

SMME DEVELOPMENT THROUGH PRODUCTIVE USE OF DOMESTIC ENERGY RESOURCES

David K. Kimemia & Harold J. Annegarn

University of Johannesburg, Department of Geography, Environmental Management & Energy Studies, ²
SeTAR Centre, University of Johannesburg, Bunting Road Campus

ABSTRACT

Productive energy services are often overlooked in domestic energy access programs; yet people cannot raise their welfare except by engaging in economic activities. Household energy demand(s) should be viewed in two components, that is, residential and productive energy services. Although the South African government prioritised electricity distribution after independence, this programme was framed in terms of domestic residential use. Thus, the supplied electrical power was limited to low amperage current, adequate only for household lighting and electronics. Intrinsically, the National Electrification Programme and the Free Basic Electricity Programme [1] that have substantially increased electricity access in the last decade, did little to spur Small, Medium and Micro Enterprises [SMME] growth in urban penumbras and rural localities. Yet, perambulates in these areas indicate that people are engaged in enterprises that yearn for cleaner, reliable, and cost-effective energy inputs. Commercial cooking is a prevalent business in the low-income settlements, which is powered mostly by basic fuels and low efficiency combustion technologies. Although SMMEs contribute about a quarter of gross capital formation, they have a major potential in employment creation, especially within the current context of negative jobs growth in government and large enterprise sectors. This paper argues that SMME growth can be consolidated and accelerated through provision of safe, affordable and efficient energy technologies. Evidence for this claim is based on a quantitative survey that was carried out among street vendors in Alexandra Township, Johannesburg. Discussions were held with the business owners on alternative fuels and modalities for transitioning the informal business sector to use of clean energy resources. The entrepreneurs cite energy poverty and poor premises as the biggest constraints to their businesses.

Keywords: productive energy services, SMME, domestic energy, free basic energy

1. INTRODUCTION

Energy is a necessary ingredient for socioeconomic development. Energy provision must therefore be prioritised alongside food, water, health and education. Despite this, many households in developing countries lack access to basic energy resources for residential and productive requirements. This situation is termed energy

poverty, and affects about 3 billion households globally [2]. Such households rely mostly on inefficiently utilised solid fuels.

The “energy-poor” suffer the health consequences of inefficient combustion of solid fuels in inadequately ventilated dwellings, as well as the economic consequences of insufficient power for productive income-generating activities [3]. A World Bank study indicates that countries with underperforming energy systems may lose up to 1-2% of growth potential annually because of inefficient use of scarce energy resources [3].

The term “productive uses of energy” as used in this paper refer to economic end use of basic energy, specifically for commercial cooking. The utilised energy is derived from domestic supplies. The energy conversion technologies too are likely to be similar to those used in households rather than in formal restaurants and catering businesses. Skills levels in operation of such businesses are low at entrance level, growing steadily, depending on milestones overcome and opportunities for practical training. Awareness and access to technology options and financial instruments boosts the developmental path from small micro enterprises to medium formalised businesses. In South Africa, energy is an incontrovertible challenge to 25% of the population [4] who live in off-grid rural areas or in tin shack urban dwellings. It is our view that access to productive energy services would lead to economic emancipation of these communities. This view is evident from the fact that some residents of the poor areas are engaged in incoming generating activities; however, constraints on access to sufficient energy diminish their outputs and growth potential. These economic units face challenges in energy supply, inadequate premises, and capitalisation.

SMME business sector is vital for the growth of developing country economies. This is because such business units can be started with low capital outlays, and powered by basic energy resources that are often available in local areas. It is argued that SMME expansion is especially crucial to South Africa because all other aspects of orthodox macro-economic policy have failed to spur socio-economic growth for the bottom of the pyramid [5]. SMMEs are usually defined with two indicators: number of employees and capital investment [6]. Most of them cater towards the domestic market and use of local resources, including energy.

