



African Biodigester Component in Kenya

Biodigester enterprise
inventory – 2023

SEE – Clean Cooking
African Biodigester Component

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This publication presents an updated inventory of the biodigesters enterprises active in Kenya in 2023. This report was developed by Mark Rotich, Energy advisor for the African Biodigester Component in Kenya under the overall supervision of Florent Eveillé, African Biodigester Component manager in Kenya.

Among the colleagues who provided valuable inputs, the authors would like to thank Evelyne Munihi and Caroline Makonnen for their careful reading, editing and suggestions. The results from this inventory are used to better understand the biodigester market dynamics in Kenya and improving the services offered to the biodigester companies.

The data and information presented was collected from over 50 biogas companies and individuals operating in Kenya, who received the inventory questionnaire via email and responded to ABC. Additionally, follow up was conducted through phone calls to companies who could not respond to email, or the data provided was incomplete. The data received was documented, analysed and presented in this study represented the biodigester sector status for the year 2023. The author would like to warmly thank the following participating companies: Afrisol Energy Ltd, Homebiogas Kenya Ltd, Green Yard Ltd, Green Drive, Gimosong Ltd, Center for Innovative Development Solutions – CIDES Ltd, Byestar International Ltd, Mount Kenya Renewable Energy Ltd, Pluro Industries, AKUT East Africa Ltd, Igwemas General Biodigester Ltd, Renewable Energy Engineering Contractors, Scode Ltd, Fagadan Enterprises, Rural & Urban Alternative, Jamtu Contractors Ltd, Perso Biogas & CO. Ltd, Sistema.bio, Kensam Constructors, Rural Green Energy Services, Mazao construction, Ozone renewable energy and construction, ECOSAN Renewable Energy Solutions Ltd, Woodroffe enterprises Ltd, Intermuck Comm. Enterprises, Abiud Limited, Nyongi Construction & Energy Services, SAKAKI Natural Renewable Energy, Likunga Company Ltd, Marirmoi Investment, Kentainers Ltd, Kenya Sunrise Ecoenergy, Biogas International Ltd, Felikam Biogas Services, Takamoto, Andcol Ltd, Biotechno & Serviced, Keloit Kenya Ltd, Fraha Biotech, Sian Biogas, MURUME inc., Green soil Entreprises, John Murira, Charles Ngure, HomeBiogas Ventures Ltd, Chogo Biogas, Robert Ngetich, Joseph Kimani, Fexmy, MeltGreen Ltd, Ascom Networks Ltd, JKUAT Industrial Park, , PPAT and Bio Franca.

Funded by the Dutch Ministry of Foreign Affairs (DGIS), the Danish International Development Agency (DANIDA) and the European Union (EU), the African Biogas Component (ABC) in Kenya aims at facilitating a shift of the biodigester market from its pioneering to the expansion phase where 20,017 small and 250 medium-sized biodigesters will be constructed/installed. This will be achieved by means of a well-balanced mix of demand-side, supply side, financing and enabling environment interventions, geared at boosting demand and supporting small scale and medium scale biodigester companies in acquiring more clients. The component is implemented by a consortium between GIZ and SNV (the Netherlands Development Organisation) in cooperation with the Africa Bioenergy Partnership Limited (ABPL - ex-Kenya Biogas Programme).

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Executive summary

There are currently about 90 companies active in the biodigester industry in Kenya, 52 of these enterprises participated in this survey against 39 (+13) in 2022. The analysis of their answers shows the following findings:

- While most of the Biodigester companies in Kenya are officially registered, they are rather small and have a limited outreach. Only the ones selling and installing prefabricated systems are larger and have genuine marketing strategies. Most of the others, mostly in the fixed dome market segment, expressed their interest to expand their businesses beyond the current status and the need for appropriate marketing tools and strategy to achieve it.
- The total number of staff per enterprise is rather low: 13 (+8) do not have any staff (except the owner), 27 (+10) employ up to 5 permanent staff including the owner, 6 companies (+4) employ between 6 and 10 staff, 11 enterprises (+5) have between 11 and 20 personnel, 5 businesses (+2) employ between 21 and 50 individuals and only 2 companies have more than 50 staff. The total numbers add up to 803 (+279), mainly men - 506 (63% - 6%) - and 305 (37% - +6%) women. From 2022 to 2023, we saw an increase of staff in the sector (+279 persons) and an improvement of the women to men ratio (+6%) which cannot be only attributed to the enlargement of the company sample (+13). During the analysed period, biogas companies have recruited more staff and more women.
- Each company has constructed so far between 5 to more than 9600 (+4,600) biodigesters. The total number of units installed is 22,491 units (+7,708) of which 41% (-13%) are fixed dome systems and 59% (+13%) are prefabricated biodigesters. In 2023, prefabricated biodigesters have become the majority of biodigesters sold in Kenya.
- The total number of biodigesters sold per annum per company ranges from 1 to more than 2600 for a total of 4553 biodigesters (+977 compared to 2022). Six companies (+1) sell currently below 10 plants per year, 8 (+2) between 11 and 20, 10 (-4) between 21 and 50, 10 (+2) more than 50. The total number of biodigester sales per year is 4,553 units (+977), of which 1,594 (+377) are fixed dome (35%) and 2959 (+726) are prefabricated digesters (65%). Introduced in Kenya in 2018, prefabricated biodigesters now constitute the fastest growing biodigester market segment. We also observe a concentration of the sales into a few companies as the number of companies selling more than 21 biodigesters per year decreased by 2: there were 22 companies selling more than 21 biodigesters per year in 2022 while they were only 20 in 2023.
- The participating enterprises expect to sell or construct in the next four years between 18 and 20,000 biodigesters. Eight companies (+1) are planning to install up to 100, 11 between 101 and 200, 7 between 201 and 500, and 9 (+2) want to increase their sales by more than 500 units, even up to 20,000.
- Participating companies generally operate in the Mount Kenya area, followed by the Rift Valley. Another regional concentration can be found in the Western part of the country (Kakamega, Siaya, Busia). Prefabricated biodigesters are sold countrywide whereas fixed dome biodigesters enterprises need to send a team of masons in the area to build several biodigesters. They mostly work through the

activation of referrals from their existing clients in the area. Therefore, they need to activate their current clients, ensure their satisfaction and track leads to conclude sales. They also require a certain number of sales in a specific area before sending a team of mason to install the biodigesters.

- The participating enterprises made a set of recommendations for the project during the interviews. It is suggested that the Ministry of Energy builds up and maintains a database of trained / certified biodigester masons in each county. The project should also explore options to engage demand aggregators (cooperatives, MFIs, FIs and SACCOS) and provide them with Result-Based incentives. The biodigester enterprises would appreciate support to develop bankable business proposals to present to commercial banks, especially for larger units (medium scale / commercial segment of more than 50 m³). Finally, developing specific end-users financing mechanisms for biodigesters would be highly appreciated by the enterprises. All these recommendations are currently implemented by ABC Keny

Figure 1 - Fixed dome and prefabricated domestic biodigesters have been adopted in small farms with dairy cows in stables – © GIZ – Mark Rotich



Survey results

Based on existing data from previous projects and regular engagement of the project with biodigester enterprises, a total of 52 biodigester companies (+13) participated in the 2023 survey (see Annex 2).

General information

Gender and age of the owners/managers

Biodigester installation is still very much a male-dominated sector. Out of the 52 interviewed enterprises, there are only 6 (+2) women owners against 43 (+9) men, 3 (+1) enterprises have one man and one woman each as CEOs. One company did not answer the question in 2022. The age of the owners ranges from 23 to 62 years, 13 persons are 40 and below years of age, whereas 8 (+1) are between 41 and 50, 7 (+1) between 51 and 60 and 2 (+1) over 60 years old. Twenty-two owners (+10) did not disclose their age. These figures show that biodigester enterprises are mainly run by middle-aged men even though it is worth noting that the largest biodigester enterprise in Kenya is managed by a woman.

Type of company

Of the companies interviewed, 47 are of formal character (91%), while only 5 (-1) are of informal character. Forty-four enterprises are “Private Limited Companies” and 8 enterprises are registered under the “Sole proprietorship” status. Thirteen enterprises (+1) operate on their own and 31 on rented premises. Nine companies did not reply to this question.

Location / County

The highest number of enterprises (14) are based in Nairobi, 7 in Kiambu, 4 each in Nandi, and Nyeri, 3 in Meru, and one each in Kericho, Embu, Kakamega, Nakuru, Nyamira, Eldoret and Laikipia County. Two companies operate in the 47 counties of Kenya, while 30 companies operate in 5 to 15 counties and 20 did not provide an answer to this question. The main counties of operation are Kiambu, Nyeri, Murang’a, Nakuru, Uasin, Meru, Kericho, Kajiado, Laikipia, and Nandi.

