

**ECONOMIST
IMPACT**

The business of electrification

Rewiring industry and the workforce for
an electrified economy



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About this research

This Economist Impact report, supported by Iberdrola, investigates the barriers slowing electrification at the company level, along with policy and financial levers to unlock this transition. The analysis is informed by a survey of more than 1,200 executives in 11 countries across North America, Latin America, Europe and Asia-Pacific. It also covers the following five sectors: construction, infrastructure and real estate; energy and utilities; IT and technology; manufacturing; and transport and logistics. Economist Impact also convened a round-table discussion with experts and conducted one-on-one interviews.

We would like to thank the following experts for their time and insights:

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- **Ana Rovzar**, chief of staff, Global Renewables Alliance
- **Andrew Prag**, managing director for policy, We Mean Business Coalition
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Executive summary

We are on the cusp of a major shift from an energy system powered by fossil fuels to one increasingly powered by electricity generated from renewable sources. Change has been gradual, but the pace is quickening. Solar generation is roughly doubling every three years, and clean energy now supplies more than 40% of global electricity.¹ A new wave of 'electrotech', including solar photovoltaic and batteries, electric vehicles (EVs) and heat pumps, is revolutionising how electricity is generated, stored and consumed, increasingly at lower cost than fossil fuels.² At the same time, economic uncertainty and geopolitical tensions have made energy security a national and business priority, as countries such as China seek to establish global leadership and competitive advantage in the race to a clean-powered future.

Until now, attention has been focused on producing clean power. But an equally important question is how we deploy that power through grids and then use it to light homes and power industries and cities. Electrification of end use is what will ultimately displace fossil fuels and unlock access to the renewable sources of energy. In other words, turning renewable supply into end-use adoption is the lever that delivers decarbonisation, cost control and energy security in practice.

A new age of demand driving business electrification

The speed and success of this transition will predominantly be determined by the way in which companies large and small electrify over the next decade. To better understand progress at the company level and the barriers to accelerating and scaling this transition, Economist Impact, supported by Iberdrola, surveyed more than 1,200 executives across five sectors and 11 markets. Key findings include:

1. Businesses are charging ahead with electrification, but few are scaling

Most firms are now electrifying parts of their operations and assets, with 84% of businesses surveyed at least piloting solutions; nearly half are seeing some returns on investments (ROIs). But only 9% are fully electrified. Business is betting on an electrified future, but capital, grid capacity and skilled labour will determine how fast we get there.

2. Larger firms are advancing faster, with more confidence on commercial gains

Larger companies tend to be further along the journey and see clearer pay-offs from early investment. High borrowing costs and scalability challenges erode the commercial

¹ World surpasses 40% clean power as renewables see record rise. Ember. April 2025. Available at: <https://ember-energy.org/latest-updates/world-surpasses-40-clean-power-as-renewables-see-record-rise/>.

² Bond K, Walter D, Butler-Sloss S. The Electrotech Revolution. Ember. September 2025. Available at: <https://ember-energy.org/latest-insights/the-electrotech-revolution/>

case for electrification in small- and medium-sized companies, keeping them stuck in the early stages of the journey. Targeted support and financial incentives for smaller firms (representing 70% of global GDP)³ are needed to avoid a two-speed transition.

3. Energy sector leads the charge

Electrification is playing out differently by industry. IT firms are swapping diesel back-up generators for batteries; steel manufacturers are switching from coal-fired blast furnaces to electric arc furnaces; construction companies are moving from diesel to electric machinery; while utilities both electrify their own operations (eg, battery storage systems, power-to-heat solutions for district heating, electric fleets) and enable electrification of other sectors by installing technology and meeting the growing demand. Against this backdrop, energy firms and utilities are furthest along, with 43% scaling or optimising. Meanwhile, construction and real estate are slowest, with about half still exploring or piloting; 58% cite worker shortages for slowing momentum to build the grids, chargers and retrofits on which other sectors rely. These two sectors play a critical role in setting the pace of electrification across other industries.

4. Regional progress reflects local challenges

Firms in China and the US show significant ambitions for electrification, with nearly 40% reporting that they are scaling or embedding projects. The Chinese economy continues to electrify rapidly with 28% of energy consumption coming from electricity, compared to 22% in the US and 21% in the EU.⁴ However, Chinese companies also report significant challenges in delivery, with seven in ten falling behind on their electrification targets. US businesses, on the other hand, are confident, but call for greater policy stability. European companies are progressing, but highlight high financing costs, skilled labour shortages and infrastructure bottlenecks as the key barriers to faster implementation. In this context, adequate grids, storage, and low-carbon generation,

including wind, solar, nuclear and hydro will be crucial for the transition.

5. Electrification will create jobs, but skills shortages could slow delivery

Three-quarters of firms expect to see their workforce grow as a result of electrification. At the same time, many are anticipating shortages in labour and skills, which could slow their progress. For instance, labour shortages in the construction sector and a lack of skilled electricians will be felt across the economy as they deliver the charging networks, grid upgrades and electrified buildings on which all sectors depend. Gaps in grid engineering, digital systems and automation skills mirror the needs of more data and power-intensive operations.

6. Businesses see decarbonisation and long-term savings as the pay-offs from electrification, but need capital and steady policy to realise them

Businesses globally ranked decarbonisation and cost savings as the most valuable outcomes of electrification. To realise these benefits, however, businesses are calling for financial incentives (59%) and predictable policy (58%). Policy stability is most important to US and UK firms; Europe and Australia prioritise subsidies; while in Japan firms are urgently calling for permit reform.



³ Future Readiness of SMEs. World Economic Forum. Available at: <https://initiatives.weforum.org/sme-resource-hub/home>

⁴ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.

The state of corporate electrification

Business is betting on an electrified future, but faces a long road ahead

Our survey reveals that an overwhelming majority of businesses are now actively electrifying their assets, operations and supply chains. More than four out of five (84%) companies surveyed were at least piloting electric solutions and 70% say they have set electrification targets at corporate level—a strong signal that firms are betting on an electrified economy in the near future and reshaping themselves accordingly.

The business case for investing in electrification is starting to prove itself too. Of companies polled, 65% see electrification as a major business opportunity and almost half (48%) are already seeing some returns on early investments. Falling costs and better technology

are making electrification a practical and profitable proposition for many firms, who are increasingly integrating electrification into business strategy.

While intent to electrify appears universally strong, only 9% of firms report having fully embedded electrification into their business, and a majority are in the early stages of their journey (57% are either piloting or implementing solutions). Moreover, half of those who have set corporate electrification targets report falling behind. Businesses may be convinced of the feasibility, imperative and commercial opportunity of electrification, but implementing and scaling solutions is proving challenging.

Forces driving change

The biggest drivers pushing companies towards electrification among the group surveyed were regulation (47%), net-zero targets (41%) and government incentives (31%). Beyond compliance and financial motivation, three recent geopolitical and market shifts have further driven companies to embrace electrification. First, during the energy crisis, European gas prices hit record highs in 2022 and still remain at around double pre-crisis averages, spurring electrification as a hedge against fossil-fuel volatility.⁵



“Electrification is becoming the common-sense, efficient pathway to competitiveness, energy security and climate action.”

Andrew Prag, We Mean Business Coalition

⁵ Gas Market Report, Q4-2022: Cold Comfort. IEA. Available at: <https://www.iea.org/reports/gas-market-report-q4-2022/cold-comfort>.

