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THE FUTURE OF GAS TURBINE TECHNOLOGY

7th International Gas Turbine Conference

14-15 October 2014 | Brussels | Belgium

EUROPEAN TURBINE NETWORK

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Welcome

THE FUTURE OF GAS TURBINE TECHNOLOGY

Dear IGTC-14 Participant,

On behalf of the ETN Board and the IGTC-14 Conference Advisory Board I am very pleased to welcome you to the 7th biennial International Gas Turbine Conference in Brussels. In the next two days, you will have the opportunity to listen to and to discuss the future of gas turbine technology with high level policy makers, users from the power generation and oil and gas industries as well as gas turbine specialists from the whole value chain.

The keynote sessions will present and debate the outlook for the gas turbine industry from a policy, market and technology perspective. Distinguished speakers during these sessions include senior delegates from the European Commission, the US department of Energy, the International Energy Agency, as well as high-level industry representatives and experts from the gas turbine research community.

Once the keynote sessions have outlined the political and commercial expectations of the future, there will be parallel sessions presenting future challenges operators of gas turbine technology will face, as well as promising gas turbine developments. The key topics to be addressed are:

- Innovative Low Carbon Cycles
- Optimising Combined Cycle Operations
- Materials and Lifetime
- Optimising Oil and Gas Operations

The requirements and on-going R&D projects for the development of the next generation of gas turbine technology will then be presented in technical parallel session on:

- Turbomachinery
- Combustion
- Flexible Operation and Fuel Flexibility
- Hydrogen-rich syngas operation

I would like to extend a warm thank you to all our speakers, to our Conference Advisory Board memebers and reviewers as well as to our generous sponsors, who all play an important part in making this a successful conference.

Finally, I wish you a successful conference and hope that by the end of these two days you will have gained a clearer view of the future and return with innovative ideas and new thoughts for cooperation!

Sincerely Yours,

Christer Björkqvist
Managing Director

Day 1 Keynote

Marcelo Accorsi Miranda is a Senior Advisor with Petrobras E&P Production Development Projects. He is responsible for conceptual design, specification, selection and shop test acceptance and commissioning of turbomachinery. His background includes rotordynamics, lateral and torsional analysis, stability analysis, stability test, thermodynamics, performance test, process simulation, RAM analysis and life cycle cost analysis. Mr. Accorsi Miranda received a B.S. degree in Mechanical Engineering and a M.S. degree in Industrial Engineering. He has authored technical papers on turbomachinery testing, rotordynamics, stability testing, compressor selection, RAM analysis and LCC analysis.

Mansoor Al Najar is a Mechanical Engineer with over 11 years of experience in Oil & Gas industries, in Rotating Equipment refurbishments, trouble-shooting and retrofits. He works for GASCO as a Rotating Equipment Section Head with experience in gas compressors, gas turbines, turbo expanders, air compressors and liquid ring compressors and know-how in gas compressor dry gas seal retrofit projects. He is proficient in troubleshooting gas turbines, compressors and turbo expander failures and is involved in many energy saving projects.

Wim Broos has been active in the energy sector, working for Electrabel and GDF SUEZ for more than 20 years. He fulfilled different positions in the field of coal- and gasfired power plants. He has been the project manager for the CCGT of Zandvliet Power (Belgium) and has worked as a manager of the production region East (Belgium). He has been setting up a generation organization within GDF SUEZ Energie Deutschland. Since 2012, Wim Broos is working as Senior Vice President Fleet Management within the branche Energy Europe of GDF SUEZ.

Junior Isles is the Editor-in-Chief of The Energy Industry Times newspaper and an Energy Media Consultant with Man in Black Media. As a journalist in the power sector since 1989, he is a well-known commentator on the power and energy sector and often appears at industry conferences as an accomplished moderator. He has a Bachelor of Engineering (BEng) degree in Electronic Engineering from Middlesex University.

