ETN NEWS

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ETN is a non-profit association bringing together the entire value chain of the gas turbine technology community in Europe and beyond. Through the cooperative efforts of our members, ETN facilitates gas turbine research and technology development, promoting environmentally friendly stationary gas turbine technology with reliable and low cost operation.



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Christer Björkqvist Managing Director

The role of Gas Turbines in the Future Energy Network

In November last year I participated as a panellist at the international gas turbine conference in Tokyo, organised by the Gas Turbine Society of Japan. The topic of discussion was the role of gas turbine technology in the future energy network. This is a fundamental question that we have discussed and debated within ETN since the organization was founded in 2005. Over the years, we have learned that this is extremely difficult to predict because there are so many factors that can influence it: policies; legislations; economics; market demand; fuel prices; technology developments and wild cards (unexpected events like the Fukushima disaster). You might argue that this has always

been the case but the difference is that the market and policy framework have become less stable and more globally connected. Consequently, changes appear quicker and more unpredictable than in the past. However there is plenty of gas available and we can also influence the future role of gas turbine technology through further technical development and innovation. It will though require a wider R&D cooperation to reduce cost and risk as well as to enable a faster response to the market needs.

The wide global agreement on CO_2 -reduction among 195 countries during the climate negotiations of the COP21 in Paris in December is encouraging; especially the acknowledgment of market based mechanisms to achieve the agreed targets. Even though there is no legally binding agreement, it is an irreversible step towards a global low carbon transition which I believe will favour gas-based solutions in the energy mix. Gas turbine technology is a proven and reliable technology that can, already today, provide significant contributions to global low emission pathway. The technology has also a high potential for further emission reductions through part load efficiency improvements and in the medium/long-term perspective, it can be developed to deliver decarbonised solutions through the use of CO_2 neutral fuels or by integration of CO_2 capture technologies. These are all future promising developing paths where gas turbine technology, with supportive R&D collaboration programmes and the right market incentives, could provide cost efficient energy solutions for the future in line with the requirements of the Paris COP21 agreement.

Hans van der Loo, a well-recognized energy and policy expert, recently highlighted the accelerating demographic developments as one of the biggest barriers for realising the COP21 Climate Deal. From the beginning of the 20th century until today, we have seen a staggering population increase from 1.5 billion people to 7.3 billion. As a result a large part of any efficiency increase or emission reduction through technical development and innovation will first be absorbed by the demographic and economic growth before giving any ecological net benefit. This demonstrates that it will be crucial to address both energy supply and energy demand with all tools available. From policy makers, we would like to see stable framework conditions where the winners will be the technologies that provide emission reductions in the most cost efficient way.

I am pleased to announce that by the end of 2015 we reached the highest number of members in ETN's history which clearly shows the industry players and research community's willingness to cooperate, even though these are tough times for both Power Generation and Oil & Gas industries. I therefore have a positive outlook for 2016 and look forward to a wide and enlarged cooperation on the multitude development opportunities for gas turbines.



ETN's Exhaust Systems Project: Interview with Amelie Pesquet, Total

The Exhaust Systems Working Group is finalising the Waste Heat Recovery Units (WHRU) standard to be submitted to the ISO/TC 192 before the end of 2015. Amélie Pesquet, Chair of the Exhaust Systems project from Total, gives us more details about the project.

As the Chair of the Exhaust Systems Project Group, could you explain the project's main objective?

The main objective of the project is to create an ISO standard on exhaust system designs for gas turbines, at first for Oil & Gas application and therefore, essentially concerning Waste Heat Recovery Units and standard Exhaust Systems for gas turbines.

When was it initiated and who is currently involved?

It was initiated by Statoil, Shell and Total in 2009 due to the number of recurrent

breakdowns experienced by operators. The goal was to bring together operators facing similar problems with their exhaust systems, as well as exhaust system designers and external expertise and support, who could address the problems by developing a common standard for the design of gas turbine exhaust systems.

Currently, AAF, Aarding, Alstom, BIHL, Camfil, Dresser-Rand, GE Oil & Gas, Kanfa-Tec, Mjorud, TOTAL, RWTH, Shell, Statoil, TechPart and Frazer-Nash are working together to finalise the first version of this standard.

