

ETN is a non-profit association bringing together the entire value chain of the gas turbine technology community globally. Through cooperative efforts and by initiating common activities and projects, ETN optimises turbomachinery research and technology development and promotes environmentally sound gas turbine technology with reliable and low cost operation.

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**Christer Björkqvist**  
Managing Director

### Growth opportunities in sight

*A year has passed, yet it feels like only a short moment since the start of 2018, as our life, work, technology and society move at an unprecedented pace. No individual, organisation nor sector is immune from the disruptive changes at play. With both opportunities and threats around the corner, we need to be on our toes as we are confronting new realities. ETN tries to help you take stock of current trends and opportunities and to be in a good position to explore and exploit them. With our wide platform of expertise within our members ETN can help you navigate by exchanging expertise and experiences and to initiate collaborative research & development projects, in line with the user community's needs, to secure a prosperous growth of our industry.*

*The energy transition is gathering pace as the global electricity demand is increasing and the world is becoming increasingly unified in its determination to counter global warming. Nonetheless, global carbon emissions are still rising as it takes time to change direction. However, on the generation side, the three dominant global trends of recent years are anticipated to continue in 2019, which are further displacement of coal-fired generation, steady growth in natural gas, and rapid growth in wind and solar generation. The drivers for these trends are a combination of economics, customer preferences and an increasing political pressure on carbon reduction and local air quality improvements. These trends are all good news for the gas turbine community if we play our cards right. To enable this we need to showcase the important role that our technology today can play in meeting the climate and energy targets in a cost efficient way, parallel to highlighting and exploring development opportunities and contributions in the medium and long term. By exchanging ideas, experiences and knowledge we can then ensure that we are exploring and following up on the most promising opportunities.*

*As wind and solar generation is growing, gas turbine technology is considered as the most suitable technology to provide the major part of flexible back-up to intermittent renewable energy in the future due to its impressive operational flexibility and highly flexible load response. Thanks to the high efficiency, considerably lower carbon emission and much fewer pollutants than coal fired generation, it will also provide immediate important contributions to the carbon emission reduction targets and to local air quality. On top of that there are numerous of promising pathways to follow for the development of cost-efficient carbon-neutral energy generation and storage system solutions based on gas turbine technology. As you can read in ETN's R&D Recommendation Report, Power-to-X is one pathway where "green" electricity produced in abundance is converted to carbon-neutral hydrogen and oxygen for other uses. This includes the transformation of electricity into heat (Power-to-Heat); gas (Power-to-Gas); chemical products (Power-to-Chemicals) or fuels (Power-to-Fuel). Power-to-X technologies can thus balance volatile renewable energy generation which will both enable a continuing growth of this energy and make a vital contribution to decarbonisation. In 2019 ETN plans to start up a new Working Group on hydrogen and ammonia operations to further explore non-carbon and carbon-neutral solutions for future energy systems.*

*Going into the New Year the ETN Board, Project Board and ETN office are highly motivated to help you address technical requirements and explore growth opportunities in sight. I look forward to an active involvement in 2019 in our Working Groups, projects, Workshops and User meetings. You will find more information of the planned activities in this newsletter and on our website. Finally, don't forget to register for our Annual General Meeting 27-28 March in Pau, generously hosted by Total, which will be a meeting not to be missed.*



## AGM & Workshop 2019

*ETN's 15<sup>th</sup> Annual General Meeting and Workshop will take place on 27-28 March 2019 in Pau, France, kindly hosted by our member Total. ETN's AGM & Workshop is a great occasion to meet other members and welcome the six new members who have joined our network since the previous AGM in Bucharest in 2018.*



The first day will be dedicated to the Annual General Meeting (AGM), which will provide the attendees with the results and status of ETN activities from the past year, and the proposed strategy and activities for the upcoming years. One of the new initiatives is ETN's Hydrogen/Ammonia Working Group, which will be introduced at the AGM.

On the second day prioritised topics of interest will be presented, and the participants will be provided with an opportunity to review and influence ongoing projects and new initiatives. Presentations and panels of the first Workshop session will focus on additive manufacturing and hydrogen, followed by parallel Technical Committee sessions addressing the main issues raised by the user community, such as remaining life assessment and R&D opportunities. Preliminary agenda is now available on [ETN's website](#).

### Accommodation

We have negotiated special rates for rooms at [Hotel Parc Beaumont](#) (150 euros/night) on 26-28 March. You may book your accommodation at Hotel Parc Beaumont by filling in the reservation form on [our website](#). This offer is available only until 20 February 2019 on a first come, first served basis.

