



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 gas turbine 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

Surf the waves!

In 2017 we have seen a number of transition waves growing stronger and demonstrated their power; digitalisation, additive 3D manufacturing and the biggest one, the transition wave to a low carbon society, which has now truly become a global wave.

President Trump tried to diminish the wave by announcing in June 2017 the United States' decision to withdraw from the Paris Climate agreement. However, this actually instead strengthened the wave as it prompted the EU, China, India, and Canada to engage in an even stronger commitment and also created more momentum for the private sectors and citizens to act on climate change to make up for the US reversal. The Paris agreement was also successfully completed at the UN's 23rd COP Convention on Climate Change that took place in November in Bonn, Germany, as all members of the United Nations have now signed the agreement. Even though the United States still withstands their decision to withdraw from the agreement, they can formally only do so in four years, after the signature, which interestingly happens to be one day after the next U.S. presidential election, in November 2020.

Chinese President Xi Jinping also stepped up their commitment in 2017 and stated that China intends to become a "torch bearer" for ecological issues and the combat against climate change. Having said that, it should be noted that China still burns more coal than any other country, but they are clearly making efforts to live up to President Xi's words, at least domestically, as they are in the process of shifting from coal to natural gas in major cities. China is also still the world's largest investor in renewable energy, spending about a billion dollars a year on clean energy in the race to cash in on renewable energy technologies.

Digitalisation including data collection, advanced analytics and diagnostics together with additive 3D manufacturing are other major waves that can help our industry to both cut costs and further develop our technology. After 20 years of iteration on the same basic additive manufacturing technologies for metal, a new wave of innovation is emerging. Lower cost, safer processes are replacing the old ways of doing things, offering vastly different material properties through resolution, surface quality, and design freedom.

"How to stay on top of these waves", "future research directions" and "cooperation opportunities" were all discussed at our well attended October Workshop in Genoa, Italy in the autumn. At this meeting we also had the opportunity to meet and discuss with Filippo Abba', the CEO of Ansaldo Energia. You will find an interesting interview with him in this edition, where he displays his view on the future.

With the further strengthening and widening of ETN both in coverage and in Membership in 2017, we are well positioned to both influence and stay on top of the waves through the wide knowledge and experience within our network. Anyone who has tried surfing knows how much more fun it is to be on top of the board surfing than swimming against the waves in deep water.

In 2018 I look forward to a continuous and enlarged cooperation to secure a prosperous future for our industry. Many meetings and activities have already been scheduled, the two main ones being our AGM and workshop 14-15 March and our International Gas Turbine Conference 10-11 October. I hope to see you at these meetings.



October Workshop gathered 120 ETN members

ETN held its biennial Autumn Workshop on 4-5 October 2017 at Ansaldo Energia Foundation in Genoa, Italy, where 120 participants joined to discuss the gas turbine community's needs and requirements and to plan future research activities.

On the first day, Christer Björkqvist, ETN Managing Director opened the ETN Workshop and introduced the programme, followed by a warm welcome by Filippo Abba', CEO of Ansaldo Energia. As the President of ETN Board, Bernard Quoix (TOTAL) addressed a special greeting to the new ETN members and welcomed them as part of the ETN network. Catherine Goy, ETN Board Vice-President/Uniper reported the outcomes of the High Level User meeting, which took place one day ahead of the Workshop and was hosted by the University of Genoa.

The opening day continued with presentations from high level speakers, who addressed the opportunities related to digitalisation as a mean to optimise the operation of power plants; additive manufacturing for onsite components' repair; integration of energy storage in the power plants; the role of hydrogen in the EU energy scenario; and the future direction of gas turbine technology. In the evening of 4 October, the ETN members were invited to attend a dinner at the Aquarium of Genoa, kindly sponsored by Ansaldo Energia. The Aquarium was open exclusively for the ETN Workshop attendees who had the



opportunity to explore the fascinating venue before dining.

The second day consisted of parallel sessions where the activities and projects of ETN's Technical Committees were discussed. The fruitful meetings advanced ongoing activities but also generated ideas for new initiatives. An interest Group on NH₃ Combustion was launched and a Working Group on Hot Corrosion was established.

