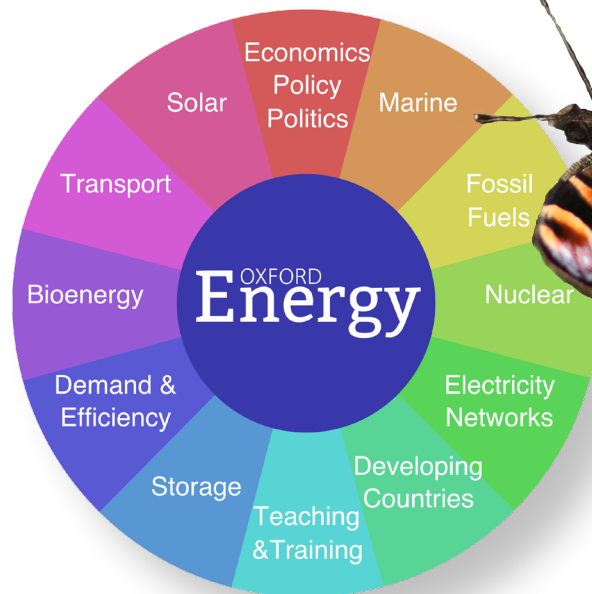


## TRANSFORMATIVE CHANGE IN ENERGY



17 June 2014

3<sup>rd</sup> annual Oxford Energy Conference  
Programme, Speakers and Participants

# Morning session

*Chair – Mark Fulton (Energy Transition Advisors)*

10.00 WELCOME & INTRODUCTION

*Chris Llewellyn Smith (Oxford University)*

10.15 LESSONS FROM HISTORY

Technological paradigm shifts, industrial revolutions  
and the low carbon transition

*Peter Pearson (Cardiff University)*

The predictability of technological performance

*Doyne Farmer (Oxford University)*

11.00 RETHINKING DEMAND (and efficiency): What Could be Gained?

*Malcolm Keay (Oxford Institute for Energy Studies)*

11.30 RENEWABLES

Cheap Solar?

*Henry Snaith (Oxford University)*

Low cost large scale anaerobic digestion?

*Mike Mason (Oxford University)*

Discussion

12.15 Parallel sessions

NUCLEAR

*Chair: Patrick Grant (Oxford University)*

Could fission compete with Gas?

*Tony Roulstone (Cambridge University)*

Fusion: when and at what price?

*Steve Cowley (Culham Centre for Fusion Energy)*

FOSSIL FUELS

*Chair: Belinda Perriman (Shell)*

Resource Surprises?

*Richard Moore (Shell)*

Clean Coal?

*Charles Soothill (Alstom)*

# Afternoon Session

13.00 LUNCH

*Chair – Richard Nourse (Greencoat Capital)*

13.30 Report from Chairs of parallel sessions

13.45 A Smart Future (Cities, Transport, Grid...)

*David Banister, Peter Grindrod, Malcolm McCulloch (Oxford University)*

14.30 Energy Storage

*Nigel Brandon (Imperial College)*

15.00 Panel discussion of transformative technologies

*Nigel Brandon (Imperial College)*

*Michael Liebreich (Bloomberg New Energy Finance)*

*Malcom McCulloch (Oxford University)*

*Lord Oxburgh (Select committee on Science and Technology)*

*Charles Soothill (Alstom)*

16.00 TEA

FINAL SESSION

*Chair – James Cameron (Climate Change Capital)*

16.30 Transformative Policy Changes

*Cameron Hepburn (Oxford University)*

17.00 Panel discussion of policies needed to drive transformative change

*Juliet Davenport (Good Energy)*

*Ben Moxham (Capital Dynamics),*

*Peter Pearson (Cardiff University)*

*Tony White (BW Energy)*

18.00 DRINKS

# Speakers, Chairs and Panel Members

(in order of appearance)



**Professor Sir Chris Llewellyn Smith FRS** (*Oxford University*) is Director of Energy Research at Oxford and President of the Council of SESAME (Synchrotron-light for Experimental Science and Applications in the Middle East). He is a theoretical physicist who studied in Oxford, where he was the first Chairman of Physics. He has served as Director General of CERN (when the LHC was approved and construction started), President and Provost of UCL, Director of the UKAEA Culham Division and on many advisory bodies, including the Prime Minister's Advisory Committee for Science and Technology.