We have also some rooms blocked for ETN members at [Hotel Villa Navarre](#) (135 euros/night) with a deadline on 10 February 2019. Please contact the [ETN office](#) for more information.

### Venue

The meetings on both days will be held at Total's Conference Centre, located 5 km away from Parc Beaumont hotel and 4 km from Villa Navarre hotel.

### Transport

Pau Pyrénées Airport is located 13 km from the city centre and has daily flights from Paris (CDG and Orly), Lyon, Nantes and Marseille. Other airports nearby are Biarritz, Bordeaux and Toulouse. Pau can

also be reached by train from several cities around France. Bus service will be organised between the venue and hotels for the afternoon of 27 March and the morning of 28 March.

### Side meetings

ETN Board and Project Board members will hold a half-day meeting in the morning of 27 March.

### Registration

Registration for the event is now [open](#) for our members (requires login). If you are an ETN member and do not have a user profile on our website yet, you can create your login credentials [here](#). ■





## ETN User Groups



**SGT-A35  
USER GROUP  
2019 MEETING**



**LM2500  
USER GROUP  
2019 MEETING**



The ETN office has developed a new online platform to gather topics of interest on LM2500 and SGT-A35 (formerly Industrial RB211) gas turbine engines. This platform allows the user community of these engines to share information about specific enquiries, such as operational issues, development needs and clarifications. The objective is to share these with other users and collect their inputs, as well as to define topics of discussion for the upcoming User Group meetings.

Knowledge sharing of operational experience is a key element for the users of our community. Therefore all topics gathered from previous User Group

meetings are also available on the platform, together with technical answers and reactions from OEMs (namely BHGE and Siemens) and invited Independent Service Providers (ISPs).

Once the main topics of interest are defined for the 2019 edition of the User Group meetings, they will be shared with the OEMs and relevant ISPs, who are provided with the opportunity to highlight the latest developments in the selected fields during technical discussions and create a closer relationship with the user community.

If your company would be interested to attend either of the meetings, please contact Valentin Moëns at [vm@etn.global](mailto:vm@etn.global). ■

## ETN booklet on additive manufacturing defects

### Additive Manufacturing Working Group

Best practices for defects detection in additive manufactured components in the energy sector



One of the outcomes of ETN's Additive Manufacturing Working Group meeting in October was a decision to draft a booklet on additive manufacturing defects. The users involved in the Working Group would like to better understand and detect defects on AM components, and therefore it was decided that ETN would compile the best practices for tackling defects together with the WG members' input. The booklet "**Best practices for defects detection in additive manufactured components in the energy sector**" will be available for ETN members on our website ahead of the AGM & Workshop in the end of March. ■

## New members

*Masaoood John Brown International (UK) and Braden Europe (Netherlands) joined ETN at the end of the year.*

**MJBI** is an independent total service provider to owners and operators of industrial gas turbines worldwide.

**M J B  
INTERNATIONAL**  
GAS TURBINE SERVICES

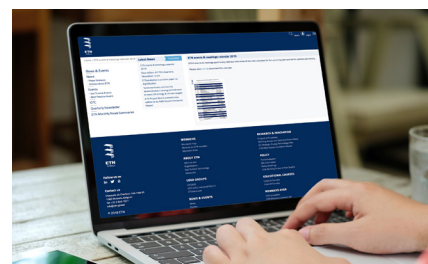


**Braden Europe** is active in the power generation industry for design, manufacture, installation and retrofit of auxiliary equipment for gas turbines.

**INNOVA BRADEN  
EUROPE**  
AN INNOVA GLOBAL COMPANY

We warmly welcome our new members and hope to meet them at our upcoming AGM & Workshop in March. ■

## Preliminary events & meetings calendar for 2019



ETN office has compiled a list of planned and confirmed activities for the upcoming year. The calendar is available on [our website](#) and will be updated regularly. ■

## European standards for gas quality



The objective of CEN (European Committee for Standardisation) Sector Forum Gas Working Group is to facilitate the exchange of information between the different gas stakeholders. ETN office monitors the updates within the Working Group 'Pre-normative study of H-gas quality parameter' under the CEN Sector for a Gas Infrastructure and Utilisation, which was established in May 2016 with the support of European Commission's DG Energy. This Working Group studies and evaluates possible Wobbe Index ranges for distributed H-gas in view of the future revision of EN 16726:2015, and involves all stakeholders, including TSOs, manufacturers, industrial and automotive. The CEN Sector Forum Gas Working Group on Gas Quality has the following sub-groups:

- Chair Advisory Group (CAG)
- Task Force 1 'Wobbe Index' (TF1)
- Task Force 2 'National/Sectorial Situations' (TF2)
- Ad-hoc Group 'Units and Definitions' (AhG)

Uniper attends the CEN Working Group meetings on behalf of ETN (WG, TF1 and CAG). ETN then circulates the relevant information to involved members and receives input from the company experts within our network. Last year ETN submitted comments to the Wobbe Index scenario evaluation to outline the position of gas turbine users. The comments from ETN members, as well as summary documents of the previous WG meetings and working documents are available for our members on [our website](#) (requires login). We invite all interested ETN members to provide their input and get involved. Please [contact us](#) for more information. The topic will be also discussed during our AGM & Workshop in March. ■



## ASME IGTI Electric Power Committee nomination

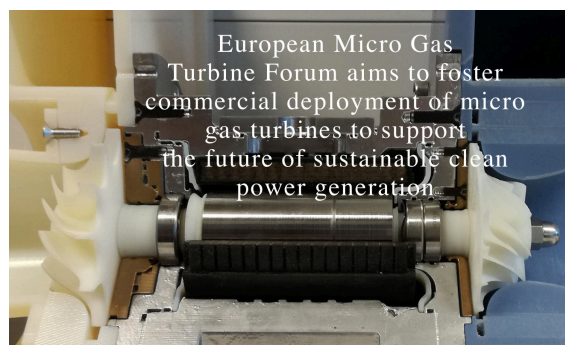
ETN's Managing Director Christer Björkqvist was nominated as Member of ASME International Gas Turbine Institute (IGTI) Electric Power Committee. The Committee promotes the exchange of significant technical information about the application and operation of gas turbine power plant systems, and organises sessions on electric utility operation and application of gas turbines at IGTI's annual Turbo Expo conference. This year's ASME Turbo Expo will take place in Phoenix (US) on 17-21 June. ■

## European Micro Gas Turbine Forum



The European Micro Gas Turbine Forum (EMGTF) initiative aims to foster the commercial deployment of micro gas turbines by setting the scenario where all stakeholders have a platform to share knowledge and experiences, collaborate and discuss a roadmap to move the technology forward. The main objective is to make fast progress that would otherwise not be possible with the business as usual scenario.

The second EMGTF meeting was held on 26-27 November 2018 in Madrid, Spain, hosted by Altran. The objective and focus of this 1.5 day meeting was to provide important information that could foster the commercial deployment of micro gas turbine (MGT) technology. This initiative is carried out in parallel to ETN's Micro Gas Turbine



Working Group that focuses on paving the way for funding opportunities for innovative sustainable MGT system solutions and initiating R&D projects, as well as covering standardisation needs.

Keynote presentations during the morning session of the first day of MGT highlighted the view and interest of potential investors, and in the afternoon a number of case studies for current or potential future applications were presented. The following half day was dedicated to intellectual property management and discussions on additional collaborative efforts going forward. ■

## Bio-HyPP project



The Bio-HyPP power plant is a combined heat and power (CHP) system that can use both biogas and natural gas as fuel. The Bio-HyPP concept is based on a hybrid power

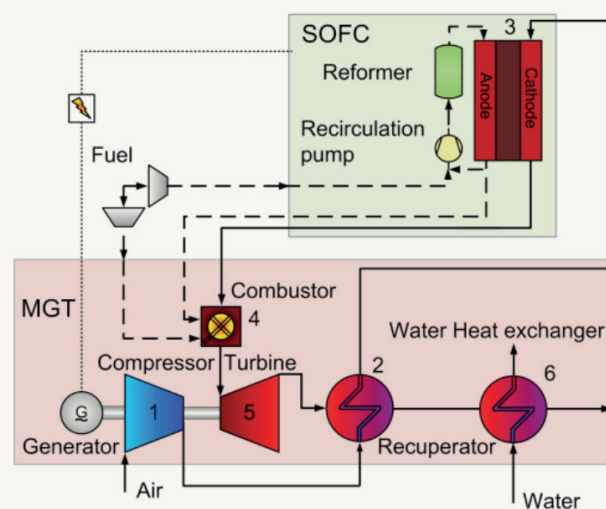
plant – a combination of solid oxide fuel cells (SOFC) and a micro gas turbine (MGT). The project aims at developing a full-scale technology demonstrator with an electric power output of 30 kW.