What is the main achievement of the project so far and what are the next steps?

The first version has been technically finalised and will be submitted to ISO by the end of 2015 or beginning of 2016. The next big steps are the validation of the modeling method through a benchmark case on a unit and the review of the HRSG API recommendation in order to amend it.

Further information can be found on the Exhaust Systems webpage.

EU-funded Project Development EU-Funded Project: OMSoP Consortium Meeting



On 25-26 November 2015, the OMSoP project partners met in Stockholm, Sweden to discuss the

latest developments of the project. The OMSOP project is making good progress towards the full demonstration.

Partners are now at the final stages of the component development laboratory testing and system assembly preparation phase. The demonstration is scheduled in mid-2016 as a stand-alone system. The first receiver and the micro gas turbine and its control system are currently being demonstrated individually and then will be shipped to Rome for ENEA to assemble the complete package with the parabolic dish before the start of the system demonstration.

Parallel to this, an optimised design at the components and system levels are being conducted which will be eventually further improved based on test results in combination with techno-economic and market analyses that are also being conducted for future deployment.

For more information, please visit the OMSoP website at <u>www.omsop.eu.</u>



8th International Gas Turbine Conference "The Future of Gas Turbine Technology"

12-13 October 2016, Brussels, Belgium



The eight edition of ETN's international flagship conference "The Future of Gas Turbine Technology" will take place in October 2016 in Brussels. The conference offers a platform on the crossroads of science, technology, policy & business related to gas turbine technology where attendees will have the opportunity to discuss and get an insight on future market opportunities within the current policy framework.

The IGTC-16 is not only a conference. Attendees can also join the refreshing conversations around the exhibition, where established companies as well as promising start-ups will show their innovative products and/or services.

Attend the next edition of ETN's International Gas Turbine Conference and seize the opportunity to exchange knowledge, create new partnerships and network actively with the entire value chain of the gas turbine community. Registration will open in the spring.

Sponsorship opportunities

Sponsorship opportunities for the IGTC-16 are now available to the entire GT community! ETN offers several Sponsorship Packages as well as flexible options that should correspond to your specific needs for visibility. You can view the Sponsorship Information Package by <u>clicking here</u>. Please contact Dominique Cornut, ETN at <u>dc@etn-gasturbine.eu</u> should your organisation be interested in sponsoring the IGTC-16.

IGTC 2014 Quotes

Click on the videos on the right or visit the <u>conference's webpage</u> to listen to speakers talking about the IGTC-14.



Past Events

ETN October Workshop 2015

ETN held its biennial October Workshop on 21-22 October at the Technical School of Mining and Energy Engineers in Madrid, Spain, where ETN members joined to discuss ETN's new initiatives and progress on on-going projects.

The objectives of the Workshop were to provide a clear message to the industry and the R&D community on the priority issues of the oil & gas and power generation user communities and to generate real actions with short- & mediumterm objectives that can help the users to overcome their main issues. At the Workshop the participants explored new initiatives since the Annual General Meeting in April 2015, progressed on ongoing Technical Committee (TC) initiatives and identified medium- & long-term research issues where ETN can push for research opportunities in future R&D programmes.

During the event, ETN's five Technical Committees were divided into parallel sessions where Technical Committee members met and discussed further the following projects:

Topics discussed during the workshop

- TC1: Low Carbon Gas Turbine Operation: Position paper "A holistic approach for low carbon energy"
- TC2: Operational and Fuel Flexibility: CO prediction, combustion dynamics, hot corrosion, compressor washing, wobbe index and gas composition variation
- TC3: Material Degradation, Repair Technologies and Manufacturing: Review of User's Issues, Hot Corrosion and HGPP Degradation / Fuel Flexibility, Repair and Overhaul, Additive Manufacturing, Condition Based Maintenance / Remote Monitoring and Diagnostics, Dynamic Load Demands / SX Materials Life Extension / Materials Database
- TC4: Condition Monitoring and Instrumentation: CBM Project, Sensor Compression, User's feedback
- TC5: Asset Management: CCPP best practice, Risk based decision making methods, Operational flexibility for installed CCPP fleet

The Workshop's summary report, presentations and <u>pictures</u> can be downloaded on the <u>ETN website</u> (available exclusively to ETN members).