This project has investigated the energy challenges of SMMEs through a quantitative case study of Alexandra Township, Johannesburg. The purpose for the work is to highlight the role played by informal businesses in community development and the role of energy in their operations. Based on the findings, possible intervention strategies will be suggested. The study focuses on micro enterprises that act as the cradle for entrepreneurship and play a critical role in income generation for many South Africans. The study ponders how micro enterprise owners can be equipped to reach a minimal standard of business viability. It is proposed that an income target for micro enterprises should be the minimum wage in the formal sector set by the government [7].

1.1. SMMEs in SOUTH AFRICA

The classification on whether a business unit falls under a small, micro or medium enterprise depends on size of investment, establishment and output. A micro-enterprise (the subject of this study) usually operates in informal business premises; draws upon domestic energy sources; is not registered for VAT due to low turnovers; lacks trade licences; is undercapitalised; and has fewer than five employees [8].

The importance of SMMEs in the economy expresses itself in their contribution to the GDP and employment, which is likely to be equivalent to the total employment in large enterprises. In South Africa, the total economic output of small and medium enterprises is some 50 per cent of (GDP) and employment share in excess of 60 per cent of the total labour force [9]. Although often overlooked by policy makers, a greater employment potential resides in the informal rather than formal economic sectors. However, growth is stifled by energy burden and limited access to bank credit.

Effective energy access can provide new opportunities for SMMEs to develop and diversify, thereby increasing income and providing additional employment [10]. SMMEs in the study area need energy for cooking and catering services, refrigeration, phone charging, and to run salons and barber shops. Contemplated alternative energy sources should be renewable, clean, safe and transformative in terms of practices and wellbeing.

In low income urban South Africa, solid fuels are a widely used energy source in heat-intensive micro enterprises (and may cover up to a third of energy consumption). A progression towards the cleaner liquid and gaseous fuels is expected as the consumption of commercial energy increases [11].

Energy related expenditures, as a fraction of the total running costs of SMMEs, can be high, depending on energy intensity and thermal efficiency of conversion technologies. Use of optimised stoves would therefore increase prosperity, safety, and improve the health of entrepreneurs.

2. METHOD

A quantitative research design was adopted for this study. This was achieved through a structured questionnaire, administered among a randomised sample of street vendors in Alexandra Township, a historically Black suburb in Johannesburg, South Africa. The traders, who operate cooking and catering businesses, were interviewed on energy access and expenditure issues, and on business operational details. Enumerators for this project were seconded to the project by a community-based organisation based in Alexandra Township. Before commencing on the actual data collection exercise, the enumerators were trained for a day and tested in a pilot survey that also assisted in refining the questionnaire.

Convenience sampling was applied in the selection of the study area, while purposive and random sampling was used in the selection of businesses to interview. In total thirty micro enterprises were interviewed. Complimentary methods were personal observations, photography and qualitative discussions.

3. RESULTS AND DISCUSSION

3.1. ENERGY TECHNOLOGIES

The businesses sampled in this study were involved in commercial cooking using a diversity of fuels and conversion technologies. The most common fuel was paraffin, used by 34.1% of the businesses, while 25% used wood, 22.7% used LPG, and 9.1% used coal or electricity. Often, the businesses deployed more than one fuel, depending on availability and perceived cost-effectiveness for the different tasks. Thus, paraffin was used alongside LPG or wood. LPG was named as the overall most important fuel for cooking enterprises, followed by paraffin.

Comparisons between the current findings and previous spot survey in 2009/2010 [12] indicate a fuel transition in the small and micro enterprises from dirtier solid fuels to cleaner liquid and gaseous fuels. Narratives indicate that energy choices are based on cost, cleanliness and availability. Smoke pollution is the biggest reason that people cite for translating to use of paraffin or LPG in their enterprises. Businesses that are still using solid fuels are mainly situated in the poorer areas of the sprawling township and their stated aspirations are to graduate to LPG. Unlike in residential energy choices, safety concerns do not play a major role in the choice of energy technologies for productive services.

