

International Workshop on

“Renewable Energy Development Strategies and Mechanisms with special reference to Solar Energy” (05th February to 09th February 2024)

International Centre for Environment Audit & Sustainable Development (iCED), as the Global Training Facility (GTF) of INTOSAI Working Group on Environmental Auditing (WGEA) organised an International Workshop on “Renewable Energy Development Strategies and Mechanisms with special reference to Solar Energy” from 05.02.2024 to 09.02.2024 in two batches through virtual mode. A total number of 51 participants (37 in Batch- I & 14 in Batch-II) represented 17 SAIs in the workshop.



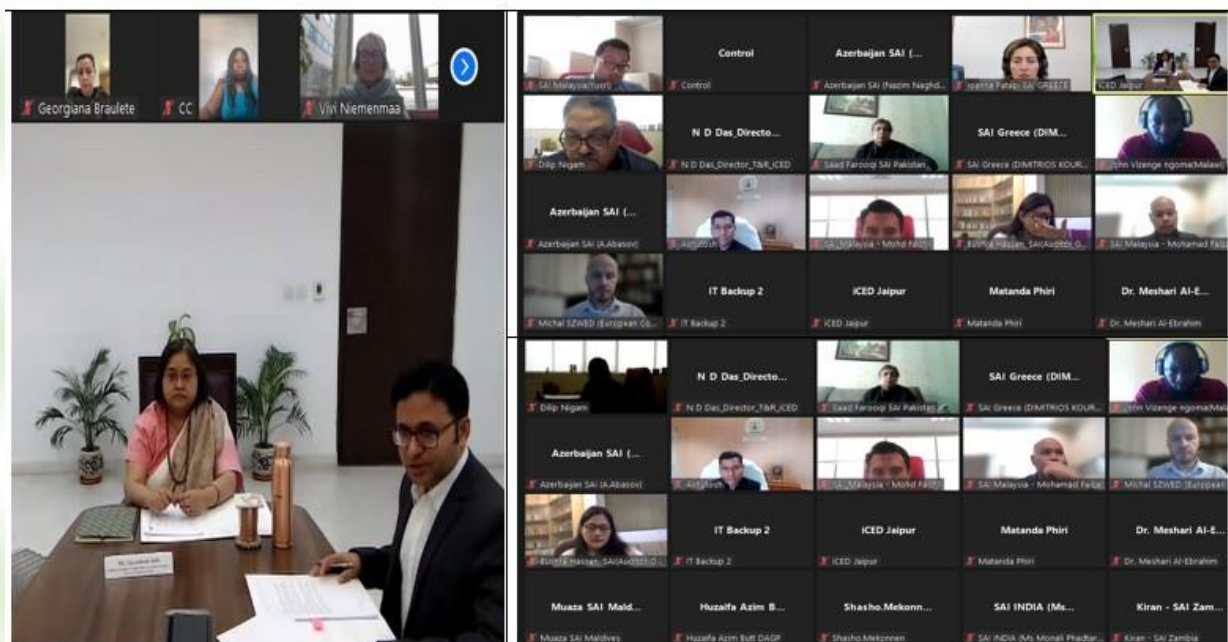
Ms. Sayantani Jafa, ADAI & DG, iCED addressing the participants during Inauguration of the International Workshop

During the inaugural sessions of Batch-I & Batch-II, Dr. Nanda Dulal Das, Director (Training & Research), iCED welcomed Ms. Sayantani Jafa, Additional Deputy Comptroller and Auditor General & Director General, iCED, participants, and the honourable guest speaker Dr. Vivi Niemenmaa, Secretary General, INTOSAI WGEA and from the National Audit Office, Finland.

Ms. Jafa madam in her inaugural address highlighted that iCED, Jaipur on behalf of SAI India, has played a key role in augmenting and disseminating SAI India’s efforts towards environmental auditing and sustainable development at global forums such as the INTIOSAI

WGEA, ASOSAI WGEA etc. This centre is working as the technical focal point for research projects of the INTOSAI WGEA Work Plan 2023-2025, including the “Climate Scanner”, and “Environmental Accounting”, under the “Climate and Biodiversity Hub” and “Green Economy Hub”, respectively.

