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ENERGY SECURITY: ITS EVOLVING ROLE IN THE ENERGY TRANSITION

Energy security is being redefined and elevated to a national security imperative by a turbulent geopolitical landscape, rising protectionism in pursuit of energy sovereignty, and the demands of electrification, digitalisation and decarbonisation. As the International Energy Agency (IEA) acknowledged in its World Energy Outlook 2025: "the nature of energy security is changing". This briefing explores those changes, and how emerging risks and evolving priorities are reshaping global energy security strategies.

FROM TRADITIONAL RISKS TO EVOLVING THREATS

The oil crises of the late 1960s and early 70s triggered supply disruptions, major price increases, and a global energy crisis. In response, oil-importing countries reassessed their dependence on imports and reviewed their domestic energy security strategies. Following the 1973 oil shock, countries sought to diversify energy supplies, promote energy conservation to reduce demand and develop a co-ordinated international approach to supply shocks.

These efforts led to the establishment of the IEA and a mechanism to implement an emergency oil-sharing reserves system. The IEA came to define energy security as the uninterrupted availability of energy sources at an affordable price.

While physical supply disruptions and price volatility continue to be key challenges, underlying risks are evolving and new threats emerging, including cybersecurity threats, grid constraints, electricity system resilience, and the vulnerabilities of supply chains. Energy security strategies are having to adapt to a rapidly changing and increasingly unpredictable geopolitical landscape, as well as the complexities of the energy transition. We also see the return of energy as a weapon in conflicts, sharpening the energy security focus even more: as Keir Starmer said in 2025 "*Energy security is national security*", while the IEA has called for the same spirit of international cooperation and focus that first emerged in response to the 1973 oil shock.

THE ENERGY TRILEMMA: COST, EMISSIONS AND SECURITY

Energy policy in the UK, and to a large extent elsewhere, has been driven by three aims: reduce cost, reduce carbon emissions and increase energy security. Unfortunately, each of the three policy aims can impact the other two in a potentially negative way.

Ensuring that all aspects of the energy industry be as low cost as possible, has tended to see a desire to increase the use of fossil fuels (gas in the UK) which works against low carbon and, at least as far as gas is concerned, against security, given the reliance on imported gas as UK continental shelf production declines. Increasing energy security requires the use of domestic energy resources, which could mean increasing (or restarting) coal and increasing wind power and solar, depending on the prevailing domestic resources. This works against the low-carbon objective in the case of coal and, in the case of wind and solar, increases costs. Driving ambitious action on climate change at home means a commitment to more expensive types of generating solution, namely, renewables, which although cheaper at source, require increased grid expenditure. The most viable of these, onshore and offshore wind and solar, suffer from intermittent operation, which until longer-term storage is delivered at scale, does not deliver security of supply and can also drive-up system costs. This tripartite clash is known as the energy trilemma.

A significant change recently has been a move away from a focus on decarbonisation in some key jurisdictions, notably the US, and a refocus on security. Additionally, energy affordability and the economic impact of climate policies have moved up the political agenda.

"The next Administration should use Treasury's tools and authority to promote investment in domestic energy, including oil and gas. It should reverse support for international public- (and private-) based efforts promoting Environmental, Social, and Governance and Principles for Responsible Investment, both of which have badly damaged U.S. energy security."

PROJECT 2025 MANDATE FOR LEADERSHIP

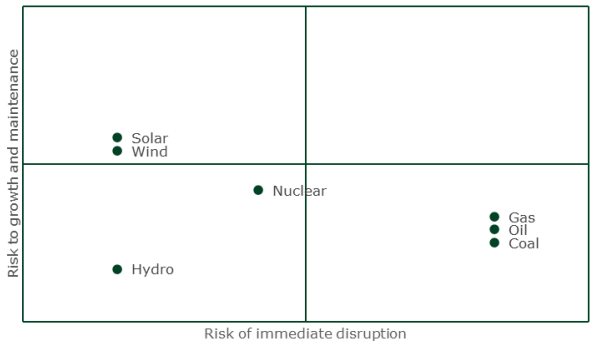
THE SWAPPING OF ONE IMPORT RISK FOR ANOTHER?

With the aim of strengthening its energy security, China launched into renewable energy technologies many years ago, later prioritising clean tech as an industrial strategy and forging forward with manufacturing capabilities.

The hostile approach to clean energy exhibited by the US Republican administration has seen China continue to take a growing lead in the supply of clean energy technologies. While the country appeared to take a rather passive role at COP30, President Xi Jinping has recently pushed for the country to promote a comprehensive green transition. China is already moving rapidly ahead in both the use and manufacture of solar PV, batteries and electric vehicles, leading to cost reductions in all three, with major export initiatives benefiting from the cost advantage created.

