

Are industries in emerging countries becoming greener?

According to the International Energy Agency (IEA), industry generates a fifth of the world's direct greenhouse gas (GHG) emissions. It also produces indirect emissions due in part to electricity generation, the world's largest source of emissions. The reduction of industrial emissions is thus a major environmental concern, particularly in newly industrialized countries where the economic weight of industry is particularly high. Analysis of survey data from eight emerging countries sheds light on the changing attitudes of industrial companies to this issue.

Approaches that seek to limit energy consumption, and more broadly to make industrial processes greener, have been the subject of numerous studies over the last two decades. Most of these studies rely on macroeconomic indicators and focus particularly on the socioeconomic impacts of the predicted decline in carbon-intensive sectors and the associated emergence of lower-carbon activities (Espagne *et al.* 2021). The few existing microeconomic studies using company data offer complementary and more detailed insight by analyzing the evolution of individual company behavior. Nevertheless, they have so far only covered geographical areas limited to a single country or region and have been based on small samples of companies.

Thanks to the series of questions on greening included in the World Bank Enterprise Surveys questionnaire since 2023, it is now possible to carry out comparative studies covering several countries and using larger samples. These surveys are not entirely free from methodological problems (see box), and their results must be interpreted with a degree of caution, but they have the advantage of using a uniform set of questions in all the countries covered. The results presented here are taken from a study based on data from surveys of industrial companies in eight emerging countries: Colombia, Côte d'Ivoire, Indonesia, Morocco, Mexico, Pakistan, Peru, and Vietnam.

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Box 1. The World Bank Enterprise Surveys

The *World Bank Enterprise Surveys* (WBES) now cover companies in 150 countries. Launched at the beginning of the 2000s, the surveys are carried out every five to ten years, depending on the country. They use samples of a few hundred to a few thousand companies per country. They use the same questionnaire for all countries, divided into fifteen thematic sections requiring mainly qualitative responses. In terms of sectors, they only cover industrial activities, construction, and a few service activities.

The statistical use of the data from these surveys raises various quality issues, particularly due to the sampling method used and the way certain accounting variables are filled in. Most notably, after weighting the sample data to account for sampling rates, coverage of the manufacturing field remains incomplete and biased in parts, with under- or overrepresentation of certain size classes or sectors. For this reason, we do not present the results in absolute terms, instead preferring comparative analyses within comparable sectors and size classes as far as possible. Moreover, it was sometimes necessary to use data processing methods to remove singular units or data deemed to be outliers, or to impute some partially missing responses.