Rodrigo Pinto Scholtbach works at the International Energy Agency as Senior Gas Market Analyst. Before this position, Mr. Pinto Scholtbach has worked for 4 years as head of the Gas market Unit of the Ministry of Economic Affairs of the Netherlands. He has almost 20 years of experience working as senior policy advisor for the Dutch Government. Mr. Pinto Scholtbach has two master's degrees in Public Administration and History & International Relations from the Free University of Amsterdam and the Netherlands School of Public Administration of The Hague.

Bernard Quoix, Head of Total E&P Rotating Machinery Department since 2003, 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. In 2005, 2009 and 2014, he was elected member of the distinguished Turbomachinery Advisory Committee in Houston. In 2008, he was elected member of the Board and in 2010 President of ETN.

Speakers

Beate Raabe was appointed Secretary General of EUROGAS, the association of companies and associations engaged in the wholesale, retail and distribution of gas in Europe in 2011. In 1998, she joined the International Association of Oil & Gas Producers (OGP), where she became Director EU Affairs and Head of the EU office in 2005. She came to Brussels in 1993, working in EU Affairs at the International Association of Combined Road-Rail Transport (UIRR) and later at the German and Swedish railways (DB and SJ).

Andy Williams received his BSc in Metallurgy and Materials Science from the University College Cardiff. Before joining Ethos Energy Group, he has been with CUK Ltd, focusing on the technical support of aero and industrial gas turbine components and been a partner and the sales director of Fusion Services Ltd. Since 1995, he has been working Ethos Energy Group, where he held various technical and operational roles overseeing the engineering activities within the complete product portfolio.

Mechthild Wörsdörfer is working as Director for Energy interinstitutional relations, Directorate for general strategy, international relations and economic analysis in the Directorate General for Energy in the European Commission since January 2014. Prior to that, she was Head of Unit A1 (Energy Policy & Monitoring of electricity, gas, coal and oil markets). She has also pursued a long career in the Commission in Directorate General Enterprise & Industry and in the Cabinet of Commissioner Erkki Liikanen. She studied Economics in Heidelberg and in Montpellier and holds a Master's degree in European Economics from the Free University of Brussels.

Christer Björkqvist is the Managing Director and co-founder of the European Turbine Network. He has, over the last 15 years, been working closely with the European institutions and gained a wide experience in EU policy, gas turbine technology and project management. He has been involved and coordinated several EU- and industry-funded projects. Prior to ETN, Mr. Björkqvist was the General Manager of the association of European Manufacturers of Gas.

Dieter Krapp joined OMV Gas & Power as Senior Vice President Power in 2012. Since 2013, he has been responsible for all Power Generation activities of the OMV Group. After graduating in Mechanical Engineering, Dieter worked in the Power Generation Industry. After almost 15 years working for OEMs he joined National Power in the UK. He then moved on to Duke Energy in the US before joining BP to set up Gas & Power Marketing and Sales business for Northern Europe. In 2007, Dieter joined Shell as VP Power and from 2011 he has been part of Shell's Global LNG Leadership team.

Day 1

MORNING, TUESDAY 14 OCTOBER 2014

07:15 Registration and Welcome Coffee

08:15 **Welcome note: Key points from the 2012 Conference and Introduction to IGTC-14**

- **Christer Björkqvist**, Managing Director, ETN
- **Bernard Quoix**, ETN President/ Head of Rotating Machinery Department, Total

08:30 **INTERNATIONAL ENERGY POLICY AND MARKET OUTLOOK TOWARDS 2030**

Chair:
Christer Björkqvist, Managing Director, ETN

Speakers:

- GAS MARKET OUTLOOK
  Rodrigo Pinto Scholtbach, Senior Gas Market Analyst, International Energy Agency
- ENERGY CHALLENGES AND PRIORITIES FOR 2015
  Mechthild Wörsdörfer, Director for Energy policy, DG Energy, European Commission
- BUILDING A SUSTAINABLE ENERGY SYSTEM – HOW TO KEEP IT SIMPLE AND FLEXIBLE
  Beate Raabe, Secretary General, Eurogas

PANEL DISCUSSION

Moderator:

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

Pannelists:

- **Rodrigo Pinto Scholtbach**, International Energy Agency
- **Mechthild Wörsdörfer**, DG Energy, European Commission
- **Beate Raabe**, Eurogas

10:20 Coffee break

INTERNATIONAL POLICY AND MARKET OUTLOOK TO 2030

The opening session will cover policy and market overview for both utilities and oil & gas operators with a focus on potential future opportunities.

