

THAILAND, BANGKOK



POPULATION
11 million
(2023)

Kamphaeng Saen East & West Landfill Gas Extraction Project

The Bangkok Kamphaeng Saen Landfills, situated in Nakhon Pathom province, are key waste management sites for Thailand's capital. Comprised of two major sites, Kamphaeng Saen East and Kamphaeng Saen West, these landfills were developed to handle the increasing waste from Bangkok, with a daily intake of 5,000 to 7,000 tonnes as of 2005.

In response to Thailand's growing electricity demand, the early 2000s saw a series of national-level reforms aimed at expanding renewable energy. The government introduced various incentives, including capital grants for renewable energy equipment and tax exemptions on imports for renewable energy production. With a large proportion of organic waste, landfills such as Kamphaeng Saen offered significant potential for methane production and recovery.

The landfill sites, managed by two private Thai companies under contracts with the Bangkok Metropolitan Administration, explored opportunities to monetize the landfill gas. With support from a UK-based investor experienced in landfill gas extraction, Sindicatum Carbon Capital, a comprehensive project was launched. This project involved the installation of gas collection and power generation infrastructure, upgrades to the leachate capture system, and grid connections to supply electricity to the local grid. The \$16.4 million investment enabled the captured methane to generate sustainable electricity, simultaneously improving waste management and reducing greenhouse gas emissions. In 2009, the investor also secured gas rights from the landfill owners.

The Kamphaeng Saen East and West landfill gas extraction projects have played a crucial role in both reducing greenhouse gas emissions and generating clean energy since 2011, with an expected operational lifespan of 21 years. This waste-to-energy approach aligns with Thailand's broader goals to diversify its energy mix and reduce reliance on fossil fuels. By leveraging the energy potential of the organic waste stored in these landfills, the Kamphaeng Saen projects contribute to cleaner energy production while addressing the challenges of managing the city's growing waste volume.

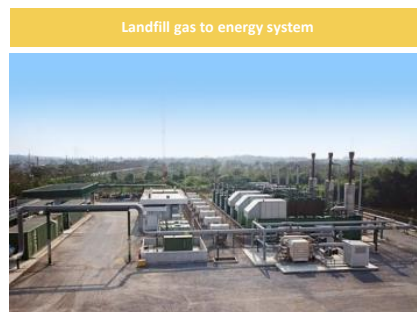


Source: Climate Impact Partners



IMPACTS TO ACHIEVE SDG 11.6.1

- Two 8.0 MW power generation and abatement schemes.
- Approximately 50 – 60% of the landfill gas is methane.
- Total emission reductions achieved in the monitoring period (01/11/2011 – 31/03/2012) – 132,230 tonnes CO₂e
- Expected reduction of carbon dioxide emissions by over 1.9m and 1.7m tonnes of CO₂e for the West and East project respectively over the first crediting period (2011-2015).
- Environmental benefits include improved air quality, reduced impact upon climate change, reduction in the impact of the landfill to its surroundings.
- Social impacts include improved quality of life in the neighboring communities, increased safety of the landfill due to reduction of combustion danger, sanitary waste disposal, creation of 30 direct green jobs on site.
- The two projects were registered with the UNFCCC in January 2011, and combined are expected to generate 5.2 million Certified emission reductions over their lifetimes.



