



THE FUTURE OF GAS TURBINE TECHNOLOGY

4TH INTERNATIONAL GAS TURBINE CONFERENCE

15 – 16 OCTOBER 2008, BRUSSELS

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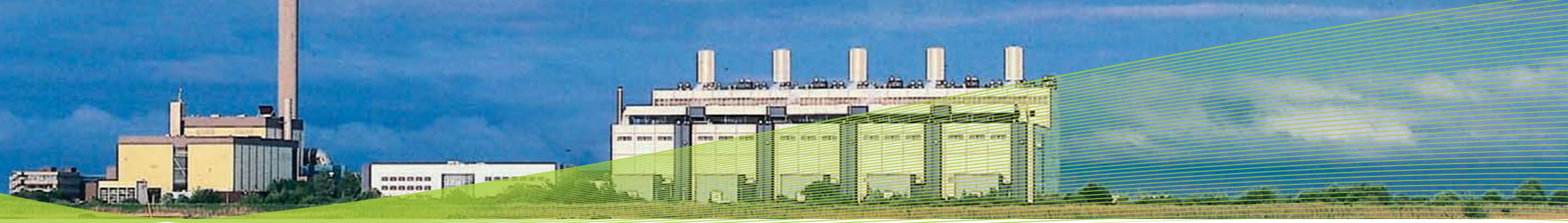
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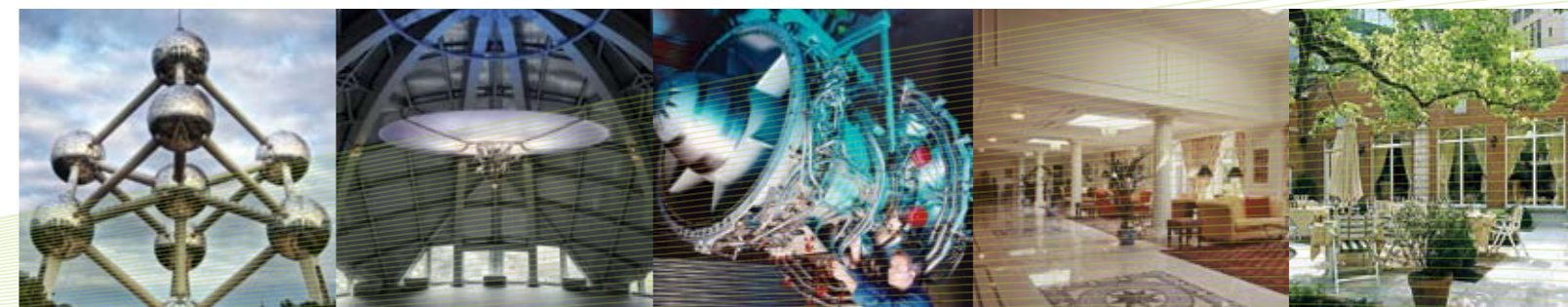
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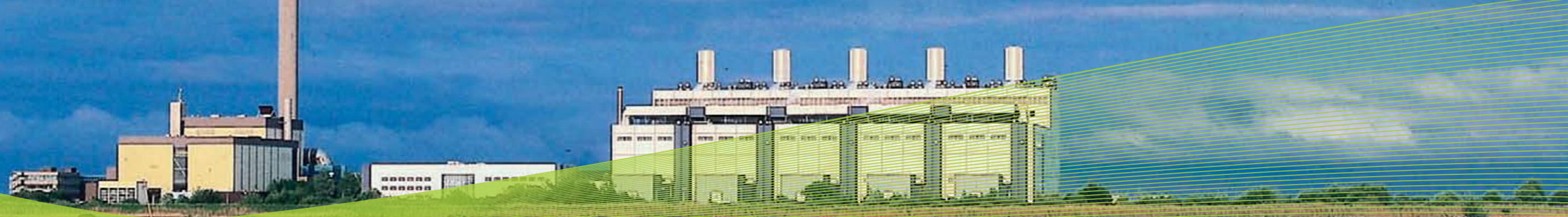
4TH INTERNATIONAL GAS TURBINE CONFERENCE PROGRAMME

