

Energy Storage Supplement

China Construction Bank Global Green Finance Index 17

London

Singapore

Zurich

Amsterdam

Geneva

Paris

Luxembourg

Copenhagen

Frankfurt

Vienna

April 2026



Energy Storage – The Missing Piece Of The Net-Zero Puzzle

Background

Geopolitical events (as of April 2026) have seen extreme volatility in global crude oil prices. This volatility has led to spikes in energy costs which are impacting on the global economy. This impact will fall across all sectors, from transport and industry to food production, with some commentators predicting that the impacts could surpass those of the oil shocks of the 1970's¹.



Photo Of Kuwaiti Oil Well Fire, March 1991 By EdJF

The history of civilization is the history of energy use, from muscle and wood, through steam and coal, to oil and electrons.

In 1900, world electricity generation totalled about 66.4 terawatt-hours (TWh)², serving a population of around 1.6 billion people³ (although the vast majority did not have access to electrical power). In 2026, global energy generation exceeded 1,080 TWh⁴ serving a population of 8.3 billion, and whilst access to power is considered a basic necessity, today, nearly 4.6 billion people still do not have access to a sufficient level of energy to enable satisfactory human development (particularly in terms of health and education), whilst 730 million lack access to electricity entirely⁵.

¹ NIESR (Accessed 19.03.26) **Possible Effects on UK Inflation in 2026 of the US-Iran Conflict** <https://niesr.ac.uk/blog/possible-effects-uk-inflation-2026-us-iran-conflict#:~:text=The%20economic%20impact%20of%20the,shock%20of%20the%20early%201970s>

² Boston University (Accessed 20.03.26) **World Electricity Generation Since 1900** <https://visualizingenergy.org/world-electricity-generation-since-1900/>

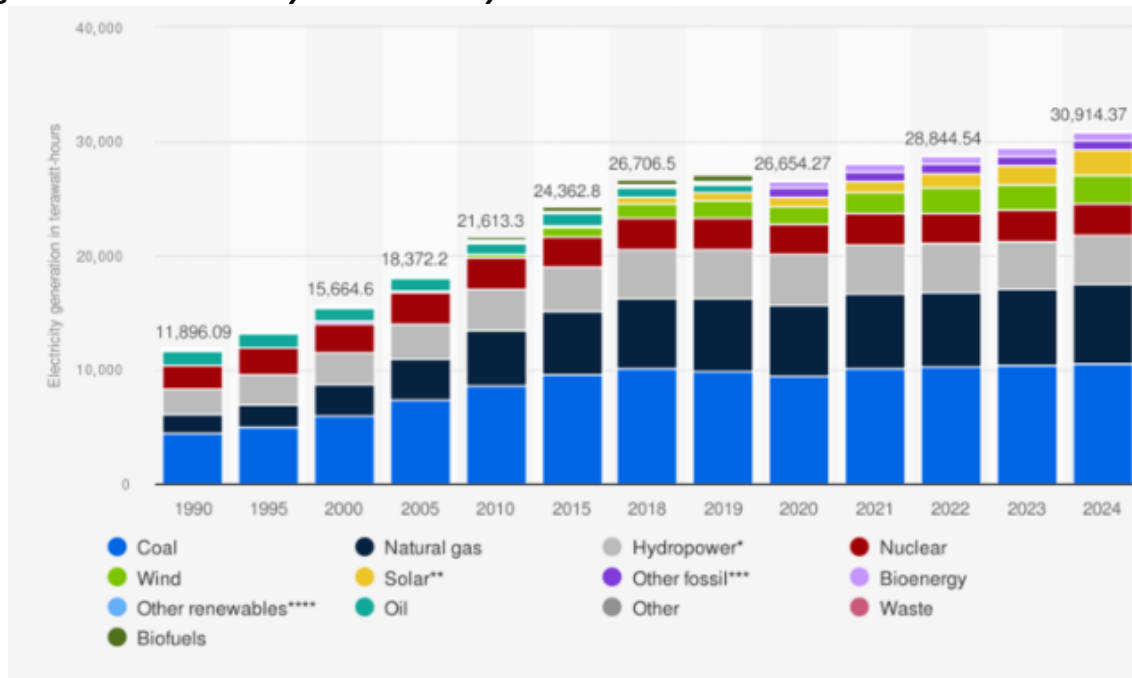
³ Worldometer (Accessed 19.03.26) **World Population By Year** <https://www.worldometers.info/world-population/world-population-by-year/>

