

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.



Christer Björkqvist
Managing Director,
ETN Global

Driving progress through a strong user-driven community

With the first quarter now behind us, ETN Global continues to build strong momentum across our network. Our 22nd Annual General Meeting (AGM) & Workshop, held in Malmö, once again demonstrated the value of bringing together users,

technology providers, service organisations and researchers around shared priorities. With more than 130 participants, the event provided an opportunity to reflect on our collective achievements, exchange knowledge and set the direction for the year ahead. Together with our co-host Uniper, we also organised an insightful visit to the Öresundsverket power plant. These site visits have become a valued feature of ETN Global events, giving participants first-hand operational insight and helping to set the scene for the discussion that follows.

The AGM also marked the start of a new two-year Board term. With around 40% new members, the newly elected Board provides a healthy balance of continuity, senior-level expertise and fresh perspectives. One of the Board's first assignments, the nomination of the new technical Project Board has already been completed. This group will play a key role in ensuring progress across a balanced portfolio of activities within our Working Groups, user groups and projects, while maintaining strong alignment with the needs of our global user community.

This user-driven perspective was also at the heart of the discussions in Malmö, where a clear message emerged: the energy transition must be grounded in operational reality. Rising electricity demand, combined with the growing share of variable renewable energy is increasing the need for secure, flexible and dispatchable capacity. This has contributed to renewed demand for gas turbines, reaching levels not seen since the early 2000s. At the same time, changing operating profiles, with more frequent starts, stops and cycling, combined with bottlenecks in the service and supply chain, are increasing the importance of condition-based maintenance and life extension.

Combined, these developments create a more complex and fast-changing operating environment, making constant dialogue, through a user-driven platform such as ETN Global, essential to ensure continuous alignment between operational needs, technology development and practical solutions.

These challenges are also addressed in our latest publications, which provide relevant insights into the development pathways ahead: the *Urgency and Positioning of Gas Turbines in Future Power System Report*, offering a quantitative assessment of dispatchable capacity needs and the 2026 edition of our long-standing biennial *R&D Recommendation Report*, which translates user priorities and operational challenges into future research and development recommendations. Together, these reports reinforce the importance of aligning technology development, policy frameworks and market signals with the real needs of asset owners and operators.

These insights also shape our wider activities, from Working Groups and projects to user meetings and international events, including the inaugural Frame 5, 6B, 7E and 9E User Group Meeting, hosted by BASF in Ludwigshafen, Germany; the upcoming LM2500 User Group Meeting in Stavanger, hosted by Aker BP; the SGT-A35 User Group Meeting in Calgary, hosted by TC Energy; the Southeast Asia Gas Turbine User Meeting "Fleet Optimisation, Reliability and Lifetime Extension" in Kuala Lumpur; and ETN Global's involvement in the GTEN Symposium in Banff, Canada and in ASME Turbo Expo and MEGAWATT in Italy. All these activities show how ETN Global is expanding internationally, while keeping user priorities at the centre.

I would like to thank our members, Board & Project Board representatives and Working Group Chairs for their continued engagement and support. With a strong governance structure in place, an active user community and a growing programme of international activities, I am confident that 2026 will be another successful year for ETN Global.

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ETN Global's 22nd Annual General Meeting & Workshop highlights



ETN Global's Annual General Meeting (AGM) and Workshop successfully took place on 23-25 March 2026 in the city of Malmö, Sweden, where we were generously co-hosted by our member Uniper.

Event at a glance

ETN Global's Annual General Meeting (AGM) & Workshop gathered over 130 participants from within our community. It was a great moment to reconnect, reflect and move forward together. Over two and a half energising days, attendees participated in insightful discussions, knowledge exchange sessions, networking moments and an exclusive site visit to [Uniper's Öresunds-verket power plant](#), including a showcase of the world's first gas turbines operating on Hydrogenated Vegetable Oil.



ETN Global's achievements over the last 12 months

The AGM & Workshop provided not only an opportunity to reflect on a year of collective progress, but also to look ahead and set the priorities for 2026.

Since our AGM in 2025 our network grew to 142 members across 21 countries, spanning Europe, North America, Asia and Africa. A total of 13 new members joined, strengthening the diversity of the community.

Over the past 12 months we have made strong progress across all our initiatives, activities and projects:

- **Published four technical reports:**
 - [Executive Report of the High-Level User Meeting \(HLUM\) 2025](#) (login required)
 - [Micro Gas Turbines: Challenges and Opportunities](#)

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- [Urgency and Positioning of Gas Turbines in Future Power System – a quantitative assessment of dispatchable capacity needs](#)
- [R&D Recommendation Report – 2026 Edition](#)
- **Actively participated in five EU-funded projects and two industry-funded projects:**
 - Advocated for recognition of cogeneration in European Commission’s Net-Zero Industry Delegated Act; contributed to Industrial Emissions Directive (IED 2.0) Studies; Provided input to UK Government’s call for evidence on H₂-to-power projects; Urged for a technology-inclusive Clean Industrial Deal; and provided input to European Committee for Standardization on gas composition standardisation.

Our Working Groups delivered more than 15 collaborative initiatives and brought their expertise to our events and webinars, which provided space for technical knowledge exchange, innovation and dissemination across multiple formats.

A significant governance milestone was reached with the appointment of the 2026–2028 Board of Directors (Figure 1).

Overall, discussions throughout the event reaffirmed the essential role of gas turbines and turbomachinery in enabling a secure, flexible, and sustainable energy system. In a context of increasing geopolitical uncertainty and evolving policy priorities, the importance of security of supply and resilient energy systems has come back into sharp focus.

