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About ECECP

EU-China Energy Cooperation Platform was launched on 15 May 2019.

The overall objective of ECECP is to

'enhance EU-China cooperation on energy. In line with the EU's Energy Union, the Clean Energy for All European initiative, the Paris Agreement on Climate Change and the EU's Global Strategy, this enhanced cooperation will help increase mutual trust and understanding between EU and China and contribute to a global transition towards clean energy on the basis of a common vision of a sustainable, reliable and secure energy system.'

Phase I of ECECP (2018 – 2021) was implemented by a consortium led by ICF, with National Development and Reform Commission – Energy Research Institute and CECEP Consulting Company.

Phase II (2021 – 2023) was implemented by a consortium led by ICF, and with National Development and Reform Commission- Energy Research Institute.

Phase III (2024 – 2029) is implemented by a consortium led by GOPA Worldwide Consultants and with GIZ.

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Letter from the EU Ambassador to China

Powering the future together: reflections ahead of COP31



Caspar Veldkamp
Ambassador of the European Union to China

Dear all,

As leaders gather in Antalya for COP31, the climate debate must move beyond promises on renewable generation and coal phase out and confront the real political challenge of the transition: turning clean electricity into the backbone of our economies. Agreement on tripling the global renewable capacity and doubling energy efficiency measures by 2030 was a major step forward, but clean power alone will not decarbonise our societies if our cars, homes and industries remain locked in on fossil fuels.

The next frontier is electrification – something the EU and China have both fully understood and are taking global leadership on. This is no longer only a technical issue; it is a question of political leadership, industrial strategy and making the economy work for people and planet. If we want the energy transition to succeed, governments across the globe must now focus not only on producing more renewable electricity, but also making it accessible and affordable to businesses, households and transport systems.

Today, electricity still accounts for only around 23% of global final energy demand. That is the central contradiction of the transition: we are expanding clean power, but not yet transforming consumption at the speed required. Yet the economic case is increasingly clear. Under current conditions, a far greater share of transport, heating and industrial processes could already be electrified competitively. Electrification is therefore not just a climate imperative; it is a pathway to greater efficiency, lower energy waste and stronger economic resilience.

This is why the European Commission and its partners launched the Electrify Now initiative earlier this year. The initiative gives political momentum to a simple but transformative ambition: to raise electricity's share of final energy demand to 35% by 2035. Achieving this will require more than targets. It will require grids, storage, charging infrastructure, heat pumps, industrial modernisation and above all public and private investment on a far greater scale.

The politics of implementation now matter as much as the politics of ambition. Electrification will succeed only if citizens and companies see it as affordable, reliable and fair. That means tackling grid bottlenecks, reducing connection delays, reforming electricity markets and protecting consumers from price volatility. Europe's own experience shows that the transition is not just about innovation, but about regulation, planning and public trust.

COP31 should therefore send a clear signal: the age of fossil fuel dependence must give way to the age of clean electrification. National climate plans should set out concrete electrification pathways for transport, heating and industry. Grid expansion must be treated as a political priority, not an afterthought. And developing economies must receive the financing needed to electrify without being pushed into a new generation of fossil-fuel dependence.

The transition will not be won by supply-side targets alone. It will be won by connecting clean power to people's daily lives, industrial choices and national development strategies. That is the political task before Antalya. Europe stands ready to lead it, and to work with China and other partners to ensure that electrification becomes not just a technological option, but the defining global project of the next decade.

Caspar Veldkamp
Ambassador of the European Union to China

NEWS in Brief

ECECP highlight some recent key energy news headlines in the EU and China

Click on the headlines to learn more.



POLICY INITIATIVES

EU: Commission advances policy package for sustainable data centres »

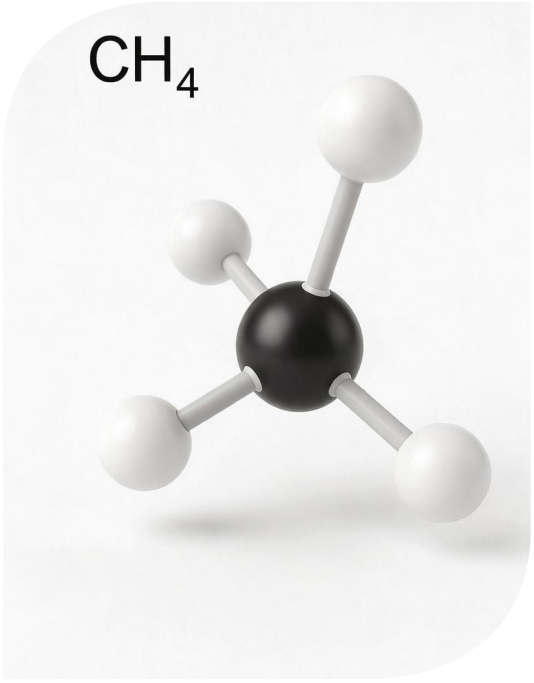
The European Commission has proposed a common rating scheme for data centres as part of broader efforts to improve their energy efficiency and sustainability while supporting Europe's digital growth. The scheme aims to improve transparency on energy and water use and assess how data centres can support the energy system through waste heat recovery, clean energy generation and flexible electricity consumption. Alongside the rating scheme, the Commission has launched a public consultation on minimum performance standards for data centres operating in the EU. The measures seek to limit the environmental impact of expanding computing capacity while helping data centres integrate more sustainably into the electricity system. The first sustainability labels are expected in 2027.

EU: New Arctic Strategy prioritises renewable energy development and infrastructure connectivity »

The European Commission and the EU's High Representative have presented a new Arctic Strategy that identifies renewable energy, critical raw materials and resilient infrastructure as priorities for economic cooperation and security. The EU will continue supporting the Arctic to develop its renewable energy and sustainable minerals potential, while maintaining its position that oil, coal and gas should remain in the ground, including in Arctic regions. The strategy also aims to strengthen energy and transport links by integrating European ports, railways and energy terminals into emerging Arctic trade networks. The EU will help establish an Arctic Cable Hub to monitor, protect and repair submarine cables in the North Atlantic and Arctic, while advancing the Pan-Arctic Cable project to connect Greenland directly to Europe through secure, resilient submarine infrastructure.

EU: Parliament backs longer delay to methane rules for energy imports »

The European Parliament has backed a three-year extension to deadlines for certain methane-related obligations under the EU Methane Regulation, going beyond the European Commission's proposed one-year postponement. MEPs support giving importers of oil, natural gas and coal until May 2031 to demonstrate compliance with requirements for monitoring, reporting and verification of methane emissions. The Parliament also backed postponing methane-intensity reporting by EU producers and importers until August 2031, alongside extended deadlines for verified emissions reports from oil and gas operators. The proposed extension would not apply to fossil fuels originating in or exported from countries subject to relevant EU import sanctions. Parliament's position paves the way for negotiations with the Council on the final legislation.





Denmark: New grid connection rules prioritise critical services and electrification »

The Danish parliament has adopted an emergency framework that replaces its traditional first-come, first-served principle for electricity grid access with a targeted, four-tier prioritisation model to address growing pressure on the electricity network resulting from increasing electrification and renewable energy deployment. Critical societal functions, new households and general electricity consumption will receive the highest priority, followed by electrification of transport, heating and industry, renewable energy, carbon capture and storage, and hydrogen projects. Energy storage ranks third, while large energy consumers, including most data centres, are given lowest-priority. Grid companies may also favour projects that put less strain on the network, such as those able to adjust electricity use to match available capacity. The rules came into force on 12 October 2026.

MARKET BUSINESS

EU: Sustainable investments exceed EUR 1.2 trillion since 2021 »

More than EUR 1.2 trillion (CNY 8.95 trillion) has been invested in sustainable activities across the EU since 2021, according to European Commission data published on 20 October. In 2025, investments in activities aligned with the EU Taxonomy, which classifies environmentally sustainable economic activities, exceeded EUR 320 billion (CNY 2.38 trillion), with the energy sector accounting for the largest share (driven mainly by electricity providers). European Green Bonds are also gaining momentum. Since the European Green Bond Standard took effect in December 2024, around EUR 60 billion (CNY 447 billion) has been issued, including EUR 39 billion (CNY 290 billion) between January and 7 October 2026. These figures underline the role of the EU's sustainable finance framework in supporting the transition to a more sustainable, resilient and competitive economy. The Commission is also working to simplify the framework to facilitate its implementation.

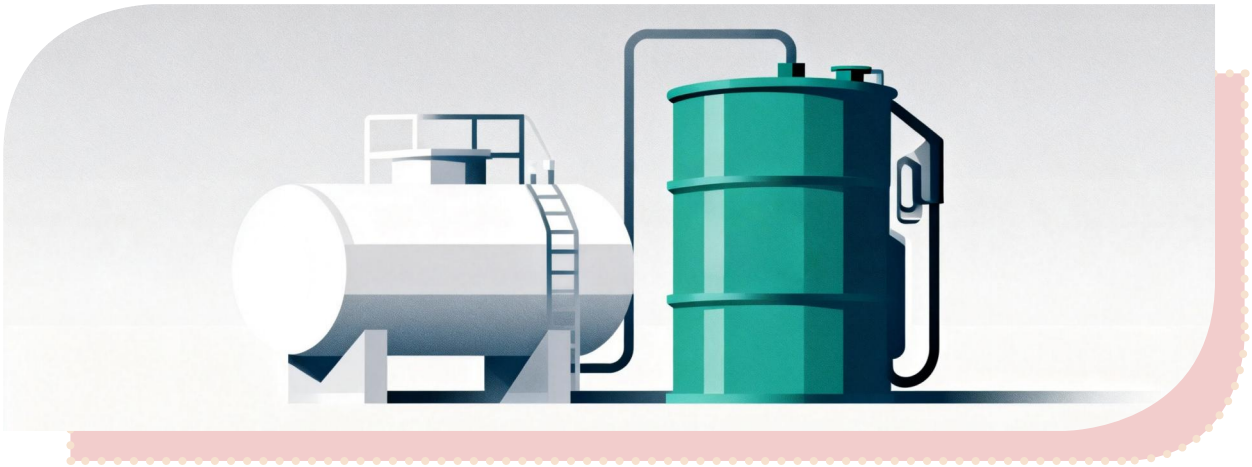


Europe: Wind installations rise 30% in first half of 2026 »

Europe added 8.8 GW of new wind capacity in the first half of 2026, up 30% year on year and putting the continent on track for a record 24 GW full-year build-out, according to WindEurope. Deployments were led by Germany (3.4 GW), alongside strong additions across Denmark, Poland, and France. Despite record auction volumes and EUR 9 billion in new investments, WindEurope noted that progress on permitting, grid investment and electrification will be crucial to sustaining growth and strengthening Europe's energy security and competitiveness.

EU: Electric vehicle sales hit record as affordable models expand »

Electric vehicle (EV) sales in the EU reached a record 1.64 million in the first eight months of 2026, up 45% year on year, according to a report by environmental group Transport & Environment (T&E). EVs accounted for 22% of the market, six percentage points higher than a year earlier. T&E described 2026 as a pivotal year for EV availability, with the number of models on offer increasing by 50% as automakers expand their line-ups to meet EU emissions targets. European manufacturers accounted for nearly 60% of available models, while Chinese brands held a 21% share. The report also noted that rising fuel prices linked to the Middle East conflict could further influence drivers' choices, with diesel prices up 38% since the conflict began.



France: Diesel and gas supplies secured from the Middle East »

French President Emmanuel Macron has secured a series of energy supply agreements across the United Arab Emirates, Bahrain, and Qatar during an official Middle East tour. Under the agreements, France will receive approximately 100 000 tonnes of diesel per month from the UAE, with a further 100 000 tonnes per month supplied by Bahrain. France has also reached an agreement with Qatar to procure LNG equivalent to 2 TWh/month to ensure adequate supplies over the winter. The diversified supply contracts are expected to help reduce fuel and transport expenses.

Baltic region: 14 energy organisations form Baltic Energy Initiative »

Polish energy group ORLEN and 13 energy companies and organisations from Northern and Central Europe have together launched the Baltic Energy Initiative to develop joint energy projects and strengthen regional cooperation. The initiative will focus on offshore wind, hydrogen, LNG and bioLNG, carbon capture and storage (CCS), and small modular reactors (SMRs). Participating organisations include Ørsted, Fortum, Siemens Energy, Topsoe, DNV Energy Systems, Eesti Energia, Enefit, KN Energies, Adven, Steady Energy, P2X Solutions, Latvenergo, and Gasgrid Finland. The coalition brings together expertise, experience and capabilities to identify and develop projects across the region. The initiative also aims to support investment and cooperation in energy infrastructure, including cross-border CO_2 transport and storage infrastructure connecting industrial emitters with storage hubs in the North Sea and Baltic region.

Poland: Joint venture formed for six-unit SMR plant »

Poland's SGE and energy utility ZE PAK have agreed to establish a joint venture to develop a nuclear power plant at Pątnów featuring six BWRX-300 small modular reactors (SMRs) designed by GE Vernova Hitachi Nuclear Energy. With a planned total capacity of 1.8 GW, the project will repurpose ZE PAK's existing coal-fired power plant site for nuclear generation. ZE PAK will contribute land rights, while SGE will lead project development. The companies say the project could help Poland replace retiring coal-fired generation with reliable nuclear power, supporting the country's energy security and broader efforts to transition away from coal.

TECHNOLOGY IINNOVATION

Germany: New electrode design boosts battery energy density by up to 15% »

A consortium led by Germany's Fraunhofer Institute for Solar Energy Systems (Fraunhofer ISE) has developed a thicker-electrode design that could increase battery cell-level energy density by 10% to 15% without adding weight. Demonstrated in lithium-ion, sodium-ion and zinc-ion cells, the technology has also been used to produce lithium-ion pouch-cell prototypes. By increasing electrode coating thickness from the conventional 100–200 µm to up to 800 µm, the design reduces the need for current collectors, leaving more room for active energy-storing materials. The PFAS-free, solvent-free manufacturing process is designed to simplify production and reduce capital and operating costs compared with conventional wet coating.

Denmark: Greensand Future opens commercial offshore CO_2 storage facility »

Greensand Future has inaugurated Europe's first commercial-scale, fully integrated CO_2 capture, transport and offshore storage value chain in Denmark. Supported by a EUR 41 million (CNY 305 million) EU Innovation Fund grant, the project aims to permanently store around 2.4 million tonnes of CO_2 over eight years in the depleted Nini West oil field in the Danish North Sea. CO_2 captured from Danish and other European biogas production is liquefied, transported by ship from Esbjerg and injected approximately 1 800 metres beneath the seabed. Building on a 2023 pilot that demonstrated cross-border CO_2 transport and offshore injection, the project moves towards commercial-scale operation and aims to expand storage volumes as additional CO_2 sources become available.

Finland: World-first used nuclear fuel repository receives operating licence »

Finland has granted radioactive waste management company Posiva an operating licence for its used nuclear fuel encapsulation plant and Onkalo geological repository in Olkiluoto, making it the first facility of its kind to receive such authorisation. The licence allows Posiva to handle and dispose of up to 6 500 tonnes of uranium from the Olkiluoto and Loviisa nuclear power plants. Located about 450 metres underground, the repository will use sealed iron-copper canisters, bentonite clay and surrounding bedrock to isolate the waste. Disposal operations are expected to continue into the 2120s, after which the repository will be backfilled and closed. However, operations cannot begin until Finland's Radiation and Nuclear Safety Authority has inspected the facility and confirmed that all conditions for safe operation have been met, and the facility will subsequently be subject to regular safety inspections.