**Mark Fulton** (*Energy Transition Advisors*) went on from studying Philosophy and Economics at Oxford to a 35-year career in financial markets in London, Sydney and New York. His roles included head of research at Citigroup Australia and US, and at Deutsche Bank Climate Change Advisors. He currently engages in clean energy and carbon asset risk research through his consulting firm Energy Transition Advisors and is an advisor to the Carbon Tracker Initiative, Ceres, CDP and the Climate Bods Initiative.



**Professor Peter Pearson** (*Cardiff University*) is Director of the Low Carbon Research Institute of Wales, and a Visiting Professor at Imperial College and the University of Surrey. His research focuses on long run energy and infrastructure transitions: their past and future energy and environmental policy implications. He chairs the international Scientific Advisory Board of the E.ON Energy Research Centre at RWTH Aachen and the Advisory Board for the Carbon Trust's Carbon Trust Standard. He co-leads the EPSRC-funded Realising Transition Pathways consortium.



**Professor Doyne Farmer** (*Oxford University*) co-directs the programme on complexity economics in the Institute for New Economic Thinking at the Oxford Martin School, and is a Professor in the Mathematics Institute. Trained as a physicist, he has worked in dynamical systems theory, time series analysis, theoretical biology, and more recently economics, including agent-based modelling and technological improvement. He also founded a successful hedge fund, sold to UBS in 2006.



**Malcolm Keay** (*Oxford Institute for Energy Studies*) has been Division Head at the International Energy Agency, Director of Energy Policy at the UK DTI, Senior Managing Consultant at Oxera, worked at Chatham House and the World Coal Institute, and been involved in many energy studies, including as expert reviewer for the IPCC and Director of the Energy and Climate Change Study for the World Energy Council. His research focuses on the implications of electricity market liberalisation for the achievement of key energy policy objectives in particular the environment. OIES, which is a Recognised Independent Centre of Oxford University, was rated the world's number 1 Resource and Energy Policy Think Tank by the University of Pennsylvania in January 2014.

# Speakers, Chairs and Panel Members



**Professor Henry Snaithe** (*Oxford University*) is the RCUK Fellow in Photovoltaics in the Oxford Physics Department, and founder of Oxford Photovoltaics. He was identified by Nature in December 2013 as one of 'ten people who matter' - in all science world-wide. For details of his career, see the latest edition of the Oxford Energy Newsletter.



**Mike Mason** (*Oxford University*) is an engineer who founded Climate Care, one of the world's first and most innovative carbon trading businesses, which he sold to JP Morgan in 2008. His current activities and investments include Biojoule, a start-up which uses new anaerobic digestion (AD) technology in Africa, and YASA Motors, a high-tech company which originated in the Oxford Engineering Department. Mike has a Masters in Environmental Change Management from Oxford's Environmental Change Institute, and is now working on a DPhil in Engineering, while putting together a consortium to work on novel ideas related to CAM plants and AD, which he will describe.



**Professor Patrick Grant FREng** (*Oxford University*), who holds the Vesuvius Chair of Materials, researches (in close collaboration with industry) the interface between materials science and manufacturing, including novel approaches to improved performance energy storage devices and advanced alloys for extreme environments such as those found in nuclear energy generation. He served for five years as a member of the RCUK Fusion Advisory Board.



