Global Collaboration for Innovation and Sustainable Cooling: Solutions for Market Transformation

UNFCCC Side-event at 28th Session of the Conference of Parties to the UNFCCC (COP28)

Dubai, UAE
Date: Monday, December 4, 2023
Time: 11:30 am - 1:00 pm
Duration: 90 minutes
Venue: Blue Zone, SE Room 8

Organized by:
The Energy and Resources Institute (TERI)
Natural Resources Defense Council (NRDC)
New Energy and Industrial Technology Development Organization (NEDO), Japan

Live Stream Link: https://www.youtube.com/watch?v=B2nUgNdpB3Y

Description:

In a warming world, one of the largest drivers of electricity demand will be cooling equipment. Accounting for about 7 percent of global greenhouse gas emissions currently, emissions from both refrigerant and energy use in cooling is expected to triple by 2050. The rising challenge of cooling is particularly important for the countries in the global south such as India, which with a high growth economy has a rapidly increasing cooling demand. It is important for these countries to start right from the start to avoid a built up of emissions from inefficient technologies and solutions. The challenge of cooling will need rapid innovations across the sectors of space cooling, transport and cold chain.

This side event organized by The Energy and Resources Institute (TERI), Natural Resources Defense Council (NRDC) and New Energy and Industrial Technology Development Organization (NEDO) brings together global stakeholders to discuss innovative solutions that address the complexities of climate change, with a focus on heating and cooling challenges in emerging economies. Speakers will reflect on innovative technologies and policies related to the Internet of Things (IoT), Artificial Intelligence (AI), food security, thermal comfort, LiFE, productivity, and more. The side event will highlight examples of technological innovations in refrigeration and air conditioning sector as well as passive cooling strategies. The event will also delve into a discussion around three specific topics:

1) Innovative technology for enabling low-carbon cooling and investment
2) Mobilizing financing for implementing low-carbon cooling solutions at scale and
3) Role of partnerships and collaboration in advancing development and implementation of cooling innovations across countries.

Contacts for the Event

- **Prima Madan**, Senior Advocate, Cooling and Efficiency, NRDC, pmadan@nrdc.org, +91 9811965408 (whats app)

- **Manish Shrivastava**, Associate Director, TERI, manish.shrivastava@teri.res.in, +919891884894

Draft Agenda:

11:30- 11:35 am	**Welcome Address** Dr. Vibha Dhawan, Director General, TERI
11:35- 12:00 pm	**High-Level Session** on ways of institutionalizing and scaling technology innovations for sustainable cooling through partnerships and collaborations Moderated by: Manish Bapna, President and CEO, NRDC 1. Ali Zaidi, Assistant to the President and White House National Climate Advisor, United States 2. Leena Nandan, Secretary, Ministry of Environment, Forests and Climate Change (MoEFCC), Government of India (TBC) 3. Vijay Menghani, Chief Engineer, Central Electricity Authority, Government of India 4. Shinichi Kihara, Director General for International Policy on Carbon Neutrality, Ministry of Economy, Trade and Industry of Japan 5. David Sandalow, Inaugural Fellow, Center on Global Energy Policy, Columbia University
12:00- 12:55 pm (including 15 mins Q&A with the audience)	**Technical Panel Discussion on Examples of Innovations in Sustainable Cooling** Moderator: R R Rashmi, Distinguished Fellow and Programme Director, Earth Science and Climate Change Panelists: 1. Michihiro Kishimoto, Environment Strategy Director, Environment Strategy Business Division, Hitachi, Ltd 2. Noah Horowitz, Program Director, Clean Cooling Collaborative 3. Prima Madan, Senior Advocate, Cooling and Efficiency, International Program, NRDC 4. Shaurya Anand, Research Associate, TERI 5. Abas Jha, Practice Manager, Climate Change and Disaster Risk Management, South Asia Region, World Bank *Release of 'TERI-FCDO Policy Brief on Climate Change and Health Systems Response for 7 Countries'* Audience Q&A
12:55- 1:00 pm	**Closing Remarks**

	Masatsugu Yoshioka, Executive Director, NEDO
Total: 90 min	

Run of Show:

The event is organized in two sections beginning with high-level remarks by government representatives, followed by a technical presentations and discussions with experts from academia, civil society, industry and philanthropy to discuss policy, technology, and market transformation with a focus on innovation and sustainable cooling.