It has also built and promoted inter-disciplinary and trans-disciplinary research on multi-sectoral topics related to Climate Change and sustainable development. She further highlighted SAI India’s vision of upscaling knowledge and experience sharing on the Blue Economy with the Hon’ble C&AG of India, Shri Girish Chandra Murmu setting up a Centre of Excellence on Blue Economy at iCED.



Participants during the International Workshop on “Renewable Energy Development Strategies and Mechanisms with special reference to Solar Energy”, on 05th February 2024

Ms. Jafa said that emissions need to be reduced to end our reliance on fossil fuels and invest in Renewable Energy sources that are clean, accessible, affordable, sustainable, and reliable. Solar energy, Wind Energy, Geothermal Energy, Hydropower Energy, Ocean Energy and Bioenergy are various forms of Renewable Energy that can be harnessed to mitigate climate change.

The adoption of renewable energy sources is crucial for providing clean, affordable energy, mitigating climate change, driving economic growth, creating jobs, and improving quality of life. This shift requires making renewable energy technology a global public good, improving access to components and raw materials, levelling the playing field, shifting energy subsidies, and increasing investments in renewables. Renewable energy sectors in the US, EU, India, and Brazil are predicted to double by 2028, driven by supportive policy environments and global such as the INTOSAI WGEA, ASOSAI WGEA etc. Before closing, she welcomed all the

participants and guest faculties. ADAI madam also thanked the Chair of INTOSAI Working Group on Environmental Auditing, Auditor General of the National Audit Office Finland Mr. Sami Yläoutinen and his team, for their support in organising this workshop.

During this workshop, experts from European Court of Auditors (ECA), SAI Brazil, SAI Estonia, SAI Finland, SAI Indonesia, SAI India, and other renowned Institutions such as the Ministry of New & Renewable Energy, Govt. of India, National Maritime Foundation (NMF), New Delhi etc. shared their perspectives with relevant case studies to elaborate the various aspects of Audit of Renewable Energy. The session-wise details are given below:

S. No	Resource Person	Session	Date
1.	Dr Vivi Niemenmaa, SAI, Finland	Talk on “An Overview of Renewable Energy Systems with reference to SDGs and role of SAIs”	05.02.2024 (Batch-I & II)
2.	Dr. Nanda Dulal Das, SAI India	Renewable Energy Options, SDGs, and Auditing by SAIs	05.02.2024 (Batch-I & II)
3.	Ms. Katarzyna Radecka Moroz, European Court of Auditors (ECA)	Renewable Energy Options: Wind Energy, Tidal Energy, and other options	05.02.2024 (Batch-I & II)
4.	Commodore Debesh Lahiri, Executive Director, National Maritime Foundation (NMF), New Delhi	Marine Renewable Energy Options: Case Studies	06.02.2024 (Batch-I & II)
5.	Shri S.N. Pandey, Deputy Director, National Power Training Institute, Faridabad, Ministry of Power, Govt. of India, New Delhi	Development of Solar Energy as a viable alternate source of Energy: Issues and Challenges	06.02.2024 (Batch-I & II)
6.	Shri Dilip Nigam, Scientist G, Ministry of New & Renewable Energy, Govt. of India, New Delhi	Innovations in Solar Energy Sectors in India	07.02.2024 (Batch-I & II)
7.	Mr. Alar Jürgenson, SAI Estonia	Audit of Renewable Energy: Experience Sharing on Wind Energy	07.02.2024 (Batch-I & II)

8.	Mr. Fery Irawan and Mr. Bagus Permadi, SAI Indonesia	Audit of Renewable Energy: Experience Sharing	08.02.2024 (Batch-I)
9.	Mr. Denny Wahdini and Mr. Normas Andi Ahmad, SAI Indonesia	Audit of Renewable Energy: Experience Sharing	08.02.2024 (Batch-II)
10.	Mr. Andre Delgado de Souza, SAI Brazil	Audit of Renewable energy with special focus on Solar Energy	08.02.2024 (Batch-I & II)
11.	Dr Subrahmanyam Pulipaka, Chief Executive Officer, National Solar Energy Federation of India, New Delhi	Developments of Solar Power Plants: Cases from the world and India	09.02.2024 (Batch-I & II)
12.	Ms. Gurveen Sidhu, SAI India	Renewable Energy Audit (Indian perspective) with focus on Solar Energy: Experience Sharing	09.02.2024 (Batch-I & II)



Dr. Vivi Niemenmaa, SAI, Finland delivered her talk to both the batches focusing on the importance of environment, climate change and energy transition. She charted out the global risks ranked by severity over the short and long term. She also discussed about the extreme weather events, and their impact upon biodiversity, ecosystem and natural resources.