BOX 1: DEFINING ELECTRIFICATION

Electrification describes the process of replacing technologies or processes that rely on fossil fuels, such as internal combustion engines and gas boilers, with electrically powered alternatives such as EVs or heat pumps.⁶ It means shifting away from using molecules derived from combustion to using electrons as a primary energy source, reimagining how we run our cars, heat our homes and power our industries.

Electrification offers a range of benefits. Electric technologies are typically more energy efficient and less polluting than their fossil fuel equivalents, delivering cost savings and improved air quality. Electrification also enhances energy security by reducing dependence on volatile fuel markets. Crucially, electrification provides the most direct and scalable pathway to reducing carbon emissions from economic activity. As the biggest lever for deploying renewable energy in end-use sectors, electrification will underpin decarbonisation across all sectors.

Progress towards electrification is typically tracked at the national or sector level.⁷ These metrics aggregate the progress of thousands of individual firms and households switching from fuel-based to electric solutions in buildings, vehicles, equipment and production processes. Looking at electrification through a business lens can shed new light on what might be driving or slowing the transition. Our research takes this approach, examining how firms across sectors and regions are approaching electrification in practice, and what they perceive to be the biggest hurdles and opportunities in that process.

For this research, we define electrification at the company level as the substitution of fossil-fuel technologies with electric alternatives across a company's assets, products and supply chains. In practice, how a firm electrifies and what is electrified will vary hugely by sector. An IT or data-centre business might focus on substituting diesel back-up generators and cooling systems with battery-based systems and electric chillers.⁸ A steel manufacturer may replace coal-powered blast furnaces with electric arc furnaces, which melt scrap using electricity rather than coal.⁹ For a construction company, the switch might be from diesel excavators to battery-powered electric machinery on demolition sites. Energy and utility companies are unique because alongside switching to electric solutions in their network operations, they are actively transforming the way in which electricity is supplied to the wider economy. As the sector generating the power on which other companies rely, they are driving fundamental changes in the ways electricity is generated and distributed across the broader economy. Because each sector deals with distinct technologies, investment cycles, asset lifetimes and regulatory contexts, electrification will not be a standardised process. Our analysis focuses on companies' sense of their progress, the bottlenecks they face and where they believe the momentum lies.

Second, the policy and regulatory environment has been conducive to electrification. Before being significantly rolled back, the US Inflation Reduction Act (IRA), committed roughly US\$369bn in incentives,¹⁰ while the EU's Renewable Energy Directive (RED III) raised binding renewable targets to a minimum of 42.5% by 2030 and introduced 'acceleration areas' to streamline permitting.¹¹ In parallel,

the Clean Industrial Deal State Aid Framework (CISAF), adopted in June 2025, broadened the scope of permissible public support to include investment in electrification, hydrogen, carbon capture and other decarbonisation technologies as part of Europe's industrial transition.¹²

Third, technology costs have continued to fall, reinforcing bankable business cases.

⁶ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.

⁷ Electricity 2025: Analysis and forecast to 2027. IEA. February 2025. Available at: <https://www.iea.org/reports/electricity-2025>.

⁸ Walton R. Microsoft Replaces Diesel Generators with Saft Batteries at Swedish Data Center. Microgrid Knowledge. October 2023. Available at: <https://www.microgridknowledge.com/energy-storage-microgrid/article/33012640/microsoft-replaces-diesel-generators-with-saft-batteries-at-swedish-data-center-microgrid>.

⁹ Trailblazers in Industrial Electrification: Top 5 Industries to Watch. Kanthal. October 2024. Available at: <https://www.kanthal.com/en/knowledge-hub/inspiring-stories/top-5-industries-to-watch/>.

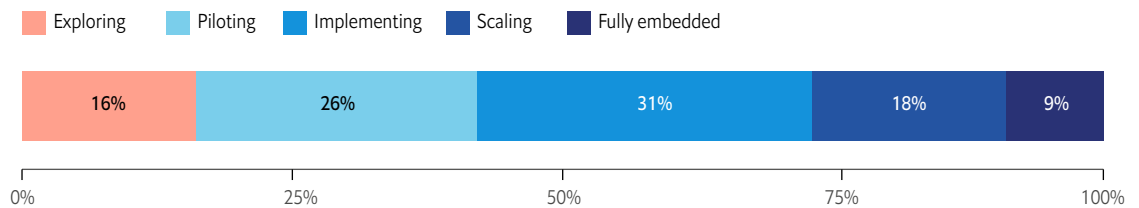
¹⁰ United States of America: \$369 billion in investment incentives to address energy security and climate change. UN Trade & Development Investment Policy Hub. August 2022. Available at: <https://investmentpolicy.unctad.org/investment-policy-monitor/measures/4004/-369-billion-in-investment-incentives-to-address-energy-security-and-climate-change>.

¹¹ Renewable energy targets. European Commission: Energy, Climate Change, Environment. Available at: https://energy.ec.europa.eu/topics/renewable-energy/renewable-energy-directive-targets-and-rules/renewable-energy-targets_en.

¹² New State aid framework enables support for clean industry. European Commission. 2025. Available at: https://ec.europa.eu/commission/presscorner/detail/en/ip_25_1598.

Figure 1. Electrification hits the mainstream, not maturity

Share of respondents at each stage of electrification



Source: Economist Impact

In parallel, surging demand from EVs, heat pumps and data centres has pushed electricity into a new 'age of demand',¹³ with electricity use projected to double by 2050 and with business driving three-quarters of that growth.¹⁴ These forces are pushing electrification firmly into the corporate mainstream, but the pace of progress and the obstacles companies face differ markedly across countries.

Progress and constraints differ by country

The business outlook on electrification varies significantly across and within regions (see Annex for details). In Asia-Pacific, progress is uneven. Among the countries surveyed, China leads with the largest share of firms in the advanced stages of electrification (38%), as well as the largest share of firms seeing positive returns on electrification investments (66%). The Chinese economy continues to electrify rapidly, with 28% of the final energy consumption now powered by electricity; this accounted for more than half of global electricity demand growth in 2024.¹⁵ Momentum is driven by strong industrial mandates such as the Made in China 2025 plan, which sets targets for electrification

across multiple sectors and provides large-scale subsidies for EVs and grid modernisation.¹⁶ However, Chinese companies also report significant challenges in delivery, with seven in ten falling behind on their electrification targets.

Businesses in India are also progressing in their electrification journey (32% scaling or embedded), helped by regulatory pressure¹⁷ and energy-security imperatives.¹⁸ Indeed, India's overall electricity demand is forecast to outpace China's and grow at an average 6.3% annually until 2027.¹⁹ Australia stands out for having the largest share of firms in the piloting stage (39%), suggesting slow commercial scale-up.

Meanwhile, Japan has the highest share of firms at the implementing stage (41%), but the lowest share scaling and optimising, indicating that firms are able to start projects but struggle to commercialise them. This reflects their top barriers, available technology (48%) and regulatory delays (35%), and the country's reliance on conservative industries such as steel and automotive, in which long asset life cycles and limited incentives for disruptive technologies slow electrification. Permitting restrictions are a top concern among Japanese firms, with 62% citing streamlined permitting as the top incentive for

¹³ Executive Summary. Electricity 2025: Analysis and forecast to 2027. IEA. Available at: <https://www.iea.org/reports/electricity-2025/executive-summary>.

¹⁴ Sankaran A. Rising business energy demand creates new challenges — and a major opportunity — for providers, says EY research. EY. May 2025. Available at: https://www.ey.com/en_gl/newsroom/2025/05/rising-business-energy-demand-creates-new-challenges-and-a-major-opportunity-for-providers-says-ey-research.