5 min **11:30-11:35**	***Welcome Remarks*** ***by*** **Dr. Vibha Dhawan, Director General, TERI** Dr Dhawan to open the side-event and provide a brief welcome on behalf of the partners and set the context for the discussion. Dr Dhawan will then invite Manish Bapna to kick off the high-level segment of the event.
55 min **11:35 am-** **12:00 pm**	***High level session*** ***Round of interventions – Please keep your interventions to 5 minutes*** Manish will moderate the high-level session and begin with welcoming and introducing the distinguished speakers. Manish will give 3-4 minutes of opening remarks and will ask a question to each of the speakers, inviting them to deliver their remarks. ***Question to Ali Zaidi:*** United States in the recent years has advanced action on sustainable cooling through global commitments at Montreal Protocol and domestically through the AIM Act. It will be great to hear from you the role that United States can play in supporting and moving the global cooling agenda forward especially in the global south? ***Question to Vijay Menghani:*** India has taken strong steps in advancing the cooling agenda, recognizing its fast-growing cooling needs. It released the India Cooling Action Plan in 2019, one of the first, globally. It will be great to hear from you on how's the implementation of the plan going and what it is that India looks for from global community in meetings its ICAP vision. How can the world support this national momentum? ***Question to Shinichi Kihara:*** The government of Japan has been promoting Green Transformation Policy to both achieve emission reduction and economic growth. What is the Japan's policy packages for energy-climate policy while driving innovation? **Role of innovation in decarbonization and current gaps in scaling innovative solutions**: David Sandalow, Inaugral Fellow, Center on Global Energy Policy, Columbia University

	Post the remarks by all speakers, Manish will sum up and close the session by thanking all the distinguished speakers. The event will then transition to the technical panel discussion on examples of innovations in sustainable cooling.
55 mins 12:00- 12:55 pm (including 15 mins Q&A with the audience)	The technical session will be chaired by R R Rashmi, Distinguished Fellow and Programme Director, Earth Science and Climate Change and will have the following panelists. Panelists (remarks for 6 mins each): 1. *Hitachi's plan on innovative sustainable cooling solutions*: Michihiro Kishimoto, Environment Strategy Director, Environment Strategy Business Division, Hitachi, Ltd 2. *Role of 5X less climate impact room air conditioners and plans to bring this to market*: Noah Horowitz, Program Director, Clean Cooling Collaborative 3. *Sustainable Cooling Through Technological Innovations: example of room air conditioners and ceiling fans*: Prima Madan, Senior Advocate, Cooling and Efficiency, International Program, NRDC 4. *Innovations in mobile air-reconditioning and role of behavioral change in sustainable cooling:* Shaurya Anand, Research Associate, TERI 5. *Role of financing in bringing the innovative cooling solutions to scale and how is World Bank prioritizing sustainable cooling in its portfolio especially for the countries in global south:* Abas Jha, Practice Manager, Climate Change and Disaster Risk Management, South Asia Region, World Bank Mr Rashmi will kick off the session with opening remarks and will invite each speaker to share their perspective on the assigned topic. After the remarks from each of the speakers, Mr Rashmi will open the floor for Q&A with the audience for about 15 mins. The event is an open side event for all COP delegates including the media.
5 min 12:55-13:00	**Masatsugu Yoshioka, Executive Director, NEDO** Mr Yoshioka will wrap up the event and makes final remarks for 5 minutes

Speaker Bios:

Dr Vibha Dhawan, Director General, TERI

Dr Vibha Dhawan's long association with The Energy and Resources Institute dates back to 1985. During 2005-2007 she led TERI School of Advanced Studies in the capacity of Vice-Chancellor. She is a Fellow of the National Academy of Sciences, India and is currently also serving as an Adjunct Professor, at Consul General South Asia Partnership, Michigan State University. Being driven by a deep academic and research interest, Dr Dhawan has authored 6 books and over 50 publications, which have added immense value in scientific research.
Dr Dhawan's thought leadership and engagement in research as well as policy development, both at the national and international level is widely acknowledged. She is currently a task force member of National Committees with the Department of Biotechnology, the Biotechnology Industry Research Assistance Council, and the Biotech Consortium India. Dr Dhawan is currently a member of the Networks Strategy Council that advises Sustainable Development Solutions Network – a global initiative for the United Nations and was previously the Co-Chair of the T20 Task Force 4 on Refuelling Growth: Clean Energy and Green Transitions.
Under her able leadership, the National Centre of Excellence in Green Port & Shipping, in collaboration with Indian Ministry of Ports, Shipping, and Waterways, was established at TERI campus.
Dr Dhawan was instrumental in establishing the highly successful Micropropagation Technology Park at TERI. Her other major achievements include developing e-contents for the post-graduate programme in biotechnology for the University Grants Commission. Her recent research interests are in the area of biofuels.

President & Chief Executive Officer, NRDC

Manish Bapna is president and chief executive officer of NRDC (Natural Resources Defense Council), one of the United State's most influential environmental groups, which works to ensure the rights of all people to clear air, clean water, and healthy and equitable communities. During his 25-year career, Bapna's leadership roles have focused on designing sustainable development strategies that are equitable, durable, and scalable. Most recently, he served as executive vice president and managing director of the World Resources Institute, a leading global research organization focused on the environment and development, for more than 14 years. As NRDC's new president and CEO, Bapna joins the 51-year-old nonprofit of some 700 scientists, lawyers, and policy advocates around the globe to tackle the biggest environmental issues we face today.

Ali Zaidi, Assistant to the President and White House National Climate Advisor

Ali Zaidi serves as Assistant to the President and National Climate Advisor. In this role, he leads the White House Climate Policy Office, which coordinates policy development and President Biden's all-of-government approach to tackle the climate crisis, create good-paying, union jobs, and advance environmental justice. Zaidi is a longtime advisor to President Biden, having provided counsel and leadership on climate policy development, legislation, and executive action from day one of the Administration and on the Biden presidential transition and campaign. Before his current role, he served as Deputy National Climate Advisor.

During his time in the Biden-Harris Administration, Zaidi has led on efforts to re-establish U.S. climate leadership, set a national target to cut greenhouse gas emissions by 50-52 percent by 2030; deliver robust executive actions, including regulatory, investment, and procurement-based initiatives; and secure the largest legislative wins on climate in U.S. history, through the Bipartisan Infrastructure Law and Inflation Reduction Act. Together these efforts have advanced the largest annual deployment of solar, wind, and batteries; brought together the U.S. auto sector around an all-electric future; tackled super-pollutants like methane and HFCs; bolstered domestic adaptation and resilience; and centered U.S. climate action around workers and communities, prioritizing good-paying union jobs and the critical work of environmental justice.

Zaidi joined the Biden-Harris Administration after serving as the state of New York's Deputy Secretary for Energy and Environment and Chairman of Climate Policy and Finance, where he led the state's efforts on climate change — driving investment into infrastructure and innovation, empowering workers and communities, and boosting economic and environmental resilience. Zaidi also taught graduate courses on technology policy and studied the fiscal and financial impacts of climate change as an adjunct professor at Stanford University. During that time, Zaidi also co-founded Lawyers for a Sustainable Economy, a Stanford-coordinated initiative that equips sustainability-focused startups with pro bono legal services.

Zaidi brings the cross-sector and multi-disciplinary experience needed to deliver a whole-of-government response to the climate crisis. During the Obama-Biden Administration, Zaidi served as Associate Director for Natural Resources, Energy, and Science for the Office of Management and Budget and as Deputy Director of Energy Policy for the Domestic Policy Council — helping to design and implement a wide range of domestic and international policies. Zaidi has advised non-profits, including as a Trustee of the Natural Resources Defense Council, and counseled the private sector, as an attorney who helped launch a sustainable investment practice.

Zaidi immigrated from Pakistan and grew up outside Erie, Pennsylvania. He received an A.B. from Harvard University and J.D. from Georgetown University.