We extend a sincere thank you to all the attendees, moderators and speakers as well as the sponsors for their contributions to another successful AGM & Workshop event.

ETN Global will continue to play a key role in ensuring alignment between policy, technology development, and real-world system needs.

A detailed overview of ETN Global's achievements presented during the event and summarising activities since 2025 AGM - Activity Update 2025-2026 - along with the Working Groups' objectives for 2026-2027 and all the presentations, are now available for download on the [event webpage](#) (login required). ■



Figure 1: ETN Global's Board of Directors 2026-2028

ETN Global publishes Urgency and Positioning of Gas Turbines in Future Power System Report

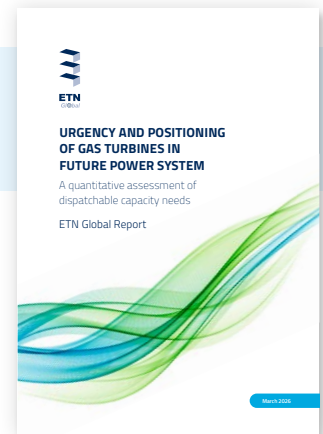
In March ETN Global published a report, titled “[Urgency and Positioning of Gas Turbines in Future Power System – a quantitative assessment of dispatchable capacity needs](#)”. The report explores the role of gas turbines in Europe’s energy systems up to 2040. As the UK, Germany and the Netherlands move towards a low-carbon future, the study investigates how these assets can remain relevant alongside growing renewable energy sources.

Key findings are:

- **Strategic role and stability:** While the function of gas turbines (GTs) is shifting from bulk energy provision to balancing the system, they remain a structural component of the grid by providing essential “firm capacity” during long periods of low renewable output.
- **Necessary policy intervention:** While GTs remain critical through 2040, declining full-load hours will create a revenue gap. Thus, transitioning from wholesale electricity markets to capacity remuneration mechanisms and low-carbon business models is essential to ensure plant availability and grid stability.

- **Urgency for investment:** A significant portion of the current turbine fleet is ageing, with 29–60% expected to exceed a 35-year lifespan by 2040. Because new projects can take up to eight years to develop, the report warns that delayed investment decisions could pose a risk to national energy security.

To download the report, please visit the [following page](#) on our website. ■



ETN Global publishes R&D Recommendation Report – 2026 Edition

In March ETN Global also published the 2026 edition of its biennial [R&D Recommendation Report](#), which highlights turbomachinery’s important role in a decarbonising energy system but the scale and nature depend on flexibility, reliability, and future adaptability.

While demand for turbomachinery is sharply increasing, the sector continues to face important market challenges, such as:

- **Spare-parts shortages and long-lead times;**
- **Ageing fleets; and**
- **Regulatory uncertainty.**

The report treats these barriers as key drivers for future R&D shifting the focus from maximum efficiency at full load towards operational resilience and flexibility, with particular attention to:

- **Product sustainability**, including digital tools, life extension and advanced repair methodologies.
- **Operational optimisation**, including digital twins and artificial intelligence for predictive maintenance

- **Integrated energy systems**, including Waste-Heat Utilisation and Recovery, cogeneration and trigeneration, and energy storage.
- **Energy efficiency**, including air filtration and advanced bottoming cycles.
- **Low carbon solutions**, including alternative low-carbon fuels, NOx emissions control and CCS solutions.

To download the report, please visit the [following page](#) on our website. ■



New members

Since our last quarterly newsletter, the following new members have joined ETN Global, and we bid them a warm welcome: :

Netherlands



HyAPC (Hydrogen-Argon Power Cycle) is developing a patented, hydrogen-ready turbine technology designed to deliver zero-carbon, zero-NOx power. By utilising argon as the working fluid, the cycle eliminates harmful emissions and improves operational efficiency without reinventing the wheel; the system is built on proven, reliable turbomachinery.



Pathwaze Energy® provides consulting services for combustion, gas turbines and energy infrastructure as well as innovation and product development for new affordable clean fuel (non-electrolysis hydrogen) production pathways.



A member of the global PTD Group, Schelde Exotech is a specialist in the fabrication and welding of complex structures and difficult materials. Based across a network spanning Estonia, the Netherlands, and the USA, the company delivers high-performance turbine systems for the world's leading OEMs. The core expertise lies in the manufacturing and co-development of inlet volutes and exhaust diffusers for GE LM6000 systems; exhaust diffusers for GE LM2500 systems and custom turbine components for the PE6000 and future-phase developments.

Hungary



Aero Space Power provides high-quality MRO solutions for the aviation and energy sectors. The aviation division maintains a global footprint, holding prestigious FAA, EASA, CAA UK, and CAAC certifications to guarantee world-class safety and reliability. In the energy sector, the company delivers technical excellence through two specialised units: (1) Power repair - Expert overhaul of hot-section components for GE Frame 6, 7, and 9 industrial gas turbines, focused on extending asset life and optimising performance; (2) Solutions - Design and manufacture of turnkey packaging systems and control houses for LM2500 and LM6000 aeroderivative turbines.

