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Energy-efficient technologies help micro and small enterprises reduce their electricity consumption

This brief is based on results from the study *Energy Demand and Energy efficiency and Conservation Practices of Manufacturing Industries in Ethiopia*, EfD Study (MS-761) by Sied Hassen and Abebe Damte.

Do micro and small enterprises' use of energy-efficient technologies and conservation practices help them to reduce their monthly electricity consumption? We provide insights from the energy consumption and micro and small enterprises project in Ethiopia, based on data collected by Policy Studies Institute, Ethiopia.

KEY MESSAGES

From the study, we found that:

- Micro and small enterprises' use of energy-efficient technologies increased to 72% in 2020.
- Non-users of efficiency and conservation measures consume on average 40% more electricity than users.
- Enterprises that use energy-efficient technologies consume about 215kwh less than users of conservation method
- This calls for the inclusion of micro and small enterprises in Ethiopia's Energy Auditing program, which are currently excluded.

Background and Methodology

In Ethiopia, the industrial sector consumes a large proportion (40%) of the total electricity of the country (Hassen et al. 2018). Micro, small, and medium enterprises comprise (MSMEs) more than 50% of the industrial sector in the country (Gebreeyesus et al., 2016). MSMEs are generally less energy efficient than large enterprises; as a result, the rapid growth of the sector puts pressure on the energy sector. Studying the energy efficiency and energy demand of micro and small enterprises will help policymakers design policies to make these sectors more energy efficient. Improved energy efficiency also has spillover benefits by reducing power outages caused by overburdened generation, transmission, and distribution infrastructure; routine outages increase coping costs. This paper studies the energy demand of micro and small enterprises and the effect of energy efficiency and conservation measures on the energy consumption of these firms.

We found few previous studies on the effect of energy efficiency and conservation practices on firms' energy demand. Thus, the purpose of this study is to investigate the effect of energy efficiency and conservation measures on energy consumption.

This study is based on two waves (2016 and 2020) of the Policy Study's Institute Survey on Micro and Small Enterprises. The baseline survey was conducted as part of the 'Entrepreneurship and Small Business

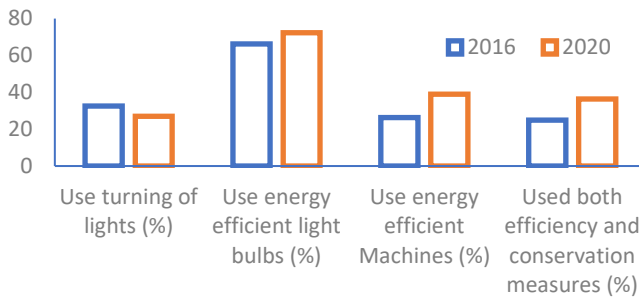
Development (ESBD) Research Programmed', a project that aimed to generate data and knowledge on small business development in Ethiopia, with a focus on micro and small firms in the manufacturing sector (Gebreeyesus et al., 2018). The energy study was an integral part of that project. The survey covers 8,174 firms in 10 major cities in Ethiopia. However, due to budget limitations, the follow-up survey covers only 1,000 firms from Addis Ababa. The current study used the 1,000 firms from Addis Ababa.

Both qualitative (descriptive) and quantitative data analysis methods were used to analyse the data. In what follows, we present the results in brief.

Descriptive (qualitative) Result

Enterprises' use of energy efficiency and conservation measures are shown in figure-1. The Policy Study's Enterprise survey asked enterprises whether they are using efficiency and conservation measures. The efficiency measures include the use of energy-efficient light bulbs and machinery. The conservation measure we consider is turning off light bulbs when they are not in use. The results are presented in Figure 1.

Fig-1:Firms' use of efficiency and conservation measures(%)



The graph shows that about 66% and 26% of the firms used energy-efficient light bulbs and energy-efficient machinery in 2016, respectively. The percentage of users of these energy-efficient technologies increased to 72% and 39% in 2020, respectively. The graph also shows that the percentage of users of both efficient and conservation methods increased from 25% in 2016 to 36% in 2020.

Table-1A: electricity consumption and efficiency measures

Efficiency and conservation measures taken	Mean Electricity consumption (in kwh)
No efficiency and conservation measure	640.84
Use efficiency or conservation measures	457.43

Table-1B: electricity consumption and efficiency measures

Efficiency and conservation measures taken	Mean Electricity consumption (kwh)
Only turning off lights used	544.35
Used efficient technologies measures	415.23
Used both efficiency and conservation	387.35

As it can be seen from both tables (1A and 1B), non-users on average consume 40% more electricity than users of efficiency and conservation measures. Furthermore, firms that use energy efficient appliances consume about 31% less electricity than those that use

only conservation measures (i.e. turning off light bulbs). Firms that use both efficiency and conservation measures consume 7.2% less electricity than firms that use only energy-efficient technologies. This implies that firms are saving more energy from the use of energy-efficient technologies than the conservation method (turning off lights).

Quantitative Analytical Result

We used a quantitative analytical model (a regression model) to measure the effect of these efficiency and conservation measures on their electricity consumption. From this method, we found that firms that used energy-efficient technologies consumed about 215kwh less than those that used the conservation method. On the other hand, firms that use only energy conservation would have consumed 157.08Kwh less if they had 'used' energy-efficient technologies. These results imply that firms that use energy-efficient technologies consume less electricity than firms that use energy conservation methods.

Policy implications

The key findings of this study show that firms that use energy-efficient methods consume less electricity than those that never used these methods. The government should include micro and small enterprises in their energy-efficiency policy and promote energy auditing programs that include these efficiency methods

References

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