Vijay Menghani, Chief Engineer, Central Electricity Authority, Government of India

Vijay Menghani, based in Delhi, is currently a Chief Engineer (Clean Energy and Energy Transition), CEA at Central Electricity Authority (CEA), bringing experience from previous roles at Central Electricity Authority (CEA), Central Electricity Regulatory Commission, Central Electricity Regulatory Commission and Central Electricity Authority (Cea). Vijay Menghani holds a 2006 - 2009 MBA in Finance @ Faculty of Management Studies - University of Delhi. With a robust skill set that includes Energy, Power system study using PSS-E, Renewable Energy, Transmission Pricing study using WebNet Software IIT Bombay, Smart Grid and more.

Shinichi Kihara, Director General for International Policy on Carbon Neutrality, Ministry of Economy, Trade and Industry of Japan

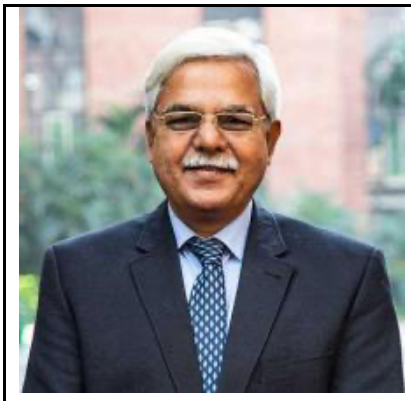
Shinichi Kihara was appointed in July 2023 as the Director-General for International Policy on Carbon Neutrality.

Mr. Kihara has rich experience in the area of international energy/ climate policy. He served as Deputy Director-General for Environmental Affairs in 2021, and took the lead for the G7 Ministers' Meeting on Climate, Energy and Environment in Sapporo. He served as Deputy Commissioner for International Affairs at Agency for Natural Resources and Energy (ANRE) in 2020. He served as Director for International Affairs at ANRE in 2012, when he led the work for the G7 Kitakyushu Energy Ministerial in 2016. He was also involved in energy related work including the International Affairs Division in 2004 and Nuclear Power Safety Administration Division in 1998.

Mr. Kihara served as Senior Energy Analyst at the International Energy Agency (IEA) in Paris in 2009. He contributed to the flagship publication, World Energy Outlook.

Mr. Kihara joined METI in 1993, He has diverse experience serving various offices in the METI, including Director for Policy Planning and Coordination Division of Trade Policy Bureau, Director for Middle East and Africa Division and Americas Division. His experience also covers the area of economic cooperation, export control and others.

Mr. Kihara earned a Bachelor of Economics from University of Tokyo in 1993. He earned a MBA in 1998 from Cornell University, USA.



R R Rashmi, Distinguished Fellow and Programme Director, Earth Science and Climate Change

Mr Rajani Ranjan Rashmi is engaged with the Resource Efficiency & Governance Division of The Energy and Resources Institute as a Distinguished Fellow. At TERI, Mr Rashmi works on issues relating to climate policy, strategy, carbon markets, and environmental sustainability.

A retired officer of the Indian Administrative Service, Mr Rashmi is an expert on climate change related policies, strategy, actions, and international negotiations. He has been involved with formulation and implementation of public policies of the central and state government in the field of environment, commerce, and finance for over 35 years.

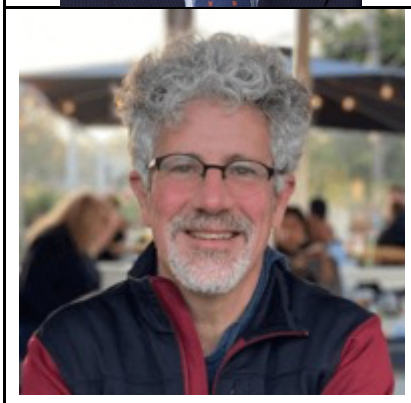
Mr Rashmi has been part of climate change policy making in India in the run-up to and after the Paris Agreement on Climate Change. In the Ministry of Environment, Forest and Climate Change where he held senior positions for several years, he was India's principal negotiator under the UN Framework Convention on Climate Change. As Special Secretary in the Ministry, he guided work and policy relating to national and state level climate action plans, pollution, environmental clearances, and Green India Mission.