User Meeting 2015

On 21 October 2015, an ETN user meeting took place in Madrid, Spain where 17 representatives from different organisations

(oil & gas and power generation) joined to discuss and identify the issues that hurt most from an economical point of view for both the oil & gas and the power generation user communities.

During the meeting, the user community agreed that operational and maintenance costs urgently need to be reduced through a closer and more coordinated cooperation among all stakeholders. The agreed way forward would be for the user community to highlight the key issues and requirements and then seek for technical solutions and new development opportunities within ETN's Technical Committees. Standardisation of gas turbine packages would also be a major route to reduce issues and operational expenditure according to the participants.



The user community also highlighted the need to have in place well-functioning independent user groups on selected gas turbines models. It was agreed that ETN would be the perfect platform to arrange such groups in cooperation with GTUsers.com, who already organises independent meetings and also provides and manages secure databases where users can share issues. The participants acknowledged that today's existing independent user meetings currently do not have any link with the research community. Peter Jansohn, Chairman of ETN's Project Board presented a "solution procedure" where more generic issues that come out of these meetings would be discussed in ETN's Technical Committees and also posted on the ETN website. Potential solution providers from the ETN community would then have the chance to respond with proposals on how to tackle these issues. Proposals would be screened by the technical bod-

ies of ETN (Project Board and Technical Committee experts) prior to be presented to the problem owners.

At the meeting each user also listed and agreed on the short-& medium/ long-term issues/requirements with regards to the operation of their current and next generation gas turbine fleet. A summary of the outcome of the user requirements was presented to ETN members at the ETN Workshop in Madrid in October 2015 and the full report will be used as an input for the review and update of the next edition of ETN's R&D Recommendation Report that will be presented at ETN's Annual General Meeting in April 2016. The group also agreed to make this general user meeting into an annual event.

Past Events

Conclusions of the Conference of the Parties (COP21), Paris, France

On 12 December 2015, world governments adopted the first-ever universal global climate deal to fight global warming at the Conference of the Parties (COP21) that took place from 30 November to 11 December in Paris, France.

Governments agreed to keep a global temperature rise this century well below 2°C and to drive efforts to limit the temperature increase even further to 1.5°C above pre-industrial levels, since this would significantly reduce risks and the impacts of climate change.

Review Mechanism

Before and during the Paris conference, countries submitted comprehensive national climate action plans to reduce their emissions. According to the analysis, countries' Intended Nationally Determined Contributions (INDCs) will only cap global warming at 2.7°C. The European Union said in statement, "The sum total of the countries INDCs [...] are not yet enough to keep the world below 2°C by the end of the century. However, the agreement traces the way to achieving this target."

Under the terms of the deal, countries will submit new INDCs every five years, and they cannot be less ambitious then their

previous climate plan. A robust transparency and accountability system will track progress towards the long-term goal.

Strengthen Support to Developing Nations

The EU and other developed countries will continue to support climate action to reduce emissions and build resilience to climate change impacts in developing countries. Developed countries intend to mobilise USD 100 billion per year until 2025 when a new collective goal will be set.

Next Step: Signing the Paris Agreement

Following the adoption of the Paris Agreement by the COP, the Agreement will be deposited at the UN in New York and be opened for one year for signature on 22 April 2016. The agreement will enter into force after 55 countries that account for at least 55% of global emissions have signed the agreement.

Energy Union Progress

Following the publication of the "Framework Strategy for a Resilient Union" in February 2015, the European Commission (EC) published in November 2015 the first State of the Energy Union Report. The report, which was accompanied with a large documentation (25 documents in all), gives an assessment of where Europe is in terms of progress towards an Energy Union and outlines the legislative proposals for 2016. The EC has committed to present these reports annually in order to address the key issues and steer the policy debate.



Maroš Šefčovič, Vice-President for the Energy Union, European Commission

Overall, the report shows the progress that has been made over the last nine months. The accompanying documentation is for the large part a collection of existing documents, rebranded under the 'Energy Union' umbrella. Via the guidance documents issued to Member States, the European Commission is encouraging Member States to come forward with their plans for the period after 2020.

