Powering Past Coal Alliance

CARBON TRUST

Electrification: why clean power delivers where coal cannot

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Contents

Executive Summary

The world is entering a period of rapid electrification. According to the International Energy Agency, global electricity demand is set to grow by around 3.6% a year to 2030, with emerging economies accounting for nearly 80% of additional demand. Yet, the question of what will power the age of electricity is still open. Coal remains one of the world's largest sources of power generation, accounting for 33% of electricity generation and around 73% of power sector emissions. While its use is already in structural decline in advanced economies, it continues to play a central role in precisely the countries where electricity demand is growing fastest.

Acting now to definitively tip the balance against coal in all parts of the world will substantially increase the long-term benefits of electrification. Powering the electrification wave with clean energy rather than coal brings a fourfold advantage: lower long-run energy costs, as renewables and battery storage are now cheaper than new coal globally, and are becoming cheaper than existing coal in most markets; greater energy security, by cutting reliance on imported coal and its price shocks; a more flexible and resilient grid, better suited to the variable demand that electrification brings; and sharply higher emission reductions compared with coal-based generation.

The challenge is that many emerging economies are still locked into coal-heavy systems. In developing Asia, relatively young coal fleets, large unrecovered capital costs and long-term contracts make early retirement of coal power plants difficult. High capital costs, major grid investment requirements and the need to protect workers and communities in coal-dependent regions create further near-term barriers. These are real obstacles, but they are not insurmountable. Financing instruments for early coal retirement, just transition planning frameworks and grid management approaches that accommodate high shares of renewable power have all been developed and tested. As electricity demand accelerates, governments now have both the tools and a new compelling rationale to deploy them.

We make two key recommendations:

For governments and system planners we recommend that as the changing demands that electrification will place on the grid become clear, they take the opportunity to update power sector plans, and bring rising electrification, clean build-out and coal transition scenarios together into a single costed pathway. A holistic, integrated plan will support an accelerated transition away from coal towards a more flexible, affordable and resilient system.

For the international community, we recommend that addressing the factors that lock in coal use in the power sector should sit, alongside electrification, as a central element of the proposed global roadmap for the Transition Away from Fossil Fuels (TAFF). This means ensuring that every country seeking to accelerate its transition away from coal can access the international partnerships, financial and technical support needed to turn that commitment into delivery.

How is electrification shaping global power demand?

Global electricity demand is projected to grow around 3.6% a year to 2030, with emerging economies accounting for nearly 80% of additional demand.[1] **Electricity demand is growing at least 2.5 times faster than overall energy demand,**[2] a shift driven by air conditioning expanding across hot and fast-growing economies, electric vehicles displacing oil-fuelled fleets, data centre build-out, and the electrification of industrial heat. **All countries are experiencing a structural shift in how their economy uses energy, with transport, industry, heating, cooling and digital infrastructure moving onto the grid.**

The countries where this shift is happening fastest also tend to be the most reliant on coal. Coal supplies almost three-quarters of India's electricity and around half of Southeast Asia's, precisely the regions where electricity demand is growing fastest.[3] Decisions on what form of generation will meet rising demand for electricity will therefore be critical. **Meeting demand through clean generation multiplies the benefits electrification brings. Meeting it through coal-based generation risks deepening dependence on coal in emerging economies.**

Recent energy crises have sharpened this choice. They have exposed the risks of running power systems on imported fuels – and made the case for abundant, cost-competitive renewables more compelling. **This is a crucial moment for policymakers to take stock of forward plans for the power sector.** They can turn a demand challenge into an opportunity to build the affordable, secure and flexible power systems that electrification requires.

> Coal supplies almost three-quarters of India's electricity and around half of Southeast Asia's, precisely the regions where electricity demand is growing fastest.

[1] IEA, Electricity 2026 – Analysis and forecast to 2030.
[2] IEA, Electricity 2026 – Analysis and forecast to 2030.
[3] Ember, 2026, Electric Asia.

The long-term benefits of powering electrification with clean energy

Clean energy makes electrification more **affordable**

Solar paired with battery storage offers cheaper power than even the most efficient new coal power plants, and the economics of existing coal are also beginning to shift.