DAY 1 – 15 October

07:30 – 08:30	Registration and welcome coffee
08:30 – 08:45	Welcome and Introduction Christer Björkqvist, Managing Director, ETN
GAS TURBINE TECHNOLOGY TRENDS Chair: Bernard Quiox, Head of Rotating Machinery, TOTAL	
08:45 – 09:10	Gas Turbine Technology Trends An overview of the development trends in efficiency and process modifications for turbomachinery, combustion and systems. Prof Phil Ligrani, Donald Schultz Professor of Turbomachinery, Oxford University
09:15 – 09:40	RWE nPower's View of Future Development of CCGT Key issues in determining the future development of combined cycle gas turbines: market, fuel supply, performance and technology development. Dave Wallis, Turbine Generation Team Manager, RWE nPower
09:45 – 10:10	Gas Turbine Technology: Challenges, Achievements, Outlook Predictions of, and responses to, future challenges, market outlook and users' requirements. <ul style="list-style-type: none"> What are the challenges for future GT technology? What are the aims of proven and continuing gas turbine development? Wolfgang Menapace, Director of Project Strategy & Marketing, Siemens
10:10 – 10:20	Q&A
10:20 – 10:50	Coffee Break
10:50 – 11:00	EMISSION POLICY AFFECTING THE GAS TURBINE INDUSTRY Chair: Derek Taylor, Senior Advisor, DG Transport & Energy, European Commission
11:00 – 11:20	European Commission's Future Legislation Plans: IPPC Directive on Industrial Emissions and the 3rd Phase of the Emission Trading Scheme Regulation in industrial emissions is going through a period of rapid changes. The European Commission released two major draft legislative proposals on the regulation of CO ₂ and other greenhouse gases such as NO _x : Integrated Pollution Prevention and Control (IPPC) Directive and the 3 rd phase of the Emission Trading Scheme (ETS). Both initiatives will have profound impact on industrial behaviour and foresee to accelerate the research in clean emerging technologies Marianne Wenning, Head of Unit, DG Environment, European Commission
11:25 – 11:45	U.S. Emission Regulation on NO_x & CO₂ U.S. Department of Energy shares its experience and view on emission and projected future regulations. Dr. Victor Der, Deputy Assistant Secretary, U.S. Department of Energy (DOE)
11:45 – 12:30	PANEL SESSION – OPPORTUNITIES AND CHALLENGES Moderator: Professor Riti Singh, ETN Board Member, Cranfield University Opportunities and Challenges Facing the Gas Turbine Industry and Users Panellists: M. Wenning, European Commission; V. Der, Department of Energy; D. Taylor, European Commission; W. Hardeveld, Shell Global Solutions; N. Otter, Alstom Power
12:30 – 13:30	Lunch

	CYCLE EFFICIENCY Peter Jansohn, PSI	CONDITION MONITORING Kyrre Langnes, Ecoxy Norway
13:30-13:55	<ul style="list-style-type: none"> Design, Development and Testing of an in-Engine Turbine Traverse System. Kamaljit Chana, QinetiQ (UK) 	<ul style="list-style-type: none"> Evolution of a Site Based Monitoring Strategy for Optimization, Environment and Efficiency Improvement on a Gas Turbine Driven Compressor Station. M Durcan, Bord Gais Éireann / C. Dagnall, Cogsys (UK)
14:00-14:25	<ul style="list-style-type: none"> Flow Characteristics around the Knife Edge of a Labyrinth Seal revealed using Computational Fluid Dynamics. B.I. Soemarwoto, National Aerospace Laboratory NLR (The Netherlands) 	<ul style="list-style-type: none"> Monitoring blade resonances using microwave tip clearance sensors. M. Hafner, Vibro-Meter SA (Switzerland)
14:30-14:55	<ul style="list-style-type: none"> Impact of Sweep and Lean on the Aerodynamic Behaviour of Transonic Compressor Rotors. R. Biollo, University of Padova (Italy) 	<ul style="list-style-type: none"> Evaluation of thermo-mechanical fatigue stresses and residual life: an implemented procedure for on-line monitoring of a gas-steam power plant. E. Lo Casto, University of Padova (Italy)
15:00-15:25	<ul style="list-style-type: none"> Tip leakage flow and heat transfer characteristics on turbine shroud and blade tip. I. Hassan, Concordia University (Canada) 	<ul style="list-style-type: none"> Ultrasonic manual inspection techniques for gas turbine R0 compressor blades. J. M. Berrio, Iberdrola Generación (Spain)
15:30 – 16:00	Coffee Break	
	FUEL FLEXIBILITY & EMISSIONS Thomas Alvarez, Endesa	MATERIALS AND STRUCTURES Jean-Pierre Keustermans, Electrabel/Laborelec
16:00-16:25	<ul style="list-style-type: none"> Development of a low-swirl injector for syngas and H₂ gas turbines. Robert K. Cheng, Lawrence Berkeley National Laboratory (U.S.) 	<ul style="list-style-type: none"> Life-Limiting Mechanisms of Critical Gas Turbine Components. R. van Gestel, Chromalloy (The Netherlands)
16:30-16:55:	<ul style="list-style-type: none"> The use of combustion dynamics for condition monitoring of gas turbines. H. Laget, Electrabel/Laborelec (Belgium) 	<ul style="list-style-type: none"> Trends in developing coatings - summary from International GT Forum. N. Czech, Gas Turbine Forum (Germany)
17:00-17:25	<ul style="list-style-type: none"> Numerical simulation of unstable and turbulent premixed combustion of hydrogen and hydrogen containing methane. R.J.M. Bastiaans, Eindhoven University of Technology (The Netherlands) 	<ul style="list-style-type: none"> Development of innovative non destructive methods for TBC coatings and monitoring techniques in the frame of an Italian R&D programme. C. Rinaldi, CESI RICERCA (Italy)
18:15	Meeting Point: Stanhope Hotel Reception	
18:30	Buses leave to Atomium	
19:00	Cocktail reception	
20:30	Dinner at Atomium	
23:00	Buses leave from Atomium to Stanhope Hotel	





