

IEEE Second International Conference on Advancements and Key Challenges in Green Energy and Computing (AKGEC 2024)

Day 1: 21st November 2024

The second edition of the IEEE International Conference on Advancements and Key Challenges in Green Energy and Computing (AKGEC 2024) commenced on 21st November 2024 at Ajay Kumar Garg Engineering College, Ghaziabad, with an inspiring inaugural session.

The dignitaries for the event included the Chief Guest, **Shri Dinesh Jagdale**, former Joint Secretary, Ministry of New and Renewable Energy (MNRE); Guest of Honour, **Dr. Mohd. Rihan**, Director General, National Institute of Solar Energy (NISE), MNRE; and eminent industry guest **Mr. Sanjeev Kaul**, a distinguished leader from Jackson Greens. The international keynote address was delivered by **Prof. (Dr.) Akshay K. Rathore**, IEEE Fellow and Professor at the Singapore Institute of Technology (SIT), Singapore.

The began with arrival of chief guest Mr Dinesh Jagdale followed by the arrival of Guest of Honours Mr Sanjeev Kaul and Dr. Mohd. Rihan. The guests were seated with Director General Dr R K Agarwal for formal discuss over tea. The guests were escorted to the seminar hall for the inaugural session.

The formal inaugural program commenced at the scheduled time, with the welcoming of dignitaries and participants to the event. **Ms. Navjyoti Sharma**, the Master of Ceremonies, initiated the proceedings by inviting the dignitaries and guests for lamp lightening and then to take their seats on the dais.

Following the lamp-lighting ceremony, Ms. Sharma invited **Dr. R. K. Agarwal**, Director General of AKGEC, to deliver the formal welcome address and opening remarks for the conference. In his address, Dr. Agarwal emphasized the relevance of the conference theme in the modern era of energy transition and sustainable development. He expressed his gratitude to the distinguished guests, participants, and organizers for their contributions to making the conference a reality.



Next, **Dr. Vani Bhargava**, the Organizing Secretary of the conference, presented the conference preface. She provided an overview of the conference objectives, the number of papers received, and the rigorous review process that ensured the selection of high-quality research contributions. Dr. Bhargava highlighted the importance of collaboration between academia and industry in addressing the challenges of green energy and computing.

The inaugural program continued with an address by the Chief Guest, **Shri Dinesh Jagdale**, who shared his insights on the policies and initiatives of the Ministry of New and Renewable Energy for promoting sustainable energy in India. Shri Jagdale lauded the efforts of AKGEC in organizing such a significant conference and stressed the importance of fostering innovation and research in green energy technologies.

This was followed by addresses from the Guests of Honour. **Dr. Mohd. Rihan** spoke about the advancements in solar energy technologies and the pivotal role of renewable energy in India's energy security and sustainability goals. **Mr. Sanjeev Kaul** shared his industry perspective on the emerging trends and challenges in achieving a green energy transition and the vital role of academia in nurturing skilled professionals to meet these challenges.



The inaugural session concluded with the release of the conference digest/proceedings by the dignitaries on the dais. The ceremonial unveiling of the conference document marked the formal launch of the technical sessions and other activities of AKGEC 2024.



The program ended with a vote of thanks by the MC, followed by high tea, where the guests and participants had an opportunity to interact and network in an informal setting.

The inaugural session was followed by the first international keynote address, delivered by **Prof. (Dr.) Akshay K. Rathore**, IEEE Fellow and Professor at the **Singapore Institute of Technology (SIT), Singapore**. In his

talk, titled "**Multidisciplinary Engineering in the Design and Operation of Sustainable Energy Systems**", Prof. Rathore emphasized the need for collaboration across diverse engineering disciplines to address the challenges of sustainable energy. He shared insights into integrating renewable energy, advanced energy storage systems, and predictive analytics, highlighting real-world applications and the role of innovation in designing efficient energy systems.

The second keynote address was delivered by **Prof. B. K. Panigrahi**, Professor at **IIT Delhi** and Founding Head of CART. His talk, titled "**Future Directions in Artificial Intelligence**," explored the critical role of AI in optimizing energy systems, forecasting renewable energy generation, and maintaining grid stability. Prof. Panigrahi also shared ongoing research and developments at IIT Delhi, underlining the transformative potential of AI in driving sustainability.



Both keynotes set a forward-thinking tone for the conference, inspiring attendees and providing valuable perspectives for the technical sessions that followed.

The first day of the conference concluded with a series of impactful sessions and activities, showcasing a blend of academic excellence and student-driven initiatives.

