2022

Sustainable Energy Technology Limited (SETECH)

setechghana.com

The Care Economy Knowledge Hub

the-care-economy-knowledge-hub.org

Profiling Businesses in the Care Economy

The care economy consists of paid and unpaid labor and services that support caregiving in all its forms. In Africa, Asia and Latin America, women spend between three to five times as many hours on unpaid care and domestic work as men. This represents 80 percent of a household's total hours devoted to unpaid care work.

Care economy businesses can help recognize, redistribute, reduce and reward - also known as the 4 Rs - unpaid and paid care and domestic work in the following ways:

Recognize: Initiatives that increase visibility and recognition of paid and unpaid care and domestic activity as "productive" work that creates real value and contributes to economies and societies.

Redistribute: Services and initiatives that redistribute care work from individuals to public and private sector entities, and redistribute care and domestic work within the household.

Reduce: Products and initiatives that reduce the time spent on and burden of unpaid care and domestic work.

Reward: Products, services and initiatives that ensure that care and domestic workers are paid fairly and have professional growth potential. This provides them with financial reward and security.

The Care Economy Knowledge Hub aims to address the knowledge gap around care businesses by showcasing various business models and creating a resource base for relevant stakeholders. It also aims to raise awareness and increase knowledge of the state of impact-driven care economy business models and attract a broad range of funders to invest in care economy solutions by showcasing opportunities. These business profiles are intended to showcase said potential investment opportunities. They have been created from information and data provided by the business itself.

This project is supported by Canada's International Development Research Center, in partnership with the Soros Economic Development Fund at the Open Society Foundations. Building on their track record and commitment to transforming the care economy and mobilizing finance for gender equality, they have jointly launched this action research program to help transform the care economy through impact business and investment.

Executive Summary

Reduce

Sustainable Energy Technologies Limited (SETECH) is a for-profit social enterprise[1] that produces and supplies climate-smart renewable energy and environmental technologies to improve the livelihoods of rural and peri-urban households, as well as agro-processing women's groups in Ghana. It designs, produces, and sells clean cookstoves, briquettes/pellets, biogas, and renewable energy lighting solutions. Through its business model, it enhances access to clean energy products and reduces deforestation, indoor air pollution, and household energy expenditure for its customers. The enterprise also serves agro-processing businesses by supplying them with clean cookstoves, solar lighting and heating solutions, waste-to-energy solutions, and solar dryers. It has served over 2,500 customers and has completed 120 projects since its establishment in 2019. SETECH has 5 full-time employees and 10 part-time employees. In 2021, it had a revenue of US$ 23,863.

Enterprise Stage:
Early-stage

Year Established:
2019

Enterprise Type:
For-profit

Women Owned/Led:*
At least 30% of women are in senior leadership positions

Enterprise Contact
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[1] SETECH is a registered limited liability company and social enterprise in Ghana.

*According to 2X "women entrepreneurship" and "women leadership" criteria; 2X Challenge Criteria

1. About The Enterprise

1.1 Problem

Lack of clean cooking fuel is a major challenge in Ghana. It is estimated that 80% of Ghanaian households use either wood or charcoal for cooking.[2] In rural areas, around 76% of households use firewood, while 17% use charcoal. In urban areas, usage of cleaner cooking fuels (such as gas and electricity) is higher than in rural areas, with 39% of urban dwellers using cleaner energy compared to 7% of rural dwellers.[3]

The use of wood and charcoal for cooking creates indoor air pollution, which in turn causes respiratory and circulatory ailments among those exposed.[4] Thus, a significant level of illness and mortality due to indoor air pollution has been observed in Ghana. It is estimated that deaths due to air pollution in Ghana total 28,000 per year, with nearly 75% of these deaths being attributed to household air pollution.[5] Women and girls are the most affected, as they are primarily responsible for household cooking.[6] Based on an analysis of the Ghana Demographic and Health Survey (DHS), women using unclean fuels were more likely to have moderate to severe anemia and weighed 3kgs less than those using clean cooking fuels.[7]