Switzerland: Removable solar panels tested on active railway tracks »

Swiss start-up Sun-Ways has developed a removable solar system that installs PV panels between railway tracks, making use of existing infrastructure without requiring additional land. Its pilot installation in Buttes, Switzerland, spans 100 metres and comprises 48 panels with a total capacity of 18 kWp. The panels can be installed and removed using specialised machinery, allowing railway maintenance to continue. However, the technology faces challenges including lower efficiency from flat-mounted panels, exposure to dirt and weather, and higher installation and maintenance costs than conventional solar farms. Sun-Ways estimates that deploying the system across suitable sections of Switzerland's 5 000 km rail network could generate up to 1 TWh of electricity annually, although wider deployment will depend on technical and economic feasibility.

PROJECTS INVESTMENTS

EU: Innovation Fund awards EUR 3.4 billion to 77 net-zero technology projects »

The European Commission has selected 77 projects across 23 European Economic Area countries to receive EUR 3.4 billion (CNY 25 billion) in grants from the EU Innovation Fund, financed by revenues from the EU Emissions Trading System. The projects span energy-intensive industries, renewable energy and storage, clean-tech manufacturing, low-carbon mobility, critical raw materials, alternative fuels and industrial carbon management. For the first time, the selected portfolio includes a small modular nuclear reactor (SMR) project and a direct air carbon capture and storage (DACCS) project. The Commission estimates that the projects could avoid around 290 million tonnes of greenhouse gas emissions during their first decade of operation. The funding decisions will accelerate the deployment of innovative low-carbon technologies while strengthening Europe's industrial competitiveness and clean-technology supply chains.



EU: EUR 125.8 million approved for cross-border renewable energy projects »

The European Commission has approved EUR 125.81 million (CNY 938 million) in Connecting Europe Facility (CEF) Energy grants for three cross-border renewable energy projects. Two projects will support the decarbonisation of district heating systems in Germany and Poland, while the third will develop an onshore wind farm near the Latvia-Lithuania border. The largest award, EUR 70 million (CNY 522 million), will fund a cross-border heat pipeline connecting the district heating systems of Görlitz, Germany, and Zgorzelec, Poland. A further EUR 11.41 million (CNY 85 million) will help replace coal-fired heating units in Słubice, Poland, with biomass boilers. The EUR 44.4 million (CNY 331 million) wind project is expected to include around 30 turbines and generate up to 680 GWh of electricity annually, using shared transmission infrastructure to support Baltic grid integration.

EU: Commission opens call for cross-border electricity and smart grid projects »

The European Commission has opened a call for cross-border energy infrastructure projects seeking Project of Common Interest (PCI) or Project of Mutual Interest (PMI) status under the TEN-E Regulation. The call covers electricity transmission and storage, smart electricity grids, smart gas grids and projects under Article 24 of the regulation. Successful projects may be included in the EU's third Union list of PCIs and PMIs, gaining recognition for their contribution to cross-border energy infrastructure development and benefiting from accelerated permitting and regulatory procedures. Applications for electricity projects must be submitted by 13 November 2026, while the deadline for smart electricity grids, smart gas grids and Article 24 projects is 4 December. The Commission plans to adopt the next Union list by the end of 2027.

Romania: EU's largest solar project secures EUR 561 million financing »

Renewable energy developer Rezolv Energy has secured EUR 561 million (CNY 4.2 billion) in financing for its 1.3 GW Dama Solar project in western Romania, enabling construction to proceed. The project is expected to become the EU's largest onshore renewable energy development, with commercial operations scheduled to begin in the second half of 2028. The financing package, structured as a green loan, is supported by an anchor investment from the European Investment Bank with an InvestEU guarantee and involves a consortium of 14 lenders, including commercial banks and international development finance institutions. The project has also secured two Romanian contracts for difference (CfD) covering 520 MW of capacity, alongside a corporate power purchase agreement, providing additional revenue support.

Netherlands: Europe's largest commercial CCS project is inauguarated »

Europe's largest commercial CCS project has begun operations at the Yara Sluiskil ammonia and fertiliser plant in Sluiskil, the Netherlands. The project can capture and liquefy up to 800 000 tonnes of CO_2 annually from ammonia production. The CO_2 will be shipped to Norway and permanently stored beneath the North Sea as part of the Northern Lights CO_2 transport and storage project. Supported by the EU's Connecting Europe Facility, the cross-border project is expected to capture and store around 12 million tonnes of CO_2 over 15 years. It brings together industry, the EU, its Member States and Norway, following the EU-Norway Green Alliance signed in 2023. The project demonstrates how cross-border infrastructure can support emissions reduction in energy-intensive industries.



Finland: EIB makes its first investment into SMR technology »

The European Investment Bank (EIB) is providing up to EUR 40 million (CNY 298 million) in financing to Finnish nuclear technology company Steady Energy to accelerate development of its small modular reactor (SMR). The company's 50 MW LDR-50 reactor is designed to produce low-carbon heat for district heating networks, using established light-water reactor technology and a simplified design. Backed by the EU's InvestEU programme, the financing will support research and development, testing and licensing activities in Finland between 2026 and 2028, advancing the technology towards its first commercial deployment. The investment marks the EIB's first financing for SMR technology and forms part of efforts to support the development of Europe's next generation of nuclear reactors.



POLICY INITIATIVES

China pushes for integrated development of coal and renewable power

China's energy regulator NEA has issued new guidelines to coordinate the development of renewables and coal-fired power (CFP) projects to support system reliability, carbon targets, and green power consumption. The document outlines five models for integration, including connecting nearby wind and solar projects to public coal-fired power plants to jointly transmit and use electricity; linking renewables to combined heat and power plants to support clean heating; connecting offshore wind farms to coastal coal plants; integrating renewables with captive coal-fired power plants; and using on-site or nearby renewables to meet coal plants' own energy needs. The guidelines also set technical requirements for carbon reduction, grid connections, power system performance, metering and technological innovation. By the end of the 15th Five-Year Plan period (2026-30), China aims to have established mature, widely applicable integration models and to have significantly reduced annual carbon emissions.

China rolls out new framework for industrial carbon emissions control

By 2030, China aims to slash carbon dioxide emissions per unit of industrial value added by over 17% and reduce energy intensity by more than 10% from 2025 levels, according to an implementation plan issued by the Ministry of Industry and Information Technology (MIIT). The 2026-30 plan establishes a framework for controlling both total carbon emissions and carbon intensity across the industrial and information technology sectors. It calls for carbon management systems covering local governments, industries, companies, projects and product carbon footprints. It outlines targeted measures across key manufacturing sectors, enterprises, industrial parks, and local investment projects, emphasising strict emissions reviews for high-energy assets alongside wider adoption of green power.

New Five-Year Plan shifts battery sector towards quality and next-gen tech

China has released its 15th Five-Year Plan (2026–30) for the new-type battery industry, setting 2030 targets for next-generation technologies, product quality and broader energy storage applications. The plan places greater emphasis on technological upgrades, product quality and supply-demand coordination, without setting a specific capacity or output-value target. By 2030, China aims for the initial large-scale application of all-solid-state batteries, a cycle life of 15 000 cycles for long-life lithium batteries, and product defect rates at leading manufacturers reaching the parts-per-billion level. The plan retains lithium-ion batteries as the core technology while promoting the development of sodium-ion and flow batteries. Priority storage applications include the generation and grid sides, industrial parks and data centres. It also calls for stronger capacity early-warning mechanisms, product-quality supervision and regulation of price competition to support a more orderly industry development.

NDRC proposes revised rules for power spot market »

China's National Development and Reform Commission (NDRC) has proposed revised electricity spot-market rules that would explicitly allow renewable energy plants and their co-located battery storage systems to participate jointly in bidding, dispatch, settlement and performance assessment. The draft would replace interim rules introduced in 2023, with implementation proposed for 1 January 2027, following public consultation. The proposal would allow wind and solar operators to coordinate generation and battery charging and discharging in response to spot prices, potentially shifting electricity deliveries to higher-priced periods and reducing imbalance-related costs. It also explicitly recognises new market participants, including energy storage, virtual power plants, load aggregators and smart microgrids. However, detailed bidding, metering and settlement arrangements would still require clarification in regional and provincial rules. The draft forms part of China's broader effort to strengthen its unified national electricity market.

New measures to advance hydrogen application pilots »

China has outlined implementation rules for its four-year pilot programmes to expand hydrogen energy applications across five city clusters. The circular calls on participating cities to advance four sets of priority tasks covering hydrogen technology and equipment development, industrial hydrogen projects, fuel cell vehicle deployment and hydrogen refuelling station construction. Cities are also expected to strengthen industrial and supply chains, improve safety management and avoid local protectionism. The Ministry of Industry and Information Technology, Ministry of Finance and National Development and Reform Commission will assess the programmes, with results determining the allocation of central government funds. The funding must be disbursed promptly and used exclusively to support hydrogen applications, helping lower costs and pass savings on to end users.

MIIT drafts 2030 standardisation roadmap for power battery recycling »

China's Ministry of Industry and Information Technology (MIIT) has released draft guidelines for building a standards system for power battery recycling and reuse. The draft proposes formulating or revising more than 50 national standards by 2030, with the aim of establishing a system covering the entire industrial chain and product lifecycle. The framework comprises six-pillar architecture, covering general standards, collection and sorting, physical processing, chemical processing, recycled product standards, and green and low-carbon standards. The new guidelines are intended to improve resource efficiency, extend coverage across the industrial chain and strengthen coordination between domestic and international standards.

New plan for clean inland shipping »

China has issued an action plan to accelerate the adoption of new-energy vessels on inland waterways, and to double its fleet by 2028 from 2025 levels. The plan, jointly issued by the Ministry of Transport, Ministry of Industry and Information Technology, and National Energy Administration, aims to put more than 1 000 electric vessels and over 100 methanol-powered vessels into service by 2028. It also targets the development of 3 000 km of zero-carbon water transport corridors. The measures focus on deploying electric vessels for shorter-distance routes and methanol-powered vessels for longer-distance and larger-tonnage freight, alongside the expansion of charging, battery-swapping and methanol-refuelling infrastructure.

MARKET BUSINESS

First regional electricity market enters formal operation »

China's Southern Regional Electricity Market officially entered operation on 24 October 2026, marking a major step towards establishing a unified national electricity market. Covering Guangdong, Guangxi, Yunnan, Guizhou and Hainan, the market allows generators, electricity retailers, consumers, energy storage operators and virtual power plants to compete under a common set of rules, with prices formed through unified bidding across all power sources. From January to September 2026, electricity traded through the market approached 900 TWh, accounting for more than 70% of total electricity sales across the regional grid. Renewables supplied 40% of the increase in electricity sales during the period, while the number of registered market participants exceeded 290 000. The market's formal launch is expected to facilitate cross-provincial electricity trading and broaden participation in spot and ancillary services markets.

Electrification rate reaches 29.5% in 2025 »

China's national electrification rate reached approximately 29.5% in 2025, up 1.4 percentage points from the previous year, according to the annual report published by China Electricity Council. Electricity has become the country's largest source of final energy consumption, accounting for a share 3.1 percentage points higher than coal, the second-largest energy source. Since 2015, China has contributed more than 80% of the global increase in electrification, the report says. As China's industrial system continues to shift towards smarter, greener and more integrated development, its electrification rate is expected to reach 35% by 2030.

Wind and solar capacity surpasses 2 TW »

Latest statistics from the NEA show that China's combined installed wind and solar power capacity reached 2.01 TW by the end of September 2026, with around 170 GW of new capacity added in the first nine months of the year. Solar capacity reached 1.31 TW, up 16.5% year on year, while wind capacity rose 20.4% to 700 GW. Wind and solar power generation in the first nine months was 193.7 TWh higher than in the same period in 2025. The increase accounted for 64% of China's growth in electricity consumption over the period. During peak summer demand, maximum midday wind and solar output exceeded 40% of total power load on days with the highest electricity demand. The continued rapid development underscores the growing role of renewables in China's energy system, powering the nation's green transition.





Approvals for new battery storage factories temporarily suspended »

China has temporarily suspended approvals for new battery manufacturing projects for energy storage as authorities review existing and planned production capacity, with a focus on battery cells. The move comes amid concerns over excess capacity and intense competition in China's rapidly expanding energy storage industry. China's battery production capacity has grown rapidly alongside rising domestic and global demand. The suspension applies to new projects, while existing production and previously approved projects are not affected, according to reports. The review could lead to tighter controls over future capacity expansion and may potentially reshape China's battery storage manufacturing landscape, with implications for global energy storage supply chains.

China to lower NEV export tax rebates from April 2027 »

China will lower the value-added tax (VAT) export rebate rate for new-energy vehicles (NEVs) from 13% to 9% starting 1 April 2027, according to a joint policy announcement by the Ministry of Finance and the State Taxation Administration. The policy shift comes amid rapid growth in overseas sales of Chinese NEVs and follows earlier reductions in export rebates for batteries and the planned rebates phaseout for PV products. Industry analysts note the adjustment aims encourage automakers to shift from competing on price and sales volumes towards technology, branding and product value, while expanding overseas localised manufacturing capacity.



TECHNOLOGY IINNOVATION

First 100 MW-class CO_2 energy storage project connects to grid »

China has connected its first 100-megawatt-class compressed CO_2 energy storage facility to the grid in Mori Kazakh Autonomous County, Xinjiang, marking a breakthrough in large-scale energy storage technology. The facility stores energy by compressing CO_2 into a liquid state during periods of low electricity demand and generates power by allowing it to expand back into gas to drive turbines when demand peaks. It is designed to generate around 200 million kwh of electricity annually, saving approximately 50 000 tonnes of standard coal and reducing CO_2 emissions by about 170 000 tonnes a year. Unlike pumped-hydro and compressed-air storage, the closed-loop technology does not require specific geographical features such as mountains or underground caverns. The project is expected to help balance local grid demand and facilitate the integration of renewable energy.

ENN begins construction of hydrogen-boron fusion device »

Chinese energy company ENN Group has begun construction of Helong-2, its third-generation hydrogen-boron fusion device, at its research and development centre in Langfang, Hebei province. The facility is expected to be ready for equipment installation by the end of June 2027, with commissioning and experiments scheduled to begin by year-end. ENN aims to generate electricity through hydrogen-boron fusion for the first time in 2030 and achieve low-cost power generation before moving to the demonstration reactor stage by 2035. The technology combines hydrogen protons with boron-11 nuclei to produce helium and energy without generating high-energy neutrons. Helong-2 follows the company's earlier Xuanlong-50 and Xuanlong-50U devices, marking another step in its development of fusion technology for commercial power generation.

First national standard for grid-forming energy storage converters »

China has approved its first national standard for grid-forming energy storage converters, GB/T 48211-2026, establishing technical requirements for the equipment used in electrochemical energy storage systems. Led by China Electric Power Research Institute, the standard defines 34 technical indicators and associated test methods, including 16 core indicators tailored to grid-forming converters. It also standardises communication interfaces and data exchange between storage systems and the grid. By enabling converters to establish voltage and frequency references independently, grid-forming technology helps maintain grid stability. The standard is intended to improve equipment consistency and grid-connection safety, supporting wider deployment of the technology and the development of China's new power system.

PROJECTS INVESTMENTS


Image Source: www.ess-news.com

700 MW salt-cavern energy storage project completes start-up »

China Huaneng's 700 MW Jintan salt-cavern compressed-air energy storage (CAES) project in Jiangsu Province has completed a full-system start-up of its two generating units. The facility comprises two 350 MW units and uses four underground salt caverns at depths of around 1 000 metres to store compressed air. It captures heat generated during compression for reuse during power generation, with round-trip energy conversion efficiency expected to exceed 70%. The project is designed to store 2.8 GWh of electricity per charging cycle and deliver rated power for four hours. Its thermal storage system uses 16 spherical water tanks with a combined capacity of 56 000 cubic metres. The project will now proceed with pre-grid-connection tests and system commissioning.