For those utilising wood or coal as fuel, three-stone open-fires or drum braziers stoves were used. Paraffin was burnt in the old-type wick stove that has been declared unsafe, and banned for sale in South Africa [13]. Respondents say their choice for this stove is its high fire-power. The common LPG stoves were three to four burner commercial varieties (Figure 1).



Figure 1: LPG stoves used in street cooking enterprises, Alexandra Township

A majority 86.7% of the respondents say high fire-power is a very important attribute of a commercial-cooking technology as it ensures fast cooking. Other desired attributes are: less gaseous emissions; easy to ignite and versatility. In this regard, LPG is most preferred, as it meets all the desired attributes. The only concerns are seasonal LPG shortages and rising prices.

Energy expenditure for the businesses ranges from R30 to R1 030 per week, with a mean of $R235 \pm 193$. On average, the businesses make a gross profit of R1 500 per week, with a range of R400 to R7 000.

3.2. OPERATIONAL ENVIRONMENT AND RESPONDENTS' PROFILE

Most of the businesses (65.2%) are operating on open-road reserves in makeshift premises, made up of a roof canopy on poles and canvas walls (Figure 2). Only a minority of businesses are on formal premises, either rented or owned on tenant purchase basis. Businesses in makeshift premises normally rent space in nearby formal buildings for overnight storage of their valuables or store this at home if they live close by. Vendors cite the makeshift structure as a major constraint to their operations as they cannot cook or serve customers when it is raining.



Figure 2: Makeshift informal business structures, Alexandra Township

Ambient air pollution is a point of contention between street vendors and local communities, who decry air quality degradation from solid fuel using enterprises. Local authorities also frequently confiscate braziers for environmental health and safety reasons. Cases of fire incidents from cooking enterprises have been documented [14]. Safety and health risks could be addressed through use of safe stoves and educational campaigns.

None of the interviewed entrepreneurs had received business finance from lending institutions. Most of the start-up capital were from own savings or borrowed from friends or relatives. A significant 36.7% of the enterprises do not keep records of their business transactions. Training on bookkeeping, business formalisation, use of efficient energy technologies and operation in formal premises would go a long way in stabilising the enterprises.

A majority of the businesses are family owned and operated. Establishments comprise on average two workers, often made up of the owner with an employee or relative. Most of the respondents were female, and only 17.9% of them had a matric certificate. When asked "what was the biggest threat to the sustainability of their local community", most respondents mentioned lack of jobs, lack of proper houses, and energy burden.

4. CONCLUSION

SMMes play an important part in the economy of developing countries. Micro enterprises often depend on conventional sources of energy and inefficient combustion technologies. Lack of access to modern energy sources hampers the development of SMMes, with potential entrepreneurs unaware of the possibilities offered by public and private organisations.

Lack of a dedicated domestic energy policy in South Africa that promotes access to clean productive energy resources is a great hindrance to socio-economic growth. Such a policy should be enacted with the aim of

promoting greater use of commercial energy for poverty reduction and human welfare development.

LPG is the preferred energy technology for cooking enterprises as it satisfies all the attributes that operators are looking for. The Government and relevant role players should look into modalities of assisting the micro enterprises to acquire the desired energy carrier. The provision of energy technology as per entrepreneurs' preferences plus appropriate premises, funding arrangements and skilling would spawn new possibilities for SMMEs, leading to viable enterprises and empowered communities.

Modern bioenergy with efficient conversion technologies could be applied in micro cooking enterprises. The biofuels may come from ethanol, biomass gasification or biogas. If the biofuels are available in sufficient quantities, high energy density, and at reasonable prices, they could be promoted as alternatives or complements to LPG.