The project started in June 2015 and will run until May 2019. The main focus of the project is now on the emulation test rigs to characterise components, their interactions and gain insights for the demonstrator. Recently two test rigs have been set up: the MGT test rig (real MGT with emulated SOFC) and the SOFC test rig (real SOFC with emulated MGT). These test rigs are used to analyse characteristics of the components for the hybrid power plant and their interaction.

ETN is a member of the Bio-HyPP project's Stakeholders Group and advises on potential future market applications. ETN member DLR is coordinating the project, and our members University of Genoa, Eindhoven University of Technology and RINA Consulting are part of the project consortium. The project is funded by the EU's Horizon 2020 research and innovation programme. More information on Bio-HyPP is available on the project website: [www.bio-hypp.eu](http://www.bio-hypp.eu).

### Bio-HyPP technology

The air is compressed by the compressor (1) of the MGT, and preheated in the recuperator (2). Before entering the SOFC (3) the biogas has to be reformed. The unused fuel and the products of the SOFC are recirculated to increase the system efficiency. The remaining SOFC fuel downstream of the SOFC is oxidised in a combustion chamber (4). The hot exhaust gases are expanded in the turbine (5). The remaining heat can be used for heating or process heat & steam purposes (6).



## SUPEHR conference

The “Sustainable PolyEnergy generation and HaRvesting – SUPEHR 2019” conference will take place on 4-6 September 2019 in Savona, Italy. The conference will bring together the industry, academia, and research community to exchange experiences, ideas and technical results on future technologies for sustainable energy generation, encompassing the whole range from large power plants to small energy harvesters.

SUPEHR'19 will co-locate three complementary events on specific days:

- 4 September: Sustainable Power Plants
- 5 September: Thermal and Electrical Hybrid Systems
- 6 September: Energy micropolygeneration and harvesting

The call for abstracts is still open – find out more about the event [here](#) and submit your abstract by 31 January 2019.





# NexTurbine 2019

*The 8<sup>th</sup> Annual NexTurbine Summit will take place on 30-31 May in Wuxi (Jiangsu), China. Last year's conference gathered together over 320 participants, making it the biggest gas turbine event in China. NexTurbine 2018 was well-attended by the Chinese users who represented one third of all participants. Also over 19.000 people followed the live coverage of the sessions via the social media app WeChat.*

China is becoming one of the most important gas turbine markets worldwide, being currently the 2<sup>nd</sup> largest market by installed gas power with 87.93GW capacity. Ronnie C. Tian, Founder of NexTurbine was one of the keynote speakers at our International Gas Turbine Conference in last October, giving a comprehensive and interesting overview of the gas power industry in China. His paper *From Survive to Thrive – Gas Power Industry and Policy in China* is available on [ETN's website](#).

However, for many foreign companies it may be difficult to enter the Chinese market due to linguistic, cultural and information barriers. Therefore at this year's NexTurbine conference ETN will organise an **ETN pavilion in the exhibition area** for our members. The main objective is to highlight the expertise and wide range of products and services provided by ETN members, as well as to facilitate the interaction with the Chinese user community. ETN members at the expo will be offered to provide a one pager about their products and services that will be translated into Chinese and included into a booklet which will be circulated to the Chinese user community prior to the conference, with the option for them to request further information and to schedule meetings at the event. Translation service on-site can also be organised if needed. If your company would be interested to participate as an exhibitor, please contact the [ETN office](#) and we will send you the complete package with all benefits.

More information about the conference is available on NexTurbine's website: [www.nexturbine.net](http://www.nexturbine.net).



## Tackling fugitive methane emissions



The reduction of fugitive methane emissions in the energy sector is a prerequisite for the sustainable use of gases in the future energy mix. Therefore the development of a common, robust

measurement methodology and life-cycle based reporting of net methane emissions is necessary.

In line with the latest developments of the European Gas Regulatory Forum (Madrid Forum), ETN was approached by GIE and Marcogaz who are leading the Joint Task Force responsible for carrying out an investigation on the potential ways industry can contribute to the detection, quantification and reduction of methane emissions.