Sinopec launches 1 million tonne CCUS project at Shengli Oilfield »

China has begun construction of its first 1 million tonne full-chain carbon capture, utilisation and storage (CCUS) demonstration project targeting low-concentration emissions at Shengli Oilfield in Shandong province. Launched by China Petroleum & Chemical Corporation (Sinopec) on 16 October 2026, the project will capture CO_2 from coal-fired power plant flue gas for enhanced oil recovery and underground storage. It will integrate wind power, energy storage and direct green electricity supply to capture facilities, a configuration described as a domestic first. Using self-developed absorbents and an energy-saving regeneration process, the technology has achieved a CO_2 capture rate above 90%, product purity exceeding 99.5% and heat consumption below 2 gigajoules per tonne of CO_2. The project is scheduled for completion and commissioning by the end of 2028.



Flagship green hydrogen and ammonia project to expand

China Energy Engineering Group (CEEC) has begun construction of the second phase of its Qingqing No 1 Songyuan Hydrogen Energy Industrial Park in Jilin province, with an investment of CNY 10.83 billion (EUR 1.46 billion) . The expansion will double the project's renewable energy capacity to 1.6 GW and raise total green ammonia production capacity to 600 000 tonnes a year. By optimising system design and using upgraded domestic equipment and digital management, the new phase is expected to reduce unit green ammonia production costs by more than 10% compared with Phase I. The first phase began operations in December 2025, and its green ammonia was used in the world's first ship-to-ship bunkering of green ammonia fuel in Zhoushan, Zhejiang province, in October 2026. The expansion marks a further step towards scaling up renewable-based fuels for shipping and chemical production.

China's largest offshore solar project passes 1 GW operational milestone

China's 2 GW Tianwan tidal-flat solar demonstration project in Lianyungang, Jiangsu province, has brought more than 1 GW of capacity online, over half of its planned total. Located in the warm-water discharge area of Tianwan Nuclear Power Plant, the project combines solar generation with nuclear power infrastructure through the shared use of sea space. The layout is designed to lower seawater temperatures and reduce the environmental impact of thermal discharges from the nuclear plant. Since its first generating units were connected to the grid in January 2025, the project has followed a phased commissioning schedule. By the end of October 2026, it had installed 1.63 GW of solar capacity, around 77% of the total. Once fully operational, it is expected to generate 2 TWh of clean electricity annually.



Electrify Now: mobilising electricity demand ahead of COP31

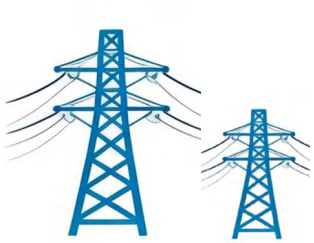
With green electricity supply now surging, what will encourage consumers to invest in clean technology? Dr Flora Kan, team leader at ECECP, looks at the challenges facing both the EU and China ahead of COP31



As delegations assemble in Antalya for the 31st United Nations Climate Change Conference (COP31), the international energy transition faces a critical operational question. For much of the past decade, international energy diplomacy has concentrated on renewable generation targets. The multilateral agreement to triple global renewable energy capacity by 2030 was a vital political and economic milestone. Yet power generation addresses only the supply side of the energy system. How far can that achievement take us if our vehicles, buildings and factories remain unequipped to use the clean electricity being produced?

The next step is to mobilise the demand side of the transition, enabling industries, households and transport operators to switch from fossil fuels to clean electricity, and bringing their investment decisions and practical constraints more directly into energy diplomacy. Alongside discussions on renewable generation, our bilateral energy partnerships and multilateral dialogues need a stronger focus on the policies, financing and infrastructure that will make this switch happen.

Electrification offers a direct route to decarbonisation across much of the economy. Highly efficient and powered by an increasingly low-carbon generation fleet, electric technologies can displace fossil fuels in road transport, space heating and many industrial processes. Yet, despite rapid additions of wind and solar capacity, electricity still supplies a relatively modest share of the energy used by final consumers. The contrast invites closer attention to the relationship between what we generate and how we consume it.



Today, electricity accounts for around 23% of global final energy demand[1]. Much of the remainder is supplied by the direct combustion of fossil fuels in industrial furnaces, boilers, internal combustion engines and building heating systems, alongside other sources such as bioenergy and supplied heat. This limits the reach of power-sector decarbonisation. Yet the scope for change is substantial. The IEA's September 2026 special report finds that existing 'technologies that are already cost-competitive under 2025 energy prices, technology costs and financing conditions could raise electricity's share to around 33%. Around half of oil-based road transport demand and global space-heating demand could already be electrified competitively, as could around 40% of energy consumption in low- and medium-temperature industrial applications.'[2]

There is also an important efficiency dividend. Internal combustion engines lose a substantial share of fuel energy as waste heat, whereas electric drivetrains convert a much larger proportion of their input into motion. Heat pumps offer a particularly clear illustration: by transferring heat rather than generating it through combustion, they can deliver several units of thermal energy for each unit of electricity consumed. Electrification therefore changes more than the source of energy. It can reduce the energy required to sustain industrial activity and domestic living standards, making the transition an opportunity for greater productivity as well as lower emissions.

1. International Energy Agency (IEA), Electrification, Paris. Available at: https://www.iea.org/reports/electrification
2. International Energy Agency (IEA), Electrification, Paris, Executive Summary, pages 15–16

The 'Electrify Now' Initiative and the 2035 benchmark

This connection between clean generation and its productive use lies at the heart of the 'Electrify Now' initiative, launched by the European Commission and international partners during London Climate Action Week in June 2026. By bringing governments, industry and other participants into a common discussion, the initiative gives practical expression to Europe's continuing role in advancing international cooperation on the energy transition.

With analytical support from the International Energy Agency (IEA) and the International Renewable Energy Agency (IRENA), Electrify Now provides a platform for practical cooperation that can help deliver the ambition behind the COP31 Presidency's proposed global objective of raising electricity's share of final energy demand from around 20% today to 35% by 2035[3]. Participation in this initiative does not, in itself, imply endorsement of the proposed target. The benchmark offers a shared direction while leaving open an essential question: what pathways would make that ambition achievable across economies with very different starting points?

An increase of around 12 percentage points within a decade implies substantial changes in equipment, infrastructure and investment decisions. It brings heat-pump deployment, charging networks for light- and heavy-duty vehicles, and wider use of electric furnaces and industrial heat technologies into the same conversation. For an industrial operator considering the replacement of a gas-fired boiler, or a household weighing the cost of a heat pump, the global ambition ultimately becomes a local calculation about affordability, reliability and confidence in future energy prices.

IRENA's analysis[4] illustrates the scale of this coordinated effort. Its revised 1.5°C pathway envisages around 18 400 GW of installed renewable power capacity by 2035 alongside a 35% electrification rate. Global grid investment would need to more than double, with cumulative investment of around USD 10 trillion (CNY 66 trillion, EUR 8.9 trillion) over 2026-35. The mobilisation of electricity demand therefore needs to go hand in hand with expanding clean supply, strengthening networks and unlocking flexibility.

Electrify Now is also developing two complementary coalitions to support implementation. Electrify Cities, being developed with the Global Covenant of Mayors, will bring local governments and delivery partners together around practical opportunities such as efficient cooling, electric heating and thermal storage, and resilient public services. The Electrify Now Finance Coalition will bring development banks, other financial institutions and investors into the discussion, helping identify financing barriers and mobilise capital for clean electrification, particularly in emerging and developing economies. Together, these coalitions can connect demand-side priorities with the partnerships and investment needed to deliver them.

Technical assessments by the Energy Transitions Commission highlight the close relationship between electrification, clean generation and system flexibility[5]. If electricity demand grows faster than low-carbon supply and the infrastructure needed to deliver it, additional consumption may draw on fossil generation, reducing the emissions benefit. How can investment in new electric equipment be better coordinated with the generation, storage and network capacity on which its performance depends?

3. European Commission, Electrify Now Initiative, Brussels. Available at: https://energy.ec.europa.eu/topics/eus-energy-system/electrification/electrify-now_en
4. International Renewable Energy Agency (IRENA), Electrification, Abu Dhabi. Available at: https://www.irena.org/electrification; see also IRENA (2026), Transitioning away from fossil fuels: A roadmap powered by renewables, electrification and grid enhancement, May 2026. Available at: https://www.irena.org/-/media/Files/IRENA/Agency/Publication/2026/May/IRENA_OUT_TAFF_RE_electrification_grids_2026.pdf
5. Energy Transitions Commission (ETC), Electrifying the Global Economy, London. Available at: https://www.energy-transitions.org/publications/electrifying-the-global-economy/

The EU policy experience: infrastructure, markets, and affordability

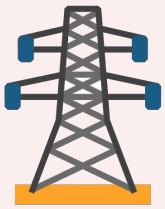
Europe's experience[6] offers a useful perspective on these questions. Translating electrification ambitions into functioning energy systems has brought policymakers into direct contact with the practical frictions of infrastructure development, market design and consumer choice. Three policy initiatives illustrate how these issues are being approached.

The Electrification Action Plan[7] sets out measures intended to make the switch to electricity more attractive across industry, transport and buildings. Its significance lies partly in recognising that the availability of a technology does not of itself guarantee its adoption. Investment also depends on regulatory clarity, access to finance and a credible expectation that operating costs will justify the initial expenditure.

The same relationship is evident in the electricity networks. A willingness to electrify can run ahead of the capacity to connect new demand. Grid connection queues and long equipment lead times can turn an otherwise viable investment into a prolonged wait. The EU's Grids Package[8] addresses this practical constraint, focusing on the infrastructure that allows generation and consumption to develop together.

Its priorities bring several familiar questions into focus:

- How can permitting for transmission corridors become more timely while retaining environmental scrutiny and public confidence?
- What balance would allow network operators to invest ahead of emerging demand while protecting consumers from the cost of capacity that may remain unused?
- How can digitalised distribution grids make better use of rooftop photovoltaics, household batteries and electric vehicle charging as these resources become more widespread?



Affordability is equally consequential. The Affordable Energy Action Plan[9] and European electricity market reforms address the conditions under which clean power can translate into more predictable costs for households and businesses. Long-term arrangements, including power purchase agreements (PPAs) and two-way contracts for difference (CfDs), can reduce exposure to short-term market volatility. Their practical value rests on how effectively those benefits reach consumers. For many potential adopters, the decisive consideration will be whether clean electricity offers a dependable economic advantage over the fuel they already use.



These initiatives provide a body of regulatory experience from which other economies can draw according to their own circumstances. Europe's contribution includes the lessons emerging from difficult questions about network congestion, investment risk and tariff design. Sharing those lessons candidly may be as valuable to international cooperation as setting ambitious targets.

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6. European Commission, Electrification in the EU, Brussels. Available at: https://energy.ec.europa.eu/topics/eus-energy-system/electrification_en
7. A plan to make Europe the first electro-continent: https://commission.europa.eu/news-and-media/news/plan-make-europe-first-electro-continent-2026-07-17_en
8. Commission proposes upgrade of the EU's energy infrastructure to lower bills and boost independence: https://ec.europa.eu/commission/presscorner/detail/en/ip_25_2945
9. Affordable Energy: https://energy.ec.europa.eu/strategy/affordable-energy_en

EU-China technical alignment and operational realities

The relationship between the EU and China gives these questions particular significance. Together, they account for a major share of global energy consumption and clean-technology supply chains. Their different institutional arrangements provide a basis for comparing approaches to challenges that are increasingly shared and these include:

- Making electrification affordable, including the upfront cost of equipment and electricity prices relative to fossil fuels.
- Creating viable business models for flexibility, so that storage and consumers who adjust their electricity use are rewarded for supporting the system.
- Coordinating electric vehicle charging to avoid excessive peak demand and enable vehicles to provide power back to the grid.
- Reducing industrial emissions while maintaining competitiveness, particularly where electrification requires substantial investment or changes to production processes.

China's experience demonstrates the scale and pace at which clean-energy infrastructure and equipment can be deployed. Ultra-high-voltage (UHV) direct-current and alternating-current transmission networks connect resource-rich western regions with major centres of demand, supporting the movement of large volumes of electricity over long distances. In transport, China's manufacturing scale in batteries and electric vehicles has helped expand supply and lower technology costs.

Europe brings complementary experience in cross-border power-market coupling, regional transmission coordination and the integration of variable renewable generation. The value of cooperation lies in examining how these different capabilities can inform practical decisions in both regions.

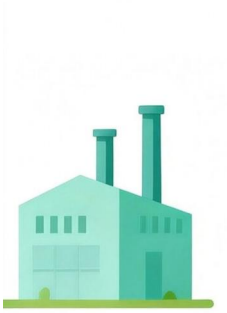


For engineers and system operators, several questions arise regardless of institutional setting:

- System stability and grid inertia: How can frequency stability and voltage control be maintained as inverter-based wind, solar and battery assets take on a greater role alongside conventional synchronous generation?
- Flexibility and storage remuneration: Which market arrangements can reward batteries, pumped hydro and demand-side response for the services they provide, while encouraging investment where it is most useful?
- Vehicle-to-grid interoperability: What technical standards and commercial incentives would allow electric vehicle fleets to support distribution networks through bidirectional charging, without adding to peak demand or inconveniencing drivers?

These are natural subjects for dialogue within the EU-China Energy Cooperation Platform (ECECP). Exchanges on engineering standards, operational experience and market arrangements offer opportunities to identify solutions, offering value on both sides. As electrification advances, transparent approaches to measuring emissions and assessing the carbon content of electricity could also deepen mutual understanding. Progress in such areas would give technical cooperation a tangible relevance to investment and industrial competitiveness.

Questions for COP31 in Antalya



As negotiators gather in Antalya, the discussion around 'Electrify Now' offers an opportunity to connect international ambition more closely with implementation. Several questions may help frame that discussion.

- Electrification in national climate plans: In what ways can future NDC updates offer clearer, more actionable targets for sector-specific electrification (specifically transport, heating, and manufacturing)? Sectoral milestones might help connect climate ambitions with the decisions facing consumers, manufacturers and infrastructure providers.

- Grid investment and clean generation: How closely do national network plans reflect anticipated growth in both renewable supply and electricity demand? A clearer relationship between these plans could give investors greater confidence that new projects will be able to connect and operate as intended.

- Finance in emerging and developing economies: What would make clean electrification an affordable choice where capital is scarce and reliable electricity access remains incomplete? Development finance and blended finance may have a useful role in reducing investment risks and supporting network modernisation. The wider question is how international cooperation can help countries meet growing energy needs without making new fossil-fuel assets the default choice.

The 35% ambition of Electrify Now gives the international discussion a clear point of reference. The European Commission's role in convening 'Electrify Now' helps create space for the policy exchanges and investment partnerships that delivery will involve. Europe's regulatory experience and China's deployment capabilities have much to offer to that discussion. As we look towards the outcomes of Antalya, could a closer connection between these separate strengths help make clean electrification a more accessible and attractive choice for economies around the world?



Electrification takes centre stage

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The age of electricity

Electricity plays a central and growing role in powering modern economies. Its rapid growth and increasing economic importance can bring major benefits for competitiveness, energy security and energy transitions. Global electricity demand has grown faster than global GDP and nearly twice as fast as overall energy demand in recent years. Already electrified end-uses such as air conditioning, data centres and advanced manufacturing are expanding quickly, while sales of electric vehicles have surged.

Electricity is therefore the main source of energy for activities that generate nearly half the world's GDP. Globally, one-fifth of the increase in the revenues of manufacturing companies since 2020 has come from electrification-related sectors. Around half of these revenues flow to companies headquartered in Europe, Japan, Korea and North America, driven by their strong positions in grid equipment, generation and end-use technologies. Companies headquartered in China account for the vast majority of the remainder. These shares have remained broadly the same since 2020. High value-added sectors like digital and financial services, artificial intelligence and advanced manufacturing are powered by electricity, as are key technologies like chips and robotics.

