Newsletter

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ETN Global is a non-profit association bringing together the entire value chain of the gas turbine technology community. Through cooperative efforts and by initiating common activities and projects, ETN Global encourages and facilitates information exchange and cooperation to accelerate research, development, demonstration, and deployment of safe, secure and affordable carbon-neutral energy solutions.

IN THIS ISSUE

Christer Björkqvist
Managing Director,
ETN Global

Coordination and collaboration: Crucial for our industry in today's market

As another intense and successful quarter comes to a close, we are pleased to share recent developments and get you ready for what lies ahead. The past few months have been action-packed, following a highly productive Annual General Meeting at the end of the first quarter. Since then, we have focused on following up on AGM decisions, launching agreed working group activities, and advancing our two industry-funded projects: GT enclosure for H_2 fuel and high-temperature alloys for turbine blade applications, which are set to begin in the coming months.

In early June, ETN Global successfully hosted its largest-ever LM2500 User Meeting. With no fewer than 560 engines represented by the users around the table, it was an impressive gathering, providing a valuable platform for exploring ways to overcome supply chain constraints through coordination and collaboration. The event also included an insightful visit to Score Group's impressive service and testing facilities.

We then participated to ASME Turbo Expo in Memphis, US, where those who made the long journey (22 hours in my case) benefited from a rich programme of keynotes, panels, tutorials, and technical sessions. ETN Global led three panel discussions: Customer's Voice, OEM Pathways Forward, and Micro-Gas Turbine Markets and Technology Developments. These sessions offered insights into evolving US user needs and OEM strategies, while participants also gained valuable perspectives on the booming AI sector. It became clear that data centres are at the forefront of rising energy demand, contributing to unprecedented lead times of up to 5–7 years for gas turbine purchases.

This growing demand for reliable power further highlights the urgent need to strengthen grid resilience, as clearly illustrated by the recent widespread blackout in Spain and Portugal. The incident underscored the critical role of fast-starting, flexible, and dispatchable power solutions in stabilising an increasingly variable energy system, a point already emphasised in ETN Global's White Paper, *The Critical Role of Dispatchable Power Generation*. We are now actively engaging with policymakers to ensure these insights are reflected in tangible regulatory frameworks that prioritise system stability and security of supply throughout the decarbonisation transition.

Looking ahead, we are excited to continue these discussions at ETN Global's High Level User Meetings in Houston and Brussels this October. These gatherings strengthen coordination within the user community by establishing clear priorities and timeframes that help guide our industry forward for the benefit of all. The consolidated outcomes will be presented at ETN Global's 12th International Gas Turbine Conference, taking place in Brussels on 14 and 15 October. This flagship event will be a key gathering for anyone engaged in the future of turbomachinery and the energy transition. I encourage you to register to secure your place.

As we enter Q3, I encourage your active involvement in ETN Global's many ongoing activities and projects. This includes our industry-funded initiatives, where opportunities to participate remain open. Together, we can drive a safe, sustainable and prosperous development of turbomachinery.

ETN Global's 12th International Gas Turbine Conference: registration is open

ETN Global's 12th International Gas Turbine Conference (IGTC) "Advancing turbomachinery innovations and strategies for net-zero pathways" will take place on 14-15 October 2025 at Tangla Hotel in Brussels, Belgium. Registration is now open, and we invite everyone to join us, industry leaders, policymakers and innovators from around the world at this prestigious event.

About IGTC

The IGTC is ETN Global's biennial event bringing together the turbomachinery and energy community, aiming to provide a platform for **transparent dialogue** and **strategic alignment**, accelerating **progress** toward an **integrated**, **secure**, **and carbon-neutral energy system**.

The event brings together representatives from utilities, industrial operators, energy companies, gas turbine manufacturers, suppliers and service providers, consultancies, research centres, universities, international analysis & forecasting organisations and policymakers.

Reasons to attend

- **Stay informed on the latest R&D developments**. Discover the latest solutions and innovations in identified net-zero pathways, facilitating flexible, efficient, and low-emission energy solutions.
- **Bridge the gap between research and application**. Engage in cross-sector dialogue with users, suppliers, service providers, and policymakers to shape future innovation.
- **Gain market and policy insights**. Access strategic outlooks on European and global energy markets, including trends, challenges, and investment drivers.
- **Focus on user-driven needs and priorities**. Hear first-hand what end-users are looking for, and how R&D can respond with practical, forward-looking solutions.
- **Be part of the community advancing net-zero goals**. Join a targeted platform dedicated to accelerating the role of turbomachinery in the energy transition.

Programme

The conference is a two-day event, which will take place on 14-15 October 2025, composed of **5 Keynote sessions** and **6 Technical sessions** with a total of **20 technical papers** to be presented, an exhibition and plenty of networking opportunities.

Keynote sessions

The keynote sessions will set the strategic direction of the conference, focusing on how turbomachinery can best support a secure, affordable and sustainable energy future. These high-level discussions will bring together decision-makers from across the value chain, including users, OEMs, policymakers, and energy analysts, to explore how the industry can respond to the challenges of security, affordability, and sustainability.

Participants will gain valuable insights into how policy, market forces, and technology development must align to accelerate the energy transition. The sessions will highlight user expectations, regional market trends, and the growing importance of system integration and optimisation.