In this regard, ETN members are invited to provide input ahead of the next workshop on methane emissions in the gas sector, organised by GIE, Marcogaz and UNECE on 27 March in Geneva, Switzerland. This will be followed by a report on current understanding within the gas industry to be presented during the next Madrid Forum on 5-6 June 2019. For more details on how to collaborate, please contact [Valentin Moëns](#). ■

# NexTurbine® 19

## the 8th annual summit

30-31 May 2019 | China Wuxi | Sheraton Wuxi Binhu Hotel

江苏·昆山 Kunshan · Jiangsu · China  
2018 5.23-5.25

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### Adapt & Transit

Adapt to today's market requirement; transit for tomorrow's technology challenges

### Down-to-earth

topics generated by high-level executives in Jing-jin-ji, Yangtze & Pearl Delta

### Interactive

AI robot championship for GTers, Beer Night & more interactive events under planning!

### Spacious

1500m<sup>2</sup> grand ballroom more space for meeting & exhibition

• [www.nexturbine.net](http://www.nexturbine.net) •

Contact : TIAN Chao (Ronnie) [ronnie.tian@a-carbon.com](mailto:ronnie.tian@a-carbon.com) +86-18611172076 +86-21-20501626



## COP24 climate conference



Negotiators from around the world met at the United Nations climate change conference COP24, held in December in Katowice, Poland, to agree on details of how to put the Paris Agreement into practice. The conference faced problems already during its first days when oil countries United States, Russia, Sau-

di Arabia and Kuwait refused to accept a resolution that would have welcomed the recent IPCC Global Warming 1.5 °C report, and instead the conference participants agreed to only “note” the publication of the report, which was supposed to form the backbone of the discussions. On the last day of the

COP24, discussion on carbon credits prolonged the negotiations for a day, as Brazil blocked the proposed text which aimed to define rules on global carbon market mechanism. Brazil also withdrew the offer to host the next COP in 2019 ahead of the Katowice conference.

Although the common “rulebook” for implementing the Paris Agreement was adopted at the conference by almost 200 countries, it is still lacking concrete answers to some of the most difficult questions, such as the rules on carbon credits and climate finance for poorer countries. These topics were deferred to the next year’s conference, COP25, to be held in Chile.

Environmental groups called the results of Katowice negotiations unambitious, and criticised the lack of political will to speed up the global climate action in order to keep the global temperature rises well below 2 degrees above pre-industrial levels as agreed in the Paris Agreement. ■

## European Commission’s long-term climate strategy

European Commission presented its long-term strategy for reducing greenhouse gas emissions, calling for a “climate neutral Europe” by 2050. The [strategy publication](#) introduces a vision on how the EU can meet its targets in line with the Paris Agreement, listing eight different scenarios for greenhouse gas emissions, from 80% reduction to net-zero GHG by 2050. Published ahead of the COP24 conference, the strategy strives for strengthening Europe’s role as a leader in global climate action and presents a vision for a transition to a climate neutral economy. EU member states were invited to submit their draft national climate and energy plans to the Commission by the end of 2018, which are “central for the achievement of the 2030 climate and energy targets”.



## Global CO<sub>2</sub> emissions on the rise again

UN Environment reports that global CO<sub>2</sub> emissions increased in 2017, after three years of stagnation. United Nations Environment Programme’s [2018 Emissions Gap Report](#), published in November, states that if the current trend continues it will likely result in global warming of around 3°C by 2100. The annual report notes that technically it is still possible to stop the global rise in temperatures to 2°C, but this would require the nations to raise their ambition and triple their efforts to reach the target. ■

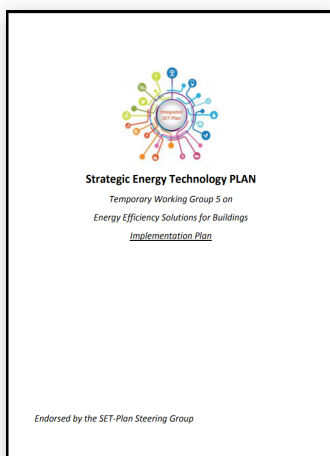




## SET Plan Action 5 – Energy Efficiency in Buildings

High potential of energy savings in buildings and highly efficient technologies for heating and cooling are in the centre of the work of the SET Plan Temporary Working Group 5: Energy Efficiency Solutions for Buildings. The Temporary WG was recently divided in two subgroups to address these topics: “New materials and technologies for energy efficiency solutions for buildings” and “Cross cutting heating and cooling technologies for buildings”.