While Europe is resisting the import of cost competitive Chinese products, its response has so far been more nuanced than the US-driven trade war, and it is likely to continue to benefit from low-cost Chinese equipment. The UK has moved to benefit from Chinese wind turbine technology, with plans to accept a £1.5bn investment from Mingyang Smart Energy in turbine production in Scotland, although the UK government has just delayed taking a decision on the project. Australian think tank Climate Energy Finance has reported US$80bn in Chinese foreign investment in green power in the past year.

This potential swapping of the import of fossil fuels with the import of clean energy technologies changes the energy security risk. Where countries rely on external sources of fossil fuels, they can have their energy supply cut off immediately. Where they are reliant on clean energy technologies, the flow of energy from assets already imported cannot be cut off, provided cyber sabotage is ruled out and there is sufficient access to spare parts to cover maintenance, technical and storm-related failure. The risk really only impacts replacement of plant coming to the end of its life, or otherwise failing, and the build out of new capacity to meet demand growth. This is a lower level of threat and in most cases, there is time for countries to access alternative sources of capacity rather than being held to ransom by any other country.



This risk map plots energy disruption risk from outside sources: illustrating the relative exposure of energy sources to immediate disruption compared to longer-term growth and maintenance challenges.

Source: Longspur Research

A RENEWED FOCUS ON NUCLEAR

Between these two extremes, nuclear offers something of a halfway house. Nuclear plants rely on fuel that will for most countries be imported (and processed and enriched abroad). However, refuelling is typically required only every 18 months, so there is a lot of visibility, and any supply threats can be addressed by alternative sourcing, processing and enrichment. With a renaissance in nuclear, driven by improved policy support in the US, UK and India amongst others, nuclear is seen as a reliable and secure source of energy and is, in particular, being targeted by those seeking to serve data centre demand.

Whilst multi-year construction schedules for large new nuclear plants are not uncommon, necessitating longer delivery times, by contrast new Small Modular Reactors (SMRs) offer the prospect of materially shorter construction periods. This is because they use factory fabrication and modular assembly, reducing on-site complexity and schedule risk. SMRs also have the potential for longer intervals between refuelling outages (often several years) due to higher fuel burnup, advanced core designs, and in some cases advanced fuel cycles. However, the first SMRs are not expected to enter commercial operation in Western markets until around 2028-30; thereafter SMRs are primed for significant worldwide growth.

GRIDS AND ELECTRICITY SECURITY

As electrification gathers pace and intermittent renewables increase their share of the energy mix, the resilience and flexibility of electricity systems, in particular grids, are coming under increasing focus. Grid investment is essential to support energy security, yet it lags behind generation investment and long wait times for connections are hindering projects. The UK is currently implementing significant reforms to its grid connection process to accelerate connections, in effect reducing the queue by nearly two thirds.

Grids need to modernise for the energy transition, with flexibility being paramount. They need to manage rising demand from electrification; more distributed and intermittent renewables generation; enable dispatchable generation when needed; cope with supply shortfalls and peak demand; and become smarter. Electricity security will need to rely on a portfolio of flexibility resources, including short and long-duration storage additions; demand-side response; digitalisation and AI-led efficiencies, alongside ongoing grid investment and modernisation. Improving energy efficiency to reduce demand will also remain a key priority in energy security strategies.

THE CHANGING ROLE OF GAS

Natural gas has traditionally played a pivotal role in energy policy, especially in Europe where dependence on Russian pipeline supplies has been a source of vulnerability, highlighted by the sabotage of the Nord Stream pipelines. The need for gas supply diversification after the 2022 energy crisis resulted in a number of response measures, including a ramping up of liquefied natural gas (LNG) imports and investment in LNG infrastructure. In the energy transition, gas-fired power generation is being positioned as a crucial cornerstone for electricity system stability and to meet peak demand. This will see a change in its role from offering a consistent baseload output to providing dispatchable generation that responds to the needs of the system.

VULNERABILITY IN SUPPLY CHAINS AND CRITICAL MINERALS

Supply chains for energy transition technologies and critical minerals have emerged as key energy security vulnerabilities. China dominates critical minerals processing, in addition to other clean tech global supply chains. The IEA has highlighted that China dominates refining for 19 out of 20 strategic energy minerals and has 94% of the production market for rare-earth-containing permanent magnets, used in cars, wind turbines, data centres and other industries. Critical minerals are essential for low-carbon energy technologies but are also vital to strategic industries beyond the energy transition, including to data centres and military and defence systems.