**Tony Roulstone** (*Cambridge University*) is an engineer who, after periods in the army and with UKAEA, working on fast reactor developments at Dounreay, spent 20 years with Rolls-Royce plc: on nuclear submarine propulsion and aero-gas turbine engineering; as MD of the nuclear group of companies; and finally as leader of an ambitious efficiency and change programme for the whole company. After 10 years as an independent business consultant for large international companies, he returned to nuclear energy and established a new taught masters course in Nuclear Energy in Cambridge.



**Professor Steve Cowley FRS** (*Culham Centre for Fusion Energy*) is a plasma theorist, with a BA in physics from Oxford and PhD from Princeton. Since 2008 he has led the UK fusion programme at Culham, while also being a visiting Professor at Imperial College. His contributions to plasma physics were recognised by election to the Royal Society in 2014. He is a member of the Prime Minister's Council of Science and Technology.

# Speakers, Chairs and Panel Members



**Belinda Perriman** (*Shell UK Ltd.*) read Physics at Jesus College, Oxford. She started her career in Shell on an oil rig in the South China Sea, and as a reservoir engineer. After sorties into HR and Finance, she has worked in Upstream Commercial, including global acquisitions and swaps and Joint Ventures Manager for Biofuels. Until recently, she was the lead for Shell's Bid in DECC's CCS Competition; Peterhead CCS Project plans to reduce CO<sub>2</sub> emissions from 400 MW of SSE's gas fired power station by 90%. She now leads a project for Shell to work more effectively with the North Sea Supply Chain.



**Richard Moore** (*Shell*) has been involved in the Oil & Gas industry for thirty years and has worked with BP and Shell. His background is in drilling, petroleum engineering and field development. He has worked in a variety of areas of planning and strategy over the last ten years and currently provides advice on oil and gas supply to the scenarios team.



**Charles Soothill** (*Alstom*), who is Senior Vice President and Chief Technology Officer of Alstom Power, was voted the most influential individual in the European power generation sector in 2013 following a poll carried out by POWER-GEN Europe. Charles is a Mechanical Engineer whose experience includes 25 years in the field of Gas Turbine, Research and Development, Engineering and Manufacture. He has been responsible for Alstom Power's R&D program portfolio and its expansion to grow the product range in the field of Renewables and Low Carbon Technologies, and leads the Future Technology Program linked to Alstom's long term strategy. Since 2005, he has been Vice Chairman of the European Technology Platform Zero Emission Fossil Fuel Power.



**Richard Nourse** (*Greencoat Capital*), who has a BA in Geology from Oxford, is Managing Partner of Greencoat Capital, the innovative and specialist renewables and resource efficiency fund manager. He leads Greencoat's overall investment strategy and is a member of the investment committee. He previously enjoyed a long career in the City, first at Morgan Grenfell and then at Merrill Lynch where he led the EMEA Energy and Power Team. On leaving Merrill Lynch, Richard joined the Shareholder Executive, with responsibility for British Energy, BNFL and Urenco. Richard is a non-executive director of Urenco, a leading uranium enricher.



**Professor David Banister** (*Oxford University*) is Director of the Transport Studies Unit in the School of Geography and the Environment. Until 2006, he was Professor of Transport Planning at University College London. He has held many posts overseas, the most recent being as the first Benelux BIVET-GIBET Transport Chair (2012-2013). His research interests are in transport and cities, low carbon mobility, and in scenario analysis.

# Speakers, Chairs and Panel Members



**Professor Peter Grindrod CBE** (*Oxford University*) joined Oxford's Mathematical Institute in September 2013. His energy interests include the future grid (smart meters and technology insertion) and energy demand (consumer segmentation and response, and real time forecasting) and social media, working with companies within the marketing, energy, retail, consumer goods, and mobile communication sectors. Peter has founded three start-up companies and is a former member of the Councils of both the EPSRC and the BBSRC, and a member of the MOD's Defence Scientific Advisory Committee.