- **Session 1**: Realigning policy and markets to tackle the energy trilemma in a changing world
- **Session 2**: User priorities for a secure and net-zero energy future
- **Session 3**: OEM roadmaps & technology development - delivering on the energy trilemma
- **Session 4**: Global gas turbine markets - regional pathways, shared challenges
- **Session 5**: Delivering the transition - integration, optimisation & risk control

Technical sessions

The technical sessions are designed to showcase concrete progress towards net-zero solutions, share operational experience, and highlight applied research that tackles real-world challenges. Driven by user priorities, the sessions will

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address key technology developments across the energy trilemma: security, affordability, and sustainability, ensuring that innovation is aligned with both near-term operational needs and long-term strategic goals.

Participants can expect in-depth technical papers and presentations showcasing field-proven solutions, pilot projects, and emerging turbomachinery innovations that support the energy transition. Each session aligns with key elements of the net-zero transition, offering insights into how advanced turbomachinery contributes to more flexible, efficient, and low-emission energy systems.

- **Session 1**: Progressing hydrogen-readiness - international field experience
- **Session 2**: Advancing CO_2 technologies - capture and storage technologies, and power cycles
- **Session 3**: Alternative fuels-powered turbines - ready to deploy solutions for decarbonisation
- **Session 4**: Enhancing flexibility in operations - design, control and retrofit solutions
- **Session 5**: Understanding hydrogen combustion- impact on performance, safety and emissions
- **Session 6**: Enabling next-gen turbomachinery - advanced techniques for component design

Sponsorship and exhibition opportunities

The IGTC provides a unique opportunity to showcase your company's commitment and contribution to a secure and timely development of a carbon-neutral society.

As a sponsor you will benefit from:

- High visibility before, during and after the event through ETN Global communication channels
- Direct access to high-level decision makers, user communities, OEMs, technical suppliers, and turbomachinery experts from around the world
- Extensive networking opportunities and the chance to explore future partnerships & collaborations

Position your company at the forefront of innovation by joining our growing list of sponsors:

- GOLD: Proenergy , NEM Energy, Aarding
- SILVER: Woodward
- Exhibitors: NYCO, DEKOMTE, ENGIE, EnergyLink

Accommodation

The conference hotel, Tangla Hotel, in Brussels, Belgium, has rooms reserved for IGTC attendees at a discounted price, valid until 15 September 2025. To book your stay, follow this booking link.

Join us at the 12th International Gas Turbine Conference and be at the forefront of advancing turbomachinery innovations and strategies for net-zero pathways. Together, we will ensure secure, affordable, dispatchable and clean energy solutions.

For registration, sponsorship form and more information, visit our 12th IGTC event webpage. ■

5th European Micro Gas Turbine Forum

5th European Micro Gas Turbine Forum (EMGTF) event will be held right after ETN Global's 12th International Gas Turbine Conference (IGTC) on 15-16 October at the same venue, the Tangla Hotel in Brussels, Belgium. ETN Global is a media partner for this event and urges everyone who has an interest in micro gas turbines to register for this conference.

About EMGTF

EMGTF is a biannual event designed to bring together all **key stakeholders in the micro gas turbine (MGT) ecosystem**. Its mission is to foster the **commercial deployment** of micro gas turbines by offering a high-level **in-person platform** where experts, researchers, industry leaders, and investors can share knowledge, collaborate, and co-design the roadmap for the future of MGT technology.

Programme

Designed to address critical industrial activities necessary for MGT advancements, keynote sessions, panel discussions and problem-solving talks will cover operational, environmental, and cost perspectives, presenting recent technology developments and innovative solutions, ensuring a balanced view of current and future industrial and research needs.

Sponsorship and exhibition opportunities

This conference provides a unique opportunity to showcase your company's commitment and contribution to the secure and timely development of Micro Gas Turbines.

Join our lineup of sponsors:

- Sponsor: UMARC
- Partner: Fit4Micro

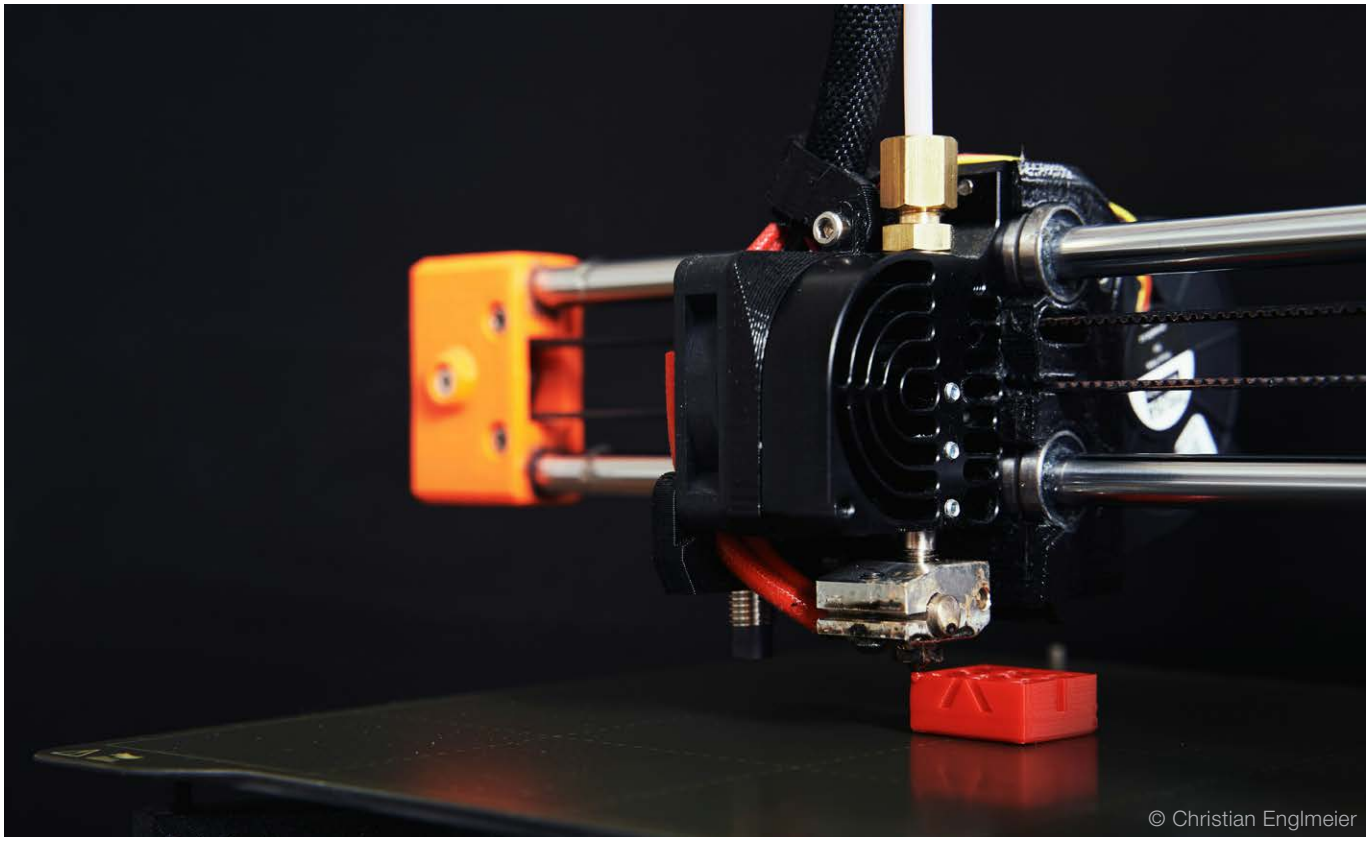
For more information, registration, and sponsorship form please visit the 5th European Micro Gas Turbine Forum event website. ■

New member

We are pleased to extend a warm welcome to our newest member of ETN Global:

ExxonMobil manages an industry-leading portfolio of resources, and is one of the largest integrated fuels, lubricants and chemical companies in the world. With operations in more than 60 countries globally, ExxonMobil team of 62,000 scientists, engineers, researchers, technicians, professionals and other employees, are focused on safely meeting the world's energy and product needs; something the company has been doing for more than 140 years. ■

ETN Global launches new industry-led project in additive manufacturing for extreme conditions



ETN Global is preparing to launch a new collaborative project in September 2025 that aims to accelerate the development of advanced additive manufacturing (AM) materials for use in gas turbines operating under extreme temperatures.

Backed by a committed consortium of 12 industry partners, the project is set to move forward to address a critical need in the energy and turbomachinery sector: developing materials that can withstand harsh operating conditions, such as temperatures exceeding 1000 °C, high oxidation exposure, and mechanical stress, while remaining compatible with modern laser powder bed fusion (LPBF) manufacturing techniques.

The project will follow a structured development process, including material selection, process optimisation, metallurgical analysis, and mechanical and environmental testing, with the goal of advancing promising high-temperature alloys to Technology Readiness Level (TRL) 3-4.

Figure 1: Yogi Pardhi, Global Lead Additive Manufacturing, Sulzer

As explained by project partner at Sulzer:

"At Sulzer, our goal is to bridge the gap between the material requirements for high-performance gas turbine blades and the capabilities of printable superalloys. Achieving this milestone is crucial for enabling the use of additively manufactured rotating hot section components in gas turbines."

With a strong core consortium already in place, this exciting new project is set to launch in September: offering a unique opportunity for additional partners to come on board and play a strategic role in advancing the next generation of high-performance turbine materials.

For more information, please contact ETN Global project coordinator Nicolo Cairo. ■

Another ETN Global project shaping safety standards for hydrogen gas turbine enclosures

ETN Global is proud to announce the launch of another industry-funded project, focused on shaping future safety standards for safe integration of hydrogen and hydrogen blends in gas turbine operations.

With hydrogen gaining momentum as a key fuel in the energy transition, this initiative addresses critical gaps in current safety standards for gas turbine enclosures, especially relating to gas dispersion and explosion risk.

Driven by an 8-member industry consortium and carried out in partnership with DNV at its Spadeadam Research & Testing facility in the UK, the project will combine computational fluid dynamics (CFD) modelling with large-scale experimental testing. The project will provide scientifically validated data for future updates to international safety guidelines and ultimately supporting the safeintegration of hydrogen deployment across the power generation sector.

Figure 2:
Jan Van den Auweele, Combustion Expert, ENGIE

Jan Van den Auweele, Combustion Expert at ENGIE, explains:

"Hydrogen will play a key role in the decarbonisation of gas turbine power plants. Ensuring safety in GT enclosures is critical during this transition. Participating in the ETN Global GT Enclosure Project helps assess if ISO 21789 remains sufficient for hydrogen, protecting infrastructure and lives through validated scientific analysis."

ETN Global invites additional stakeholders to join this strategic initiative and contribute to shaping a science-based safety standard needed for the hydrogen era.

For more information, please contact ETN Global project coordinator Nicolo Cairo. ■

2025 BPEA winner announced: methanol-fuelled gas turbine study takes top prize

On 08 July 2025 ETN Global's Young Engineers Committee held the final round of the 2025 Brian Pitt Excellence Awards (BPEA) – Master Thesis competition selecting the winner of the competition.

