

Report on Distinguished Lecture Series

Department of Environmental Science and Engineering

Delhi Technological University

January 30th, 2026

Title: “Emission Inventory and CAAQMS-Based Assessment of FGD Requirement for Coal-Fired Power Plants in India”

Distinguished Speaker

The event featured an invited keynote lecture by a leading environmental expert:

Dr. K. V. George is a senior environmental scientist and Chief Scientist at CSIR–National Environmental Engineering Research Institute (NEERI), with extensive experience in air pollution assessment, emission inventory development, and industrial pollution control. He has made significant contributions to national air quality management initiatives, including emission factor development, source apportionment studies, and regulatory impact assessments for thermal power plants and industrial sectors. Dr. George has been actively involved in advising central and state governments on air pollution mitigation strategies, including the implementation of Flue Gas Desulfurization (FGD) systems and Continuous Ambient Air Quality Monitoring Systems (CAAQMS).

Summary of the event

The guest lecture held on 30th January 2026 commenced with a formal inauguration, beginning with the National Anthem, followed by the lighting of the ceremonial lamp, after which the chief guest, Dr. K. V. George, Chief Scientist, CSIR–NEERI, was welcomed and felicitated with a sapling and honoured with a stole as a mark of respect. The session was chaired by the Head of the Department, Dr. Geeta Singh who initiated the programme by addressing the gathering and sharing insights into the history, growth, and academic contributions of the department, highlighting its role in environmental research, education, and capacity building. This was followed by the lecture titled “Emission Inventory and CAAQMS-Based Assessment of FGD Requirement for Coal-Fired Power Plants in India,” delivered by Dr. K. V. George, which focused on air pollution control in coal-based thermal power plants. The lecture began with fundamental concepts of air parcel movement, dry air characteristics, and atmospheric dispersion, establishing their relevance in emission estimation and inventory development. The methodology for preparing emission inventories was discussed in detail, considering fuel properties, plant capacity, combustion technology, operating load, and pollution control efficiency, with particular emphasis on the high ash content (42–50%) of Indian coal. Coal-based thermal power plants were identified as major sources of SO₂, NO_x, particulate matter, and fly ash, and the role of CSIR–NEERI in developing emission factors, air quality data, regulatory frameworks, and environmental assessments was highlighted, along with the guidelines and international benchmarks. A focused discussion on Flue Gas Desulfurization (FGD) systems covered their necessity for SO₂ mitigation, principles of operation in externally combusted thermal power plants, types of FGD technologies (wet, semi-dry, and dry), their integration with electrostatic precipitators, and operational considerations such as water requirement, gypsum by-product management, energy penalty, and system reliability for both pit-head and load-centre plants, supported by CAAQMS-based assessment approaches. The

lecture concluded with an interactive discussion session, and the programme was attended by research scholars, B.Tech and M.Tech students, and faculty members of the department, with a total of 76 participants, followed by the vote of thanks delivered by the coordinator, Dr. Rajeev Kumar Mishra, formally bringing the event to a close.

Key Takeaways

- Emission inventory development is fundamental to air quality management, requiring accurate plant-level data on fuel characteristics, operating conditions, and pollution control efficiencies for regulatory compliance and impact assessment.
- The high ash content of Indian coal (42–50%) significantly affects particulate emissions, necessitating customized emission factors instead of generic international values.
- CAAQMS-based assessment enables data-driven evaluation of ambient SO₂ levels and dispersion trends, supporting informed decisions on the siting, sizing, and prioritization of FGD installation in coal-fired power plants.
- Integration of FGD systems with electrostatic precipitators is essential for optimizing overall emission control efficiency in externally combusted thermal power plants.

Conclusion

The lecture highlighted the critical role of accurate emission inventories and CAAQMS-based assessments in strengthening air quality management for coal-fired power plants in India. It emphasized that effective implementation of FGD systems, supported by reliable data and appropriate technology selection, is essential for achieving regulatory compliance, reducing SO₂ emissions, and ensuring sustainable operation of thermal power plants.

Feedback

The lecture was extremely insightful and well-structured. The speaker explained common and fundamental air pollution topics in a clear and accessible way, which helped address many doubts and questions attendees had. Complex concepts were broken down effectively, and practical examples made the material easy to relate to real-world situations. The session was interactive and engaging, leaving participants with valuable knowledge they can apply in their work. Overall, it was a very worthwhile and inspiring programme.