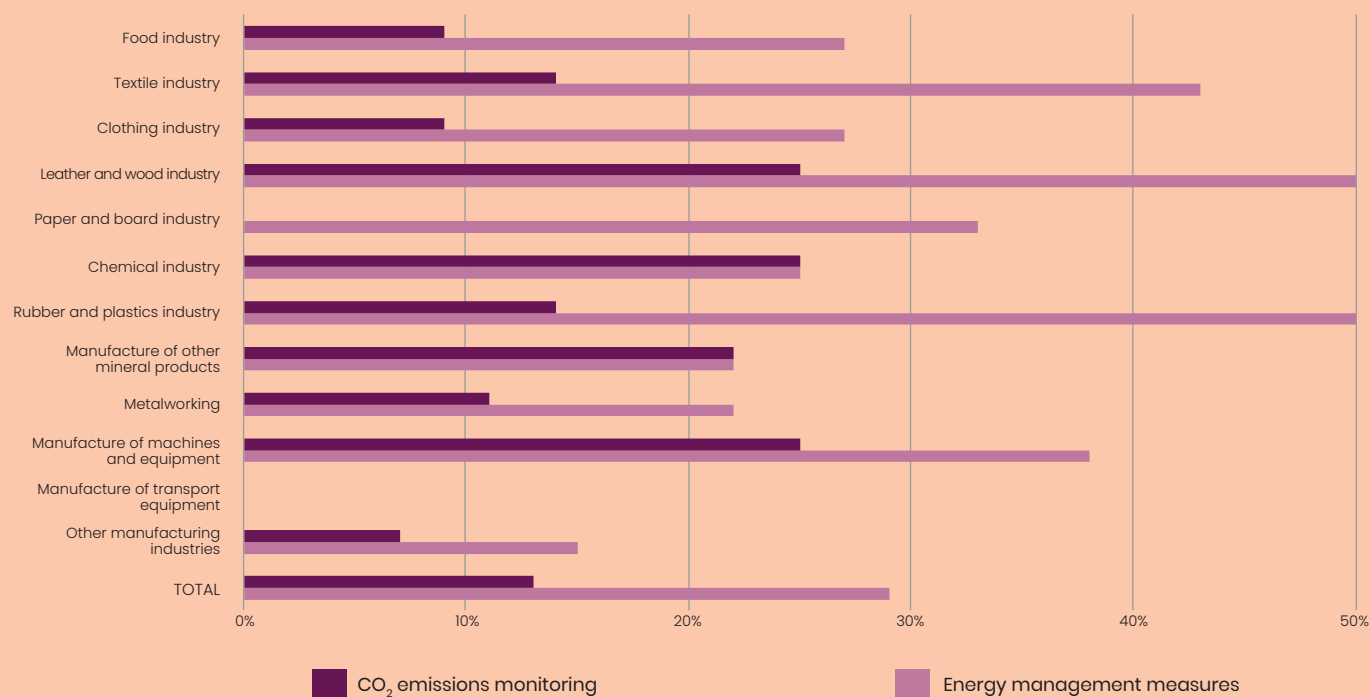
From the first signs of greening...

Energy management measures designed to reduce emissions, pollution, and waste have been fairly widely adopted in the last three years, especially in the three Latin American countries covered. They have been implemented by around 30% of the industrial companies in the eight study countries, almost half of companies in Mexico and Colombia, and 60% of companies in Peru. At the sector level, the proportion of companies using such measures is particularly high in the plastics and rubber, leather and wood, and textile sectors.

By contrast, only 13% of companies monitor CO₂ emissions. This more demanding practice is used almost exclusively by companies that have also adopted the energy management measures discussed above. It remains relatively rare in Indonesia and Morocco.

Finally, only 1% of the industrial companies surveyed have developed innovations (in the broad sense of the term) that could be considered “green,” whether at the product level (production of organic or biodegradable products, use of environmentally responsible packaging or of natural raw materials, etc.) or in terms of production processes (recycling of production materials, use of natural gas or electricity instead of more polluting energy sources, use of eco-friendly raw materials, implementation of sustainable and efficient water management processes, etc.). Again, these companies are almost exclusively those that have also adopted measures to manage energy consumption and, in some cases, to monitor emissions.

Figure 1 – Behaviors of industrial companies in eight emerging countries in 2023



Source: WBES, 2023 survey data, authors' calculations.

... to tangible effects on electricity consumption

The adoption of energy management measures tends to be associated with significantly more efficient electricity consumption in relation to revenue: the average ratio of electricity consumption (in kWh) to revenue for companies with such measures in place is under 40%. This improvement in energy performance is reflected in substantial savings: the electricity consumption of the whole group of industrial companies would be 37% higher if these “greening” companies had not adopted any measures, in other words if they had the same energy ratios as the other 70% of companies.

Nevertheless, the effects of these measures have principally been felt by the largest companies, and so the biggest consumers: they have led to a 60% reduction in the electricity consumption of companies with over 120 employees, but just 10% in that of the smallest companies. Moreover, energy management can have ambivalent effects, reducing electricity consumption but also sometimes increasing it, for example when companies replace fossil fuels with electricity. Thus, within similar business sectors and size categories, there are about as many situations where companies that have adopted energy management measures have achieved more efficient energy consumption as there are situations where they have become less energy efficient.

An overall more efficient use of electricity leads to lower electricity costs as a proportion of revenue (1.4% for companies with energy management measures, compared to 1.9% for those without), and so to greater competitiveness. This is probably the principal aim of such measures. This 0.5 percentage point saving increases the estimated gross profit of these companies by 2%.