Looking ahead, it is important to keep in mind that the Commission's governance is a legislative proposal and thus, must *continued on page 6*

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go through a co-decision process involving the Member States and the European Parliament. Winning the support from Member States, who are traditionally resistant to giving the Commission greater powers on such matters, will remain a challenge for the Commission.

In a recent event in Brussels, Maroš Šefčovič, Vice-President for the Energy Union, European Commission said that "2016 is very clearly the year of delivery as we want to deliver 90% of what we promised to do under the Energy Union umbrella". Over the course of the next 12 months, the European Commission will come forward with legislative proposals to translate the 2030 Climate & Energy Framework agreed by Member States in October 2014 into legislation.

GHG Emissions

2020: Overall, the EU is on track to meet its target for reducing greenhouse gas emissions by 20% below the 1990 level. EU emissions in 2014 were 23% below 1990 levels and EU projections estimate that emissions are expected to be 24% lower in 2020 than 1990.

2030: The focus on GHG reductions has already shifted from 2020 to 2030. In October 2014 the Council of the EU agreed to a 40% emissions reduction target by 2030.

Renewables

2020: On renewables, the EU is also expected to meet its 2020 target of 20% of renewable generation.

2030: The debate has already shifted to 2030 with the EU having signed up to target of at least 27% renewables in the energy mix by 2030 at the EU level. The Commission will release a proposal to revise the existing Renewable Directive, updating it in line with the agreed 2030 targets in the second half of 2016. As part of this preparation, the Commission launched a public consultation, which will run until 10 February 2016. Interestingly, the accompanying consultation document notes that renewables are not reaching market maturity.

Energy Efficiency

2020: Despite having set energy efficiency targets of 20% by 2020, the EU is falling short and looks set to reach only 17.4% primary energy savings by 2020.

2030: In October 2014, the Council agreed to an EU indicative target of an at least 27% improvement in energy efficiency by 2030, possibly rising to 30% based on a Commission review. The Commission will release a legislative proposal to achieve this 2030 energy efficiency savings target in the second half of 2016.

Energy Security

The Staff Working document on 'European Energy Security Strategy (EESS)' accompanying the State of the Energy Union report gave an assessment of the four pillars of the EESS strategy. In gauging the resilience of the European gas sector, it notes that the level of resilience and preparedness has improved significantly since the first major Russia-EU-Ukraine gas dispute back in 2009. As part of its 'Gas Strategy', to be released in February 2016, the Commission will propose a revision to the Gas Security of Supply Regulation. Accompanying this will be an LNG and gas storage strategy, and a review of the current setup with regard to intergovernmental agreements in gas.

Research and Innovation

Achieving the EU's climate targets will require much innovation and breakthrough of new low carbon technologies. At present, it remains too early to assess whether the EU's efforts to promote research and innovation via schemes such as the Strategic Energy Technology (SET) plan, and the new proposed ETS Innovation and Modernisation Funds will lead to these necessary breakthroughs.

National Factsheets

The European Commission has also published 28 factsheets (one per Member State), giving an overview of where each Member State stands today on many aspects of the Energy Union. <u>Click here</u> to see the factsheets.

Next Steps

Key legislative proposals will be presented over the course of 2016. These proposals will be presented in three separate legislative packages.

For more information on the State of the Union Report, please <u>click here</u>.





Upcoming meetings and events

Date	Location
6 January 2016	Brussels, Belgium
27 January 2016	Brussels, Belgium
28-29 January 2016	Brussels, Belgium
26-27 April 2016	Prague, Czech Republic
21-23 June 2016	Milan, Italy
31 May - June 2016	Amsterdam, The Netherlands
13-17 June 2016	Seoul, South Korea
11 October 2016	Brussels, Belgium
12-13 October 2016	Brussels, Belgium
	Date 6 January 2016 27 January 2016 28-29 January 2016 26-27 April 2016 21-23 June 2016 31 May - June 2016 13-17 June 2016 11 October 2016 12-13 October 2016

* Event open exclusively to ETN members

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