**Dr Malcolm McCulloch** (*Oxford University*) leads the Energy and Power Group in Oxford's Department of Engineering which focusses on developing and commercialising sustainable energy technologies for the domestic, transport and renewable generation sectors. His work on smart feedback metering led to the spin-out Intelligent Sustainable Energy, now merged with Navetas Energy Management. One successful project on power trains for electric and hydrogen vehicles was the Morgan LifeCar – the first ever Hydrogen sports car. This project led to the development of high-efficiency low-weight motors which in turn resulted in the Oxford spin-out company Oxford Yasa Motors. In renewable generation, novel lightweight low speed direct coupled generators are being developed along with a transverse axis tidal turbine.



**Professor Nigel Brandon OBE FREng** (*Imperial College*), is an Electro-chemical Engineer and Director of the Sustainable Gas Institute and BG Chair in Sustainable Gas at Imperial College London. He directed Imperial's Energy Futures Lab from 2005 to January 2014. He joined Imperial in 1998 following a 14-year research career with BP and Rolls Royce. He is a founder of the UK fuel cell company Ceres Power, CoI of the EPSRC challenge project Energy Storage for Low Carbon Grids and leads the Energy Storage Research Network [www.esrn.co.uk](http://www.esrn.co.uk).



**Michael Liebreich** (*Bloomberg New Energy Finance*) is Chairman of the Advisory Board of Bloomberg New Energy Finance, a company he founded in 2004 as a specialist provider of information on clean energy for the finance and energy industries, manufacturers and policymakers. BNEF was acquired by Bloomberg L.P. in 2009. As a student at Cambridge Michael specialised in Mechanics, Fluid Dynamics, Thermodynamics and Nuclear Engineering, before earning his MBA from Harvard Business School, where he was a Harkness Fellow and Baker Scholar. Michael is a member of numerous energy-focused industry groups, including the World Economic Forum's Global Agenda Council on the New Energy Architecture and the UN Secretary General's High Level Group on Sustainable Energy for All. He is a visiting professor at London's Imperial College Energy Futures Lab and a board member for Transport for London.

# Speakers, Chairs and Panel Members



**Lord (Ron) Oxburgh FRS**, who studied geology at Oxford and Princeton, is a member of the House of Lords Select Committee on Science and Technology and an officer of the All-Parliamentary Group for Earth Sciences. He has taught at Oxford and Cambridge and been chief scientific adviser to the Ministry of Defence and Rector of Imperial College London. As non-executive chairman of Shell (the UK arm of Royal Dutch Shell) 2004-05, Lord Oxburgh expressed his “fears for the planet” because of climate change, sought new energy sources, and urged the global community to reduce greenhouse gas emissions.



**James Cameron** (*Climate Change Capital*) is non-executive Chairman of Climate Change Capital, chairman of the Overseas Development Institute and a member of HM Treasury’s Infrastructure UK advisory council. He serves as a member of GE’s ecomagination board, Vice-Chair of the World Economic Forum’s Global Agenda Council on Measuring Sustainability and their Advisory Board of the Global Competitiveness Index, and has served on the UK Prime Minister’s Business Advisory Group. James is also an advisor to the Climate Bonds Initiative, a trustee member of the UK Green Building Council and the Carbon Disclosure Project and was a member of the Green Investment Bank Commission. He spent much of his legal career working on climate change matters, including negotiating the UNFCCC and Kyoto Protocol as an adviser to the Alliance of Small Island States. As a barrister he has appeared in several leading cases in international and environmental law. He has held academic positions at Cambridge, London, Bruges and Sydney, and is a member of the development board at Oxford’s Smith School of Enterprise and the Environment, and the advisory board of Oxford’s Environmental Change Institute.



**Professor Cameron Hepburn** (*Oxford University*), who is Professor of Environmental Economics at the Smith School and at the Institute for New Economic Thinking, is an economist with expertise in energy, resources and the environment. He has degrees in law and engineering, a doctorate in economics, and publishes on economics, public policy, law, engineering, philosophy, and biology. His work has been referred to in publications such as the *Economist* and the *Financial Times*, and he has been interviewed on television and radio in various countries. Cameron has provided advice on energy and environmental policy to governments and international institutions around the world, and co-founded two successful businesses.