¹⁵ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.

¹⁶ Wübbcke J, Meissner M, Zenglein MJ, et al. Made in China 2025: The making of a high-tech superpower and consequences for industrial countries. Merics Papers on China. December 2016. Available at: <https://merics.org/sites/default/files/2020-04/Made%20in%20China%202025.pdf>.

¹⁷ Lolla A, Das D. Green electrification can unlock clean energy gains for Indian industries. Ember. June 2024. Available at: <https://ember-energy.org/latest-insights/india-green-electrification-for-indian-industries/>.

¹⁸ India: Energy sector at crossroads. EY. February 2025. Available at: <https://www.ey.com/content/dam/ey-unified-site/ey-com/en-in/insights/energy-resources/documents/2024/ey-india-energy-sector-at-cross-roads.pdf>.

¹⁹ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.

electrification. Securing approvals for new projects can take three to five years, a delay compounded by fragmented prefectural processes and complex curtailment rules that discourage investment in grid expansion.²⁰ These procedural bottlenecks create uncertainty for businesses, raising costs and slowing the pace of renewable deployment. Unlike RED III reforms in Europe, which streamline approvals, Japan’s permitting system may be holding back electrification and the broader energy transition.²¹

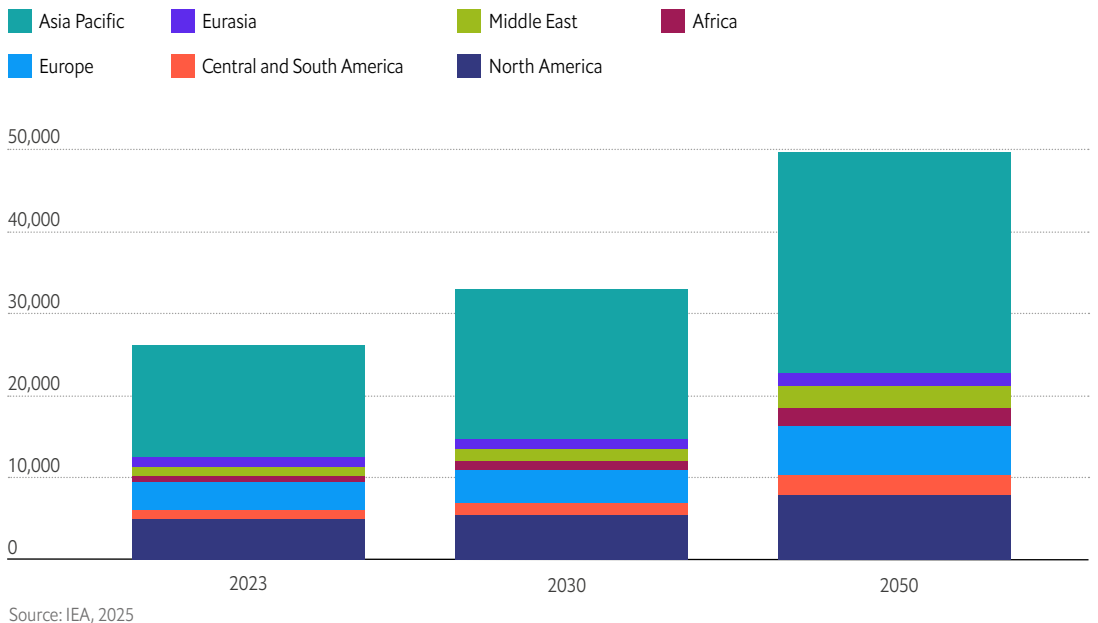
While the US economy is somewhat behind China in overall electrification, with 22% of energy demand being met by electricity,²² the growth outlook remains strong, and business leaders optimistic, with 37% of US firms reporting being at the scaling or embedding stage. This has likely been spurred by the strong economy and the recently rolled-back IRA (2022), which provided

billions in tax credits, grants and direct investment for EVs, batteries and domestic manufacturing,²³ incentivising businesses to invest in electrification. US firms also believe these investments are paying off (56% see at least some positive returns) and two-thirds of those with electrification targets expect to be on track. However, policy uncertainty is a concern that could significantly undermine such momentum.

In Europe, electricity consumption returned to growth in 2024 after a couple of years of decline due to economic slowdown and energy crisis; it now constitutes around 21% of total energy demand.²⁴ However, despite achieving steady progress in some sectors, companies in the region report to be in earlier phases of the electrification journey, with nearly half either exploring or piloting initiatives. One in five also reports that these initiatives have so far delivered unclear returns.

Figure 2. Global electricity demand by region, 2023–2050

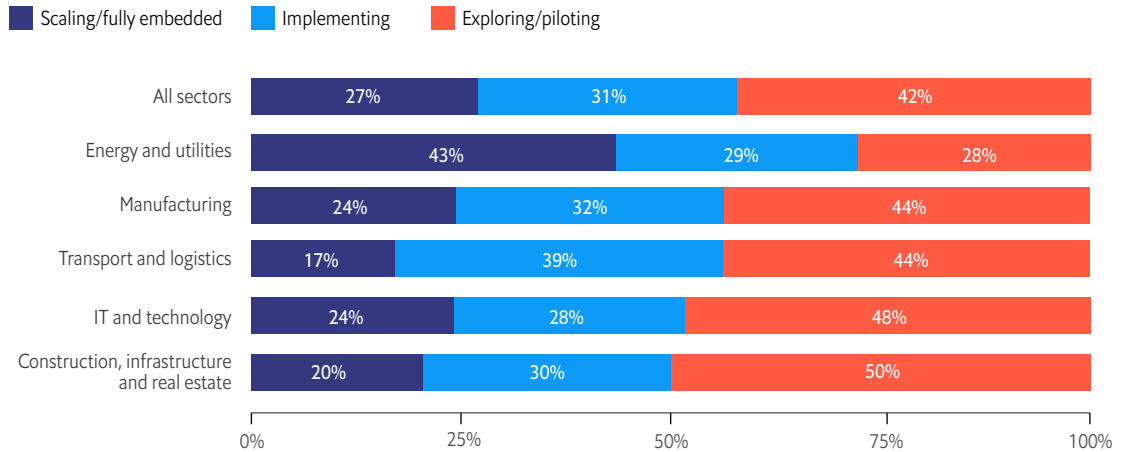
Global electricity demand continues to rise steadily through mid-century under current stated policies



²⁰ Miyamoto M. Key barriers in Japan’s renewable energy development. Institute for Energy Economics and Financial Analysis. August 2025. Available at: <https://ieefa.org/resources/key-barriers-japans-renewable-energy-development>.
²¹ Miyamoto M. Key barriers in Japan’s renewable energy development. Institute for Energy Economics and Financial Analysis. August 2025. Available at: <https://ieefa.org/resources/key-barriers-japans-renewable-energy-development>.
²² Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.
²³ Bird L, Light A, Goldsmith I. US Clean Power Development Sees Record Progress, As Well As Stronger Headwinds. World Resources Institute. February 2025. Available at: <https://www.wri.org/insights/clean-energy-progress-united-states>.
²⁴ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>

Figure 3. Energy firms lead on electrification progress

Share of respondents describing the stage of their electrification targets



Source: Economist Impact

Despite Europe’s robust policy support to enhance energy security and reduce emissions, through initiatives such as RED III and CISAF, some countries are restricted by slower upgrades to electricity grids and less developed infrastructures.²⁵ The IEA highlights that extending the lifespan of existing nuclear power plants, currently under discussion in several European countries, offers one of the most cost-effective sources of low-carbon electricity.²⁶ Mirroring the US, 67% of UK companies are calling for greater policy stability, reflecting recent reversals on EV targets and building standards, which have dented credibility.²⁷

Financing challenges and high upfront costs pose a universal challenge to electrification and are ranked as a top barrier by 47% of all respondents. Infrastructure challenges (39%) and lack of skilled workforce (38%) are close behind. Capital constraints are most acute in Germany where 62% of firms cite this as their top challenge, while lack of skills is top of mind for firms in Spain (46%) and the UK (51%).