The burden of sourcing fuels for cooking (wood and crop residue) also falls primarily on women and children, who walk long distances for this purpose.[8] A study in Ghana found that women and girls spend a daily average of 1.4 hours collecting solid fuels.[9] Furthermore, solid fuel use contributes to deforestation and puts immense pressure on natural resources, thus adversely impacting the environment.[10]

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[2] Abdul-Wakeel Karakara, A., & Dasmani, I. (2019). An econometric analysis of domestic fuel consumption in Ghana: Implications for poverty reduction. Cogent Social Sciences, 5(1), 1697499.

[3] Bofah, R. O., Appiah-Konadu, P., & Ngwu, F. N. (2022). Transition to cleaner cooking energy in Ghana. Clean Energy, 6(1), 193-201.

[4] Burns, J., Boogaard, H., Polus, S., Pfadenhauer, L. M., Rohwer, A. C., Van Erp, A. M., ... & Rehfuess, E. A. (2020). Interventions to reduce ambient air pollution and their effects on health: an abridged Cochrane systematic review. Environment International, 135, 105400.

[5] Mudu. (2021). Ambient air pollution and health in Accra, Ghana. In *Ambient air pollution and health in Accra, Ghana* (pp. 1–44). World Health Organization. https://apps.who.int/iris/rest/bitstreams/1341612/retrieve

[6] Business Ghana-Women using Firewood face Increasing Health Effects. (2022, April 09) https://www.businessghana.com/site/news/general/260442/Women-Using-Firewood-Face-Increasing-Health-Risks

[7] Amegah, A. K., Boachie, J., Näyhä, S., & Jaakkola, J. J. (2020). Association of biomass fuel use with reduced body weight of adult Ghanaian women. *Journal of Exposure Science & Environmental Epidemiology*, *30*(4), 670-679.

[8] Murshed, M. (2022). Pathways to clean cooking fuel transition in low and middle income Sub-Saharan African countries: the relevance of improving energy use efficiency. *Sustainable Production and Consumption*, *30*, 396-412.

[9] Kyerewa, R. Daniel, C. Boakye, F. Tawiah, T. Nuhu, M. Gyaase, S. Kwartenf, A. Ayuurebobi, K. Agyei, O. Twumasi, M. Agbokoy, F. Kwaku, P. Darby, J. (2020, December). Time use implication of clean cookstove in Rural setting in Ghana; A Time Use Study https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7795878/#:~:text=Generally%2C%20households%20(mostly%20women%20and,day%20gathering%20firewood%20%5B12%5D.

[10] Servir Global-Mapping charcoal production to protect Land in Ghana. (2018, July)

https://servirglobal.net/Global/Articles/Article/2660/mapping-charcoal-production-to-protect-land-in-ghana

1.2 Solution

Sustainable Energy Technologies Limited (SETECH) designs, manufactures, and distributes clean and affordable cookstoves, briquettes, and pellets to households in rural and peri-urban areas of Ghana. The enterprise manufactures two types of stoves: charcoal briquette-fuelled and firewood-fuelled. These stoves are manufactured through the use of waste metal sheets from factory rejects. The briquettes and pellets are produced from agro-waste materials.

SETECH's supply of briquettes and pellets reduces the time spent by women and girls on sourcing solid fuel (firewood and charcoal), even when compared to liquified petroleum gas (LPG) users. A study in Ghana showed that time spent on economic activities was higher for liquefied petroleum gas (LPG) users, compared to traditional biomass cookstove users.[11]

The use of clean fuels (briquettes and pellets) also reduces indoor air pollution, household expenditures on cooking fuels, and environmental degradation through deforestation.