Apart from the Workshop and the High Level User meeting, several side meetings were organised in Genoa: the IGTC-18 Conference Advisory Board meeting; Micro Gas Turbine standardisation meeting; ETN-UK-US National Department of Energy collaboration meeting; and Air Filtration standardisation meeting. We would like to thank our members for a successful week full of productive meetings. ■

IGTC-18 sponsorship opportunities available for conference



The International Gas Turbine Conference 2018 will take place at Le Plaza Hotel in Brussels, Belgium, on 10-11 October 2018. Its objective is to review future market opportunities, raise awareness

of gas turbine (GT) technology R&D development achievements and future needs, as well as to explore and exchange ideas with GT experts from the whole value chain, attending from all continents. The conference will provide an exclusive opportunity for any company to show their role in the Future of Gas Turbine Tech-



nology. All our exhibitor spaces for the conference have already been reserved, but you can visit [our website](#) to find out more about other available sponsorship options, or contact Noora Kilpinen at nk@etn-gasturbine.eu. ■

Best Practices to be awarded at Annual General Meeting 2018

Last year ETN, together with the Combined Cycle Journal, launched the Best Practice Award at a global scale, with an objective to collect the practices that can benefit the gas turbine industry.

Topics for the submission are:

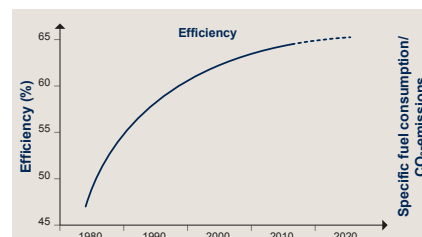
- Workforce development/knowledge management
- EHS: Environment, Health and Safety

The panel of judges specialised in asset management will evaluate the entries and award the Best Practices during the ETN Annual General Meeting in March 2018, to be held in Bucharest, Romania. All entries will also be granted recognition from the industry with the publication of a special ETN report circulated within the member community.



Pascal Decoussemaeker introducing the Best Practice Award

All companies, members and non-ETN members, operating or supporting gas turbine operations can apply. Deadline for submitting entries is 28 February 2018. The detailed rules are available on the [ETN website](#). ■



The race towards 65% efficiency

In the last quarter, all the heavy-duty OEMs announced impressive [efficiency improvements](#) towards a 65% combined cycle efficiency. Energy efficiency is very important from the supply side, as well as the demand side. The International Energy Agency estimates that of all efforts required delivering a 50% reduction in global CO₂ emissions by 2050, 7% will need to come from power generation efficiency. As reported in the latest issue of the [Energy Industry Times](#), "Pushing the combined cycle envelope", combined cycle plants with improved flexibility operating at 63% and beyond will be "well placed to play an important role in the evolving energy landscape globally". ■



Open position at ETN

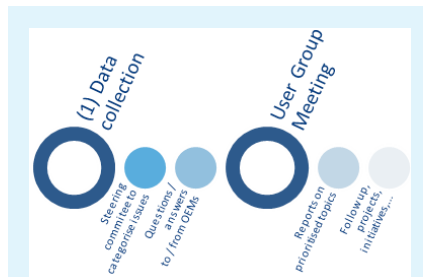
Our team in Brussels is looking for a Technical Project Officer, with a background in gas turbine engineering, who will coordinate ETN's Engine Specific User Groups and activities. Read more about the new position on our [website](#) and spread the word around.

ETN User Groups tackle technical issues and highlight future requirements of the industry

ENGINE-SPECIFIC USER GROUPS

This year ETN will continue to further develop its engine specific groups initiated by the gas turbine user community. Following the established methodology of the previous years, ETN is currently collecting the recurring issues from the LM2500 and SGT-A30/35 (previously Industrial RB211) users, as well as information about their specific development needs. Once collected, the User Group Steering Committee will hold a meeting on 31 January in Florence, Italy, to classify and prioritise the issues. The agendas for each of the two-day User Group meetings will be designed to address the top priority topics in an efficient and focused way.

Ahead of the User Group Meetings, the listed issues are shared with the OEM of the specific engine in order to prepare for the meeting. This upstream model has proven to be an efficient way of guaranteeing a focused and productive discussion between the users and technical experts from the OEMs. After the meetings, ETN will produce reports for the user community for each prioritised issue based on the meeting discussions and after the meeting closely monitor and follow-up on the outcomes.



The call for data collection is still open. If you are an owner and operator and wish to share your issues and participate in the UGMs, feel free to contact Matthieu Pawlik at mp@etn-gasturbine.eu for further information. Sponsorship opportunities are also available for both groups. If you are interested, please contact us at mp@etn-gasturbine.eu.