The costs of onshore wind and solar have fallen sharply over recent years, and renewables now make up the bulk of new generation globally because they are the cheapest new source of electricity in most markets. **91% of newly commissioned renewable capacity in 2024 generated power at a lower cost than the cheapest fossil fuel alternative.**[4]

The costs of the supporting technologies have shifted decisively too. Battery storage costs have fallen 93% since 2010, to around $192/kWh in 2024, turning the storage and flexibility that high-renewables grids depend on from a barrier into an increasingly affordable complement.[5] Recent analysis found that **solar paired with eight-hour battery storage offers cheaper power than even the most-efficient coal power plants for meeting new demand globally.**[6]

The advantage is clearest for new capacity, but the economics of existing coal are also beginning to shift. BloombergNEF's 2026 New Energy Outlook finds that coal increasingly cannot compete with cheaper alternatives in most parts of the world, and is being displaced by lower-cost renewables into a more limited, residual role rather than supplying baseload power.[7] Already in 2023, the IEA found that three-quarters of new wind and solar PV plants offered cheaper power than existing coal and gas power plants.[8] Where coal does persist, it is largely because of existing asset bases and cost advantages in specific markets. In economies with young coal fleets, retiring those plants therefore depends on deliberate planning and finance.

Markets are starting to reflect the increasing costs of continued coal operation. In 2025 in India, solar-plus-storage tariffs fell below ₹3/kWh (around 3.4 cents in US currency) for the first time, and

93%

decrease in battery storage costs since 2010.

> Solar paired with battery storage offers cheaper power than even the most efficient new coal power plants globally.

[4] IRENA, 2025, Renewable Power Generation Costs in 2024.
[5] IRENA, 2025, Renewable Power Generation Costs in 2024.
[6] RMI, 2026, Reconsidering Planned Generation, Exhibit 7, pg. 18.
[7] BloombergNEF, 2026, New Energy Outlook 2026, Summary Findings, p. 5.
[8] IEA, 2024, Renewables 2023.

India Energy and Climate Center analysis of these auction results finds that solar paired with storage can now deliver round-the-clock clean power at roughly ₹4–4.5/kWh (around 5 cents), competitive with new coal-fired power tariffs in India.[9]

The savings from renewable energy sources are projected to flow through to electricity costs as systems shift. The IEA projects that as Southeast Asia incorporates more cost-competitive clean sources in place of coal, the region's average electricity cost falls from around $120 per MWh today, above the global average, to just under $100 by 2035 and $80 by 2050.[10] Cheaper, more stable electricity will in turn strengthen the case for electrifying transport, industry and heat.

The Spain case study in this brief provides further insights into how affordability benefits have been delivered since the country's coal phase-out and transition towards renewables.

Electrification with clean energy **delivers greater energy security**

The recent energy crises since 2020 have exposed how vulnerable economies remain when run on globally traded fuels. Coal is no exception. Over 90% of globally traded coal in 2024 moved by sea, three-quarters of it thermal coal used for electricity generation - and like any seaborne commodity, coal exposes importing countries to price swings and supply risks driven by global markets and geopolitical events.[11] Thermal coal prices rose to above $400 per tonne at the peak of the 2022 crisis, several times pre-crisis levels.[12] This was a cost that likely had to be absorbed into the power bills and public finances of importing countries.

This cost exposure is most significant in the emerging economies of Asia, where electricity demand is rising fastest and coal still dominates the mix. Southeast Asia, which now draws close to half its electricity from coal, overtook the United States in 2023 to become the world's third-largest coal-consuming region.[13] Much of that coal is imported: the Asia-Pacific region accounted for around 85% of global coal imports in 2024.[14] For economies meeting rapid demand growth with imported coal, that dependence ties a widening share of their power systems to a globally traded fuel whose price they cannot control.

Many emerging economies could be at risk of future coal price shocks and there is a real need to move to clean domestic energy sources. To date, Morocco imported a broadly stable 10-11 million tonnes of coal a year between 2020 and 2023, yet its annual import bill swung from $633 million to $2.06 billion, driven by a global price it cannot control.[15] In parallel, the Philippines saw

$400

thermal coal prices per tonne at the peak of the 2022 crisis, several times pre-crisis levels.

As Southeast Asia transitions from coal to clean, the region's average electricity cost falls from around $120 per MWh today to just under $100 by 2035 and $80 by 2050.

The recent energy crises since 2020 have exposed how vulnerable economies remain when run on globally traded fuels. Coal is no exception.