⁴ IEA 2026 **Global Energy Review 2025** <https://www.iea.org/reports/global-energy-review-2025/global-trends>

⁵ IEA 2026 (Accessed 20.03.26) **Access To Electricity Stagnates, Leaving Globally 730 Million In The Dark** <https://www.iea.org/commentaries/access-to-electricity-stagnates-leaving-globally-730-million-in-the-dark>

Global electricity demand surged by 4.4% in 2024⁶, well above the 3.2% growth in global GDP⁷. The surge was driven by climate change-related record temperatures, as well as the march of electrification and digitalisation, but for the first time, renewable energy outpaced fossil fuels⁸ meeting 83% of the global increase in electricity demand.

Figure 1 World Electricity Generation By Source 1900-2024



Source: Statista

Globally low carbon energy sources (renewables and nuclear) provided 40.9% of the world's electricity generation, with projections that low carbon sources will overtake fossil fuels as a source of energy generation by the end of 2026⁶. Economically, and from an energy security perspective, it is highly likely that this acceleration will continue apace as countries seek to insulate their economies from events outside of their control.

Furthermore, the rapid growth of AI is fundamentally altering energy demand patterns, as data centres for AI training and inference can consume as much power as a small city. Global data centre electricity consumption is projected to double by 2030, reaching approximately

⁶ IEA 2025 Electricity Mid-Year Update 2025 <https://www.iea.org/reports/electricity-mid-year-update-2025/demand-global-electricity-use-to-grow-strongly-in-2025-and-2026>

⁷ IMF (Accessed 03.04.2026)

https://www.imf.org/external/datamapper/NGDP_RPCH@WEO/OEMDC/ADVEC/WEOWORLD

⁸ Ember 2025 **Global Electricity Mid-Year Insights 2025** <https://ember-energy.org/latest-insights/global-electricity-mid-year-insights-2025/>

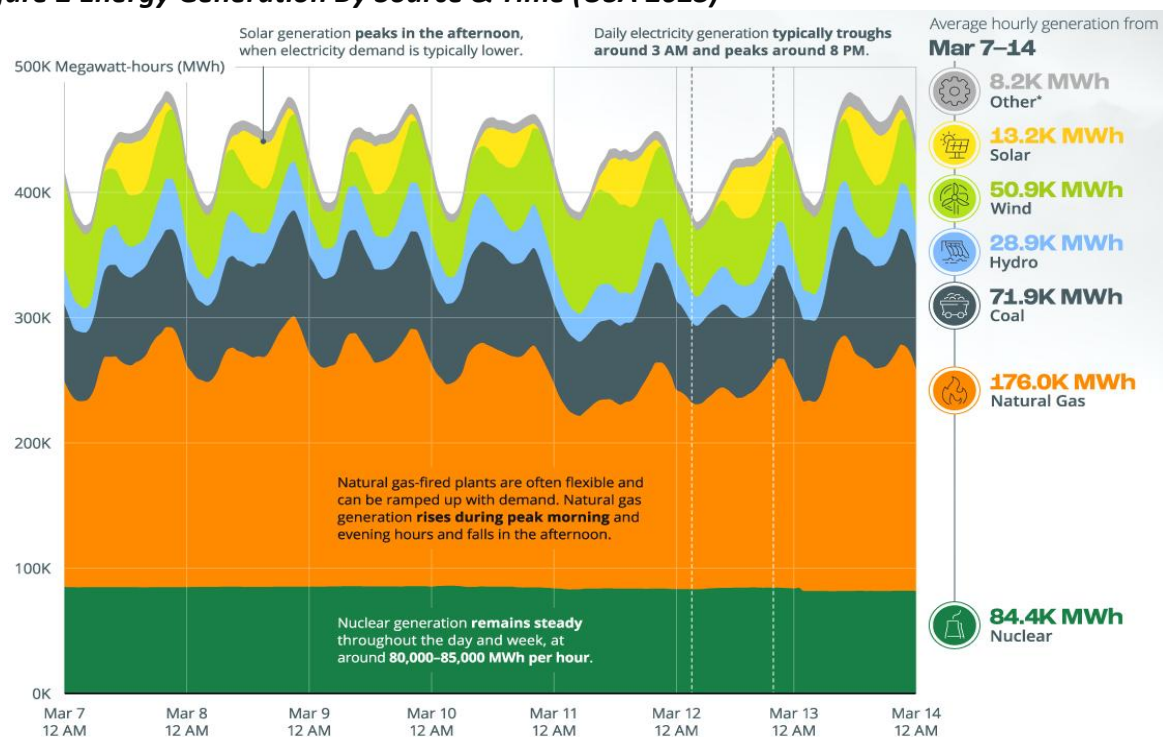
3% of global demand⁹ - data centres could account for 32% of Ireland's electricity usage by late 2026 leading to local moratoria on new builds unless paired with on-site generation¹⁰.