Five exceptional master's students presented their work on energy and turbomachinery-related topics during the final round of the **2025 Brian Pitt Excellence Award (BPEA)** on 8 July 2025, coordinated by ETN Global's Young Engineers Committee.

This year's winner was **Krzysztof Danielak from Cranfield University**, recognised for his thesis: *"Use of methanol as a potential alternative fuel in a power generation gas turbine".* His presentation stood out for its technical depth, as well as his ability to clearly communicate complex ideas and respond confidently the jury's questions. It was a tough competition as the other finalists also delivered strong performances, each presenting a 7-minute summary of their research:

- **Franco Agustin Rizzi**, Politecnico di Torino – *CFD Analysis of a Lean Premixed Gas Turbine Combustor for H_2 Applications*
- **Thomas Hollweck**, TU Munich – *Adjoint-accelerated Bayesian Inference in a 3D Helmholtz Solver for Thermoacoustic Test Rigs*
- **Jean Bériot**, UMons – *Uncovering the Economic Tipping Point Between H_2-based Gas Turbines and CCS-enhanced Gas Turbines*
- **Mohammad Aatif Qazi**, University of Alberta – *Dispersoid-strengthened High Entropy Alloy (HEA) Coatings for Hydrogen Embrittlement Resistance*

As part of his award, Krzysztof is invited to join ETN Global's 12th International Gas Turbine Conference (IGTC) on 14-15 October 2025 in Brussels, Belgium, and will be considered for inclusion in the technical programme, subject to approval by the IGTC's Conference Advisory Board.

ETN Global would like to once again congratulate all the students for their outstanding contributions and the members of the jury for their hard work throughout the process:

- Rainer Kurz, ETN Global Emeritus Members/former Solar Turbines
- Andrea Ciani, Ansaldo Energia
- Daniel Phillips, SSE Thermal
- Alberto Patti, ETN Young Engineers Committee / University of Genoa

About Brian Pitt Excellence Award

The award is named in honour of Brian Pitt, a former Rolls-Royce employee long-standing supporter of research collaboration in the gas turbine field.

The award recognises master's degree students who embody Pitt's dedication to excellence and innovation in the fields of energy and turbomachinery.

To learn more about 2025 Brian Pitt Excellence Awards (BPEA) – Master Thesis competition, please visit the competition's webpage.

Make sure to stay updated for the opening of the 2026 edition via ETN Global's event webpage. ■

ETN Global actively involved in ASME Turbo Expo 2025

ASME Turbo Expo (Turbomachinery Technical Conference & Exposition) 2025 was held on 16-20 June 2025 in Memphis, Tennessee, USA. It is a 5-day technical conference alongside a 3-day exhibition.

ETN Global was once again supporting ASME Turbo Expo 2025 event as a participating organisation, had a booth, exhibiting our EU-funded projects, such as ASTERIx-CAESar, FLEX4H2, HyPowerGT and InsigH2t and was actively involved in moderating and chairing selected technical sessions.

Figure 3: ASME Turbo Expo 2025 - Decentralised energy systems panellists and moderators

On 16 June 2025, ETN Global's Technical Lead Giuseppe Tilocca and Managing Director Christer Björkqvist co-chaired the session *"Turbomachinery Solutions for Decentralised Energy: A Pathway to Resilient and Competitive Power and Heat Supply"*. Panelists David Sánchez Martínez, Universidad de Sevilla, Martina Hohloch, German Aerospace Center (DLR), Dang Le, Solar Turbines and David Wu, EPRI, discussed: the role of turbomachinery in supporting low-carbon, dispatchable power and heat solutions; ways in which decentralised energy systems can enhance resilience and affordability; and explored the challenges and barriers that need to be unlocked to allow the full potential of decentralised technologies.

Figure 4: ASME Turbo Expo 2025: Measuring and communicating gas turbine research impacts: panellists and moderators

In the morning of 17 June 2025, Christer Björkqvist took part in the panel "Measuring and Communicating Gas Turbine Research Impacts", where industry leaders (Tim Lieuwen, Georgia Institute of Technology; Markus Feigl, GE Vernova; and John Crane, National Energy Technology Laboratory together with moderators Stephen Lynch, Penn State University, and Allan Arisi, Pratt & Whitney) discussed how to better demonstrate the value of gas turbine research and development (R&D) in today's fast-changing energy landscape.

Christer Björkqvist emphasised the importance of user-driven innovation and strategic coordination across the value chain. The panellist agreed on the need to align R&D efforts with real-world user needs and implementation timelines. ETN Global's collaborative model with High-Level User Meetings, Technical Working Groups, and industry-led projects was recognised as an effective approach to accelerate innovation and maximise impact.

The panel also highlighted the importance of communicating the value of gas turbine R&D to policymakers and the public, attracting next-generation talent, and fostering supportive regulatory frameworks to ensure secure, affordable net-zero pathways.

Figure 5: ASME Turbo Expo 2025: MGT session

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In the afternoon of 17 June 2025, we were pleased to see strong engagement at *"Micro-Gas Turbine: Technological advancements and market research"* led by our colleagues Antonio Escamilla and Giuseppe Tilocca, with guest speaker Ward De Paepe, UMONS. Turbomachinery International magazine featured a detailed article based on the session, outlining the current state of development and the steps needed for broader adoption. The session explored both the opportunities and ongoing challenges facing micro-gas turbine technology — from outdated designs and high costs to promising applications in Combined Heat and Power (CHP), remote operations, and biogas systems. The full article can be accessed here.