In 2018-19, Mr Rashmi served on the Sub Committee of the Ministry of Finance on Climate Finance. In 2008, he was awarded the Prime Minister's Award for Excellence in Public Administration for his contribution to management of finances in the state of Manipur. An alumnus of Patna University, Mr Rashmi is also a management graduate from the Free University (Vriet Universitiet) of Brussels.

David Sandalow, the Inaugural Fellow, Center on Global Energy Policy, Columbia University

David Sandalow is the Inaugural Fellow at the Center on Global Energy Policy and co-Director of the Energy and Environment Concentration at the School of International and Public Affairs at Columbia University. He founded and directs the Center's U.S.-China Program and is author of the Guide to Chinese Climate Policy. During Fall 2019, he was a Distinguished Visiting Professor in the Schwarzman Scholars Program at Tsinghua University. Mr. Sandalow has served in senior positions at the White House, State Department and U.S. Department of Energy. He came to Columbia from the U.S. Department of Energy, where he served as Under Secretary of Energy (acting) and Assistant Secretary for Policy & International Affairs. Prior to serving at DOE, Mr. Sandalow was a Senior Fellow at the Brookings Institution. He has served as Assistant Secretary of State for Oceans, Environment & Science and a Senior Director on the National Security Council staff.

Mr. Sandalow writes and speaks widely on energy and climate policy. Mr. Sandalow is a member of the Innovation for Cool Earth Forum (ICEF) Steering Committee and chair of ICEF Innovation Roadmap Project. He serves as a director of Fermata Energy. Mr. Sandalow is a member of the Zayed Future Energy Prize Selection Committee, Global CO2 Initiative Advisory Board, Electric Drive Transport Association's

	"Hall of Fame" and Council on Foreign Relations. Mr. Sandalow is a graduate of the University of Michigan Law School and Yale College.
	**Michihiro Kishimoto, Environment Strategy Director, Environment Strategy Business Division, Hitachi, Ltd** Michihiro Kishimoto is a Corporate Officer at Hitachi Ltd. He works as Environment Strategy Director to promote Hitachi's green transformation for growth. Before joining Hitachi, he works as Deputy Director General for Environmental Affairs, at Ministry of Economy, Trade and Industry of Japan, and Managing Executive Director of Development Bank of Japan. He graduated University of Tokyo and has Master's degree in International Development Policy, Duke University.
	**Noah Horowitz, Program Director, Clean Cooling Collaborative** Noah Horowitz is Program Director of the Clean Cooling Collaborative at ClimateWorks Foundation. Before joining ClimateWorks, Noah's work as a Senior Scientist with Natural Resources Defense Council (NRDC) and the Director of the Center for Energy Efficiency Standards aimed to make buildings and the equipment inside them more energy efficient. Noah has worked on the state, federal and international levels and his areas of expertise include residential lighting and appliances, consumer electronics, and energy-saving "cool" roofs. Noah co-authored model regulations issued by the United Nations Environmental Program (UNEP) for use by developing countries for air conditioners and refrigeration equipment. He also served as the World-wide Manager of Environmental Programs for the Quaker Oats Company. Noah holds a BS in chemical engineering from Carnegie Mellon University and a MS in environmental engineering from the Illinois Institute of Technology.
	**Abas Jha, Practice Manager, Climate Change and Disaster Risk Management, South Asia Region, World Bank** Abhas Jha is Practice Manager, Climate Change and Disaster Risk Management, South Asia Region within the Urban, Resilience and Land Global Practice for the World Bank. He leads a global team working on infrastructure lending, technical assistance, and advisory services within the World Bank. Abhas works on cities, infrastructure finance and economics, technology, climate risk and resilience, and public policy. He has been with the World Bank since 2001, working on policy reform and development finance in a variety of countries including China, India, Vietnam, Indonesia, Thailand, Bangladesh, Pakistan, Sri Lanka, the Philippines, Turkey, Mexico, Brazil, Argentina, Jamaica, Laos, Cambodia, Myanmar, PNG, and Peru. Abhas earlier served as Adviser to the World Bank Executive Director for Bangladesh, Bhutan, India, and Sri Lanka. He was for 12 years a member