United Kingdom



As a specialist subsidiary of Centrica, Centrica Storage is at the heart of the UK's energy security. The company operates the Rough 47/3B offshore platform and the Easington Gas Terminal, facilitating the flow of gas from both the Rough field and the third-party Tolmount field. ■

Highlights from ETN Global's inaugural Frame 5, 6B, 7E, 9E User Group Meeting 2026



Baker Hughes

INDEPENDENT SERVICE PROVIDERS



CHROMALLOY EthosEnergy

IFTA M J B INTERNATIONAL GAS TURBINE SERVICES **ROCHEM**

PETROTECH **WOODWARD**

ETN Global's [2026 Frame 5, 6B, 7E, 9E User Group Meeting](#) successfully took place on 17-19 February 2026 in Ludwigshafen, Germany bringing together the specific engine users, OEMs, service providers and industry experts for three days of technical exchange and collaboration.

The programme combined end-user sessions with expert presentations from independent service providers, alongside dedicated discussions with the OEM. This format created a valuable platform for open exchange, enabling participants to share operational insights and address common challenges across mature gas turbine fleets.

Key topics included fleet performance optimisation, hot gas path strategies, lifetime extension considerations, supply chain

constraints, and the implications of decarbonisation for established frame technologies. The discussions highlighted both the technical complexities and the strategic importance of maintaining and evolving these assets within a changing energy landscape.

Operators and owners of Frame 5, 6B, 7E & 9E gas turbines who were unable to attend are encouraged to subscribe to the ETN Global mailing list [here](#) to stay informed about upcoming user group meetings and future opportunities to engage with the community. ■

2026 Brian Pitt Excellence Awards (BPEA)

In January 2026 ETN Global's Young Engineers Committee launched the 3rd edition of the [Brian Pitt Excellence Awards \(BPEA\) – Master Thesis competition](#), building on the success of the inaugural edition in 2024.

About Brian Pitt Excellence Award



Figure 2: Brian Pitt

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' outstanding contributions in the ever-evolving domains of energy and turbomachinery, while carrying forward the legacy established by Brian Pitt.

2026 competition and prizes

ETN Global's Young Engineers Committee is calling on all Master students to take part in the 2026 BPEA competition, which is organised in three stages:

- **Stage I:** Initial Abstract Submission: deadline 15 May 2026

- **Stage II:** Summarised Thesis Submission: deadline 17 July 2026
- **Stage III:** Online Competition Event: 9 Sept 2026

The winner benefits:

- Opportunity to present your research at the [ETN Global October Workshop](#) (12-14 October 2026, Siena, Italy)
- All major expenses covered for the October Workshop – round-trip travel, accommodation & registration fees
- Official certification recognising your achievement
- €1000 cash prize
- Unparalleled networking with top industry professionals & experts.

The other four finalists' benefits:

- Free entrance to the [ETN Global October Workshop](#).
- Poster presentation opportunity at the Workshop.

To learn more about the eligibility criteria and submission guidelines for the 2026 Brian Pitt Excellence Awards (BPEA) – Master Thesis competition, please visit the [competition's webpage](#). ■

ETN Global's LM2500 User Group meeting

ETN Global's LM2500 User Group Meeting will be held on 09-11 June 2026 in Stavanger, Norway, hosted by Aker BP.



REGISTRATION IS OPEN!

ETN Global's LM-2500 User Group Meeting

09-11 June 2026, Stavanger, Norway

Hosted by Aker BP

Representatives of LM2500 user companies are invited to register to attend [here](#). Registrations will close on 2 June at 12 pm (CEST).

The three-day event will include the following agenda:

- User & technical sessions: Discussions among users (and service providers/suppliers) on top operational priorities identified by the user community.

- GE Aerospace/Baker Hughes/AeroAlliance JV sessions: Update on the latest developments and upgrades, followed by technical discussions on the key operational priorities identified by the user community during the year. There will also be an exhibition area and plenty of networking opportunities.

The 2026 LM2500 UGM is sponsored by the following companies:

OEM



GE Aerospace

CERTIFIED SERVICE PROVIDERS



INDEPENDENT VENDORS



To register to ETN Global's 2026 LM2500 UGM, visit the [event webpage](#).

ETN Global's SGT-A35 User Group Meeting 2026

ETN Global's SGT-A35 User Group Meeting 2026 will be held on 28-30 October 2026 in Calgary, Canada, kindly hosted by TC Energy.



SAVE THE DATE!

ETN Global's SGT-A35 User Group Meeting

28-30 October 2026, Calgary, Canada

Hosted by TC Energy

Representatives of SGT-A35 user companies are kindly invited to save the date for the upcoming User Group Meeting in October.

The three-day SGT-A35 User Group Meeting 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 vendors and service providers can only attend by sponsoring the event and receiving an invitation from the user group's Steering Committee. Interested sponsors are encouraged to submit their expression of interest at [this link](#). Note the due date for submitting an application is 10 May.

To learn more about the ETN Global's SGT-A35 User Group Meeting 2026, visit the [event webpage](#).

2026 Asia Turbomachinery & Pump Symposium



The Asia Turbomachinery & Pump Symposium (ATPS) will be held on 18–21 May 2026 at the Kuala Lumpur Convention Centre, Malaysia. The event combines a high-level technical programme with an international exhibition.

The Asia Turbomachinery & Pump Symposium 2026, organised by the Turbomachinery Laboratory at Texas A&M University, brings together leading engineers, operators, and solution providers from across the rotating equipment sector and plays a key role in knowledge exchange in the rapidly growing Asian market.

The symposium's content is curated by industry experts and focuses on real-world challenges, covering topics such as maintenance, reliability, troubleshooting, and emerging technologies through case studies, tutorials, and interactive discussions.