ETN has been actively involved in drafting the Implementation Plan of the Temporary



WG 5, which was endorsed in November, pushing for the inclusion of one activity fiche on micro CHP-CCHP: “Cost reduction and increase in efficiency of micro CHP/CCHP”. This will constitute the basis for future European research programmes funded by the EU member states.

The next step for the SET-Plan Action 5 WG members is to discuss potential cooperation opportunities, in which EU member states will join resources to fund the activities presented in the Implementation Plan. The Action 5 Implementation Plan can be accessed [here](#). ■



### Clean energy package completed

The EU negotiators finalised the formal approval of four pieces of the Clean energy package, as regulations for [risk preparedness](#) and [ACER](#) (Agency for the Cooperation of Energy Regulators), as well as the [electricity market](#) directive and regulation were approved by the Council, the European Parliament and the European Commission at the end of last year.

The risk preparedness regulation aims to improve security of electricity supply in crisis situations, whereas the ACER regulation enhances the role of the Agency for the Cooperation of Energy Regulators. Reform of Europe's electricity market will put an end to the state subsidies for the power plants emitting 550gr CO<sub>2</sub>/kWh or more. The measures will apply to all new power plants as soon as the regulation enters into force later this spring, and to the existing power plants from 2025 onwards.

Completion of the negotiations means that political agreements have been reached for all eight legislative proposals of the Clean energy package which the European Commission introduced in November 2016. ■

## Renewable Heating & Cooling ETIP

**RHC** Renewable Heating & Cooling

European Technology and Innovation Platform

European Technology and Innovation Platform on Renewable

Heating & Cooling (RHC-ETIP) brings together stakeholders from the biomass, geothermal, solar thermal and heat pump sectors, including the related industries such as district heating and cooling, thermal energy storage, and hybrid systems. The platform aims to define a common strategy for increasing the use of renewable energy technologies for heating and cooling.

RHC-ETIP has five technology panels. ETN follows the developments within the platform and receives updates from DLR who represents ETN in the Biomass Technology Panel Steering Committee. The panel brings together industrial and R&D stakeholders of the biomass sector, aiming to pave the way for biomass based heating and cooling in Europe. It is composed of four Issue Groups:

- Biomass fuel
- Technologies for residential heating
- Technologies for industrial and district heating
- Non technological issues (markets, policies, communications, training)

The RHC-ETIP was restructured recently and new Horizontal Working Groups (HWGs) were launched, allowing experts from different technology panels to work on common horizontal topics, defined on the basis of main challenges to be addressed by the RHC sector. DLR will contribute to the “100% RE buildings” HWG, which includes micro and small scale CHP technologies as a topic. ETN members will be invited to provide input to the issue topics. ■

## Upcoming meetings and events

Meeting/Event	Date	Location
ETN Board meeting	13-14 February 2019	Brussels, Belgium
ASME GTS Advanced Manufacturing & Repair for Gas Turbines*	19-20 March 2019	Berlin, Germany
ETN Board meeting	27 March 2019	Pau, France
ETN Project Board meeting	27 March 2019	Pau, France
ETN AGM & Workshop**	27-28 March 2019	Pau, France
SGT-A35 User Group meeting	May 2019 (week 19)	To be confirmed
NexTurbine*	30-31 May 2019	Jiangsu (Shanghai), China
LM2500 User Group meeting	June 2019 (week 24)	To be confirmed
ASME Turbo Expo*	17-21 June 2019	Phoenix, United States
Sustainable PolyEnergy generation and HaRvesting – SUPEHR 2019 conference	4-6 September 2019	Savona, Italy
ETN High-Level User Meeting**	October 2019	To be confirmed
ETN October Workshop**	October 2019	To be confirmed
GTSJ International Gas Turbine Congress*	17-22 November 2019	Tokyo, Japan

\* ETN members are entitled to a discounted registration fee | \*\* Only for ETN members

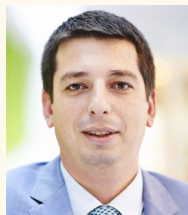
## ETN Team



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**Ilona Kolb**  
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**André Mom**  
External Consultant

### ETN at a Glance!

Download the [ETN Brochure](#), featuring:

- ETN Mission & Objectives
- ETN Technical Committees
- ETN Projects
- ETN Events & Activities
- ETN Membership Benefits
- And more!



Are you a gas turbine user?  
[Download the Brochure](#) showcasing the benefits of being part of ETN's global gas turbine user community.



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