The next meeting will be the SGT-A30/35 User Group meeting 26-27 April 2018 in Sitges, Spain, near Barcelona. The LM2500 User Group meeting will take place 20-21 June in Berlin, Germany. A detailed agenda and more information of these events will be available on the ETN website in the upcoming months. ■

MGT Working Group published Technology Summary



Since the early days of ETN, Micro Gas Turbines (MGTs) have been a promising technology that

many ETN members have shown interest in. ETN's MGT Working Group, which connects the key stakeholders in the MGT community and consists of representatives from OEMs, Heat Exchangers Manufacturers and R&D Institutes, published its Technology Summary report in January 2018. The report aims to provide a state of the art overview of the technology that can guide and encourage investment in further research and development of the technology, as well as highlight integration opportunities. It provides an overview of the MGT and the challenges in developing the technology further, as well as analyses the results of international research projects. Ugo Simeoni, who is coordinating the Working Group states that the Technology Summary intends to explain how MGT technology, integrated with combined heat and power (CHP) and renewables, could contribute in reaching the EU 2030 energy targets, and to analyse the impacts of deploying Micro Gas Turbines. A set of alternative research activities for the development of the MGT, both in the short and long term, are also introduced in this report. The Technology Summary is available on the ETN website. ■

OMSoP project video showcases the potential of CSP in Europe's low carbon energy goals



As part of the Optimised Microturbine Solar Power System project consortium, ETN coordinated the production of two OMSoP videos. The overall objective of the OMSoP project was to provide and demonstrate technical solutions for the use of state-of-the-art CSP system coupled to micro gas turbines (MGT) to produce electricity, which was successfully achieved. The project started in February 2013 and ran until July 2017. A longer video explaining the technology and project outcomes is available on

the OMSoP website www.omsop.eu and a short video via [this link](#). ■

INTERVIEW:

Filippo Abba', CEO, Ansaldo Energia

Ansaldo Energia recently hosted ETN's Autumn Workshop at their headquarters in Genoa, Italy. Today the company operates in eight countries and employs over 4,500 people worldwide. At this occasion ETN caught up with the newly appointed CEO Filippo Abba', who joined Ansaldo Energia in March 2017, and asked his views on some timely topics concerning his company and future opportunities for the industry.

Ansaldo Energia has transformed rapidly from a national company to a truly international actor in the power generation industry. In 2014 Ansaldo entered into a joint-venture with Shanghai Electric and in 2016 both the acquisition of key Alstom technology assets from General Electric and the takeover of the US-based service company PSM (Power System Manufacturing) was finalised. What is the secret behind the company's recent expansion and success?

Ansaldo Energia, with the acquisition of key Alstom technology and assets from General Electric, becomes a more important global player, with an even broader product portfolio parallel to a unique service technology platform covering also several gas turbines produced by other OEMs, including the most advanced models. This would not be possible without new skills, new vision and new enthusiasm.

How important is the partnership with Shanghai Electric for your company?

The partnership between the two companies has given the Ansaldo Energia Group access to the Chinese market, where it has received orders for more than 20 gas turbines, which are currently being supplied and installed. In June last year, together with SEC, we signed three important cooperation agreements, one with the Shenergy Electric Group and two with Shanghai Electric Power (one for China and one for Pakistan).

The first two industrial cooperation agreements cover the construction of two power generation plants in the Shanghai area using the most advanced technology in Ansaldo Energia's portfolio, the GT36 maxi gas turbines built in Italy and delivered from the new Cornigliano production facility. The agreements allow Ansaldo Energia on one hand to start penetrating the Chinese market with this advanced technology featuring high production efficiency associated with the lowest environmental impact, and on the other hand to consolidate the strategic partnership with Shanghai Electric Group, which has resulted in the two companies winning a market share of 30% of the Chinese power generation market.

The third strategic cooperation agreement which is called "One Belt & One Road" has the aim of developing a project in Pakistan, in which Shanghai Electric Power is acting as investor, and Shanghai Electric together with Ansaldo Energia as the supplier of the machinery and main components for the plant.

How do you see Ansaldo Energia handling the energy transition towards a low-carbon society in 2030 and zero-emission technology in the 2050 scenario?

For Ansaldo Energia the low-carbon challenge is an opportunity to consolidate and even expand our business. We have both gas turbines able to utilize meaningful percentages of carbon-free

fuel such hydrogen and the capability of integrating different technologies to deliver a full key hybrid plant. On top of it, our engines ensure already a high level of efficiency, flexibility and highest standard emissions compliance. We can provide high efficiency equipment ranging from 100kWe, through our AE-T100 micro gas turbine, to 500MWe through our GT36 heavy-duty gas turbine.

