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From 1973 to 2025: Sri Lanka's Biogas Journey and the Road Ahead

Sri Lanka's biogas sector has come a long way since the first unit was successfully operated in 1973 at the University of Peradeniya. What began as a small university-based experiment in renewable energy has matured into a multi-dimensional sector linked to renewable energy, waste management, organic agriculture, climate action, and local enterprise development. Yet the journey has not been linear. It has been shaped by innovation, institutional effort, policy gaps, technical failures, rehabilitation, and renewed confidence, making biogas one of the clearest examples of how a local technology can evolve into a development platform.

The earliest phase of biogas development was driven by academic research and engineering curiosity. Late Prof. Milton Amaratunga's pioneering work at the University of Peradeniya established the scientific and technical foundations for biogas in Sri Lanka, including research on gas yield from different feedstocks, final year engineering course content and calorific value determination, and experiments on structural behavior and durability.

During the mid-1970s, the focus expanded from laboratory research to integrated rural applications. Biogas systems were designed not just as digesters, but as components of farm systems that could include animal houses, fish ponds, duck ponds, and algae ponds. This integrated model was implemented at the In-service Training Centre in Gannoruwa, Peradeniya with technical support from the University of Peradeniya, demonstrating the practical value of linking energy with agriculture, demonstrating that biogas was more than a fuel technology, but a circular system that turned waste into useful energy and fertilizer.

The late 1970s and early 1980s saw the first institutional spread of biogas across Sri Lanka. Government bodies such as the Industrial Development Board, Department of Agriculture, Ceylon Electricity Board, National Engineering Research and Development Centre, and Ceylon Institute of Scientific and Industrial Research were all active in testing, constructing, or documenting systems. The early biogas landscape included pilot installations at schools and government offices, together with notable demonstration sites such as Gannoruwa and Pattiyapola. These early efforts confirmed that the technology was possible, but they also revealed the importance of design quality, feedstock availability, and daily user discipline.

By the early 1980s, the country had already seen over 143 biogas systems. A first major dissemination project introduced biogas as a cheap source of energy for lighting and cooking, while also helping to protect forest cover, reduce fuelwood collection, and lessen dependence on chemical fertilizers. This was a strong development message for the time because it linked household energy security with environmental protection and rural labour savings, especially for women. Even so, the sector remained fragile, and many systems struggled because support services were limited and the technology was often treated as a one-time installation rather than a maintained service.

An electricity grid connected Biogas System commissioned in 2012

The 1980s also exposed the limits of early growth. Some projects performed well, especially where there was technical supervision and clear user need, but others were abandoned or underused because of poor maintenance and weak follow-up. Several systems installed under rural development initiatives became non-functional, which highlighted a central lesson for the future: biogas is not a "fit-and-forget" technology. It requires training, repair networks, customer support, and a supply chain for appliances and spare parts if it is to remain productive.

The 1990s marked a decisive period of learning and recovery. A nationwide survey in the mid-1990s found that only about 30 percent of sampled systems were functional, forcing the sector to confront its weaknesses honestly. Rather than ending promotion, this evidence led to a rehabilitation drive and a more professional approach to dissemination. Practical Action (then Intermediate Technology Development Group - ITDG) expanded field work, and the sector began to focus on improving quality, training technicians, and restoring public confidence. The 1990s were therefore not a period of collapse, but a period in which biogas learned how to survive beyond pilot enthusiasm.

A major shift in this period was the growing involvement of the Department of Animal Production and Health. Its veterinary surgeons and livestock development instructors had strong field-level reach across all provinces, which made them ideal partners for dissemination among dairy and livestock farmers. They helped biogas move deeper into the rural

economy, where dung supply was reliable and the technology could be linked to farm productivity. Practical Action also played a large role in training masons and extension officers, creating a workforce that could construct, promote, and service systems across the country.