According to the International Energy Agency (IEA) natural gas use could increase dramatically and meet more than 25% of global energy demand by 2035. In its more recent 2014 Medium-Term Gas Market Report the 'Golden Age of Gas' firmly established in North America will expand to China over the next five years. The IEA's forecasts were corroborated by a Frost & Sullivan report, which states that the global gas turbine market is firmly on the upswing with growing demand from both utilities and oil and gas operators. Growth, however, will vary from country-to-country and region-to-region depending on gas availability and price, government policy on tackling greenhouse gas emissions and strategy on energy mix.

What will be the key drivers for gas turbines in the coming years and where do the opportunities lie?

- Significant developments over the last two years and how these affect market outlook
- General outlook for gas price and availability
- Policy changes in Europe, elsewhere and impact on growth
- Key future market segments for gas turbines

Presentations will be followed by a panel discussion.

10:50 **DEVELOPMENT NEEDS FOR UTILITIES AND OIL & GAS OPERATORS FOR THEIR CURRENT AND FUTURE GAS TURBINE FLEETS**

Chair:
Dieter Krapp, Senior Vice President, OMV Power International

Speakers:
- FLEXIBILITY IN EUROPEAN POWER PLANTS
  Wim Broos, Senior Vice President Fleet Management, GDF SUEZ Energy Europe
- DEVELOPMENT NEEDS FOR OIL & GAS OPERATORS OF GAS TURBINE FLEETS
  Marcelo Accorsi Miranda, Senior Consultant, Petrobras, Brasil
- GAS TURBINES INLET AIR QUALITY IMPROVEMENT FOR HIGHER RELIABILITY, AVAILABILITY & EFFICIENCY
  Mansoor Al Najar, Rotating Equipment Section Head, GASCO, Abu Dhabi

PANEL DISCUSSION

Moderator:
- **Andy Williams**, Vice President Engineering, EthosEnergy

Pannelists:
- **Wim Broos**, GDF SUEZ Energy Europe
- **Marcelo Accorsi Miranda**, Petrobras, Brasil
- **Mansoor Al Najar**, GASCO, Abu Dhabi

12:45 **Lunch offered by PW Power Systems**

DEVELOPMENT NEEDS FOR UTILITIES AND OIL & GAS OPERATORS FOR THEIR CURRENT AND FUTURE GAS TURBINE FLEETS

It is in the interest of all gas turbine users to enhance gas turbine technology development which can deliver **flexible and environmentally sound gas turbine technology with reliable and low cost operation**. However, gas turbine development's needs vary quite substantially between power generation and oil & gas operations. Today the market's needs between the different continents are also very different. The operational environment of the gas turbine also has a big impact on the requirements and demands of the gas turbine technology. This session will highlight the most important technical requirements and expectations from users in different markets and sectors and for different operations. The focus will be on identifying R&D development needs for current and future fleets in order to maximise the return of assets over their entire lifecycle.

Presentations will be followed by a panel discussion.

Day 1

AFTERNOON, TUESDAY 14 OCTOBER 2014

	INNOVATIVE LOW CARBON CYCLES **Room**: Netherlands 1 & 2 **Chair**: **Dick van der Vecht**, GDF Suez	OPTIMISING COMBINED CYCLE OPERATIONS **Room**: Belgium 1, 2 & 3 **Chair**: **Jacques Maunand**, EDF
14:00	**Concentrated Solar Power Hybrid Gas Turbine Demonstration Test Results** **David Teraji**, Solar Turbines	**Field Measurement Reconciliation for Combined Cycle Heat Recovery Steam Generator Monitoring** **Alessio Martini**, University of Genoa
14:35	**High Temperature Storage for CSP Plants: Test Rig Dynamic Analysis** **Alessio Martini**, University of Genoa	**Review of HRSG capabilities for flexible operation** **Pascal Decoussemaeker**, Alstom
15:05	**Carbon Footprint Assessment for Compressor Stations** **Rainer Kurz**, Solar Turbines	**Preservation guidelines for CCGT & conventional power plant boilers during short- and long-term shutdowns** **William Moore**, ETD Consulting
15:30	**Coffee break**	