The Challenge

The problem with using renewables to power national grids, is that traditional grids are legacy infrastructure which were designed for centralised power generation from coal and gas. These can provide base load and dispatchable generation (sources of electricity that can be programmed on demand at the request of power grid operators).

Renewable energy generation is intermittent and unpredictable, dependent on weather conditions and time of day¹¹. This can lead to a supply-demand mismatch: Peak generation for renewables (e.g., midday sun) often does not align with peak demand (e.g., evening heating and lighting).

Figure 2 Energy Generation By Source & Time (USA 2023)



Source: Decarbonisation Channel

⁹ IEA 2025 **Energy Demand From AI** <https://www.iea.org/reports/energy-and-ai/energy-demand-from-ai>

¹⁰ KPMG (Accessed 21.03.26) **Ireland's Data Centre Policy Reset** <https://kpmg.com/ie/en/insights/energy-utilities-telecoms/irelands-data-centre-policy-reset.html>

¹¹ Pommeret A & Schubert K **2022 Optimal energy transition with variable and intermittent renewable electricity generation** Journal of Economic Dynamics and Control Volume 134, January 2022, 104273 <https://www.sciencedirect.com/science/article/abs/pii/S0165188921002086>

Furthermore, traditional rotating turbines (such as those in fossil fuel power stations or hydro-electric plants) provide "inertia" that naturally stabilises grid frequency. Renewables often use inverters that do not provide this, making the grid more sensitive to sudden disturbances and potentially prone to blackouts, whilst the stochastic nature of renewables output (e.g., gusts of wind or clouds changing generation rates) can lead to voltage instability, which can damage electrical equipment if not carefully managed.

Finally, while fossil fuel power stations were originally sited in response to demand, and as such tend to be in proximity to large population centres, renewable projects are often in remote locations (e.g., offshore wind), straining existing networks, which already suffer significant (up to 9%) transmission losses¹². Many grids lack the capacity to handle new projects; in the UK, some renewable sites face wait times of 10 to 15 years to connect¹³.

Upgrading grids to handle renewables requires massive investment in new pylons, cables, and substations as well as the integration of smart technologies. A key requirement of this upgrade is going to be large scale investment in energy storage technologies.

Energy Storage Technologies

- **Batteries:** Lithium Iron Phosphate (LFP) is the most common technology, with several firms repurposing used electric vehicle batteries to form energy storage arrays (see [Redwood Energy](#), [Connected Energy](#) and [Powervault](#)). Advances in solid-state batteries (which replaces the liquid or gel electrolyte in conventional lithium-ion batteries with a solid material, such as ceramic, glass, or sulfide) offer significantly higher energy density, improved safety, and longer lifespans although this technology is still in its infancy and it will take a while for costs to come down.

Cheaper alternatives to lithium such as Sodium-Ion¹⁴, Nickel-Manganese-Cobalt, and Iron-Air Batteries¹⁵ are also emerging as potential mass energy storage technologies.