Even so, around 730 million people today still lack access to electricity, constraining their ability to meet basic energy needs and limiting opportunities for economic development. This is one of the reasons for large variations in electricity use around the world. Total per capita electricity consumption is 200 kilowatt-hours (kWh) per year in sub-Saharan Africa; advanced economies consume on average around 7 000 kWh per capita, as does China.

Cost-effective technologies bring 35% electrification within striking distance

Amid two ongoing energy supply shocks and persistent concerns around energy affordability, many countries are looking to electrification as a tool to boost energy security: 25 have announced new electrification-related policies since February 2026. Sales of electrification-related technologies have jumped, particularly in markets most exposed to disruptions in energy shipments through the Strait of Hormuz. In addition, electrification is the main opportunity to bring down emissions across transport, industry and buildings.

This report was developed at the request of Türkiye and Australia, in the framework of the strategic partnership between the President of COP31 and the IEA. It explores a High Electrification Scenario that achieves the goal of increasing the share of electricity in global final energy consumption to 35% by 2035 – in line with the objective announced by the COP31 President. It analyses electrification potential by sector, implications for energy security and climate goals, and broader benefits and trade-offs.

New sector-by-sector analysis by the IEA shows that it is cost-effective to raise electrification levels to around 33% of global energy consumption today. This analysis is based on 2025 technology costs, energy prices and financing conditions; continued technology cost declines will increase this potential. This would bring the world close to the goal, currently under international discussion, of reaching a global electrification rate of 35%, up from 23% today. This trajectory for electrification, reaching 35% by 2035, is derived from the IEA's energy sector pathway to net zero emissions globally by 2050. Electrification rates differ across countries depending on the structure of their economies and energy systems, and their policy goals. Countries do not all reach the same endpoint in global electrification pathways.

The greatest potential lies in the transport sector, underpinned by the 90% reduction in lithium-ion battery prices since 2010. Our analysis finds that around half of oil-based road transport demand could be electrified competitively today. If battery prices continue to move down the cost curve as in recent years, this would rise to over four-fifths.

Buildings offer major potential for the electrification of space and water heating. The sector is already quite electrified due to the rapid growth of end-uses that only run on electricity, such as cooling, appliances, data centres and information technology equipment. But electrification rates are much lower for end-uses such as heating, which can be met by multiple fuels. Our analysis estimates that half of global space heating demand could be electrified competitively.

In industry, the key sectors with near-term electrification potential are textiles, food processing, pulp and paper, and some chemicals production. IEA analysis finds that around 40% of energy consumption in low- and medium-temperature applications in industry can be electrified cost-effectively.

Near-term priorities differ, but all regions have untapped potential

All regions around the world have substantial cost-effective potential to increase electrification rates above today's levels. Specific opportunities differ depending on local energy costs, taxes, financing conditions, infrastructure availability and industrial strategies. Energy importers see the greatest potential, because consumers in these regions typically face higher fuel prices. Tapping cost-effective potential in Europe would raise electrification rates by almost 15 percentage points compared with today; the Middle East, a major energyexporting region, would see a smaller increase of 5 percentage points.

Advanced economies and China typically have high heating needs and large fleets of cars; in both of these uses, electrification can be cost-effective today. Globally, the majority of heating demand comes from advanced economies and China, and heat pumps are competitive in around 75% of these markets today. Many countries have both heating and cooling needs, and traditional heating-only markets are seeing emerging demand for air conditioning as temperatures rise. In these markets, reversible heat pumps are a costeffective solution for providing both heating and cooling. Three out of four cars on the road globally are in advanced economies and China, and around half of road transport demand in these countries is cost-effective to electrify today. In Europe, one in three cars sold were electric in the first half of 2026, a substantial increase compared with 2025.

In emerging and developing economies, light industry and dense and often polluted cities provide strong opportunitiesfor electrification. The rapid growth of housing, infrastructure, cars and appliances provides scope to electrify from the outset. In Southeast Asia, the share of electric cars in total sales increased by around 10 percentage points in the first half of 2026, bringing it to a level comparable with Europe. In many emerging and developing economies, dense cities mean that daily commute distances are far shorter than the range offered by electric cars and motorcycles available on the market today. High levels of air pollution and fuel imports provide additional incentives to electrify. Heat for light industry and for cooking and water heating in buildings provides further opportunities. For countries that do not yet have full access to modern energy, expanding access to electricity and supporting the growth of productive uses in agriculture and manufacturing are key to raising electrification rates.

Electrification can bring major energy security benefits

Electrification can be a key pillar of strategies to diversify energy consumption in end-uses and deliver significant benefits for energy security. Today, electric cars, motorcycles, trucks and buses together avoid around 2.3 million barrels of oil demand per day (mb/d). This is more than the amount that bypassed the Strait of Hormuz via the United Arab Emirates' Habshan-Fujairah pipeline in summer 2026, providing an important lifeline to oil markets. By 2035, electric cars are set to account for around half of global sales in a scenario based on today's policy settings, up from a quarter today. By 2035, electric vehicles avoid oil demand of around 10 mb/d, equivalent to the total oil production of Russia.

The High Electrification Scenario sees these trends accelerate, with electrification extending to additional end-uses and regions. In this scenario, importers reduce their import bills by around a quarter by 2035 compared with 2025, or USD 400 billion per year. Assessed against the higher energy prices that prevail in 2026, this rises to more than USD 500 billion. Global avoided oil demand due to electric vehicle adoption in this scenario rises to 18 mb/d by 2035, of which four-fifths occurs in fuel-importing regions.

For fuel exporters, electrification can support a more diversified energy mix and improved economic resilience. Some fuel exporters consume large amounts of energy domestically, supported by low energy prices. In some cases, below-market energy prices also represent substantial forgone fiscal resources;

reforming energy pricing has often proven politically challenging. For these countries, electrification can offer an opportunity to tap domestic renewable resources, which are often significant; develop technologies such as nuclear power; improve energy efficiency; and support the rationalisation of energy pricing. Electrification can therefore be part of strategies to promote greater economic diversification and resilience.

How electricity demand is met matters, but importers see reductions in import bills across a range of electricity generation scenarios. Very little oil is used in electricity generation globally, and so the electrification of transport in the High Electrification Scenario leads to reductions in oil imports regardless of the electricity generation mix. In the specific case where a heat pump replaces natural gas for heating, its efficiency gains are large enough to lower total natural gas demand, even when all additional electricity generation required is supplied by natural gas. However, the overall impact of electrification on natural gas demand and imports is influenced by evolutions in the electricity generation mix.

Electrification cuts emissions, but by itself is not enough for climate targets

Building on the wide availability of cost-effective technologies, electrification is a critical strategy to reduce emissions in end-uses. The combustion of fossil fuels in end-use sectors accounts for around 18.5 billion tonnes of carbon dioxide emissions globally, and these emissions have increased by around 5% since 2015. In the High Electrification Scenario, end-use emissions fall by 40% by 2035.

Efficiency, renewables deployment and electrification are three mutually reinforcing goals; alongside other technologies, these are critical to pathways that return temperatures to below 1.5 °C in the longer term. An electrification goal of 35% by 2035 is aligned with and supports the goals of doubling efficiency improvements and tripling global renewables capacity. Because electric technologies waste less energy, they support the efficiency goal. Energy efficiency measures also make electrification easier and more affordable. Tripling renewables helps meet additional electricity demand with low-emissions sources. Net zero pathways, however, also require action on technologies like nuclear power, bioenergy, carbon capture and storage, and low-emissions fuels like hydrogen and its derivatives – although the precise mix depends on national circumstances. After 2035, electrifying additional end-uses requires technological innovation to unlock further potential.

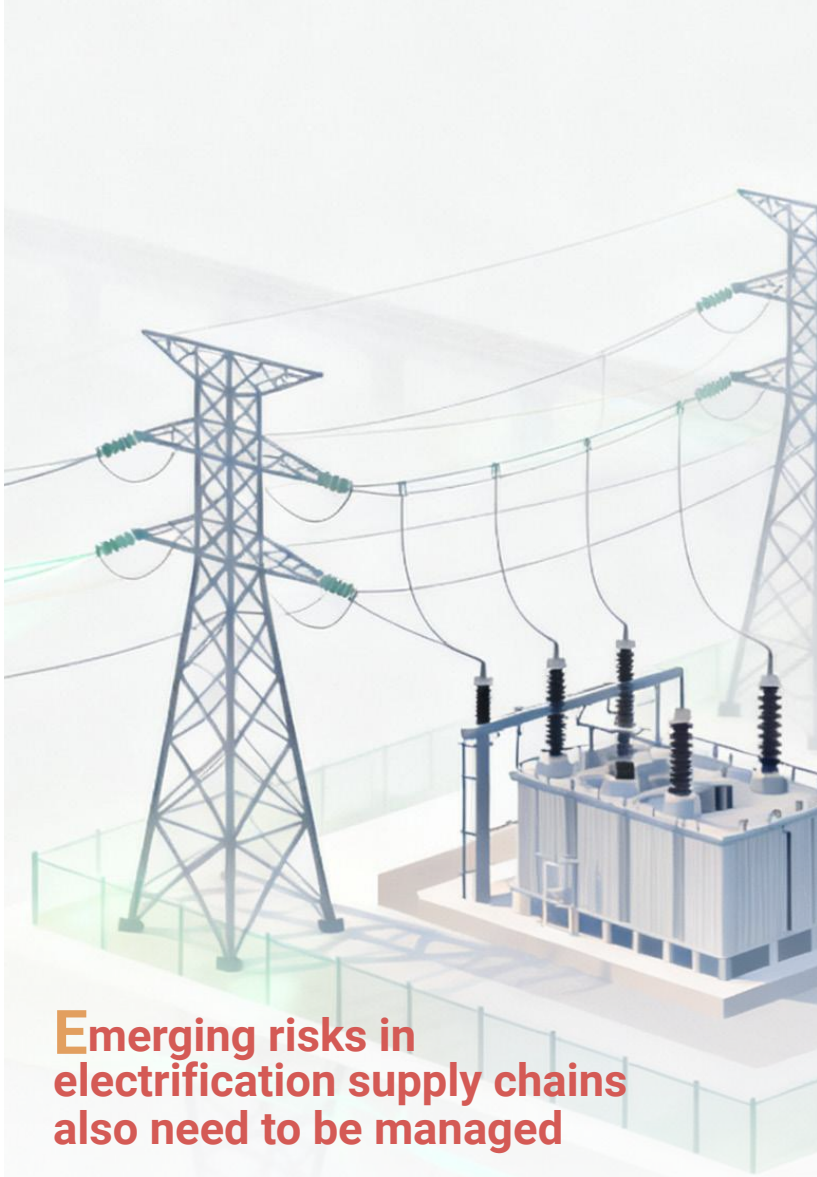
The foundations for clean electrification are taking shape …

The global electricity mix has undergone profound changes over the past decade, but the transition is far from complete. The share of generation from low-emissions sources rose from 33% in 2015 to 42% in 2025, with renewables and nuclear providing nearly 70% of the increase in global electricity generation over this timeframe. Solar PV deployment increased more than tenfold and wind deployment more than doubled. In 2025, the increase in low-emissions generation matched global electricity demand growth. Coal- and natural gasfired generation also increased over the past decade. Electricity generation still accounts for around 14 billion tonnes of CO_2 emissions annually, and these emissions have yet to peak.

But maximising the benefits demands systems thinking

Electrification cuts emissions under today's policy settings, but cleaner electricity multiplies its impact. Raising electricity's share of final energy consumption to 35% pushes electricity demand growth to 1 400 terawatt-hours per year to 2035, nearly twice the pace of the past decade. If low-emissions sources of electricity continue to grow in line with today's policy settings, their growth is just sufficient to meet all additional electricity demand in aggregate. As a result, emissions from electricity generation decline modestly, reinforcing emissions reductions in end-uses. However, a pathway to net zero emissions by 2050 requires a much faster expansion of low-emissions supply, with annual solar PV additions doubling to over 1 200 gigawatts (GW) by 2035, wind additions increasing by two-and-a-half times to around 400 GW and nuclear power making a strong comeback.

Secure, reliable and affordable electrification requires low-emissions generation, grids, digital capabilities, storage and other flexibility options to develop together. Grids need to be modernised and expanded 40% faster to 2035 than over the past decade to connect new supply and rapidly growing demand in the High Electrification Scenario. Delays would lead to longer connection queues, greater congestion and curtailment, and increased risks to reliability. On a pathway to net zero, for example, battery storage capacity rises almost tenfold, reaching around 2 900 GW by 2035, helping to shift electricity across the day. Demand response can complement this by moving vehicle charging, heating and cooling, and suitable industry processes away from periods of system stress. Together, storage and demand response can support affordable electrification by tapping lower-cost variable renewables and making fuller use of existing infrastructure. This requires co-ordinated planning of generation, networks, storage and demand, supported by the right incentives, smart-grid capabilities, and robust cybersecurity safeguards.



Emerging risks in electrification supply chains also need to be managed

Many countries are concerned that electrification could create new dependencies on technology supply chains, but the nature of this risk is different. Critical minerals and supply chains for some electrification technologies, such as batteries, are characterised by high levels of geographical concentration. Reducing exposure to these supply dependencies is essential, as is ensuring a level playing field. At the same time, unlike combustion-based technologies, which depend on continuous flows of input fuels, any disruptions to supply chains for electrification technologies would not affect the operation of equipment already installed in energy systems. However, potential remote control of digitally connected energy assets can be a source of risk, highlighting the significance of cybersecurity safeguards. Electrification technologies increasingly overlap with those in other strategic areas, such as artificial intelligence, robotics and advanced manufacturing. For this reason, strengthening innovation and manufacturing capacities in electrification technologies will be important for broader economic security. Balancing the benefits of international trade with efforts to diversify supply chains will remain a critical challenge for policy makers.



Key barriers remain

Although electrification can be cost-effective in many contexts today, barriers remain in terms of consumer convenience and awareness, infrastructure and market readiness, and access to finance. Consumers often lack the means to account for longer-term savings from electrification, or access to affordable finance if needed to cover higher upfront costs. Electrification requires infrastructure upgrades: in many markets, permitting and building are slow, and planning is fragmented. In some emerging and developing economies, the unreliability or high cost of grid electricity supply is a key barrier. Energy taxes, subsidies and prices also influence the cost attractiveness of electrification options. Reflecting these barriers, the global electrification rate rises to around 30% by 2035 in a scenario based on today's policy settings, highlighting the action that would still be needed to meet the global goal under discussion.

Although an increasing number of countries have sector-specific policies such as EV support schemes, to date very few have comprehensive, cross-sectoral electrification strategies. Deeper electrification will require more integrated approaches to energy system planning that better co-ordinate economy-wide electrification, electricity transitions and enabling infrastructure.

Electrification can help improve energy affordability with the right policies

While electrification can deliver lower-cost energy services, it can require large upfront investments that may be a barrier. In the High Electrification Scenario, global investment in end-use electrification sees a threefold increase to around USD 1 trillion by 2035. In contrast to investments in electricity generation and networks, investments in end-use electrification are often undertaken by many actors, such as households, businesses and public authorities. Some may have limited access to capital or pay high costs for it; some may discount future benefits. This means that policy measures such as subsidies, investment support, awareness campaigns and regulations may be needed.

Electricity can deliver energy services more cheaply because of the greater efficiency of electric technologies. While electricity typically costs more per unit of energy consumed than fuels like natural gas or gasoline, technologies that consume electricity are often much more efficient than their conventional equivalents. EVs are around three-times more efficient than internal combustion engine vehicles; the efficiency gains for heat pumps over conventional boilers can be greater still. As a result, electrification technologies can save consumers money across their operating lifetime.