	MATERIALS AND LIFETIME **Room**: Netherlands 1 & 2 **Chair**: **John Oakey**, Cranfield University	OPTIMISING OIL AND GAS OPERATIONS **Room**: Belgium 1, 2 & 3 **Chair**: **Chris Dagnall**, DNV GL
16:00	**Manufacture of Metal-Ceramic Clad Powders for Plasma-Spray Thermal Barrier Coatings** **Vassilis Stathopoulos**, Technological Educational Institute of Sterea Ellada	**Remote Assistance Intervention and Diagnosis (RAID) for Rotating Machines** **François Jouanna**, Total
16:35	**Integrated approach to gas turbine rotor condition assessment and life management** **John Scheibel**, EPRI	**Remote Condition Based Monitoring and Diagnostic Solution for Gas Turbines** **Lukasz Sznajder**, Shell
17:05	**Temperature Memory Coatings for Short and Long Term Applications in Gas Turbines** **Jorg Feist**, Sensor Coating Systems	**Experience with Condition-Based Maintenance Related Methods and tools for Gas Turbines** **Christoforos Romesis**, NTUA
18:15	**Reception and Gala Dinner** **MTU**, our sponsor for the Cocktail reception and **GE Oil & Gas**, our sponsor for the Gala dinner, welcome you to the **Colonial Palace in Tervuren**. For more information please see page 9.	

EVENING, TUESDAY 14 OCTOBER 2014


Colonial Palace in Tervuren, Belgium

Our sponsors, **MTU** for the Cocktail reception and **GE Oil & Gas** for the Gala dinner, welcome you to the Colonial Palace in Tervuren.

Please **meet in the Thon Hotel lobby at 18.15.** There will be a bus transfer (return) from the Thon Hotel EU to the Gala dinner venue. Bring your badge for the entrance.

Dinner

Belgium invented the praline in 1912 and was soon renowned for making the best chocolate in the world. Hosting the International Gas Turbine Conference in a country that produces over 172000 tons of chocolate with more than 2000 chocolate shops, ETN has dedicated this gala dinner to chocolate and invites a special guest to share his expertise and creativity with you.

Dominique Persoone is Belgium's most audacious chocolate maker, a self-styled "Shock-o-latier" who has surprised the traditional world of pralines by adding unique textures and flavours. Behind his image as the world's wackiest chocolate maker, Mr. Persoone takes his chocolate very seriously. He collaborates with scientists to uncover new flavour combinations and uses only top quality natural ingredients, matching chocolate varieties to complement his innovative fillings. Thanks to a dedication to quality, Mr Persoone has earned the respect of some of the world's superstar chefs as among others Ferran Adrià (Spain) and Heston Blumenthal (UK).

At the Gala Dinner, you will discover some of his interesting innovative creations, in particular one which was created for a surprise birthday party for the Rolling Stones.

Day 2 Keynote

Gil Amengual is the Director of Marketing and Product Strategies for Solar Turbines, responsible for product line planning and management, marketing communications, market analysis and government relations activities. Gil joined Solar in 2006 as Managing Director of Latin America and moved to San Diego in 2012 to assume his current role as marketing director. He is a registered professional engineer and a graduate of Rensselaer Polytechnic Institute with Bachelors and Masters of Engineering degrees in Electrical Systems.

Richard Dennis is the Turbine Technology Manager and the Advanced Combustion Technology Manager at the U.S. Department of Energy's National Energy Technology Laboratory (NETL). He has a BS and MS in Mechanical Engineering from West Virginia University. Mr. Dennis has worked at NETL since 1983.