In addition, Antonio Escamilla gave a video interview discussing emerging market dynamics and the collaborative innovation required to bring micro-gas turbines into wider use. You can watch the video interview here.

In the morning of 18 June 2025, Christer Björkqvist co-moderated the panel *"Voice of the Customers: Decarbonisation Pathways and International Cooperation"* alongside David Wu from EPRI. The session participants Mark Lozier, Constellation; Rick Tomlinson, Chevron; and Josh Barron, Southern Company provided valuable strategic insights from the user perspective, with a focus on R&D needs, operational priorities, and international collaboration.

The discussion highlighted that the optimal configuration of future combustion power plants will depend heavily on local conditions, including grid composition, energy demand profiles, and regulatory context. While large-scale combined-cycle gas turbines (CCGTs) with carbon capture may be the preferred solution in some regions, other markets may favour smaller, more flexible simple-cycle turbines, particularly for peaking and backup applications.

Panellists emphasised the urgent need to optimise the existing gas turbine fleet to bridge the transition period. Recommended actions included upgrading to advanced gas path components, integrating SCR and carbon capture technologies, blending fuels such as hydrogen and HVO, and improving instrumentation and controls.

R&D priorities identified during the session included the development of flexible and sustainable CCS solutions, the reutilisation of CO_2 for synthetic fuels, and the advancement of clean fuel supply chains, particularly for hydrogen, ammonia, and HVO.

The session also underscored the importance of international collaboration to accelerate technology readiness and reduce duplication of efforts. Sharing test data from hydrogen, ammonia, and HVO trials, participating in cross-border research initiatives, and promoting knowledge exchange were all recognised as essential to enabling faster, safer, and more cost-effective decarbonisation.

In the afternoon of 18 June 2025, Christer Björkqvist co-chaired the session *"OEM Pathways Forward: Advancing Gas Turbine Innovation"* together with Ben Emerson from the Georgia Institute of Technology. The session brought together panellists from leading OEMs (Ralf Jakoby, Ansaldo Energia; John Mason, Solar Turbines; Ghenadie Bulat, Siemens Energy; Yoshifumi Tsuji, Mitsubishi Power; Jeffrey Goldmeer, GE Vernova) to explore how they are responding to changing user needs, evolving market demands, and growing operational challenges.

Despite differences in portfolio and regional focus, all OEMs agreed that gas turbines will continue to play an essential role in addressing the energy trilemma. Key themes included the need for greater fuel flexibility, enhanced reliability, and integration with carbon capture and storage (CCS). Each OEM outlined their progress on hydrogen capabilities, ranging from hydrogen blends to 100% H_2, and several showcased pilot projects already underway.

Figure 6: ASME Turbo Expo 2025: OEM session

Digitalisation and artificial intelligence (AI) featured prominently, with predictive and generative AI increasingly applied across fleets for equipment health monitoring, remaining useful life estimation, operational optimisation, and support for OEMs make-or-buy decisions. Examples included Predictive Emissions Monitoring Systems (PEMS) and digital twins.

Advanced manufacturing and materials were also recognised as critical enablers for next-generation performance. OEMs highlighted the growing role of additive manufacturing (AM) and high-temperature alloys in producing components capable of operating under extreme environmental conditions.

The panel further underscored the importance of close collaboration across the value chain. All speakers stressed that accelerating innovation and deployment will require alignment between OEMs, users, regulators, and the R&D community. The session concluded with a discussion on workforce and supply chain challenges, where OEMs emphasised the urgency of attracting engineering talent, restoring industrial capacity, and establishing policy frameworks that support investment in clean, dispatchable technologies.

To read the full article by *Turbomachinery International* magazine covering "*Micro-Gas Turbine: Technological advancements and market research*" session, visit this link.

To access the interview of Antonio Escamilla, ETN Global's Client Relationship Manager, visit this link.

To register and learn more about ASME Turbo Expo 2026, which will take place on 15-19 June in Bilbao, Spain visit the event website. ■

Global LM2500 community representing over 500 engines gathers in Aberdeen for three days of technical exchange and collaboration

ETN Global's 2025 LM2500 User Group Meeting successfully took place from 3–5 June in Aberdeen, bringing together the specific engine users, OEMs, service providers, and industry experts for three days of technical exchange and collaboration.

This year's event saw a remarkable level of engagement, with users representing more than 500 LM2500 engines, highlighting the community's scale, depth of experience and operational insight shared throughout the meeting.

The agenda included user-only sessions and a series of round-table discussions tackling key technical challenges, including turnaround times, control system upgrades, exhaust system reliability, and fuel valve best practices. These technical conversations enabled participants to share real-world experience and discuss the most suitable solutions.

Service providers shared recent advancements and technical updates, while GE Aerospace, Baker Hughes, and Aero Alliance participated in detailed OEM-user discussions on system upgrades and future developments.

Networking highlights included an insightful visit to Score Group facilities, offering a closer look at cutting-edge capabilities in valve engineering and energy services, and an evening event at Drum Castle, kindly sponsored by GE Aerospace.

ETN Global extends a sincere thanks to all the attendees, the Steering Committee, and the sponsors for their contributions to another successful LM2500 user group meeting.