Parallel Technical Sessions: The day ended with three **parallel track presentations in three technical session 1, 2 and 3**, where researchers and participants presented their innovative studies and findings across diverse themes. These sessions provided an engaging platform for knowledge exchange and in-depth discussions, encouraging collaboration among researchers, faculty, and industry experts. The quality and diversity of the topics discussed reflected the broad scope of the conference and its commitment to advancing research in green energy and computing.



Tutorial Session: A significant addition to the day's proceedings was the **tutorial session**, led by **Dr. Sreejith S.** from NIT Silchar and **Dr. Shakila B.** from NIT Nagaland. The session focused on the **Harmony Search Algorithm**, a metaheuristic optimization technique inspired by the musical process of searching for a perfect harmony. Attendees gained hands-on exposure to the algorithm's principles, applications, and potential in solving complex optimization problems in engineering and technology. The interactive nature of the session, coupled with the expertise of the speakers, made it an enriching experience for participants.



SIGHT Poster Presentations: Adding to the highlights of Day 1 was the **Special Interest Group on Humanitarian Technology (SIGHT)** poster presentation activity, an entirely student-driven initiative organized by **IEEE AKGEC** volunteers. This activity showcased projects aimed at leveraging technology for humanitarian purposes, emphasizing practical solutions to real-world challenges. Both **IEEE and non-IEEE members** actively participated, demonstrating a spirit of inclusivity and innovation. The enthusiasm and organizational skills of the student volunteers were commendable, making this activity a testament to the conference's focus on fostering young talent and encouraging humanitarian applications of technology.





These sessions and activities together brought Day 1 to a close on a high note, leaving participants inspired and eager for the proceedings of the next day.

Day Two Highlights

The second day of the conference was packed with insightful keynote sessions, technical presentations, engaging tutorials, and vibrant discussions that brought together experts from academia and industry to address pressing challenges and advancements in green energy and computing.

Keynote Sessions





The day commenced with a thought-provoking keynote address by **Mr. Rajeev Porwal, Director (System Operations), Grid Controller of India Limited**, who shed light on the critical aspects of **grid stability and reliability**. He elaborated on the **implementation of grid codes in India**, emphasizing their significance in ensuring the seamless integration of renewable energy sources. Mr. Porwal also discussed the visionary **"One Nation, One Grid" initiative**, highlighting its role in fostering a unified and robust national power grid, a vital component for India's sustainable energy future. His session provided participants with a clear understanding of the technical and operational challenges in maintaining grid reliability and the measures taken to address them.

Following this, the second keynote session was delivered by **Mr. A. K. Saxena, Senior Director, Electricity and Renewables, TERI (The Energy and Resources Institute)**. Mr. Saxena delved into the **recent developments and future trends in sustainable energy**, offering a comprehensive overview of innovative technologies and policy frameworks shaping the energy landscape. His talk emphasized the critical need for collaborative efforts between policymakers, researchers, and industry leaders to accelerate the adoption of sustainable practices. The session inspired attendees to explore emerging opportunities and challenges in the energy sector.

Technical Sessions and Tutorial 2

The technical momentum continued with **Parallel Technical Sessions**, where researchers presented their innovative findings across various domains. These sessions encouraged dynamic discussions and knowledge sharing among delegates, fostering interdisciplinary collaborations.

A hands-on **tutorial session** led by **Dr. Soumya Shubhra Nag** focused on **Battery Management Systems (BMS) and Its Implementation in MATLAB**. The session offered participants a deep dive into the design, simulation, and application of BMS in electric vehicles and energy storage systems. Attendees appreciated the practical, interactive format of the tutorial, which enhanced their understanding of MATLAB's role in optimizing BMS operations for sustainable energy solutions.



Additionally, a **Young Professional (YP) session** conducted by **Dr. Vikas Garg, Professor at CHRIST University**, provided a platform for early-career professionals to share their perspectives on the challenges and opportunities in green energy. This session resonated particularly well with young researchers and professionals, offering valuable career guidance and insights into emerging trends in the field.



Industry-Academia Panel Discussion

The highlight of the second half was the much-anticipated **Industry-Academia Panel Discussion** on **"Integrating Innovations: Overcoming Challenges in Green Energy Transition"**. This dynamic session, moderated by **Dr. Ashish Srivastava, Professor at SVSU**, brought together a distinguished panel of experts from diverse sectors:

- **Mr. Meenu Singhal, Regional Managing Director, Socomec**
- **Dr. R. Balasubramanian, Ex-Professor, IIT Delhi**
- **Ms. Ritu Lal, Client Partner, Infrastructure and Energy Practices, Amrop India**
- **Mr. Vineet Bhatia, Executive Director, Energy and Renewables, Grant Thornton Bharat LLP**

- **Mr. Sumit Koriwal, Regional Manager Sales, Fronius India Pvt. Ltd**

The panelists shared their unique insights on fostering innovation and collaboration to accelerate the green energy transition. Key topics included challenges in scaling renewable energy projects, advancements in technology, and the integration of sustainable solutions into existing infrastructures. The discussion was lively and engaging, with the panelists addressing audience queries, offering practical solutions, and debating strategies for overcoming barriers in the energy transition.