Ahead of the symposium, ETN Global will convene its inaugural Southeast Asia Gas Turbine User Meeting on 18 May 2026 in Kuala Lumpur, bringing together selected operators for a closed, user-driven exchange focused on fleet *optimisation, reliability and lifetime extension*.

This exclusive session is part of ETN Global's international engagement strategy and aims to capture regional operational priorities, validate key challenges and strengthen the user voice in Southeast Asia.

The outcomes of this meeting will directly feed into ETN Global's contribution to ATPS, including the keynote and user panel sessions, ensuring that the discussions reflect real operational needs from the region.

Alongside the technical sessions, the exhibition floor will showcase innovations from across the turbomachinery, pump, oil & gas, petrochemical, power, aerospace, chemical and water industries making ATPS a comprehensive platform to explore new technologies and connect with key players.

As a partner and a participating organisation, ETN Global's Managing Director [Christer Björkqvist](#) is actively involved in the following sessions:

19 May 2026

- **9:00 - 9:30**, Banquet Hall: Keynote Address "**Energy transition meets operational reality: Solving the energy equation of tomorrow**" (keynote speaker).
- **9:30 - 10:30**, Room 401: panel session "**The User Voice: Aligning technology and R&D priorities with operational reality**" (session organiser and moderator). The panel will bring together high-level experts and senior representatives from leading user organisations across South-east Asia, reflecting the region's key operational perspectives, challenges and priorities.

ETN Global members are entitled to a discount on a conference pass. Reach out to [Viktorija Charbagi](#) for a discount code.

To download the programme and register to attend ATPS 2026, visit the [event website](#). ■

ASME Turbo Expo 2026

ASME Turbo Expo 2026 titled "*Beyond Resilience - Power and Propulsion Systems for a Fast-Changing World*" will be held on 15-19 June 2026 at Allianz MiCo in Milan, Italy.



ETN Global will be well-represented at the event – you can meet us at the exhibition area at the booth #D75 - and we are actively involved in the programme as follows:

- **Panel:** "From Decentralised Assets to Integrated Energy Systems: The Role of Turbomachinery in Flexible Power and Heat Supply" ([Giuseppe Tilocca](#) – session organiser)
- **Panel:** "Voice of the Users: Operational realities defining future gas turbine priorities" ([Christer Björkqvist](#) – session organiser and moderator)
- **Panel:** "OEM Pathways Forward: From latest technical developments to R&D Priorities" (Christer Björkqvist – session organiser and moderator)
- **Tutorial of Basics:** "Micro-Gas Turbine Technological advancements and market research" ([Antonio Escamilla](#) and [Giuseppe Tilocca](#) – chair and co-chair respectively)

ETN Global members are entitled to a discount on a 5-day conference pass. Reach out to [Viktorija Charbagi](#) for a discount code.

To learn more about ASME Turbo Expo 2026 and to register, visit the [event website](#). ■

2026 GTEN Symposium

The Gas Turbines for Energy Network (GTEN) will hold its 26th biennial symposium on 2-4 November 2026 at the Fairmont Banff Springs Hotel in Banff, Alberta, Canada.

The event offers a platform to exchange knowledge on topics such as system efficiency, low-carbon solutions, operational flexibility, and the evolving role of gas turbines in a rapidly changing energy landscape.

ETN Global maintains a close partnership with GTEN, with Managing Director Christer Björkqvist serving on the organisation's committee, reinforcing the strong collaboration between the two networks.

For programme, sponsorships and registration, visit [2026 GTEN Symposium website](#). ■



Understanding the ISOP project and its impact in the energy transition.

An interview with Francesco Crespi, Dissemination Manager from University of Seville and Amgad Khamis, a Doctoral Candidate



Figure 3: Francesco Crespi, Dissemination Manager, ISOP project



Figure 4: Amgad Khamis, Doctoral Candidate, ISOP project

We have recruited 17 doctoral candidates, and their research is co-created and co-supervised by academia and industry, which helps keep questions ambitious but also grounded in practical needs. In short, ISOP is about advancing Supercritical Carbon dioxide (sCO₂) engineering knowledge and, just as importantly, building the talent Europe will need to deploy it.

What are the key technical challenges ISOP is tackling across its research work packages?

Francesco: We deliberately didn't define ISOP around a single 'hero KPI', because sCO₂ technology doesn't mature that way. The real challenges are often at the interfaces: system optimisation that ignores real component maps, designs that look great at nominal conditions but struggle off-design, transients and control becoming the bottleneck under load-following, or materials and manufacturing routes that aren't yet ready for industrial scale. That is why ISOP is structured to cover the whole chain, from system-level integration down to component and material choices, while keeping an explicit eye on operability and real-world constraints.

What is ISOP and why does it matter now for Europe's energy transition?

Francesco: ISOP is a Marie-Sklodowska-Curie Actions (MSCA) Doctoral Network built around a simple but very practical ambition: to help supercritical CO₂ (sCO₂) power systems move from promising research to industrial reality by training people who can bridge both worlds. The timing is not accidental. Europe is decarbonising fast, and the energy system is becoming more variable, so we need conversion technologies that are not only efficient, but also flexible, operable and bankable in real projects. ISOP addresses that gap by combining doctoral research with structured training, mobility and secondments, so that early-career researchers learn to work with the constraints that actually drive deployment: component behaviour off-design, transients and control, reliability, manufacturability, and the economic and regulatory context.