Recent export controls, such as those imposed by China on rare earth elements in 2025, exposed the vulnerability of global supply chains. The resulting supply disruption forced some US and European car manufacturers to cut production or temporarily shut down factories. To de-risk supply chains and secure supplies to meet increasing demand, there is a renewed focus on protectionism, increasing domestic capabilities, stockpiling and building supply chain alliances. The EU adopted the RESourceEU Action Plan in December 2025, aiming to accelerate critical mineral projects in the EU and partner with like-minded countries to diversify supply chains. The EU is also planning to increase recycling capabilities. The UK issued a new Critical Minerals Strategy in November, to strengthen its capabilities for mining, refining and recycling and to build a resilient supply network; and the US is taking action to accelerate domestic extraction and processing, investing in projects, and building reserves. As well as its strategic location, potential critical mineral resources make Greenland even more attractive to the US. In January 2026, the US convened a meeting with the G7 countries, the EU, Australia, Mexico, South Korea and India to discuss ways to reduce dependence on rare earths from China, exploring measures such as setting a price floor and new partnerships to build up alternative supplies.

RISING CYBERSECURITY RISK

A key security issue is the vulnerability of energy systems to cyber threats. There is a long history of computer attacks, going back to the creation of the malicious computer worm Stuxnet, considered the first state-sponsored cyberattack designed to sabotage industrial infrastructure. It was used to attack the Iranian nuclear programme by targeting Siemens SCADA (industrial control) systems and was thought to be part of a joint US-Israeli operation. Given the major real-time variance in demand and supply seen in the electricity industry, the use of sophisticated data processing, including agentic AI, has allowed significant efficiencies to be developed. Growth in smart meter usage and distributed energy resources (DER) drives demand for data and control solutions, and we are seeing major developments in these areas. However, this also brings major security risk. That includes perceived risk of attack through malware hidden in imported equipment.

CONSUMER RESILIENCE: SUPPLY AND PRICE

Traditionally, security concerns in developed countries have been focused on national policy, with individual energy consumers relying on governments and their agencies to manage energy supply securely. The importance of this can be seen whenever power is materially disrupted. As well as there being a cost to consumers and the economy, there is also a political cost. Where this is enough to bring down a government, you could say the value of lost load (VOLL) = 1 government. Some may recall the 1974 Conservative government losing its majority thanks to the three-day week when power was restricted.

Despite this, we are now seeing a greater focus amongst users on security of supply, especially in the growing data centre sector where the concept of “bring your own power” is gaining pace. The recent outage at data centre operator CME, caused by overheating, disrupted global futures markets using the company’s servers and has particularly focused commercial users on the need for security of supply.

To improve resilience in the event of price volatility shocks, corporate power purchase agreements can offer corporates longer-term price stability. Global corporate clean energy PPAs have seen a slump, with announced agreements in 2025 to end November at 37.2GW against 43.0GW at the same point in 2024 and 61.1GW for full year 2024. November saw the lowest demand since 2019. Notable was a lack of large deals in Australia and India. The US remained relatively flat and there was some growth in Europe. This is happening despite a rise in demand for secure energy supplies for new data centres. In part this is due to difficulties in securing grid connections for new data centres.

We note that the clean electricity industry has preferred long term PPAs locking in output at fixed prices, sometimes over the life of the generation assets and allowing project finance to be secured. This is at odds with the more traditional electricity industry approach of hedging output over a maximum of three years and with the oil industry which often relies on risk-taking intermediaries taking supplies on a spot basis.

EXTREME WEATHER AND INFRASTRUCTURE RISK

Energy security planning must also address the escalating threats to critical energy infrastructure from extreme temperatures, wildfires, storms, floods, and water availability. Weather-related incidents can damage assets and infrastructure, curtail outputs, and increase insurance costs or cause gaps in coverage. A new IEA dataset identifies nearly 300 disruptions of critical energy infrastructure in 2023 caused by extreme weather events, with around 85% of incidents affecting transmission and distribution grids. The IEA is investigating the resilience of energy assets and infrastructure to extreme weather, natural hazards and climate change and intends to issue a special report in 2026.

REFRAMING ENERGY SECURITY FOR THE TRANSITION

While the traditional energy security risks of supply disruption and price volatility remain acute, they are compounded by new threats, including grid constraints and electricity system weaknesses, supply chain fragility, cyber threats and more frequent extreme weather. Strategic responses need to address these risks simultaneously.

If you are interested in any of the topics discussed in this briefing, please do get in touch with any contributing author, or your usual contact at Longspur Capital or Stephenson Harwood.

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