

Institution of

Power Engineers

2026 Power Generation Technologies Conference

Power Technologies for a Sustainable Future

02nd November – Afternoon Workshop

03rd and 04th November – Conference

Hilton Hotel East Midlands Airport



ABOUT THE IPOWEE CONFERENCE

Following on from the IPowerE's successful 2024 Power Technologies conference this conference continues to offer a broad selection of genres and topics, offering a unique opportunity to listen to industry experts describe the latest developments in power generation, storage and grid stability. It will consider the engineering, technology and application of these key elements for future sustainable power generation.

THE BACKGROUND

It is accepted that the energy mix and energy networks will need to adapt to a more sustainable future. Projects developed today will be required to suit the future energy needs, with innovation in power technologies a key factor in successfully adapting to sustainability. Greater deployment of the latest technologies delivers greater grid stability, lower carbon intensity and meeting the future energy needs.

This IPowerE conference provides an opportunity to hear and discuss the latest developments in power generation technologies that are intended to meet the need for a sustainable future, covering established conventional technologies and innovative solutions, set in the context of design, operation, development, and project execution with papers from key participants in the energy sector. The conference will also seek to identify further trends and market differentiation, which may drive future developments comparing the technology developments with the experience and needs of operators for existing plants and future investments.

This will be explored throughout the conference through an interactive workshop and world-class conference presentations. Presenters will share their experience and case studies relating to the future energy mix, and provide the ideal forum for networking. If you or your company has an interest the energy industry challenges and innovations, then this is the place to be this November. Register as a delegate and join with others in the industry for this unique and prestigious event.

CONFERENCE WORKSHOP

Monday 02nd November

13.00 Registration

13.30 Workshop

Workshop theme and timings to be confirmed.

16.30 Close

08:30 Exhibition Open

09:15 Welcome

**09:30 Keynote Address: *Dr Anna Ferguson, Blake Clough Consulting*
*The Changing Grid: My View of Two Decades of Transformation***

This keynote speech will take a canter through the development of Britain's electricity networks over the past couple of decades: the growth of renewable generation and grid decarbonisation alongside demand growth from electrification. Long-awaited island connections, changing industry structures and emerging competition in transmission ownership is another interesting aspect to the changing Grid.

The keynote will consider how engineering, policy and industry have responded, what has enabled this major decarbonisation success, the technical challenges it has created, and what the experience may tell us about the next phase of network development.

10:10 Paper 1 INNIO Jenbacher
How Gas Power Plants and Heat Pumps Complement Each Other

INNIO Jenbacher supply major equipment for gas-fired power plants that play an important role in this transition period, but the requirements for these dispatchable gas power plants will change significantly, running more seasonally and flexibly whilst also providing grid services. They can also be configured as combined-heat-and-power (CHP) plants. With the electrification of the heating sector resulting in the increased use of heat pumps this presentation will discuss the role of gas power plants and illustrate how gas power plants and heat pumps can complement each other.

10:50 Coffee/ tea break

11:10 Paper 2 Frazer Nash - Application of the ISO 21789 dilution ventilation basis to hydrogen-blended fuels in gas turbine enclosures: a case study

Using hydrogen-blended fuels in gas turbines is a future option for low-carbon power generation. A key safety requirement for mitigation of explosion potential from a gas leak inside gas turbine enclosures uses dilution ventilation as outlined in the well-defined standard ISO 21789. Design analysis includes the uses CFD to investigate the dispersion and mixing behaviour of gas leaks as the concentration of hydrogen increases in a fuel. This analysis highlights the changes associated with the increased buoyancy of the fuel blend, the interaction with the ventilation flow field, and how this may change depending on the leak type considered. It shows that the detection strategy for the enclosure considered in this case study meets the required standard with minimal updates for up to 35% hydrogen (by volume). The work demonstrates the robustness of current enclosure safety concepts for hydrogen-blended fuels and identifies key leak and ventilation characteristics that influence safety as hydrogen content increases.

11:50 Paper 3 Nuclear Institute - Nuclear Industry Policy Overview

This will provide the Nuclear Institute's view of current UK Nuclear policy and its future direction.

12:30 Lunch

13:30 Paper 4 Siemens Energy- Power Technologies for a Sustainable Future: Compressed Air Energy Storage (CAES)

The decarbonisation of the power grids and industrial processes requires the extensive addition of intermittent renewable generation. When the renewable generation gets significantly higher than the demand, this green excess power must be stored to enable a continuous supply of carbon emission free energy during times of low wind and/ or solar energy. While short term demand might be covered already today with Li-Ion battery systems, the technologies for longer duration energy storage (LDES) with capacities of several hours are still under evaluation, but essential for a successful energy transition.

