

A 350 kg/day biogas plant: what it costs and how fast it pays back



A joint initiative of Lush Farms (the site) and LushBert (Lush Bert Ltd is the investor), at Lush Farms, Mau Mau Road, Lari, Kiambu County, Kenya.

USD 55,000

Total project investment
(modelled, all-in)

≈ 2.7 years

Simple payback, before
financing costs

350 kg/day

Organic feedstock

≈ 110 m³/day

Biogas (design value)

STATUS

Bank financing is underway (in the pipeline).

TIMELINE

Commissioning and operation of the plant will start at the beginning of 2027.

What Project Mavuno is

Project Mavuno is a commercially operated circular-agriculture demonstration facility: a modular biogas plant that converts agricultural and organic waste into renewable energy. The objective is a working commercial reference facility, not simply an equipment installation. It will show that the business model works, not only that the digester does.

The facility demonstrates

- Reliable biogas production
- Substitution of conventional energy (LPG, electricity)
- Commercial sale of surplus biogas
- Use of the digestate as fertiliser
- Monitoring, maintenance and technical training
- The financing model for future installations

Waste → biogas → value

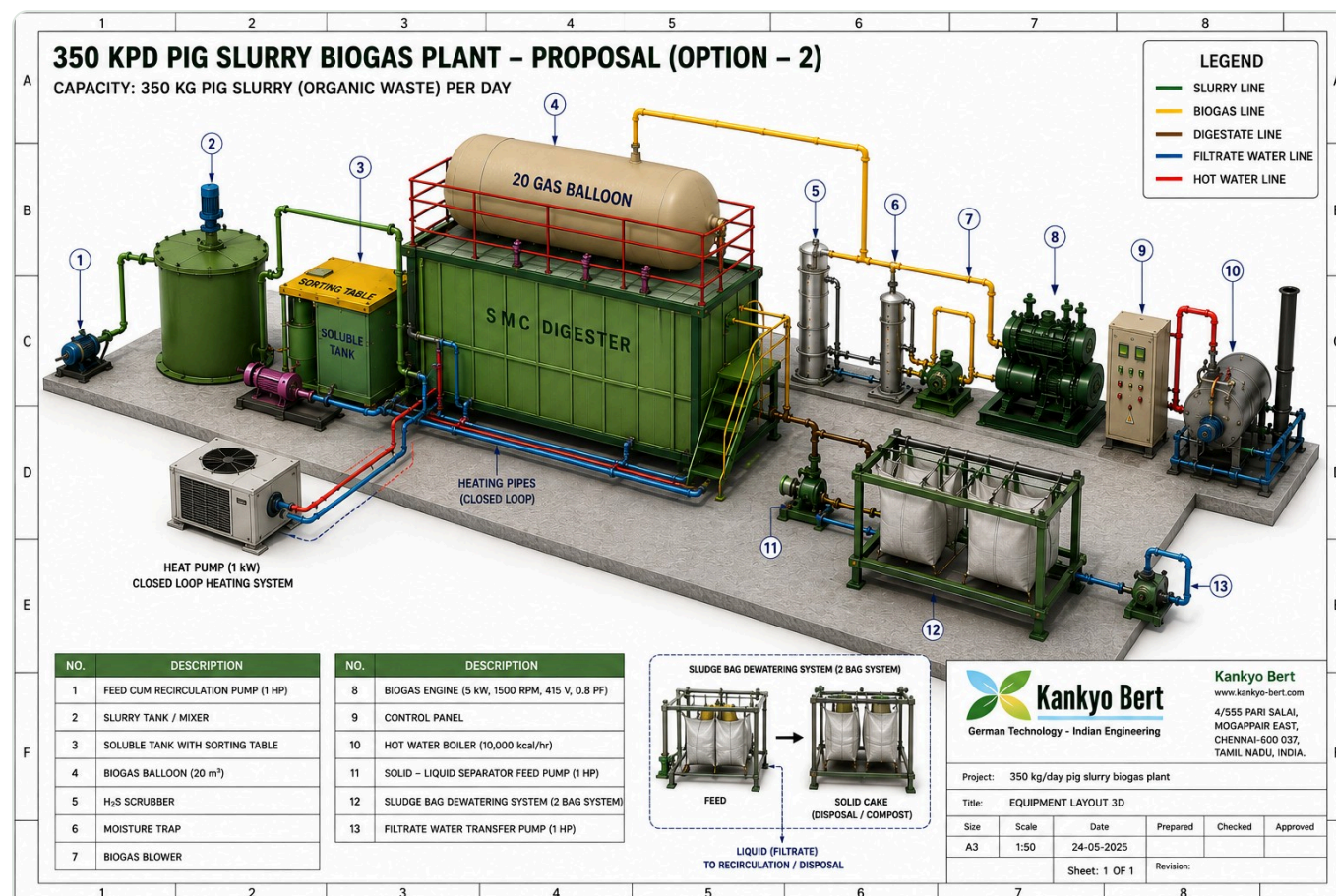
Waste from Lush Farms' pig, poultry and food operations becomes clean Cooking Gas (Heating and Hot Water), electricity savings and nutrient-rich digestate. A cost that farms carry today (waste disposal and purchased energy) turns into three connected value streams: renewable energy, biogas sales and recovered nutrients.

Why this page shows real numbers

We publish the investment and the payback so that farmers, schools, cooperatives and financing partners can see what a plant of this size costs, what is installed for that money, and how quickly it earns it back. All figures are a modelled base case, explained on page 4.

The plant in one picture

Equipment layout of the 350 kg/day plant, from the slurry feed to the biogas engine and the digestate dewatering.