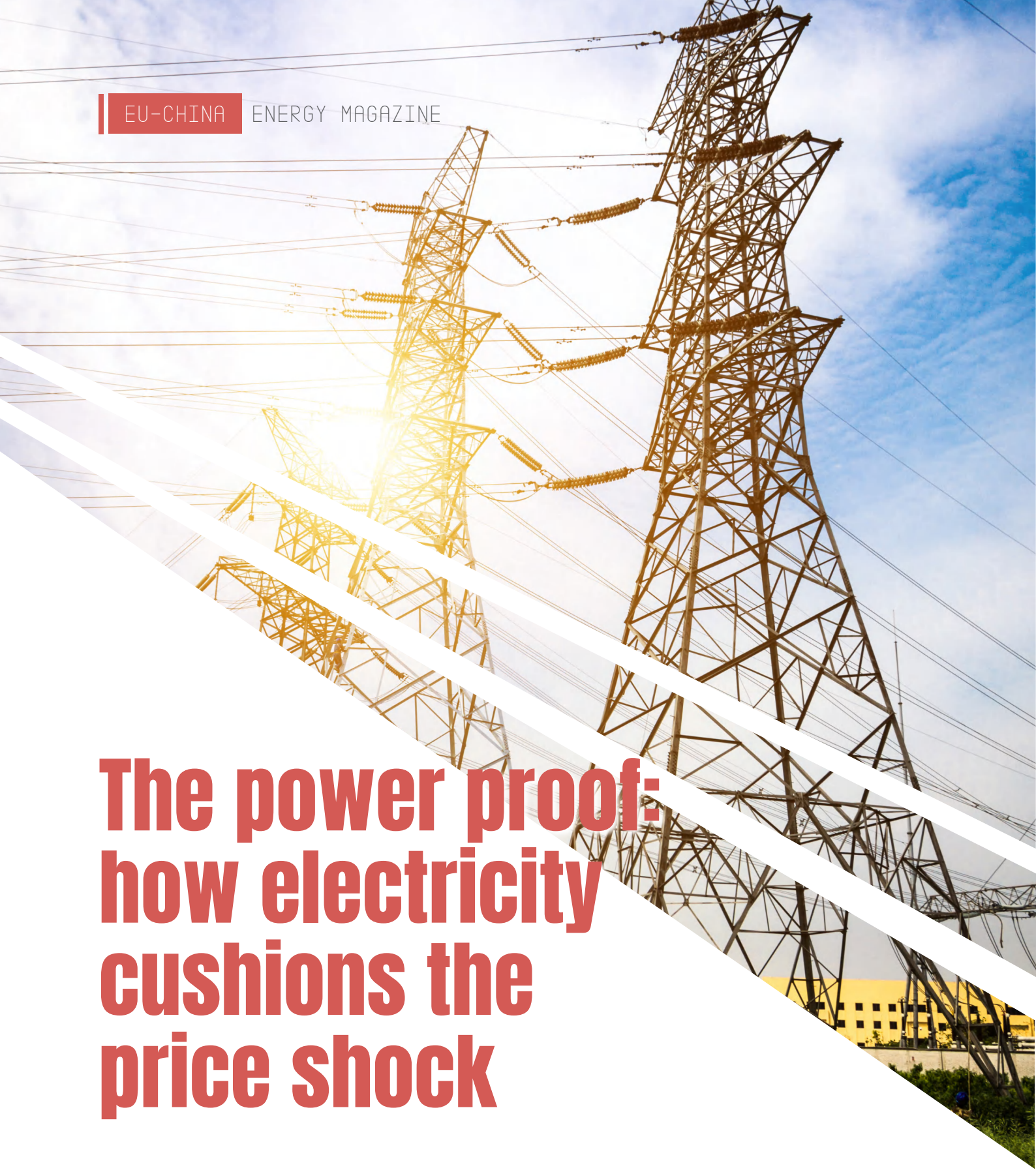
Attention needs to be paid to how the benefits and costs of electrification are distributed. Average household energy bills in the High Electrification Scenario fall by around 15% by 2035 compared with today, benefiting from the greater efficiency and lower operational costs of electrical technologies. But to realise these gains, individual households need to make large, one-off investments in new heating equipment or vehicles. Such costs can place a major burden on lower-income households; policies that aim to push higher electrification may need to be accompanied by targeted measures for such households.

Electrification presents an employment opportunity, but care needs to be taken to bridge emerging skills gaps. Today, the electricity sector is the largest energy employer, with annual employment growth since 2019 well above average for the energy sector and the economy as a whole. Skilled trades such as electricians, welders and grid line workers are critical in the electricity sector, and some labour markets have started to see shortages of skilled workers. Looking ahead, accelerating electrification in line with the High Electrification Scenario would create a major opportunity to expand and upskill the workforce in occupations linked to electrification, potentially doubling current employment in these roles.



Key actions:

1. Develop cross-cutting electrification strategies and policy frameworks. Electrification has broad energy system impacts and depends on infrastructure readiness, appropriate energy pricing and taxation, and financial incentives. Cross-cutting strategies can integrate these elements while considering co-benefits and trade-offs. High-level electrification targets can help guide different actors.
2. Identify priorities for cost-effective electrification in line with national circumstances and policy goals. All countries will have different priorities depending on their energy system structure and broader energy policy goals. Priority setting can identify which electrification segments to target.
3. Pursue full access to electricity and clean cooking. For countries lacking access to electricity, the top priority is increasing access. Improving access to clean cooking also contributes to electrification by increasing the overall energy efficiency.
4. Support consumers where needed. Electrification can lower energy bills, but some households and businesses may need appropriate policy frameworks to support upfront investments in electrification.
5. Identify and address energy price distortions. Reducing price gaps between electricity and its alternatives can boost the attractiveness of electrification. Fossil fuel subsidies or high electricity taxes can be targets for reform, although care needs to be taken with the distributional and fiscal implications.
6. Build out diversified supply chains. Electrification entails increasing reliance on critical minerals and electric technologies; in some cases, their supply chains are highly concentrated. Secure and diversified supply chains support greater electrification.
7. Enhance electricity system readiness. Accelerated electrification can add to pressure on grids that often already face congestion and long permitting timelines. Scaling up investment in generation and grids, and in smarter and more flexible electricity systems, is critical to ensuring electrification is affordable and secure.
8. Invest in skills and labour. Electrification raises the demand for skilled workers and specialised university graduates like electrical engineers. Investments in skills and training can ensure the supply of workers keeps pace with this opportunity.
9. Seize energy security benefits but watch for emerging electricity security threats. Electrification can help diversify energy mixes and reduce import bills; at the same time, emerging threats to electricity security, including cyber risks, natural disasters and climate hazards, need to be considered.
10. Co-operate internationally. Electrification supports global goals like the doubling of energy efficiency and tripling of renewables capacity, and it is a key pillar of pathways to reach the temperature goals of the Paris Agreement.



The power proof: how electricity cushions the price shock

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It's been a year of geopolitical tensions and record heatwaves in Europe. The situation is severe, yet electricity prices remain well below those of 2022. In this sombre situation, there is a silver lining; electricity acts as a price shock absorber rather than a direct pass-through mechanism for fossil fuel volatility. That's the main take of Eurelectric's newly launched Power Barometer report.

Clean, homegrown power is more resistant to shocks. This is the clear result of our intelligence analysis. While electricity prices did rise by 22% during the summer of 2026, gas prices rose four times faster, increasing by 88%.

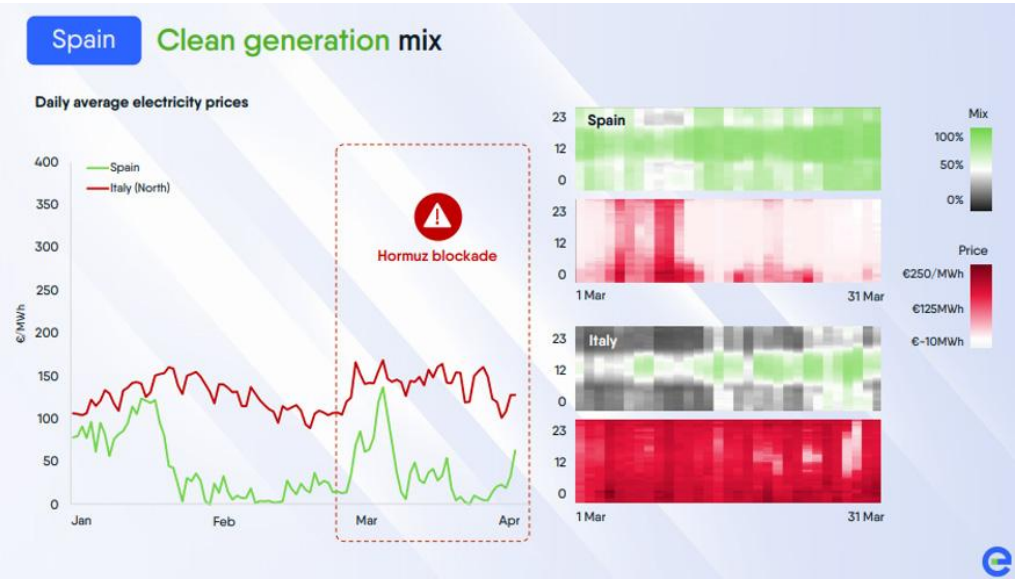
That's not all: Eurelectric's analysis also shows a clear correlation between decarbonisation of the electricity mix and lower prices. The less a country relies on fossil fuels, and the more storage it has, the better shielded it is from price shocks.

Power has proved itself in the face of crisis

At this year's Power Barometer launch event, sponsored by EDF and Iberdrola, more than 100 policymakers, industry leaders and energy experts came together to discuss the report's findings and what they mean for Europe's energy future. The discussions highlighted how the power sector is responding to market volatility while laying the foundations for a more competitive, secure and sustainable energy system.

Despite continued turbulence in global energy markets, electricity generated from Europe's clean, homegrown energy sources has weathered the storm. Countries that have advanced decarbonisation the fastest are now in a better position when it comes to electricity prices.

Daily average electricity prices in Spain vs Italy throughout 2026.



Source: Power Barometer 2026

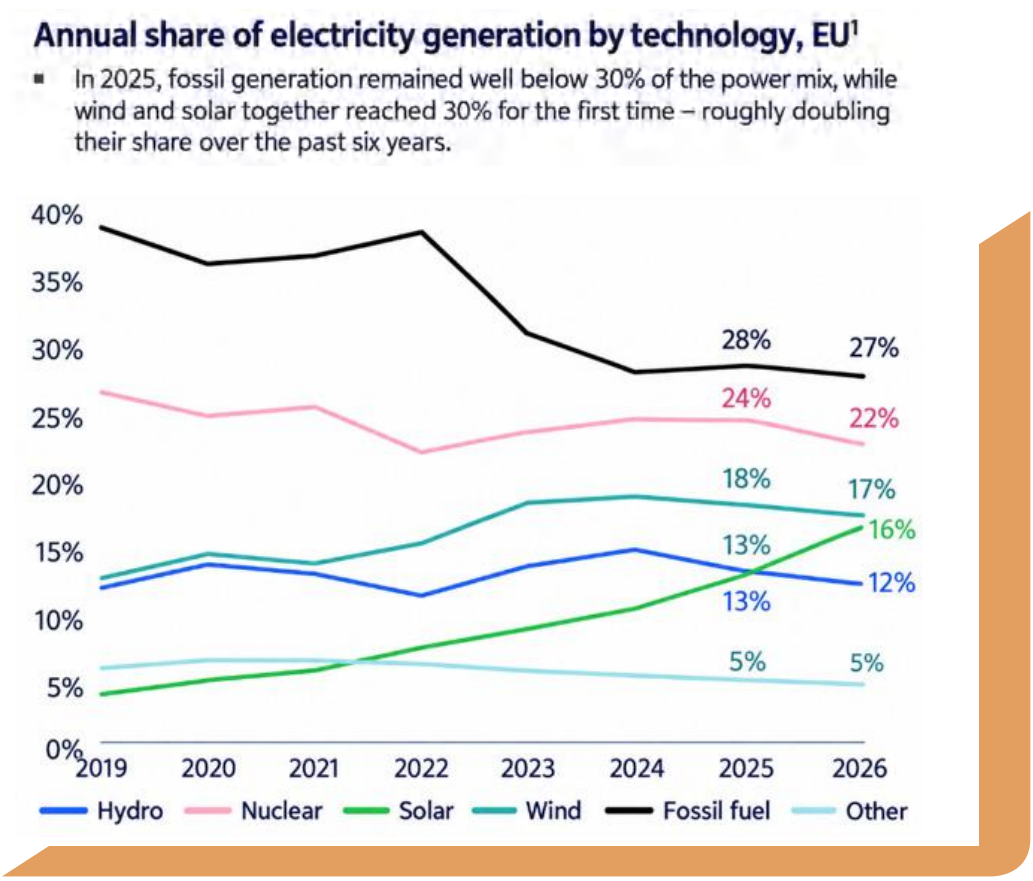
At EU level, the sector has come a long way. 73% of electricity generated in the EU so far this year was clean.

For households and businesses alike, a more resilient and clean power system ultimately means greater protection from international fuel price shocks and more predictable energy costs.

> **2026 has seen severe disruption of global energy markets, once again exposing the risks of reliance on imported fossil fuels. Amidst the turmoil, we're seeing real proof that Europe's bet on clean electricity is paying off**
>
> said Kristian Ruby, Secretary General, Eurelectric.

Solutions already exist. These are called decarbonised electricity sources: wind, solar, nuclear and hydropower. And for the variable part of the mix, the buzzwords are storage and grid reinforcement.

EU power generation.



Source: Eurelectric Power Barometer, 2026.
Notes: 1) Figures sourced from Elda.

Storage, grids and flexibility can't wait

Storage helps bridge the gap between production and consumption by capturing excess renewable electricity when generation is high and releasing it back into the system when demand rises. This creates flexibility in a power system where renewable energy production is variable. It is an essential tool in reducing hourly price fluctuations which hit consumers during peak demand times.

Some countries are already showing what's possible. Bulgaria, for example, has achieved a remarkable feat. Just two years ago, wholesale power prices in Bulgaria were 21.2% higher than the EU average. Today, that gap has shrunk to just 8.3%.