Professor Jiang Hongde, a member of Chinese Academy of Engineering, is Director at the Institute for Gas Turbines at Tsinghua University, Director of the National Research Center for Gas Turbine and IGCC Technology of China and the Board Chairmen and General Manager of Beijing Huatsing Gas Turbine and IGCC Engineering Co. Ltd. He has dedicated most of the last five decades to the manufacturing, the basic and applied research, core technology development and industrialization of steam and gas turbines in China. He is the author or co-author of about 240 technical papers published in journals and at domestic and internationalconferences..

Dr. **Michael Ladwig** has over 29 years of experience in the field of gas turbines. From 1990-2002, he was in various positions in the gas turbine development of Alstom. In 2000, he became responsible for the gas turbine component engineering for all Alstom heavy-duty gas turbines. He also managed the product strategy and technical marketing of various Alstom Thermal Power business units. In July 2012, he became Director Scientific Collaboration in the Chief Technology Office of Alstom Thermal Power, where he is responsible for the worldwide scientific collaborations.

Mike Leary holds a B.S. degree in mechanical engineering from Northeastern University in Boston. He first worked for GE Aviation and held various gas turbine design engineering positions, primarily on helicopter and fighter engine programs. In 2002, he was engineering manager for advanced helicopter engine programs with partners in Italy; then joined the large commercial engine program in 2004. In 2007, he moved to GE Power and Water where he has held various management positions in systems engineering. He is currently the engineering manager of Gas Turbine Engineering.

Gary Lock graduated in Mechanical Engineering in 1982. He specialised in structural integrity especially creep and fatigue lifing methods. For the last ten years he has led the Gas Turbine sector of Frazer-Nash Consultancy, specialising in hot component lifing techniques, enclosure design, exhaust design and special purpose tooling.

Speakers

André Mom is President Emeritus of the European Turbine Network. He was elected President from 2005-2010, steering it to become a successful platform for furthering gas turbine technology. Currently he manages his own consultancy, which is active in the energy, aerospace and defence market. He was the Managing Director of the Dutch Gas Turbine Association (1994-2010), where he worked to represent the Netherlands' gas turbine industry. Mr. Mom previously worked for the National Aerospace Laboratory (NLR), Civi Consultancy and Coopers & Lybrand. He obtained his degree in Physics and Materials Engineering at Delft Technical University, the Netherlands in 1975.

Dick van der Vecht is a Mechanical Engineer of the University Twente in Enschede, the Netherlands. He began his career in Applied Research & Development and Consultancy at TNO, and in 1984 joined utility company PGEM. Since 1987 he has worked for EPON and Electrabel as Manager of Operations and Maintenance of several different power stations with Combined Cycle Gas Turbine units. Mr. van der Vecht is a founder and vice-chairman of the 9FA/FB Userconferences, a member of R&D steering groups within KEMA and Laborelec on CCGTs, and sits on the Advisory Board for Power-Gen Europe.

Robert Rijsdijk is Global Discipline Head of Shell in the Netherlands. In this position he is accountable for the global strategy, health and capabilities of the rotating equipment discipline across all Shell businesses, projects and operating units. As an Executive Steering Team Manager he is responsible for all business and relational aspects with management of OEM's for Rotating Equipment globally. Robert is an expert in Commissioning Start up, Engineering and Maintenance management. He is an ETN board member.

Sergio Picon has over 25 years of experience in power generation and oil and gas industries. Today, Mr. Picon leads a global sales team as the Senior Vice President of Global Sales & Marketing for EthosEnergy where he directs EthosEnergy's investment in Salesforce effectiveness and establishes methods, strategies and values for the team to take to market. Mr. Picon began his Wood Group career in 2005 following senior positions with PIC Energy Group, General Electric, and Stewart & Stevenson, starting in 1997.

Franco Rosatelli is Chief Technical Officer and Head of Development Engineering at Ansaldo Energia S.p.A where he works on the development and testing of gas and steam turbines and electrical generators and deals with turbomachinery design, advanced materials for high temperature applications, structural design and combustion technologies. He is Chairman of the Technology Committee and Board member of European Association of Gas and Steam Turbine Manufacturers, Member of the Advisory Boards of PowerGen Europe and Russia Power Conferences and Member of the Scientific Committee of the Genoa Smart City Association.