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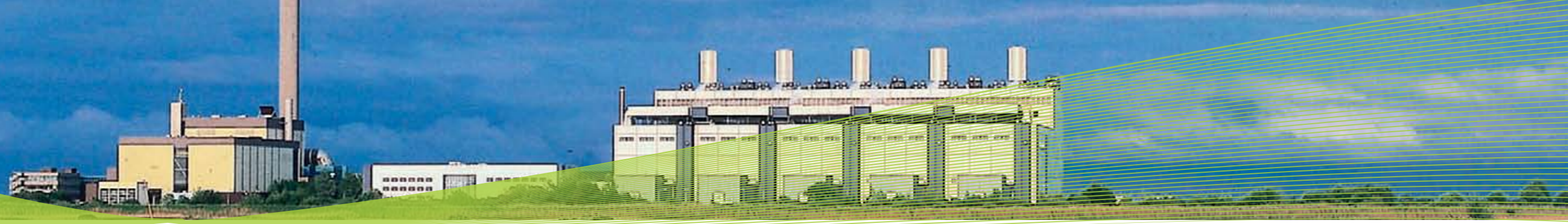
4TH INTERNATIONAL GAS TURBINE CONFERENCE PROGRAMME

DAY 2 – 16 October

08:00 – 08:50	Networking Coffee	
09:00 – 09:05	Opening	
	TECHNOLOGY & MARKET	
	Chair: Junior Isles, Editor, The Energy Industry Times	
09:05 – 09:25	Creativity in Turbomachinery Design An inspiring presentation on how the industry and academia can be more creative in turbomachinery design Peter Childs, Professor, Imperial College London	
09:30 – 09:50	Climate Change Implications for Land-based Gas Turbines What are the implications of climate change on development and innovation of gas turbine technology? How will the large- and small-size gas turbine technologies and markets develop from Solar's point of view? What is the current status and future perspective of integration of gas turbines with renewable sources? Paul Browning, Vice President, Solar Turbines	
09:55 – 10:15	Gas Turbine Insurers' perspective on Technology Development and Innovation What are the European insurers' views on the development and market introduction of new gas turbine technologies? Gerhard Mueller, Senior Risk Consultant, Allianz Global Corporate & Speciality	
10:15 – 10:30	Q&A	
10:30 – 11:00	Coffee Break	
	FUEL FLEXIBILITY & EMISSIONS	MATERIALS AND STRUCTURES
	Peter Griebel, DLR	Maria Martin, Iberdrola
11:00-11:25	<ul style="list-style-type: none"> Modeling natural gas turbulent combustion in gas turbine: Coupling 3D combustion simulations with Chemical Reactor Network for advanced NO_x prediction. V. Fichet, EDF (France) 	<ul style="list-style-type: none"> Blade Lifing with Material and Friction Damping. J.S. Rao, Altair Engineering (India)
11:30-11:55	<ul style="list-style-type: none"> Combustion of Syngases: Fundamental Combustion Studies at Gas Turbine Conditions. D. Winkler, University of Applied Sciences Northwestern Switzerland (Switzerland) 	<ul style="list-style-type: none"> Analysis and optimization of nonlinear gas-turbine structures with friction and gaps with respect to resonance peak forced response. E.P. Petrov, Imperial College London (UK)
12:00-12:25	<ul style="list-style-type: none"> Co-utilization of biomass and natural gas in existing power plants through primary steam reforming of natural gas. F. Delattin, Vrije Universiteit Brussel (Belgium) 	<ul style="list-style-type: none"> Operating temperature estimation based on micro-structure evolution of Ni-base superalloys for TG blades/vanes. E. Vacchieri, Ansaldo Energia (Italy)
12:30 – 13:30	Lunch	