Exposure to IT/electronic media

All 52 companies own a smartphone and use this for more than just making phone calls. Only 9 (+1) companies have their own websites, 28 of them are active in various social media accounts and 27 of them are active on Facebook, which is also mentioned as the main marketing tool. Two companies are on Instagram, 2 on LinkedIn and 2 on YouTube.

Workforce

The total number of staff per enterprise is rather low: 14 (+1) do not have any permanent staff, meaning that the owner him/herself is the main workforce, 15 employ (with or without contract besides the owner) 1 up to 5 permanent staff, 5 between 6 and 10, 12 between 11 and 20 and 4 between 21 and 50. Only 2 companies employ more than 50 staff, out of which the leading biodigester company in the country has more than 150 employees.

By the end of 2023, the total number of permanent full-time staff with employment contracts is 421, up from 189 in 2022, while the total number of full-time staff without employment contracts is 240, up from 58 in 2022. Therefore, the total number of permanent staff adds up to 661, up from 524 in 2022. This represents an increase of 137, of which only 63% have contracts, a 1% increase from 62% in 2022. 1182 men work in the sector up from 446 in 2022, a 165% increase. They constitute 72% of the workforce, a constant since 2022. In administration, finance and support functions men represent 52% of the staff, 77% in the skilled functions and 66% in the unskilled functions. The total number of temporary staff working days per year is 1,087 which is equivalent to roughly 5 full-time staff. The proportion of male temporary staff is 64%, 76% in skilled and 62% in unskilled functions.

During the documentation of this inventory report in the last quarter of 2024, 15 out of the 18 companies contracted under RBF in the ABC project have grown their work force up to 760 employees, of which 260 are women and 500 are men. The companies and individual technicians not being part of the ABC Result Based Finance Facility (RBF) reported a total workforce of 277. Thus, the workforce in 2024 is 760 + 277, a total of 1037 employees in the sector.

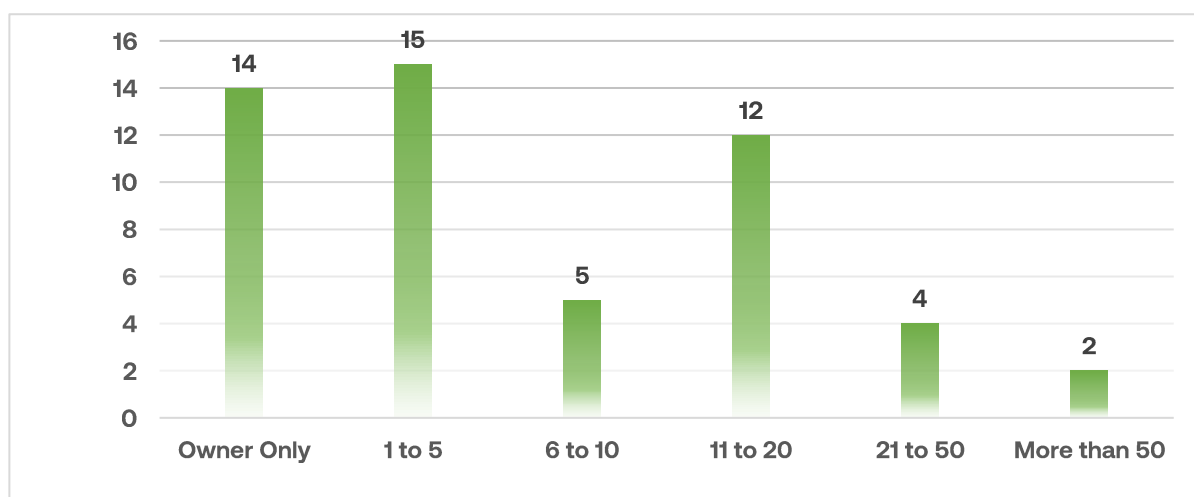


Figure 2 - Number of companies clustered per number of staff

The following tables give a detailed listing of staff in the companies apart from the owner(s). 18 companies did not disclose the number of full-time staff with contract, while 34 companies did not disclose the number of full-time staff without contracts.

Table 1 - Number of permanent full-time staff with and without employment contracts

	With contract		Without contract		Total
	Male	Female	Male	Female	
Admin/finance and support	55	54	14	9	132
Trained technical	195	62	97	16	370
Untrained technical	49	6	67	37	159
Total	299	122	178	62	661

Table 2 - Number of temporary staff days per year

	Male	Female	Total
Skilled	474	145	619
Unskilled	231	137	368
Total	705	282	987

The completed questionnaires do not include information on the number of days per year that temporary staff were engaged. Whereas the installers of prefabricated digesters work mostly with permanent staff, the construction of fixed-dome plants is mainly done by trained masons and their untrained helpers on contract or without contract. The latter category was not disclosed by companies. It takes between 6 (6 m³) and 60 (124 m³) days to construct one biodigester, depending on the size, with an average of 40 days (including the installation of piping). In addition to the staff reported above, one of the companies has a network of about 100 independent sales agents that work on commissions.

Eight companies mentioned the lack of technical and/or managerial skills for further expansion of their biodigester activities. This, in turn, means that most companies do not have sufficient access to skilled masons, either on their payroll or in their vicinity. Skilled staff with the knowhow of biodigester installation / construction and unskilled staff are also engaged on temporary basis by the companies especially during the peak seasons.



Figure 3 - Prefabricated biodigester – © GIZ – Mark Rotich

Biogas exposure

Services offered / Type of digester

Twenty-three enterprises - an increase from 15 in 2022 - exclusively provide services for the construction of fixed-dome plants, while only 1 specializes solely in the construction of the floating drum type. Six companies install prefabricated biodigesters. Besides construction of fixed dome biodigesters, 23 companies also offer additional services such as repairs, maintenance, artisans and mason trainings, bioslurry and extensions services, and sale of accessories. In addition to the installation of prefabricated biodigesters, 5 companies sell biodigester accessories, and organise agriculture trainings.

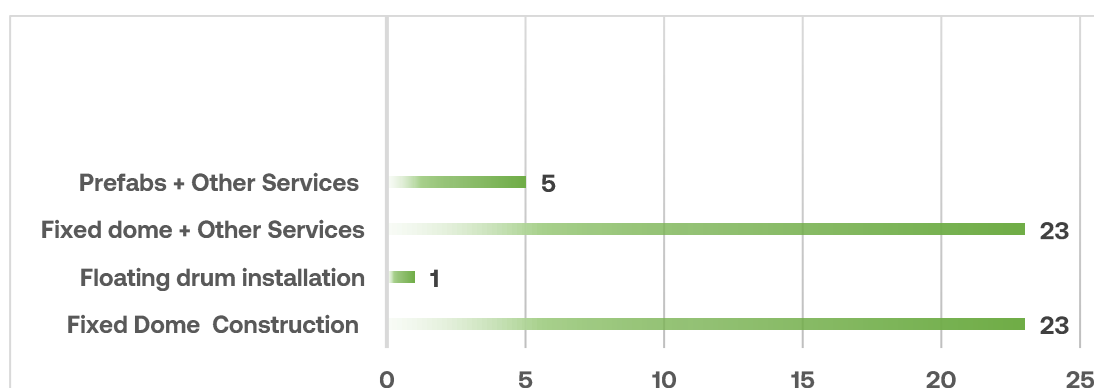


Figure 4 - Number of companies per type of service offered

Enterprise creation timeline

Six of the 52 enterprises started their activities between 2001 and 2010, all of them under the GIZ PSDA project. Twenty-three started between 2011 and 2019, under the Kenya Biogas Programme. Seven companies started since 2020, outside of any biogas development program. Fourteen enterprises did not reply to this question.