Infrastructure constraints rank above capital costs for firms in India (37%) and Chinese firms set themselves apart with regulatory barriers as their top concern (30%). While capital costs lead in both market types, they dominate far more in developed markets (52% versus 33%), whereas emerging markets show evenly distributed constraints across capital, infrastructure and skills (all clustering at 30-33%).

Energy sector leads the charge

Compared to other sectors, energy and utilities companies are further along their electrification journey. The sector is central to electrification across sectors and to meeting the growing power consumption, 95% of which is expected to come from renewable sources.²⁸ More than seven in ten firms (72%) are at least implementing electrification initiatives and maturity is higher than elsewhere: 43% report scaling or having fully embedded these initiatives compared with an average of only 27% (see Figure 3).

²⁵ Anacleto A, González D, Ribeirinho MJ, et al. The Iberian green industrial opportunity: Electrification and renewables. McKinsey & Company, July 2024. Available at: <https://www.mckinsey.com/industries/electric-power-and-natural-gas/our-insights/the-iberian-green-industrial-opportunity-electrification-and-renewables>.

²⁶ Nuclear Power. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/nuclear-power>

²⁷ 2023 Progress Report to Parliament. Climate Change Committee. June 2023. Available at: <https://www.theccc.org.uk/publication/2023-progress-report-to-parliament/>.

²⁸ Electrification. International Energy Agency (IEA). Available at: <https://www.iea.org/energy-system/electricity/electrification>.



These companies are under greater impetus to meet surging electricity demand, coupled with a strong commercial incentive to transition faster. Utilities also already control generation assets and grids, and with revenues that are often backed by regulation or government-guaranteed returns, investor confidence may help them to scale investments faster than other sectors.

Positive returns (64%) may reflect these companies' abilities to recover capital expenditures through regulated rates and create new revenue streams from EV charging and flexibility services.²⁹ Yet this confidence in ROI coexists with capacity constraints: by the end of 2023, more than 2,600 GW of projects were waiting in US interconnection queues, with average waits of three to five years.³⁰

By contrast, the construction, infrastructure and real estate sector shows the slowest progress, with half of these firms still at the exploratory or pilot stages of electrification. Volvo Construction Equipment recently launched the world's first fully electric construction site in Erlangen, Germany,³¹ a milestone in electrified building operations. However, switching from diesel to electric machinery in construction is slow because high upfront costs, limited charging infrastructure and short battery range make electrified equipment less practical for heavy or remote worksites. More than half (58%) of firms we polled in this sector cited workforce shortages as a top constraint, far above the global average of 38%. As the sector responsible for building the grids, charging networks and retrofits that enable others to electrify, these shortages risk slowing progress across the wider economy.

Similarly, the IT and technology sector shows slower progress, despite clear ambition.

Nearly four in five (79%) are at least piloting electrification initiatives such as sourcing renewable power for data centres, deploying battery storage and electric heating, ventilation and air conditioning systems, and electrifying internal transport fleets, yet only 24% report scaling or having fully embedded them. This lag reflects the sector's unique challenge: growing electricity demand from data centres, AI systems and digital infrastructure is outpacing the availability of clean power and grid connections, complicating the shift to fully electrified operations.³² Even so, they cite net-zero credibility and technology availability as their primary drivers (51% each), rather than regulation (36%) or fuel-cost savings (21%).

Progress is also constrained by skills shortages, infrastructure bottlenecks, immature vendor solutions and ROI ambiguity. The sector's electrification challenge is shaped by data-centre-heavy, high-reliability loads, where interconnection capacity and vendor maturity have not kept pace with exponential demand growth. The International Energy Agency (IEA) warns that grid bottlenecks could delay approximately 20% of planned global data-centre capacity in the next five years.³³ In Europe, one study found that up to half of Europe's data-centre capacity could relocate from established hubs due to grid connection delays of up to 13 years.³⁴

Electrification is now clearly core to business strategies, with companies piloting or implementing solutions across their assets and operations. But progress is uneven, with businesses facing some shared and some highly localised challenges to scaling their efforts.

²⁹ Utilities and Electric Vehicles: The Case for Managed Charging. Utility Dive. April 2017. Available at: <https://www.utilitydive.com/library/utilities-and-electric-vehicles-the-case-for-managed-charging>.

³⁰ J, Rand J, et al. Grid connection backlog grows by 30% in 2023, dominated by requests for solar, wind, and energy storage. Energy Markets & Policy, Energy Technologies Area, Berkeley Lab. January 2025. Available at: <https://emp.lbl.gov/news/grid-connection-backlog-grows-30-2023-dominated-requests-solar-wind-and-energy-storage>.

³¹ Volvo CE powers world's first all-electric deconstruction at Siemens site. Volvo customer story. September 2025. Available at: <https://www.volvoce.com/europe/en/about-us/news/2025/volvo-ce-powers-worlds>

³² Franke A. Global data center power demand to double by 2030 on AI surge: IEA. S&P Global: Commodity Insights. April 2025. Available at: <https://www.spglobal.com/commodity-insights/en/news-research/latest-news/electric-power/041025-global-data-center-power-demand-to-double-by-2030-on-ai-surge-iea>.

³³ Spencer T, Singh S. Energy and AI. IEA. April 2025. Available at: <https://www.iea.org/reports/energy-and-ai>.

³⁴ Crellin F. Poor grid planning could shift Europe's data centre geography, report says. Reuters. June 2025. Available at: <https://www.reuters.com/technology/poor-grid-planning-could-shift-europes-data-centre-geography-report-says-2025-06-18/>.

Making electrification viable

Unlocking the gains of electrification will take capital, grid capacity and skills

The promise: cheaper, cleaner, more secure energy

From a national perspective, the case for electrification makes sense. It promises to deliver greater energy security, cost efficiency and decarbonisation. In Europe, for instance, more than half of primary energy demand is met by imported fossil fuels, with proportions among the highest in Italy and Spain.³⁵ Storage capacity is limited so any disruption to fuel imports can quickly constrain economic activity. Renewable electricity from solar, wind and hydro offers a home-grown solution that reduces import dependence and cuts fossil fuel imports by 70%.³⁶ Even taking storage costs into account, solar and wind are now often the cheapest energy sources, undercutting fossil fuels in many markets and providing an efficient route for countries to decarbonise.³⁷

On the demand side the commercial case appears equally compelling. The total maintenance cost of a battery-powered light-duty vehicle works out at around six US cents a mile, significantly lower than the running costs of an internal combustion engine.³⁸ The payback period for installing workplace EV charging points can be as little as three years with incentives.³⁹ Firms with large fleets therefore increasingly regard electrification as a no-regrets option. Retrofitting commercial buildings with heat pumps can reduce operating costs by 12% to 17%⁴⁰ and electrification lifts asset values by up to 9%.⁴¹ For owners this means lower bills and higher resale prices if they can make the upfront investment. Manufacturers report benefits too: electrified processes are more efficient, improve product quality and provide a buffer against volatile fuel prices.⁴² Whether measured in cents per mile, cost cuts or impact on asset value, the headline economics of electrification appear strong.



