SAMAY
Engineers & Contractors

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India's BioCNG Expansion Needs More Feedstock Intelligence and Less Technology Rush

India's BioCNG sector is entering a decisive growth phase. Across the country, entrepreneurs, infrastructure developers, dairy ecosystems, agro-industrial groups and corporate investors are increasingly evaluating Compressed Biogas (CBG) projects as part of the broader transition toward cleaner fuels and circular economy models. New plants are being planned around paddy straw in northern states, press mud in sugar-producing regions, cattle manure in dairy-linked ecosystems and cultivated biomass such as Napier and maize. At the same time, multi-feedstock projects using market waste, poultry litter and mixed agricultural residues are gaining attention.

This momentum is encouraging because India possesses one of the world's largest biomass resources. Agricultural residues that were historically underutilised are now being viewed as energy assets capable of supporting rural economies, reducing waste and contributing to cleaner fuel ecosystems. Government emphasis on PNG expansion, cleaner gaseous fuels and CBG adoption is further strengthening investor confidence in the sector.

However, a recurring issue is beginning to emerge across several projects. Considerable effort is often spent on selecting technology partners, digesters, upgrading systems and equipment configurations, while comparatively less time is spent understanding the local feedstock ecosystem. In practice, this can become a major risk because a BioCNG plant is not merely an engineering project; it is fundamentally a feedstock management business supported by engineering.

Many projects begin with confidence around a single feedstock source. Napier cultivation, for example, has become popular because of its biomass yield potential and suitability for silage preparation. Yet field experience often reveals challenges that are not fully reflected during early project planning. Seasonal variations, monsoon disruptions and lower winter productivity can influence actual availability. Similar situations occur when projects rely heavily on a single waste stream such as press mud, cattle manure or market waste without adequate backup planning.

The stronger approach is to build feedstock diversity. Every region has its own biomass profile and developers who invest time in mapping local organic resources usually create more resilient projects. In some districts, vegetable market waste may become significant. Sugar belts may provide cane trash and press mud. Tapioca clusters can generate large organic streams, while certain regions produce considerable volumes of cashew apple residue. Maize stalk, wheat residue, poultry litter and cattle manure may together create a more stable supply framework than dependence on one source alone.

Another factor that deserves far more attention is seasonality. Availability is not merely a question of quantity; it is equally a question of timing. Biomass available for only a few months can still support year-round operations if preservation systems are designed properly. Unfortunately, silage and storage planning are frequently postponed during initial project development. This can later affect continuity of feeding and ultimately gas production. Feed continuity determines methane continuity, and methane continuity directly influences project economics.

International experience offers useful lessons. Several mature biogas markets developed their ecosystems by focusing first on biomass aggregation, contract farming, storage infrastructure and feedstock mapping before finalising technology choices. Technology followed feedstock security rather than leading it. India is gradually moving toward a similar stage, and projects that invest early in feedstock intelligence may create a meaningful advantage.

At Samay Project Services Limited, this principle forms the starting point for project development. The process begins with land identification, feedstock assessment, quantity estimation, quality evaluation and seasonality studies. Only after understanding these variables does technology selection move forward. Depending on biomass characteristics, engineering decisions may vary significantly, influencing feeding systems, digester configuration, silage infrastructure, upgrading systems and balance-of-plant requirements.

Samay is presently progressing development activities for two BioCNG projects of approximately 10 TPD each in Andhra Pradesh, while additional locations are under evaluation. The company welcomes discussions with entrepreneurs, strategic investors, ESG funds, multinational green investors and corporate groups evaluating opportunities in the BioCNG ecosystem.

India’s BioCNG story is still in its early stages. The biomass exists, technology is available and capital is beginning to move into the sector. The projects that succeed over the next decade may not necessarily be those with the largest capacities, but those that understand their feedstock ecosystem the best.

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