After attending a thermal and hydraulic engineering course in the Department of Energy Conversion of Dresden Technical University, **Frank Schnabel** received his Master's degree in engineering in 1989. He started his career as a maintenance engineer for piping, vessels and valves with VK-AG Peitz, Thierbach Power Plant. Since 2003, he has held various leadership positions with Siemens, where he currently works as Head of Strategy and Portfolio in the Power and Gas Division.

Yoshiaki Tsukuda graduated from the University of Tokyo in BS Aero-nautics in 1972 and from the MS Graduate School of the University of Tokyo in 1974. He joined Mitsubishi Heavy Industries Ltd (MHI) in 1974 and has worked as a design engineer of heavy duty GT for Power Generation until 2011. In 2013, he became Executive Senior Vice President, Innovation & Technology at the Head Quarters of MHI and Executive Corporate Advisor. He was also elected Chairman of the Gas Turbine engineers Society of Japan in 2012.

Day 2

MORNING, WEDNESDAY 15 OCTOBER 2014

08:00 Networking coffee

08:30 **Opening and introduction**
Andre Mom, ETN President Emeritus

08:40 **NATIONAL AND REGIONAL GAS TURBINE MARKETS: OPPORTUNITIES AND CHALLENGES**

Chair:
- **Dick van der Vecht**, Senior Advisor, GDF Suez

Speakers:
- GLOBAL MARKET OVERVIEW
  Sergio Picon, Vice President Power Market, EthosEnergy
- GAS TURBINE MARKET AND INDUSTRY IN CHINA: TODAY AND TOMORROW
  Hongde Jiang, Professor, Tsinghua University
- U.S. DEPARTMENT OF ENERGY ADVANCED TURBINE PROGRAM
  Richard Dennis, Turbine Technology Manager, US Department of Energy, National Energy Technology Laboratory (NETL)

PANEL DISCUSSION

Moderator:
- **Andre Mom**, ETN President Emeritus

Pannelists:
- **Sergio Picon**, EthosEnergy
- **Hongde Jiang**, Tsinghua University
- **Richard Dennis**, US Department of Energy, National Energy Technology Laboratory (NETL)
- **Yoshiaki Tsukuda**, Mitsubishi Heavy Industries

10:45 Coffee break

NATIONAL AND REGIONAL GAS TURBINE MARKETS: OPPORTUNITIES AND CHALLENGES

After a demand drop between 2011 and 2012, the expansion of the global gas turbine industry is forecast to grow quite substantially in the coming years. However, in the aftermath of the global economic and financial crises, project financing is a greater challenge. Regulatory, safety and environmental concerns for different regions also need to be considered. The materialisation of future growth opportunities also depends on technology developments but at the same time the markets' needs are getting more and more diversified. Even though the market outlook looks promising on a global scale, each regional market has its own challenges. This session will highlight market opportunities and challenges from a gas turbine perspective as well as inform on R&D programmes in place that aim to widen the opportunities for the gas turbine market.

Presentations will be followed by a panel discussion.

