

Electricity connections of firms in Lusaka



In brief

- There is very limited information available on energy access of Zambian firms and this may inhibit design of appropriate policies related to productive uses of energy.
- A new census of businesses in Lusaka suggests that over 96.6% of businesses surveyed appeared to have electricity access.
- Comparison with data on existing connections to the grid suggests that many firms may be accessing electricity through residential or shared connections.
- More data and better understanding of energy access of Zambian firms is needed to inform the design of tariff structure, firm electrification efforts, and general energy policies.

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Electricity as an obstacle to firm growth

According to the Zambia Living Conditions Monitoring Survey 2015, 31.4% of the Zambian population had access to electricity – with a large discrepancy between electricity access in urban (67.3%) and rural areas (4.4%). Due to low electrification rates, electrification has been a focus area for policymakers and donors alike through ambitious policy plans such as the Rural Electrification Master Plan developed in 2008 and donor-funded programmes such as the [Increased Access to Electricity Services \(IAES\)](#) Project by the World Bank.

These projects have predominantly focused on electricity access for households and community institutions with less emphasis on provision of electricity for productive use. This is despite the fact that [growth diagnostic studies in Zambia and Sub-Saharan Africa](#) (SSA) often identify lack of access to reliable electricity as a key impediment to growth. Enterprises deploy various sources of energy in their production process but electricity is arguably the most versatile and economical. Access to reliable electricity is therefore an indispensable input into most, if not all, business operations due to their reliance on electrical devices, machinery, and of course lighting.

Firms that lack reliable electricity supply are forced to resort to various coping strategies. Typical responses include adjustments in choice of business, choice of location, output reduction, factor substitution, and self-generation. Such adaptation does not come without a cost and can prove detrimental to the productivity, profitability, and growth prospects of firms. On a macro-economic level, this can translate into a serious impediment to a country's overall economic development – [as experienced recently in Zambia](#).

Limited data on electricity access of Zambian firms

Designing appropriate interventions to increase electricity access requires the ability to assess the level of access to electricity and energy more generally. This is equally important for tracking progress towards improving access.

Currently, there is very limited information on electricity access among Zambian firms. One exception is the [World Bank Enterprise Survey](#) which provides comprehensive information on a number of firms in each country (720 in Zambia) and has almost global coverage.

The headline findings related to electricity, illustrated in the table below, seem to indicate that the average Zambian firm is much less constrained by access to electricity compared to the average firm on the continent. Indeed, the average number of outages, their duration, and the waiting time to obtain a connection is 50% of that experienced by the average SSA firm.

	Zambia 2013	Sub-Saharan Africa 2013
Percent of firms identifying electricity as a major constraint (%)	27.1	39.3
Percent of firms owning or sharing a generator (%)	27.3	50.9
Number of electrical outages in a typical month	5.2	8.3
If there were outages, average duration of a typical electrical outage (hours)	2.1	4.1
Days to obtain an electrical connection (number of days)	18.9	36.8

Across the four cities included in the survey, we observe that the firms in the capital city Lusaka, the most populous city in Zambia, were relatively more constrained by unreliable electricity compared to the two secondary cities Kitwe and Ndola.

	Electricity as a major constraint (% of firms)	Number of outages	Duration of outage (hours)	Owning Generator (%)	Days to obtain electricity connection
Lusaka	30.0	6.8	2.6	31.8	15.8
Kitwe	13.4	1.9	1.6	16.9	25.5
Ndola	17.0	2.6	1.0	19.4	26.4
Livingstone	60.7	6.8	2.7	28.9	32.0