Siemens Energy is offering Compressed Air Energy Storage (CAES), a low risk, high impact, readily available solution with a significant lower footprint (compared to Li-Ion Battery Storage, BESS, and Pumped Hydro Storage, PHS) and without any harmful materials (compared to BESS). The solution supports both the capacity and balancing market as well as the ancillary service market. However, visibility and importance of LDES and especially CAES is missing.

The presentation will provide an overview of the current landscape and activities in

Europe and worldwide as well as the capabilities of a Compressed Air Energy Storage plant for the grid.

14:10 Paper 5 Invinity - Energy Storage Without Limits: Showcasing Vanadium Flow Batteries

As global energy systems increasingly deploy low-cost, low carbon wind and solar generation, long-duration, high-throughput energy storage has quickly become an essential component in our broader energy ecosystem.

Headquartered in the UK, Invinity is the leading global manufacturer of Vanadium Flow Batteries (VFBs). Offering unlimited cycling, zero fire risk and 30+ year service life, Invinity's VFBs help unlock the power of renewable energy, reducing curtailment at key bottlenecks and driving down electricity bills for our homes and businesses by unlocking home-grown, low-cost renewable energy on demand.

This presentation will outline the key characteristics of Invinity's technology and the Company's global engineering and manufacturing capabilities before presenting a number of case study projects deployed in the UK, Europe and globally.

14:50 Coffee/ tea break

15:10 Paper 6 WSP - The Mindset shift from project document production toward design validation and optimisation using AI.

UK energy infrastructure developers face compounding commercial pressures: a fragmented consulting market with inconsistent cost models, CfD strike price

exposure, long-lead equipment cost escalation, stretched manufacturing capacity, and planning and regulatory complexity that persists well into project execution. These pressures combine to increase investment uncertainty and erode the contingency that projects depend on. A partial response to cost challenges within the engineering industry is offshoring, but this option is largely exhausted. We need a fundamentally different approach to engineering delivery and optimisation.

This paper examines how AI can accelerate and optimise energy infrastructure design in power projects without compromising the standards compliance and professional accountability that grid interconnection and safety-critical delivery require. Drawing on EPC project experience across the energy sector, including renewables, CCGT, and grid substation applications, the paper addresses three questions: where in the FEED and detailed design workflow does AI deliver the greatest acceleration, framed as "AI doing, engineers reviewing"; how chartered engineers maintain governance and accountability over AI-generated design outputs within responsible AI frameworks; and how the engineering deliverable workflow must be fundamentally reimagined to deliver optimised designs faster. Deliverables becoming expressions of a data-centric process, drawing on information management principles in an engineering design environment.

15:50 Paper 7 Willis Tower Watson - Challenges facing the Insurers of Power Generators

The global insurance market for power generation plants is navigating a complex landscape shaped by the green energy transition, severe climate trends, and evolving infrastructure needs. Insurers are currently facing several key challenges, including extreme weather and natural catastrophes, the underwriting of "unproven" and nascent technologies, supply chain volatility and cost inflation, Grid constraints and infrastructure strain, cyber security vulnerabilities and shifting market capacity and premium volumes.

16:30 Expert Session All Day 1 Speakers

A session with all day 1 presenters responding to audience questions or key themes covered during the conference.

17:30 Chairman's Summary

18:00 Networking Drinks

19:00 Conference Dinner

CONFERENCE - Day 2 Wednesday 04th November

08:30 Exhibition Open

08:55 Institution Welcome – Day 2 Chairman

09:00 Paper 8 CDA Energy Services - CCS: Post Capture Value Chain Overview

Recent UK focus on (CCS) has been on very location specific emitter-to-store pipeline connected projects, resulting in £21.7Bn of funding being allocated to just two carbon stores, Hynet and Northern Endurance (NEP) and, initially,

three emitter sites. The "Regulated" approach taken has led to high Government support costs, as government is required to make certain balance sheet provisions to cover the risks the "Regulated" approach has meant it needs to carry.

Non-Pipeline Transportation (NPT) delivers significantly more VfM, is highly competitive with pipeline solutions, opens up the opportunity for wider industry to decarbonise across the UK, and enables CO₂ imports, significantly reducing the cost of CCS to the UK taxpayer. VfM is best realised by increasing the breadth of eligible projects, including new competitive less- or non-regulated merchant stores, hubs, and ships, which will deliver system resilience and reduce reliance on Government cross-chain protections.