By the turn of the century, biogas had broadened in purpose. The sector's motivations evolved from energy in the 1970s, to integrated farming in the 1980s, to agriculture in the 1990s, and then to waste and smell management in the 2000s and early 2010s. This evolution is important because it shows that biogas became more relevant as Sri Lanka's development challenges changed. Household cooking remained central, but biogas increasingly gained value as a solution for waste disposal, environmental compliance, and fertilizer recovery.

The early 2000s brought greater organization and standardization. In 2003, a Technical Advisory Committee was created to strengthen coordination among experts, and this led to the development of the national code of practice for domestic biogas systems in 2006. The code, later finalized through consultation with the Sri Lanka Standards Institution, gave the sector a shared quality framework. At the same time, the Biogas Developers Collective emerged to strengthen professional practice, and the Lanka Biogas Association was formed in 2009 to provide sector representation and policy voice. These developments marked the transition from project-based promotion to sector building.

The 2000s and 2010s also saw technical diversification. Fixed-dome systems became the most common domestic model, while compact, and plug-flow systems expanded options for food waste, small industry, and institutional use, while the popularity of Dry-batch and floating drum systems had dropped. Some systems were linked to wastewater treatment, hospital waste, restaurants, and agro-processing. This mattered because biogas began to move beyond the household into the broader economy, especially where organic waste streams were concentrated and where the environmental cost of disposal was visible.

By the mid-2010s, the number of installed systems had risen to more than 7,800, and the market potential had been estimated at far higher levels, especially in the household, restaurant, and hotel sectors. The sector had clearly matured, but it still faced recurring barriers: weak appliance supply, inconsistent maintenance, limited finance, and a lack of data on composition of biogas, slurry quality and agronomic performance. The biggest untapped opportunity was to treat biogas not just as an energy source but as part of a wider system that includes waste treatment, climate mitigation, organic farming, and local enterprise.

The biogas sector enters 2026 with a stronger institutional memory than in any previous decade, and that is a major advantage. The late Prof. Amaratunga has shown that the sector's success has always depended on research, engineering discipline, and practical relevance. Sri Lanka now has the chance to build on that legacy by connecting biogas with biomethane, circular economy goals, and climate policy in a more systematic way.

The future should therefore rest on four priorities. First, research must deepen around biomethane upgrading, slurry standards, feedstock behavior, durability, and emissions reduction. Second, policy should explicitly support waste-based biogas in municipalities, restaurants, livestock systems, and industries, with standards, incentives, and licensing that reward good performance. Third, market development must be strengthened through trained technicians, spare-part supply, after-sales support, and finance packages that suit different users. Fourth, organic agriculture should be brought more fully into the biogas agenda through scientific validation and practical extension on slurry use as biofertilizer.

Biogas in Sri Lanka has never been a single-issue technology. It has always sat at the intersection of energy, waste, agriculture, climate, and livelihoods. That is precisely why it matters now more than ever. If the next phase is guided by strong research, smart policy, and serious technology transfer and adoption, biogas can do more than supply fuel: it can help build cleaner towns, healthier soils, lower emissions, and stronger economies. In that sense, the sector's story is not merely about where it has come from, but about how confidently it can now shape the country's low-carbon future.

The World Biogas Association INDIA Congress 2025 on 3-4 December in New Delhi will spotlight India's rise as a biogas superpower, bringing together national and international expertise. Hosted by the World Biogas Association (WBA), the Congress will feature two programmes - Policy and Leadership and Technical Track, providing insights, collaborations and solutions driving the next phase of biogas growth.

Attend the Congress, to gain direct insights from global leaders, engage with key government officials from MNRE, MoPNG, MoHUA, and MoAFW, and connect with international peers, researchers, entrepreneurs and technology partners.

Early Bird tickets are available until Wednesday 12 November. Register now to get your ticket at a discounted price.

WBA is delighted to offer LBA members a 15% discount on tickets using this code: WBGA15