[9] Chojkiewicz, Abhyankar and Phadke, India Energy and Climate Center, 'Plummeting Solar+Storage Auction Prices in India Unlock Affordable, Inflation-Proof 24/7 Clean Power', 2025.
[10] IEA, 2024, Southeast Asia Energy Outlook.
[11] IEA, 2025, Coal 2025 - Analysis and forecast to 2030.
[12] IEA, 2025, Coal Mid-Year Update 2025.
[13] IEA, 2025, Global Energy Review.
[14] IEA, 2025, Coal 2025 - Analysis and forecast to 2030.
[15] WITS, Morocco coal imports (HS 270119), 2020–2023; see Table 1.

average coal import prices reach around $214 per tonne across 2022, a 281% increase on 2020 levels, with electricity tariffs for one distribution utility reaching $310 per MWh as the cost of imported coal was passed directly to consumers.[16] Similarly, Viet Nam's coal use has outgrown its domestic mines, leaving it increasingly dependent on imports. Coal made up around 40% of Vietnamese electricity generation in 2024, around half of which was sourced from imports.[17,18] The OECD reports that rising electricity demand and low hydropower output pushed imports higher in 2024, setting Viet Nam on track to be the world's fifth-largest coal importer, with adverse effects on its trade balance and energy security.[19] The recent Iran War has presented estimates that with traded fuel prices spiking, diversifying this risk through solar power installations could help Viet Nam avoid $545 million from coal imports.[20] **There is an opportunity for emerging economies in Asia such as the Philippines and Viet Nam to achieve greater energy security through clean energy deployment, as they plan for increased electrification.**

$545

million costs of coal imports that could be avoided thanks to solar power installations in Viet Nam.

Decisionmakers are increasingly seeking to build energy independence through a clean power system to address energy security vulnerabilities, as the analysis of Morocco in this brief illustrates.

Electrification with clean energy delivers **significantly lower emissions**

Coal provides around a third of the world's electricity but is responsible for over 70% of power sector emissions.[21, 22]

Electrification can reduce emissions even on today's grids, primarily because electric end-uses on the demand side are more efficient than the fossil fuel combustion processes they replace. This means that, for a given level of energy service, less overall generation is required, lowering emissions. However, the full climate benefit of electrification depends on how electricity is generated. When paired with clean power, electrification delivers substantially larger emission reductions, as each unit of new demand avoids the high emission intensity of coal-based generation. Moreover, electrification shifts emissions from dispersed end-uses such as cars, residential heating or industrial boilers to the power sector, where they can be addressed more efficiently through targeted decarbonisation of generation.

Coal provides around a third of the world's electricity but is responsible for over 70% of power sector emissions.

[16] TransitionZero, 2026, Philippines' Emergency and Long-Term Coal Contracts are Costing Consumers.
[17] IEA, 2024, Achieving a Net Zero Electricity Sector in Viet Nam.
[18] IEA, 2024, Coal Mid-Year Update.
[19] OECD, 2024, OECD Economic Surveys: Viet Nam 2025, drawing on IEA, Coal Mid-Year Update, July 2024.
[20] Zero Carbon Analytics, 2026, Solar could help Vietnam avoid almost $600 million from coal and gas imports'.
[21] Ember, 2026, Global Electricity Review.
[22] IEA, 2023, CO_2 emissions from power generation.

Electrification requires a **more flexible, resilient grid** that can best be delivered with clean generation.

Electrification changes not only the volume of demand but also when peaks occur and how steep they are. As demand expands into transport, heating and cooling, grids must manage both higher volumes and a greater variability of load, such as an EV fleet charging overnight, heat pumps surging in a cold snap, air conditioning demand peaking in a heatwave, or industrial demand flexing through the day, all while the rising share of wind and solar adds variability on the supply side. This requires a fundamental shift away from what the IEA describes as **the old model of 'centralised, vertically integrated systems using a relatively small number of large dispatchable thermal power plants' toward a landscape of many producers of every size.**[23]

> Coal power plants are slow to ramp, costly to cycle, and need to run at high utilisation to cover their fixed costs.