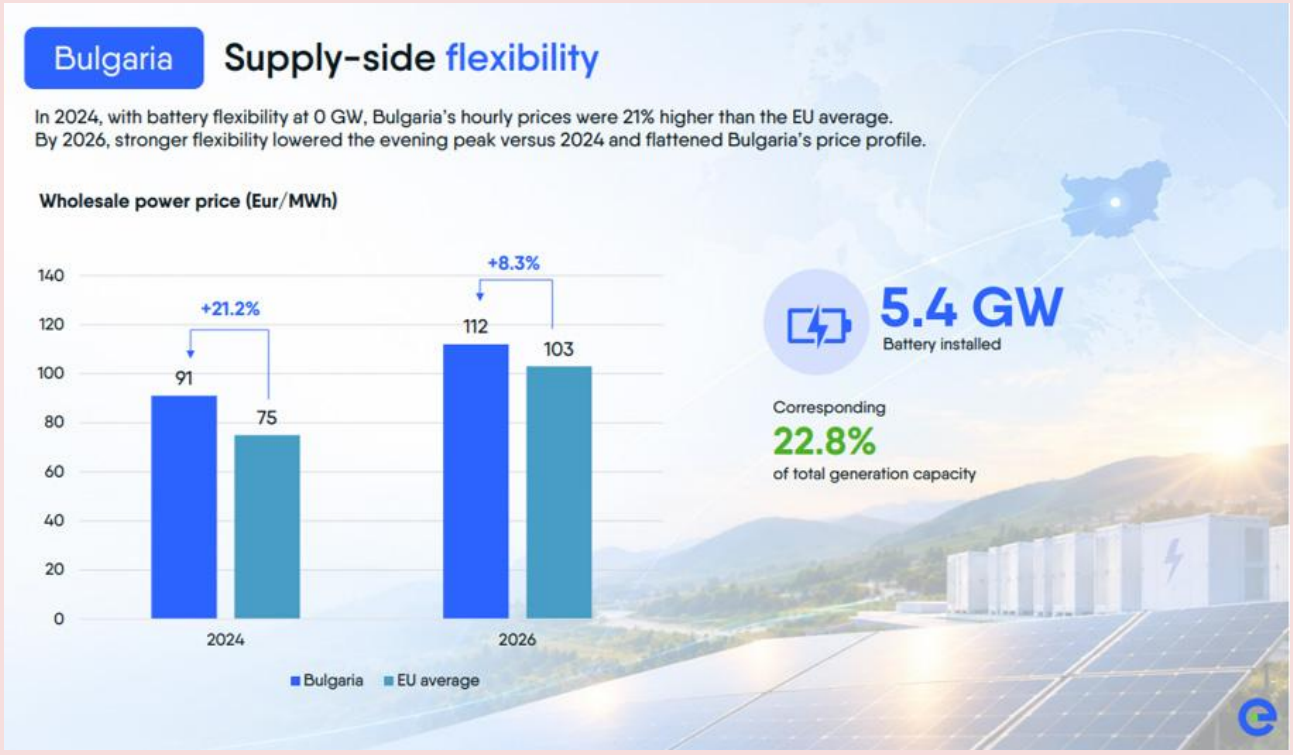
How did Bulgaria manage to reduce price volatility? By adding 5.4 GW of battery storage capacity, equivalent to almost a quarter of the country's total generation capacity.

Bulgaria is not the only country to increase flexibility. Consumers in Finland have demonstrated a keen response to changing prices, with demand increasing as prices go down, and vice versa. Demand from electric boilers has already reached a significant scale, with capacity equating to roughly 25% of peak demand. From March to August 2026, Finland had Europe's lowest average power price, at €38.91/MWh.

Storage does not need to be everywhere to work. It needs to be present in the hours when the system is tight. This is how a relatively small volume, correctly placed in the evening peak, moved Finland's whole national price curve.

The next challenge: Europe's grids. Progress is being made and deployment is accelerating, but still not to the level necessary as per Eurelectric's Grids4Speed report. The culprit? Permitting. Fixing it remains as urgent as ever.

The next challenge: adjusting to shifting demand. While industrial demand has not fully recovered, electricity demand from e-mobility, heat pumps and data centres is increasing. This is a shift to which our sector must adapt as customer demand patterns evolve.



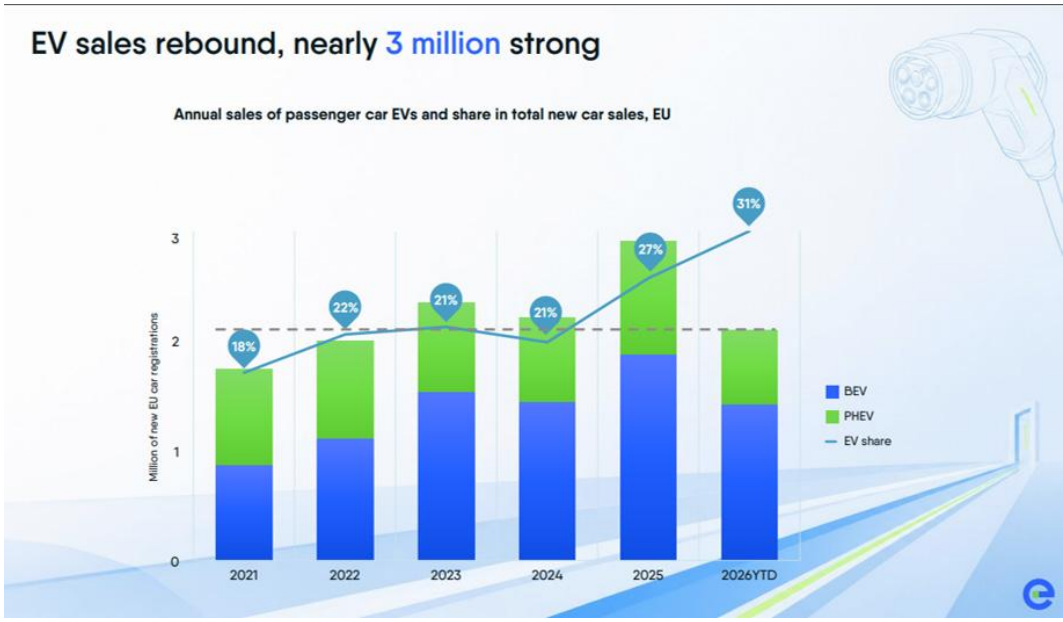
Read about more examples in the Power Barometer Launch Presentation 2026.

Where is demand?

Another key challenge will be adjusting to shifting demand. While industrial demand has not fully recovered, electricity demand from e-mobility, heat pumps and data centres is increasing. This is a shift to which our sector must adapt as customer demand patterns evolve.

▶ Electric vehicles

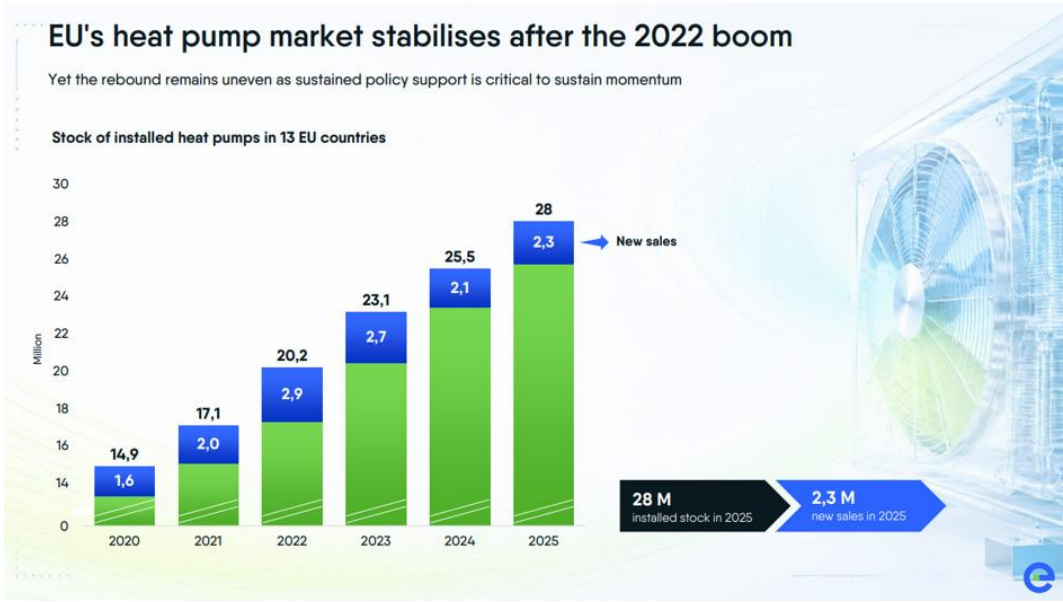
Annual EV sales rose to almost 3 million new cars registered in 2025, a 31% increase from 2024. Moreover, BEV sales represented 17.4% of new sales in 2025. Demand for electricity to charge BEVs has grown accordingly, rising to 28.8 TWh in 2025. That's nearly the equivalent of Ireland's entire annual electricity consumption of 30.9 TWh. Charging demand could equal Poland's current annual consumption by 2035.



Source: Power Barometer 2026

▶ Heat pumps

The EU heat pump market has stabilised after a contraction in demand, but the market requires sustained policy support to maintain momentum. 28 million heat pumps have been installed in the EU, though the rate of adoption needs to increase to meet the target of 60 million by 2030.



Source: Power Barometer 2026

▶ Shifting industrial demand

Industrial demand has yet to recover from the 2022 crisis and remains 9% lower compared to pre-crisis levels. This reduction in demand is being partially offset by data centres which require large amounts of power for their compute capacity.

Europe has the potential to become a major hub for AI computing thanks to low-cost, reliable electricity. For example, in a recent deal worth €13bn, Google signed a 22-year contract with Finnish utility company Fortum, to buy up to 50% of the output from the Loviisa nuclear power plant. Clean power is already proving to be a competitive advantage for some European countries and is supporting increased electrification across the economy.

The next test: scaling success

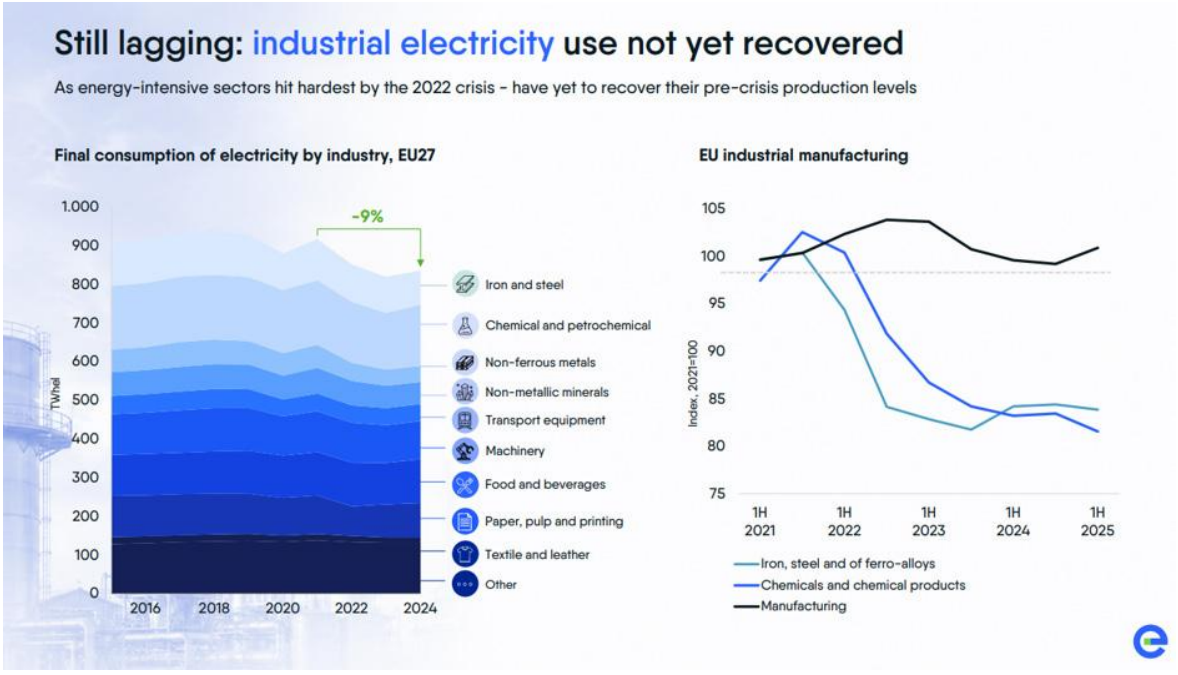
The next phase of the energy transition will depend on making the power system smarter, more flexible and better connected. As electricity demand grows from transport, heating, data centres and industry, investment in distribution grids, storage and cross-border interconnections will become increasingly critical. At the same time, consumers themselves have a role to play. EVs, heat pumps, batteries and flexible industrial processes can help balance the system by shifting consumption to times when clean electricity is most abundant.

The recipe for success is clear:

1. accelerate grid upgrades;
2. streamline permitting;
3. reward flexibility; and
4. remove policies that continue to favour fossil fuels over electricity.

If Europe gets these foundations right, clean power will not only decarbonise the economy, but it will also strengthen its competitiveness, resilience and energy security for decades to come.

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Source: Power Barometer 2026



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Beyond clean trucks: China bets on zero-carbon freight corridors

By ***Xinyi Shen,*** *Senior consultant at Centre for Research on Energy and Clean Air*
Ginger Yedan Li, *Lead analyst at Earthwise Institute*
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China's latest policy package signals a shift from promoting clean trucks to building the infrastructure and logistics systems needed for large-scale freight decarbonisation.

China has unveiled a new round of policy support for new energy heavy-duty trucks, signalling a shift in focus from subsidising vehicle purchases to building the infrastructure needed for large-scale freight decarbonisation.

In June 2026, 11 government agencies, including the Ministry of Transport, the National Development and Reform Commission (NDRC), and the Ministry of Industry and Information Technology (MIIT), jointly released an implementation plan to scale up deployment of new energy heavy-duty trucks, including electric and fuel-cell vehicles. The plan calls for the construction of around 3 000 charging and battery-swapping stations for heavy trucks, the development of 30 000 kilometres of zero-carbon freight corridors, and wider adoption of new energy heavy-duty trucks across different freight applications. Earlier this year, an outline of China's 15th Five-Year Plan (2026–2030) also identified zero-carbon transport corridors as a national priority, proposing the coordinated deployment of charging, battery-swapping, hydrogen, ammonia and methanol refuelling infrastructure, together with integrated renewable power and energy storage systems along major freight routes.



The policy comes at a time of rapid expansion within China's electric heavy-duty truck market. In 2025, nearly three out of every ten new heavy-duty trucks sold in China were electric. Despite the gradual phase-out of purchase tax exemptions and vehicle replacement subsidies, electric trucks accounted for more than half of all new heavy-duty truck sales in December—the first time they had crossed the 50% mark in a single month. Large-scale deployment was already underway in ports, mines and steel plants, where fixed transport routes and predictable operating patterns have made electrification commercially viable.

According to BloombergNEF, China has sold about 17 times as many clean trucks as Europe so far this year, and is expected to remain the world's largest market for electric commercial vehicles in 2026. Although purchases were front-loaded at the end of 2025, sales remained strong. Industry data show that 103 000 electric heavy-duty trucks were sold during the first five months of 2026, up 68% from a year earlier. In other words, nearly one in every three new heavy-duty trucks sold in China during the period was electric.

Falling battery costs, improvements in vehicle performance and the continued expansion of charging and battery-swapping infrastructure have helped sustain this momentum.

The latest policy package suggests that the next phase of China's freight electrification will be defined less by how many new trucks are sold and more by how quickly an integrated transport system can be built. Rather than focusing solely on vehicle deployment, policymakers are increasingly prioritising the coordinated development of charging networks, freight operations and energy infrastructure along major logistics corridors, pointing towards a more systemic approach to freight decarbonisation.



Why new energy heavy-duty trucks?

Heavy-duty trucks are emerging as one of the most important frontiers for decarbonising China's transport sector.

Road freight underpins China's transport system and is also one of its largest sources of emissions. According to existing research, transport accounts for roughly 12% of China's total carbon emissions, with road transport responsible for more than 80% of emissions from the sector. Heavy-duty trucks make up only a small share of the vehicle fleet, yet generate nearly half of all road transport carbon emissions.

Their environmental impact extends well beyond carbon dioxide (CO_2). According to the 2025 China Mobile Source Environmental Management Annual Report published by the Ministry of Ecology and Environment, freight trucks accounted for 83% of nitrogen oxide (NOx) emissions and more than 90% of particulate matter (PM) emissions from the country's vehicle fleet in 2024, with heavy-duty trucks contributing the largest share. Decarbonising freight is therefore essential not only for achieving China's climate goals, but also for improving air quality.

The challenge is particularly significant because of China's industrial structure. China, the world's largest manufacturing economy, also has the world's largest road freight market. The movement of steel, coal, iron ore, construction materials, agricultural products and containers relies heavily on trucks. Heavy-duty vehicles connect mines, steel mills, ports, logistics hubs and manufacturing centres, making them a critical link in both industrial production and supply chains. As a result, decarbonising freight is not simply a transport issue—it is now part of China's broader industrial transition.