**Juliet Davenport OBE** (*Good Energy*) decided to set up renewable electricity company Good Energy almost 15 years ago, catalysed by frustration with government inertia on climate change. Armed with a physics degree from Oxford and a Masters in Economics from Birkbeck, she began her career at the European Commission on European Energy policy. Stemming from this grew a now long-held vision for a 100% renewable Britain, a vision embodied by Good Energy. Juliet is passionate about enabling consumers to play their part in reducing climate change and helping the UK achieve long-term energy security. In 2013, she was awarded the OBE for her services to renewables.



# Speakers, Chairs and Panel Members



**Ben Moxham** (*Capital Dynamics*), who read Philosophy, Politics, and Economics (“PPE”) at Oxford, is a Director, Clean Energy Infrastructure, at Capital Dynamics. From 2011-13 he was Senior Policy Adviser to the Prime Minister and Deputy Prime Minister for Energy and Environment. From 2007-11 he was at energy private equity investor Riverstone Holdings and before that worked for three years in external affairs & policy for BP.



**Dr Tony White MBE** (*BW Energy*) has worked in the utility and finance sectors since leaving Oxford with a DPhil in Physics. His interests include the valuation of generating assets in liberalized power markets, the evolution of energy markets in a carbon constrained world and the development of network regulation. Tony was a founder of Climate Change Capital and his company BW energy continues to provide advice to them and others. He is a non-executive director of the Crown Estate, Green Energy Options, the Green Deal Financing Company and 2OC Limited, and a member of the British Government’s Nuclear Liabilities Financing Assurance Board.