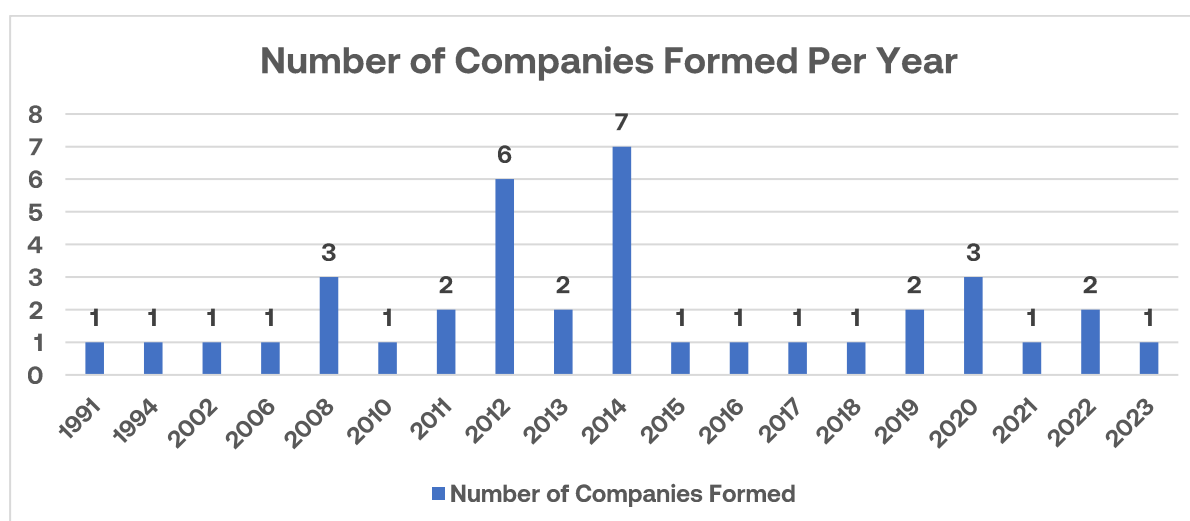


Figure 5 - Number of biodigester enterprises created per year.

Biogas training

Thirty-five out of the 52 surveyed companies have received trainings in Biogas construction and installation: 14 by GIZ PSDA (2007 – 2011), 8 by KBP (2010 – 2019), 3 by KENDAF (2010 – 2013), 2 by HomeBiogas (2017) and 1 by ILRI (2008). Sixteen companies did not answer the question.

Companies trained by GIZ PSDA have proven their capability to construct quality digesters even with larger volumes and specific requirements due to non-standard substrates like waste from abattoirs and agricultural processing. Two enterprises engage in training of farmers and masons.

To construct a fixed-dome digester, an ordinary mason needs special training, which is currently neither part of any vocational curriculum nor training institute in Kenya. Entrepreneurs see the need to train more masons following the PSDA approach (whereas the KBP programme invested in capacity building measures to transition masons into entrepreneurs) with theoretical lessons and practical construction training. It is recommended that the Ministry of Energy builds up and maintains a database of trained biodigester masons in each county after they undergo certification through NITA or a NITA-accredited entity.

Past, current and expected sales and installations of digesters

Among the 52 companies, three types of biodigesters are represented: fixed dome, prefabricated and floating drum according to the figure 6 below.

The current number of annual sales and installations ranges from 1 to 2530 per year. Six companies, up from 5, sell currently below 10 plants per year, 8 between 11 and 20, 12 between 21 and 50. However, 10 enterprises have annual sales of more than 50 with the lion's share lying with one company. The total number of annual sales and installations amounts up to approximately 4,553 units of which 1594 are fixed dome (35%) and 2959 are prefabricated digesters (65%). Sixteen companies did not answer this question.

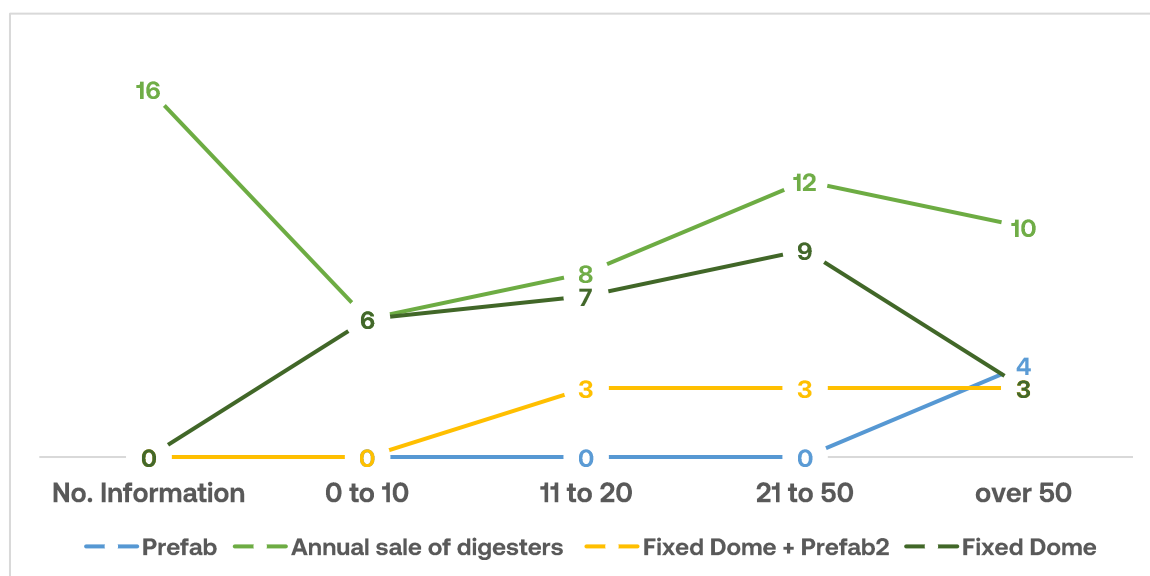


Figure 7 - Number of enterprises per average yearly sales

The total number of digesters sold and constructed so far ranges from 5 to more than 9,500 per company. Six enterprises (-1) state that their total number is 50 and below, 3 between 51 and 100, 8 between 101 and 200, 10 between 201 and 500, and 6 (-5) account for more than 500. The total number of sold or constructed digesters by the interviewed companies is 20,491 up from 14,783 units in 2022 (+5,708). Nineteen companies did not provide information on this question.

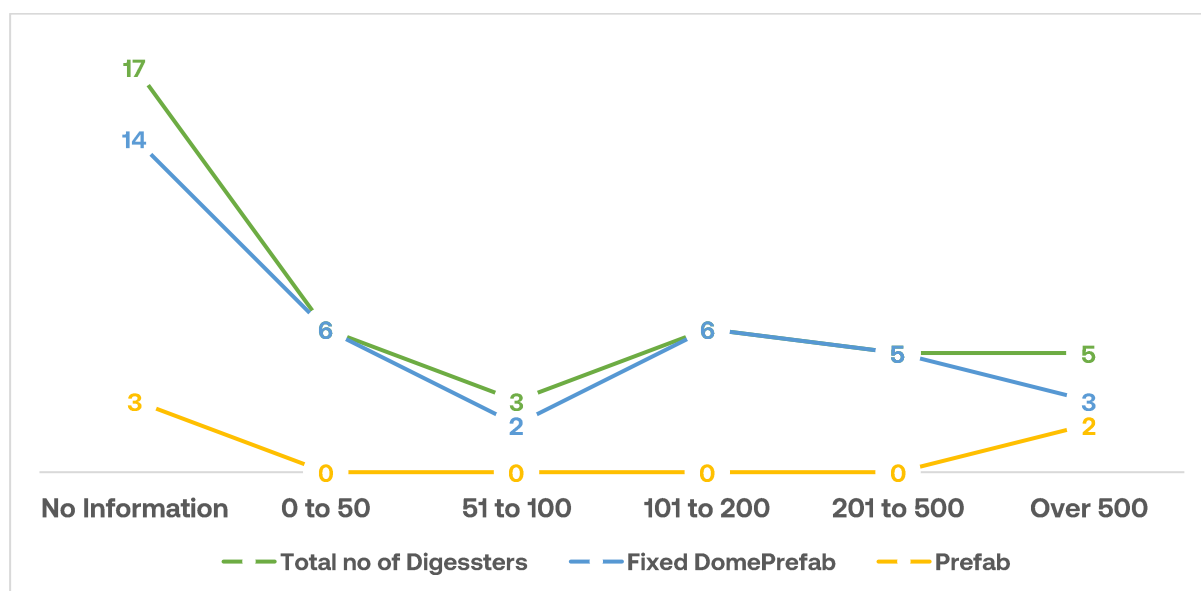


Figure 8 - Number of enterprises per historical sales

The participating enterprises expect to sell or construct in the next four years from 18 up to 20,000 Biogas plants. Eight of those gave a modest forecast of up to 100, 11 between 101 and 200, 7 between 201 and 500, and 9 want to increase their figures by more than 500 units, including one up to 20,000. Seventeen companies did not provide a response to this question.



Figure 9 - Number of enterprises per projected yearly sales in the next four years

If the medium size companies would be able to reach their targets by selling or constructing between 100 and 500 digesters during the next 4 years, there would be between 15,000 and 18,000 additional Biogas plants in Kenya.