Clean systems are structurally better placed to provide the flexibility electrification requires. Flexibility can come from demand-side response, which allows consumers to shift load dynamically (EVs charging off-peak, heat pumps and cooling adjusting to supply); storage, which moves electricity across time to smooth short-term fluctuations, and a diverse mix of distributed and large-scale resources that can respond quickly to changing conditions.[24] Coal power plants, by contrast, cannot deliver this flexibility at scale. Designed for steady baseload operation rather than rapid adjustment, they are often slow to ramp, costly to cycle, and need to run at high utilisation to cover their fixed costs.[25] They can be operated more flexibly, but at significant cost and with reduced reliability.[26]

[23] IEA, 2020, Power Systems in Transition.
[24] IEA, 2020, Power Systems in Transition.
[25] GEM, 2026, Boom and Bust Coal 2026.
[26] Coal Transition Commission, 2025, From Flex to Phase-Out.

The path from coal to clean: navigating near-term challenges

The long-term case for clean electrification is clear, but emerging economies tackling the coal-to-clean transition face some immediate challenges that international cooperation and support can help address.

Challenge 1: **Young coal fleets are costly to retire**

In much of developing Asia, the coal fleet averages around 15 years against a roughly 40-year operating life, with over $1 trillion of capital yet to be recovered.[27] Plants are often shielded from market signals by long-term contracts, meaning early retirement costs will include the costs of renegotiating these contracts in a fair and orderly fashion and addressing any outstanding debt, alongside the costs of repurposing or rehabilitating the site and supporting workers through the transition.

Challenge 2: **Renewables require a low cost of borrowing**

Although the levelised cost of renewables has fallen globally (total lifetime cost from construction to operations & maintenance), the actual cost of delivering projects in emerging economies is pushed up by high financing costs. For example, the cost of capital can reach around 12% in parts of Africa compared to 3.8% in Europe.[28] The difference in cost of capital across these two regions reflects higher perceived risks and limited access to affordable finance in emerging markets. As a result, the constraint in most cases is access to financial mechanisms such as concessional or blended finance. Low cost of borrowing is particularly important because renewable energy projects require high upfront investment capital, even when their lifetime costs are affordable.

Challenge 3: **Grid scale-up requires a step change in investment**

Meeting electrification demand will require grid investment globally to increase by nearly 50%, from around $400 billion a year to $600 billion by 2030.[29] Procurement bottlenecks are already acute, with lead times for large power transformers doubling since 2021 and over 2,500 GW of renewable energy projects waiting for grid connections worldwide.[30] In emerging economies, where demand is growing at three times the rate of advanced economies, the challenge is steeper still, as these economies need not only more generation but a fundamentally different kind of grid.

[27] IEA, World Energy Outlook 2021.
[28] IRENA, 2025 , Renewable Power Generation Costs in 2024.
[29] IEA, Electricity 2026.
[30] IEA, Building the Future Transmission Grid, 2025; IEA, Electricity 2026.

Challenge 4:
The transition needs to deliver benefits for workers and communities

Over the long term, the transition from coal to clean energy is projected to create more high-quality jobs than it displaces, with clean energy already employing around 35 million people globally, exceeding fossil fuel employment at around 32 million, reflecting the current direction of travel in energy labour markets.[31] However, the transition can be particularly disruptive for workers and communities that have depended on coal. Around 7.8 million people worldwide work in coal-related activities today, with jobs heavily concentrated in a small number of regions, meaning losses are likely to be geographically and socially concentrated as demand declines.[32] Governments can help manage these impacts through appropriate policies, planning processes and financial support, including for skills training, the creation of decent work opportunities and support for local economic development.

Solutions exist and are being deployed. These challenges are real, but they are not insurmountable. Governments have developed policy measures to incentivise investment and engage communities and other stakeholders around a plan for a just transition. Financial and technical experts have developed innovative solutions to finance upfront costs of early retirement and replacement with clean energy. Multilateral development banks have developed facilities to support the build out of new capacity, retirement or repurposing of existing assets and to address the social aspects of the transition. Also, governments and utilities are finding ways to incentivise and deliver flexible operation of coal plants, as a short-term transition measure, to support faster integration of renewables as a bridge while longer-term storage and grid solutions scale. The PPCA's Solutions Bank brings together practical guidance on many of these tools in one place.[33]

The steps needed to accelerate implementation of these solutions are also increasingly clear. The PPCA's Plan to Accelerate Coal Transitions, launched at COP28, sets out three key levers: supporting governments to develop and implement strong enabling policies and transition plans, scaling finance for just coal-to-clean transitions and accelerating the development of investable projects.[34] As the power sector becomes ever more central to economic prosperity and energy security, the benefits of moving faster multiply, and so does the cost of delay.