## Participants

Shilpy Aery

Mohammed Alfahmi

Wade Allison

Christopher Allsopp

Karen Anderton

Mark Boris Andrijanic

Jeremy Arthur

Hazel Assender

Anne Augustine

Gemma Avey

Alison J. Bailey Castellina

John Baldwin

Rene Banares

David Banister

Sana Bardawil

Pranab Baruah

Paul Bate

Andrew Baxter

George Beechener

Amelia K. Bennett

Noam Bergman

Ian Berryman

Tim Bertels

Claudia Bertoni

Cheng Bi

Felix Bischoff

Jonathan Black

Mark Blackburn

Katherine Blundell

Holden Bonwit

Matthew Brady

Christian Brand

Nigel Brandon

Mostyn Brown

Adam Bruce

Andrew Buglass

Mark Burgess

Victor Burlakov

James Cameron

Tim Camp

Iliana Cardenes

Neil Carmichael

Angel Carrasquero

Rev Paolo E Castellina

Flynn Castles

Jon Chapman

Mehdi M. Chennoufi

Robbie Claase

Martin J. Clegg

Phil Clement

Steve Cowley

# Participants

Scott Craig  
Hannah Curwell-Parry  
Steve Dagg  
Martin Dare-Edwards  
Juliet Davenport  
Bill David  
Richard E. Dean  
James del Nevo  
Priyanka deSouza  
John D. Dewar  
Leon Dimarco  
Beate Dirks  
Mike Dolman  
Jeremy Doyle  
Peter Edwards  
Lindsay Edwards  
Jakob Engel  
Lucy Erickson  
Llion Evans  
Chris Farmer  
J Doyne Farmer  
John Feddersen  
Mike Fell  
Colm Fitzgerald  
John Foord  
Martino Foschi  
Simon Foy  
David Freedman  
Chaopeng Fu  
Mark Fulton  
Alfred Gathorne-Hardy  
Andy Gilchrist  
Ryan Glancy  
Sergio Gonzez-Cortes  
Nicholas Good  
Chris Goodall  
Roy Goode  
Michael Gorley  
Al-Karim Govindji  
Philip Gradwell  
Patrick Grant  
Gonzalo Griebenow  
Peter Grindrod  
Chris Grovenor  
Phil Grunewald  
Rajat Gupta  
Stephen Haben  
Jim Hall  
Tj Hall  
Ben Hambly  
Jo Hamilton  
Jeffrey Hardy  
Barbara Harriss-White  
Amelia L. Hay  
Tom Heel  
Manus Henry  
Cameron Hepburn  
Ruth Herbert  
Jenna Holder  
Matthew Holgate  
Zuliang Hong  
David Howey  
Shuyuan Hu  
Ann Huang  
Jenny Huggett  
Jonathan M. Hyde  
Kathryn Janda  
Nick Jelley  
Viviana Jimenez  
Christopher E. Johns  
Savina Joseph  
Krisztina Kaldenekker  
Karg Kama  
Androulla Kaminara  
Christopher Kaminker  
Malcolm Keay  
Richard Keen  
Stewart P. Kempself  
Michael Kenefick  
Iara Kesterton  
Yu Neng Khong  
Nick King  
Nina Klein  
Torsten Kowal  
Niels Kroner  
Francois Lafond  
Alice Lang  
Tamsin Lee  
Samuel Lee-Gammage  
Sean Lemon  
Bo-Shiuan Li  
Xin Li  
Michael Liebreich  
Craig Lightbody  
Denis Linfoord  
Yingqi Liu  
Sir Chris Llewellyn Smith  
Eirik Lonning  
Sara Lukic  
Mark Luntley  
Christopher MacMinn  
Josh Makepeace  
Alan Mann  
Mehdi Mansourpour  
Alexander Marks

# Participants

James Marrow	Richard Pearson	Marcus Stewart
Marit Marsh Stromberg	Belinda J. Perriman	Deborah Strickland
Kuldipak Marwaha	Nicholas E. Perry	Mina Tanikawa
Mike Mason	Alexandra Pons	Edwin D. Taylor
Nathan Mattock	Nadine Prill	James Taylor
Andrew Mayer	Ioannis Psorakis	Scott Thacker
Ruth Mayne	Gurinder Punn	Will Thomas
Conor McClenaghan	Jose Luis Ramirez Mendiola	Ian Thompson
Malcolm McCulloch	Tori Read	Michael Thornton
Caitlin McElroy	Liz Reason	Hugo Thould
Claire McIlvennie	Adriana Reino	Matthew Tipper
Ian McPherson	John Rhys	Anna Tranberg
Shyam Menon	Branoc Richards	Miha Troha
Richard Millar	Moritz Riede	Wendy Twist
Ria Miller	Adam Ritchie	Christopher Vogel
Richard Moore	Steve Roberts	David Wallom
Alexander W. Morris	Paul Robinson	Yunqi Wang
Robin Morris	Tony Roulstone	Francesca Ward
Charlie Morris-Marsham	Martha Samano	David Ward
Alasdair Morrison	Hiram Samel	Christopher Watson
Magdalena Mos	Stephen Samuel	Shearer West
Ben Moxham	David Sanders	Jeremy Western
Kiron Neale	Christopher A. Sayer	Tony White
Nicholas Newman	Justine Schluntz	Alan Whitley
Jack Nicholas	Michael Sheridan	Matthew J. Whittell
Kathy Norman	John Simmons	John-Paul S. Whyatt
Peter Norreys	Andrew Sims	Alan Wood
Richard Nourse	George Smith	Anthony B. Wooldridge
Ron Oxburgh	Henry Snaith	Gordon Wylie
Tim Palmer	Jack Snape	Weimu Xu
Sarah Parker	Charles Soothill	Katja Yafimava
Tom Parkinson	Robert Spencer	Yin Yang
Quentin Parsons	Aditi Srivastava	Jiao Zhang
Julia Patrick	Bradley Steel	Peteris Zilgalvis
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