	CYCLE EFFICIENCY	CONDITION MONITORING
	Michael Schmitz, GE	Chris Dagnall, Cogsys, UK
13:30-13:55	<ul style="list-style-type: none"> Performance simulation of a microturbine running on biofuels. N. Bloemberg, Delft University of Technology (The Netherlands) 	<ul style="list-style-type: none"> Compressor maps rebuilding for gas turbine monitoring. B. Bride, EDF (France)
14:00-14:25	<ul style="list-style-type: none"> Implementation of gas turbine components in the CO₂-free brown coal power plant. B. Persigehl, RWTH Aachen University (Germany) 	<ul style="list-style-type: none"> Application of different ANN model structures for sensor validation. T. Palme, University of Stavanger (Norway)
14:30-14:55	<ul style="list-style-type: none"> Solarised Gas Turbine Power Systems. R. Buck, DLR (Germany) 	ADVANCE COMBINED CYCLES
		Martyn Adams, E.ON Engineering
15:00-15:25	<ul style="list-style-type: none"> Off-design performance analysis of existing combined cycle power plant integrated with parabolic trough solar field. R. Gabbrielli, University of Pisa (Italy) 	<ul style="list-style-type: none"> Introduction of the Next Generation 1700 degree C Class Gas Turbine Engine Development Project Takeishi Ken-ichiro, Osaka University, Gas Turbine Society of Japan (Japan)
15:30 – 16:00	Coffee Break	
	THE FUTURE OF GAS TURBINE TECHNOLOGY	
	Chair: Andre Mom, President of ETN Board	
16:05 – 16:25	The Future of Gas Turbine Technology In a world of toughening energy challenges and rising environmental concerns, the responses of the gas turbine industry. Luigi di Pasquale, Gas Turbine Manager, Ansaldo Energia	
16:30 – 16:50	Future Gas Turbine in a Carbon Constrained World The combustion of hydrogen poses both challenges and opportunities for gas turbine users in the future. Wim Hardeveld, Global Manager Rotating Equipment, Shell Global Solutions	
16:50 – 17:00	Summary and Closing	





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KEYNOTE SPEAKERS



Dr. Phil Ligrani is currently the Donald Schultz Professor of Turbomachinery in the Department of Engineering Science at the University of Oxford. He is also Director of Oxford University's Rolls-Royce UTP (University Technology Partnership) in Heat Transfer and Aerodynamics. He received his Ph. D. degree from Stanford University in 1980. Prior to his appointment at Oxford University he was a Professor of Mechanical Engineering and Associate Department Chair in the Department of Mechanical Engineering at the University of Utah. He has also held academic appointments at the Imperial College of Science and Technology (University of London), at the von Karman Institute for Fluid Dynamics, and at the U.S. Naval Postgraduate School.



Mr. Dave Wallis is an electrical machines expert with 37 years experience in the field. He is currently the Head of RWE nPower Engineering's Turbine Generator Team. The team provides technical support for the operation and maintenance of turbine generator plant. It is also responsible for the Research and Development aspects within the fields of turbine generators and rotating plant dynamics.

With a wide experience in the design, procurement, operation, repair and maintenance of steam turbines, gas turbines and turbine generators both in the United Kingdom and overseas, Mr Wallis publishes also various papers and chaired the Cigré Study Committee A1 "Rotating Electrical Machines" from 1997 to 2004.



Mr. Wolfgang Menapace holds the position of Director of Project Strategy & Marketing in Fossil Power Generation, Siemens Energy. He joined Siemens Industry Automation in 1990 as a graduate of Mechanical Engineer from the University of Erlangen. Over the past 18 years in Siemens, he has been working in project management in gas turbine projects in Europe and South East Asia, strategic marketing and most recently Head of Sales Steam Turbine Components.



Mr. Derek Malcolm Taylor is has been Adviser in DG Transport & Energy. He advises on various aspects of energy and energy policy, in particular looking at the energy mix in the European Union and its Member States. He is also responsible for international co-operation on clean coal technologies (CCT) and carbon capture and storage (CCS), in particular with China, India, South Africa and OPEC, and for following the environmental aspects of conventional energy use.

