

Press Release

First ever 'National Conclave on Greening Industrial Boilers in India' organized in Lucknow – iFOREST calls for a National Green Boiler Mission to meet climate and air quality goals

- The first ever Boiler inventory estimates 45,226 process boilers and 1.26 billion tonnes of steam generation per year in the country. The top three states are Gujarat, Maharashtra and Uttar Pradesh.
- GHG emissions from process boilers stand at 182 million tonnes per year – more than 5% of India's energy-related CO₂ emissions. However, air pollution from the process boilers is as large as the automobile sector due to lax regulations.
- Future projections indicate a quadrupling in steam demand and corresponding rise in GHG emissions and air pollution by 2047.
- iFOREST recommends setting-up a Green Boiler Mission to support a switch to solar thermal, renewable electricity, hydrogen and clean biomass to drive net zero goals.

Lucknow, 14 May 2025: Environment think tank iFOREST, in partnership with the Department for Promotion of Industry and Internal Trade (DPIIT), Ministry of Commerce and Industry, Government of India, and Department of Labour, Government of Uttar Pradesh, hosted the first ever '*National Conclave on Greening Industrial Boilers in India*' in Lucknow. At the conclave, a national report '*Greening Industrial Steam: Low-carbon and Clean Air Roadmap for Process Boiler*' and a state specific report '*Greening Industrial Process Boiler: Low carbon and clean air pathways for Uttar Pradesh*' was released. These reports were the output of a first-of-its-kind comprehensive study on process boilers in India.

Based on data shared by 16 States and Union Territories, these two reports unpack the current boiler landscape and associated energy and emissions profile, making a compelling case for a green transition.

In India, key industries such as food processing, chemicals and textiles run on steam generated by process boilers. The study reveals that India's process boilers produce 1.26 billion tonnes of steam each year, releasing 182 million tonnes of CO₂ emissions – more than a quarter of all

industrial GHG emissions. The particulate matter (PM) and SO₂ emissions from the process boilers are more than India's entire automobile sector, largely because of the lax emissions standards.

The study, however, found that many of the newer technologies, such as electric boilers, clean biomass boilers and hydrogen boilers, are slowly becoming cost competitive with the conventional gas, oil and coal-fired boilers.

The study also deep-dived into Uttar Pradesh's 2,798 boiler stock – the third largest in the country. It found that over 15% of the boilers are over 25 years old, and only 40% of their capacity is utilized. Most interestingly, the process boilers are moving to biomass, away from fossil fuels such as coal. Considering the potential of biomass-fired boilers, the report recommends promotion of cleaner biomass technologies and strengthening of regulatory and institutional frameworks to ensure a low-pollution future.

Speaking at the Conclave, the Guest of Honour Shri Anil Rajbhar, Hon'ble Minister of Labour & Employment, Government of Uttar Pradesh, said "Today under the leadership of our hon'ble CM Yogi Adityanath, Uttar Pradesh has emerged as the leader in industrial development. Since the past year, UP has been recording the highest number of factory registrations since the last year. The Govt. of India and of UP, are fully committed to balancing the requirement of national growth agenda and the requirement of environmental impact."

In his opening address, Shri Sandeepkumar Sadanand Kumbhar, Technical Advisor (Boiler) & Secretary, Central Boiler Board, DPIIT, said, "The Boilers Act, 2025, is a landmark reform initiative that has been enacted to usher in a new era of efficiency, safety and sustainability in India's boiler landscape. It presents the strategic lever to ensure safety of labour, protect environment and green the boilers."

The Chief Guest, Shri Manoj Kumar Singh, IAS, Chief Secretary, Govt. of Uttar Pradesh appreciated the report and said, "This report shows a roadmap to not only reduce pollution but also grow the economy in a cleaner fashion. With the right mix of targeted policies, technological shifts, and government–industry collaboration, Uttar Pradesh can drive emissions reductions while enhancing energy efficiency, safety, and industrial competitiveness. Given the potential of biomass in this context, we could create rural employment and increase farmers' incomes".

Dr. Chandra Bhushan, CEO, iFOREST, who presented the findings of the report said, “Coal-fired boilers played a key role in sparking the industrial revolution in the 18th century. The decarbonization of boilers is now essential to unleash a new industrial revolution powered by cleaner, greener technologies. It is not just a climate imperative—it is also an economic opportunity to build a green economy and provide green jobs. We must launch a Green Boiler Mission to grab this opportunity.”

The conclave also hosted round tables with government, academia, civil society and industry experts on reforming boiler governance, innovative technologies for clean and efficient steam and creating inter-departmental cooperation. There was robust participation from leading institutions such as IIT Kanpur and the steam-dependent tech industry representing companies such as Forbes Marshall, Cheema Boilers Ltd, Thermax Global, IBL Group and Thermodyne Engineering Systems.

Key report findings

- The first ever boiler inventory created in India estimates 45,226 process boilers with 8 States/UTs housing two-thirds of them.
- Most boilers in India are small – 85% of process boilers are up to 10 tonnes per hour (TPH).
- The average age of boilers in India is 18 years, posing safety and efficiency challenges.
- About 40% of the installed capacity is fossil fuel driven, and 90% presents air pollution challenges.
- In terms of industry sector, Food sector has the highest (41%) installed capacity followed by Chemicals and Petroleum refinery.
- Annual steam generation in India is estimated to be 1.26 billion tonnes.
- Energy consumption for process steam generation is estimated to account for 38% of total industrial energy consumption – comparable to India’s transport sector.
- CO₂ emissions from process steam in India are estimated to be 182 million tonnes with 56% CO₂ emissions by 5 states (Gujarat, Maharashtra, Tamil Nadu, Andhra Pradesh and Uttar Pradesh) and 54% of the total CO₂ emission by three industry sectors (chemicals, food (non-sugar), and paper).

- Air pollution analysis reveals that process steam is responsible for 9% of PM, 8% of SO₂, and 17% of NO_x emissions from industry. Gujarat, Maharashtra, Tamil Nadu and Uttar Pradesh are the top polluters.
- Based on '*Viksit Bharat*' growth scenario, the annual steam generation could grow four times by 2047. This will result in corresponding growth in CO₂ emissions and air pollution assuming the same fuel mix.
- Techno-economic feasibility analysis shows that gas-fired boilers are the most expensive and some of the gas-fired boilers can be shifted to electricity or green hydrogen even today.
- Between 2030 to 2050, low-carbon fuel options become more attractive with renewable electricity and green hydrogen emerging as most feasible for new installations.

About iFOREST

The International Forum for Environment, Sustainability and Technology (iFOREST) is an independent non-profit research and innovation organization working on pressing environment-development challenges in India.

We conduct independent evidence-based research, develop new knowledge and innovative solutions, convene stakeholders to increase awareness and build consensus to scale up green solutions.

Visit: <https://iforest.global/> for more information.

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