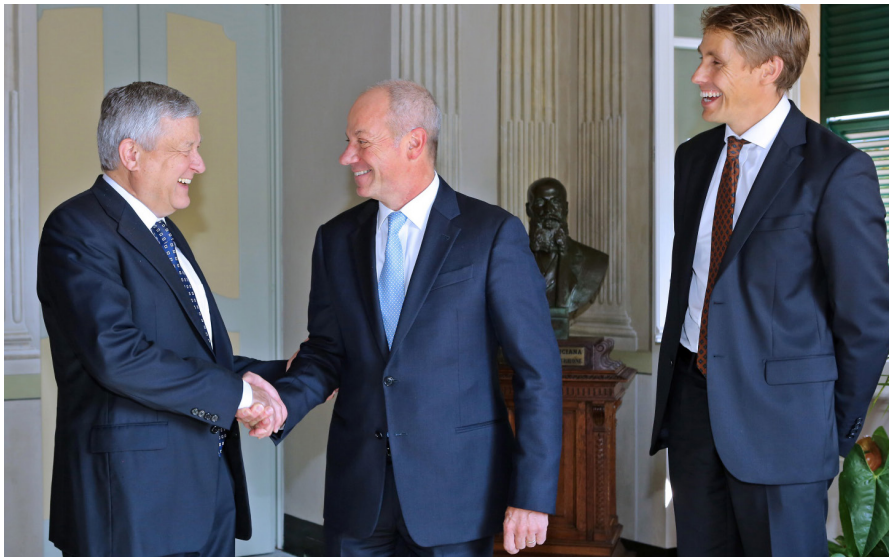
In Europe the gas turbine industry has been facing a drastic slowdown in orders over the last years, due to the high amount of renewables entering the market and the high price of gas. Do you see a comeback for GT in Europe, as coal and nuclear power generation to a large extent is being faced out, and as a result of the lower price and higher availability of gas?

For sure coal and nuclear in the long run are bound to be phased out, especially in Europe where environmental concern is particularly strong. This opens up an important market window primarily for renewables but also for gas power generation. Gas turbines are essential in order to ensure grid stability vis a vis highly fluctuant power coming from renewables. Of course this poses a challenge to the gas turbine OEMs for increasing product portfolio variety, levels of flexibility, emission reductions and fit to hybrid plants which are going to play a relevant role in the medium term.

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continued from page 5



ETN President Bernard Quoix, Ansaldo Energia CEO Filippo Abba' and ETN Managing Director Christer Björkqvist at the ETN Workshop in Genoa

Just in case I would highlight we are already actively acting in the European decentralised power generation market from years with our AE-T100 micro gas turbine technology, building up small-size cogenerative and trigenerative plants in industrial and civil contexts which are mainly concentrated in those markets with sensitively renewables diffusion, strict smart grid codes and environment regulations like Italy, Germany, UK and Scandinavia.

In the current European market scenario, fast starting simple-cycle gas turbines seem more attractive than the larger combined cycle gas turbines for back-up power, cycling and decentralised power generation, where operational flexibility, lower capital investment cost and smaller footprint are attractive elements. Do you think this will change as a result of the latest technology developments and advancements of current GT capabilities?

Basically, it is a correct perception: simple-cycle gas turbines are for sure cheaper and fit to decentralised and back-up power. However recent developments affecting large/very large turbines in terms of efficiency and flexibility may put large combined cycle in the position of being a good investment

to complement an extensive presence of renewables powered plants, ensuring stability to the grid especially when large amount of unplannable generation capacity is missing.

What role and impact do you foresee for the new GT36 gas turbine in the current market scenarios in Europe and globally?

Our GT36 has been designed starting from Customers' needs and it is bound to be a solid alternative to the GE, Siemens and Mitsubishi H class turbines. Performances are at par with best in class. On top of that the GT36 thanks to its unmatched flexibility, is the best choice to support fluctuant power grids

To meet the user community's needs of increased reliability, reduced outage time and operational cost, the major OEMs have invested heavily in coupling Operational Technologies with Information Technologies in digital platforms. Is this a path Ansaldo Energia is also taking?

Sure, Ansaldo Energia takes the digital transformation as a serious opportunity to improve its processes' efficiency and to increase the Customer value. To this regard we have planned major investments at the factory level inside the Italian government scheme Industry 4.0. In

addition, we are developing and introducing into the marketplace new products with heavy digital contents in the areas of predictive maintenance and service inspection, among the others.

What do you see as the biggest challenges for Ansaldo Energia in the upcoming years?

Our challenges are the same challenges the other OEMs are tackling; to decide on what, how and when to invest. On our side, we have the advantage of being smaller, more flexible and faster. It is all about business, as usual.

