



SEAD SUPER-EFFICIENT
EQUIPMENT & APPLIANCE DEPLOYMENT
AN INITIATIVE OF THE CLEAN ENERGY MINISTERIAL



International Workshop on Energy Efficient Cooling

Agenda



12-13 December 2019

Venue- Scope Complex

New Delhi, India

[#energyefficientworld](#) [@beeindiadigital](#) [@superefficient](#) [@IEA](#)

For more information about the workshop and to express an interest to participate please contact tp.ashwin@beenet.in or vida.rozite@iea.org

About BEE

The Bureau of Energy Efficiency is an agency of the Government of India, under the Ministry of Power created in March 2002 under the provisions of the nation's 2001 Energy Conservation Act. The agency's function is to develop programs which will increase the conservation and efficient use of energy in India.

About the IEA

The IEA works to ensure reliable, affordable and clean energy for its 30 member countries and beyond. Our mission is guided by four main areas of focus: energy security, economic development, environmental awareness and engagement worldwide. The IEA works with policy makers and stakeholders across the globe to scale up action on energy efficiency.

About SEAD

The Super-efficient Equipment and Appliance Deployment (SEAD) Initiative is a voluntary collaboration among governments working to promote the manufacture, purchase, and use of energy-efficient appliances, lighting, and equipment worldwide. SEAD is an initiative under the Clean Energy Ministerial (CEM) and a task of the International Partnership for Energy Efficiency Cooperation (IPEEC).

Workshop context - the urgent need for energy efficient cooling

Global temperatures are on the rise, July 2019 was the hottest month ever recorded (NOAA, 2019). Cooling is essential to wellbeing, food and medicine preservation, industrial manufacturing, sustainable agriculture and economic growth. It is a critical component of sustainable urbanisation and rural development. The energy demand of space cooling and cold chain cooling is expected to surge at a dramatic rate. Current rates of energy efficiency gains are insufficient to dent this growth, there is a need for urgent action and innovation to develop and deploy new technologies, systems and business models. This workshop will explore policies, technologies, innovation, new approaches and business models that can accelerate progress on energy efficient cooling across sectors and systems.

The use of energy for space cooling is growing faster than any other end use in buildings, more than tripling over the past three decades. Almost a fifth of all the electricity use in buildings is for cooling. Global sales of air conditioners (ACs) have been growing steadily and significantly: since 1990, annual sales of ACs nearly quadrupled to 135 million units. There are now more than 1.6 billion in use and keeping them running consumes over 2000 terawatt hours (TWh) of electricity every year, which is two and a half times the total electricity use of Africa. Increased AC loads push up not only overall power needs, but also the need for generation and distribution capacity to meet demand at peak times, placing further stress on the power system. The greatest share of the projected growth in energy use for space cooling by 2050 comes from India, China and Indonesia – contributing half of global cooling energy demand growth. Rigorous action by governments is needed urgently to curb the rapid growth in demand for air conditioning (IEA, 2018).

The cold chain plays a vital role in economic development, food security and employment creation. Cold-chains are integrated, seamless and resilient networks of refrigerated and temperature controlled pack houses, distribution hubs, vehicles and processes to maintain the safety, quality and quantity of food, while moving it swiftly from farm gate to consumers (Shakti, 2019). According to the Food and Agriculture Organization of the United Nations (FAO), in developing economies, 30 to 40% of food produced for human consumption is lost before it can even make it to market. The carbon footprint of food produced and not eaten is estimated to be 3.3 Gtonnes of CO₂ equivalent – in other words, food loss and waste would rank as the third top GHG emitter after USA and China if it were a country. The development of sustainable cold chain technologies is one opportunity to close the gap on food loss and carbon emissions, since spoilage could be avoided if proper refrigeration infrastructure were in place (CFCCC, 2015). While food lost in the delivery chain is avoidable through use of technology, cold-chain itself is an energy intensive application, often relying on diesel for off-grid and on-vehicle cooling (Shakti, 2019). The cold chain sector offers significant opportunities for reducing cooling demand,

refrigerant requirement, and energy consumption through improved design, including proper insulation and use of energy-efficient cooling equipment (MoEFCC, 2019).

With the view of exploring opportunities to accelerate progress on energy efficient cooling across sectors and systems, under the aegis of the Clean Energy Ministerial's Super-efficient Equipment and Appliance Deployment (SEAD) Initiative, the Bureau of Energy Efficiency is together with the International Energy Agency organising this workshop to chart out steps towards accelerating the development and deployment of efficient and sustainable cooling appliances, equipment and systems. The workshop will explore policies, technologies, innovation, new approaches and business models across space cooling and cold chains. It will highlight action plans, international best policy practices, measures to stimulate innovation, new business models and deliberate on steps forward.