Until now, most industrial decarbonisation efforts have focused on production itself. Steelmakers have invested in ultra-low-emission upgrades, electric arc furnaces and hydrogen-based steelmaking, while mining companies have begun electrifying mining equipment and expanding the use of renewable energy. By comparison, the logistics connecting mines, factories, ports and end markets has remained heavily dependent on diesel-powered trucks, making freight one of the weakest links in supply-chain decarbonisation.

That picture is beginning to change. Falling battery costs, improvements in vehicle performance and the rapid expansion of charging and battery-swapping technologies have enabled electric heavy-duty trucks to move beyond demonstration projects towards large-scale commercial deployment. Adoption has been particularly successful in closed or semi-closed industrial environments, such as ports, steel plants and mines - where transport routes are fixed, utilisation rates are high and charging infrastructure can be planned alongside fleet operations. These early deployments have demonstrated not only the technical feasibility of electric heavy-duty trucks, but also their commercial viability.

This explains why China's latest policy package places greater emphasis on infrastructure than on additional vehicle subsidies. The next challenge is not simply to put more clean trucks on the road, but to ensure that they can operate efficiently at scale. Over the longer term, continued growth in the sector will depend not on purchase incentives but rather on the availability of charging and battery-swapping networks, reliable clean energy supplies and efficient freight operations.

As zero-carbon freight corridors begin to connect steel mills, mines, ports and logistics hubs, they may reshape not only how goods are transported, but also how industrial supply chains are organised. In that sense, the significance of China's latest policy shift extends well beyond the transport sector itself.

From subsidising trucks to building networks

One reason electric trucks have scaled up so quickly in recent years is that they were first deployed in environments where operating conditions naturally favoured electrification. Ports, mines and steel plants typically feature fixed routes, short transport distances and highly coordinated fleet management, allowing operators to develop integrated plans that include vehicles, charging or battery-swapping infrastructure, and logistics. Under these conditions, the economic advantages of electric trucks become much easier to realise.

The steel industry provides perhaps the clearest example. A recent study jointly published by Clean Air Asia and Tsinghua University's School of Environment found that policies such as ultra-low-emission retrofits and environmental performance rating schemes have created favourable conditions for the large-scale deployment of electric heavy-duty trucks. Rather than relying solely on vehicle subsidies, the sector has developed a model in which policy support, suitable operating scenarios and commercial viability reinforce one another.

Hebei Province illustrates how this integrated approach has evolved. Of the steel plants that had completed ultra-low-emission retrofits by 2025, electric trucks accounted on average for 93% of on-site transport, while some facilities had fully electrified their internal logistics.

Electrification has also expanded beyond plant boundaries: for inbound and outbound transport, electric trucks typically account for more than 70% of freight movements, reaching up to 90% at some sites. Importantly, many steelmakers have invested simultaneously in charging and battery-swapping facilities and have coordinated fleet scheduling and battery-swapping operations. Their experience suggests that the rapid adoption of electric trucks depends not only on improvements in vehicle technology, but equally on the development of supporting infrastructure and more efficient operational systems.

However, these early successes have largely been confined to closed or semi-closed industrial environments. As electric heavy-duty trucks move beyond ports, mines and steel plants into regional distribution networks and long-haul freight, a different set of challenges begins to emerge. The main bottleneck is no longer the vehicle itself, but the availability of reliable charging and battery-swapping infrastructure.



For long-distance freight operators, the convenience of charging, the speed of energy replenishment and access to reliable supplies of green electricity directly affect fleet utilisation and operating costs. The same Clean Air Asia study identifies several remaining barriers, including insufficient charging and battery-swapping networks, underdeveloped service ecosystems and increasingly complex fleet scheduling. The next phase of market development, therefore, requires a shift from promoting individual vehicle acquisitions to building the infrastructure, business models, and industry partnerships needed to support large-scale operations.

This explains why the new implementation plan places the expansion of charging and battery-swapping infrastructure at the top of its agenda. It calls for the construction of around 3 000 charging and battery-swapping stations for heavy-duty trucks, the development of 30 000 kilometres of zero-carbon freight corridors, and the installation of dedicated charging facilities at motorway service areas. The plan also promotes integrated energy hubs that combine renewable power generation, energy storage, charging and battery swapping, alongside direct renewable electricity supply, greater local renewable energy consumption, and vehicle-to-grid (V2G) technologies. Together, these measures are intended to help integrate freight electrification within the wider energy system.

In other words, the next stage of development in China's electric heavy-duty truck market will not be determined solely by vehicle performance or battery technology. Increasingly, it will depend on who can build the most efficient charging networks, secure reliable clean energy supplies and optimise freight operations. If the first phase of the industry's development was about proving that electric trucks could work in specific operating environments, the next phase is about creating a transport system capable of supporting large-scale, long-distance freight electrification. That transition will ultimately determine whether electric heavy-duty trucks can move beyond niche industrial applications and become a mainstream solution for road freight.

From demonstration projects to freight systems

If charging infrastructure determines whether electric heavy-duty trucks can operate efficiently, the breadth of their deployment will determine whether they can achieve truly large-scale adoption.

Reflecting this shift, China's latest plan identifies the expansion of application scenarios as another key priority. It calls on large transport operators, logistics companies, and commercial freight fleets to accelerate the adoption of new-energy heavy-duty trucks, while targeting sectors such as steel, mining, coal-fired power, non-ferrous metals, coking, and coal chemicals. The plan also encourages the development of zero-carbon freight corridors along some of China's busiest commodity transport routes, including coal shipments from Xinjiang and from Shanxi–Shaanxi–Inner Mongolia, as well as the country's major north-to-south grain transport corridors.

The implications are significant. Electric heavy-duty trucks are no longer being promoted simply as vehicles for individual companies or industrial parks. Increasingly, they are becoming part of a broader effort to decarbonise regional logistics networks and the national freight system.

That transition is already beginning to take shape.

In April 2025, China launched its first commercially operated regional electric heavy-duty truck corridor along a roughly 250-kilometre route between Ningbo and Yiwu. Running along the Yongjin Expressway, the corridor links Ningbo-Zhoushan Port with the Yiwu International Trade City and will be supported by ten dedicated charging and battery-swapping stations, creating a continuous energy-replenishment network along the route. Carrying around 1.3 million twenty-foot equivalent units (TEUs) of container traffic each year, it can accommodate the high and predictable freight volumes needed to support large-scale electric truck operations. An initial fleet of 300 electric heavy-duty trucks is expected to reduce carbon emissions by around 48 000 tonnes per year while cutting operating costs by approximately RMB 84 000 per vehicle each year. More importantly, the project shows how electric heavy-duty trucks are beginning to move beyond the closed industrial settings where they first gained traction and into open-road, regional freight transport.

A similar evolution is underway in bulk commodity logistics. Earlier this year, Huayuan Landport Group and Shanxi Coking Coal Group launched a fleet of 100 battery-swapping heavy-duty trucks as part of a zero-carbon freight corridor in Zuoyun County, Shanxi Province. Unlike the Ningbo–Yiwu corridor, which focuses primarily on transport infrastructure, the Shanxi project integrates vehicle operations, battery-swapping services, freight scheduling and energy supply within a single operating model. Logistics operators, cargo owners, battery suppliers and technology providers each play defined roles, creating a more comprehensive solution for decarbonising coal transport.

Although these two projects serve different industries, they point in the same direction. The focus is shifting from electrifying individual fleets or transport routes to building integrated freight systems where vehicles, charging infrastructure, energy supply and logistics operations are planned together. Freight electrification is gradually expanding from fixed industrial routes towards interconnected regional transport networks.

These developments reflect an important distinction between China's approach and developments in other parts of the world. Globally, transport electrification has made significant progress in closed operating environments such as mines, ports and industrial sites, where international mining companies and logistics operators are increasingly working with Chinese battery manufacturers and equipment suppliers.

However, large-scale efforts to connect these isolated projects through open-road, cross-regional zero-carbon freight corridors remain relatively limited.

China is now pursuing a more systemic approach: treating freight decarbonisation as a system rather than a collection of individual vehicle deployments.

That is also the broader significance of the "zero-carbon transport corridors" proposed in China's 15th Five-Year Plan outline. Rather than simply putting more electric trucks on the road, the strategy aims to coordinate charging and battery-swapping facilities, hydrogen, ammonia and methanol refuelling infrastructure, renewable electricity generation, energy storage and freight operations along major logistics corridors. In other words, the objective is to integrate transport, energy and industrial policy into a single decarbonisation framework.

The latest implementation plan reinforces this objective. Alongside vehicle deployment, it emphasises the coordinated development of charging infrastructure, renewable electricity supply, digital freight platforms and transport operations. It also proposes new industry alliances linking roads, vehicles, logistics and energy systems, while encouraging innovative business models such as vehicle–battery separation, battery leasing and integrated energy services. The future competitiveness of China's freight sector will therefore depend not simply on who manufactures the best electric truck, but on who can build the most efficient low-carbon freight ecosystem.

Uncertainties remain. There are lingering questions over the economics of charging infrastructure, the availability of renewable electricity, cross-regional operating models, technical standards and the commercial value of low-carbon freight services. Yet one conclusion is already becoming apparent: the focus of China's freight electrification strategy has fundamentally changed. The first phase was about replacing diesel trucks with electric and fuel-cell ones. The next phase is about building a transport system that enables those vehicles to operate efficiently at scale.

Over the past decade, China's electric vehicle revolution has largely been defined by passenger vehicles. During the 15th Five-Year Plan period, however, a new phase of the transition may unfold in freight transport, where vehicles, energy systems, infrastructure and logistics networks are being redesigned together. Whether China's vision of zero-carbon freight corridors can move from policy to widespread implementation will shape the future of the heavy-duty truck industry and the decarbonisation of steel, mining, coal and logistics supply chains. It will also provide an important indicator of China's broader industrial transition towards a low-carbon economy.

Bridging the green premium gap: what cargo owners need to scale green shipping



By ***Xinxi Wang, Consultant,*** *Green Finance Forum of 60*
Johnny (Zhong) Huang, *Cofounder & Executive Director for Asia, Sustainable Finance Institute*
Beibei Gu, Vice President, *Green Finance Forum of 60*

Green shipping is increasingly constrained by market design rather than technology. Drawing on desk research into the 2025 Corporate Climate Action Transparency Index (CATI) Top 100 (developed by the Institute of Public and Environmental Affairs (IPE)), alongside interviews with and surveys of 19 industry stakeholders in China, this study finds a sharp gap between stated ambition and paid green shipping procurement. It also suggests that the next phase of maritime decarbonisation will depend as much on demand aggregation, cost sharing and credible carbon accounting as on new fuels and vessels.

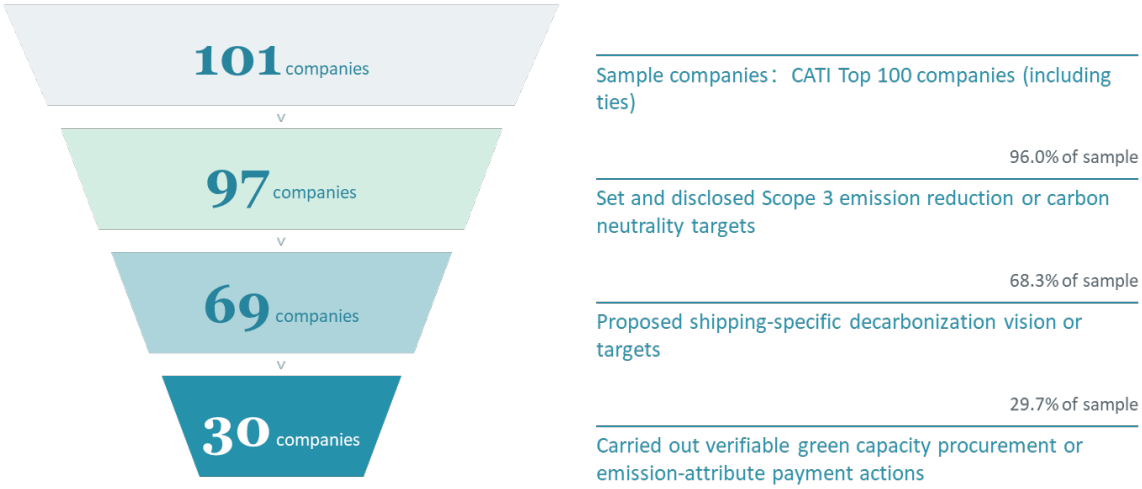
The demand side as a long-standing bottleneck

Maritime transport carries around 80% of world merchandise trade by volume, and is therefore central to supply chain decarbonisation. Policy pressure is also becoming more concrete. The EU Emissions Trading System (EU ETS) has covered emissions from large ships calling at EU ports since 2024, with surrender obligations continuing to phase in through 2026. The FuelEU Maritime Regulation, which came into force in January 2025, is setting progressively tighter limits on the well-to-wake greenhouse-gas intensity of energy used on board. At the global level, the International Maritime Organisation (IMO) approved the draft Net-Zero Framework in April 2025, although formal adoption discussions were adjourned in October 2025 and remain unresolved in 2026.

These regulatory measures are principally obligations on ship operators, but their economic effects pass through freight markets to cargo owners. Deep decarbonisation by 2050 requires zero-emission or near-zero-emission fuels and vessels that can burn them, yet many of those options still sell at a substantial premium compared to conventional marine fuels. In order to scale green shipping, the supply side and the demand side need to answer some key questions: whether shipping companies can provide greener capacity (the supply-side); and whether cargo owners are willing and able to pay for it, how the green premium is shared and what commercial or compliance value buyers receive in return (the demand-side).

The key findings in this article are drawn from a 2026 study led by the Green Finance Forum of 60, a Shanghai-based think tank, with support from Pacific Environment. The study used desk research to review leading brands ranked in the 2025 Corporate Climate Action Transparency Index (CATI) Top 100, alongside detailed survey and interview responses from 19 industry stakeholders in China, selected from a broader engagement with 40 participants across the shipping value chain. Those responses were used to examine willingness to pay, shipping decarbonisation procurement behaviour and the barriers to scaling green shipping.

Funnel Distribution of Cargo Owner Green Shipping Actions



Sample source: 2025 Climate Action CATI Index Top 100 (101 companies, including ties), Institute of Public and Environmental Affairs (IPE)

1. Full report can be accessed at: https://gf60.org.cn/research-focus?focus1d=6aba007b2be4ee36173e2b0b.
2. Institute of Public and Environmental Affairs (IPE). 2025 货主企业绿色物流 CATI 指数评价报告 [2025 CATI Evaluation Report on Green Logistics for Cargo Owners]. IPE, 23 Dec. 2025, www.ipe.org.cn/reports/report_22712.html.

A pronounced gap between targets and action

The evidence suggests a notable gap between Scope 3 decarbonisation targets and green shipping fuel procurement decisions. Of the 101 companies evaluated in the CATI Top 100 index (including tied rankings), 97 disclosed Scope 3 targets and 69 stated a specific maritime decarbonisation vision. Only 30, however, were found to have paid for green shipping capacity or made an equivalent financial commitment.

By sector, Textiles & Clothing had the highest share of companies with a stated maritime decarbonisation vision (85.7%), followed by Consumer Electronics & IT (81.3%) and Automotive (77.8%).

Textiles & Clothing also had the highest share reaching the procurement stage (57.1%), followed by Automotive (44.4%). All sector shares are calculated against each sector's own sample (Table 1).

The findings suggest that willingness to pay for green shipping is shaped by business models as well as by climate ambition. Consumer-facing companies with stronger margins, clearly defined Scope 3 targets and greater exposure to European customers may be more able to absorb a green logistics premium than companies competing primarily on delivered cost. This is a particular problem for many Chinese exporters, who face growing pressure to decarbonise their supply chains while selling into highly price-sensitive markets.