[31] IEA, 2023, World Energy Employment.
[32] IEA, 2024, Accelerating Just Transitions for the Coal Sector.
[33] PPCA, 2025, Solutions Bank - PPCA.
[34] PPCA, Plan to Accelerate Coal Transitions.

Case Studies

Many countries are taking action to accelerate the transition towards clean power. We have chosen two case studies that help illustrate the benefits that this can bring in the context of rapid electrification.

Morocco - from imported coal dependence to domestic clean power

Morocco has no domestic coal reserves, yet coal still generates 62% of its electricity based on 2025 figures, leaving its power sector heavily exposed to international price volatility.[35] However, as the country electrifies, policymakers have chosen to take the opportunity to accelerate the shift from coal to clean power, driven by its energy security, economic and social benefits.

The system shift is already visible. Electricity demand is climbing year on year, reaching a record 47.9 TWh in 2025, driven by industrialisation, urbanisation and a growing services sector.[36] That rising demand is increasingly being met by clean generation; wind and solar have risen from roughly 8% of generation in 2015 to around 21% in 2025.[37] Coal still supplies the largest single share, but its dominance is receding, down from 70% in 2022 to 62% in 2025, as renewables have expanded.[38]

The energy security case for this shift is stark. Between 2020 and 2023, the country imported a broadly stable 9.9–10.9 million tonnes of coal annually, yet the cost of doing so swung from $633 million in 2020 to a peak of $2.06 billion in 2022, before falling back to $1.38 billion in 2023. The swing was driven almost entirely by the global coal price, which roughly tripled for Morocco from $64 per tonne in 2020 to $192 per tonne in 2022. For a country with no domestic coal, this is a macroeconomic exposure beyond its control. Renewables, by contrast, are powered by a domestic resource that carries no import bill and no commodity price risk.

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cost of imported coal in Morocco in 2022, compared to $633 million in 2020.

[35] IEA, Energy Statistics Data Browser, Electricity Generation by Source, Morocco, 1990-2023.
[36] Ember, Electricity Data Explorer, Electricity demand in Morocco.
[37] Ember, Electricity Data Explorer, Electricity generation in Morocco (wind + solar ~8.4% in 2015 to ~21% in 2025).
[38] Ember, Electricity Data Explorer, Share of electricity generation in Morocco, 2000-2025.

Figure 1: Morocco's coal import price ($/tonne) and volume, 2020–2024 (2024 based on Carbon Trust analysis).[39]

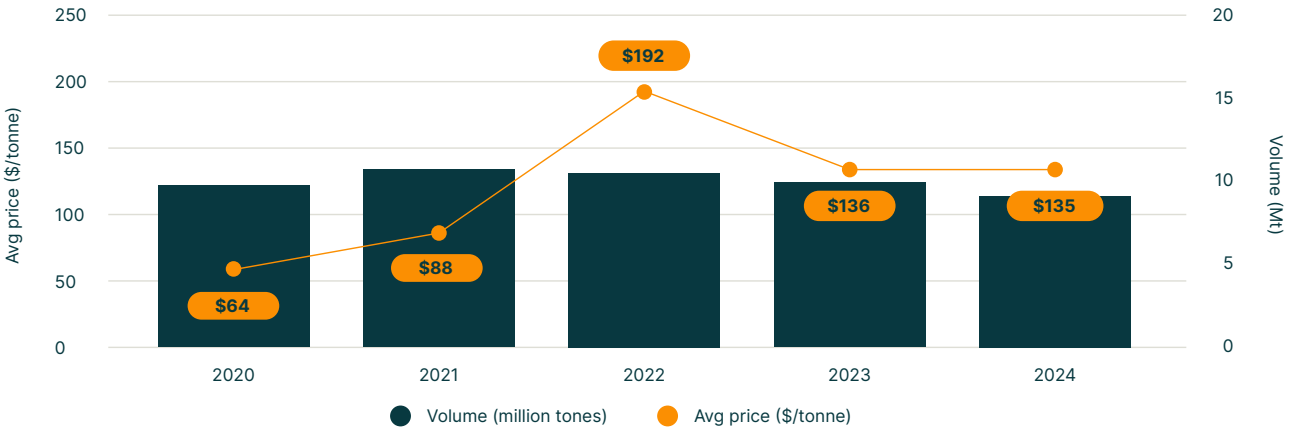

Table 1: Morocco's coal import bill, 2020–2024 (2024 estimated).[40]