You recently hosted ETN's Autumn Workshop in Genoa and had the opportunity to meet our members and get a better insight into ETN's activities. What was your impression and what role do you think ETN could play in helping its members to overcome the challenges ahead?

At the ETN Autumn Workshop, the majority of the discussions and presentations focused on development opportunities in the transition wave towards a low carbon and carbon free society. All of them had very high-quality content, and the high number of attendants at the Workshop clearly demonstrates that these are important topics to address. ETN has an important role to play, as they can highlight recommendations for R&D topics based on interpretations of the user community's needs and requirements, as well as policy targets. Their meetings also provide an excellent opportunity for high quality networking and exchanging of ideas and experiences within ETN's Technical Committees and Working Groups, as we saw in Genoa. ■



They are on Twitter:
@AnsaldoEnergia



They are on LinkedIn:
Ansaldo Energia



eu2018bg.bg

Bulgarian Presidency of the Council
of the European Union

Bulgaria's first Council of the EU Presidency



On 1 January 2018, Bulgaria took over the rotating presidency of the Council of the EU for the first time in the history of the European Union. The Balkan country will chair the Council meetings and drive forward the Council's work during the next 6 months. Bulgaria lists the "future of Europe and young people, Western Balkans, security and stability, and digital economy" as its key focus areas during the presidency. In its [Work Programme's](#) energy section, Bulgaria stresses the importance of the necessary gas infrastructure in ensuring the energy security in South-East Europe. "The diversification of sources and routes and the construction of the "Balkan" European gas hub will be among the Bulgarian government's most important priorities during the Bulgarian Presidency."



They are on Twitter:

@EU2018BG, @EUCouncil

EU Energy Council meeting in December 2017



The EU energy ministers met in Brussels on 18 December 2017, agreeing on the Council's negotiating positions on four legislative proposals of the Clean energy package. For the [renewables directive](#), the ministers set a target of 27% for renewable energy of the EU's overall energy consumption by 2030. This was criticised for being unambitious by the environmental groups and business leaders, and already in late-November the European Parliament's Committee on Industry, Research and Energy (ITRE) called for increasing the 2030 target to 35%. Also Miguel Arias Cañete, the Commissioner for Climate Action and Energy called the Council's level of ambition insufficient and the numbers outdated due to the falling prices of renewables.

Regarding the [internal electricity market](#), the energy ministers discussed the stand-by power through the "capacity mechanisms", and decided that

the new installations will be "eligible to participate after 2025 only if their emissions are below 550gr CO₂/kWh or below 700 kg CO₂ on average per year per installed kW". The ministers also agreed on a limit for participation for existing power plants, which "cannot receive payments after 2030 and the payments need to decrease after 2025." As a next step the Council and the Parliament will need to find a compromise on all the legislative proposals before the Clean energy package can become law.

During the Energy Council meeting it was also announced that the EU will invest 101.4 million euros in [the construction of the liquefied natural gas \(LNG\) terminal](#) on the island of Krk in Croatia.



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2017 second hottest year in history

According to a [new report](#) by the European Commission's Copernicus Climate Change Service, the data from the last year shows that 2017 was the third exceptionally warm year in a row. The hottest year on record was 2016, 2015 being the third warmest in history.

Upcoming meetings and events

Meeting/Event	Date	Location
ETN Project Board and TC Chair meeting*	23 January 2018	Brussels, Belgium
IGTC-18 Conference Advisory Board meeting*	24 January 2018	Brussels, Belgium
User Group Steering Committee meeting*	31 January 2018	Florence, Italy
ETN Board meeting*	21 February 2018	Brussels, Belgium
ETN Annual General Meeting*	14-15 March 2018	Bucharest, Romania
SGT-A35 (Industrial RB211) User Group meeting*	26-27 April 2018	Sitges (Barcelona), Spain
NexTurbine2018	24-25 May 2018	Kunshan (Shanghai), China
LM2500 User Group meeting*	21-22 June 2018	Berlin, Germany
International Gas Turbine Conference 2018	10-11 October 2018	Brussels, Belgium

* Only for ETN members

ETN Team



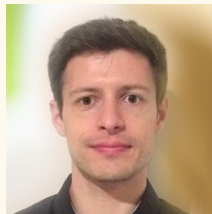
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Managing Director



Noora Kilpinen
Communications Officer



Ugo Simeoni
Technical Project Manager



Matthieu Pawlik
Technical Project Officer



Ilona Kolb
Financial and Administrative Officer



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 located outside the EU? [Download the Brochure](#) showcasing the benefits of being part of ETN's global gas turbine user community.



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