¹² UKPN (Accessed 21.03.26) **Distribution Network Energy Losses**

<https://www.ukpowernetworks.co.uk/distribution-network-energy-losses>

¹³ Department for Energy Security and Net Zero 2025 **Clean Energy Projects Prioritised For Grid**

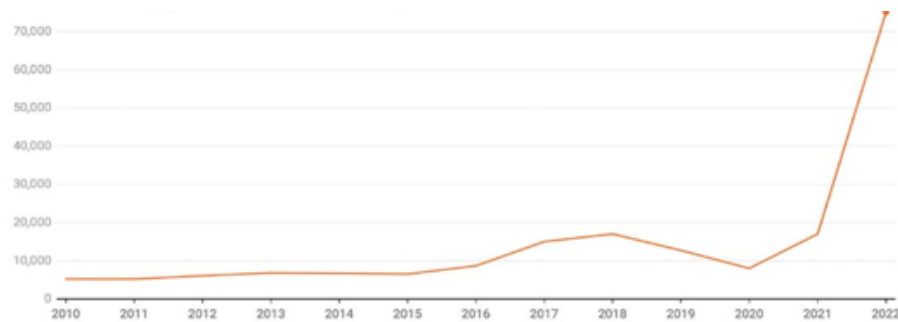
Connections <https://www.gov.uk/government/news/clean-energy-projects-prioritised-for-grid-connections#:~:text=So%2Dcalled%20'zombie'%20projects,the%20government's%20Plan%20for%20C>
[hange](#)

¹⁴ Iberdrola (Accessed 22.03.26) **Sodium-ion batteries: the revolution in renewable energy storage**

<https://www.iberdrola.com/sustainability/environment/energy-efficiency/sodium-ion-batteries>

¹⁵ Form Energy (Accessed 22.03.26) **Battery Technology** <https://formenergy.com/technology/battery-technology/>

Figure 3 Price Of Battery Grade Lithium Carbonate USD/Tonne



Source US Geological Survey

- **Pumped Hydro:** This remains the largest source of global storage capacity (approx. 160 GW¹⁶), primarily used for long-duration daily balancing. [Dinorwig](#) power station in Wales is an excellent example of this type of instillation. However, pumped hydro is expensive and suffers geographical constraints.
- **Compressed Gas Storage:** There are several ways of doing this:
 - **Liquid Air Energy Storage (LAES)** is a long duration energy storage technology that uses surplus power to liquify air at -194°C; when demand peaks, the air is expanded to drive turbines. [The Carrington facility](#), which is currently under construction at Trafford Energy Park will be the world's largest example of this technology.
 - **CO₂ Batteries** use excess energy from the local grid (such as that supplied by solar power) to compress and liquify carbon dioxide, storing it in steel tanks. When baseline power is needed, the CO₂ is decompressed and used to run turbines. The CO₂ is kept within a closed loop system and stored in low pressure containers when not in use. A large scale [demonstration project](#) is currently operating in Sardinia.

One of the principal advantages of this technology is that carbon dioxide liquefies under high pressure at ambient temperature (unlike air). The principal disadvantage is the significant scale of the plant and associated storage.

¹⁶ IEA (Accessed 22.03.26) **Grid-scale Storage** <https://www.iea.org/energy-system/electricity/grid-scale-storage>



EnergyDome CO₂ Battery, Sardinia

- **Thermal Storage:** This utilises materials like molten salts, phase change materials, reversible chemical reactions, or solids such as [sand](#) or concrete to store excess renewable energy as heat for later electricity generation or industrial use. However, although this energy can be converted heat back to electricity, its most efficient use is in the utilisation of that heat for industrial or domestic purposes.
- **Gravity Energy Storage:** This uses the potential energy gained by raising heavy loads during surplus generation periods, to power generators by lowering these loads when the energy is required. A demonstrator project was connected to the Swiss grid by [Energy Vault](#) in 2020, but a large scale project has yet to materialise. Scotland-headquartered energy storage company Gravitricity which planned to use disused mineshafts to store potential energy, entered administration in October 2025¹⁷.

The Current Economic & Regulatory Landscapes

One of the most significant issues facing deregulated electricity markets, such as that of the UK, is that the "baseload market" has largely disappeared or become obsolete because electricity markets have shifted from prioritising constant, inflexible generation to rewarding flexibility and low marginal costs. Although the need for baseload remains, legacy infrastructure, such as coal and nuclear plants, is increasingly becoming uneconomic due to competition from renewables.

