



ANNUAL REPORT 2015



THE OXFORD
INSTITUTE
FOR ENERGY
STUDIES

A RECOGNIZED INDEPENDENT CENTRE OF THE UNIVERSITY OF OXFORD



UNIVERSITY OF
OXFORD

Oxford Institute for Energy Studies



Annual Report 2015

About the Oxford Institute for Energy Studies

The Oxford Institute for Energy Studies (OIES), a non-profit making charity and Recognized Independent Centre (RIC) of the University of Oxford, was founded in 1982 as an independent centre for advanced research into the social science aspects of international energy.

In addition to conducting leading edge research on a wide range of current energy questions, the Institute is committed to exploring these through dialogue – between consumers and producers, government and industry and academics and decision makers. This is reflected in the membership of the Institute and in the diversity of its research team, drawn from different national, academic and professional backgrounds. Our aim is that co-operation between researchers and interaction with benefactors and external stakeholders, will lead to a more informed and balanced understanding of the behaviour, motivations and objectives of the various economic forces, agents and policy makers that operate in or influence the performance of international energy markets.

Research carried out at the OIES is designed to encompass the following disciplines:

- the economics of primary and secondary energy sources including petroleum, gas, coal, electricity and renewable energy;
- the economics of electricity market design and regulation of electricity networks;
- the evolution of oil and gas price formation, market structures and trading;
- the politics and social aspects of energy;
- the international relations of oil and gas producing and consuming nations;
- the economic development of oil-producing countries and the energy problems of other developing countries; and
- the economics and politics of the environment in its relationship with energy.

As a general policy, the Institute concentrates on research in energy issues of international significance or issues which have implications for the interface of producers and consumers.



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Registered Charity No. 286084
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Message from the Chairman

For those involved in international energy markets, 2015 was an extraordinary year. In mid-2014 oil was priced at over \$100 per barrel, the following 18 months saw a sharp decline in price, of nearly 70 per cent, to just above \$30 per barrel. This dramatic fall in price raises huge challenges for the industry and for policy makers and necessarily affects research agendas. Not long ago policy research was preoccupied with high oil prices and their economic and political consequences.

The complexities, the financial magnitudes involved and the importance of global energy problems and issues are not only challenging, they are also intellectually exciting. These extraordinary events have large implications for the Oxford Institute for Energy Studies. The demand for the Institute's research and for objective commentary increased markedly. Issues relating to the interactions between the global economy, energy markets, oil and gas prices and volatility all increased in saliency as did issues relating to particular countries and regions – the Middle East and North Africa, India and China.

The Institute, as one of the few independent academic institutions concerned with piecing together the global picture, was well placed to respond. The interest generated in our work is allowing the institute to prudently expand the size and scope of its research effort.

A new research programme on electricity has been launched, and is being led by Dr Rahmatallah Poudineh. Research focuses on achieving a better understanding of the economic and social science aspects of electricity generation, transmission, distribution, and retail supply in order to inform public and private sector decision-making. Analysis of the wider implications of electricity sector developments is strengthened by the institute's strong regional specialisations and expertise in fossil fuel markets.

The institute's capacity to continue with its research activities depends heavily on the continued generosity and support of our benefactors. We were therefore very pleased to welcome APICORP, CME Group, Gunvor SA, Repsol SA, the School of Government and Public Transformation, Tecnológico de Monterrey, Statoil ASA and the Swedish Energy Agency to our roster of current benefactors.

On behalf of the Board of Governors I want to convey our appreciation to Mr Rolf Magne Larsen, Statoil on his resignation. He was a long serving member of the Board and I thank him for his support of the institute's activities. I am pleased to welcome his replacement from Statoil, Mr Halvor Engebretsen and look forward to working with him.

The year 2015 can be described as a highly successful year of consolidation and growth for the institute. On behalf of the Board of Governors I thank Bassam Fattouh for his hard work in 2015 in not only maintaining existing funding but securing new funding, for the strategic leadership he provides for the institute, and for developing and implementing research strategies as the issues surrounding energy in the world economy become ever more complex and difficult. My thanks also to Kate Teasdale for her support of the Director and all institute staff for their continuing hard work and dedication in 2015.