Landfill gas to energy system

Source: sustainabledevelopment.un.org

INSTITUTIONAL SUSTAINABILITY



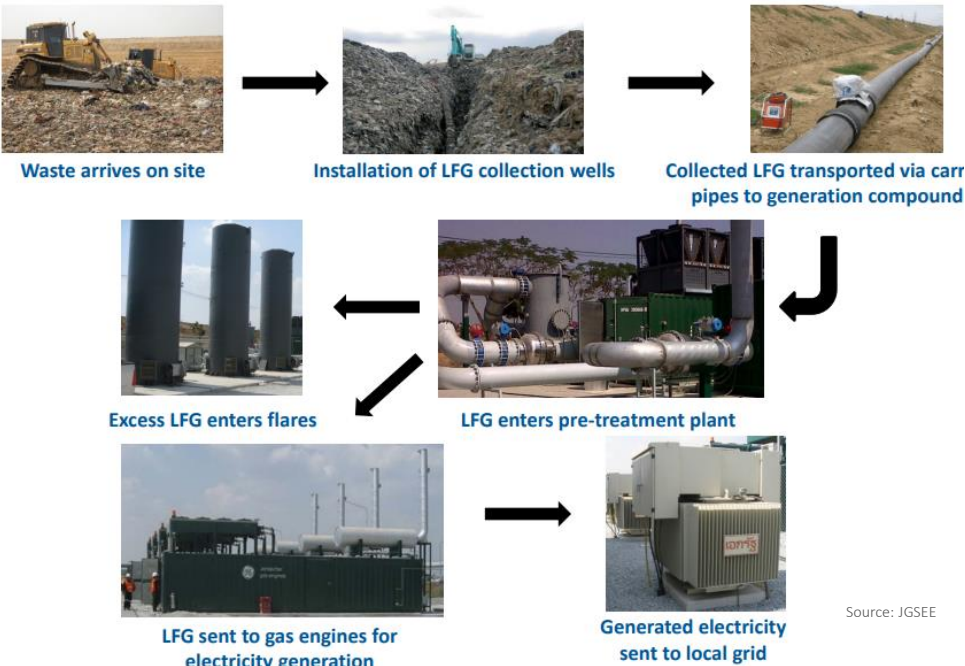
The institutional sustainability of the Kamphaeng Saen East and West landfill gas extraction projects was supported by strong governance frameworks and collaborations between public and private stakeholders. The projects were operated by Sindicatum, working closely with local subsidiary companies, Bangkok Green Power and PS Natural Energy, to manage the technical and operational aspects of the landfill gas systems. These partnerships were critical in shielding assets and ensuring operational accountability. Furthermore, the projects aligned with Thailand's broader environmental and energy policies, benefiting from national incentives like the "adder" fee for renewable energy producers. By adhering to international standards through the Clean Development Mechanism (CDM), the projects ensured long-term institutional support. This integration of local governance, private expertise, and international frameworks created a stable institutional environment that could support the ongoing management and expansion of the landfill gas extraction projects.

PLANNING & MONITORING



Comprehensive planning involved not only installing gas collection and generation infrastructure but also technical upgrades like leachate capture systems and building grid connections, which required constructing cables up to 15 km long. Regular monitoring of environmental, health, and safety standards was enforced, with third-party auditors reviewing the projects' compliance with guidelines. These audits ensured that the landfill sites were well-managed and that methane emissions were effectively reduced. Additionally, the project underwent verification through the Clean Development Mechanism (CDM) to ensure accurate tracking of carbon reductions. Continuous monitoring and third-party oversight were essential in maintaining operational standards and aligning the project with global environmental benchmarks.

APPROPRIATE TECHNOLOGY



Source: JGSEE



FINANCIAL SUSTAINABILITY

The financial sustainability of the Kamphaeng Saen East and West landfill gas extraction projects in Thailand was supported by multiple revenue streams. The project benefited from the country's "adder" fee, providing a bonus of about 8 cents (USD) per kWh above the regular electricity rate, guaranteed for seven years. This ensured financial viability for electricity produced from landfill gas. Additional revenue came from selling electricity to the grid and carbon emission reduction credits on international markets. Sindicatum, the project operator, used carbon finance strategies, including the Clean Development Mechanism (CDM), pre-selling carbon credits to cover initial costs, and sought Gold Standard certification to enable quicker revenue generation from voluntary carbon markets while awaiting UNFCCC verification.



STAKEHOLDER INVOLVEMENT

Stakeholder involvement in the project was a critical component of its success. The projects brought together a range of stakeholders, including the Bangkok Metropolitan Administration (BMA), private companies, international investors, and local communities. BMA facilitated the partnership with private operators, Sindicatum, and its subsidiary companies, which managed the daily operations of the landfill gas extraction and energy generation processes. International investors played a key role in providing financial backing, enabling the projects to secure the necessary infrastructure and technical upgrades. Local communities also benefited through job creation and improved environmental conditions, as the project reduced methane emissions and enhanced air quality. In addition, local governments were engaged in the planning and monitoring of the project, ensuring that it aligned with Thailand's renewable energy goals. This multi-stakeholder approach not only ensured the technical and financial viability of the projects but also promoted long-term community buy-in and environmental sustainability.



SOURCES

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