¹⁷ Green M 2026 **Gravitricity wound up voluntarily with under £8k assets**
<https://www.solarpowerportal.co.uk/energy-storage/gravitricity-wound-up-voluntarily-with-under-8k-assets>

Solar and wind have near-zero fuel costs, and extremely low maintenance costs. When these sources are available, they frequently generate enough power to drive market prices near zero, forcing inflexible "baseload" plants to either pay to operate or shut down, losing money in either scenario.

Modern grids need resources that can ramp up and down quickly (flexible generation) to follow the fast-changing supply from solar/wind and demand fluctuations. Traditional baseload plants (coal/nuclear) are designed to run at full output constantly and cannot adapt quickly, making them unsuitable for modern grid requirements. Baseload plants have high capital expenditure requirements and, as their operating hours are displaced by cheaper renewables, they cannot generate enough revenue to repay their construction costs, making them risky investments.

This risk is compounded as grids often use a merit order system where only the price at the time of delivery matters. In this system, low-cost renewable generators win most auctions, breaking the traditional business model where "baseload" suppliers could guarantee a steady, profitable supply.

However, the low cost of renewables does not mean that consumers receive cheap electricity. Electricity generators bid into the system, starting with the cheapest sources and moving upward until demand is met. The price paid to all generators is then the price offered by the final generator required to meet demand, which in near enough 97% of cases in the UK in the last year was a gas-fired power station¹⁸. This is because gas power stations are currently critical to the running of a grid due to the supply-demand mismatch described in an earlier section.

Around the world policy makers are waking up to this issue:

- **China:** Remains the global leader in energy storage, accounting for over 50% of annual installations in 2025¹⁹. Policies are heavily driven by mandatory renewable-storage coupling at the provincial level and strong government targets, such as achieving 40GW+ of battery storage by end-2025.
- **United States:** The 2022 Inflation Reduction Act (IRA) continues to be the primary driver, offering investment tax credits (ITC) for stand-alone storage, which fuelled a

¹⁸ Murphy R 2026 *Why gas sets the price of electricity, and why the economics behind it makes no sense* <https://www.taxresearch.org.uk/Blog/2026/03/17/why-gas-sets-the-price-of-electricity-and-why-the-economics-behind-it-makes-no-sense/>

¹⁹ Darmani A & Weis A 2026 *Global energy storage market surpasses 100 GW annual installation milestone in 2025* <https://www.woodmac.com/news/opinion/global-energy-storage-market-surpasses-100-gw-annual-installation-milestone-in-2025/>

53% surge in 2025²⁰. Despite potential policy headwinds, large-scale projects remain strong, supported by state-level mandates and grid-firming requirements.

- **European Union:** Focuses on the "Fit for 55" package and the Electricity Market Design reform. The EU Battery Regulation (2026-2027) introduces strict sustainability, carbon footprint, and recycling requirements ("battery passport"). Germany is leading in distributed storage, supported by high retail tariffs, while Spain is pushing aggressive targets of 22.5 GW by 2030²¹.
- **United Kingdom:** Is focusing on long-duration energy storage (LDES) with a new cap-and-floor mechanism set to start in 2025–2026 to encourage investment²².
- **Australia:** Driven by the Capacity Investment Scheme (CIS)²³ and successful state-level auctions, with high growth in large-scale storage to replace aging coal capacity.

What More Can Be Done To Encourage Investment?

There are a number of steps that policy makers can take to encourage investment in energy storage projects. These include:

1. Market and Regulatory Reforms

- **Implementing Revenue Stability Mechanisms:** Introducing "cap and floor" schemes to provide a revenue floor for developers (e.g., in long-duration storage), ensuring bankability while allowing taxpayers to share in high profits.
- **Removing Double Taxation:** Abolishing inconsistencies in grid tariffs that treat storage as both a generator and a consumer, which results in double taxation that affects the attractiveness of project economics.

²⁰ Ford N 2026 **Battery storage outlook boosted by thirst for firm power** <https://www.reuters.com/business/energy/battery-storage-outlook-boosted-by-thirst-firm-power--reeii-2026-02-03/>

²¹ Energy Storage Europe (Accessed 23.03.26) **Market Analyses** <https://energystorageeurope.eu/publications/market-analyses/>

²² Clean Growth Fund 2025 (Accessed 23.03.26) **Emerging Opportunities for UK Long Duration Energy Storage** [https://www.cleangrowthfund.com/news/emerging-opportunities-for-uk-long-duration-energy-storage/#:~:text=The%20role%20for%20LDES%20in,decarbonise%20overall%20operations%20\(4\).](https://www.cleangrowthfund.com/news/emerging-opportunities-for-uk-long-duration-energy-storage/#:~:text=The%20role%20for%20LDES%20in,decarbonise%20overall%20operations%20(4).)