Measures to assure quality

Twenty-three companies underlined the importance of having well-trained masons and close supervision during construction time, 12 have a warranty (mostly one-year) on the digesters, and 15 have contracts for after sales service. Four interviewees use social media to advise and keep contact with their clients.

Market barriers for up-scaling of the individual business

The participating enterprises mentioned a multitude of barriers to up-scale their businesses:

21 own financial limitations	1 import logistics
11 low consumer awareness on the technology	1 failed biodigesters
9 costs of the digesters	1 inflation
6 limited resources for marketing	1 lack of subsidy
4 limited capacities of the company	1 water scarcity in semi- and arid areas
3 logistics	1 taxation
	1 competition from prefabricated plants

The answers show that many companies do not have the financial means to expand their business activities on their own, which is also a reason why they do not see themselves in the position to run awareness or marketing campaigns.

Engagement of financial intermediaries

Eighteen companies had so far not engaged with financial intermediaries, 4 gave no information. The other 30 had engagements with:

- 17 different SACCOs
- 5 Kenya Women Finance Trust
- 5 Commercial Banks e.g., Equity Bank
- 1 NGO
- 1 Agricultural Finance Corporation
- 1 Fortune Micro-finance

SACCOs, most of them for dairy farmers, are by far the most popular financial intermediaries for the provision of credits to Biogas users. The biodigester enterprises would appreciate support to develop bankable business proposals to present to commercial banks, especially for larger units (medium scale / commercial segment of more than 50 m³).



Figure 10 - Biogas Companies have partnered with financial intermediaries to upscale sales – © GIZ

Engagement with demand aggregators

Only 6 companies had not engaged with aggregators (marketing hubs, cooperatives, SACCOs or farmer groups), 20 gave no information, but 26 had engaged with:

- 18 dairy SACCOs and cooperatives
- 4 other cooperatives
- 1 Kenya Agricultural and Livestock Research Organisation (KALRO)
- 3 did not mention the name of the aggregator they have engaged with.

Most of the biogas entrepreneurs have realised that aggregators, especially dairy cooperatives, can play an important role to reach potential clients, since these are in regular contact with dairy farmers. The project should explore options to engage such aggregators, maybe even open an opportunity to have access to or manage Result-Based Finance for aggregators. In counties with low demand for biodigesters, enterprises have difficulties having enough clients to develop their business. This is specially the case for fixed dome biodigester enterprises. These enterprises would need an intermediary which would aggregate the demand for them.

Mode of pricing

The prefabricated biodigesters are sold at fixed prices according to the size and location. Price information can be found in Annex 3.

Most of the companies constructing fixed-dome digesters (45) submit a list of material depending on the digester size to the client to purchase. With this system, the clients benefit from lower prices as they typically have a better knowledge of the local raw material costs than the mason. For labour, supervision and warranty the companies add between 25% and 35% on the material costs. Five companies sell their fixed-dome digesters at a fixed price according to the digester's size, 3 ask for a fixed price per cubic meter plus logistics (for a table with the average price for fixed-dome digesters see Annex 3). Two companies have established a price list for after-sales services. The price of accessories depends very much on the quality and the wholesale or on import prices.

County coverage

The 52 participating companies (up from 39) cover a total of 33 out of 47 counties, two state that they are active country-wide. The following table provides an overview of the number of enterprises operating in each respective county.

Table 3 - Counties of operation of the interviewed companies

# enterprises	County	# enterprises	County
19	Kiambu	6	Bomet, Laikipia, Bungoma,
17	Nyeri		Kirinyaga
14	Muranga	5	Taita Taveta
12	Nakuru	4	Kilifi, Tharaka-Nithi, Nairobi,
10	Nyandarua, Kericho, Meru		Transnzoia
9	Kajiado, Kakamega	3	Narok, Makueni, Nyamira,
8	Uasin Gishu, Busia, Embu		Machakos, Kisii, Nandi
7	Siaya		

The majority of counties in which the participating companies operate is in the Mt. Kenya area (Kiambu, Nyeri, Muranga, Nyandarua, Meru, Embu), followed by the Rift Valley (Nakuru, Kajiado, Uasin Gishu, Kericho, Laikipia). Another regional concentration can be found in the Western part of the country (Kakamega, Siaya, Busia). Two companies each operate in the ASAL (semi- and arid land) counties of Baringo, Garissa and Turkana. Remarkable is the fact that only 4 companies are active in Nairobi, the county with the highest number of inhabitants, and 2 in Mombasa, the second largest city in Kenya.

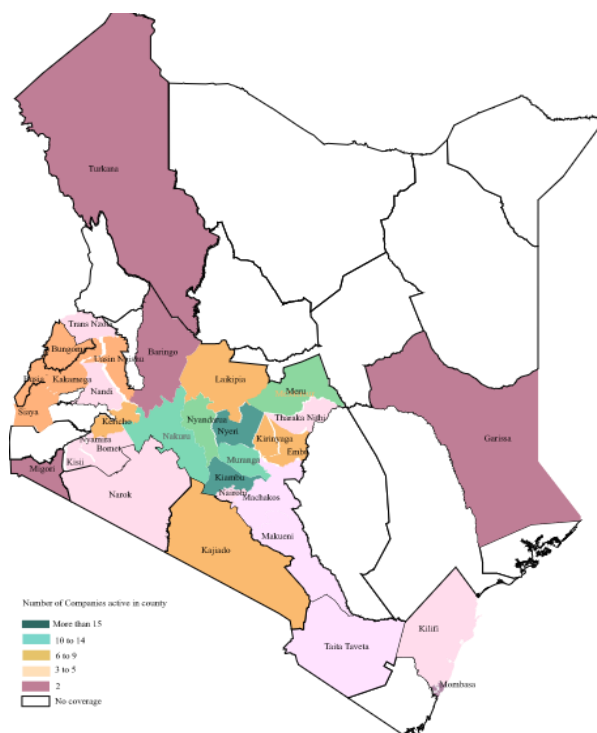


Figure 11 - Counties of operation of the interviewed companies

The following table gives an overview of the 3 best and 3 worst performing counties in terms of sales according to the participants.

Table 4 – 3 Best and 3 worst performing counties in terms of biodigester sales

Count of enterprises	3 best performing counties	Count of enterprises	3 worst performing counties
9	Kiambu.	4	Embu, Laikipia.
8	Meru, Muranga.	3	Kisii, Meru, Nakuru, Wajir,.
6	Nyeri, Uasin-Gishu,.	1	Bomet, Bungoma, Garissa, Kakamega, Kericho, Kiambu, Kitui, Kisumu, Makueni, Mandera, Muranga, Nairobi, Nyeri, Samburu, Siaya.
5	Embu, Kajiado, Nakuru. Nandi, Nyandarua, ,		
4	Busia, Kisii Laikipia, Nairobi , Siaya, Tharaka-Nithi.		
3	Bomet, Bungoma, Elgeyo Marakwet, Kericho Kirinyaga, Makueni, Migori , Nyamira, Mombasa.		

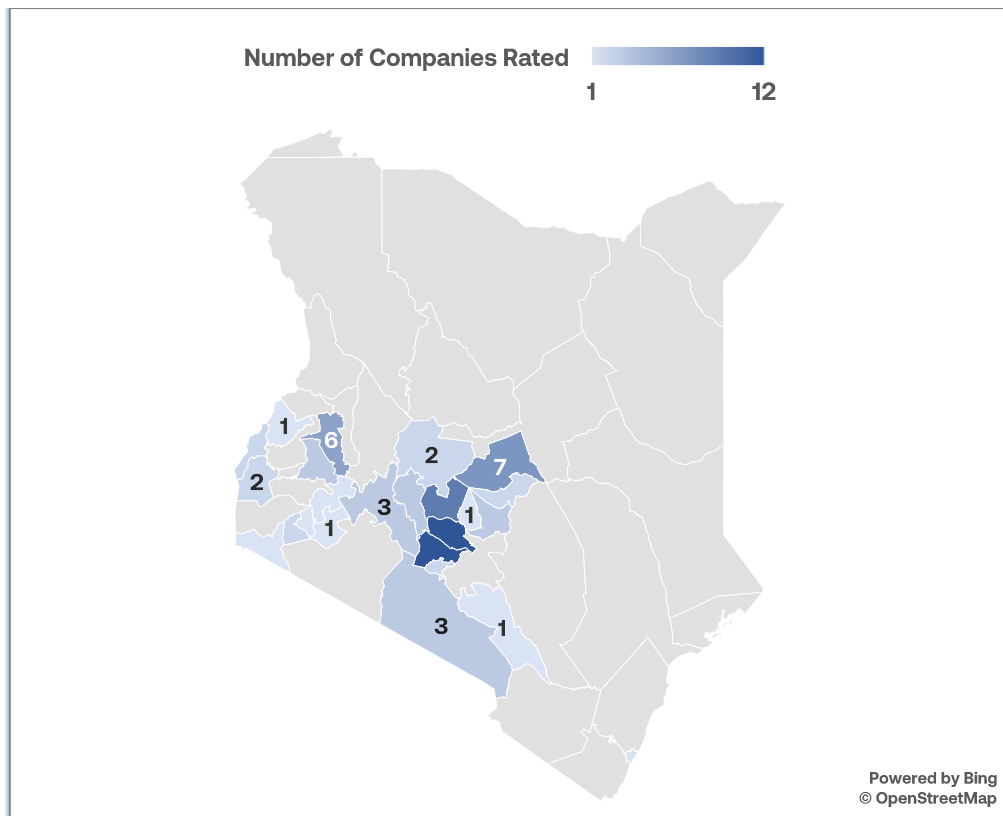


Figure 12 – Counties rated as best performing by the interviewed companies

Counties in the Mount Kenya region (Muranga, Nyeri, Kiambu, Meru and Embu) are rated best when it comes to sales performance, followed, once again, by those in the Rift Valley (Uasin Gishu, Nakuru, Nandi and Kajiado).



