



Closing the energy efficiency gap

A new report suggests that there is a big gap between the energy performance of manufacturers around the world, with the potential for some of the least efficient to reduce their energy use without any loss of output. Andrew Warren highlights the key conclusions.

While governments brace for another fossil fuel crisis, firms are leaving major energy savings on the table. New research reveals that the gap between the most and the least energy efficient firms, even within the same industry, is vast.

Closing even part of that gap could more than halve total industrial energy use and emissions, all without sacrificing output or waiting for new technologies. In a world of volatile energy markets, that gap is not just an environmental problem, but one of competitiveness and economic security.

This might seem a rather familiar warning were it coming from conventional energy analysts, but this particular study comes, unusually, from the OECD, the Organisation for Economic Co-operation and Development – a multinational organisation charged with improving industrial and economic efficiency worldwide.

The latest disruption to oil and gas flows is a reminder of a vulnerability that never fully went away. Global energy prices already tripled between 2020 and 2022, prompting OECD economies to spend around 0.7% of GDP shielding households and firms from the shock. Now, with supply routes under pressure again, the question of how firms use energy has become urgent in a new way. And the answer is: very unevenly. The large gap between best and worst performers in identical sectors really does mean that we are restricting both economic security and overall competitiveness. Very bad indeed for profits.

Uneven performance

The research draws on official firm-level data for manufacturing firms with at least 20 employees. In Britain, the data covers approximately 73,000 industrial firms. For each firm, the analysis observes energy use alongside economic variables such as value added, employment, labour productivity and capital investment, and computes energy productivity as value added per unit of energy used – measured in physical terms (joules)

rather than expenditure.

This allows for accurate comparisons concerning how efficiently firms convert energy into output, independent of price fluctuations. It develops unique cross-country data on the energy and economic performance of firms, revealing that there is this huge disparity across firms in their energy productivity within narrowly defined industrial sectors. And the gap in Britain between the best and the worst in similar industries appears to be the biggest in Europe – in places, a 20:1 differential

In a world of rising and increasingly volatile energy prices, energy productivity can play a key role for competitiveness. On top of that, it is a vital component in the transition to net zero. Whilst the energy sector can produce more carbon-efficient electricity, industrial firms – which account for 23% of global energy-related emissions – must also use all types of energy more efficiently.

Catch-up potential

What would happen if the laggards caught up? This OECD research estimates just raising the 25% of firms with the lowest energy productivity in each industry up to the higher level (surely a realistic target) should result in a 42% reduction in manufacturing energy use, all with no loss of output. Lifting all firms in the bottom half of the distribution table to the median would cut energy use by 61% (all with comparable reductions in energy-related emissions).

According to the OECD: “These gains are possible across all manufacturing sectors but are largest in certain high-emitting industries such as chemicals, paper products, and non-metallic minerals including cement.”

Several factors explain why less efficient firms are not being forced or incentivised to improve. Younger firms and those using newer production technologies tend also to be more energy efficient. Interestingly, larger firms often underperform on energy productivity, in part because their scale gives them market power to negotiate lower



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energy purchasing prices. But also because, in many countries, they also benefit from reduced energy taxes or exemptions. However, these lower prices reduce pressure to improve efficient use, while simultaneously disadvantaging smaller, more energy-productive competitors.

There is a strong relationship between energy productivity and broader economic performance. Firms with higher labour productivity tend to have higher energy productivity, so investments in management, skills and technology adoption should deliver a ‘double dividend’ with higher output per worker and more output per unit of energy.

The OECD argues that policies to improve labour productivity should have co-benefits for energy productivity and aggregate emissions. The key implication of this ground-breaking work is important. It is that reducing industrial energy use and emissions need not depend on speculative technology breakthroughs.

The necessary production technologies and practices already exist, and are in use by firms operating in the same countries and industries

as the laggards.

In other words, a large share of the potential reduction in industrial energy use and emissions could, in principle, be achieved simply by spreading current best practices more widely. The challenge is therefore not invention, but diffusion.

Policies that deliver

The OECD concludes that policymakers need two key levers to drive improvements in energy productivity. These are:

(1) Fair energy and carbon pricing to incentivise energy productivity improvements. Rising energy prices are associated with narrowing gaps in energy productivity between firms, suggesting that price signals work when they apply broadly. Subsidising cheap energy as an industrial strategy for energy-intensive sectors may protect some firms in the short run. But it delays efficiency improvements, disadvantages smaller, more efficient competitors, and adds to fiscal costs. Broad-based carbon and energy pricing combined with targeted support for efficiency-improving investments is a more durable approach.

(2) Fostering business dynamism and technology diffusion. Industries with stronger competition, better access to finance and more active innovation tend to show less dispersion in energy productivity. When inefficient firms face genuine competition, they upgrade or contract. When productive firms can access capital and grow, best practices spread. Policies that lower barriers to entry, strengthen competition policy, and support technology diffusion can support both growth and resilience.

The current global situation makes the case for urgency. Production technologies to close the energy productivity gap already exist. Firms that embody best practice are already operating. What is needed is a policy environment to ensure that their example is followed. ■

Andrew Warren

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