³⁵ Shedding light on energy in Europe – 2025 edition. Eurostat. Available at: <https://ec.europa.eu/eurostat/web/interactive-publications/energy-2025>.

³⁶ Hill JS. "Too cheap to contain and too big to ignore." The electrotech revolution that will sweep away fossil fuels. Renew Economy. September 2025. Available at: <https://reneweconomy.com.au/too-cheap-to-contain-and-too-big-to-ignore-the-electrotech-revolution-that-will-sweep-away-fossil-fuels/>.

³⁷ Schwerhoff G. The economics of decarbonizing electricity production. International Monetary Fund. 2024;213:33. Available at: <https://www.elibrary.imf.org/view/journals/001/2024/213/article-A001-en.xml>.

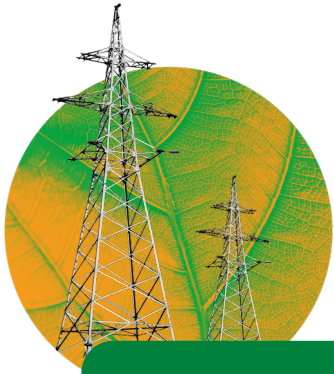
³⁸ Battery-Electric Vehicles Have Lower Scheduled Maintenance Costs than Other Light-Duty Vehicles. Vehicle Technologies Office. US Department of Energy. June 2021. Available at: <https://www.energy.gov/eere/vehicles/articles/fotw-1190-june-14-2021-battery-electric-vehicles-have-lower-scheduled>

³⁹ Commercial EV Charging Stations Costs. Spirit Energy. Accessed October 2025. Available at: <https://www.spiritenergy.co.uk/kb-ev-charging-point-business-case>

⁴⁰ Electrification: A Cost-Saving Solution for Commercial Buildings. Vanguard Building Solutions. June 2024. Available at: <https://vbs-energy.com/electrification-a-cost-saving-solution-for-commercial-buildings/>

⁴¹ Joannides C. The future is electric: The impact of electrification on commercial real estate. CIM. January 2024. Available at: <https://www.cim.io/blog/the-future-is-electric-the-impact-of-electrification-on-commercial-real-estate>

⁴² Pizzemonte A. The Future of Manufacturing: How Electrification Powers Progress. Workforce Insights. MAU. June 2024. Available at: <https://mau.com/the-future-of-manufacturing-how-electrification-powers-progress/>.



“The challenge is making big grid investments at a time when we’re also trying to manage the customer bill. We need to do this in a way that balances affordability and allows people to put food on their table, keep the lights on, keep warm in winter.”

Michael Innocenzo, Exelon

But for many individual businesses, the picture is more complicated in practice. While some firms—typically large ones—already see positive returns, others find the path to electrification harder to justify on purely commercial grounds.

Scale matters

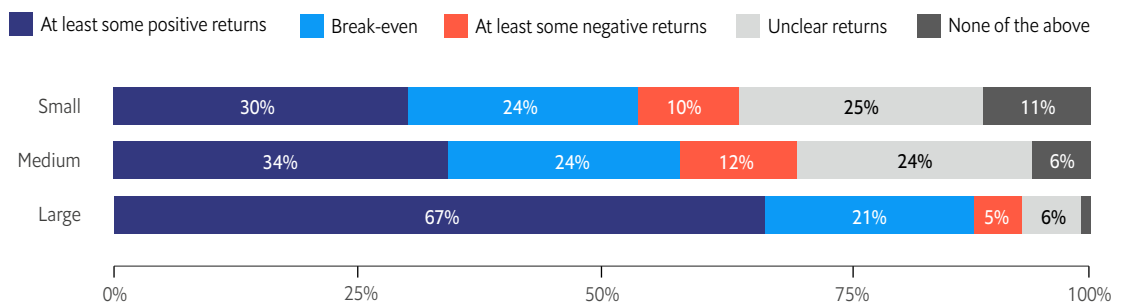
At the company level, the commercial case is not always so clear cut. Our survey indicates that ROIs depend heavily on the size of the firm. Larger companies report the strongest commercial gains from electrification, while for smaller businesses, the picture is far less certain (see Figure 4). Nearly all large firms surveyed are now actively electrifying (96%), most have

set formal targets (89%), and two-thirds report positive returns (67%). Smaller firms, by contrast, are earlier in the process and far more likely to cite uncertain paybacks.

This is partly down to scale and repeatability, but equally significant is access to capital. Larger firms have the balance sheets to absorb longer payback cycles and the market access to secure cheaper finance. Many small- and medium-sized enterprises (SMEs), on the other hand, struggle to access external financing to fund decarbonisation initiatives,⁴³ which are likely to include electrification. They also face systematically higher financing costs and stricter collateral requirements in sustainable

Figure 4. Scale brings sharper, stronger electrification returns

Share of respondents describing the extent of return from investing in electrification initiatives



Note: organisation size definitions are as follows: small, 20-250 employees; medium, 250-500; and large, over 500.

Source: Economist Impact

⁴³ Access to Sustainable Finance for SMEs: A European Survey 2023. Eurochambres. Available at: <https://www.eurochambres.eu/wp-content/uploads/2023/09/Access-to-sustainable-finance-for-SMEs.pdf>.

BOX 2: MAHINDRA BETS ON ELECTRIC MOBILITY

The Mahindra Group, a leading Indian automobile manufacturer, illustrates how electrification is becoming a commercially viable and strategically central part of business transformation. The Indian conglomerate has made the mobility segment, particularly electric three- and four-wheelers, the focus of its electrification strategy, supported by strong policy signals and a fast-growing domestic market.

“When it comes to the energy transition, I divide it into three parts: renewables, energy efficiency and electrification,” says Ankit Todi, Mahindra’s chief sustainability officer. “While all three parts are equally important, electrification, both in transportation and hard-to-abate sectors will really determine how deeply we can decarbonise rapidly.”

India’s electric three-wheeler market could reach almost 100% electrification within a decade, driven by clear cost advantages and rapid vehicle turnover, according to Mr Todi. Mahindra has attracted international investment from commercial and impact-oriented funds, including the International Finance Corporation, Japan’s National Investment & Infrastructure Fund, British International Investment and Temasek to its EV ventures, in what it sees as external validation of the commercial case for electrification.

Beyond transport, the company is piloting battery-based storage to replace diesel generators across its real-estate and hospitality portfolios, cutting fuel use for back-up power by up to 80%. Together, these steps show how supportive policy, blended finance and clear cost economics can accelerate electrification in both core operations and supporting infrastructure.

finance.^{44,45} By contrast, larger companies can access bond markets and blended finance (see Box 2: Mahindra case study), shifting their focus to delivery constraints.

The advantages of scale are practical too, as illustrated by New York City’s bid to electrify its building stock. Emily Hoffman, director of building energy and emissions performance at the New York City Department of Buildings, explains that under Local Law 97 (LL97), which requires approximately 50,000 private buildings to reduce emissions,⁴⁶ large property owners often have in-house energy teams or retained experienced consultants to plan upgrades. Smaller owners may not have this dedicated expertise, but LL97 required them to contract with service providers to do this work. Additionally, because this was the first reporting year, the department extended the deadline in order to allow owners and providers more time to learn the new system and file their reports.