Among these 30 early adopters, procurement models already show some variation. The most common approach is to buy off-the-shelf green shipping products from carriers, typically backed by verified emissions-reduction certificates. Alternative pathways include joining buyers' alliances, such as the Zero Emission Maritime Buyers Alliance (ZEMBA); participating in sector-specific carrier programmes, such as green logistics initiatives tailored for automotive Roll-on/Roll-off (Ro-Ro) shipping; procuring low-carbon transport services through freight forwarders; and making direct investments in vessels or long-term chartering arrangements. The evidence is that the green shipping market is still young and fragmented, with adoption concentrated among a small group of large first movers.

Table 1. Commitment-to-Action Gap in Green Shipping, 2025 CATI Top 100 Companies

Sector	Sample Size	Tier 1: Scope 3 Target Disclosed	Tier 2: Stated Maritime Decarbonisation Vision	Tier 3: Verified Green Shipping Fuel Procurement
Textile & Apparel	21	21 (100%)	18 (85.7%)	12 (57.1%)
Consumer Electronics & IT	16	16 (100%)	13 (81.3%)	2 (12.5%)
Automotive	18	18 (100%)	14 (77.8%)	8 (44.4%)
Solar PV & New Energy	11	8 (72.7%)	4 (36.4%)	1 (9.1%)
Food, Beverage & Agriculture	10	10 (100%)	6 (60.0%)	3 (30.0%)
Retail & Diversified Groups	8	8 (100%)	5 (62.5%)	1 (12.5%)
Industrial & Electrical Equipment	9	8 (88.9%)	4 (44.4%)	2 (22.2%)
Chemicals, Pharma & Healthcare	8	8 (100%)	5 (62.5%)	1 (12.5%)
Total	101	97	69	30

Source: 2025 Climate Action CAT Index Top 100 (101 companies, including ties), Institute of Public and Environmental Affairs (IPE)

Willingness to pay exists, but faces strict ceilings and practical challenges

The survey and interview data provide further insights into cargo owners' willingness to pay and the operational factors that shape green shipping procurement:

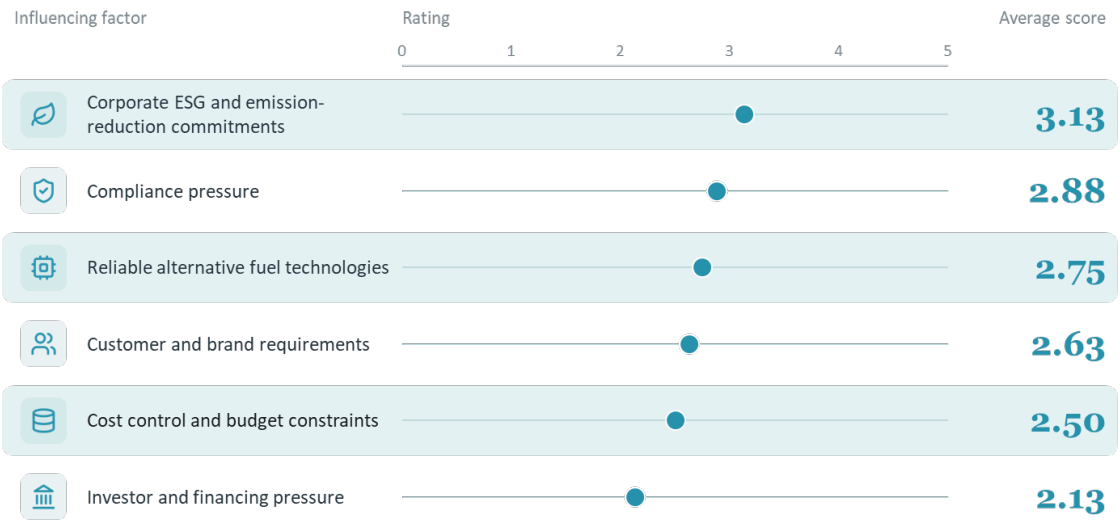
- Green Premiums Face a Clear Affordability Threshold: More than 60% of respondents would not accept a premium above 15%, while roughly four in ten were clustered below 5%. Cargo owners are not refusing to decarbonise, but their willingness to pay depends on affordability, predictability and whether the value can be realised elsewhere in the business.

- Near-Term Procurement Favours Practical Fuel Options: Green methanol and green ammonia attract considerable attention as long-term pathways, but current procurement is concentrated in fuels that can be used with less operational disruption. Desk research on the 30 companies with verified green shipping procurement indicates that in 2025 second-generation biofuels accounted for 56.7% of disclosed fuel choices, while bio-LNG or biomethane represented 23.3% and was the fastest-growing secondary option. In terms of stated preferences, some 70% of cargo owners expressed a clear fuel preference, while the remaining 30% largely deferred to the carrier's choice.

- Operational Practicality First: Cargo owners prioritise practical considerations. All respondents identified fuel-supply security and cost controllability as important, with 80% also highlighting technology availability and delivery certainty, as well as a clear compliance pathway. Verifiability of emissions reductions was cited by 60%, while bunkering-infrastructure coverage mattered to 40%. Buyers want options that are commercially and operationally effective, and whose emissions savings can be credibly measured, before they turn to fuels whose zero-carbon potential is still largely theoretical.

- Corporate Commitments Lead, while Regulation Creates the External Boundaries: A similar pattern appears in an assessment of motivating factors. Voluntary corporate ESG and climate commitments received the highest average score as a driver, at 3.13 out of 5, followed by regulatory compliance at 2.88. Technical reliability scored 2.75 and customer pressure 2.63. Corporate commitments clearly represent an important trigger for pilot projects, while regulation increasingly creates the external boundary conditions for companies exposed to the European market.

Factors Shaping Cargo Owners' Green Shipping Decisions (5-Point Scale)



- Policy Support Is Expected to Reduce Commercial Risk: However, pilot projects do not become recurring procurement instances simply because a company is striving towards a target. The policy incentives preferred by buyers point to the same concern: direct support to narrow the fuel-price gap is ranked first, followed by carbon pricing or market mechanisms, and then Contracts for Difference (CfDs). In short, buyers want mechanisms that reduce uncertainty.

Why the green premium gets stuck across the value chain

This commitment-to-action gap persists because of four structural barriers in the value chain that prevent the green premium from being absorbed:

First, without a working commercial loop, green investments earn no return further down the value chain: 75% of respondents identified the lack of targeted demand-side incentives as a major obstacle. Fragmented demand also makes it difficult for fuel producers and carriers to see a stable long-term offtake signal. Nor can the cost simply be passed on: none of the respondents believed it was feasible to pass on the premium through carbon labels on consumer-facing products.

Second, the lack of harmonised accounting, certification and verification standards keeps the market fragmented. Half of respondents cited the absence of unified green-shipping certification and pricing standards as a barrier. EU and Chinese regulatory systems are not formally incompatible, but cargo owners still need clearer, credible methods for establishing what is being purchased, how lifecycle emissions reductions are calculated, who owns the resulting environmental attribute and how double counting is avoided.

Third, internal governance silos and misaligned cost-control objectives prevent corporate climate targets from translating into logistics procurement decisions. ESG or sustainability teams were the lead internal sponsor of green-shipping initiatives for 37.5% of respondents, and boards or senior management for another 37.5%. Procurement and supply-chain functions, which control logistics budgets, led in only 12.5% of cases. At the same time, 87.5% of respondents reported a structural conflict between green-logistics spending and conventional cost-control objectives. Half of those surveyed identified data or carbon-accounting inconsistencies, while 37.5% reported incentive misalignment.

Internal Ownership and Key Driving Departments for Green Shipping Transitions

Lead department	Description	Share
Sustainability / ESG department	Delivers annual emissions reduction reports or oversees SBTi commitments.	37.50%
Executive Management / Board of Directors	Drives top-down long-term vision and strategic alignment.	37.50%
Supply Chain / Logistics Procurement	Mitigates risks associated with surging carbon tax costs.	12.50%
Others		12.50%

Finally, external uncertainty, ranging from the choice of future fuels to geopolitical disruption, leaves companies little room to experiment. Uncertainty over the future fuel pathway received the highest risk score, at 3.63 out of 5, followed by geopolitical disruption at 3.50 and uncertainty over the policy framework at 3.38. Rerouting around maritime chokepoints raises fuel use and freight costs before any green premium is added. The delayed adoption of the IMO Net-Zero Framework reinforces the perception that companies are being asked to make far-reaching decisions while important parts of the regulatory architecture remain unsettled.

Cargo Owners' Perceptions of Green Shipping Risks (five-point scale)

Risk Dimension	Mean Score
Green fuel technology pathway uncertainty Unconverged vessel technologies and alternative fuel options constrain future green shipping capacity deployment.	3.63
Geopolitical disruptions to green fuel and shipping markets Geopolitical conflicts threaten the stability of global green fuel supply chains and maritime logistics.	3.50
Green shipping policy and regulatory uncertainty Evolving frameworks (e.g., IMO Net-Zero Framework, EU ETS) impair investment visibility for green shipping assets.	3.38
Inadequate green fuel bunkering infrastructure Underdeveloped alternative bunkering networks (e.g., green methanol) limit the operational reliability of green services.	3.13

Pathways to commercial viability for green shipping

It is clear that scaling green shipping means moving away from bespoke, project-by-project negotiations towards shared market infrastructure. Here, four main groups play a central role.

First, policymakers need to support both sides of the market, giving demand-side incentives as much weight as supply-side support. Most existing instruments target supply, but supply will not scale without buyers willing to commit to long-term offtake. Targeted demand-side incentives are needed alongside those focused on supply, including direct support that narrows the fuel-price gap for early buyers and promotes carbon pricing or



other market mechanisms. Policy support should be linked to verified lifecycle greenhouse-gas performance and should be designed to be withdrawn as technology costs fall and demand grows. Competitive procurement, CfDs or other price-gap mechanisms can give early buyers greater cost certainty. Public procurement and large corporate purchasing programmes can also create core demand, while firm demand in turn reduces the risk faced by fuel producers and carriers and makes their investment more bankable. Rather than attempting to build every element of a national ecosystem before the market exists, policymakers can use selected green-shipping corridors as practical testbeds that combine fuel supply, Monitoring, Reporting and Verification (MRV), demand aggregation, port services and finance.



Second, cargo owners must turn decarbonisation goals into concrete action and align internal teams around them. For cargo owners with significant maritime transport volumes and high carbon footprints, achieving this requires the establishment of a credible shipping-emissions baseline across relevant Scope 3 categories, adoption of a robust methodology for allocating emission reductions, and inclusion of sustainability targets into procurement budgets so that internal teams work towards the same goals. Where individual freight volumes are insufficient, sectoral or regional buyers' alliances can aggregate demand, run joint tenders and give carriers and fuel suppliers multi-year demand signals they can finance against.

Third, carriers need to turn green shipping services into a standard, verifiable product that delivers real emissions reductions. To build commercial confidence, carriers can move green transport away from bespoke contracts and towards standard, ready-to-use offerings. They can meet buyers' core requirements by providing service structures that are easy to compare, transparent pricing mechanisms for green services, verified lifecycle emissions data, and clear rules for chain of custody or allocation of attributes. Carriers should also consider smaller cargo owners and offer them more accessible green shipping products.

Fourth, third-party organisations can lead the development of shared market infrastructure. Industry associations, exchanges, standards bodies and research institutions can organise buyers' alliances, publish green shipping premium benchmarks, develop shared carbon-accounting tools and support credible registries for the allocation and retirement of emissions-reduction attributes. This is particularly important for small and medium-sized exporters that cannot build their own ESG, legal and verification systems.



FEATURED PUBLICATION

01

Industrial electrification and energy efficiency: technological success stories from EU programmes



Electrification and energy efficiency are central to the transformation of European industry, with many innovative clean energy technologies already available to drive this shift. This report from the European Commission's Directorate-General for Energy showcases technologies tested across 189 EU-supported demonstrators, highlighting 20 success stories. The technologies span five areas: industrial heat pumps, electric furnaces and boilers, demand flexibility and storage, heat recovery, and energy efficiency improvements to motor systems. Together, these projects represent around EUR 1 billion in investment, including EUR 600 million in EU support, illustrating how EU funding can help bring proven solutions closer to wider deployment and support businesses and industrial ecosystems in their transition to cleaner, more sustainable energy use. Large-scale deployment of these technologies alone could halve the share of fossil fuel consumption in industrial energy by 2040, argue the authors.

→ *More*

02 European retail markets for electricity and gas: 2026 monitoring report

This annual monitoring report prepared by the EU Agency for the Cooperation of Energy Regulators (ACER) and the Council of European Energy Regulators (CEER) examines how retail market conditions can support affordable electrification and offer consumers more flexible electricity use. Although high electricity prices relative to gas can weaken incentives to switch to electric technologies, and rising network costs may put further pressure on household bills, the report highlights opportunities for consumers to reduce costs by shifting electricity use to periods when prices are lower. The extent of these benefits depends on consumers' contract types and consumption patterns. Looking ahead, the report identifies three priorities: making electrification financially attractive; ensuring that network investment delivers value for consumers; and monitoring existing household contracts to better understand consumer choices and outcomes.



→ *More*

03 Powering artificial intelligence



Prepared by the International Energy Agency (IEA) at the request of France's G7 Presidency, this report examines how governments and data centre operators are responding to the rapid expansion of AI-driven digital infrastructure and its implications for electricity systems. In a survey of policies and regulations across 34 jurisdictions, representing 90% of global capacity, the analysis finds that policy efforts focus mainly on improving the visibility of data centre demand and management of grid connections, while measures to promote operational flexibility and grid stability remain less common. The authors explore emerging approaches, including non-firm grid connections, requirements for data centres to contribute to power supply, and new electricity procurement strategies. The report also weighs the implications for electricity affordability, emissions, and water use. It sets out six principles for decision-makers, emphasising the need for transparent project attributes, predictable grid connections, integrated approaches to resource efficiency, fair allocation of costs and risks, frameworks for active grid support, and continuous dialogue and knowledge sharing to navigate this fast-moving field.

→ *More*

04 The role of nuclear in the energy transition: complementary but limited



A report by the Energy Transitions Commission (ETC) examines where nuclear power can make an economically viable contribution to the energy transition. Although costs vary significantly across regions, the report finds that nuclear can play a targeted supporting role, particularly in countries where it offers system benefits and projects can be delivered cost-effectively. Its role depends on national circumstances, including renewable energy potential, grid infrastructure and capital costs. The report estimates that global nuclear capacity could reach around 750 GW by 2050, requiring annual new-build rates of 15-25 GW - at least three times the average pace of the past two decades. However, even at this rate the expansion would be modest compared with the parallel investments required in renewables, grids and storage. The ETC argues that new nuclear development should complement, rather than compete with, the broader clean energy buildout. Meanwhile, extending existing reactors' operating lives within safe parameters could reduce the need for new construction.

→ *More*

05 Deep dive on critical raw materials for hydrogen technologies in the EU



Commissioned by the DG ENER as part of the Joint Research Centre's 'Deep Dive' series on materials security, this report examines the raw materials requirements of water electrolysers and fuel cells and their implications for the EU's hydrogen ambitions. It maps five key materials - iridium, platinum, titanium, nickel and zirconium - across the value chains of these technologies and projects demand to 2050 under two scenarios reflecting different levels of technological innovation. The analysis considers the roles of efficiency, component lifetimes and recycling in shaping future demand, alongside options for supply diversification and the development of circular value chains. It also examines the data and monitoring needs involved in assessing materials throughout the supply chain. The report provides an evidence base for policymakers considering how to support the development of Europe's hydrogen technology industries and their associated material value chains.

→ *More*

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