Year	**Quantity** (million tonnes)	**Trade Value** ($M)	**Avg Price** ($/tonne)
2020	9.9	633	$63.75
2021	10.9	954	$87.54
2022	10.7	2,059	$192.19
2023	10.1	1,376	$135.67
2024	*9.4*	*1,264*	*$135.00*

In its updated Nationally Determined Contribution (NDC 3.0), Morocco commits to tripling renewable energy capacity to over 15 GW by 2030, expanding storage and grid infrastructure, and achieving conditional coal phase-out by 2040, subject to international support. The policy direction is clear, and this is mobilising substantial domestic and international investment. Morocco has set out its ambition to build the more secure and affordable power system that electrification requires. What will make a difference now is for the international community to match it with the finance and technical support to make it real.

[39] 2024 figure estimated using 2024 reported import volume × Newcastle thermal coal benchmark (IEA, 2025).
[40] Methodology note. WITS publishes Morocco's official coal import values through 2023 (For 2024, where WITS reporting is incomplete, we estimate the import bill as reported import volume (9.36 Mt, statbase.org) multiplied by the 2024 annual average Newcastle 6,000 kcal/kg FOB thermal coal benchmark of ~$135/tonne, assessed from the IEA Coal Mid-Year Update 2025. The Newcastle benchmark is the standard reference price for seaborne thermal coal in Asia-Pacific markets and a widely used proxy for international thermal coal pricing. All figures refer to HS 270119 "Other coal, whether or not pulverised, but not agglomerated". We assume this to be the dominant coal import category for Morocco, based on desk-based research. Figures exclude other HS codes such as anthracite (HS 270111), coking coal (HS 270112), and coal briquettes (HS 270120).

Spain - how a clean-power transition away from fossil fuels can deliver cheaper, more stable electricity

The case of Spain shows how the phase-out of coal has been an important enabling condition to help deliver lower and more stable electricity prices when replaced by solar and wind rather than gas. By rapidly scaling up renewable generation and reducing reliance on fossil fuels, Spain has moved from one of Europe's more expensive power markets in 2019 to one of its cheapest in 2025.[41] Spain's experience shows what the energy transition can deliver in practice, with lower wholesale prices, and a just transition that has created new economic opportunities in the regions most affected by coal's decline.

By reducing reliance on fossil fuels, Spain has moved from one of Europe's more expensive power markets in 2019 to one of its cheapest in 2025.

In 2015, coal accounted for almost 20% of Spain's electricity generation.[42] By mid-2025, mainland coal generation had effectively ended, with coal accounting for just 0.32% of the country's power for the year.[43] Coal's decline has largely been driven by the rapid deployment of cheaper renewables and by carbon pricing, which has raised the operating cost of coal and further eroded its competitiveness.

In the first half of 2025, wind and solar met almost 50% of Spain's electricity demand – up from 27% in the first half of 2019.[44] The cost impact has been significant. As Spain rapidly built out wind and solar, cheaper renewable power began to displace coal and gas, reducing the influence of fossil fuels on wholesale electricity prices. As a result of the switch from fossil fuels to increasingly deploying wind and solar, Spain's wholesale power prices fell to 32% below the EU average in early 2025.[45]

The build-out of renewables has kept Spain's wholesale electricity prices well below where they would otherwise have been: the Bank of Spain estimates that without the wind and solar added since 2019, wholesale prices would have been around 40% higher in early 2024.[46] Over the same period Spain has been one of the EU's fastest-growing major economies, expanding by 2.6% in 2025 against a euro-area average of about 1.4%, though this reflects several factors, of which lower energy costs are only one.[47, 48] Spain's experience shows that supportive energy policy measures that seek to unlock the full benefits of low-cost renewables, coupled with parallel investment in grids and flexibility, can lessen the impact of geopolitical shocks.