Dr. Nanda Dulal Das, SAI India explained the backdrop for Energy Transition and Sustainability of Energy Sources. He discussed about the push for New and Renewable Energy Sources as well as Common Sources of Renewable Energy. He also briefed on Interlinking Energy Transitions and SDGs, need for Auditing Achievements under SDGs and Principles of ISAM (IDI's SDG Audit Model).



Ms. Katarzyna Radecka Moroz, European Court of Auditors (ECA) shared her experience on a Special Report of the European Court of Auditors i.e. Union Offshore Renewable Energy in the European Union (No-22 of 2023). She explained the audit approach adopted, decarbonisation of energy climate and energy targets, strategy for offshore renewable energy, assessment of the cumulative effects on the marine environment, effect on marine biodiversity and ecosystems etc. She also highlighted practical, social and environmental challenges and inadequate analysis of environmental impacts emerged from the audit findings.



Commodore Debesh Lahiri, Executive Director, National Maritime Foundation (NMF), New Delhi on Marine Renewable Energy Options discussed about causes of Climate Change & characteristics of Climate Justice, Historical Emissions & Cumulative CO2 Emissions and India's stand at various COPs (Conference of Parties). Commodore Lahiri also provided an in-depth exploration of the fundamental aspects, challenges, generational advancements, and emerging technologies within the areas of Marine Renewable Energy.



Shri S.N. Pandey, Deputy Director, National Power Training Institute, Faridabad, Ministry of Power, Govt. of India, New Delhi outlined major events in the history of solar energy and reasons for rising solar popularity across the globe, energy sources, future of solar energy, advantages of solar energy. He also briefed about the Innovative Technologies used in Solar Energy Sector, Renewable Energy Scenarios in India, Initiative for Promotion of RE, New Policy on Carbon Credit in India and India's Panchamrit Goals.



Shri Dilip Nigam, Scientist G, Ministry of New & Renewable Energy, Govt. of India, New Delhi elaborated Renewable Energy Sources and types. He further outlined about the challenges & innovations in Solar sector in India, major innovative reforms, and schemes such as Roof Top Solar Scheme, PM-KUSUM Scheme, Solar Park Scheme and Production

Linked Incentives (PLI) Scheme for High Efficiency Solar PV Modules etc.



Mr. Alar Jürgenson, Auditor from SAI Estonia shared valuable insights into the renewable energy audits conducted by SAI Estonia encompassing a diverse range of topics viz. energy security, electricity production supply and initiatives promoting wind energy. He also outlined the Estonia's renewable energy targets and provided an

overview of the current state of renewable energy in the country. Additionally, Mr. Jürgenson presented a prototype detailing the audit scope, objectives, criteria, and findings utilized in these audits, to provide a comprehensive understanding of their methodology and approach used in these audits.



Mr. Fery Irawan, Mr. Bagus Permadi, Mr. Denny Wahdini, and Mr. Normas Andi Ahmad from SAI Indonesia shared their valuable experiences in auditing renewable energy during the workshop. They provided insights into various aspects of their audit processes, including the audit ecosystem, stakeholder mapping, analysis, audit scope, objectives, criteria, and findings. Additionally, they emphasized the significance of multi-stakeholder engagement in renewable energy audits and highlighted the importance of collaboration among different stakeholders. Furthermore, they outlined a prototype for audit procedures, preparing the audit design matrix, and addressing vertical and horizontal policy incoherence. This prototype may serve as a valuable tool for other SAIs to replicate during their future audits in renewable

energy, facilitating knowledge sharing and best practices dissemination within the auditing community.



Mr. Andre Delgado de Souza, SAI Brazil presented the experiences of Brazilian Federal Court of Accounts during the Audit of Renewable Energy with Special Focus on Solar Energy. He presented the overview of TCU, current state of renewable energy in the country and the Brazilian energy system. He also pointed out that out of total 29 areas that represent high risk for

Brazilian federal public administration, 2 are related to the power sector. He also briefed about the coordinated audit conducted by 12 SAIs on Renewable energy in the electricity mix and outlined the various aspects of their audit processes viz. audit scope, objectives, criteria and findings.