References:

- AEEE (2018), Demand Analysis for Cooling by Sector in India in 2027.
- AEEE (2018), Mainstreaming Super-efficient Appliances in India.
- GFCCC (2015), Assessing the potential of the cold chain sector to reduce GHG emissions through food loss and waste reduction.
- IEA (2018), The Future of Cooling – Opportunities for energy-efficient air conditioning.
- IIR (2015), Food Waste Reduction & Cold Chain Technologies.
- NOAA (2019), July 2019 was the hottest month on record for the planet.
- MoEFCC (2019), India Cooling Action Plan.
- SE4ALL (2019) Chilling Prospects: Providing Sustainable Cooling for All.
- Shakti Sustainable Energy Foundation (2019), Promoting Clean and Energy Efficient Cold-Chain in India.
- University of Birmingham (2018), A Cool World – Defining the Energy Conundrum of Cooling for All.

Energy efficient cooling DRAFT

VENUE: SCOPE CONVENTION CENTRE, SCOPE COMPLEX, LODHI ROAD, NEW DELHI

13:30 - 14:00 Participant Registration - Welcome Coffee and Tea

INTRODUCTORY REMARKS

14:00 - 14:10

- Arijit Sengupta, Director, Bureau of Energy Efficiency
- The role of Mission Innovation towards sustainable cooling - Dr Sanjay Bajpai, Department of Science and Technology

SESSION 1: LOW ENERGY COLD CHAINS AND RURAL COOLING PERSPECTIVES, TECHNOLOGIES

This session will identify opportunities to improve the efficiency and sustainability of cold chains, explore the roles of different stakeholders and showcase pilot projects and best practices. It will discuss actions to can accelerate development and deployment of innovative technologies and systems.

Kenote address :Pawanexh Kohli, CEO & Chief Advisor, NCCD

Moderator: Arijit Sengupta, Director, BEE

Key note presentations:

14:10 - 16:00

- Low-energy pack-houses – Satish Kumar, President, AEEE
- Technologies and innovations for energy efficient cold chains – Nagahari Krishna Lokanadham, Director, Danfoss
- Mr. Rakesh Kumar, Programme Director & Sr. Consultant, International Solar Alliance
- Energy efficient cold chain technology in rural Africa: incentives and awards – Sam Grant, Africa Regional Lead, CLASP
- Are clean cold-chains the panacea to manage food loss, eliminate hunger, minimize farmer distress and mitigate GHG emissions, Shubhashis Dey, Program Manager – Shakti Sustainable Energy Foundation

Moderated panel discussion on the prerequisites and enablers for the development of efficient cooling equipment and systems

- Satish Kumar, AEEE
- Nagahari Krishna Lokanadham, Danfoss
- Sam Grant, CLASP
- Shubhashis Dey, Program Manager – Shakti Sustainable Energy Foundation
- Mr. Rakesh Kumar, Programme Director & Sr. Consultant, International Solar Alliance

16.00 - 16:30

Coffee and Tea Break

SESSION 2: EFFICIENT COOLING SYSTEMS

This session will provide insights on the impacts of cooling on electricity systems and discuss effective approaches to manage cooling energy demand and explore integrated approaches and district cooling.

Chair: Winfried Damm, Head of Indo-German Energy programme, GIZ

16.30 – 18.00

Key note presentations:

- Impact of cooling on load curves - Rajesh Bansal, Head – NWO BSES Rajdhani Power Limited
- Approaches to mitigate implications of cooling on the electricity system – Mahesh Patankar, Senior Advisor, Regulatory Assistance Project (RAP)
- Integrated approaches to cooling in energy systems – Caroline Stignor, Research and innovation lead, IEA Technology Collaboration Programme on Heat Pumping Technologies, HPT TCP, and Heat Pump Centre

- Unlocking the potential of District Cooling - Peter Lundberg, Head of operations, Asia Pacific Urban Energy Association (APUEA)
- District cooling lessons learned and opportunities for India – Benjamin Hickman, Regional technical advisor for Asia and Europe, UNEP District Energy in Cities Initiative

Moderated panel discussion on how to reduce implications of cooling on electricity systems and prerequisites needed to enable the deployment of integrated cooling solutions:

- Rajesh Bansal, BSES
- Mahesh Patankar, RAP
- Caroline Stignor, HPT TCP
- Peter Lundberg, APUEA
- Benjamin Hickman, UNEP

Energy efficient cooling

INAUGURAL SESSION

Welcoming address – Abhay Bakre, Director General, Bureau of Energy Efficiency and Brian Motherway, Head of Energy Efficiency Division, International Energy Agency

9.30 – 10.30

Keynote address – *India Cooling Action Plan* by Geetha Menon, Joint Secretary, MoEFCC

Inaugural Address – Shri Sanjiv Sahai, Secretary (Power), Government of India

SESSION 3: TOWARDS ENERGY EFFICIENT AND SUSTAINABLE COOLING

The session will highlight progress on the development and implementation cooling action plans, policies and programmes. The session will explore the role of standards and labels, initiatives to stimulate innovation and integrated approaches to accelerate the development and deployment of energy efficient and sustainable cooling technologies. It will discuss pre-requisites for the development of effective policies and programmes.