The enterprise sells its products in outlets, through commissioned sales agents, in small retail shops and supermarkets, and through women's groups. In addition to clean cookstoves, the enterprise also distributes and sells renewable lighting technology solutions (solar panels for lighting and heating). Briquettes and pellets are sourced from other manufacturers and sent to customers. The enterprise also provides its products and services to food and beverage (F&B) and agro-processing businesses, most of which are women-led. For these businesses, clean cookstoves, biomass gasifiers, brick ovens, solar dryers, and solar panels are the most frequently installed products. The enterprise also installs biomass gasifiers and solar panels for middle and upper-income households and institutions.

[11] Dwommoh Prah, R. K., Carrion, D., Oppong, F. B., Tawiah, T., Mujtaba, M. N., Gyaase, S., Kwarteng, A., Ae-Ngibise, K. A., Agyei, O., Twumasi, M., Agbokey, F., Asante, K. P., & Jack, D. W. (2021). Time Use Implication of Clean Cookstoves in Rural Settings in Ghana: A Time Use Study. https://www.ncbi.nlm.nih.gov/pmc/articles/PMC7795878/

1.3 Customer Segment

Customer Segment	Product / Service Provided	Paid / Unpaid
Low-income households in rural and peri-urban areas	The enterprise manufactures and distributes clean-energy cookstoves, and distributes briquettes and pellets. In addition to its own manufactured stoves, the sales team also markets products such as solar panels for lighting and heating, pellets, briquettes, and cookstoves (from other manufacturers).	**Paid** The enterprise offers pay-as-you-go options for its products. Households can opt to pay installments for the purchased product on a weekly or monthly basis. The price for a household stove ranges from US$ 10–US$ 30.
F&B and agro-processing businesses, such as those involved in fish smoking, palm oil processing, cassava processing, and shea butter processing	The enterprise manufactures and distributes clean-energy cookstoves, and distributes briquettes and pellets. In addition to its own manufactured stoves, the sales team also markets products such as solar panels for lighting and heating, pellets, briquettes, and cookstoves (from other manufacturers). The enterprise also builds solar dryers for agro-businesses.	**Paid** The enterprise offers a pay-as-you-go system, with the option of weekly or monthly installments. This is specifically helpful for women food vendors that cannot afford a one-time payment. The price for a commercial stove ranges from US$ 50–US$ 80.
Institutions, middle and upper-income households	The enterprise provides institutions with clean cookstoves, briquettes/pellets, and clean lighting solutions. The enterprise also installs solar panels, biogas digesters, and brick ovens.	**Paid** Customers most often pay for these products through a one-time payment. Alternatively, there are payment installment options for the purchased product.

1.4 Team And Governance Structure

The enterprise has 5 full-time employees and 10 part-time employees.[12] Currently, 40% of the full-time employees and 30% of the part-time employees are women. The full-time employees include the CEO, 2 employees in finance and administration, and 2 employees in manufacturing, sales, and marketing. The part-time employees include 5 in manufacturing and 5 in sales and marketing. The enterprise has a management board of 5 members, 40% of whom are women.

[12] Part-time employees are onboarded as needed by business operations throughout the year.

1.5 Enterprise Policies

Policy	Yes / No
Overall HR Policy	Yes
Equal pay for equivalent work policy	Yes
Non-discrimination / Equal employment opportunity / Diversity and inclusion policy (gender, LGBTQ, PWD, etc.)	Yes
Anti bullying and sexual harassment policy / Respectful workplaces	Yes
Whistleblower policy / Employee grievance mechanism	Yes
Maternity / Paternity leave policy	Yes
Safeguarding policies for vulnerable groups (children, elderly, PWDs)	Yes
Safeguarding policies for the environment or to reduce detrimental impact on the environment (covers reducing carbon footprint, reduced water consumption etc.)	Yes

2. Impact

2.1 Mission Statement

SETECH's mission is to use innovative business models to provide clean energy and environmental solutions for cooking, waste management, and lighting in weak-grid and off-grid communities

2.2 Intended Impact

SETECH **reduces** the time women and girls spend on sourcing fuel for cooking and lighting by providing clean cooking and solar lighting solutions to households.