Figure 13 – Biogas user in Kiambu county, Kenya - © GIZ – Florent Eveille

The Rift valley counties top the list of worst performing counties (Laikipia, Nakuru). From the Mt. Kenya area only Embu (4), Meru (3), Muranga (1) and Kiambu (1), and Eastern Machakos (5), were mentioned as bad performers.

These figures indicate clearly that the Mt. Kenya region is by far the one with the highest potential for scaling up the biodigester market.

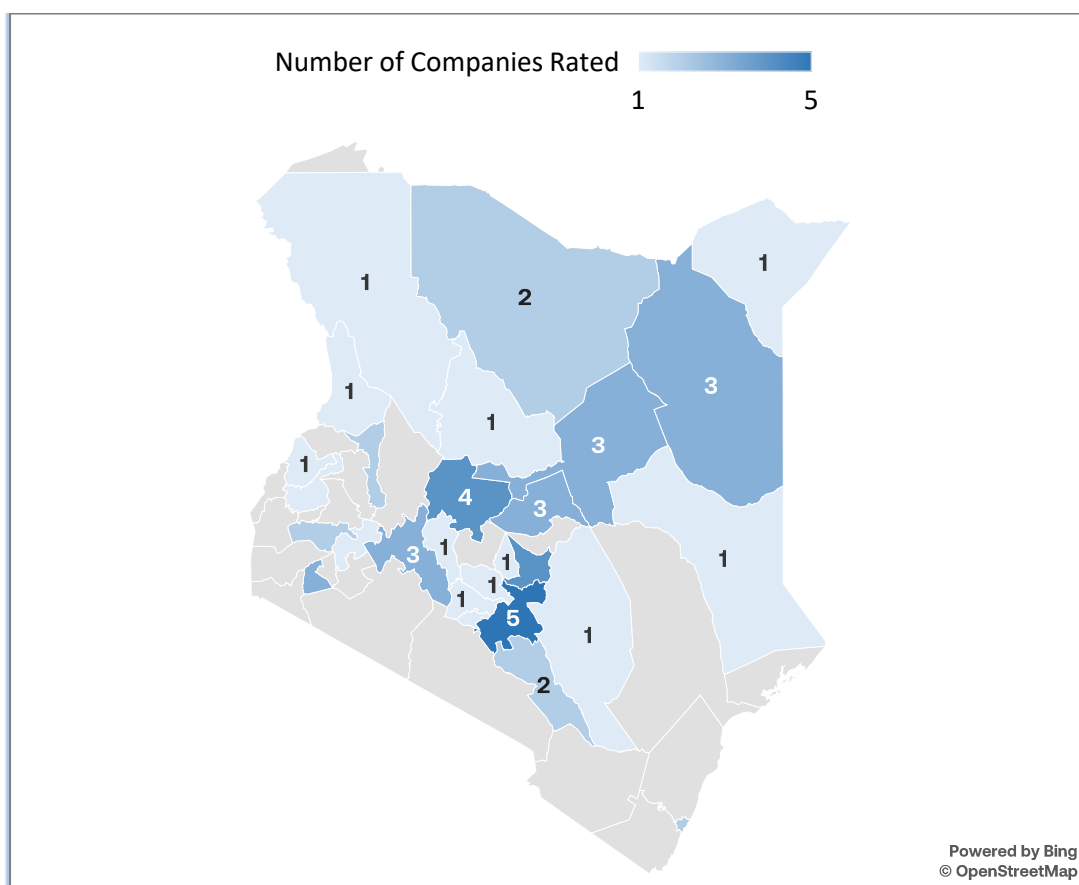


Figure 14 - Counties rated as low performing by the interviewed companies

Marketing activities

Social media is by far most popular marketing tool among the enterprises: 28 (+7) companies utilize social media to create awareness and reach more clients. However, most of them do not use social media in a structured or strategic way. For other marketing activities, 15 companies (+2) participate in exhibitions, field days and market days, 10 companies (-1) use printed material like flyers or brochures, posters and banners, magazines, newspapers, billboards and other printed promotional materials, 7 believe in the word of mouth, 4 organize exhibitions as part of community events, 2 each mentioned seminar and 6 (+5) car branding as well as national and local TV/radio as opportunities for marketing. Fourteen companies did not respond to this question. The surveyed companies estimate their annual costs for marketing activities between KES 20,000 and 600,000, depending on their size.

Only two large companies have a marketing strategy. The smaller ones make use of social media, field days and community events organised by other companies. The need for appropriate marketing tools and strategy was strongly expressed by the enterprises.

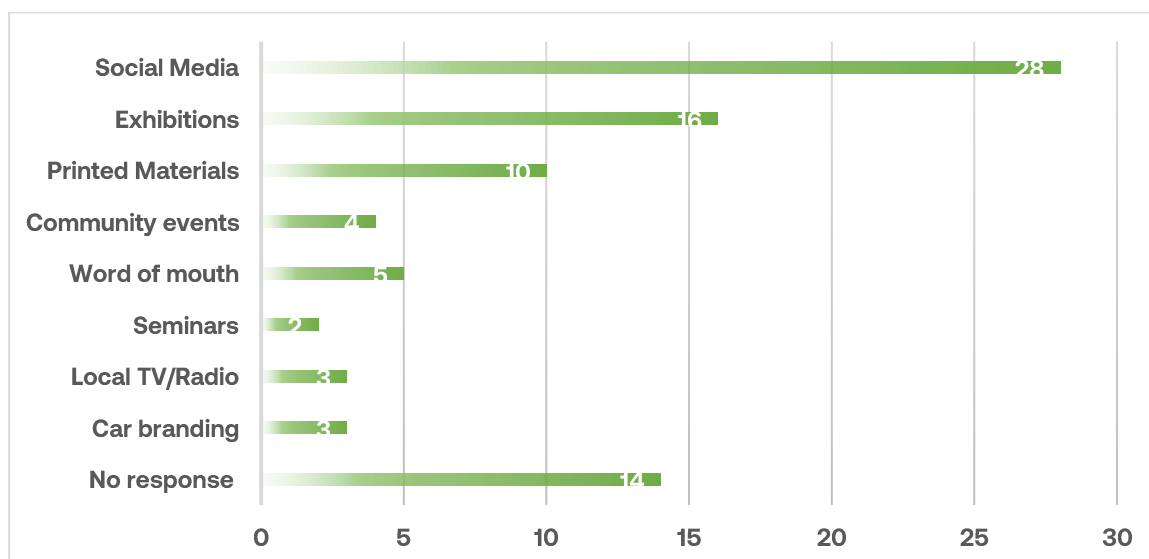


Figure 15 - Number of companies per type of marketing activity

Cooperation with other Biogas companies

Thirty-three (-1) enterprises cooperate in one way or another with their competitors, e.g., being members of a Biogas association, joint trainings, purchase of accessories or support in remote places, but there is no formal cooperation in the day-to-day business. Two (-1) companies stated that they do not cooperate with others, 17 (+14) did not reply to the question.



Figure 16 - A biodigester owner cooking on biogas – © RVO

Most of the positions in the Kenya Biogas Stakeholder Network (BIO-NET) National Board and National Executive Committee are filled by owners/CEOs of companies who participated in this survey. BIO-NET represents the sector in various governmental and private sector institutions.