Dr Subrahmanyam Pulipaka, Chief Executive Officer, National Solar Energy Federation of India, New Delhi discussed about Solar Market in India, Solar Parks Around the Globe, Developing a Solar PV Project, Risks in Utility Projects, Residential Rooftop and Procedure for installation of rooftop solar

plant. In addition, Dr. Pulipaka touched upon the growing trend of residential rooftop solar installations and outlined the procedure for installing rooftop solar plants. He provided valuable insights into the technical, regulatory, and financial aspects of rooftop solar projects, enlightening the audience with practical knowledge of solar energy installations.



Ms. Gurveen Sidhu, SAI India shared her experiences on Renewable Energy Audit (Indian perspective) with focus on Solar Energy. She presented her experience sharing on “Performance Audit of Renewable Energy Sector in India (CAG’s Report No. 34 of 2015)”. She also outlined the other

aspects of this audit viz. audit scope, objectives, criteria, and findings and present status of the recommendations suggested by audit. She further presented an overview of the Indian renewable energy scenario, providing participants with insights into the country's progress and initiatives in the field of renewable energy. Additionally, she informed the participants about an ongoing performance audit of Ultra Mega Solar Park Projects in the country. However, she

refrained from disclosing further specifics as the audit is still in progress, adhering to the confidentiality requirements of the auditing process.

Feedback: - Feedback on course designing, the time required, content, knowledge and its delivery by the resource persons was also collected from the participants through Google form. The average feedback of the participants for batch I was 8.17 out of 10 and for batch II, it works out to be 8.48 out of 10, which are highly encouraging.

Session on “**Renewable Energy Audit (Indian perspective) with focus on Solar Energy: Experience Sharing**” delivered by **Ms. Gurveen Sidhu, DGA(E&SD), New Delhi**, and Session on “**Innovations in the Solar Energy Sectors in India**” delivered by **Shri Dilip Nigam, Scientist G, Ministry of New & Renewable Energy, Govt. of India, New Delhi** were rated as highest in batch I & II respectively.

Valediction of the Workshop:

Ms Sayantani Jafa, ADAI and DG, iCED graced the valedictory session and extended heartfelt thanks to all the participants for their enthusiastic involvement throughout the programme, which significantly contributed to its successful execution.



Ms Sayantani Jafa, ADAI and Director General, iCED addressing the participants during valediction

She further encouraged the participants to explore iCED's quarterly journal i.e. "Green Files" which attempts to highlight both local and global issues on environmental audit and sustainable development. She also invited the participants to have a look at iCED's research papers published under the Occasional Research Paper (ORP) Series and specially highlighted about the recently published research papers focusing on auditing perspectives in "Floating Solar Photovoltaic Systems in India" and "Marine Energy Resources".

She wished that the sharing of experiences and perspectives during the workshop would suitably equip all the participants to take the learning process forward. She further outlined the importance of envisioning the broader picture when formulating audit approaches relating to the Renewable Energy sector, which encompasses multifaceted and interconnected aspects. In her concluding words, she also thanked all the SAIs who had nominated resource persons to deliver the sessions during the workshop.

Dr Nanda Dulal Das, Director (Training & Research), iCED conveyed his vote of thanks to all the faculties for sharing their knowledge and experiences during workshop. He also thanked all the participants for their active participation. He further conveyed sincere thanks to all the SAIs who nominated participants and supported iCED by contributing resource persons for the workshop and concluded the workshop.

Testimonials

Mr Shasho Mekonnen from SAI Ethiopia- "Very good achievement of India in utilizing Renewable energy resources, Congratulations. I hope SAI India is over-sighting and reporting on its efficiency and effectiveness timely".

Mona Fahmy Abdel Wahab from SAI Egypt- "Thank you for these great efforts".

Emad Thabet Selides from SAI Egypt- "The workshop is very useful and contains new ideas. Thank you very much for the opportunity to participate".

Mrs Banda Zulu Charity from SAI Zambia – "Thank you very much for the elaborate presentation".