On the system side, our doctoral candidates work on modelling and optimisation methodologies to connect cycle layouts with realistic boundary conditions and component behaviour; on the operation side, a strong focus is given to transient behaviour and control, because flexibility is not an "extra": it is increasingly part of the value proposition for any future thermal-to-power technology. And on the hardware side, there is high-fidelity work on key components (including turbomachinery Computational Fluid Dynamics (CFD) approaches), plus research on materials, coatings and manufacturing routes that are relevant for

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Figure 5: Group photo during the second ISOP training workshop, hosted by the University of Seville.

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high-performance energy systems. The key point is that these tracks are not separate silos: ISOP doctoral projects are meant to connect them, so that design, operation, materials and economics inform each other in a realistic engineering loop.

ISOP is an MSCA Doctoral Network: what is distinctive in the training concept?

Francesco: Unlike many R&D projects defined by a single technical target, ISOP is designed around a different kind of impact: training people who can turn sCO₂ research into industrial reality. That's not a slogan: training is genuinely the primary output, and it shapes how the whole project is run. Secondments and extended stays at industry hosts are a big part of that: they give early-career researchers first-hand exposure to how real decisions are made: time, cost, risk, manufacturability, market signals, and that experience feeds back into better research.

A key strength of ISOP is the breadth of its industrial ecosystem. The network spans multiple segments of the sCO₂ value chain, from OEM and turbomachinery expertise to heat exchanger technologies and engineering/deployment actors, with ETN Global amplifying dissemination and community outreach. And the training itself is structured, not improvised: so far, we have run four workshops and two winter schools aimed at building the complementary skills that sCO₂ needs to mature. That includes (i) system-level understanding and optimisation methodologies (including the emerging role of AI tools), (ii) component design and high-fidelity CFD approaches for turbomachinery, (iii) materials, coatings and manufacturing routes, and (iv) innovation and commercialisation topics such as IPR management and the regulatory/economic context.

What has been the most valuable part of the ISOP training programme so far?

Amgad: ISOP is structured to help doctoral researchers move back and forth between academic research and industrial reality. Part of the PhD happens at the university, where we shape the research question, build the literature review and define the methodology. Then, through secondments and close interaction with industry partners, we test that thinking against practical constraints and real needs. For me, the most valuable aspect is doing this early, not at the very end of the PhD. Industry exposure helps you spot gaps while the research is still evolving: what is missing, what is unrealistic, what data or assumptions need to change, and it supports you in bridging that academia-industry gap with practical feedback. This makes the work more relevant, and it also makes you more confident that the outcomes can eventually translate into real-world problem solving.

How does working in a European Doctoral Network differ from a “traditional” PhD experience?

Amgad: A European Doctoral Network like ISOP comes with a clear structure, shared planning and defined responsibilities across different actors, such as academic supervisors, industrial partners and the MSCA framework. This creates a strong focus on one technology area (in our case, sCO₂ power cycles), while bringing in diverse expertise needed to address energy reliability, affordability and security in a realistic way.

What feels different from a traditional PhD is the scale and the coordination. The research is divided across work packages and doctoral projects that are designed to complement each

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Figure 6: Hands-on session on heat exchanger manufacturing during the first ISOP Winter School, hosted by the University of Stuttgart.

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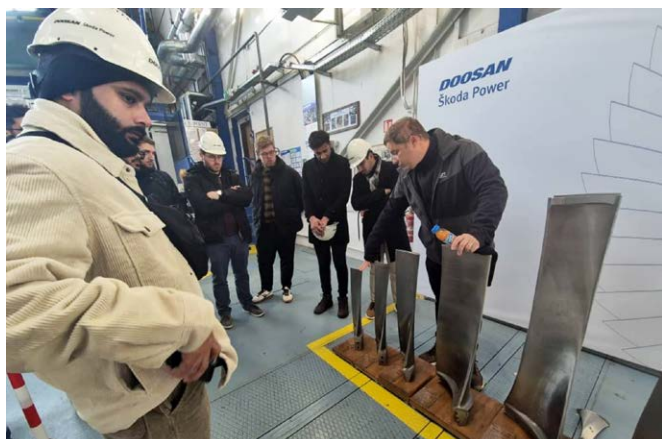


Figure 7: Technical visit to Doosan Škoda Power during the fourth ISOP training workshop, hosted by CTU (CVUT)

other, with regular communication and continuous evaluation. Results in one direction become inputs for work elsewhere, so progress is faster and less “isolated”.

In my view, it would be very difficult for a single PhD to replicate this combination of depth, breadth, industrial exposure and organised collaboration.

From your perspective, what do industry partners bring that academia alone cannot provide?

Amgad: Industry partners are an essential reference point if the goal is real deployment rather than research that stays purely academic. In academia, you can explore ambitious ideas, model them, and test them virtually, which is necessary and valuable. But when you start thinking about implementation, you immediately face questions that are hard to answer from the university alone: Can this be built and maintained? Does it fit time and cost constraints? How does it operate off-design? What regulations, standards or market realities matter?

Industry helps “close the loop”. Partners challenge assumptions, provide practical context, and push the work towards solutions that can be operated and delivered under real constraints. That feedback often leads to an iterative refinement of the research approach, which is exactly how you reduce the gap between promising concepts and bankable projects.

What skills are you developing that you think will matter most for your future career (inside or outside academia)?

Amgad: The programme is helping me develop structured problem solving, critical thinking, and the ability to connect detailed research with the wider objective. Working on a complex topic like the market uptake of sCO₂ technologies, which is the focus of my PhD, quickly shows that technical knowledge alone is not enough: you also need to define the right problem, question assumptions, and communicate results clearly.