[41] Ember, 2025, Decoupled: how Spain cut the link between gas and power prices using renewables.
[42] IEA, 2025, Energy Statistics Data Browser, Electricity generation by source, Spain, 1990-2024.
[43] GEM, Boom and Bust Coal 2026.
[44] Ember, Electricity Data Explorer, Electricity generation from coal in Spain.
[45] Ember, 2025, Decoupled: how Spain cut the link between gas and power prices using renewables.
[46] Ember, 2025, Decoupled: how Spain cut the link between gas and power prices using renewables.
[47] European Commission, 2026, Economic forecast for Spain.
[48] Eurostat, 2026, Quarterly national accounts – GDP and employment.

The whole systems approach needed for clean electrification is shown also by the events of the April 2025 Iberian blackout. The blackout increased reliance on gas for system stability, which raised costs and renewable curtailment, highlighting the importance of strengthening networks, storage and interconnection.[49] Spain is now addressing this, with planned grid upgrades, a growing battery pipeline, and new interconnection capacity underway.[50]

Spain's experience also provides useful insights on delivering a just transition. Almost all jobs lost in the affected industries and regions have been replaced with new employment opportunities, many of which are in the renewables sector, generating €7 billion in private investment in the process.[51] This just transition away from coal has been achieved through a dedicated Just Transition Institute, which has designed two complementary instruments: tripartite agreements between the national government, companies and trade unions; and Just Transition Agreements between national, regional and local governments across the 15 affected regions.

Spain is building the foundation for the electrification wave ahead. The same shift of affordable renewables backed by flexibility, also makes its grid better placed to take on rising demand from EVs, heat pumps and industry than a power system built around an inflexible coal baseload. Affordability and flexibility reinforce each other, where cheap renewable power brings prices down, and the flexibility that integrates it — storage, demand response, interconnection — drives them lower by shifting cheap midday generation into peak hours. Spain has proven what is possible; the task now is to extend these benefits to other parts of the world.

[49] Ember, 2025, Decoupled: how Spain cut the link between gas and power prices using renewables.
[50] EIB, 2025, EIB supports with €1.6 bn the strategic Bay of Biscay electricity interconnection between Spain and France.
[51] Ministry for Ecological Transition and Demographic Challenge, 2023, Spain, 4 years towards a just energy transition.

Recommendations

The long-term case for powering electrification with clean energy rather than coal is clear — and so is the path to getting there. Many of the tools needed to move away from coal already exist and have been tested in practice, and what is needed now is to deploy them at speed and scale to reap the maximum benefits from the coming wave of electrification, and to avoid the worst impacts of climate change.

We make two recommendations:

Plan electrification and the coal transition together

Most countries already have energy strategies, Nationally Determined Contributions and power development plans. The challenge is that electrification demand and coal phase-down are typically planned in isolation, which means that the benefits of each are not fully realised. Governments have a strategic opportunity to update these plans, bringing rising electrification, clean build-out and coal transition scenarios together into a single costed pathway, convening energy and finance ministries, system operators, grid utilities, financial institutions, and workers and communities from the outset. This includes developing integrated investment pathways that link coal retirement or repurposing with clean renewables build-out, and reforming market design and tariff structures so that electrified loads — from EVs to industrial cooling solutions — actively contribute to system flexibility rather than entrenching the inflexible baseload model that coal-heavy systems depend on.

Address coal lock-in in the global TAFF roadmap

For the international community, addressing the factors that lock in coal use in the power sector should sit, alongside electrification, as a central element of the proposed global roadmap for the Transition Away from Fossil Fuels (TAFF). The coal transition and electrification are not separate agendas — they are two sides of the same coin, and the roadmap should reflect that. This means ensuring that every country seeking to accelerate its transition away from coal can access the international partnerships, finance and technical support needed to turn that commitment into delivery. The international community has the tools, the frameworks and, with the global electrification campaign now launched, the political momentum. COP31 is the moment to convert that political will into concrete results, and to ensure that the coming wave of electrification is powered by clean energy, not coal.

This briefing has been published by the Powering Past Coal Alliance, a coalition of over 180 national and subnational governments, businesses and organisations working to advance the transition from unabated coal power generation to clean energy. The Alliance was launched in 2017 by Canada and the United Kingdom.

www.poweringpastcoal.org

Global climate consultancy, The Carbon Trust, conducted the research for the briefing. The Carbon Trust is an expert partner for businesses, governments and organisations around the world, helping them decarbonise and accelerate to Net Zero.

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