The session provided a rare opportunity for participants to learn from industry leaders and experts, bridging the gap between academic research and real-world applications. The diverse perspectives and rich discussions left attendees inspired and motivated to contribute to the green energy movement.

Day Two concluded with a sense of accomplishment, as the sessions and activities highlighted the conference's core objective: fostering collaboration, innovation, and knowledge sharing to address key challenges in green energy and computing.

Day Three Highlights

The final day of the conference brought a mix of enriching keynote sessions, dynamic technical presentations, and impactful programs that reflected the event's commitment to advancing knowledge and fostering collaboration in the field of green energy and computing.

Keynote Sessions

The day began with an engaging keynote address by **Prof. R. Balasubramaniam, Retired Professor, IIT Delhi**, who shared his extensive expertise and insights on pivotal topics related to green energy systems. His session laid the groundwork for the day's discussions, inspiring participants to think critically about innovative solutions to energy challenges.

The second keynote session featured the distinguished **Prof. Mohan Kolhe, Professor of Renewable Energy at the University of Agder, Norway**, who delivered an international perspective on sustainable energy. Speaking on the topic, "**Integrated Renewable Energy System Based on Energy Storage as Electrolytic Hydrogen**," Prof. Kolhe highlighted the transformative potential of integrating renewable energy systems with hydrogen-based energy storage. His presentation delved into advanced technologies and innovative methodologies for addressing energy storage challenges, offering a forward-looking vision for sustainable energy systems. The keynote captivated the audience, providing valuable insights into global energy transitions.



Parallel Technical Sessions and Special Programs

As the day progressed, technical presentations continued during **Parallel Technical Sessions**, where researchers shared their cutting-edge findings and discussed practical applications of green energy and computing technologies. These sessions fostered vibrant exchanges of ideas and collaborations among participants.

Another highlight of Day Three was the **Women in Engineering (WIE) Meet and Greet Program**, organized by the **WIE IEEE UP Section**. This interactive session celebrated the contributions of women professionals and researchers in STEM fields, creating a platform for networking, mentorship, and knowledge sharing. The event emphasized the importance of diversity and inclusion in advancing innovation and encouraged more women to actively participate in shaping the future of green energy and computing.

Valedictory Session

The conference concluded with the **Valedictory Session**, which was graced by prominent dignitaries and marked a fitting end to the three-day event. The session's **Chief Guest, Mr. Reji Pillai, President, India Smart**

Grid Forum, delivered an inspiring address on the future of smart grids and their role in sustainable energy transitions. His remarks underscored the significance of collaboration between academia, industry, and policymakers in achieving energy resilience and sustainability.

The session also welcomed **Dr. Vipin Chandra Shukla, Scientist G and Head of A2K+ at the Department of Scientific & Industrial Research (DSIR)**, and **Mr. Arpit Sharma, CEO, Skill Council for Green Jobs**, as **Guests of Honour**. Both dignitaries shared their perspectives on advancing skills, innovation, and policies for green energy development. Their speeches emphasized the need for capacity building and industry-academia linkages to overcome challenges in the green energy sector.











In their concluding remarks, the esteemed guests commended the organizing committee for hosting a conference that successfully facilitated knowledge exchange, technical discussions, and collaborations.

Acknowledgments

The conference organizers extended their heartfelt gratitude to the **IEEE UP Section** for their technical co-sponsorship and unwavering support throughout the planning and execution of the event. Special thanks were conveyed to the esteemed leaders of the IEEE UP Section:

- **Dr. Sri Niwas Singh**

- **Dr. Satish Singh**
- **Dr. Prabhakar Tiwari**
- **Dr. Mohd. Rihan**
- **Dr. Asheesh Singh**
- **Dr. Varun Kakar**

Their guidance and support were instrumental in ensuring the success of the conference.

A special note of thanks was also extended to the **Department of Scientific & Industrial Research (DSIR)** for their financial assistance and valuable contributions. The organizers expressed their gratitude to **Dr. Vipin Shukla, Dr. M. S. Shashi Kumar, and Dr. Ranjeet Bairwa** for their role in supporting the conference both financially and through strategic guidance.

Closing Remarks

The valedictory session brought the event to a successful conclusion, with participants expressing their appreciation for the well-organized conference that provided a platform for knowledge sharing, networking, and collaborations in green energy and computing. The insights gained and connections made over the three days will undoubtedly pave the way for future advancements and innovations in the field.