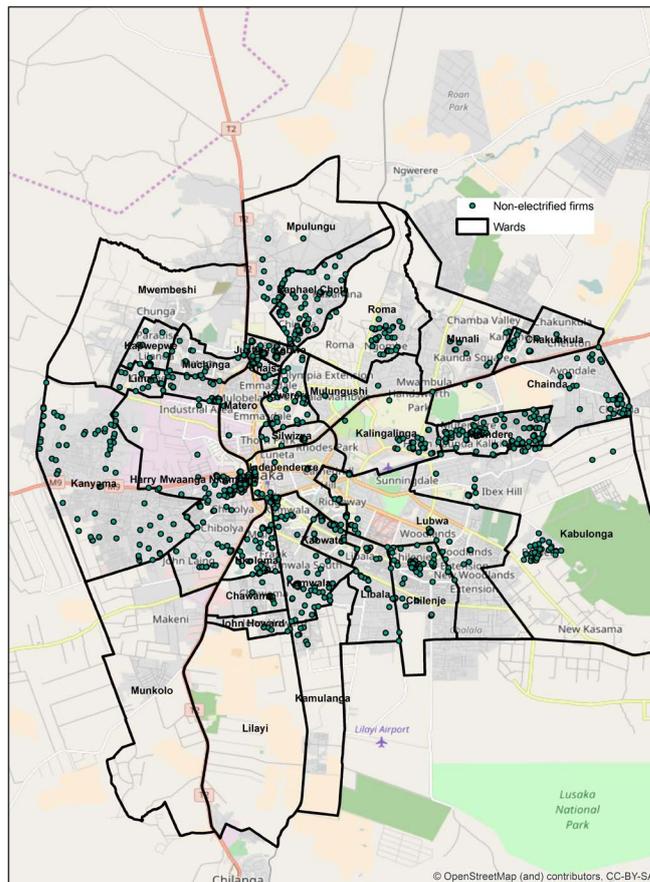
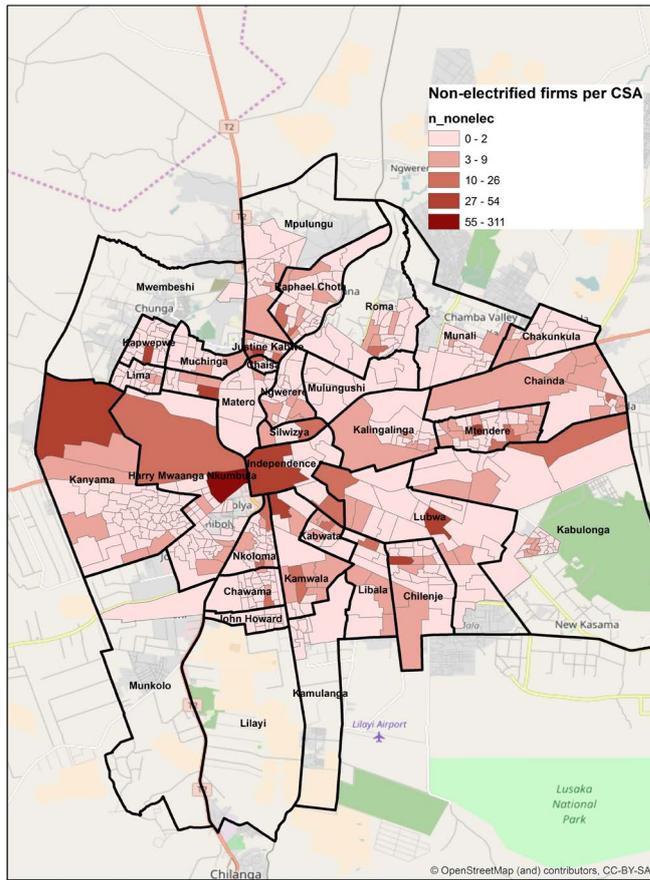
The results from the enterprise survey may, however, be outdated since the survey was administered prior to the [major electricity crisis in Zambia in 2015-2016](#).

Moreover, the survey provides only a partial picture of electricity access as it targets large, medium, and small enterprises only – excluding micro enterprises that provide employment to the majority of the population. This micro category of businesses may not be constrained by the unreliability of electricity as much as a lack formal connections to electricity in the first place – forcing them to rely on alternative sources of energy.

New data on electricity access - Lusaka census of entrepreneurs

To help shed light on the existing degree of electrification among business in Zambia, IGC recently funded a comprehensive business survey in Lusaka that included an assessment of electricity access among firms. The Lusaka Census of Urban Entrepreneurs was completed in 2016 as part of a [larger project on small entrepreneurs and urban density](#). The census targeted all businesses in Lusaka and contains basic information, including access to electricity, on 47,428 businesses across all industries and firm sizes.