	of the Indian Administrative Service (the national senior civil service of India) in the Government of India (in the Federal Ministry of Finance and earlier in the state of Bihar). Abhas is the lead author of "Safer Homes, Stronger Communities: A Handbook for Reconstructing after Disasters" (2010) and "Cities and Flooding: A Guide to Integrated Urban Flood Risk Management" (2012) and has edited/co-edited or contributed chapters to several other publications.
	**Shaurya Anand, Research Associate, TERI** Shaurya Anand is presently working as a research associate in the Earth Science and Climate Change Division of TERI, where he leads research initiatives in multisectoral sustainable cooling and energy efficiency. He is also actively engaged in the publication of quarterly newsletter newstrac focused on refrigeration and air conditioning, in partnership with the Ozone Cell, Ministry of Environment, Forest and Climate change. Shaurya has participated as a panellist in global cooling negotiations platform events, including the Open-Ended Working Group and the Meeting of Parties to the Montreal Protocol hosted by the United Nations Environment Programme. His collaborative research involves engagement with a variety of stakeholders, including governments, multilateral organizations, industry, and civil society organizations. In this capacity, he has contributed to the advancement and procurement of sustainable cooling technologies. A Mechanical Engineering graduate with distinction and a master's degree in Thermal Engineering, Shaurya's engineering expertise encompasses various projects involving Computational Fluid Simulations of complex systems, eco-friendly fuel production and analysis, and energy systems examination. In addition to academic achievements, he holds a notable record of clearing the All-India Engineering Entrance Examination (AIEEE) and achieving success in multiple Graduate Aptitude Tests for Engineering (GATE) examinations. Shaurya actively contributes articles on topics related to energy efficiency, sustainable cooling, GHG emissions, and transportation.
	**Prima Madan, Senior Advocate, Cooling and Efficiency, International Program, NRDC** Prima Madan leads the work on cooling and energy efficiency for the India program. Her work is focused on advocating for climate policies that reduce emissions from air-conditioning and refrigeration and fluorinated chemicals (HFCs, CFCs). She works on promoting building energy efficiency policies, efficient air conditioners, and passive cooling technologies to reduce cooling demand. She also supports work on air pollution, extreme heat, and programmatic work for the India team. Madan has over 15 years of experience in planning, managing, and implementing energy and climate change projects in India. Before joining NRDC, she worked in the International Institute for Energy Conservation (IIEC)'s South Asia office as a senior project manager. She spearheaded a number of IIEC's key projects, including designing a national-level fund for energy efficiency. She was also extensively involved in designing innovative financing mechanisms for promoting energy efficiency under

	India's National Mission for Enhanced Energy Efficiency. Madan began her career with the Energy and Resources Institute (TERI), where she worked on the Fourth Assessment Synthesis Report of the Intergovernmental Panel on Climate Change (IPCC). Madan holds a B.A. (Hons) in economics from Hansraj College, Delhi University, and an M.Sc in economics from the University of Nottingham, UK.
	**Masatsugu Yoshioka, Executive Director, NEDO** Mr. YOSHIOKA Masatsugu has served as Executive Director of New Energy and Industrial Technology Development Organization (NEDO) since October 2023. Prior to NEDO, he joined the Ministry of International Trade and Industry (MITI, currently Ministry of Economy, Trade and Industry; METI) in 1995, where he worked in various policy-making fields. His positions in the Japanese Government include Head, the Project Management Division (Outer Space and Land Equipment), Acquisition, Technology and Logistics Agency; Counsellor, Office for the Promotion of Regulatory Reform, Cabinet Office; Director, Coal Division, Natural Resources and Fuel Division, Agency for Natural Resources and Energy, METI; Assistant Secretariat for Prime Minister. He holds a Master of Laws (LL.M.) from Harvard Law School, a Master of Studies from University of Oxford, and a Bachelor of Laws from the University of Tokyo.