Roger Ainsworth
March 2016

Director's Note

The institute's main objectives are to undertake advanced research on issues currently affecting the world's energy sector, and to help inform the public debate and improve understanding of the political economy of energy. As an educational charity, the OIES is committed to the dissemination of the results of its research as widely as possible, both in academia and in the world at large, through its website, attendance at seminars and conferences around the world by its fellows, its own seminars and events, and its interaction with the media. The institute's work is detailed in this report.

Research and Dissemination

The institute publishes a range of research publications and commentaries, all of which are made freely available on its website, with the exception of published books. This report details ongoing research and highlights a selection of the papers published by the institute in 2015 on a wide range of subjects. The OIES also published 11 'Energy Comments': shorter papers, often devoted to current policy issues. The institute also publishes a quarterly journal, the Oxford Energy Forum, now in its 26th year.

Staffing

There were no major changes to staffing in 2015; we bade farewell to Lindsay Barker who looked after the institute's bookkeeping and welcomed Karen Clark as her replacement. Xin Li left us at the end of his contract and took up a position at the University of Strathclyde; we wish him every success in his new post.

The OIES-Saudi Aramco Fellowship, made possible by the generosity of Aramco Overseas Company, attracted numerous applications in 2015. Four OIES-Saudi Aramco Fellows joined us: Donna Peng, who is currently pursuing a joint Master degree in engineering and policy analysis, and electric power industry at Delft University of Technology and Comillas Pontifical University, respectively. She holds a MASc in chemical engineering from University of Waterloo, where she conducted simulation-based feasibility studies of utility-scale energy storage projects, and a BEng in chemical engineering from McGill University; Jun Rentschler, a Doctoral Researcher at University College London, Institute for Sustainable Resources (School of Environment, Energy and Resources), Majid Kazemi, who recently finished his PhD in economics at the School of Oriental and African Studies (SOAS), University of London. His PhD research investigated the effect of oil income on the industrial sector in Iran and Andreas Economou, a Doctoral Researcher at UCL Energy Institute, University College London and Associate Energy Economist at West Texas Research Group Economics (WTRG Economics).

We were also pleased to welcome Michal Meidan and Robin Mills as a research associates. In addition we welcomed three visiting researchers during the year: Felix Muesgens, Professor for energy economics at the 'Brandenburgische Technische Universität' in Cottbus, Seyed Reza Mirnezami, an energy economist currently working on technology development in regulated markets, from both empirical and theoretical perspectives and Virendra Chauhan an Oil Analyst at Energy Aspects in London.

We have been fortunate to work with a number of contributing authors throughout the year, and we extend our thanks to the following for their contribution to the work of the OIES:

- **Craig Brown**, a business development manager with Keystone Engineering Inc.
- **Robert Campbell**, is Head of Oil Products Research at Energy Aspects
- **Trisha Curtis**, Director of Research, Upstream and Midstream at the Energy Policy Research Foundation, Inc
- **Spencer Dale**, is Group Chief Economist, BP
- **Benjamin Foley PE**, a general manager, Keystone Engineering Inc.
- **Jorik Fritsch**, a PhD student at SOAS, University of London, London, UK
- **Tooraj Jamasb**, is Chair in Energy Economics at Durham University Business School, Durham, UK

- **Daniel Johnston**, an independent international petroleum advisory experts at Daniel Johnston & Co., Inc
- **David Johnston**, an independent international petroleum advisory experts at Daniel Johnston & Co., Inc
- **Carolina Santos de Oliveira**, works in the fuel pricing dept. of Petrobras, Brazil
- **Maarten van Mourik**, an independent oil market analyst.
- **Fabian Weber**, a Masters student at Sciences Po, Paris

Activities and Events in 2015

The annual 'Gas Day', held in October 2015, was filled to capacity, with discussions focusing on gas prices and their interaction with other energy markets and LNG markets. The 2015 'Oil Day' – kindly supported by Aramco, the King Abdullah Petroleum Studies Research Centre (KAPSARC) and the Clingendael International Energy Programme (CIEP) – was entitled 'The Oil Supply Outlook in the New Oil Price Environment: The Long and Short Term Investment Cycles'.