When electricity is derived principally from fossil fuels (as is the case in most of the study countries, except Peru and Colombia), these significant impacts on electricity consumption also translate into major impacts on CO₂ emissions. Decarbonization can, therefore, take place not just at the intersectoral level, with a shift toward low-carbon industries at the expense of carbon-intensive ones, but also at the intrasectoral level, with changes in company behavior. This echoes recent research carried out in France showing that variations in emissions intensity within a sector can have a greater impact on jobs than variations between different industrial sectors, given the wide disparity in technological processes used (Fontaine *et al.* 2023).

Multiple factors favor the adoption of greening measures

To strengthen these energy management measures in the coming years, we must understand the factors that stimulate or enable them. The econometric analyses carried out for this study (logistic regressions and ordered multinomial regressions) reveal multiple factors, confirming the results of previous studies using smaller samples of companies. The adoption of measures to reduce consumption or monitor GHG emissions is a question of individual means, challenges, constraints, and motivations.

It depends on size and the availability of resources, the propensity to emit as a function of positioning within a more or less carbon-intensive industrial sector, market integration, and pressure exerted by clients, and probably also more individual factors linked to a company's culture and management.

The propensity to adopt “greening” measures seems strongly correlated with size. All other things being equal, in the eight study countries, the probability of adopting such measures was respectively five and eight times higher for medium and large industrial companies than for very small ones. In this area, as in that of wage policy, small size seems to be a disadvantage, both in terms of the resources needed to implement certain measures, particularly those requiring research and development efforts, and in terms of the economies of scale or of scope that affect energy consumption (unit energy consumption for production, transport, storage, etc.) as well as mechanical production.

The more carbon-intensive the activity, the more companies reduce their energy consumption and monitor their emissions

Companies that engage in heavily GHG-emitting activities are four times more likely to monitor their emissions. This seems logical given the extra attention paid to these activities and the greater scope for progress, inevitably leading to higher returns on initiatives to improve energy management. It is in these sectors that companies that take steps to improve their energy management see the biggest reductions in the electricity consumption/production ratio.

This suggests that the carbon-intensive nature of certain activities is not necessarily inescapable, as shown by the progress made in greening production processes in carbon-intensive sectors like the extractive and metalworking industries (substituting fossil fuels with renewable energies, etc.).

An increasingly necessary prerequisite for integration into international markets or production processes

Integration into international markets and partial or total control by foreign shareholders also strongly encourage companies to adopt measures to reduce their electricity consumption and monitor CO₂ emissions. Having international competition increases the probability of such actions fourfold, while the presence of foreign capital almost doubles it. Both situations introduce constraints, whether regulatory or linked to much stronger demand from consumers. Companies with international rather than local competition are five times more likely to have their production internationally certified. This pressure is set to increase in the coming years following the full entry into force of the EU Carbon Border Adjustment Mechanism in 2026.

Finally, companies that have implemented energy management measures or monitored their emissions refer more frequently to the difficulties caused by corruption. This does not necessarily mean that they are more exposed to it, but rather it suggests that their directors

are more sensitive to such problems in the internationally competitive context in which they operate.

To conclude, tangible progress has already been made, both in reducing electricity consumption and in monitoring CO₂ emissions. Nevertheless, there is still considerable scope for improvement in reducing industry's contribution to global GHG emissions, and even more so in encouraging companies to develop "green" innovations. This progress will depend, first, on such measures being adopted by the smallest companies and by unregistered entities in the

informal sector, and second, on the measures already taken being enhanced to increase their impact on energy consumption and emissions. This often requires considerable investment, which may need to come from public grants, as seen in the industry greening plans adopted in recent years by countries in the Global North, or from concessional funding. But changes must also be made on the demand side by strengthening initiatives that encourage consumers in developed countries and the Global South to choose greener products, if necessary with the help of networks of actors committed to this approach.

References

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