

Uttar Pradesh leads the nation in compressed biogas potential, but challenges persist: say experts at CSE-UPNEDA joint symposium

- New Delhi-based think tank Centre for Science and Environment (CSE) and the Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA) jointly organise a symposium in Muzaffarnagar to discuss the challenges facing the compressed biogas (CBG) industry in the state, and the way ahead
- Uttar Pradesh accounts for 24 per cent of the total compressed biogas (CBG) generation potential in India. According to CSE's latest report, UP alone can install 1,000 CBG projects out of the 5,000 plants envisioned nationwide under the Sustainable Alternative Towards Affordable Transportation (SATAT) scheme, if a mere 20 per cent of its surplus feedstock is tapped
- Western UP (especially Muzaffarnagar, Meerut, Saharanpur, Bijnor, Bulandshahar and Aligarh) leads in feedstock availability as well as maximum number of functional and upcoming CBG plants in the state
- Despite leading the way in bioenergy sector in India, UP faces several challenges -- from limited offtake of the bioslurry generated during production of CBG, to lack of trained personnel

See CSE's report on CBG in Uttar Pradesh [click here](#)

For the symposium proceedings, please [click here](#)

Muzaffarnagar (Uttar Pradesh), June 22, 2024: "Compressed biogas (CBG) offers a multitude of benefits for India: it can help enhance waste management, promote local clean energy solutions, and bring down our dependence on imported compressed natural gas (CNG). And Uttar Pradesh -- especially its western districts of Muzaffarnagar, Meerut, Saharanpur, Bijnor, Bulandshahar and Aligarh -- leads the nation in the potential to generate compressed biogas: it accounts for a sizable 24 per cent of the country's total potential": said researchers from New Delhi-based think tank Centre for Science and Environment (CSE) here today.

They were speaking at a one-day symposium on CBG in western Uttar Pradesh; the symposium was jointly organised by CSE and the Uttar Pradesh New and Renewable Energy Development Agency (UPNEDA).

Compressed biogas is made from various feedstocks, including municipal solid waste, agricultural waste, press-mud, and animal wastes. It is a purified version of biogas, and is also referred to as bio-CNG. Over 90 per cent of CBG, which is produced from anaerobic digestion from organic waste or biomass, constitutes of methane.

Speaking at the symposium, Nivit Kumar Yadav, programme director, industrial pollution, CSE said: "Among Indian states, Uttar Pradesh has taken the lead in this sector with its ambitious bioenergy policy, allocating Rs 750 crore (2022-27) for CBG, while providing subsidies, land for lease and other incentives. This symposium has been organised to discuss the challenges faced by CBG producers, share successful practices, highlight opportunities for start-ups, raise awareness among district-level bioenergy committees, and educate farmer-producer bodies on the potential of bioenergy."

Echoing Yadav's comments on the state government's strides in the sector, **Pankaj Singh, secretary/CPO, UPNEDA**, said: "Uttar Pradesh has the most advanced bioenergy policy in India and leads in the number of upcoming CBG projects. Of the 128 CBG projects, 15 are operational, while the remaining 113 are in various stages of construction."

What are the challenges faced by the sector

- **Limited offtake of by-products/bioslurry/fermented organic manure (FOM):** CBG plants generate bioslurry, which can be used as a fertiliser. However, there are no takers for the bioslurry produced by CBG plants. Says Dr Rahul Jain, deputy programme manager, renewable energy, CSE and the author of CSE's report on CBG: "Instead of being considered a potential revenue source, bioslurry is perceived as a disposal challenge. Plant owners are either providing it for free to nearby farmers or disposing of it on vacant lands. There is a lack of awareness about the characteristics of bioslurry, appropriate application methods and potential benefits."
- **Partial gas offtake by oil and gas marketing companies:** These companies acquire gas from CBG plants on a 'best-endeavour' basis, depending on market demand. This exposes plant owners to the risk of being unable to sell their entire gas production. Some plants are operating below their capacity because they cannot fully offload their gas. The absence of CNG gas pipelines near plant locations is another challenge faced by these facilities. It has been noted that gas transport through cascades is a viable option for plants with capacities below 5 tonne per day (TPD); for anything above this threshold, the most effective offtake model is through gas pipelines.
- **Shortage of skilled technical manpower:** Operational challenges frequently confront functioning plants, resulting in issues like gas leakage, inefficiency and operating below optimal capacity. This arises from a lack of skilled personnel who have adequate understanding of biogas production systems and plant operations.
- **Financing issues:** Banks rarely show any interest in financing CBG projects -- their concerns revolve around risks, low margins and the non-standardised nature of the industry. Banks commonly require high collateral as a standard practice, and interest rates start at a minimum of 11.5 per cent. Moreover, lending institutions lack the capacity to evaluate CBG proposals, which hampers the decision-making process.

Jain points out: "Due to the lack of proper planning on both the upstream and downstream sides, most CBG plants are running below their actual designed capacity. On the upstream side, the plants are not able to source enough quantity of feedstock to run the plant. It is advisable to plan for the availability of surplus feedstock over and above the amount required in the plant annually. This requires plant operators to work with the suppliers (farmers, sugarcane mill owners and city municipalities) to get the feedstock. On the downstream side, the sale of gas is a big challenge due to the low CNG infrastructure presence near the CBG plant. It is critical to set up the plant either near CNG gas grids or where there is a high CNG demand for industrial or transport applications."

What CSE recommends

- **Involve the farmers as shareholders:** Encourage farmer-producer organisations through awareness campaigns to assume the role of feedstock aggregators, replacing third-party private entities. This ensures their active participation as project partners, fostering overall profit sharing in bioenergy projects.
- **Ensure complete gas offtake by gas marketing companies:** To achieve this, a strategic plan should be formulated to expand gas pipeline infrastructure near CBG plant locations. To stimulate demand in rural regions, introduce incentives for conversion of tractors and two-wheelers to run on CNG, or advocate the adoption of CNG-powered agricultural machinery.
- **Incentivise/sensitise farmers to use bioslurry/FOM:** Farmers should be made aware about the potential benefits of using carbon-rich FOM. The possibility of institutionalising incentive programmes for farmers for utilisation of FOM can be explored. To amplify awareness among farmers about the positive effects of FOM, Krishi Vigyan Kendras (KVKs) can play a pivotal role in education and outreach efforts.
- **Address the challenges in bank loan procurement:** Says Yadav: "A practical approach here would be to initiate a government-backed guarantee programme to mitigate collateral requirements, thereby encouraging financial institutions to extend loans more readily." To enhance transparency and efficiency in the loan application process, the Reserve Bank of India (RBI) should oversee and monitor CBG project applications through a centralised online portal, implementing fixed deadlines for streamlined progress tracking.
- **Establish CBG training centres:** There is a need to train people to operate the CBG projects. The training centres shall be set up with short-term CBG courses to prepare skilled personnel.
- **Broaden the feedstock variety:** Jain says that "while 80 per cent of CBG plants currently rely on pressmud, there is a need to diversify the sources." In addition to solid organic waste, efforts should be directed towards utilising liquid effluents such as spent wash from distilleries, industrial discharges from paper and pulp manufacturing, and other liquid industrial waste.

Appreciating CSE's inputs, Pankaj Singh, UPNEDA said: "All identified challenges and policy recommendations are noted and will be addressed through effective policy modifications and additions by our department."

For more on CSE's work on CBG and other renewable energy solutions, please contact Sukanya Nair of The CSE Media Resource Centre, 8816818864, sukanya.nair@cseindia.org