The institute's annual 'Brainstorming Meeting' took place in Athens in May; we are very grateful to the Olayan Group for their generous sponsorship and support of this event.

The institute continues its programme of internal seminars, which are advertised throughout the University of Oxford.

General

The interactive and networking aspects of the institute continue to benefit greatly from the close historical and current relationships with its two sister institutions: the Oxford Energy Policy Club, which meets twice annually at St Antony's College; and with the Oxford Energy Seminar, held annually at St Catherine's College.

Our thanks to the OIES administrative team – Kate Teasdale, Susan Millar, Karen Clark, Jo Illott, and Hannah Shipton – who ensure the smooth running of the institute.

Finally, we must acknowledge and thank our benefactors, sponsors, and friends for their kind support, without which the research conducted at the OIES would not be possible.

February 2016

Research

The institute publishes a range of research publications and commentaries, all of which are made freely available on its website, with the exception of published books and monographs. This report highlights a selection of the papers published by the institute in 2015 and provides an overview of ongoing research. For a full list of published research in 2015, please see the end of this report or visit the OIES website, where a full list of planned research can also be accessed.

2015 was a milestone year for EU energy and climate policy in which the EU sought to bring together a number of disparate and sometimes conflicting policies and to relaunch them in a more unified programme as the basis for an 'Energy Union'. The plan for this union was driven primarily by the scare over security of Russian gas supply arising out of the Ukraine crisis and by the EU's need to agree longer-term emission reduction goals ahead of UN climate change negotiations in Paris in December 2015. But, in addition to energy security and decarbonization, the five-pronged Energy Union plan was broadened to embrace fresh efforts in the integration of renewables into the electricity market, energy efficiency and demand management, and research, development, and competitiveness.

The OIES responded in similarly broad fashion with a book entitled '**Europe's Long Energy Journey: Towards an Energy Union?**', by David Buchan and Malcolm Keay, which was published by OUP in February 2016. The book situates the Energy Union plan in the context of past policy initiatives, analyses all aspects of it in depth, and concludes that the prescriptions for future policy, governance framework, and level of ambition will fall short of what most people would understand as a real union in energy and climate policy. The book welcomes the Energy Union's political impetus to energy initiatives but casts doubt on whether the European Commission, despite its pledge of a new electricity market design, is on the right policy track to fix Europe's power market, effectively fractured by the steady influx of subsidized renewables. To accompany their book, Malcolm and David wrote several 'Energy Comments' during the year, as well as press articles in the *Financial Times*, the *New York Times*, and on the *Chinadialogue* energy and environment online service.

The European Commission has said that 2016 is to be the Energy Union's 'year of delivery', in which 90 per cent of the Energy Union strategy is planned to be laid out. Accordingly, OIES research in 2016 will focus on the strategy's main elements, one of which, announced in February, is an LNG strategy for Europe. However, this goes little beyond work already carried out by the OIES Natural Gas Programme in terms of future gas market developments. Two other elements will get more of our attention, one of which is the negotiations between the 28 EU member states on how to share the burden of much of the emission reduction goal to which the EU has signed up internationally. These negotiations, due to be concluded in summer 2016, are aimed at reaching some accommodation between West European member states, which generally want to accelerate decarbonization, and East European member states, which do not. The other important element of the Energy Union plan – of considerable significance to the OIES Electricity Programme – is the European Commission's promise to produce draft legislation in the autumn of 2016 for a new market design for the electricity sector. In the preliminary view of OIES researchers, the Commission does not so far seem to have fully analysed the inherent contradiction between market intervention and market liberalization in a way that would enable it to come up with a solution.