Electrification can clearly create local business value, but the gains are concentrated among larger players who are further ahead on their journey. Yet SMEs make up approximately 90% of all firms globally, providing 70% of jobs and global GDP.⁴⁷ Without targeted support, particularly financial incentives, smaller firms may struggle to start their electrification journeys and reap the benefits, slowing overall progress to an electrified economy.

Capital, grids and people hold the key to faster electrification

Of the executives we surveyed, 47% cited capital costs as the primary barrier holding them back from further electrification. This is not surprising given the scale of the transformation needed. In the US alone, electrifying all mature industrial processes could cost up to US\$289bn by 2050.⁴⁸

⁴⁴ Financing SMEs for sustainability. OECD. December 2022. Available at: https://www.oecd.org/en/publications/financing-smes-for-sustainability_a5e94d92-en.html.

⁴⁵ EIB Investment Report 2024/2025. European Investment Bank. March 2025. Available at: <https://www.eib.org/en/publications/20240354-investment-report-2024>.

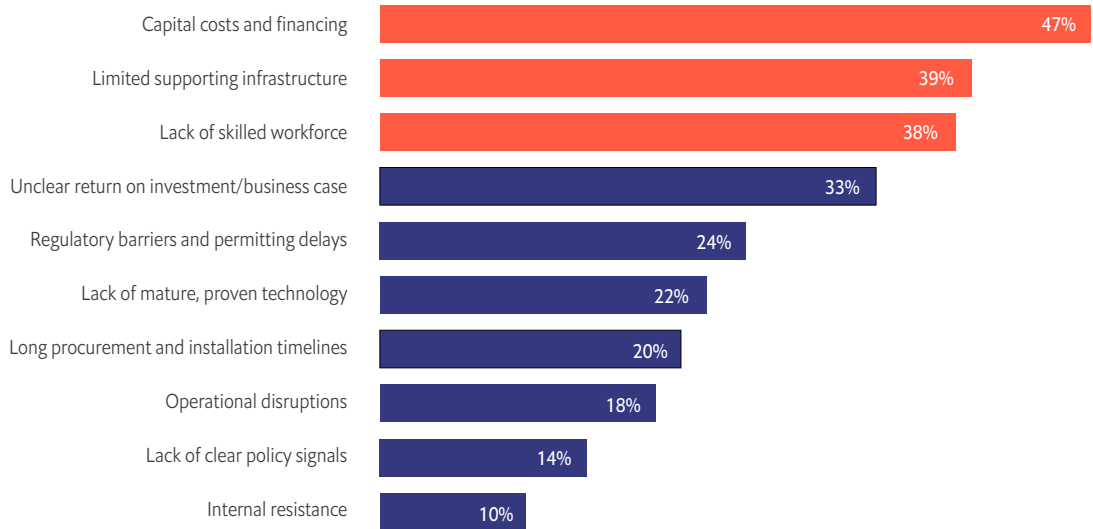
⁴⁶ What is Local Law 97? Urban Green. Available at: <https://www.urbangreencouncil.org/what-we-do/driving-innovative-policy/ll97/>.

⁴⁷ Future Readiness of SMEs. World Economic Forum. Available at: <https://initiatives.weforum.org/sme-resource-hub/home>.

⁴⁸ Baldwin S, Deshpande S, Sawe N, et al. Overcoming All Barriers To Industrial Electrification. Energy Innovation. June 2025. Available at: <https://energyinnovation.org/report/overcoming-all-barriers-to-industrial-electrification/>.

Figure 5. The power gap: money, infrastructure and skills

Share of respondents describing barriers slowing their organisation’s electrification



Source: Economist Impact

Despite the clear long-term benefits, even well-capitalised businesses may find the current costs of full electrification challenging.

Further downstream, customer and consumer affordability is also a growing risk for electrification. Today’s steep rise in demand means utilities face the task of financing major grid expansion without pricing out consumers,

whose bills will shape public support for the broader energy transition.

Grid infrastructure is a challenge across sectors and geographies, cited as the top barrier by the second largest share of respondents. The IEA estimates that grid investment will need to double to more than US\$600bn per year by 2030 to deliver on climate targets, after more than a decade of stagnating investment.⁴⁹ There is a major backlog of renewable capacity waiting to be connected, with an estimated 3,000 GW of renewable energy projects still awaiting connection to the grid as of 2023.⁵⁰ In the US, interconnection queues now average three to five years.⁵¹ Similar bottlenecks exist elsewhere: in the UK, 77% of large industrial sites could face power constraints by 2050 without upgrades⁵² and in Spain, 83% of distribution network connection points are already saturated.⁵³



“Grids must be a political and economic priority, not a technical afterthought... we can build generation, but if we can’t plug it in, that’s a big bottleneck.”

Ana Rovzar, Global Renewables Alliance

⁴⁹ Electricity Grids and Secure Energy Transitions. IEA. October 2023. Available at: <https://iea.blob.core.windows.net/assets/70f2de45-6d84-4e07-bfd0-93833e205c81/ElectricityGridsandSecureEnergyTransitions.pdf>.

⁵⁰ Renewables 2024 Global Status Report: Global Overview. REN21. Available at: https://www.lerenovaveis.org/contents/lerpublication/2024_abr_ren21_renewables-2024--global-status-report.pdf

⁵¹ Rand J, Manderlink N, Gorman W, et al. Queued Up: 2024 Edition Characteristics of Power Plants Seeking Transmission Interconnection As of the End of 2023. Berkeley Lab. April 2024. Available at: https://emp.lbl.gov/sites/default/files/2024-04/Queued%20Up%202024%20Edition_R2.pdf.

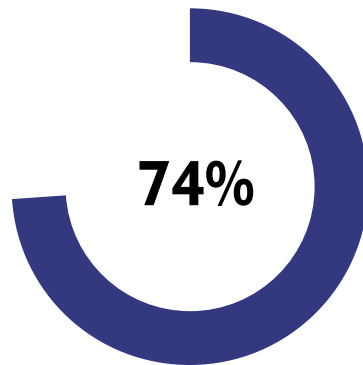
⁵² Taylor P, Gailani A. Electrifying Industry and Distribution Networks: Considerations for Policymakers. UK Energy Research Centre. February 2025. Available at: <https://ukerc.ac.uk/publications/electrifying-industry-and-distribution-networks-considerations-for-policymakers/>.

⁵³ Gualtieri T. Spain's Saturated Power Grid Threatens Data Center Ambitions. Bloomberg. September 2025. <https://www.bloomberg.com/news/articles/2025-09-09/spain-s-saturated-power-grid-puts-data-center-ambitions-at-risk>.