2.3 Monitoring And Measurement

The enterprise measures the reach of its services on a quarterly basis, by tracking the following indicators:

- Number of stoves sold
- Number of solar lamps sold
- Number of customers served (households, agro-processing businesses, and institutions)
- Number of individuals utilizing its products
- Number of commission agents[13] that benefit from the enterprise's operations
- Quantity of briquettes sold (in kgs)

The enterprise also measures the quality of its services by conducting quarterly customer satisfaction surveys. These surveys are conducted while providing customers with post-sale services.

The enterprise is also currently developing a framework to measure its impact on the climate.

2.4 Results To Date

This section provides an overview of the enterprise's results:

- Number of cookstoves sold: 3,250[14]
- Number of households served: 2,500
- Number of individuals benefiting from products: 12,500[15]
- Number of agro-businesses served: 500
- Number of solar lanterns sold: 5,370
- Quantity of pellets/briquettes sold (in kgs): 3,750
- Number of commission agents that benefit from the enterprise's operations: 25

[13] Commission agents sell clean cookstoves that have been manufactured by SETECH.

[14] Number of commission agents that benefit from the enterprise's operations: 25 The number of cookstoves sold is higher than the number of households served as some households purchase more than one stove.

[15] For the number of individuals benefited, the enterprise considers all members of the household served. It estimates that on average, each household has 5 members hence the total number of individuals benefited is 12,500.

SETECH's work is aligned with the following Sustainable Development Goals (SDGs):

3. Financials

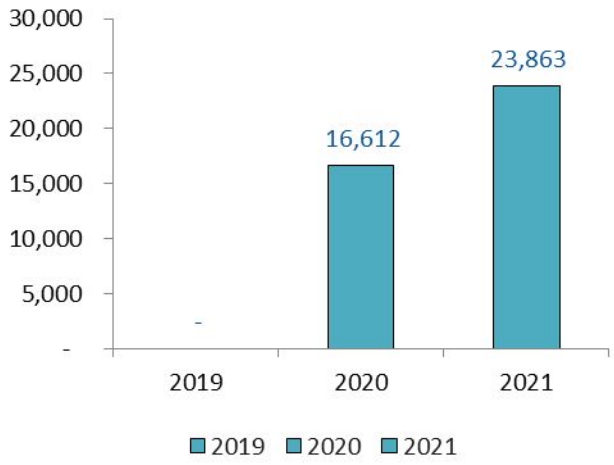
3.1 Financial Status

SETECH is financially profitable.

(Amounts in US$)	FY2019	FY2020	FY2021
Total Revenue	NA	16,612	23,863
Total Expenses	NA	10,345	20,242
EBITDA OR Profit/Loss	NA	6,267	3,621
EBITDA Margin	NA	38%	15%