2016 will also see UK voters decide in a June referendum whether they want the UK to remain in the EU or leave. An 'Energy Comment' by David Buchan and Malcolm Keay at the start of the referendum campaign in February, '**The UK in the EU – Stay or Leave? The Balance Sheet on Energy and Climate Policy**', explained that EU energy policy had generally evolved in directions favoured by the UK, which is one of the reasons why energy and climate policy is not expected to be a major issue in the campaign. However, a vote for the UK to quit the EU would probably, depending on the nature of alternative arrangements to UK membership of the EU, have negative consequences for UK energy market development and security.

The Natural Gas Research Programme, launched in 2003, has become one of the foremost sources of independent academic research on natural gas. The programme focuses on natural gas within the disciplines of the OIES: economics, politics and sociology, international relations of gas-producing, consuming and transit countries, as well as the environment in its relationship with natural gas. In 2015, the programme's staff and network of external researchers published 12 papers on a wide range of issues facing the natural gas, LNG, and shale gas sectors.

The Russian gas sector remains an important issue for the energy industry worldwide, and the OIES published four papers discussing it. The first was a joint paper by Jonathan Stern, Simon Pirani, and Katja Yafimava entitled **'Does the Cancellation of South Stream Signal a Fundamental Reorientation of Russian Gas Export Policy?'**. Katja Yafimava also authored **'Evolution of Gas Pipeline Regulation in Russia – Third Party Access, Capacity Allocation and Transportation Tariffs'**, in which she examined the progress made in reforming pipeline access and transportation tariffs in Russia since the late 2000s, amid concerns regarding the ability of existing frameworks to cope in situations of constrained capacity availability. In **'The Political and Commercial Dynamics of Russia's Gas Export Strategy'**, James Henderson and Tatiana Mitrova assessed Russia's apparent 'pivot to Asia' in response to stagnant European demand and regulatory limitations on new pipelines. In the year's final paper regarding Russia, **'The Impact of Lower Oil and Gas Prices on Global Gas and LNG Markets'**, Howard Rogers assessed a global view of the 'system' of world markets connected by LNG. Given the uncertainties of future European and Asian gas demand and the 'wave' of new LNG, Howard made a case for Russia to move to hub-based pricing in its contracts, thereby enabling it to delay future LNG projects by keeping prices below levels needed for FID.

Moving away from Russia, Bassam Fattouh, Howard Rogers, and Peter Stewart co-authored **'The US Shale Gas Revolution and Qatar's Position in Gas Markets'**, which charted the emergence of Qatar as the world's largest LNG supplier by the end of the 2000s. The paper concluded that with its mix of oil indexed and hub sales, proven ability to arbitrage between markets, and the low cost basis of its production, Qatar is well placed to weather the period of low oil and gas prices.

The prospects for Canadian LNG exports were addressed in **'Natural Gas in Canada – What Are the Options Going Forward?'**, by Ieda Gomes, which concluded that whilst it has the gas resource and is well located to export LNG to Asian markets, a host of logistical, political, and multi-layered approval processes make success elusive, especially in a market fast becoming well supplied.

'The Outlook for Azerbaijani Gas Supplies to Europe – Challenges and Perspectives', by Gulmira Rzayeva, examined the development of Azerbaijani gas exports to Turkey in the 2000s and the next phase to South East Europe by the end of this decade. Gulmira pointed out that while prospectivity remains attractive, developing exports beyond these projects will require rig availability and challenging drilling conditions to be overcome.

Looking further east, in **'Natural Gas in China – A Regional Analysis'** Xi Lin identified the drivers of historic gas consumption in five provinces. He also discussed how 'new normal' gas demand growth will be in the residential and commercial space heating sector, and in the power and industrial sectors, where air quality drives a move away from coal. Regarding Asia's other economic giant, Anupama Sen wrote **'Gas Pricing Reform in India – Implications for the Indian gas landscape'**. The paper discussed how the gas pricing formula will do little to stimulate domestic upstream activity and will result in a growing LNG import requirement in India, where future gas demand potential is significant but unclear.