For 2026 edition of the ETN Global LM2500 User Group Meeting, keep an eye out on ETN Global event page. ■

Figure 7: ETN Global LM2500 UGM participants during a visit to ScoreGroup's facility. Copyright-ScoreGroup

ETN Global is inviting all SGT-A35 users to attend our yearly User Group Meeting in November 2025

ETN Global's SGT-A35 User Group meeting will be held on 04-06 November 2025 at le Centre Scientifique et Technique Jean Féger in Pau, France, kindly hosted by TotalEnergies. Representatives of SGT-A35 user companies are invited to register via this link.

The three-day event will include:

- User & technical sessions – discussions among users (and service providers/suppliers) on current top-priority topics.
- Siemens Energy sessions – Special session(s) about the latest developments & upgrades and technical discussions about high-priority topics.
- An exhibition area & plenty of networking opportunities.

Independent service providers and vendors interested in presenting or exhibiting are encouraged to contact Antonio Escamilla as soon as possible to express their interest. Participation is subject to selection by the SGT-A35 User Group Steering Committee.

To register and learn more about ETN Global's SGT-A35 User Group Meeting, visit the event webpage. ■

Understanding hydrogen combustion under pressure: inside the InsigH$_2$t Project. An interview with project coordinator NTNU

Figure 8:
James Dawson
Professor in fluid mechanics, NTNU

What is the role of Norwegian University of Science and Technology (NTNU) in the InsigH$_2$t project?

NTNU has two main roles in the project. Our first role is that we are responsible for coordinating the project. Practically speaking this means that we are responsible for organising the scientific work across the consortium to ensure the project achieves its objectives and deliverables. This includes overseeing dissemination of results to the appropriate audiences and managing any risks or challenges that might appear. The other key part of being a coordinator is being accountable for communication with the European Commission and ensuring high quality documentation for reporting and audits. We have two partners in our consortium which strongly support us: PNO Innovation supports the management side, and the Energy & Turbomachinery Network leads the dissemination side.

The second role of NTNU is a scientific one. We will work on the first main objective of the project which is to understand how pressure affects the turbulent burning rate of premixed hydrogen flames. It is well understood how pressure affects the burning rate of conventional fuels like natural gas, but hydrogen is a unique fuel, and we know that pressure has a strong but unpredictable effect on how fast hydrogen flames burn. Understanding this is crucial for adapting or developing new gas turbine technologies capable of using hydrogen. Developing this understanding requires unique experimental facilities and NTNU is currently establishing a high-pressure rig specifically designed to tackle this challenge.

What are the main goals of the InsigH$_2$t project?

The main goals of the InsigH$_2$t project are to understand the effect of pressure on the turbulent burning rate of premixed hydrogen flames, how this affects the thermoacoustic response and emissions performance to ensure flame stability and low NOx capability, and finally transferring this new fundamental knowledge into predictive simulation tools used in the development of gas turbine burners by working with key OEMs, such as Baker Hughes and Ansaldo Energia who are partners in the project.

These goals are reflected in the three main scientific objectives of the project: 1) Understanding the effect of pressure on the turbulent burning rate of H_2 premixed flames, 2) Understand how the pressure dependence affects the thermoacoustic response of H_2 premixed flames, and 3) Validate simulation methods of advanced fuel injector concepts and demonstrate the ability to operate cleanly and efficiently with 100% H_2 at relevant pressure conditions.

What will be the main tools and methods to achieve the above-mentioned goals?

To do this we need to combine all our state-of-the-art tools. Our approach to understand the effect of pressure on the turbulent burning rate is to leverage the complementarities of experiments and direct numerical simulations of canonical flame configurations over a range of elevated pressures will be conducted. Pressure severely limits access to the flame structure but enables us to replicate realistic conditions found in gas turbines. On the other hand, direct numerical simulations fully resolve the flame structure but are restricted to simple geometries and physical size. Together they can provide access to the quantities needed to understand the pressure scaling on premixed hydrogen flames. A similar approach will be adopted to understand the thermoacoustic response of the flame which is needed to develop combustion models that can be implemented into low-order network tools used by industry to predict whether the flames will be stable over the desired operating range. The final step is to adapt the key physics identified into new engineering models that can be used by industry to facilitate rapid technology development and ensure the fastest possible transition to zero carbon gas turbines for heat and power.

Could you tell us more on the expected impacts of InsigH$_2$t (i.e., beyond the project duration)?

We expect a number of impacts to both the scientific/engineering community but also to OEMs. A fundamental scientific understanding of the pressure scaling of premixed hydrogen flames and how this impacts the thermoacoustic stability and emissions of premixed hydrogen flames is needed to develop new engineering simulation tools and design approaches for industry. The scientific work will push the field forward through publications and provide new data for the scientific community and industry. Overall, this will enable a science-based approach that essential to facilitating rapid technology development and ensure the fastest possible transition to zero carbon gas turbines for heat and power. In a macroeconomic sense, these developments will contribute to maintaining European leadership in a high technology area that is key to safe, secure and zero carbon large scale power and will undoubtedly lead to knowledge transfer to other industries such as aviation and energy intensive industries. ■

Clean Hydrogen Partnership

Co-funded by the European Union

Project funded by

Schweizerische Eidgenossenschaft
Confédération suisse
Confederazione Svizzera
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Swiss Confederation

Federal Department of Economic Affairs, Education and Research EAER
State Secretariat for Education, Research and Innovation SERI

The InsigH$_2$t project is supported by the Clean Hydrogen Partnership and its members (GA 101192349) and the Swiss Federal Department of Economic Affairs, Education and Research, State Secretariat for Education, Research and Innovation (SERI).