The ability to import CO₂ from the EU also means revenues come into the UK rather than CCS being limited to an internal UK only "washing machine" of funding. This paper and presentation will explain the full NPT value chain and discuss how NPT mitigates cross chain risk.

09:40 Paper 9 GE Vernova - Optimizing Carbon Capture for CCGT Plants through Exhaust Gas Recirculation

The integration of Exhaust Gas Recirculation (EGR) represents a critical technological advancement in the deployment of Post-Combustion Carbon Capture (PCC) for Combined Cycle Gas Turbine (CCGT) power plants. By recirculating a portion of the exhaust gas back into the gas turbine intake, the concentration of CO₂ in the flue gas is significantly increased, and the total volumetric flow rate is reduced.

This shift in flue gas composition provides three primary engineering and economic advantages: Optimized plant footprint, Reduced capital expenditure and operational expenditure and improved overall performance.

10:20 Coffee/ tea break

10:40 Paper 10 RWE - Moerdijk H₂ Conversion: Technical Feasibility Proven – Now to Unlock the Value Chain

RWE will present an introduction into a H₂ retrofit projects at a facility in the Netherlands. It will detail the currently available technology, the retrofit work required and the wider value chain and policy moves that are required to bring the projects to fruition.

11:20 Paper 11 Greenfire Solutions - Designing Battery Storage Power Schemes That Are Consent-Ready

Modern energy-storage projects often stall not because the technology is unproven, but because early-stage designs and evidence do not fully satisfy the fire, safety and environmental expectations of planning authorities, regulators and fire services. Independent technical review at high-level design can provide the bridge between ambitious project concepts and the assurance demanded by planners, investors and communities.

Drawing on Greenfire Solutions' experience with grid-connected infrastructure, including large battery energy storage, transformers and associated plant, this presentation explores what "consent-ready" looks like in practice. Using UK

case examples, framed so that the lessons apply across different national planning and regulatory regimes, it will show how clear design intent, transparent assumptions and proportionate application of guidance can prevent common gaps in submissions.

The session will set out practical principles for aligning design information with the expectations of planners, fire authorities and other reviewers, while keeping schemes flexible enough to support innovation and future development. It provides a concise framework for helping engineers, developers and reviewers work together so that independent assurance accelerates, rather than delays, innovative power schemes.

12:30 Lunch

13:30 Paper 12 Blake Clough Consulting - Project-Level Queue Analysis Under GB Connections Reform: Methodology and Applications for Solar, Onshore Wind and BESS

The introduction of Connections Reform (TMO4+) marks a fundamental shift in how electricity network access is allocated in Great Britain, moving from a first-come, first-served queue to a framework based on project readiness and alignment with Clean Power 2030.

This paper presents a data-driven assessment of Connections Reform, supported by a structured extract–transform–load (ETL) pipeline integrating grid connections datasets across transmission and distribution networks, alongside public and third-party planning data. A framework of system-level indicators is used to evaluate impacts on queue-composition, technology distribution, and capacity targets.

Using aggregated and indexed analysis, our work identifies key trends emerging from TMO4+. These include differences in how technologies interact with capacity targets, with energy storage projects exhibiting persistent saturation in many areas, while renewable generation technologies such as solar and onshore wind display more regionally varied outcomes. The analysis also highlights the role of attrition, substitution, and application timing in shaping future access to network capacity.

The results demonstrate that Connections Reform is influencing not only the ordering of projects within the queue, but also broader dynamics of project development, investment decision-making, and spatial distribution of capacity. These effects have important implications for renewable integration and long-term system planning.

14:10 Expert Session All Day 2 Speakers

A session with all day 2 presenters responding to audience questions or key themes covered during the conference.

16:30 Chairman's summary and conference closing remarks

16:45 Conference Close

CONFERENCE PRICE

Early Bird prices end 30th September

Delegate	£650 + VAT	<i>Early Bird</i> £600 + VAT
IPowerE Member Delegate	£570 + VAT	<i>Early Bird</i> £520 + VAT
Young Engineer	£350 + VAT	Student £180 + VAT

BOOKING

To book from our website go to <https://ipowere.org/ipowere-power-conference/>
email enquiries@ipowere.org or call Amanda or Rachel on 01234 214340.

ACCOMMODATION

Hotel accommodation is available onsite at the Hilton East Midlands Airport Hotel, Derby DE74 2YZ. Please book direct by phoning Hilton Hotel Reservations on 01509 674 000 or emailing the reservations team at: emahn_frontoffice@hilton.com, quoting 'Institution of Power Engineers'- prices for a standard room are £142.00 B&B per night.

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