ERF Policy Brief

Drivers of Renewable Energy Adoption by SMEs in Egypt

Abeer Elshennawy and Mohammed Bouaddi

About the authors

Abeer Elshennawy is a Professor of Economics at the American University in Cairo (AUC) and a Research Fellow at ERF.

Mohammed Bouaddi is an Associate Professor of Economics and Director of Graduate Programs in Economics at the American University in Cairo (AUC).

In a nutshell

- *Policymakers in Egypt should prioritize removing the impediments facing women entrepreneurs since they are more likely to consider deploying renewable energy (RE).*
- *Since youth are found to be important drivers of RE adoption, providing this group with the necessary skills through education would enhance this role even more.*
- *Raising awareness of the benefits of RE is a straightforward means by which firms in Egypt can be encouraged to adopt RE. In a similar vein, enhancing access to information about backup generation technology could reduce the risk of RE intermittency, thus promoting its adoption.*

Egypt managed to grow by 9.8 percent in the first quarter of FY 2022; however, raising GDP per capita remains a major challenge in light of rapid population growth. Another pertinent challenge facing the government is the endeavor to decouple growth from environmental impact. In this respect, Egypt's performance is quite modest, with the country ranking 94th out of 180 countries in the 2020 Environmental Performance Index, scoring 43.3 out of 100 points (Ministry of Planning and UNDP, 2021). The threats of climate change range from declining agricultural yields and lower productivity of factors of production to rising sea levels and the inundation of a considerable part of the Nile Delta where agricultural land is concentrated. Mitigating climate change requires concerted efforts to cut greenhouse gases and move away from fossil fuels, which continue to dominate the energy mix in Egypt. To this end, Egypt updated its nationally determined contributions in 2023, setting an ambitious target of 42 percent of its energy to be generated from renewable energy (RE) sources by 2030. Currently, the country has around 5.8 gigawatts of renewable installed capacity, the bulk of which is generated from hydropower. The rest is generated from the sun and the wind and is mostly government investment (Ministry of Planning and UNDP, 2021). Meanwhile, the share of energy generated from fossil fuels declined from 50 percent to 30 percent (Barsoum and Ehab, 2023).

Apart from the important role it plays in mitigating climate change, RE holds great potential as an employment generator. Sustained demand for RE is essential to generate momentum for continuous expansion in supply, with both residential consumers and firms being key actors in this regard. With the bulk of firms in Egypt classified as small and medium enterprises (SMEs), identifying the drivers of RE adoption by these firms constitutes an important step toward evaluating the role of the current regulatory and policy environment and designing one that enables and stimulates RE deployment. Understanding what other drivers of RE are at play in the context of Egypt is also essential.

The literature on the drivers of RE adoption by SMEs is generally scant, particularly in the case of developing countries. Several important drivers of RE are identified in the literature, including perceived responsibility for the environment, reliability of RE, price, firm customers' willingness to pay a price premium for goods produced with RE, competitive pressure, age and size of the firm, government regulations, and financial incentives. Several other factors that are important in the context of developing countries have not been rigorously investigated, including the role of gender, youth, and awareness as drivers of RE adoption, in addition to access to credit. The latter, which is one of the most important constraints facing SMEs in developing countries, is very likely to affect RE adoption.

On the other hand, several challenges facing RE adoption are identified in the literature, including (i) the liability of newness, which stems from uncertainties about cost and application, for example; (ii) techno-economic challenges, which relate to the ability to deliver competitive, low cost products using RE; and (iii) political feasibility, as dictated by the regulatory regime. The intermittency of RE is also a major challenge facing the wide-scale adoption of this type of energy.

Operating RE requires specific skillsets, such as engineering or technical skills. Since this technology is relatively new, it is reasonable to expect these skills to be acquired by the younger generation. Hence, firms that adopt RE employ a larger share of youth in their labor force. In developing countries, awareness of the environment is lacking, but it is slowly building up among the youth through education and the media. In the absence of pressure from environmentally aware consumers and environmentally lax governments, pressure for environmental protection is likely to come from employees. A young labor force should then be one of the drivers that facilitate the adoption of RE at the firm level. In another vein, there is evidence in the literature showing that women are more concerned about environmental issues compared to men. This suggests that women entrepreneurs might be more inclined to employ RE compared to their male counterparts. Thus, it is clear that the role of gender and youth as drivers of RE adoption deserves a thorough investigation.

Another strand of the literature examines the impact of insertion into global value chains (GVCs)—defined as firms that both export and import at the same time—on environmental performance. GVCs can lead to environmental degradation if their fragmented nature leads to excess waste and higher pollution levels due to longer shipping routes and excessive use of natural resources. This is particularly the case in places where domestic institutions and environmental regulations are weak. GVCs can lead to improved environmental performance by inducing the dissemination of cleaner technology and forcing firms to stick to more stringent environmental regulations.