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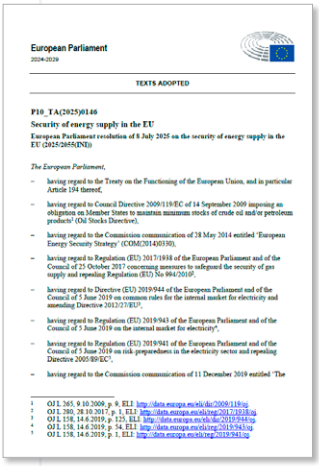
European Parliament supports greater flexibility and realism in energy policy


European Parliament
2024-2029

TEXTS ADOPTED

P10_TA(2025)0146
Security of energy supply in the EU
European Parliament resolution of 8 July 2025 on the security of energy supply in the EU (2025/2065(INI))

The European Parliament,

– having regard to the Treaty on the Functioning of the European Union, and in particular Article 194 thereof,

– having regard to Council Directive 2009/119/EC of 14 September 2009 imposing an obligation on Member States to maintain minimum stocks of crude oil and/or petroleum products[1] (Oil Stocks Directive),

– having regard to the Commission communication of 28 May 2014 entitled 'European Energy Security Strategy' (COM(2014)0330),

– having regard to Regulation (EU) 2017/1938 of the European Parliament and of the Council of 25 October 2017 concerning measures to safeguard the security of gas supply and repealing Regulation (EU) No 994/2010[2],

– having regard to Directive (EU) 2019/944 of the European Parliament and of the Council of 5 June 2019 on common rules for the internal market for electricity and amending Directive 2012/27/EU[3],

– having regard to Regulation (EU) 2019/943 of the European Parliament and of the Council of 5 June 2019 on the internal market for electricity[4],

– having regard to Regulation (EU) 2019/941 of the European Parliament and of the Council of 5 June 2019 on risk-preparedness in the electricity sector and repealing Directive 2005/89/EC[5],

– having regard to the Commission communication of 11 December 2019 entitled 'The

[1] OJ L 265, 9.10.2009, p. 9, ELI: http://data.europa.eu/eli/dir/2009/119/oj
[2] OJ L 280, 28.10.2017, p. 1, ELI: http://data.europa.eu/eli/reg/2017/1938/oj
[3] OJ L 158, 14.6.2019, p. 125, ELI: http://data.europa.eu/eli/dir/2019/944/oj
[4] OJ L 158, 14.6.2019, p. 54, ELI: http://data.europa.eu/eli/reg/2019/943/oj
[5] OJ L 158, 14.6.2019, p. 1, ELI: http://data.europa.eu/eli/reg/2019/941/oj

On 8 July 2025, the European Parliament adopted a resolution titled "Security of energy supply in the EU", aiming to address growing concerns around the reliability and sustainability of Europe's energy systems in light of geopolitical tensions and the climate crisis.

ETN Global welcomes the resolution as a step in the right direction as it sends a strong signal highlighting that the European energy system must include resilience, permitting reform and respect for national differences. Many of the priorities it outlines align closely with recommendations we shared in our January 2025 White Paper and in the joint ENZA position on a technology-inclusive Clean Industrial Deal.

Key highlights include:

- **Dispatchable capacity recognised as critical**. With the EU accelerating its transition to renewables, the need for flexible, dependable, dispatchable power has never been more critical. The resolution underlines the need to invest in technologies that can manage variability and ensure a reliable energy supply.
- **Acknowledging national realities and technology neutrality**. Europe's diversity is its strength. The resolution calls for energy transition pathways that are technology neutral, respect local conditions; geography, industry, and community realities, ensuring a just, inclusive shift for all Member States.
- **Domestically produced natural gas to contribute to security of supply**. The Parliament calls on the IEA to conduct a study on the potential role that domestically produced natural gas could play in contributing to EU energy security as a transitional measure.
- **Permitting streamlining as a priority**. The resolution backs urgent reforms to simplify and accelerate permitting processes, particularly for repowering and new energy infrastructure.

At ETN Global, we strongly support this resolution's direction. It aligns with our focus on enhancing system resilience, encouraging investment in clean dispatchable technologies, and supporting a flexible, technology-neutral approach to energy development. We remain ready to contribute our expertise and support the implementation of these principles across Europe and beyond. ■

ETN Global advocates for technology-inclusive approach in Europe Commission's Clean Industrial Deal


enza
European Net Zero Alliance

Accelerating Europe's Sustainable Industrial Transition: ENZA's Vision for a Competitive and Net Zero Economy

ENZA recommendations on the Clean Industrial Deal

23 June 2025

Introduction

The European Net Zero Alliance (ENZA) is a coalition of 23 European associations representing a myriad of sectors – from manufacturing, clean energy production and infrastructure, and construction to mobility and agriculture – and SMEs and local and regional energy companies. We also represent a wide range of energy vectors – namely liquid and gaseous fuels, heat and cold, and electricity. Together, we advocate for solutions that connect different types of energy, such as electricity, heat, solid, gaseous and liquid fuels, with sectors that rely on them. By doing so, we aim to create a more efficient, competitive and sustainable energy system, ultimately helping Europe reach climate neutrality by 2050.

ENZA acknowledges the Clean Industrial Deal (CID) as a first important step towards supporting the EU's competitiveness while decarbonising its economy, but a more technology-inclusive approach is needed to unlock an affordable and secure energy transition. A policy framework that emphasises competitiveness is essential for aligning climate ambition with meaningful action, and building a resilient, climate-neutral EU economy.

