

## Key Research Findings towards unlocking South Africa’s Micro-Digester Sector

### CHALLENGES



**Data from the fieldwork conducted shows that most digesters function below 50% of their capacity.** A micro-digester would not earn a Return on Investment because the Levelized Cost of Energy and Local Cost of Cooking values are between 1.5-4 times the cost of either grid-based electricity or bottled LP gas. An investor without incentive would have a negative Net Present Value.

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**There is a current belief that micro-digester technology has good designs that can work effectively if correctly implemented, operated, and maintained.**

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**The used technologies in the micro-digester space in South Africa is not financially viable.** For the best-case scenario of functional digesters, the techno-economic analysis shows that the technology is 1.5-4 times more expensive than grid electricity and LP gas.

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The micro-digester sector is currently dominated by development partners, government institutions through subsidies and other lobbying groups. **To fully develop the sector, there must be a direct relationship between the existing groups, the private sector, and the end-users of the technology.** Research needs to be conducted.

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### ADVANTAGES



**Micro-digester technology has more to offer than just energy for cooking.** Other value-added benefits are, for example, waste to energy management and the creation of organic fertilizer. To fully realize the potential of this technology, product and process optimization should be a key highlight in developing this sector. A few roles that micro-digester technologies can play are:



a. Local variation in energy access is reduced through the technology. A renewable energy source is provided which contributes to a simultaneous decline in greenhouse gases by eliminating traditional energy sources such as firewood.



b. Water Energy Food Nexus is enhanced. Food waste across the supply chain contributes to 4% of South Africa’s greenhouse gases, which can be used for valorization activities. Optimization of these processes can result in an interlinked solution for the Nexus.



c. Creation of new green jobs by providing skills and capable tradespeople.



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### ENABLING FACTORS



**Research and innovation are governing factors in developing the scale and depth of the micro-digester sector.** For South African, the primary forms of innovation can thus be classified and analysed as follows:

- a. **Product** innovation – Very little to non-existent. Only a few research cases have been conducted. The market is dominated by proven technologies and designs are mainly from other countries.
- b. **Process** innovation – The sector development plan outlines that little literature provides evidence of any process innovation. This includes but is not limited to research and innovation around the insulation methodologies, mixing technologies, and additives to enhance bio-methane production.



c. **Business** innovation – The current policy landscape makes any kind of business model development redundant because of the lack of proper marketing related organisation in the micro-digester sector in South Africa.



d. **Organizational** Innovation – The study shows that only one out of 53 cases has achieved the organisational innovation level required to make this technology fully functional in SA. Other countries like Malawi are leading.

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**The market for micro-digester in South Africa is present with 30 000 schools, 16.7 million households** of which 10% are rural based, which often don't receive appropriate waste management services.

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A window of opportunity has presented itself regarding the renewable energy policy landscape. The City of Cape Town has implemented a policy that bans organic waste from landfills. **This means that organic waste must be processed before being disposed.** The micro-digester sector can use the changing policy landscape to thrive.

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