Empirical evidence in Egypt for the year 2023 shows that SMEs owned by females and employing a large share of youth in their labor force are more likely to consider adopting RE. Therefore, removing the impediments

facing women entrepreneurs should be a priority for policymakers in Egypt since they are more likely to consider adopting RE. Additionally, since youth are found to be important drivers of RE adoption, providing this group with the necessary skills through education would serve to further enhance this role. These results provide an impetus for NGOs eager to advance the role of women and youth in society. In another respect, they provide firms seeking to adopt RE with guidance on the ideal composition of their labor force, encouraging them to include more females and youth.

Enhancing access to information and communication technology and raising awareness about backup generation technology are also found to strongly influence the likelihood of firms adopting RE. Providing awareness of the benefits of RE is a straightforward means to encourage firms in Egypt to deploy RE. In a similar context, improving access to information about backup generation technology can reduce the risk stemming from RE intermittency, thereby promoting its adoption. The government is expected to play an important role in this regard.

Several other government policies have been put in place to encourage the adoption of RE in Egypt. These include feed-in tariffs, which were later replaced by competitive bids. Also, according to the net consumption measurement policy, the cost of RE consumption can be deducted from an entity's electricity bill whether this entity is a household or a commercial or industrial firm. The policies introduced by the government to encourage investment in RE include a circular from the Central Bank of Egypt requesting banks to create sustainable development financing policies. However, this step falls short of providing credit guarantees. Empirical evidence points to the success of this policy in influencing the likelihood of firms employing RE.

Firms integrated into GVCs are not found to be more likely to consider adopting RE. This could be explained by the lax environmental standards in Egypt. Encouraging the adoption of RE requires more efficient institutions in the form of stricter environmental standards along with the stronger enforcement of these standards.

The lack of skills necessary to make the deployment of RE possible represents a major constraint facing firms in Egypt. This could be explained by the fact that the skills provided by the education system fall short of those required for RE. Integrating the necessary skills into the educational sector (whether private or public) is crucial for a smooth and rapid green transition.

Firm-level empirical evidence in the case of Egypt points to the important role of women and youth in promoting the adoption of RE. Removing barriers facing women entrepreneurs—particularly access to credit and increasing the share of women with STEM education—can further stimulate the deployment of RE. Enhancing the skills acquired by the youth would serve the same purpose. It is also evident that the government has implemented several policies to encourage the adoption of RE such as feed-in tariffs and competitive bids, which seem to have been successful. However, there are several potential low-cost areas of intervention that remain unexploited, such as raising awareness and providing information about backup generation technologies. In this context, it is particularly important to note that NGOs can play an active and vital role alongside the government.

References

Arias, K., Lopez, D., Camino-Mogro, S., Weiss, M., Walsh, D., Gomes, L., and Hallack, M. (2023). Green Transition and Gender Bias: An Analysis of Renewable Energy Generation Companies in Latin America. *Energy Research and Social Science*, 101:1-13.

Asante, D., He, Z., Ampaw, E., Gyamerah, S., Twumasi, M., Opoku-Mensah, E., Kyere, F., Asante, B., and Akyia, E. (2021). Renewable Energy Technology Transition Among Small and Medium Scale Firms in Ghana. Among Small-and- Medium Scale Firms in Ghana. *Renewable Energy*, 178:549-559.

Atif, M., Hossain, M., Alam, S., and Georgen, M. (2021). Does Board Gender Diversity Affect Renewable Energy Consumption? *Journal of Corporate Finance*, 66:1-29.

Barsoum, G. and Ehab, A. (2023). Green Jobs and the Future of Work in Egypt: A Focus on the Agriculture and Renewable Energy Sectors, Economic Research Forum.

Lee, C., Chen, M-P., and Yuan, Z. (2023). Is Information and Communication Technology a Driver for Renewable Energy? *Energy Economics*, 124:1-12.

Ministry of Planning and UNDP (2021). *Egypt Human Development Report*.

Siewers, S., Martinez-Zarzoso, I., and Baghdadi, L. (2024). Global Value Chains and Firms' Environmental Performance. *World Development*, 173:1-18.

ERF at a Glance: *The Economic Research Forum (ERF) is a regional network dedicated to promoting high-quality economic research for sustainable development in the Arab countries, Iran and Turkey. Established in 1993, ERF's core objectives are to build a strong research capacity in the region; to encourage the production of independent, high-quality research; and to disseminate research output to a wide and diverse audience. To achieve these objectives, ERF's portfolio of activities includes managing carefully selected regional research initiatives; providing training and mentoring to junior researchers; and disseminating the research findings through seminars, conferences and a variety of publications. The network is headquartered in Egypt but its affiliates come primarily from different countries in the region.*

Contact Information

ERF Office
Address: 21 Al-Sad Al-Aaly St. Dokki, Giza, Egypt
PO Box 12311
Tel: +202 333 18 600 - 603
Fax: +202 333 18 604
Email: erf@erf.org.eg
Website: http://www.erf.org.eg

Follow us

economic-research-forum *ERFlatest* *TheERFLatest* *www.erf.org.eg*