Another key skill is adaptability. Through ISOP, I’m learning to move between academic depth and practical relevance, and to work with people from different professional backgrounds—researchers, engineers and industry stakeholders. That exposure forces you to see the same problem from multiple perspectives and to adjust your approach accordingly. I believe this combination of technical understanding, clear communication and flexibility will be valuable whether I continue in academia or transition into industry. ■

Learn more about the project and receive updates on:

<https://isopco2.eu>

Follow us on **in**



This project has received funding from the European Union’s Horizon Europe research and innovation programme, Marie-Sklodowska-Curie Actions (DN-ID), under Grant Agreement No. 101073266.

Reflecting on the ROBINSON project. An interview with Scientific and Technical Manager - Peter Breuhaus, NORCE



Figure 8: Peter Breuhaus, Chief Scientist at NORCE, Scientific and Technical Manager, ROBINSON project

How closely do the final outcomes align with the project's original vision?

Overall, the project delivered much of what it set out to achieve, while also adapting where technical and practical constraints emerged during implementation.

Looking at the physical energy system first, the Combined Heat and Power (CHP) unit performed well and was successfully operated with a higher than originally planned

hydrogen content in the fuel. Some elements of the original plan, such as testing with syngas, integrating a wind turbine, and demonstrating the use of waste or residual heat, were not completed. These changes were mainly the result of evolving technical challenges and business considerations that became clearer during the course of the project.

At the same time, several important components were successfully developed and demonstrated. The advanced Anaerobic Digester assisted by Bio-Electrochemical Systems (AD-BES) for biogas production was built and tested, as was the hydrogen production unit. These represent key outcomes of the project's renewable energy work.

On the digital side, an energy management system for the planned integrated energy system was developed and tested using representative data for components that were not physically installed. This allowed the project to demonstrate how the system would operate and what benefits it could bring under realistic conditions.

In addition, the project delivered useful planning and assessment tools. A life cycle analysis tool was developed to support early-stage decision-making for integrated energy systems, along with a methodology to assess the impact of new installations on local wildlife.

Finally, although beyond the original scope, an interactive replication roadmap was created, together with detailed replication plans for follower islands. These outputs support the wider use and scaling of the project results.

In summary, while not every original element could be fully implemented, the project delivered a strong set of practical results, tools, and planning resources that together reflect the main objectives in a coherent way.

What are the primary regulatory or financial 'bottlenecks' that must be cleared before the ROBINSON solutions can be replicated at scale?

In ROBINSON, we found that regulatory and financial barriers are closely linked. Three main challenges stood out during the project and affected the business cases at the demonstration site:

- rules around trading or sharing energy between neighbours
- very low local energy prices at the Eigerøy site in Norway (among the lowest in Europe)
- high capital and operating costs (CAPEX and OPEX), which made some of the planned business cases unviable at that location

It is worth noting that the results looked more positive at the replication sites, in Western Isles (Scotland) and Crete (Greece), where local conditions were more supportive of the proposed solutions.

The situation is also changing more broadly. New policies and initiatives around energy communities are making it easier to share energy between households and prosumers. At the same time, regulations are being adjusted to better support local energy trading and balancing of supply and demand.

Because of these changes, some of the business cases that were not viable during ROBINSON may become more feasible in the near future, especially when applied under more supportive market and regulatory conditions.

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Figure 9: The installation of the AD-BES unit at the demonstration site of Eigerøy, Norway in December 2023

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Beyond the technical deliverables and milestones, what do you believe will be the most lasting legacy of the ROBINSON project for the energy sector?

A number of follow-up activities are already underway, many of them linked to the pilot site in Egersund, Norway. These include:

- plans to expand the hydrogen plant from 1 MW to an additional 20 MW, introducing a new business activity at the site
- the “Circular Kaupanes” initiative, which aims to bring local companies closer together to share energy, recover energy streams and support more circular use of resources. This has already led to a national project, with international proposals also being developed
- continued use of the life cycle analysis (LCA) tool developed in the ROBINSON project, which helps assess the economic and environmental performance of different design options before investment decisions are made
- use of the replication roadmap, which supports other sites in developing integrated energy systems adapted to their local conditions

Taken together, these activities show that the tools and approaches developed in ROBINSON are already being taken forward in practical ways. Even though not every original objective was fully achieved, the project has created a set of useful methods and concepts that are now supporting new developments beyond the project itself. ■



Figure 10: The installation of ROBINSON Project Partner Dalane’s hydrogen production plant at Kaupanes, Egersund (Norway) in November 2023

Learn more about the project and receive updates on:
<https://www.robinson-h2020.eu>

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This project has received funding from the European Union’s Horizon 2020 research and innovation programme under grant agreement No 957752

North American Regulatory Environment for Gas Turbines – a quarterly update

Although regionally focused, US policy continues to act as a global market signal, influencing OEM technology roadmaps, investment decisions and strategies across international markets. Readers are also encouraged to review EPRI's public report: [Energy System Implications of Market Drivers and State Policy](#) which covers this topic in detail and includes analysis of how policy (along with market drivers) can impact technology investments including in gas turbines.

Prepared by Jim Harper, Neil Kern and Bobby Noble, EPRI

Regulatory history and context

US regulation of gas turbine emissions is rooted in the Clean Air Act (CAA) and strengthened by the 1990 Clean Air Act Amendments. Greenhouse gas (GHG) regulation accelerated following the Environmental Protection Agency (EPA)'s 2009 Endangerment Finding, but policy scope was narrowed by the U.S. Supreme Court in 2022. That ruling reinforced a regulatory framework centred on sourcelevel, technologybased standards.