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REFERENCE

- [1] Department of Minerals and Energy [DME]: "Electricity basic services support tariff policy", Government Gazette, Vol. 457, No. 25088, Republic of South Africa, July 2003.
- [2] United Nations Foundation: "What we do: Achieving universal energy access". 2012.
- [3] The Secretary General's Advisory Group on Energy and Climate Change (AGECC): "Energy for a sustainable future – summary report and recommendations". 28 April 2010, UN, New York.
- [4] Statistics South Africa: "*Census in brief*", 2011. From, http://www.statssa.gov.za/Census2011/Products/Census_2011_Census_in_brief.pdf, 2012/12/10.
- [5] Bond, P.: "*Cities of Gold, Townships of Coal: Essays on South Africa's New Urban Crisis*". Asmara: Africa World Press Inc., 2000.
- [6] Shrestha, R.M., Kumar S., Martin, S., and Urmee, T.: "Application of productive uses of renewable energy for small, medium and micro enterprises". Paper prepared for the *UNDP Expert Meeting on Productive Uses of Renewable Energy*, 9-11 May 2005, Bangkok, Thailand.
- [7] Rolfe, R., Woodward, D., Ligthelm, A. and Guimaraes, P.: "The viability of informal micro-enterprise in South Africa". Paper presented at the Conference on Entrepreneurship in Africa, Whitman School of Management, Syracuse University, New York, April 1-3, 2010.
- [8] Meadows, K., Riley, C., Rao, G., & Harris, P.: "Modern Energy: Impacts on Micro-enterprises. A report produced for UK Department for International Development". 2003. Retrieved July 20, 2012, from <http://www.dfid.gov.uk/r4d/PDF/Outputs?Energy/R8145-Litrev.pdf>
- [9] Falkena, H., Abedian I., von Blottnitz, M., Coovadia, C., Davel, G., Madungandaba, J., Masilela, E., Rees, S.: "SMEs access to finance in South Africa – a supply-side regulatory review". The Task Group of the Policy Board for Financial Services and Regulation. Undated. Accessed from, <http://www.treasury.gov.za/publications/other/Access%20to%20Finance%20in%20South%20Africa%20-%20A%20Supply-Side%20Regulatory%20Review.pdf> 31 Dec.12.
- [10] Shrestha R.M., Kumar S., Martin S., Limjeerajarus N.: "Report on role of renewable energy for productive uses in rural Thailand". Prepared for Global Network on Energy for Sustainable Development. 2006.
- [11] Yao, C., Chen, C., & Li, M.: "Analysis of rural residential energy consumption and corresponding carbon emissions in China". *Energy Policy*, 41, 2012, 445-450. <http://dx.doi.org/10.1016/j.enpol.2011.11.005>.
- [12] Kimemia, D.K. & Annegarn, H.J.: "An urban biomass energy economy in Johannesburg, South Africa". *Energy for Sustainable Development*, 15, 2010, 382-387.
- [13] National Regulator for Compulsory Specifications: Consumers warned against the purchasing of unsafe non-pressure fuelled cooking stoves and heaters. 2009. Available from www.nrccs.org.za/content.asp?subID=56#, 8 April 2010.
- [14] Cox, A: "Hawkers sitting on a time bomb". Available from <http://www.iol.co.za/the-star/hawkers-sitting-on-a-time-bomb-1.1345460#.UOf5rIQaJok> January 2013. July 2012, The Star.

AUTHOR(S)

Co-Author:



Prof Harold Annegarn has researched atmospheric pollution, environmental management and energy efficient housing in southern Africa for 30 years. He has supervised over thirty MSc and PhD students. His current research interests are on energy and sustainable Megacities, through the EnerKey programme in partnership with the University of Stuttgart; and the development and testing of improved domestic combustion stoves, and their contribution to air pollution reduction.

hannegarn@gmail.com

Author:



David Kimemia holds a MSc. in Environmental Management. He is currently reading for a Doctorate in environmental management at the University of Johannesburg. His research interests interrogate the interface between society, environment, energy and economy. Current project is on household energy transitions.

dkimemia@gmail.com

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