He had worked for the OECD/NEA from 1977 until 1984 before he joined the European Commission in Brussels.



Ms. Marianne Wenning is the Head of Unit – Industrial Emissions and Protection of Ozone Layer, from DG Environment of the European Commission. The Unit develops and implements European legislation concerning integrated pollution and prevention control, large combustion plants, waste incineration, solvents and the European Pollutant Release and Transfer Register. She is in charge of European Commission legislation related to the protection of the ozone layer and heads the Montreal Protocol negotiations.

Ms Wenning is a graduate of Agricultural Engineering. She has been working in the European Commission since 1992 and has held positions in units dealing with climate change, natural resources and air quality within DG Environment.



Dr. Victor Der is currently Deputy Assistant Secretary for Clean Coal within the Department of Energy's Fossil Energy Program Office. He is responsible for directing research and development of clean coal research, development and demonstration, and implementation of energy policy initiatives and priorities relating to clean coal utilization and its role in climate change mitigation including carbon capture and sequestration. Prior to this position, he was Director, Office of Clean Energy Systems for central power systems technologies such as gasification, advanced combustion and hydrogen turbines; emissions controls technologies; advanced research, and high efficiency, zero-emissions fossil energy technologies. He was also responsible for directing the large scale demonstration programs such as the Clean Coal Technology Demonstration program; the Power Plant Improvement Initiative; Clean Coal Power Initiative; and FutureGen - a zero emissions coal-based research prototype plant.



Dr. Peter Childs is the Professor of Engineering Design at Imperial College London. He was formerly director of InQbate, the HEFCE funded Centre of Excellence in Teaching and Learning in Creativity, director of the Rolls-Royce supported University Technology Centre for Aero-Thermal Systems and Professor of Engineering Design at the University of Sussex where he worked for 21 years. He has written several books on mechanical design, fluid flow and temperature measurement and is a former winner of the American Society of Mechanical Engineers – International Gas Turbine Institute John P. Davis award for exceptional contribution to the literature of gas turbine technology.



Mr. Gerhard Müller has been working for 10 years for Allianz Global Corporate & Speciality AG in Munich. In his current position as Senior Risk Manager, he is responsible for the risk analysis of gas turbine technology throughout the Allianz Insurance Group. He is also involved in the analysis and handling of large turbine claims as well as the internal support regarding operational and maintenance questions of power plants. He is member of the European Gas Turbine Insurance Committee and has published several papers on this matter. He formerly worked as R&D engineer for ABB Power in Switzerland and as engineering underwriter for Munich Re.



Mr. Paul Browning is currently Vice President, Turbomachinery Products, with responsibility for the design, manufacture and procurement of Solar's gas turbine and centrifugal gas compressor products. Paul joined Solar in 1998 in Engineering and has held a variety of management positions including General Manager of Turbotecnologia de Reparaciones S.A. de C.V. (Turbotec) in Tijuana, Mexico, Group Manager of Advanced Materials Technology, Worldwide Overhaul Engineering Manager, and Overhaul Production Manager.

Paul holds a Bachelor's degree in Metallurgical Engineering and Materials Science from Carnegie Mellon University, and a Master's degree in Materials Science and Engineering from Rensselaer Polytechnic Institute.



Mr. Luigi Di Pasquale was born in 1961, graduated in Mechanical Engineering. He worked in an aerospace company from 1986 to 1993 getting experience on jet engines in the field of functional design, engine accessories and controls. In 1993 joined Ansaldo Energia in the gas turbine engineering department, where he has covered several positions (controls, performance, functional design, sales support, project engineer).

He is currently of the gas turbine engineering department at Ansaldo Energia.



Mr. Wim Hardeveld works in Shell Global Solutions International, GSER based in the Hague the Netherlands. He started his career in 1981 at Pernis refinery after completing his study in Mechanical Engineering. Thereafter, he spent some 8 years in downstream refineries (projects execution, construction, start-ups and maintenance jobs) in Saudi Arabia, The Hague and Port Dickson Malaysia. Subsequently, he worked in LNG and gas to liquids (GTL) for 10 years conducting Maintenance and Inspection. After completing the Woodside LNG project specification work, Wim served Upstream Oil & Gas from the central offices in The Hague, where he was involved with projects such as the West to East Pipeline in China, Kashagan and Harweel Ultra High Pressure injection as well as servicing EP production globally.

Wim is currently the Global Manager for rotating equipment in Shell.



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