Current Federal regulatory landscape (2024–2026)

EPA GHG standards for power plants

In May 2024, EPA finalised GHG standards for new and reconstructed gas-fired combustion turbines under CAA 111(b), and emission guidelines for certain existing units under 111(d). Best System of Emission Reduction (BSER) pathways are defined by operating profile: Peaking units (<20% capacity factor), Intermediate units (20–40%), and Baseload units (>40%). A second compliance phase beginning in the early 2030s allows carbon capture and storage (CCS) or low-carbon fuels such as hydrogen. Regulation increasingly hinges on dispatch profile, favouring high-efficiency combined-cycle designs and technologies capable of reducing carbon intensity.

The One Big Beautiful Bill Act and recent EPA administrative actions

Enacted in July 2025, the One Big Beautiful Bill Act (OBBBA) modified US energyrelated fiscal incentives, rolling back or reshaping elements of the Inflation Reduction Act (IRA). While not an emissions regulation, the OBBBA materially affects gas turbine markets through reduced / shortened tax credits for wind and solar, CCS tax credit revisions, Foreign Entity of Concern (FEOC) restrictions, and a less supportive framework for lowemissions hydrogen.

The OBBBA does not repeal greenhouse gas standards, however, subsequent EPA administrative actions have proposed or finalised rollbacks that materially affect enforcement and compliance timelines. EPA has proposed repealing GHG standards for power plants under CAA 111(b) and 111(d), creating substantial regulatory uncertainty. As a result, although statutory authority technically remains, the practical application of these standards does not proceed as originally planned.

Statelevel policy as a counterbalance

Despite federal retrenchment in some areas, statelevel policies continue to drive stringent emissions targets, support renewable fuels, CCS, hydrogen demonstrations and influence permitting and siting decisions. For gas turbine suppliers and operators, this creates a regionally differentiated compliance environment, requiring adaptable technology offerings and market strategies.

Load growth and policy gaps: implications for gas turbines

Recent US policy discussions increasingly recognise electricity load growth as a defining challenge for the power sector. Growth is being driven by a combination of data centres, transport electrification, and industrial and manufacturing reshoring, with projected demand increases in many regions exceeding levels observed over many years.

From a policy perspective, the United States lacks a comprehensive federal framework to align large load additions with generation planning, emissions regulation, or grid infrastructure development. While federal policy has focused primarily on supply-side incentives and emissions standards, demand growth itself remains largely unregulated, with responsibility falling to regional transmission organisations, state regulators, and utilities.

This policy gap has direct implications for gas turbines. In the absence of coordinated demand management or accelerated transmission expansion, dispatchable gas-fired generation increasingly serves as the reliability backstop for rapid load growth. Electricity demand growth driven by data centres and other emerging loads is occurring regardless of federal clean-energy incentives, reinforcing near-term reliance on existing gas turbine fleets and supporting continued demand for new, flexible gas-fired capacity. For gas turbine stakeholders, this dynamic increases the importance of operational flexibility while they also respond to evolving GHG and air-quality regulations. The result is a policy environment in which gas turbines play a critical reliability role. ■

EU Energy policy update

This policy brief outlines the latest key developments in EU energy policy up to April 2026, focusing on decarbonisation targets, dispatchable power and international trade agreements.

This policy update was first presented at ETN Global's Annual General Meeting & Workshop 2026 and has since been updated with the latest developments in relevant areas.

EU Climate targets

The European Union has set [climate targets](#) related to greenhouse gas emissions and the share of renewable energy. By 2030, the EU aims to achieve at least a 55% net reduction in greenhouse gas emissions compared to 1990 levels, alongside a binding target of at least 42.5% renewable energy in the EU's overall energy mix, with the ambition to reach 45%. By 2040, the EU has set a target of a 90% net emissions reduction, while pursuing legally binding climate neutrality for 2050.

EU initiatives

REPowerEU

[REPowerEU](#) continues to provide the framework to reducing the EU's dependence on Russian fossil fuel imports and strengthen energy security. The EU's aims to diversify its energy supply through increased gas imports from Norway, the US, the UK, Qatar and others, while accelerating the deployment of domestic clean energy sources. The gradual phase-out of Russian pipeline gas and LNG imports started in March 2026, with a full phase-out targeted by 2027 (transitional arrangements for certain long-term contracts extending into 2028).

Where does EU gas come from?

Top gas suppliers in 2025 - total 288.7 bcm



Figure 11: [European Council](#)

Natural gas, mainly used for power generation, industrial processes and household heating, remains one of the most important energy sources for Europeans. Almost one-third of imported gas comes from Norway, while US LNG accounted for more than one quarter of total EU gas imports in 2025.

Imports from Russia have dropped significantly from around 40% in 2021 (equivalent to 155 bcm) to 12.5% in 2025 (equivalent to 36 bcm).

Clean Industrial Deal

The Clean Industrial Deal is a key strategic framework focused on industrial competitiveness and rapid decarbonisation of heavy industry, mobilising more than €100 billion in support. Part of this funding is relevant to our sector and accessible through the Horizon Europe programme, providing support for research and innovation in high-priority areas. For the [2026](#) calls for proposal, the European Commission has allocated €333 million followed by further €297 million for the [2027](#) programme, to support the decarbonisation of energy-intensive industries and the development of clean technologies. Additional funds are provided through the [RAISE doctoral programme](#), offering €30 million in 2026 to train PhD candidates in the use and development of AI tools for scientific research across different disciplines.