Sales and finances

Annual turnover

Only 22 (-1) out of the 41 enterprises were ready to disclose information on their annual turnover. This ranges from KES 300,000 to KES 207,000,000 and even KES 2,700,000,000. Four (-1) out of the 22 companies report figures up to KES 1,000,000, 6 between KES 1,000,001 and KES 2,000,000, 6 between KES 2,000,001 and KES 10,000,000 and 6 above KES 10,000,000. The total annual turnover of the 22 companies is more than KES 3,4 billion, an increase of 617 million since 2022.

As already shown in previous chapters, most of the biodigester enterprises are rather small; about half report annual turnovers below KES 2,000,000, which means that they construct less than 70 digesters per year. The 30 companies that did not give information on their turnover also fall in this category; none expects to sell or construct more than 200 digesters in the next 4 years.

Biogas percentage in sales

A total of 29 (+1) enterprises responded to this topic, while 23 (+9) did not. The percentage of sales attributed to biogas varies among companies, with one company reporting 5% and five (+1) companies reporting 100%. In 2023, four (+1) companies have biogas sales below 25%, seven (-1) report between 26% and 50%, and six (-1) companies fall within the 51% to 75% range. Additionally, 12 companies primarily rely on biogas, with sales exceeding 75%.

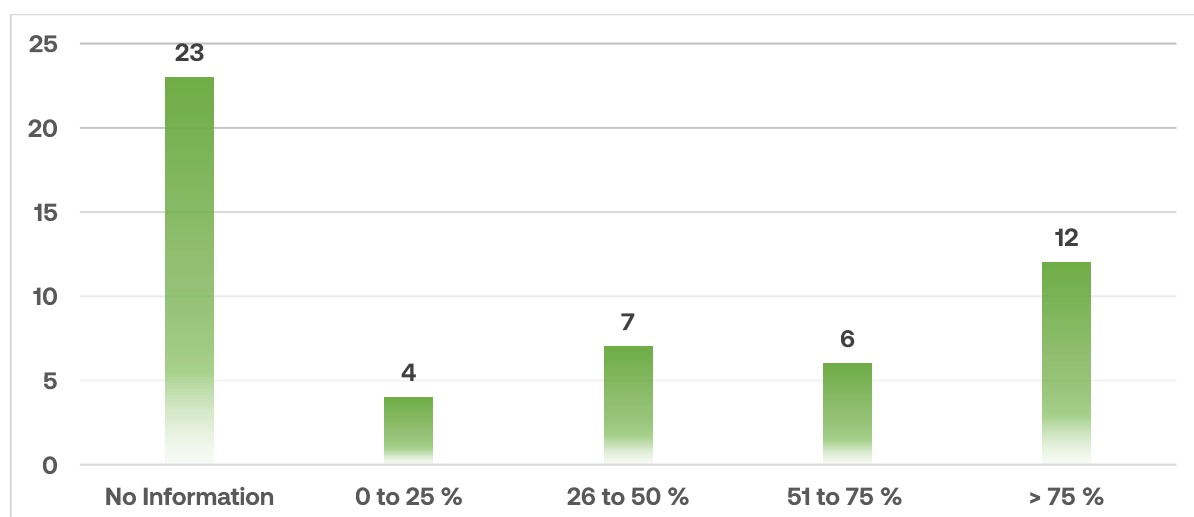


Figure 17 – Number of enterprises according to the percentage of biodigester sales in the total turnover

Out of the 29 responses, more than two third are mainly or even purely biodigester companies. Besides being suppliers of prefabricated digesters, most of these contractors have a steady and reliable source of revenue.

Real annual growth in sales

A total of 22 (+10) companies did not provide any information on this matter. Among the remaining 30 (+1), 12 (-2) reported a sales growth of less than 10%, while 4 experienced growth between 11% and 20%. Additionally, 11 companies reported annual growth rates exceeding 21%. Overall, the growth rates remain steady but below 20% for most enterprises.

Bank account and accounting system

Thirty-three (-7) companies have active bank accounts, 15 (+14) did not answer this question, while 3 do not have one. Twenty-one 24 (+3) companies engage an accountant, 11 of those on a full-time basis. Seven mentioned that they use QuickBooks, others (one each) and use ERP, ZOHO and ESRO as accounting software. Most companies do not have an in-house accountant but outsource accounting to service providers. Just about one quarter (10) use an accounting software. Ten companies do not have an accountant, and 18 companies did not answer this question.

Bank loans / credits

Nine companies do have loans of KES 150,000 (1 company), KES 200,000 (3 companies), KES 500,000 (2 companies), KES 1,000,000 (1 company) 5,000,000 (1 company), KES 9,000,000 (1 company). One company did not disclose the amount of the loan. Twenty-five companies do not have a loan, 17 did not answer the question. Three of the loans reported do not need collateral, three require a collateral. The three loans requiring collateral are of 150,000KES, 205,000KES and 500,000KES. They require a collateral of 500,000KES, 1,000,000KES and 1,500,000KES respectively. The respective values of the collateral are higher than the loan.

Nine (+2) companies state that they currently do not need a loan, 15 (+10) gave no information on this, while 28 (+2) see the need for a credit. The amounts required and the intended uses are as follows:

Table 4 - Required loan value by biogas companies and intended use

Amount (KES)	Intended use	Amount (KES)	Intended use
200,000	No information (2)	3,000,000	No information (1),
400,000	Marketing (1)	4,000,000	Accessories (1)
500,000	No information (1)	4,300,000	No information (1)
600,000	Biogas expansion (1)	5,000,000	Marketing, Purchase of tools and equipment, working capital, R&D (1)
900,000	Workshop for appliances, awareness (1)	6,000,000	Capital to import appliances (1)
1,000,000	Low account transactions (1) Biogas expansion (1) No information (1)	7,500,000	No information (1)
1,500,000	No information (2)	11,610,000	Market activation, working capital (1)
1,000,000	Biogas credit scheme (1)	50,000,000	Biogas expansion, accessories (1)
2,000,000	Management structure + tools (1) No information (1)	N/A	For special project (1) No information (1), revive appliances business (1), installation of medium scale (1), for material and vehicle (1)
2,200,000	No information (1)		

Only 5 companies had already a loan application rejected, one because of poor financial records and one because of the lack of collateral. One because of low account transactions, one reported that banks do not finance County government LPOs, one did not disclose the reason. Nineteen companies did not answer this question, and 28 companies did not have a loan application rejected.

Only 9 (less than 20%) of the participating companies do have loans, half of these from commercial banks requiring collateral. Five had applied for loans but were not successful. On the other hand, almost three quarters see the need for loan with figures ranging from KES 200,000 to more than KES 50 million. Information on the intended uses for the loan is very shallow and needs further investigation. Working capital and marketing were mentioned by more than one company. The reason why more companies did not apply for a loan was not surveyed, but the lack of collateral seems to be the largest obstacle: only 12 (+1) companies own their premises, the others work from rented places.

Mode of payment

Twenty-seven (+6) companies state that they demand pre-payment: 9 (-1) each for up to 50% and from 51 to 100%. 30 (-1) ask for payments by instalments, ranging from 2 to 25 instalments: 10 (+1) for 2 payments, 16 for 3, 1 (-1) for 12 and 1 each for 6, 15, 24 and 25 instalments. Sixteen companies did not respond to this question. Only 3 (-3) enterprises have access to micro-credit facilities. The percentages of such sales are 6%, 10%, 15%, 40% and 100%. Four businesses use lease-to-own models for 5%, 10% (2), 20% and 25% of their customers. One company uses RBF support for 40%, another for 100% of their sales.

Five companies state that they use other forms of payments for 10%, 40%, 50%, 88% and 100% of their clients, mainly invoicing after finalization of construction or installation.

There is no preferred mode of payment. Most suppliers of prefabricated digesters ask for one-time payment, either pre-paid or after installation. Two companies have, however, options and different prices for a one-time payment, 12 instalments and even 25 instalments. The prices for 12 instalments are approximatively 3% to 16% higher than payments in one instalment, the prices for 25 instalments are approximatively 16% to 26% higher than payments in one instalment. This difference in price between one-time payment and payments in instalments reflect the perceived risks for the biogas company and the cost of credit in Kenya. Most of the smaller contractors for fixed-dome digesters want to be paid in 3 instalments: after signing the installation contract, after finalisation of construction and after the plant is fully functional or commissioned. Credit facilities for biodigester clients would be highly appreciated by enterprises. These have been developed by GIZ through the ABC access to finance implementer: Private Equity Solutions.

Credit risk to end user

Thirty companies up from 21 in 2022 did not give any information on this topic. 7 (-3) assessed the risk below 10%, 7(+5) between 10% and 20% up by 1 in 2022, 1 between 26% and 50% and 7 higher than 50%, up from 5 in 2022. These results indicate that the credit facility concept is not well understood or that the credit risk is not a serious obstacle for end users. This reflects that risk aversiveness by the biodigester companies is on an acute rise, and this requires access to finance interventions.