Equipment layout, 350 kg/day pig-slurry biogas plant (proposal option 2, supplier: Kankyo Bert). Numbers 1–13 match the equipment list in the drawing.

How it works

- **Feed:** pig manure and food waste are mixed into a slurry and pumped in (1–3).
- **Digester:** a modular SMC panel digester with a heated closed loop makes the biogas; a 20 m³ gas balloon stores it (4).
- **Clean-up:** H₂S scrubber, moisture trap and blower prepare the gas (5–7).
- **Use:** a 5 kW biogas engine makes electricity, a boiler makes hot water (8, 10); a control panel runs it (9).
- **Digestate:** a two-bag dewatering system separates solid cake and liquid (11–13).

Technology and site

- Bert Panel Fermenter (Mira X series): modular, lighter and faster to build than the earlier PON generation.
- Feedstock: about 325 kg pig manure and 25 kg food waste per day.
- Footprint: about 10 m × 6 m.
- Digital monitoring of feedstock, gas production, energy use, alarms and maintenance.
- German engineering, Kenyan build: commissioned with Lush Bert Ltd's local team.

What the plant is designed to deliver



Design values from the supplier's technical proposal. They are engineering values, not guaranteed commercial output.

Feedstock	350 kg/day
Biogas	≈ 110 m ³ /day
LPG equivalent	≈ 49.5 kg/day
Power potential (theoretical)	≈ 192.5 kWh/day
Plant's own consumption	15–27 kWh/day
Digestate / manure output	≈ 145 kg/day
Approximate footprint	10 m × 6 m

Every unit of biogas has an assigned use

The base case assumes that the whole biogas output is put to economic use: half is sold, half is used on the farm.

50% external sale

About 24.75 kg/day of LPG-equivalent energy is sold. Price assumption: 80% of the LPG-equivalent value (LPG about KES 240/kg, so biogas about KES 192/kg).

50% used on the farm

70% thermal (boiler, kitchen, water heating) and 30% electricity generation. This is counted as avoided energy cost, not as sales revenue.

Not counted in the base case (upside)

The base case deliberately counts energy only. Digestate as biofertiliser, bio-pesticides, Black Soldier Fly production, biochar, training and demonstration income, and carbon credits are treated strictly as upside.

Five phases to commercial operation

1 · Financing	supplier quotation, landed cost, lender approval
2 · Procurement	supplier order, manufacture, shipping and insurance
3 · Site preparation	foundation, feedstock handling, water, electrical connection
4 · Installation and commissioning	installation, supervision, operator training
5 · Commercial operation	routine operation, data on feedstock, gas, energy, maintenance

What it costs and how fast it pays back



Modelled base case: energy only, simple payback before financing costs.

Investment

Total project investment (all-in)	USD 55,000
In Kenyan shillings (at KES 129.3/USD)	≈ KES 7.11 M

Annual value and costs

Biogas sales	KES 1.73 M
Thermal energy savings	KES 1.52 M
Electricity savings	KES 0.30 M
Annual energy value	KES 3.55 M
Operating costs (KES 78,000/month)	– KES 0.94 M
Net operating cash flow / year	≈ KES 2.61 M

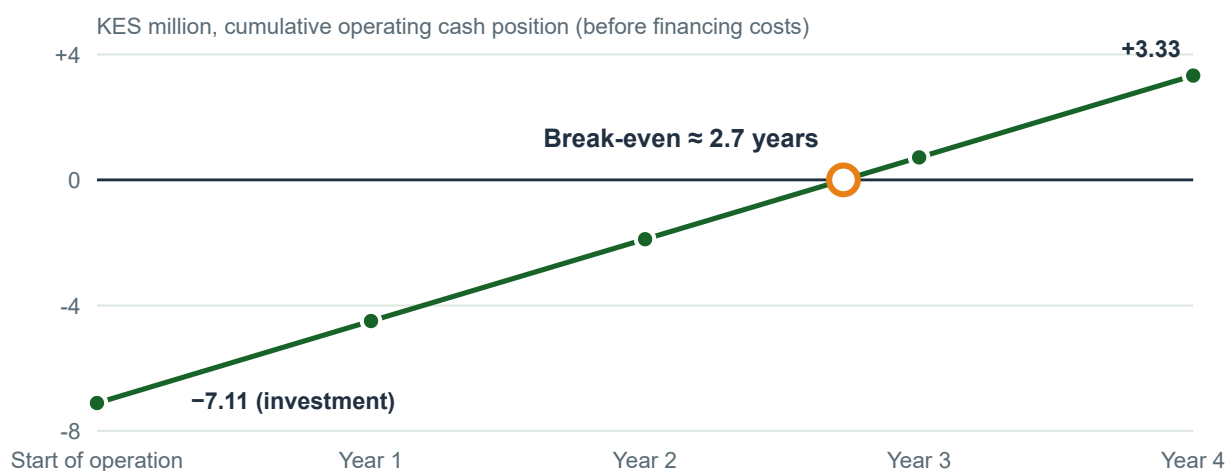
≈ 2.7 years

Simple payback: KES 7.11 M investment ÷ KES 2.61 M net cash flow per year. Under three years.

How to read these figures

- USD 55,000 is the all-in landed project cost of the first model, pending final supplier and logistics documentation.
- Payback is simple and undiscounted, before financing costs, and counts energy value only.
- Operating costs assume shared operator and technical-support resources, to be confirmed. Design values and prices are assumptions, not guarantees.

When the investment is earned back



Financing partners and project developers

The full financing package (detailed model, assumptions and supporting documents) is available on request:
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