²³ Australian Government 2025 **Capacity Investment Scheme** <https://www.dcceew.gov.au/energy/renewable/capacity-investment-scheme>

- **Reforming Market Rules (Addressing "Skip Rates"):** Updating grid balancing rules to prioritise battery usage over traditional fossil fuel generators, reducing "skip rates" - where batteries are passed over for dispatch.
- **Redefining Storage In Regulation:** Formally defining energy storage as a unique asset class - distinct from generation or consumption - to allow proper, simplified network fees and faster permitting.
- **Valuing "Flexibility" In Markets:** Shifting market designs away from purely energy-based compensation toward rewarding speed of response, duration, and reliability, essential for high-renewable grids.

2. Financial Incentives and Risk Mitigation

- **De-risking Investments:** Using government guarantees, carbon contracts for difference (CCfDs), or public-private partnerships (e.g., using multilateral banks in emerging markets) to crowd in private capital.
- **Incentivising Long-Duration Energy Storage (LDES):** Specifically funding LDES technologies (pumped hydro, flow batteries, compressed air) to meet the demand for multi-day storage, as lithium-ion is less suitable for this role.
- **Tax Credit Transferability:** Enabling the transferability of investment tax credits (like those in the US Inflation Reduction Act) to allow developers to monetise incentives faster and reduce project risk.
- **Supporting Behind-the-Meter (BTM) Storage:** Offering rebates, grants, or tax incentives for residential and commercial battery systems to reduce upfront costs for businesses and homes.

3. Infrastructure and Technology Upgrades

- **Streamlining Grid Connections:** Reducing the "gridlock" and long queue times for connecting new storage projects, which currently ties up capital and limits deployment.
- **Accelerating Digitalisation and Smart Grid Integration:** Using materials technology, AI, and digital tools for optimised storage trading, reduced transmission loss, real-time grid monitoring, and AI-driven bidding to maximize revenue stacking (using batteries for ancillary, capacity, and arbitrage simultaneously).
- **Supporting Battery "Second-Life Initiatives":** Creating policies that simplify and reward the repurposing of electric vehicle (EV) batteries for grid-scale storage, reducing waste and material costs.

- **Diversifying Storage Technologies:** Encouraging R&D in alternative chemistries (e.g., LFP, solid-state, iron-chromium) to avoid over-reliance on a single supply chain. Encouraging the development of non-stochastic renewable technologies such as tidal power.

4. Strategic Planning and Public Engagement

- **Anticipatory Grid Planning:** Transition from reactive grid upgrades to forward-looking planning that integrates storage as a non-wire alternative to costly transmission expansion.

By implementing these measures, policymakers can accelerate the transition from the around 85 GW of global battery capacity in 2023 to the roughly 1,200 GW required by 2030 to meet net-zero goals.

The Role Of Financial Centres

Financial centres can encourage and accelerate the growth of the power storage sector in a number of ways:

- They can lobby Policy Makers and lead multi-stakeholder groups to develop strategies for electricity market regulatory reforms as well as assisting in the development of regulatory roadmaps.
- They can raise awareness of the importance of the sector with respect to green transition dynamics, both domestically and internationally.
- They can support the development of new financial instruments, such as performance-related green bonds which can assist governments in investing in grid infrastructure.
- Finally, as significant electricity users in and of themselves - data centres and AI are playing an increasingly important role in financial services - they can lead by example and encourage the building of on-site energy storage for data centres and server farms within their jurisdiction.

Conclusions

Energy storage is the missing piece of the jigsaw in the energy transition, allowing the decoupling of national grids from fossil fuel energy sources. The rapid speed of technological development, the economics of renewable energy, and pressure from an increasingly unstable geo-political environment means that governments are likely to invest heavily in energy storage infrastructure over the next decade. Financial centres, as respected, politically neutral bodies are in the perfect position to assist in this field.