Closer to home, the OIES published three reports on gas issues specifically in Europe. **'The Role of Gas in UK Energy Policy'**, by Chris LeFevre, discussed how the absence of a specific strategy for gas poses risks to both the energy sector and the wider economy. It also explored specific policy initiatives which might benefit the UK gas market. Continuing her research on hub price correlation, Beatrice Petrovich provided an update for 2014 in **'The Cost of Price De-Linkages between European Gas Hubs'**, finding high correlation scores in the more liquid hubs of North West Europe, while she also investigated periodic de-linkages for the Italian, Southern France and Austrian hubs and quantified the cost to consumers. In **'The Evolution of European Traded Gas Hubs'**, Patrick Heather underlined the continuing success of mature hubs in the UK and Netherlands. However, due the lack of supportive conditions, from government commitment to a culture supportive of trading, he cast doubt on the ability of emerging hubs in the southern and eastern regions of Europe to succeed.

In **'Building New Gas Transportation Infrastructure in the EU: What Are the Rules of the Game?'**, Katja Yafimava will address the issue of construction and usage of incremental and new gas transportation capacity in the European Union. The paper will analyse existing and draft regulation, as well as various proposals for development of additional regulation with the aim of establishing whether the developing regulatory framework is adequate for construction of new cross-border pipelines in the EU. James Henderson and Tatiana Mitrova will combine to produce two papers dealing with issues further east. In **'Russian Domestic Gas Developments'**, the authors consider the political and commercial logic for further change in the Russian gas sector in light of domestic economic problems and worsening political relations with the West. The paper looks at how the emergence of non-Gazprom players, such as Rosneft and Novatek, has spurred discussion of competition with, and even dissolution of, the state-owned monopoly. The authors will also publish **'Russia, China, & Central Asia Gas Triangle'**, a paper which looks at the rise of Central Asian gas as a major competitor for Russian gas in the Chinese market – in stark contrast to Central Asia's former dependence on Russian-controlled export infrastructure. The authors will consider the political and commercial implications of the changing import/export dynamic, and they will assess whether it undermines Russia's chances of expanding its presence in eastern gas markets. Also discussing Russia, Simon Pirani and Katja Yafimava will publish **'Russian Gas Transit across Ukraine Post 2019'**, which will consider scenarios for the transit of Russian gas to Europe after 2019 and address questions including: could Gazprom cease using Ukraine as a transit corridor and, if so, how will its gas reach its European customers? What is, or might be, the attitude of stakeholders, and what are the realistic prospects for Ukraine's gas transport and storage businesses under different post-2019 scenarios?

Also discussing issues east of Europe, Elham Hassanzadeh and Ayeh Katebi will publish **'Iran's Petroleum Contract'**, which will review the terms and structure of Iran's newly developed petroleum contracts. The political and economic context of the previous 1990s 'buy-back' contracts will be addressed, followed by a rationale for the development of the new contract framework and the likely political and commercial implications.

With regard to LNG issues, **'The Outlook for Floating LNG Liquefaction Solutions'**, by Brian Songhurst, will look at how the FLNG concept has brought new players into the liquefaction market with an entrepreneurial approach providing an 'own and operate service' on a leased basis. The paper will assess the capabilities and track record of the likely FLNG solution providers, the physical limitations to this approach, an indicative cost comparison with 'status quo', and an assessment of the scope for deployment on otherwise stranded marginal fields. Meanwhile, an OIES-KAPSARC book edited by Anne-Sophie Corbeau, **'LNG Markets in Transition – The Great Reconfiguration'**, will provide contributions from several authors and an incisive summary of the historical development of the LNG industry. With Asian LNG demand growth stalling in 2015 and uncertain for the future, the impact on hub prices, the market share of Russian gas in Europe, and the future price formation mechanisms and contracting philosophy in Asia are potentially in a state of flux. Beyond the impending 'supply glut', the book addresses how the industry may change by the early 2020s, in terms of structure and pricing, as new supply is required.