Marketing, last mile distribution and quality assurance costs per biogas plant as a proportion of the unit cost

The proportion of marketing costs ranges from 2 to 40% of the total cost of the biodigester. Fourteen companies up from 13 in 2022 estimate up to 5%, 6 between 6% and 10% down from 8 in 2022, 9 between 11% and 20% up from 2 in 2022, and 5 more than 20% up from 3 in 2022. 18 did not respond to this question. The increasing investment in marketing by more companies than it was in 2022 also shows that companies have understood the importance of marketing and awareness creation in order to upscale the adoption of biodigesters.

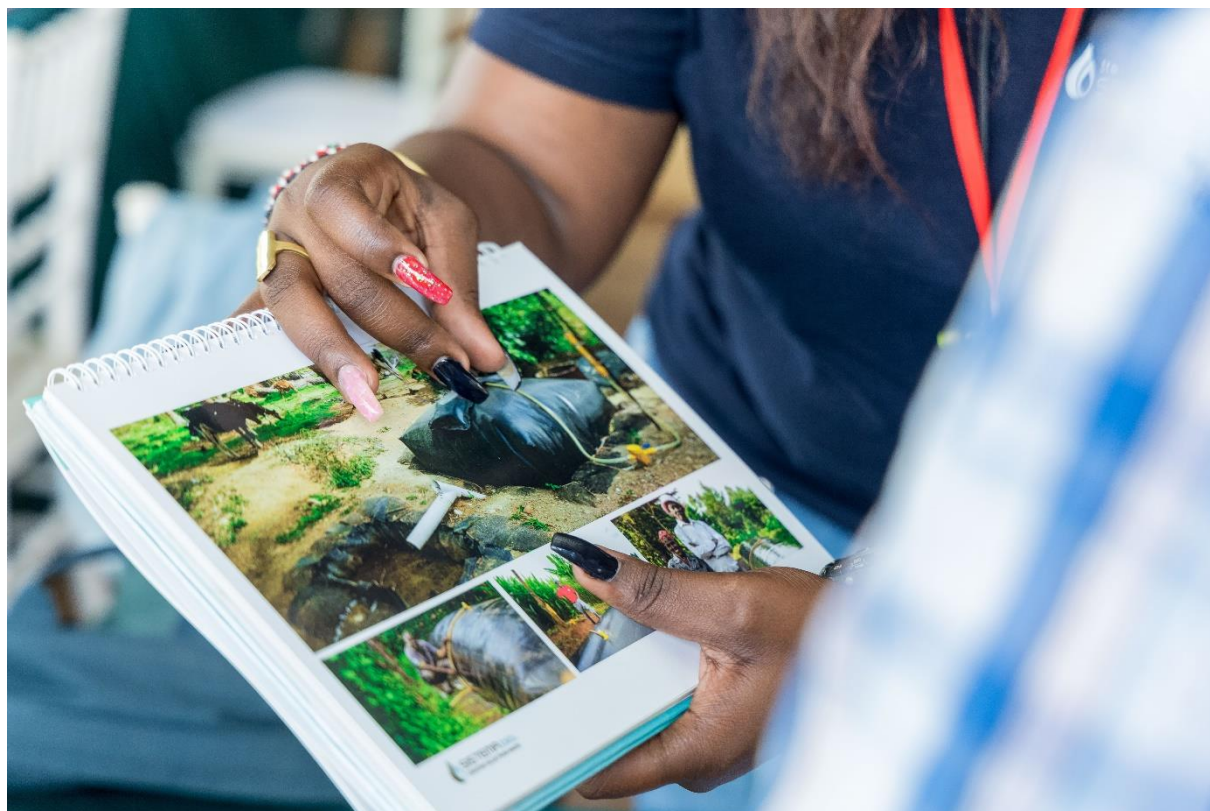


Figure 18 - Awareness raising activities conducted by enterprises – © GIZ

The proportion of last mile distribution cost of the total cost of the biodigester ranges from 0% to 80%. 9 companies up from 7, each estimate up to 5% and 7 between 6% and 10%, 4 between 11% and 20% and 11 more than 20% of the total cost of last mile distribution per sold biodigester. Twenty-one companies did not reply to this question. The highest proportion of last mile distribution costs is found in companies constructing fixed-dome digesters, i.e., the money they pay to the local masons and casual workers including transport for the masonry and plumbing work.

The proportion of after sales service cost in relation to the total cost of the biodigester ranges from 2% to 50%. Seven companies estimate up to 5%, 19 between 6% and 10%, up from 17, 8 between 11% and 20% up from 2 and 3 more than 20% down from 8. Fifteen companies did not answer this question.

The figures do not give a clear picture about the cost implications of quality assurance and after-sales services. During the in-depth interviews, however, it became clear that this can be a real cost factor when the clients are located far from the location of the contractors.

Critical number of Biogas plants to sustain marketing, distribution and after sales support costs per year

The critical number per year ranges from 8 to 3,600 plants because of the variety of the plant models and sizes. 4 companies state up to 10 up from 3 in 2022, 4 between 11 and 20 down from 6 in 2022, 8 between 21 and 50 down from 9 in 2022, 12 between 51 and 100 up from 8 companies in 2022, and 7(-1) more than 100 down from 10 in 2022. 16 companies did not reply to this question up from 5 in 2022.

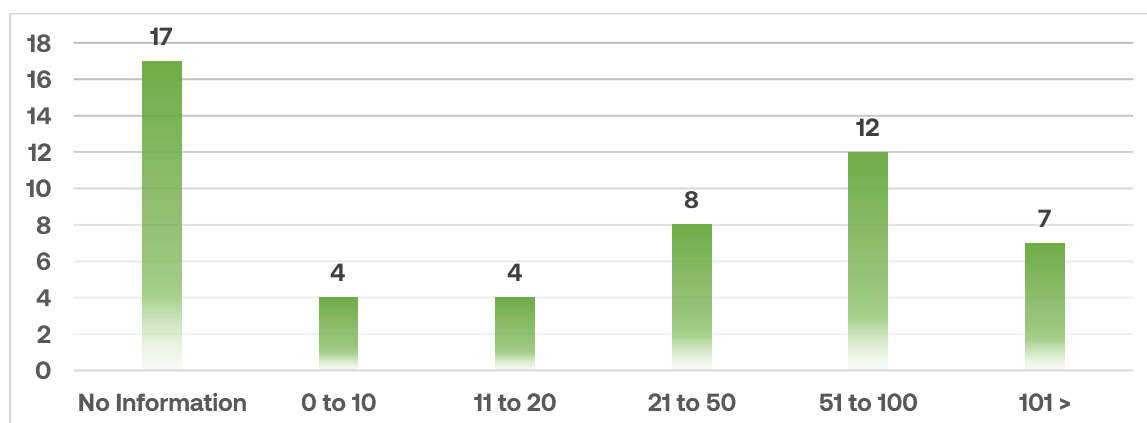


Figure 19 - Number of enterprises per critical yearly number of plants to sustain the business

All companies selling prefabricated digesters consider critical numbers of over 200 per year to sustain their marketing, distribution and after-sales support costs. Eight of the contractors for fixed-dome digesters would need just up to 20 biodigesters, the majority between 21 and 100. These figures are, however, higher than their actual sales of digesters per annum.

Benefitting from Biogas promotion projects

Seven (-20) companies have not benefitted from any Biogas promotion project. Twenty-one have benefitted from ABC, GTZ/GIZ/KBP/KCSAP projects, 11 from KBP and 2 from others like Caritas, Mau Forest Conservation, IFAD. Three benefitted from a project but did not mention the name of the project or the implementing organisation. Eleven companies did not respond to this question.

Familiarity with Result-Based Finance

24 companies have heard of or are familiar with RBF, 11 have not. No information was given by 17 enterprises up from 4 in 2022.

Trade and technology

Input of domestic or foreign origin

Fifteen (+3) companies have no inputs of foreign origin. Six companies use up to 20% domestic inputs down from 7 in 2022, 2 (+1) up to 70%, 23 companies rely on inputs of domestic origin between 71% to 100%. Nineteen companies did not respond to this question.

For most of the enterprises, hardly any foreign input is required. For the construction of fixed-dome biogas plants domestic inputs like locally available building material are mainly required. All 6 (-1) companies with a percentage of more than 60% of foreign input sell and install prefabricated digesters. For the rest this share is almost neglectable, especially since imported biogas accessories are locally available.