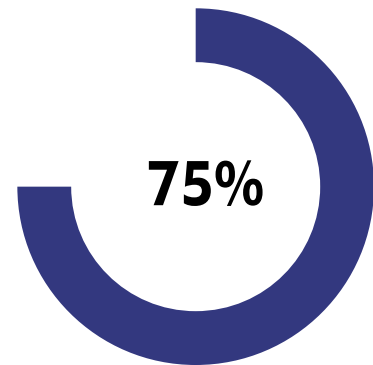
Figure 5. Electrification promises jobs, but demands reskilling

Share of respondents who agree with the following statements

“Electrification will grow my organisation’s workforce”



“Electrification will require my organisation to reskill/upskill employees”



Source: Economist Impact

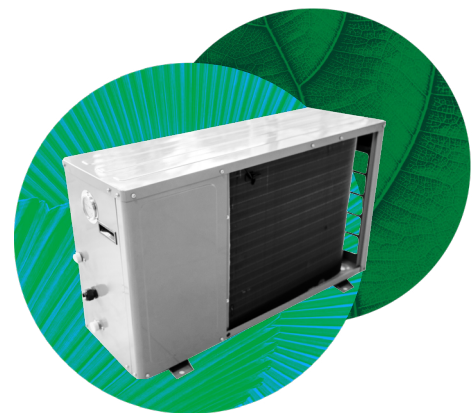
Even where financing is available and business owners are willing to pay a premium to electrify, supply chain issues and delays hold them back. According to real estate and commercial investment company JLL, two-year delays for transformers have pushed otherwise willing real-estate owners to abandon electrification plans as carrying the costs of empty premises is commercially untenable. Under-investment in grids and supply chains compounds the problem, leaving electrification regionally constrained by physical limits.

Skilled workers will unlock the next wave of electrification

About three-quarters (74%) of the firms we surveyed expect net growth in their workforces as a result of electrification. This chimes with wider projections on the future of the workforce. The IEA estimates 14m new clean energy jobs are needed by 2030 to get to net zero.⁵⁴ This aligns with the latest national analysis from the UK government’s Clean Energy Jobs Plan, which estimates that the UK’s clean-energy workforce

will grow from around 440,000 jobs in 2023 to 860,000 by 2030, suggesting approximately 400,000 new jobs in the sector.⁵⁵ In the US, residential and commercial retrofits alone could create more than 3m jobs, including more than 1.1m directly linked to electrification.⁵⁶ Most firms also anticipate major upskilling and reskilling initiatives to deliver on electrification.

Electrification may create more jobs, but finding the people to fill them is getting harder.



⁵⁴ Net Zero Roadmap: A Global Pathway to Keep the 1.5°C Goal in Reach: 2023 Update. IEA. November 2024. Available at: <https://www.iea.org/reports/net-zero-roadmap-a-global-pathway-to-keep-the-15-0c-goal-in-reach>
⁵⁵ Policy paper: Clean energy jobs plan. Department for Energy Security & Net Zero. 19 October 2025. Available at: <https://www.gov.uk/government/publications/clean-energy-jobs-plan/clean-energy-jobs-plan-html>.
⁵⁶ Rewiring America: Robust electrification would create up to 3 million new jobs. Rewiring America. October 2024. Available at: <https://www.rewiringamerica.org/newsroom/press-releases/2024-Workforce-Report>

In the US, some 73,500 electrician openings and one in three engineering roles remain unfilled each year.^{57,58} The German Economic Institute (IW) reports more than 18,300 unfilled energy transition jobs in Germany last year, with particularly acute shortages in electrical construction.⁵⁹ Australia’s Powering Skills Organisation Workforce Plan (2025) projects a national shortfall of 42,000 qualified energy trades workers by 2030, including electricians and renewables technicians, a figure set to widen if training pipelines do not expand.⁶⁰ In factories and industrial sites, many existing roles are changing too, with workers needing new skills in automation, digital systems and energy management. Businesses are starting to sound the alarm, calling on government to help with training and reskilling for renewable energy jobs.⁶¹

Skills gaps vary across sectors and regions. In the energy and utilities sector, where grid

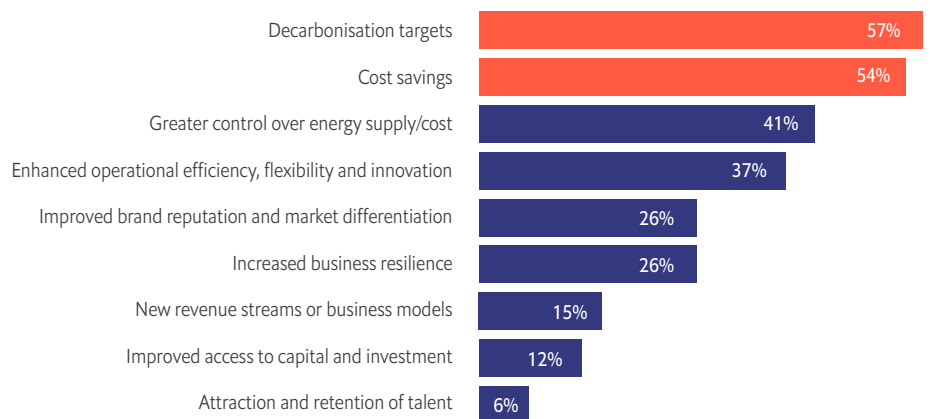
capacity is the top concern, firms report a corresponding shortage of grid engineers and electrical technicians. The IT and technology sector lacks digital integration and optimisation skills, mirroring the challenge of immature vendor solutions. China reports the lowest share (29%), citing skills shortages, reflecting a stronger industrial base and integrated training systems. Skills shortages in construction and infrastructure will be felt particularly acutely across other sectors, as they are dependent on those skills to deliver charging networks, grid upgrades and retrofits.

A further challenge is the extent to which jobs are location-specific. Anthony Fratto from the American Clean Power Association, notes that in the US, new jobs created through electrification can be a tough sell.

“They’re in places younger people just aren’t moving to,” he explains. “You can talk about job

Figure 7. Decarbonisation and cost savings, most valuable outcomes of electrification

Share of respondents who report each of the following among the most valuable outcomes of electrification

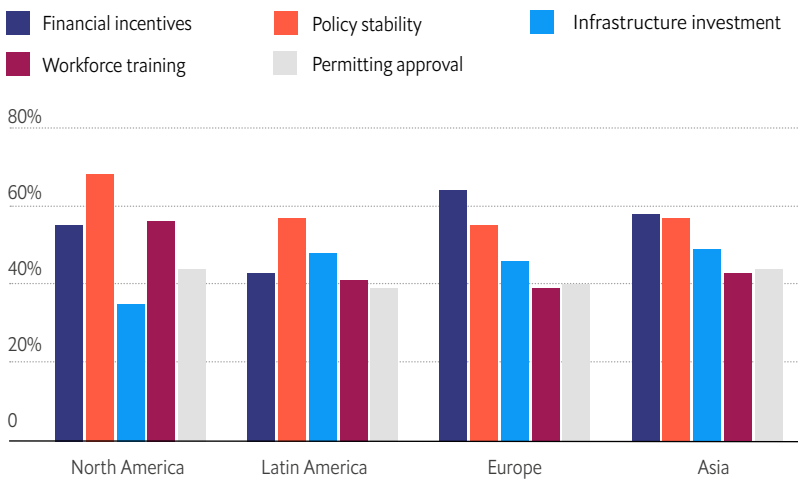


Source: Economist Impact

⁵⁷ Castro-Root G. Electrifying Everything Will Require a Much Larger Workforce. Sierra. September 2024. Available at: <https://www.sierraclub.org/sierra/2024-3-fall/feature/electrifying-everything-will-require-much-larger-workforce>.
⁵⁸ Kodey A, et al. The US Needs More Engineers. What’s the Solution?. BCG. December 2023. Available at: <https://www.bcg.com/publications/2023/addressing-the-engineering-talent-shortage>
⁵⁹ Meza E. Electricians, engineers most needed professions for German energy transition workforce - analysis. Clean Energy Wire. February 2025. Available at: <https://www.cleanenergywire.org/news/electricians-engineers-most-needed-professions-german-energy-transition-workforce-analysis>.
⁶⁰ Abrahams N-L. Australia’s clean-energy race risks stalling without surge in skilled trades. Energy News Bulletin. October 2025. Available at: <https://www.energynewsbulletin.net/energy-transition/features-articles/4521764/feature-australia-clean-energy-race-risks-stalling-surge-skilled-trades>.
⁶¹ Powering up: Business perspectives on shifting to renewable electricity. Savanta. April 2025. Available at: https://powering-up-business-poll.com/wp-content/uploads/2025/05/Powering-up_Business-perspectives-on-shifting-to-renewable-electricity_Report.pdf.