Chair: Sameer Pandita, Director, BEE

Opening presentation: India's initiatives on cooling sector, Sameer Pandita, BEE

10.30-11.30

Key note presentations:

- Context setting presentation: The Future of cooling – Vida Rozite, Programme manager, Energy Efficiency Division, International Energy Agency
- China Green Cooling Action Plan and policies in China – Liu Meng, CNIS
- Challenges and solutions for promoting cooling efficiency in emerging economies – Christine Egan, CEO and Executive director, CLASP
- Overview of the Super-efficient Appliance and Equipment Deployment Initiative – Sarbojit Pal, Manager of Partnerships, Clean Energy Ministerial Secretariat

11.30 – 12.00

Coffee and Tea Break

SESSION 4: SPACE COOLING PERSPECTIVES, TECHNOLOGIES AND INNOVATIONS

This session will focus on space cooling and will explore the current situation on markets, state of the art technology and discuss issues that need to be considered in the development efficient solutions. It will explore the role of digitalisation in enabling energy efficient technologies, solutions and behaviours.

Moderator: Saurabh Diddi, Director, BEE

12.00 – 13:30

Key note presentations:

- State of play in terms of the availability of efficient cooling in markets around the world – Nihar Shah, Co-Leader of the Emerging Economies Research Program, Lawrence Berkeley National Laboratory
- The Global Cooling Prize – Rajan Rawal, Professor, CEPT University
- Innovative approaches to cooling – V. Manjunath, S&S Design Startup Solution Private Limited
- Analysis and insights from building occupant behaviour and implications on efficiency –Hu Shan, Researcher, Building Energy Research Centre, Tsinghua University

- AI and big data analysis to improve R&D and cooling systems efficiency – Liu Hua, Vice director, GREE
- Enablers for speedy deployment of efficient cooling technologies - Jitendra Bhambure, Executive Vice President Research and Development, Blue Star

Moderated panel discussion on the prerequisites and enablers for the development of efficient cooling equipment and systems

- Liu Hua, GREE
- Rajan Rawal, CEPT University
- Hu Shan, Tsinghua University
- V. Manjunath, S&S Design Startup Solution Private Limited
- Nihar Shah, Lawrence Berkeley National Laboratory

13.30 – 14.30

Networking lunch

SESSION 5: NEW BUSINESS MODELS AND FINANCE

This session will focus on the role of finance, removing up-front investment barriers and new business models. It will explore the role of finance and mechanisms to stimulate the demand for energy efficient cooling. It will provide insights into opportunities for the financial community to stimulate the development of efficient solutions.

Moderator: Nihar Shah, LBNL

Key note presentations:

- Financing for energy efficient cooling in China – Han Wei, Programme officer, Energy Foundation Beijing Office
- RAC NAMA programme – Panit Therdsudthironapoom, Engineer, Greenhouse Gases Management Division, EGAT
- ESMAP Efficient Clean Cooling Technical Assistance programme – Samira El-Khamlichi, Programme co-lead, World Bank
- Perspectives for bulk procurement programmes for cooling – Anant Shukla, Additional General Manager, EESL
- Cooling as a Service – Sanjay Dube, CEO, IIIEC
- Support to development and commercialization of innovations, René Van Berkel, UNIDO Representative, UNIDO Regional Office India

14:30 – 16:00

Moderated panel discussion on how to enable new business models and strategic use of finance

- Sanjay Dube, IIIEC
- Samira El-Khamlichi, World Bank
- Anant Shukla, EESL
- Panit Therdsudthironapoom, EGAT
- Han Wei, Energy Foundation Beijing Office
- René Van Berkel, UNIDO

16.00 – 16.30

Coffee and Tea Break

SESSION 6: STEPS TO ACCELERATE PROGRESS

This session will focus on identifying actions and steps necessary to accelerate the development and uptake of efficiency and sustainable cooling solutions. It will discuss actions needed in the short, medium and long term across the whole value chain and provide insights into opportunities including for further international collaboration to fast track progress.

Moderator: Brian Motherway, IEA

Moderated panel discussion on opportunities to increase collaboration, scale up initiatives and accelerate progress and roles of different stakeholders

16:30 – 18:00

- Liu Meng, CNIS
- Dan Bradley, British High Commission
- Markus Wypior, GIZ
- Nihar Shah, LBNL
- Bimal Tandon, Carrier Airconditioning & Refrigeration

Wrap up and closing statements :

Vida Rozite, IEA