Efficient Economy (AEEE)

Speakers:

- **Mr. Markus Wypior,** Dy. Programme Coordinator, Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ)
- **Mr. Amit Kumar,** Chief Executive Officer, Symphony India Ltd.
- **Mr. Mayur Karmarkar,** Managing Director, International Copper Association (ICA)

Session Brief Presentation	**Presentation** by **Ms. Srishti Sharma** Key Highlights from presentation: **Ms. Sharma** presented a brief about the session "Cool is the New Hot". The presentation emphasised: ● On the selected ICAP recommendations that could lead to enabling and ensuring Thermal Comfort for a Billion Lives: ○ Ratcheting up of Room Air Conditioner's (RAC) Minimum energy performance standard (MEPS) ○ Introduction of MEPS for evaporative air coolers (EACs) and ○ Promoting the use of District Cooling (DC) in India.

- On the work of AEEE conducted under space cooling appliances in line with the selected ICAP recommendations:
    - Under RACs, AEEE has launched the **"Transitioning to Super Energy-Efficient Room Air Conditioners: Fostering ICAP Implementation" report** during this event, which is developed under the SHEETAL project. This report provides insights into the institutional and regulatory frameworks, market transformation strategies, and key initiatives to increase the performance and promote the use of super energy-efficient RACs. The report also suggests component level efficiency gains would be crucial to achieve reduction in space cooling energy demand from RACs, supporting India's net zero commitments.
    - Under the EACs, AEEE has launched **''Decoding Evaporative Air Coolers' report** aligned with the ICAP and has been developed under the umbrella of the ongoing SHEETAL project. The report lays the stepping stones for policymakers to move forward towards the development of MEPS for EACs in India. AEEE has collaborated with ISHARE, which is a standard development organisation, for bringing-in market transformation towards energy efficient EACs. The report also emphasizes on how EACs could help achieve thermal comfort at large scale and bring about systemic changes.
    - Under DC, AEEE is undertaking a project **"Energy Efficient Cool"** under the umbrella Initiative of the German Federal Ministry of the Environment, Nature Conservation and Nuclear Safety (BMU) in cooperation with BEE, on advancing the agenda of energy-efficient & environment-friendly district cooling systems (DCS), the project is being led by GIZ.

She also apprised about the key focus area of the session were:

- **Global trends and initiatives** for improving the energy efficiency of space cooling appliances.
- **Identifying the Limiting factors** for the upscale of space cooling technologies.
- **Opportunities** for reducing space cooling energy consumption and bringing market transformation.

This was followed by the panel discussion with the session speakers, moderated by Dr. Bhaskar Natarajan as mentioned below:

Panel Discussion: Key Highlights

Mr. Mayur Karmarkar

Is there a consensus that the Indian companies are not ready to move with the international standards?

Mr. Karmarkar emphasised on:

- The lack of impetus in the R&D segment of the Indian RAC industry. He drew a comparison of the Indian RAC industry with that of the Chinese Industry. According to him, the Chinese counterparts promoted contract manufacturing coupled with extensive investment in the R&D framework, enabling the industry to manifest and adopt efficient standards within its ecosystem, which the Indian market failed to align and adher. This led the Chinese original equipment manufacturer (OEMs) to proactively work towards harmonizing global standards.

- The new alternatives to refrigerants that need to be transitioned are either more flammable or more toxic.

What is the top priority in the Indian appliance efficiency scenario?

The top priority in appliances needs to cater to the manufacturing advancements, heavy investments in R&D and promoting public private partnerships.

Mr. Amit Kumar

How do we bring these standards into play and bring in this large unorganized to confirm these standards? How do we put in place the enforcement mechanism to maintain these standards?

Mr. Kumar focused on the need for bringing-in transition in the EAC industry from being highly unorganised to an organised sector, ambit to better tackle any irregularities prevalent in the sector like the inefficient energy and water consumption EACs. He praised the efforts that have been undertaken in the standardization of EAC manufacturing in recent times. At the same time stressed that standards need not only be implemented but also monitored over the years, for their effective and efficient implementation.

He dwelled upon the joint efforts of Symphony Ltd. and other key stakeholders to introduce the star rating in different EACs based not only on the energy consumption but also on the water consumption, with the monitoring being done by the emergent IoT technology and smart monitoring system present in the market.

What is the practical time for EAC standards to come in and what should be the immediate action for the association of evaporative coolers and the BEE?

As per Mr. Kumar, with the latest COP 26 event being concluded, the most appropriate time would be now. However, a couple of years from now seems practical as far as feasibility and global consensus is concerned. Also, the principles of energy efficiency in this sector are already being drafted and need to be notified along with a monitoring and implementation framework to its successful implementation.

The standards will come in the future, but what about the MSME sector? The MSME sector suffered when air conditioners went away. How will they deal when you go into two-stage evaporative cooling?

The direct and indirect, two-stage EACs are the part of the larger model that we look at. It is not about setting standards that they can not meet, it is about creating standards that suit the larger needs of the country and doesn't end at creating problems like global warming. The norms and systems are being created with an intent that doesn't harm the Ministry of Micro, Small and Medium Enterprises (MSMEs), instead help them compete with the larger system.

Mr. Markus Wypior

What are the challenges to bring in a district cooling system in the Indian context?

According to Mr. Wypior, the challenges with DCS are that:

- India is underdeveloped in terms of cooling and many buildings are yet to come up in a partially commercial and residential setup.
- People are sceptical in accepting cooling as a service.
- People in urban local bodies and municipalities are unaware of the benefits of the DCS and a case needs to be made for the economical viability and regulatory hurdles.
- The DCS is still seen as a commercial setting.

He suggested some actions for the establishment of DCS in India:

- Energy Service Companies (ESCOs) need to come forward and provide financing as there is a large upfront cost for DCS.
- Raise more awareness among local bodies about the need for a DCS code.
- It should be made mandatory for large buildings to undertake a study for DCS implementation.
- Every ministry needs to sit and check the viability of the DCS and put efforts to implement it.

Mr. Wypior also stressed on the fact that the individual appliance sector will stay and there will be a market for the same, but the need for cooling and the growth in the building sector will self-enforce DCS.

What immediate steps are required at the city level where decisions for district cooling are to be made?

According to Mr. Wypior, DC is yet to find its place in master plans. The projects that haven't been thought through yet, should be given a chance. He also emphasised on the need for more awareness is required at the designers' end. He added that we should not forget the need to develop a framework for the municipalities.

Noteworthy questions/comments from the audience	**Do you see a rapid shift of customer segments towards EACs? How will you retain the consumers from shifting to RACs?** There is a constant transition of customers who are moving upward from EACs to RACs. Once consumers are better off financially, they move from EACs to RACs. At this point, the transition from fans to EACs is higher than that of EACs to RACs. There are consumers who use the hybrid mode of cooling. That's the nature of the economic transition.
Next steps if applicable/Way forward	● Promoting local manufacturing for the RAC industry and setting up a robust R&D in partnership with academia with a goal to capture and influence the global market. ● Development of a standard and label program for the EACs, should not only include energy-saving but also includes water consumption in order to generate a holistic program.
Key Takeaways	● The Government and regulators need to be swift in rolling out policies as well as enforcing them to facilitate energy efficiency. While making sure that the local manufacturing sector benefits from these policies. ● The consumer needed to be made aware of the alternatives for cooling other than the individual appliance purchase. Alternatives such as cooling as a service and understanding the importance of evaporative cooling. ● Creating DCS code to make the implementation of DCS a lot easier and more viable, while at the same time educating the local municipalities about the DCS and its advantages.

Session Title	Closing Remarks

Next steps if applicable/Way Forward	• **Role of ICAP with respect to Net-Zero:** Sector-wise cooling strategies (building, appliance and even agriculture sector) will be essential in meeting India's net-zero target, especially in a) reducing the projected carbon emissions by one billion tonnes by 2030, b) reducing the carbon intensity of its economy by less than 45%, and c) achieving the target of net zero by 2070. • **Mobilization of climate finance** and particular grants for sustainable cooling will be critical. There should be an increase in the current budget allocations at the central, state and city level and an extensive capacity building and awareness campaign to unleash its full potential. • **South-south Cooperation**: India, through its work in holistic policymaking in sustainable cooling, has demonstrated South-South cooperation – the National Cooling Action Plan (NCAP) methodology, which draws extensively from the ICAP experience, is being successfully piloted in Cambodia and Indonesia under the aegis of Cool Coalition; Similar work is slated to begin in several developing countries and India can enhance its leadership role post-ICAP, leveraging areas of a bilateral agreement. • **Triple sector leadership:** ICAP uses the three pillars of the society (public and private sector and non-profit and research organizations) and identifies the roles and responsibilities framework with lead government ministries for

implementation. The same collaborative spirit with which it was developed must be invoked to implement the ICAP.

- **Implementation of Cooling Action Plan at state and city level** - The role of capacity building at the state and local government level, consumer awareness, research and development and enforcement and compliance measures for the implementation of ICAP is of utmost importance.

- **Delivering socio-economic benefits**: The ICAP has set India on a path of a sustainable cooling future – it has the potential to provide many socio-economic benefits, including thermal comfort and nutritional food for all.