Figure 8. Stability or subsidies? Regions diverge on top electrification incentives

Share of respondents who ranked each of the following among the most important incentives for electrification across their organisation’s supply chains. Top 5 incentives, globally



Source: Economist Impact

creation all you want, but if you’re not attracting the workforce to rural areas it’s harder to make it real.”

Unlocking the jobs potential of electrification will take co-ordination between policy and business on reskilling programmes, apprenticeships, partnerships with technical colleges and incentives to retain workers in less-favoured geographies. Without that, labour constraints

may become a strategic bottleneck, even where capital, regulation and grid barriers recede.

Business gains from electrification

Companies see decarbonisation and cost savings as the most valuable business outcomes of electrification. To realise these benefits, companies cite financial incentives (59%) and greater policy stability (58%) as the top enablers, but other priorities vary by market. Firms in the US and UK place particular emphasis on policy stability (68% of US firms and 67% of UK firms), underscoring how a stable regulatory backdrop boosts business confidence to invest in new electric solutions. Meanwhile in Europe and Australia, firms prioritise financial incentives. The EU’s RED III provides a framework of financial and regulatory support, while Australia’s capacity investment scheme follows a similar path. In Japan, where permitting reform is the top priority, approval processes often take 3–5 years, with fragmented prefectural rules creating systemic delays.



“We are facing a convergence of energy and real estate markets. Our teams are being pushed for energy expertise as they move further up the value chain – talking to utilities, negotiating power availability and interconnection capacity. This is new territory for the real estate industry.”

Josephine Tucker, JLL

The road ahead

Our survey finds that electrification has moved from being a strategic question mark to a central pillar of business planning.

No longer regarding it a marginal issue, a clear majority of firms globally are already electrifying assets, processes and supply chains, and many are beginning to see positive returns from the transition. Yet while adoption is widespread, progress is uneven. The front-runners are those with scale, capital access and supportive policy environments, while laggards struggle with ROI uncertainty and execution bottlenecks.

What is clear is that intent is no longer the main barrier. Instead, businesses face practical roadblocks, including interconnection queues and grid constraints, slow permitting, high capital costs and acute shortages of skilled labour. These brakes threaten to stall the transition even as the economic and policy case strengthens. If addressed, however, electrification offers not only a path to decarbonisation, but also a net gain in jobs and the creation of new, high-skill roles across sectors.

Rapid electrification will ultimately depend on financial incentives and policy stability, as businesses struggle to commit capital without confidence and incentives. For instance, in the US, analysis of investments in clean energy and infrastructure under the IRA showed an increase of 71% in the first two years of the legislation,⁶² illustrating how predictability can accelerate private investment. Similarly, the EU's RED III and Australia's Capacity Investment Scheme demonstrate that consistent frameworks can anchor progress.

Progress also hinges on strong partnerships. Companies are seeking more active utility partnerships to navigate complex energy transitions.⁶³ Finally, the incentives must align with business realities. Across sectors, cost savings and decarbonisation remain the leading motivations for firms to electrify. Policy design must reflect this, combining financial support, credible regulation and affordable power to meet both climate and commercial goals.



“When you bring together utilities, cities and private operators, electrification becomes cheaper, cleaner and more inclusive.”

Rogier van den Berg, WRI Ross Center for Sustainable Cities

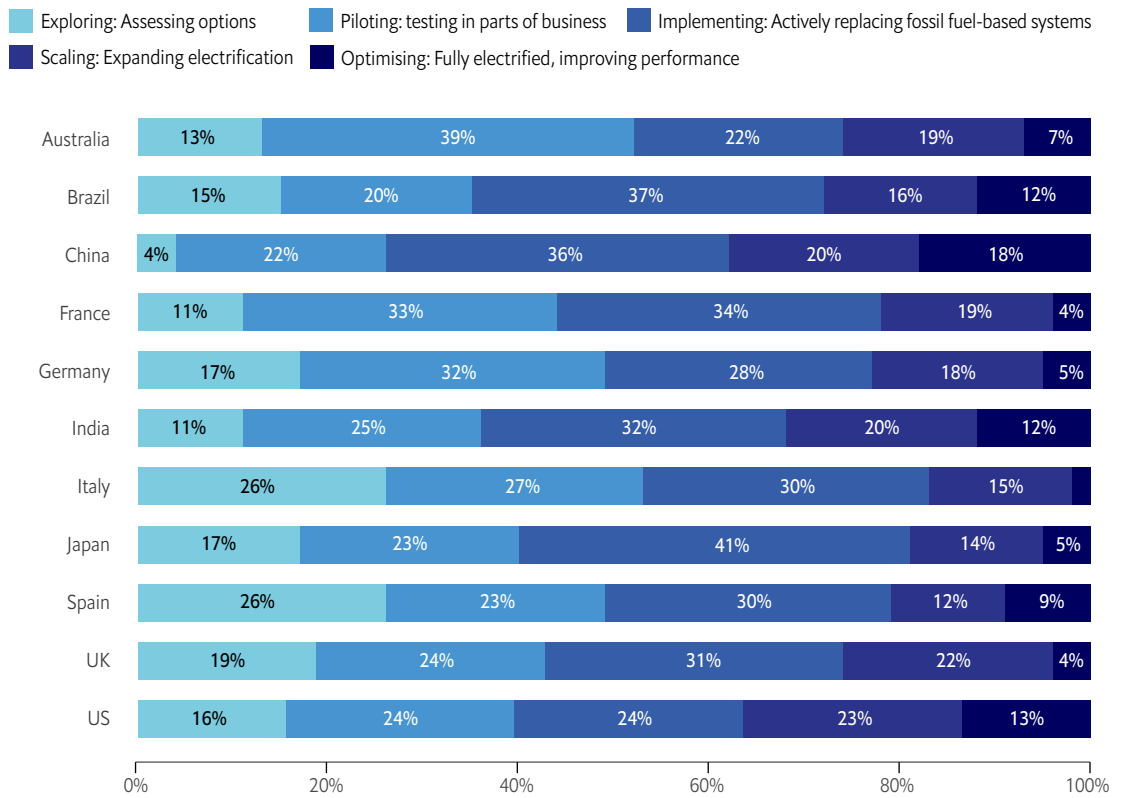
⁶² Two Years of the Inflation Reduction Act: Transforming US Clean Energy. Global Infrastructure Investor Association. September 2024. Available at: <https://giia.net/insights/two-years-inflation-reduction-act-transforming-us-clean-energy>

⁶³ Jenkinson S, Mata A, de Pous P, et al. Powering Up: Business leaders overwhelmingly back a rapid transition to renewable power. E3G. April 2025. Available at: <https://www.e3g.org/publications/powering-up-business-leaders-overwhelmingly-back-a-rapid-transition-to-renewable-power/>

Annex

Figure 9. Electrification progress varies widely across markets

Share of respondents at each stage of electrification, by country



Source: Economist Impact

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