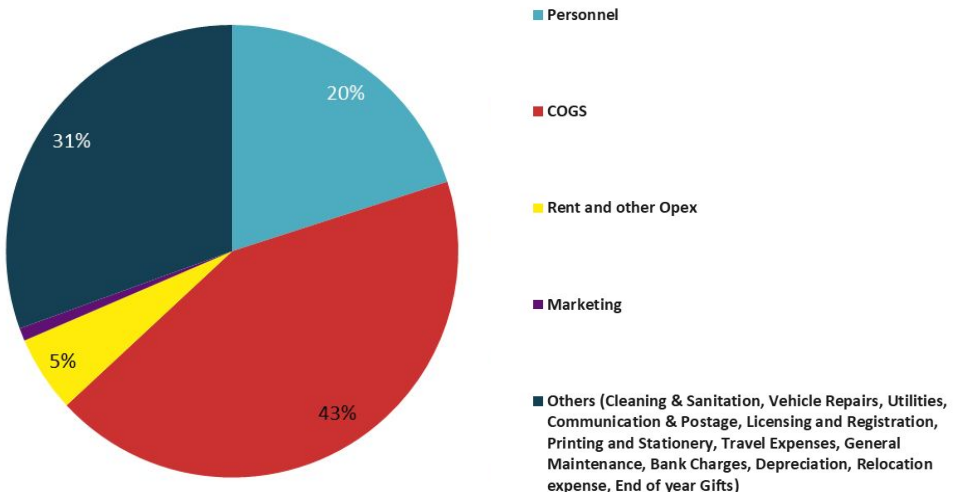
3.1.1 Revenue Streams

The enterprise generates revenue from the sale of products and through grants. On average, 60% of the enterprise's revenue comes from the sale of products, while 40% comes from grant funding. In 2022, the enterprise's revenue increased substantially. This is due to the signing of a contract for US$ 280,000 in order to manufacture and distribute climate-smart cookstoves in Ghana throughout the following year.



3.1.2 Expenses

This section provides an overview of expenses in 2021[16]



[16] The enterprise has low personnel costs as part-time employees are onboarded as needed. The enterprise has also benefited from volunteers that have assisted the company in its manufacturing operations.

3.2 External Funding Sources (Past and Current)

The enterprise has received external funding from the following sources in the past:

- In 2021, the enterprise received a grant of US$ 5,000 from the Tony Elumelu Foundation. These funds were used for working capital and the purchase of equipment.
- In 2020, the enterprise received hybrid financing of US$ 26,000 from the Orange Corners Acceleration Program. Of this sum, 70% was a loan and the remaining 30% was a grant. These funds were used to purchase equipment.
- In 2020, the enterprise received a grant of US$ 1,146 from the South African Innovation Hub. These funds were used for working capital.
- In 2019, the enterprise received a grant of US$ 23,000 from the Ghana Climate Innovation Centre. These funds were used to proto-type products and purchase equipment.
- The enterprise has also received equity funding from its board members. The amount of equity funding received has not been disclosed. Please reach out to the enterprise for further information.

3.3 Challenges Faced In Accessing Capital

High cost of capital: The enterprise has not approached mainstream financiers (such as commercial banks) for loans, as such loans are offered at high-interest rates. It is also observed that commercial banks in the country have historically not been interested in lending to cookstove businesses. Furthermore, the enterprise has only equipment to offer as collateral, which is not a preferred form of collateral for traditional banks and financial institutions in Ghana.

4. Path To Scalability

4.1 Potential Avenues For Growth

- **Expand customer base:** The enterprise seeks to expand the number of commission agents and sales outlets in order to supply its products to more customers in Ghana. Currently, it has operations in two regions within the country. By 2025, it plans to establish sales outlets in at least five regions. The enterprise also intends to export its products to at least two other countries in West Africa within the next 5 years.

- **Expand production**: The enterprise aims to expand its production facility and manufacture three more types of stoves. This could increase its manufacturing capacity to 240,000 stoves per annum.
- **Potential partnership with the government:** In Ghana, the government aims to phase out all inefficient and unclean cookstoves by 2030. Consequently, the enterprise has the opportunity to develop partnerships with the government in order to manufacture and/or distribute clean cookstoves to target households in the country. In 2020-21, SETECH was subcontracted by another entity to manufacture clean cookstoves for the government initiative.
- **Increase the number of carbon credit contracts:** The enterprise aims to engage with interested entities for the exchange of carbon credit contracts. With these agreements, the enterprise manufactures and distributes clean cookstoves and the carbon credit benefit goes to the entity. The enterprise has already signed one such contract in 2022.
- **Develop SETECH's carbon finance facility:** The enterprise aims to develop emission reduction programs and create carbon assets. This will provide the enterprise with an additional stream of revenue.