THE FUTURE OF GAS TURBINE TECHNOLOGY

	TURBOMACHINERY **Room**: Belgium 3 **Chair**: **Abdulnaser Sayma**, City University London	COMBUSTION **Room**: Netherlands 2 **Chair**: **Jean-Louis Vignolo**, GE Power & Water	FLEXIBLE OPERATION AND FUEL FLEXIBILITY **Room**: Belgium 1 & 2 **Chair**: **Tomas Alvarez**, Endesa	HYDROGEN-RICH SYNGAS OPERATION **Room**: Netherlands 1 **Chair**: **Peter Jansohn**, Paul Scherrer Institute (PSI)
11:15	**On the Fouling of Axial Compressors in Gas Turbines** **Rainer Kurz**, Solar Turbines	**The Ultra-Wet Cycle for High Efficiency, Low Emission Gas Turbines** **Panagiotis Stathopoulos**, Technical University of Berlin	**Expanded Fuel Test Capabilities for GE Aeroderivative Gas Turbines** **Michal Knapczyk**, GE Power & Water	**U.S DOE Hydrogen Turbine R&D Program: Results and Next Steps** **Richard Dennis**, NETL U.S. Department of Energy
11:50	**Compressor Degradation: Associated Performance Impact and Operational Risks,** **Wolfgang Kappis**, Alstom	**Design and Operating Experience on the Recent Application of the Fuel Staging Technology for AE94.3A Gas Turbine** **Domenico Zito**, Ansaldo Energia	**Empowering Modern Power Grids with Fast, Efficient, Flexible Generation** **John Charlton**, Rolls Royce	**H_2-IGCC system integration and techno-economic analysis** **Giovanni Cerri**, University of Roma TRE
12:20	**Analysis of multiple sensors for industrial gas turbine compressor blade health monitoring** **John Scheibel**, EPRI	**Experimental and Numerical Investigation on Auto-ignition of hydrogen-Rich Fuels at Reheat Operating Conditions** **Christoph Schmalhofer**, DLR	**Heavy Duty Gas Turbine Flexibility: Solutions, Field Experiences and Next Steps** **Sergio Chiesi**, Ansaldo Energia	**Gas Turbine Expander Design Modifications for H_2-rich Syngas Application** **Robert Kluxen**, RWTH Aachen University
12:50	**Investigation of Wall Film Induced Surface Roughness on the Performance of a Linear Compressor Cascade under Overspray Conditions** **Niklas Neupert**, Helmut Schmidt University	**Full-pressure Full-scale Characterisation of a Distillate oil-fired Gas Turbine Combustor Operated at very high Water-to-fuel Ratio for Achieving Extreme Nox Reduction** **Iarno Brunetti**, Enel	**Alstom Gas Turbine Technologies for Increased Operational Flexibility** **Wolfgang Kappis**, Alstom	**Modelling of Hot Corrosion Resistance for Gas Turbine Materials Systems in Novel Combusted Syngas Environments** **Joy Sumner**, Cranfield University
13:15	**Lunch**			

Day 2

AFTERNOON, WEDNESDAY 15 OCTOBER 2014

14:15 **WHICH GAS TURBINE TECHNOLOGY ADVANCEMENTS ARE FORESEEN BY OEMS TO SATISFY THE CURRENT AND FUTURE MARKET?**

Chair:
Robert Rijsdijk, Global Dicipline Head Rotating Equipment, Shell Global Solutions

PANEL DISCUSSION

Moderator:
Gary Lock, Business Manager, Frazer-Nash Consultancy

Panellists:
- **Frank Schnabel**, Head of Strategy & Portfolio, Siemens AG, Business Unit Large Gas Turbines, Generators
- **Yoshiaki Tsukuda**, Executive Corporate Adviser, Mitsubishi Heavy Industries
- **Michael Leary**, Gas Turbine Executive Engineering Leader, GE Power & Water
- **Franco Rosatelli**, Chief Technology, Ansaldo Energia
- **Gilbert Amengual**, Director, Solar Turbines
- **Michael Ladwig**, Director Scientific Collaboration, Alstom

16:00 **Closing remarks**
- **Christer Björkqvist**, Managing Director, ETN
- **Bernard Quoix**, ETN President/ Head of Rotating Machinery Department, Total

16:15 **End of Conference**
Networking Coffee and Drinks

WHICH GAS TURBINE TECHNOLOGY ADVANCEMENTS ARE FORESEEN BY OEMs TO SATISFY THE CURRENT AND FUTURE MARKET?

The gas turbine industry is currently going through a restructuring accumulative consolidation with mergers, strategic alliances and joint ventures in order to ensure a competitive edge in an intensifying global competition for future promising markets.

As the market's demand becomes more and more diversified, gas turbine R&D has become broader and more complex. What does this mean for technology development as 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 developments, key R&D topics and cooperation opportunities between now and 2030.

EU-FUNDED RESEARCH PROJECTS

The 7th International Gas Turbine Conference serves as a dissemination platform for the H_2-IGCC and OMSoP projects.

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EUROPEAN TURBINE NETWORK

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