Ensuring access to funding for all viable decarbonisation solutions will be essential to the energy transition, security of supply, and achieving Europe's long-term sustainability goals. This includes support for renewable energy sources such as direct renewable heat, biomass, biogas, and biomethane, low-carbon energy carriers like renewable and low-carbon hydrogen and its derivatives, as well as key enabling technologies such as cogeneration and CCUS. We welcome the CID's emphasis on circularity and highlight the need for stronger support for solutions enabling it, such as CCUS (notably by establishing an EU regulatory framework for CO2 transport and storage) or waste-derived hydrogen.

Our alliance is committed to support delivering climate neutrality by providing expertise to assist policy makers in building a successful regulatory and investment environment. ENZA stands ready to help address these concerns and ensure the Clean Industrial Deal delivers for Europe's environment, economy and industry.

In June 2025, as part of the European Net Zero Alliance (ENZA), ETN Global co-signed a position paper in response to the European Commission's proposed Clean Industrial Deal. The paper, titled "Accelerating Europe's Sustainable Industrial Transition: ENZA's Vision for a Competitive and Net-Zero Economy", supports the initiative but urges a broader, technology-inclusive approach to decarbonisation.

The position paper calls for leveraging Europe's full energy mix, including renewable electricity, sustainable fuels, hydrogen, cogeneration, and carbon capture, to create a flexible and resilient energy system. It also highlights the need for fair access to funding for all viable technologies, rather than favouring a single pathway.

Key recommendations to the European Commission include:

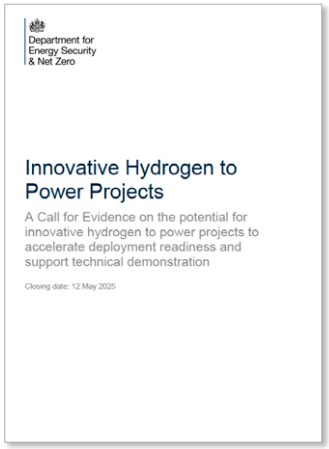
- Adopting a multi-energy strategy with inclusive financing mechanisms.
- Enhancing coordination across energy sectors and infrastructure.
- Addressing regulatory and financial barriers to clean tech investment.
- Supporting affordable, secure, and climate-aligned industrial energy solutions.

ETN Global remains committed to working with policymakers and partners across sectors to turn ambition into action and deliver a clean, and competitive energy future for Europe.

To access European Commission's Clean Industrial Deal, visit this link.

To access ENZA's position paper, co-signed by ETN Global, visit this link. ■

ETN Global contributes to UK Government's hydrogen-to-power consultation



In May 2025, ETN Global responded to the UK Government's Call for Evidence on Innovative Hydrogen-to-Power Projects. As part of our submission, we shared the latest edition of the *Hydrogen Gas Turbines Report* (2024), which provides a detailed overview of hydrogen combustion developments, integration into gas turbines, and progress by OEMs across the sector. The report also includes a global database of hydrogen projects, highlighting initiatives working toward 100% hydrogen operation.

We also expressed our interest in future collaboration and access to consultation outcomes, which would help enhance our database and support broader knowledge exchange beyond our membership.

To access UK Government's call for evidence, visit this link.

To download ETN Global's 2024 Hydrogen Gas Turbines Report, visit this link. ■

Upcoming meetings and events

Preliminary list of meetings/events*	Date	Location
ETN Global US HLUM (invitation only)	7 October 2025	Houston, USA
ETN Global HLUM (invitation only)	13 October 2025	Brussels, Belgium
ETN Global 12th IGTC	14-15 October 2025	Brussels, Belgium
5th EMGTF	15-16 October 2025	Brussels, Belgium
ETN Global SGT-A35 UGM	4-6 November 2025	Pau, France

* *For the full list of ETN Global-led & other international 2025 meetings & events, visit our event page on the website.*

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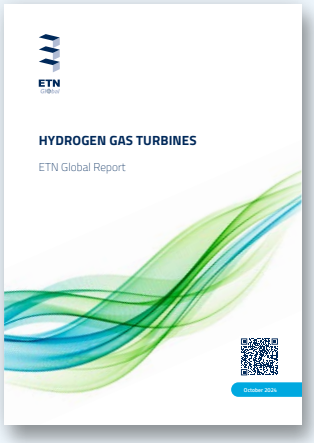
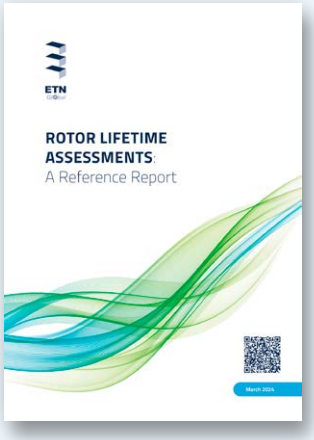
ETN Global at a glance

Download our latest publications:

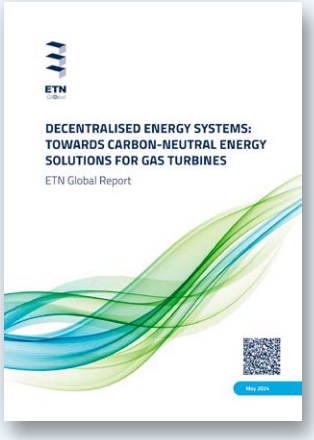
Hydrogen Gas Turbines 2024 edition report



Rotor lifetime assessment: a reference report



Decentralised energy systems: Towards carbon-neutral energy solutions for gas turbines



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