4.2 Risks And Challenges

- **Financing:** The enterprise faces challenges in accessing capital from mainstream financiers such as banks, due to the high cost of capital and lack of acceptable collateral.
- **Operational (payments):** The households that purchase the enterprise's products have low paying capacity. Hence, the enterprise offers pay-as-you-go plans to these clients. However, the enterprise faces challenges in slow recovery rates as a result.
- **Operational (product design)**: The enterprise needs to further enhance the product design of the clean stoves in order to increase uptake by households.
- **Operational (IT)**: The enterprise needs to enhance its website design and user experience of its e-commerce platforms to make it simpler for households to purchase products online.
- **Competition (low barriers to entry)**: There are low barriers to entry to sell clean cookstoves in the enterprise's regions of operation. The enterprise faces challenges in that trained employees have left the enterprise in order to set up their own ventures in the same market.
- **Competition (government)**: In Ghana, government programs provide free clean cookstoves and lanterns to end users. Consequently, this reduces the willingness of households to pay for these products. The enterprise, therefore, seeks to partner with the government and carbon finance developers in order to be able to produce and offer affordable/free solutions to end-users. The products would be paid for by the government or carbon finance developers.

- **Cultural norms:** In Ghana, there are cultural norms related to how food is cooked. Households prefer food that is grilled over charcoal or firewood. The enterprise has observed that this reduces the willingness of households to move to clean cookstoves. Often there is "stove stacking," where households own several different stoves that serve various purposes. Furthermore, some rural and peri-urban food vendors in Ghana prefer to use kerosene lamps over solar lamps, because they perceive that the smoke from the former keeps flies away from their stalls/shops. Therefore, there is a low willingness to switch from kerosene to solar.

4.3 COVID-19 Impact On The Enterprise

Due to COVID-19 restrictions, the sales agents were unable to meet customers in person to sell cookstoves. Consequently, sales remained low. Due to the financial shortfall, the enterprise also had to lay off some staff members. To address the COVID-19-related challenges, the enterprise developed an e-commerce website and social media pages to boost sales and reach out to potential customers. This website not only showcases the enterprise's products but also showcases clean energy products such as clean cookstoves, solar lanterns, and solar generators from other manufacturers. Showcasing products from other manufacturers has enabled the enterprise to sell additional products to its target customer base.

4.4 Support Received To Date

The enterprise has received support from the following institutions:

- In 2022, the enterprise received the Sustainable Energy Partnership of the Year Award.
- In 2021, the enterprise received mentorship support from the Tony Elumelu Foundation for business development and leadership training.
- In 2020, the enterprise received support from Orange Corners, a Government Funded project in the Netherlands. Through participation in this program, the enterprise was able to build its expertise in effectively managing the business, increasing sales, and networking.
- In 2019, the enterprise received support from the Ghana Climate Innovation Center (GCIC), a business incubator in Ghana. GCIC provided the enterprise with entrepreneurial training, technology development support, proof of concept grants, mentorship, and peer exchange grants. All were beneficial for the development of its clean cookstove technology, which allowed the business to reach the minimum viable products for scale-up.
- In 2019, SETECH Won the Best Environmental Clean Energy Technology of the year award from the Ghana Environmental Excellence Awards.

4.5 Inputs Required For Growth

Financial:

- SETECH is seeking both equity and blended financing:
- Phase 1: In the next year, the enterprise is seeking equity (or debt-funding) totaling US$ 100,000-US$ 500,000, in order to expand its operations throughout Ghana. The funds will be used to expand manufacturing facilities for commercially viable cookstoves, as well as to set up sales outlets/shops in the remaining two regions of Ghana.
- Phase 2: In the next 2-3 years, the enterprise is seeking funding totaling US$ 1.5-US$ 2 million in order to expand to other countries in West Africa.
- Phase 3: In the next 5-10 years, the enterprise is seeking funding totaling US$ 2-US$ 5 million in order to expand even further in West Africa.

Non-financial:

- The enterprise is seeking personnel with carbon financing expertise to develop its carbon finance facility.
- The enterprise is seeking personnel with design and engineering expertise to improve the cookstove product design for end users.
- The enterprise is seeking IT support to enhance its e-commerce platforms and improve the user experience for its intended customers.