The information on electrification status was derived from a simple yes/no answer to the question: Is the business electrified? Surveyors were also



Non-electrified firms employ fewer workers and operate in retail, services, and manufacturing

The employment and sector classification included in the survey provides some insight on the characteristics of the non-electrified businesses.

The largest number of non-electrified businesses operate in retail (916), accommodation and food services (254), and manufacturing (192). These three sectors are also the most numerous amongst electrified businesses. More generally, the sectoral distribution of businesses does not vary significantly across electrified and non-electrified firms.

In terms of employment, non-electrified businesses reported having relatively fewer employees, as could be expected, employing 0.6 workers on average compared to 2.3 for electrified businesses. In fact, 68% of non-electrified businesses were sole proprietorships with the largest non-electrified firm employing 15 workers.

Many companies operate on residential tariffs and communal connections

Comparing the census data with the register of existing electricity connections from the national electricity provider Zesco reveals some interesting patterns.

Category	Number	Percent
Agriculture	102	0.0%
Industrial	3,174	1.1%
Commercial	12,403	4.4%
Residential	265,852	94.0%
Social Services	1,171	0.4%
Zesco Facilities	31	0.0%
Total	282,733	100.0%

The number of connections within the firm categories agricultural, industrial, and commercial (15,679) is much lower than the number of electrified businesses (44,921) in the census. One could speculate that this difference may be a result of variety of factors, including use of off-grid systems, illegal connections, shared connections, and firms that are connected on residential tariffs. Although the existing data cannot provide any definitive answers to this question, it does provide some clues for further enquiry.

In particular, shared connections in market places – where 30% of Lusaka businesses are located – are likely an important explanation for the low number of commercial connections.

Census data also indicates that 6,854 businesses are located in residential

houses as opposed to commercial buildings, suggesting the possibility of businesses operating on residential rather than commercial connections. In fact, [the current electricity tariff structure](#) may incentivise this type of behaviour as residential connections are cheaper than commercial connections for consumption levels below 567 kWh/month.

Towards better understanding of energy access

The results above suggest that better targeting of enterprises – through establishing individual connections and ensuring electricity tariffs are appropriate for productive use – could help improve the revenue of the national electricity provider in Zambia as well as ensure the maximum benefits to commercial consumers.

This does not necessarily imply implementing commercial tariffs for all enterprises: for instance, residential connections for small businesses in South Africa are explicitly sanctioned as a form a subsidy, though this may not be an appropriate strategy for Zambia.

These findings should only be interpreted as suggestions for further enquiry rather than final conclusions. Above all, the analysis highlights the need for better data and understanding of productive use of energy to inform appropriate energy policies.

Part of the challenge in achieving this objective is that there is no simple and widely-accepted definition of modern energy access for firms or households. Access to energy may be derived from multiple sources and to be conducive to economic development, it requires capacity, reliability, legality, convenience, safety, and affordability, among other things.

In fact, the Sustainable Energy for All initiative under the UN has developed [a new multi-dimensional and multi-tier framework](#) for measuring energy access and it is currently being implemented in Zambia. However, initial indications are that the survey is focused on households, and thus unlikely to provide much insight on energy access among enterprises.

Overall, this suggests that there continues to be a knowledge-gap related to electricity access of firms in Zambia. Research in this area is particularly salient in view of the on-going electrification efforts that are increasingly targeting firms but lack much of an informational basis for doing so.

New IGC Zambia research on the [costs of electricity unreliability](#) and [willingness to pay for electricity](#) among firms may help shed some light on this area.

Moreover, the findings above suggest that further research on the applications and scale of energy use among firms would be useful in assessing the current tariff structure and how suitable it is for commercial

and industrial consumers. Such analysis would also be helpful in facilitating better targeting of the on-going electrification programmes to maximise the benefits of such efforts to both enterprises and the national electricity provider.