EU ETS Market Stability Reserve

The EU Emissions Trading System (ETS) remains an important driver for decarbonisation in the power and industrial sector. In response to the increased energy-market volatility and changing supply-security concerns, the European Commission has [proposed adjustments](#) to the Market Stability Reserve (MSR), allowing surplus allowances to be kept in reserve rather than cancelled.. This would give the EU more flexibility to respond to future price volatility or periods of tight allowance supply.

EU gas supply security and summer outlook

The Gas Coordination Group (GCG) has confirmed the EU is well prepared for the 2026 summer season, with gas infrastructure on track to meet the 80% storage target by 1 November. However, geopolitical uncertainty, including developments in the Middle East and around the Strait of Hormuz, requires continued caution.

To mitigate future price volatility or a late-season supply rush, the European Commission is encouraging Member States to utilise the flexibility available within the Gas Storage Regulation and fill gas storage steadily throughout the season, rather than waiting until later in the year. This should support market certainty and ensure winter preparedness.

AccelerateEU

In April 2026, the European Commission presented the AccelerateEU plan as a dynamic response to the volatile energy markets, rising energy costs and increased geopolitical uncertainty, particularly linked to the conflict in the Middle East. The initiative aims to reduce dependence on important fossil fuels by accelerating

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investment in domestic clean energy, grids and electrification, while improving coordination between Member States. It reinforces the EU's focus on energy security, affordability, industrial competitiveness and the need for a more resilient energy system.

Significant resources are available at the EU level, such as €219 billion under the Recovery and Resilience Facility and cohesion policy funds. In addition, the European Investment Bank approved a total of €10 billion in financing. Mobilisation of private investment is also on the agenda under the Clean Energy Investment Strategy from March 2026 for a total need of annual €660 billion.

Methodology for assessing greenhouse gas emissions savings from low-carbon fuels

Implemented in December 2025, The Delegated Regulation (EU) 2025/2359 has established a new framework for assessing greenhouse gas emission savings from low-carbon fuels, with a specific focus on hydrogen and other low-carbon gases. The methodology is based on a life-cycle assessment, accounting for both direct and indirect emissions across the entire value chain rather than only at the point of combustion. To meet these strict compliance standards, a fuel must demonstrate a reduction of at least 70% compared to the unabated fossil-fuel benchmark of 94 gCO₂eq/MJ. This means that the total emissions profile of any qualifying fuel must remain below 28.2 gCO₂eq/MJ. The regulation provides a methodology for assessing low-carbon fuels produced by (i) fossil pathways, such as hydrogen produced from natural gas with carbon capture, provided they meet the required life-cycle emissions savings threshold and (ii) electrolytic pathways, producing hydrogen from water and electricity, where emissions depend on the electricity mix. By setting this threshold, the EU aims to provide market certainty and support clearer definitions of low-carbon fuels.

International Agreements

EU-India Free Trade Agreement

After nearly two decades of negotiations, the EU and India successfully concluded a Free Trade Agreement in January 2026. Together they account for more than 25% of global GDP and population, making it the world's largest free trade zone. Key benefits for EU exporters include reduced trade barriers, improved access to the Indian market and greater supply-chain diversification.

India, the world's fourth largest economy and EU's ninth largest trading partner, also aims to become the world's largest green hydrogen hub, targeting annual production of 5MMT by 2030, equivalent to approximately 167 TWh of energy.

Incident in Spain & Portugal

The final [ENTSO-E report](#) on the 2025 grid incident in Spain and Portugal, published in March 2026, underscores the importance of maintaining flexible dispatchable capacity and robust grid-support capabilities alongside renewable growth. During the recovery phase, dispatchable assets such as hydro-power and combined cycle gas turbines played a critical role in restoring and stabilising the system.

The report's technical recommendations focus on enhancing grid resilience by strengthening voltage and reactive-power control, improving system coordination and ensuring robust power-independent communication channels for system restoration. While the findings of the report are currently non-binding, they are likely to inform future EU grid regulation and resilience requirements. ■

THE LIFE OF THE GT COMMUNITY

ETN Global's upcoming meetings and events

Preliminary list of meetings/events*	Date	Location
LM2500 User Group Meeting	9-11 June 2026	Stavanger, Norway, hosted by Aker BP
High-level User Meeting	12 October 2026	Siena, Italy
ETN Global October Workshop	12-14 October 2026	Siena, Italy, hosted by Sesta Lab
SGT-A35 User Group Meeting	28-30 October 2026	Calgary, Canada, hosted by TC Energy

* For the full list of ETN Global-led & other international 2026 meetings & events, visit our [event page on the website](#).

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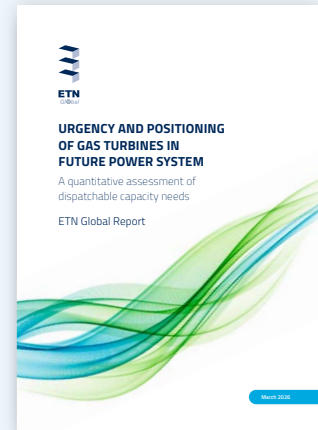


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ETN Global at a glance

Download our latest publications:

[Urgency and Positioning of Gas Turbines in Future Power System – a quantitative assessment of dispatchable capacity needs](#)



[R&D Recommendation Report – 2026 Edition](#)



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