Import and licenses, research and development

Only 6 companies gave information on import; the durations to obtain an import license were given with 4, 7, 14, 21, 30 and 45 days. Only 6(-1) companies apply technology, which is licensed from a foreign company. Import and licensing do not play a significant role in biodigester businesses. Twenty companies state that they are active and invest in R&D activities, down by 1 in 2022, 10 say they do not, 22 did not reply to this question. More than half of the participating companies state that they have R&D activities and are interested to become part of respective initiatives.

Easiness to purchase required accessories

Nineteen companies did not reply to this question up from 5 in 2022. Twenty find it easy to purchase accessories, 11(-3) find it difficult, down from 14 in 2022. Two companies see ease of business with medium ease/difficulty. One company, owned and operated by a woman, has specialized in import and branding of biodigester appliances from China.

Training in use of digital platforms

Fifteen companies responded No to receiving digital training, the other 37 expressed their interest in being trained in the use of digital platforms.



Figure 20 - Bioslurry is applied on crops to increase yields – © RVO

Annex 1. List of contacted companies

#	Company name	#	Company name
1	Abiud Ltd	42	Likunga Company Ltd.
2	Kentainers	43	Mazao contractors
3	Sistema	44	Simgas
4	Bett Ernest	45	Biogas solutions
5	Gimosong Entereprises	46	Biogas International
6	Akut East Africa Ltd	47	Keilot Kenya
7	Fagaden Enterprises	48	Sky link innovators
8	Sapudu constructions	49	Ndungu Samuel
9	Nickton Bio-Energy contactors	50	Githunguri Renewable resources
10	Rural & Urban Alternative	51	Jamtu Contractors
11	Igwemas Ltd.	52	Afrisol Energy Ltd.
12	Takamoto	53	Kiangombe modern hills contractors
13	Greesb Drive EA	54	Multi-purpose contractors.
14	Biogas construction and Energy Deve Ltd	55	Njoroge Joshua
15	Biogas construction and energy dev.	56	Nyariki Peter
16	Pluro Industries	57	Green Yard Ltd.
17	Kenya Sunrise	58	Kobole building constructions
18	Intermuck Comm. Enterprises	59	Chogo biogas techniques
19	Mt. Kenya Renewable energy	60	elico bioenergy construction
20	Redsan Enterprises	61	Green link.
21	Kibicho Simon	62	Otieno gases
22	Sakaki	63	Pessarac contractors
23	Kichemu	64	Byestar International LTD
24	Felikam	65	Nyongi contractors
25	Marirmoi Investment	66	Woodroffe Enterprises ltd
26	Kibicho Simon	67	Biogas International
27	Jasmarm General Contractors	68	Wahome Lucy
28	CIDES	69	Hard Forks engineering
29	Madahana Aggrey	70	Home Biogas
30	Scode Ltd	71	Ozone Renewable Energy and Construction
31	Biotechno & Servixe	72	Andcol Enterprises
32	Domino biogas contractors.	73	Ndimma Renewable Energy
33	Githimatu Biogas Contractors	74	Lemesko biogas construction company limited
34	Renewable Energy Engineering Contractors	75	Wahome Lucy
35	Rural Green Energy	76	Bio Esline Ltd
36	Frontiers Biogas contractors	77	Sunray biogas
37	Perjo Biogas and building	78	Peniamax Bio
38	Steve building and constructions	79	Chei constructions Co LTD
39	Kensam	80	Home Biogas Venture Ltd.
40	Mucirira Biogas Contractors	81	Ascom Networks Ltd
41	Dolphin contractors	82	Sian Biogas

Annex 2. Questionnaire

Name of company: _____

General information

Name, gender and age of owner	
Firm age	
Type of firm (formal or informal)	
If formal: legal status	
Physical address	
Premises owned or rented?	
Postal address	
Telephone number(s)	
Email address	
Website	
Social media account	
Do you own a smartphone and use it for other than phone calls?	

Workforce

Total number of staff			
Number of permanent full-time staff with employment contracts	a) Admin/finance and support	male:	female:
	b) Trained technical	male:	female:
	c) Untrained technical	male:	female:
Number of permanent full-time staff without employment contracts	d) Admin/finance and support	male:	female:
	e) Trained technical	male:	female:
	f) Untrained technical	male:	female:
Number of temporary staff; engaged for how days/year	a) Trained	male:	female:
	b) Untrained	male:	female:
Did you reduce your workforce due to the Covid19 pandemic?			
Where do you see the biggest gap or obstacle for expansion with regard to your workforce?			

Biogas exposure

Services provided (Construction of fixed dome biodigester, Installation of prefabricated biodigester, Sale of biogas accessories, Other)	
Year of first engagement with Biogas	
Type(s) of digester in your business	
Have you received training in Biogas construction or sales?	
If yes, when and by whom?	
How many Biogas units of which sizes do you currently construct or sell per annum?	
Total amount of Biogas units and sizes so far	
Expected installations in the next 4 years	
What are your measures to assure quality and after sales service	
What are the key market barriers that prevent you from scaling up the sales?	
Do you engage financial intermediaries e.g., MFIs, SACCOs? Which are the main ones?	
Do you engage aggregators of farmers (e.g., dairy cooperatives, Frigoken) who have access to potential biogas customers? Which ones?	
Did you experience a drop in sales due to the Covid19 pandemic?	
How do you do your pricing including logistics?	
Which counties do you cover with Biogas activities with which %?	
3 Best / 3 Worst performing counties (in terms of sales)	
What type of marketing activities do you apply and at which costs?	
Do you cooperate with other Biogas companies?	

Sales and Finances

Annual turnover	
% of Biogas in annual turnover	
Real annual sales growth (in %)	
Have you got a checking and/or savings bank account?	
Do you have an accountant (name) or use an accountability software (name)?	
Do you have a bank loan or line of credit? (if yes, can you disclose the amount?)	
Proportion of loans requiring collateral	
Value of collateral for the loan	
Would you currently need a loan? If yes, what amount and for which purpose?	
Has a loan application already been rejected? How much did you ask for and for which reason was this rejected?	
How do clients pay for their Biogas units?	a) Pre-paid (____%) b) Instalments (____%); number of instalments: _____ c) (micro)credit (____%) d) PAYGO (____%) e) RBF support (____%) f) Other form of payments (____%)
If providing credit to the end user, what is the portfolio at risk of default (%)	
% of marketing costs per biogas plant as a proportion of the unit cost	
% of last mile distribution costs per biogas plant as a proportion of the unit cost	
% of quality assurance and after sales support costs per biogas plant as a proportion of the unit cost	
What is the critical number of biogas plants to sustain marketing, distribution and after sales support costs per year?	
Have you or are you benefitting from Biogas promotion projects? Which ones?	
Are you familiar with RBF?	

Trade and Technology

Inputs of domestic origin (%)	
Inputs of foreign origin (%)	
Duration to obtain import license (in days)	
Technology applied is licensed from foreign companies	
Do you invest / spend money in R&D?	
How easy/difficult is it for you to purchase all required accessories?	
Are you ready to receive training using digital platforms?	

Annex 3. Sample Price Lists

Prefabricated Company 1

Variety of Size	One off payment (KES)	8 Month Instalments (KES)		24 Months Instalments (KES)	
8m ³	70,000	78,000	9,500	87,500	3,500
12m ³	80,000	86,400	10,800	100,000	4,000
16m ³	92,000	103,000	12,900	110,400	4,600
20m ³	112,000	122,000	14,900	132,000	5,500

Prefabricated Company 2

Model	Persons	Size(m3)	Price (KES)
Standard Model	Up to 6	6	80,000
XL Model	Up to 10	9	95,000
XXL Model	Up to 15	12	150,000

Model	Gas Capacity	Modules	Feedstock	Recommended Price (KES)
T-Series, Small Commercial				
T30	15m ³	Single	200	760,000
M-Series Medium Commercial				
M50	25m ³	Single	400	1,125,000
M100	50m ³	Single	800	1,600,000

Fixed dome Construction Estimated costs: costs may vary do to materials sourcing and cost of excavation.

Size	Construction Materials Cost (KES)	Excavation & Construction labour Cost (KES)	Total Cost (KES)
10m ³	60,000	40,000	100,000
12m ³	80,000	50,000	130,000
16m ³	92,000	55,000	147,000
20m ³	100,000	60,000	160,000
30m ³	140,000	80,000	220,000
40m ³	180,000	100,000	280,000
50m ³	220,000	120,000	330,000



SEE – Clean Cooking
African Biodigester Component

Co-financed by:



Ministry of Foreign Affairs



Coordinated by:



Netherlands Enterprise Agency

In partnership with:

