



IGTC International Gas Turbine Conference

10-11 October 2018 | Brussels | Belgium THE FUTURE OF GAS TURBINE TECHNOLOGY

9th International Gas Turbine Conference

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Welcome





THE FUTURE OF GAS TURBINE TECHNOLOGY

Dear ICTC-18 Attendee,

It is my great pleasure to welcome you, on behalf of the Conference Advisory Board and the Board of ETN to the 9th biennial International Gas Turbine Conference in Brussels. Throughout this conference we would like to engage with all of you in an open and constructive dialogue about the role of turbomachinery in the global energy transition to a lowercarbon society, as well as to find the means to optimise operations in a cost-effective way while preserving our environment.

In the coming two days, we have an exciting programme to present to you with a balance of high-level keynote sessions with panel discussions, as well as technical paper presentations. I am pleased to announce that we have toplevel representatives present from the European Commission and the US Department of Energy, as well as senior industrial representation from Power Generation and Oil & Gas Users; OEMs; Suppliers & Service Providers; and technical experts from the turbomachinery research community. In our five keynote and panel sessions, an outlook for the turbomachinery industry from a policy, market and technology perspective will be presented and debated. Technical development expectations in the short- and longterm will be outlined by the User community and addressed by senior representatives of the technology suppliers and service providers.

Our parallel technical sessions consist of a mix of case studies, technical solutions to the challenges that operators face today, and promising research developments that will enable a wider role for the turbomachinery community in the future energy mix.

In between the sessions and during our Gala dinner, I can guarantee you excellent networking opportunities, and throughout the conference I encourage you to engage in technical discussions with our exhibitors by visiting their stands.

Finally, I would like to thank all the speakers and authors of the high-quality technical papers. I would also like to extend a special thank you to our Conference Advisory Board and all the Paper Reviewers, as well as to our generous sponsors, who have made it possible to arrange this conference and greatly contributed to its success

I hope you will have a fruitful conference that will help you develop a clearer view of the future and inspire you to new ideas for innovation and cooperation!

Sincerely Yours,

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Christer Björkqvist Managing Director



DAY 1 – WEDNESDAY 10 OCTOBER 2018 Keynote Speakers



Christer Björkqvist is the Managing Director and cofounder of the International association ETN that brings together all stakeholders around Turbomachinery Technology development and operation. For the past 19 years he has been working with the gas turbine industry and research community and gained a wide experience in gas turbine technology, project management and energy policy. He has been involved and coordinated several EU and industry-funded projects. Prior to the foundation of ETN in 2005,

Christer Björkqvist was the General Manager of the association of European Manufacturers of Gas Turbines for a period of 5 years.



Liv A. Hovem has more than 25 years of experience in international management, technical advisory, verification, classification, engineering, development and research in the oil and gas and maritime industries. Her technical background is risk and probabilistic modelling, hydrodynamics and strength of ships and offshore structures. She has experience from several managerial roles, most recent as Regional Manager for Continental Europe, Eurasia, Middle East, India and Africa for DNV GL 0&G. She has served as board

member in several research related institutions. Ms Hovem has an MSc in Naval Architecture and Offshore Engineering from UC Berkeley (1990) and an MSc in Civil Engineering from the Norwegian Technical University (1987).



Haitze Siemers, Head of Unit "New energy technologies, innovation and clean coal", DG Energy, has been working for the European Commission since 1993. He started his career on EU-Japan relations, both in Brussels and in Tokyo, followed bywork in trade policy leading in particular the development of the European Commission's trade policy dialogue with civil society. After a stint in consumer policy, Mr. Siemers joined the team developing a blueprint for Europe's Maritime Policy. From 2008 to 2018, Mr. Siemers led a number of different teams in DG MARE on

the development of Blue Growth strategies, EU legislation on Maritime Spatial Planning, the EU's International Ocean Governance Strategy, and innovation, research and investments. As of June 2018, Mr. Siemers took on his current function at the helm of Unit C2 in DG ENER.



Nils A. Røkke is the Chairman of EERA (The European Energy Research Alliance) and Executive Vice President Sustainability in SINTEF, Scandinavia's largest R&D Institute, as well as a member of the management board of SINTEF. He has a PhD in gas turbine combustion from NTH (NTNU) in 1994, and he worked as Gas Turbine Design and Development Manager in Rolls Royce Marine (1997-2002) before returning to SINTEF as Vice President Gas Technologies and Director of the Gas Technology Centre NTNU-SINTEF. Nils is a member

of the European Zero Emission Platform (ZEP) Advisory Council, Co-chair of the Executive Committee of ZEP and member of the Divisional Board (Energy, Resources and Environment) of the Norwegian Research Council (RCN). He is also a board member of the Norwegian Climate Foundation. Initiator of ECCSEL (European CCS Labs) an energy ESFRI Lab.



Richard A. Dennis is currently the Technology Manager for Advanced Turbines and Supercritical Carbon Dioxide Power Cycle Programs at the U.S. Department of Energy's National Energy Technology Laboratory (NETL). Rich is also the current (2018-19) leader of the American Society of Mechanical Engineers Gas Turbine Segment.



Junior Isles is the founder and Editor-in-Chief of The Energy Industry Times – a specialist monthly newspaper that is distributed internationally with 40 per cent of its readership in Europe. He has been a journalist in the power sector since 1989, having previously been editor of Modern Power Systems and Power Engineering International magazines, and is a well-known commentator on the industry. Junior also often appears at both public and private conferences as an accomplished moderator and speaker, and over the years has become a trusted colleague of key players in the industry.





and Panel

Robert Steele is the Program Manager at the Electric Power Research Institute in Charlotte, NC, USA of the Combined-Cycle Turbomachinery program (P79). His gas turbine expertise is in the area of combustion driven pressure dynamics, combustor rig testing and instrumentation, and ultra-low NO_x designs. He has twenty-five years' experience in gas turbine combustion research, development and test; and electric power generation industry including carbon capture, compression and sequestration. Prior to

joining EPRI, Steele was a Vice President and Combustion Team Leader at Ramgen Power Systems in Bellevue, Washington. In addition, he also worked at Solar Turbines in San Diego as the Mars SoloNO_x Engine Combustion Team Leader.



Tommaso Nappi, born in Rome (Italy), graduated as a Mechanical Engineer, from La Sapienza University, in Rome. After having served as Second Lieutenant in the Italian Navy, in 1989 he started working in the machine department of TPL, in Rome. Then in 1991 he moved to Enel where he was holding, among others, the positions of Project Engineer for the transformation to combined cycle of several Italian power plants and of Operation and Maintenance Manager (Generation Division Deputy Director), in Enel Viesgo Spain. In 2013 he was

appointed as Head of the Industrial and Environmental Risk Assessment Unit and in 2016 he took over his current position of Maintenance Senior Specialist of Enel Global Thermal Generation 0&M / CCGT / Maintenance.



Shaun West has worked for over 18 years in the aftermarket for GE Energy Services (Italy), Sulzer Rotating Equipment Services (Switzerland) and RWE (UK) before moving to into his academic role in Luzern. In each of the roles pricing has always been an important aspect, from estimating value creation, to M&A transactions and service contracts. Today in his academic role he is bringing together his industrial experience with academic rigor to investigate and disseminate key issues associated with product-services systems primarily in an industrial setting.



Bernard Quoix, Head of Rotating Machinery Department of TOTAL E&P since 2003 and nominated Senior Fellow of TOTAL Group in 2015, started his career in 1979 within TOTAL Operations. From 1986 to 1989, he worked for Turbomeca Industrial Division and then joined Renault Car Manufacturer before working for Elf Aquitaine and eventually TOTAL, involved in all aspects of turbomachines for new oil and gas field development, commissioning and start-up, and Operations. In 2005, 2009, and 2014, he was elected member of the distinguished Turbomachinery Advisory Committee in Houston. In 2010, he was elected President of the Board of ETN.



Andy Williams is currently Senior Fellow of Chromalloy Gas Turbine Corporation supporting the whole product portfolio of Aero and Industrial Gas Turbine products and processes within the corporation. He has previously held senior technical roles within Ethos Energy and a Sales Directors position within Fusion Services. He holds a Metallurgy and Materials degree from University College Cardiff, is a Chartered Engineer and Fellow of the Institute of Materials and has been a main Board member of ETN since 2006.



DAY 1 – WEDNESDAY 10 OCTOBER 2018 Morning Programme

07:15 Registration will take place at Mathilde, Le Plaza Hotel (Theatre entrance) Welcome coffee will be served in the Gallery

- ROOM: THEATRE -

- 08:10 Welcome note: Key points from the 2016 conference and introduction to IGTC-18
 - Christer Björkqvist, Managing Director, ETN
 - Bernard Quoix, ETN President/Senior Fellow and Head of Rotating Machinery Department, TOTAL

08:20 KEYNOTE SESSION 1:

ENERGY TRANSITION TO A GLOBAL LOW-CARBON SOCIETY

Chair: Christer Björkqvist, Managing Director, ETN

Speakers:

- DNV GL'S ENERGY TRANSITION OUTLOOK 2018 Liv A. Hovem, CEO Oil & Gas, DNV GL
- A SUSTAINABLE EU ENERGY UNION TO ENABLE A COMPETITIVE LOW-CARBON ENERGY TRANSITION Haitze Siemers, Head of Unit, New energy technologies, innovation and clean coal, DG Energy, European Commission
- IS THERE ROOM FOR GAS TURBINES IN A DECARBONISED WORLD?
 Nils A. Røkke, Executive Vice President Sustainability, SINTEF

Panellists:

- Liv A. Hovem, DNV GL,
- Haitze Siemers, European Commission
- Nils A. Røkke, SINTEF
- Richard A. Dennis, US Department of Energy

Moderator:

• Junior Isles, Editor-in-chief, The Energy Industry Times

10:20 Coffee break

ENERGY TRANSITION TO A GLOBAL LOW-CARBON SOCIETY

According to DNV GL's 'Energy Transition Outlook (ETO) 2018, natural gas will become the single largest source of energy in 2026 and will meet 25 per cent of the world's energy needs by 2050. It also forecasts substantial reductions in electricity production from 'conventional' thermal generating technologies, including nuclear, with most also showing declines in total capacity, except for gas.

Yet the IEA's World Energy Investment 2018, report finds that investment in LNG liquefaction plants continues to plunge and is expected to fall to around \$15 billion 2018, as only three new LNG projects have been sanctioned since mid-2016. At the same time, market reports show that global sales of gas turbines continues to fall – from a total generation capacity of 71.6 GW in 2011, according to McCoy Power Reports to 34.4 GW last year. And this year it is expected to be smaller again at about 30GW.

So how do we reconcile what appears to be two seemingly differing outlooks for gas?

Key questions to be addressed will include:

- Is the potential golden age for gas a myth?
- What is the future role of gas in the mid and long term and how will its role differ from region to region?
- Should government policy support gas-fired generation? And if so, how might policies develop from region-to-region?
- Will the European Commission's energy strategy for climate change and energy meet its target?
- When we talk of 'gas' in the future energy mix, is it time to think more broadly encompassing syngas and hydrogen?



ROOM: THEATRE

11:00 KEYNOTE SESSION 2: OPERATIONAL NEEDS FOR UTILITIES, INDUSTRIAL USERS AND OIL & GAS OPERATORS IN CURRENT AND FUTURE SCENARIOS

Chair:

Robert Steele, Program Manager, Electric Power Research Institute

Speakers:

• FUTURE CHALLENGES FOR A CARBON NEUTRAL WORLD – WHAT ROLE COULD TURBINE TECHNOLOGIES PLAY IN THE TRANSITION?

Shaun West, Lecturer Service and Product Innovation, Lucerne School of Engineering and Architecture

 NEW CHALLENGES AND TRENDS IN ELECTRICITY MARKETS

Tommaso Nappi, Maintenance Senior Specialist of Enel Global Thermal Generation 0&M / CCGT / Maintenance, Enel

 TECHNOLOGY DEVELOPMENT NEEDS & REQUIREMENTS FOR OIL & GAS OPERATORS TODAY AND IN THE FUTURE

Bernard Quoix, ETN President/Senior Fellow and Head of Rotating Machinery Department, TOTAL

PANEL DISCUSSION

Panel Discussion with the above speakers will take place after the presentations. Moderator: Andy Williams, Senior Fellow, Chromalloy

12:45 Lunch

OPERATIONAL NEEDS FOR UTILITIES, INDUSTRIAL USERS AND OIL & GAS OPERATORS IN CURRENT AND FUTURE SCENARIOS

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It is in the interest of the whole gas turbine User community to enhance the developments that can improve operational safety and efficiency, as well as to maximise plant productivity, while preserving our environment. However, the need for such developments varies substantially between power generation and oil & gas operations and countries from a market and policy point of views. On top of that, the operational environment of the gas turbines also has a big impact on the requirements and demands of the technology.

This session will provide you with an insight into the operational needs in today's market and technical development opportunities based on the future strategy of the User communities. The variations in needs between different markets, sectors and for different types of operation will be addressed.

This session will also highlight the expected needs and requirements in the longer term and discuss required technology developments. Presentations will be followed by a panel discussion with the speakers.



DAY 1 – WEDNESDAY 10 OCTOBER 2018 Afternoon Programme

	ROOM: THEATRE	ROOM: VERSAILLES	ROOM: ESTEREL
	OPERATIONS & MAINTENANCE	ADVANCED CYCLES	DATA ANALYTICS FOR OPTIMISED OPERATIONS
	Chair: Dominique Orhon, TOTAL	Chair: Peter Jansohn, Paul Scherrer Institute	Chair: Tommaso Nappi, Enel
14:00	ORAP®: A Data Review & Assessment Salvatore A. DellaVilla , Strategic Power System (SPS) International	Status of the 10 MWe Supercritical Transformational Electric Power (STEP) Program Markus Lesemann, Gas Technology Institute	An Advanced Early Fault Detection Tool for Predictive Maintenance of a Fleet of Industrial Gas Turbines Marco Rigamonti, Aramis
	The effect of air filtration on gas turbine performance degradation - ISO16890 and its application to real engine data Thomas Schroth, Freudenberg Filtration Technologies	Fast Start and Cycling HRSGs: Siemens DrumPlus™ technology Sebastiaan Ruijgrok, Siemens Heat Transfer Technology	Reference Stress Estimation for Anisotropic Materials Using Linear Elastic Finite Element Results Richard Green, Solar Turbines
	A digitalized approach for combining diagnostic capabilities and maintenance risk-based insights to improve machine operation Matteo lannitelli, Baker Hughes, a GE Company	Towards Highly-Flexible Carbon-Clean Power Production using Gas Turbines: Exhaust Gas Recirculation and cycle Humidification Ward De Paepe, University of Mons	Using Data for Smarter Operation of a Gas Transmission Network – Keeping the Gas Flowing Jeremy Hunns, National Grid Gas
15:30	Coffee break		
	OPERATIONS & MAINTENANCE	DISTRIBUTED GENERATION	DIGITALISATION TECHNOLOGIES

	Chair: Catherine Goy, Uniper	TECHNOLOGIES Chair: Abdulnaser Sayma, City, University of London	Chair: Marco Ruggiero , Baker Hughes, a GE Company	
16:00	Performance Analysis of a Twin-Shaft Gas Turbine during Failure in the Variable Stator Guide Vanes System of the Axial Compressor Vili Panov, University of Lincoln	Distributed Integrated Solar Combined Cycle Power Plants: Despatchable, reliable, affordable, low carbon electricity Michael Welch, Siemens	Industrial Internet: The Next Age of Productivity for European GT Based Plants Chris Dagnall, DNV GL	
	The challenge of burning Diesel Oil in Aero- derivative Gas Turbines Off-Shore Dominique Orhon, TOTAL	Innovative fleet condition monitoring concept for a 2MW gas turbine Wilfried Visser, B&B-AGEMA and Vrishika Singh, OPRA Turbines	Overview of Digital Asset Management for Industrial Gas Turbine Applications Richard Green, Solar Turbines	
	Extending the Life of F-Class Gas Turbine Rotors for Improved Operational & Maintenance Life Cycle Costs Scott Keller, PSM, Ansaldo Energia Group	Hybrid Gas Turbine mech drive from BHGE Marco Baldini , Baker Hughes, a GE Company	Data driven predictive maintenance information to enhance human decision making in gas turbine operation & maintenance Jan Slagter, VBR Turbine Partners	
19:00	Reception and Gala Dinner			

Our sponsors for the Cocktail reception and the Gala dinner welcome you to a memorable evening at Centre Belge de la Bande Dessinée – Belgian Comics Art Museum in Brussels.





Cocktail Sponsor



Solar Turbines

A Caterpillar Company

We are pleased to invite you to our IGTC-18 Cocktail reception, sponsored by **MTU**, and Gala dinner, sponsored by **Solar Turbines**, taking place at Centre Belge de la Bande Dessinée – Belgian Comics Art Museum from 19:00 onwards.

Please bring your conference badge with you.

Dinner

What are the links between comics and industry? Why does Belgium have a really specific place in the history of comics? How has the industry influenced the "9th Art" – comic strips? And why is Brussels still a heaven for learning to draw and produce comic strips? Olivier Van Vaerenbergh (aka OVV) and Jean Bourguignon (aka JBGG) will try to answer to these questions with examples of the history of comic strips and live drawings.

Olivier Van Vaerenbergh

is a freelance journalist specialised in culture and comics. When he was a child, he dreamed to be editor-in-chief of Spirou, the famous Belgian

comic magazine, and started working for the magazine in 2004. He currently works with several editors and press magazines.

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Jean Bourguignon is a famous freelance

cartoonist living in Brussels since decades. He is the author of famous Belgian "fanzines" such as "Science Infuse" and "La Gazette du Rock" and has published a few independent comic books.



DAY 2 – THURSDAY 11 OCTOBER 2018 Keynote Speakers



John Oakey has over 30 years' experience in energy industries and has been progressing his career at Cranfield University since 1998. Prior to this, he was a senior Branch Manager in British Coal's Coal Technology Development Division (CTDD), leading a range of clean coal technology research programmes. With this research background in energy technologies, in particular in materials and process troubleshooting, he has been at the forefront of many of the UK's clean coal projects in recent years. He has been a Board member of ETN since 2018.



Ronnie C. Tian. Since 2010, Mr. Tian and his Asia Carbon Energy have been serving for China and global energy and technology companies with advanced fossil fuel technologies related (incl. gas turbine, CCUS, and 700°C A-USC) business, R&D and demonstration intelligence, collaboration resources and platform. Mr. Tian has a bachelor degree in mechanical engineering and received a master degree from Loughborough University, UK in 2006 While China suffered from electricity shortage in several developed provinces in 2012, Mr. Tian and

his team founded NexTurbine[®] program, aiming at providing gas turbine intelligence, technology and business collaboration resources, connecting China and global gas turbine community, facilitating fostering talents, and advocating for gas turbine's role in energy transition in China, through market research, events, training and publication.



Simon Balmer has worked in the power industry for over 22 years. He has experience in Operational, Maintenance and central Asset Management roles in CCGT, Coal and CHP technologies. As CCGT Fleet Performance Manager, Simon reports to the Director of CCGT Operations and is responsible for developing and driving performance from Uniper's CCGT fleet to ensure delivery of key performance measures through close working with all colleagues across the business. Before moving to his current position in Uniper's head

office in Dusseldorf, his recent roles included Assistant Plant Manager at Connah's Quay Power Station and Engineering Manager at Ratcliffe-on-Soar Power Station in the UK.



Vladimir Navrotsky is a Senior Principal Expert in gas turbine design and aftermarket. He is a mechanical engineer, graduated Moscow Physical & Technical University in 1983 and in 1987 took his scientific degree from the same University. He gained his 35 year professional experiences in international organisations such as Central Institute of Aviation motors in Russia, ABB in Sweden, ALSTOM in Switzerland and currently Siemens. As a Siemens employee Dr Navrotsky has held several management positions and was appointed Chief Technology Officer in 2007. In 2015 Dr Navrotsky awarded Siemens Top Innovator.



Stefaan Verbanck is currently the Global Operations Leader for BHGE Turbo Machinery Process and Solution based in Florence Italy. This covers the Global Material Supply Chain and Logistics, Global Repair Network Infrastructure and the Global Field Services team. For the last 24 years, Stefaan has worked in the Aftermarket business for Power Generation and Oil and Gas, rotating equipment, both in Commercial and Operations roles. He has gained global experience working in Asia, Africa, Europe and Americas.



Juan Rojas is currently the Vice President of Customer Services for Solar Turbines Incorporated, a wholly owned subsidiary of Caterpillar, Inc. Juan joined Solar Turbines in 1997 and has held various engineering and project management roles. His managerial positions have included: Managing Director for Latin America, Regional Manager in Mexico and District Service Manager Eastern Europe and Central Asia. Juan graduated from Universidad Metropolitana with a B.S. in Mechanical Engineering and received his M.S in Mechanical Engineering from San Diego State.



Sven-Hendrik Wiers took on the responsibility for MDT's gas turbine engineering as Vice President Gas Turbines in June 2011. Dr. Wiers previously served the position of Head of Calculation & R&D compressors since 2007 at MDT in Oberhausen and Berlin. Before that he was Program Manager for Technology Demonstrator Programs such as the GTF-Demonstrator at MTU Aero Engines Munich. He has a background as an engineer with a degree in Mechanical Engineering from the Technical University of Karlsruhe, and got his Ph.D.

from the Technical University in Stockholm in 2001. He looks back on a 20 years of experience in the gas turbine and turbo machinery industry.





and Panellis

Peter Jansohn has been for 10 years with ABB Corporate Research and Alstom Technology in various roles. He joined the Paul Scherrer Institute (PSI) in 2003 and has been heading there the Laboratory for Thermal Processes and Combustion. Recently he was appointed as Head of the Technology Platform "Energy System Integration (ESI)", which comprises demonstration facilities for energy storage and Power-to-Gas technologies.



Peter Flohr has a degree in Aerospace Engineering from the University of Stuttgart and a PhD in Applied Maths from the University of Cambridge. He has over 20 years of experience in the power industry in various roles at ABB, Alstom and GE. During this time, he spent 10 years in combustion technology & design, and held various leadership roles in the engineering of turbomachinery equipment and test & materials labs, covering a broad range of topics from 3D printing of turbine parts to the construction and operation of full-scale test power plants.

Currently, he is the leader of the Gas Turbine Engineering team in Baden with a focus on customer service upgrades for the installed gas turbine fleet.



Gary Lock completed his degree in Mechanical Engineering in 1983. After an initial spell in the Oil & Gas Industry he moved into Engineering Consultancy and has been with Frazer-Nash for over 30 years. Initially specialising in stress analysis, life prediction, and structural design. Gary's managerial career started with technical management and more latterly business management. He is currently responsible for all turbo machinery projects conducted by Frazer-Nash, He is a Fellow of the Institution of Mechanical

Engineers, a Member of the IDGTE and a Board member of ETN.



Junichiro Masada was appointed as General Manager of Takasago Gas Turbine Engineering Department, Gas Turbine Products Headquarters of Mitsubishi Hitachi Power Systems in 2014. He became Deputy Head of Gas Turbine Products Headquarters in 2015 and General Manager of Turbine Technology Development Integration Division, Turbine Products Headquarters later in the same year. In 2017, he was appointed as Deputy Head of Turbomachinery Headquarters, Senior General Manager of Gas Turbine Technology & Products

Integration Division. Currently he is the Senior Vice President, Deputy Head of Turbomachinery Headquarters, Senior General Manager of Gas Turbine Technology & Products Integration Division.



Barbara Stanley is currently the Vice President of Power Generation and Strategic Growth for Solar Turbines Incorporated, a wholly owned subsidiary of Caterpillar, Inc. Barbara joined Solar Turbines in 1982 and has held various manufacturing engineering and project management roles. Her managerial positions have included: District Service Manager in Northern Europe, Global Applications Engineering, Oil & Gas Marketing; and Director positions in Service Parts Operations, Customer Product Support, Package Refurbishment &

Upgrades, and Overhaul & Service Parts Operations in Texas and Mexico. She has also held the position of Vice President of Turbomachinery Products. Barbara graduated from University of Cincinnati and holds a B.S. in Industrial Engineering, and has accumulated considerable market experience during her 35 year career at Solar. Barbara is a member of California Polytechnic University Dean's Advisory Club, and is a member and past Solar Executive Sponsor for Society of Women Engineers, an Employee Resource Group at Solar Turbines.



Mauro Moretto is leading the Technology Development Programs in Ansaldo Energia within the Research and Development Division. Before, he was based in China holding the position of Chief Technical Officer in the newly established JV for gas turbine business between Ansaldo Energia and Shanghai Electric, supporting the startup and growth of the company since its incorporation. Prior to that, he took several management positions in Ansaldo Energia, including: Program Manager for the H class Gas Turbine Development and Head of Service Platform in

the Product Development organization. Mauro started his energy industry career in GE Oil&Gas, as Project Manager for upstream applications. He holds a degree in Engineering from University of Genoa and a MBA from Bocconi University of Milan.



Arnd Reichert has worked for Siemens in various positions starting 1994 in Germany. He was Engineering Director for Siemens in the USA in 2006 as global manager for component engineering, and Vice President Power and Gas for Siemens China in 2011 with responsibility to manage and coordinate the gas turbine and generator business in China. He assumed a position in 2016 with Siemens Germany as Vice President Technology and Innovation in the Power and Gas division.



DAY 2 – THURSDAY 11 OCTOBER 2018 Morning Programme

	ROOM: THEATRE	
08:00	Networking coffee	NA
08:30	Opening and introduction John Oakey, Professor of Energy Technology, Cranfield University, ETN Board member	M/ CH
08:40	KEYNOTE SESSION 3: NATIONAL AND REGIONAL GAS TURBINE MARKETS: OPPORTUNITIES AND CHALLENGES	Glo tov the
	Chair: John Oakey, Professor of Energy Technology, Cranfield University	pov in i The
	Speakers: • THE US GAS TURBINE MARKET AND CURRENT R&D PROGRAM AND PROJECTS Richard A. Dennis, Technology Manager, US Department of Energy	dej neo ma reg
	FROM SURVIVE TO THRIVE – GAS POWER INDUSTRY AND POLICY IN CHINA Ronnie Tian, Founder, NexTurbine	In gov aua

NATIONAL AND REGIONAL GAS TURBINE MARKETS: OPPORTUNITIES AND CHALLENGES IN CHINA AND US

Globally we are going through an energy transition towards a lower carbon energy society. At the same time the energy demand will increase as access to heat & power in the developing world is accelerating and growth in industrialised countries is strengthened.

The materialisation of future growth opportunities also depends on technology developments while the markets' needs are getting more diversified. Even though the market outlook looks promising on a global scale, each regional market has its own challenges and opportunities.

In China the demand for electricity is growing and the government is determined to curb coal use to improve air quality. In US there is a plenty of gas at a very low price.

This session will provide you with an insight into today's market needs and technology development opportunities and challenges from a gas turbine perspective in China and US. It will also cover the R&D programmes in place that aim to widen the opportunities for the gas turbine market.



ROOM: THEATRE

KEYNOTE SESSION 4: WAYS TO OPTIMISE AND REDUCE COST OF OPERATIONS

Chair:

09:40

Bernard Quoix, ETN President/Senior Fellow and Head of Rotating Machinery Department, TOTAL **Co-chair:**

Simon Balmer, CCGT Fleet Performance Manager, Uniper

Speakers:

- CONTINUOUS PRODUCT IMPROVEMENT & CUSTOMER VALUE-ADD UPGRADES Vladimir Navrotsky, Chief Technology Officer, Power Generation Service, Siemens
- INNOVATION THROUGH COLLABORATION Stefaan Verbanck, Global Operations Leader for Turbomachinery & Process Solutions, Baker Hughes, a GE Company
- TURBINE SYSTEMS LIFECYCLE OPTIMIZATION BEYOND THE HARDWARE: PEOPLE, PROCESS & TECHNOLOGY

Juan Rojas, Vice President, Customer Services, Solar Turbines

 DIGITALIZATION AT MAN TO OPTIMISE AND REDUCE COST OF OPERATIONS
Sven-Hendrik Wiers, Vice President Gas Turbines, MAN Energy Solutions

PANEL DISCUSSION

Panel Discussion with the above speakers will take place after the presentations.

10:45 Coffee break

WAYS TO OPTIMISE AND REDUCE COST OF OPERATIONS

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As the gas turbine User community today is facing very tough market conditions, what are the OEMs offering to help them to overcome the current situation?

Due to the unfavourable conditions for gas turbine technology in the European market, affordable operations and project financing has become an increasingly greater challenge in the majority of regions.

This session will explore what can be done by both the operator and the OEM to optimise operation & maintenance models in order for the user community to become more competitive.

The impact of quicker market changes and new technical developments like "big data" and additive manufacturing and their effect on operation and maintenance business models will also be highlighted and debated in this session.

After a short opening statement by each OEM, an extended panel discussion will take place with the OEM representatives including an interactive involvement by the audience.

ETN Gl@bal

DAY 2 – THURSDAY 11 OCTOBER 2018 Morning Programme

	ROOM: THEATRE	ROOM: VERSAILLES	ROOM: ESTEREL
	MANUFACTURING & REPAIR Chair: André Mom, ETN President Emeritus	NEW COMPONENT DEVELOPMENTS Chair: Peter Kutne, DLR	PUMP-HEAT TECHNOLOGY Chair: Aristide Massardo, University of Genoa
11:15	Development of life predictive methods on NovaLT16 combustor with simplified physics based models Federico Funghi, Baker Hughes, a GE Company	"Future-Proofing" Today's Industrial Gas Turbines: Combustion System Fuel Flexibility Improvements for Hydrogen Consumption in a Renewable Dominated Marketplace Peter Stuttaford, Ansaldo Thomassen and Theo de Bruijne, Dow Benelux	Integration of Heat Pump and Gas Turbine Combined Cycle: Layout and market opportunity Alessandro Sorce, University of Genoa
	Hot Section Life Management Through Improved Material Property Recovery John Scheibel, Electric Power Research Institute and Stijn Pietersen, TEServices	Development of Hydrogen and Natural Gas Co-firing Gas Turbine Kenji Miyamoto , Mitsubishi Hitachi Power Systems	Combined Cycles Integrated With a Heat Pump and Thermal Energy Storage System for Air Pre-Cooling – A Techno-Economic Analysis Rafael Guédez, KTH Royal Institute of Technology
	Internally Cooled & Lightweight Radial Turbine Wheels for Gas Turbines Simon Jones, HiETA Technologies	Ammonia Gas Turbines (AGT): Review Agustin Valera-Medina, Cardiff University	High Temperature Heat Pump – A novel Approach to increase Flexibility and Efficiency of CCGT and CHP Power Plants Sven Bosser, Mitsubishi Hitachi Power Systems Europe
	Industrialization and Current Field Experience of Additively Manufactured Gas Turbine Components Vladimir Navrotsky, Siemens	Reducing Emissions from Compressor Seal Leakage Radu Anghel, Capstone Turbine Corporation	Intelligent predictive control of a PUMP- HEAT Combined Cycle: introduction and first results Alessandro Sorce, University of Genoa
13:10	Lunch		

Afternoon Programme



ROOM: THEATRE

14:20 KEYNOTE SESSION 5: TECHNOLOGY DEVELOPMENTS FOR A LOW-CARBON SOCIETY

Chair:

Peter Jansohn, Head of Energy System Integration, Paul Scherrer Institute

Panellists:

• TECHNOLOGY DEVELOPMENT FOR A LOW-CARBON SOCIETY Junichiro Masada, Deputy Head of Turbomachinery HQ,

Mitsubishi Hitachi Power Systems

- POWERING FORWARD GE'S PERSPECTIVE ON MARKET TRENDS AND TECHNOLOGY NEEDS
 Peter Flohr, GT Engineering Executive, GE Power
- CHIPPING AWAY CARBON-GO THE SOLAR (TURBINES) WAY
 Barbara Stanley, Vice President, Power Generation & Strategic Growth, Solar Turbines
- HYBRID SYSTEMS TOWARDS A LOW-CARBON SOCIETY Sven-Hendrik Wiers, Vice President Gas Turbines, MAN Energy Solutions
- GAS FIRED POWER PLANTS TECHNOLOGIES TOWARDS DECARBONIZATION Mauro Moretto, Head of Technology Development, Ansaldo Energia
- TECHNOLOGIES FOR A LOW CARBON SOCIETY Arnd Reichert, Vice President Technology & Innovation, Siemens

Panel Discussion and Q&A: with the above speakers. Moderator: Gary Lock, Senior Business Manager, Frazer-Nash Consultancy

16:15 Closing remarks Bernard Quoix, ETN President/Senior Fellow and Head of

Rotating Machinery Department, TOTAL

16:30 End of Conference Networking Coffee and Drinks

TECHNOLOGY DEVELOPMENTS FOR A LOW-CARBON SOCIETY

In the market transition to a lower-carbon society the energy mix and the market demands will become more and more diversified and complex. What does this mean for technology development and services foreseen by the OEMs?

This session will give OEMs the opportunity to give their interpretation of the future energy scenario and market demands and to share their views on future gas turbine development opportunities. Which R&D topics do they foresee as key to ensure a wide market share in a lowercarbon economy and a carbon neutral society?

After a short opening statement by each OEM, an extended panel discussion will take place with the OEM representatives including an interactive involvement by the audience.

The 2018 edition of our R&D Recommendation Report is out!

ETN Project Board presents the 2018 edition of its biennial R&D Recommendation Report.

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