2016 will also see publication of two papers on gas in South America. The first, **'Shale Gas in Argentina: Will It Become a Real Game Changer?'**, by Ieda Gomes & Roberto Brandt, will look at the potential of Argentina's vast unconventional gas resources – including the Vaca Muerta ('Dead Cow') shale play. This paper will assess the development potential, and it will consider whether the country can develop a policy framework to achieve gas self-sufficiency in the 2020s and overcome the legacy of upstream investment decline following the economic crisis of 2002. In the second paper on the region, **'South American Gas Markets and the Role of LNG'**, Anouk Honoré addresses the natural gas demand and supply growth to 2030 and its interaction with global LNG supplies. The paper will explain that indigenous gas production, until the mid-2000s, met regional needs, thus resulting in a 'disconnection' from other gas markets. Gas trade between countries has suffered from political disagreements, tensions over price renegotiations, and delivery shortfalls, thus resulting in a resort to LNG imports.

Anouk Honoré will also publish two reports focusing on issues in Europe. In **'The Netherlands Natural Gas Market'**, Honoré will look at the giant Groningen onshore gas field, where production is being reduced following earth tremors in the province. The paper will also assess the impact of the Dutch strategy to become the key point of transit interchange and storage to 2030. In **'Industrial Gas Use in Europe'**, Honoré looks at the downward trend in European gas demand, analysis of which has so far focused on the power sector. Honoré considers the crucial question of whether the downward trend seen since the early 2000s, and especially post-financial crisis, is reversible or permanent.

The gas programme will also produce a further four pieces of research on European matters. In **'Challenges for Industrial Gas Demand in Central Europe'**, Zuzana Princova will focus on the energy/industry balances in Czech Republic, Slovakia, and Poland and how they may evolve over the next decade. Special attention will be given to energy policy and regulation and the gas versus coal versus renewables situation, as well as the future of important energy-consuming industries in these countries. **'European Transportation Bottlenecks for a Range of Global Scenarios'**, by Beatrice Petrovich and Howard Rogers, in collaboration with the EWI Cologne Institute will explore the pipeline bottlenecks previously identified by Beatrice Petrovich using the EWI's European gas network simulation model. A second stage will model the consequences of future scenarios of Russian pipeline gas and LNG supply to see whether the bottlenecks are exacerbated or eased and whether new problems appear. This work will also enable the evaluation of the relative merits of proposed new interconnectors and LNG import terminals. Revisiting the conclusions of the December 2014 paper on the dynamics of the liberalized European gas market, **'The Roles and Risks of European Gas Market Players'**, by Jonathan Stern, will further assess the implications for the gas-related business model of the 'midstream utilities' and the sustainability of long-term contracts in a market increasingly influenced by the liquid trading hubs of North West Europe. Finally, in another piece regarding gas hubs, **'Vector Auto Regressive Analysis on Gas Hubs as Multi Agent System'**, Sybren de Jong will analyse the price levels of trades on Europe's major trading hubs, this paper will identify which hubs tend to be 'prime movers', which are followers, and whether some hubs tend to be driven by their own fundamentals.

The newly created OIES Electricity Research Programme revolves around three main themes: first, access, infrastructure development, and efficient use of natural resources; second, decarbonization; and third, policy, regulation, and markets. In 2015, its inaugural year, the programme published six papers covering these themes.

Under the first theme, **'Gas-to-Power Market and Investment Incentive for Enhancing Generation Capacity – an Analysis of Ghana's Electricity Sector'**, by Rahmat Poudineh, examined whether domestic gas could advance the performance of the electricity sector. The paper identified the main barriers to domestic utilization of gas and possible approaches to modification of the electricity tariff in order to send the right signal to potential investors in generation capacity, without compromising the affordability of power supply.

Under the decarbonization theme, two papers were produced on wind power. The first, **'Decarbonizing China's Power System with Wind Power – the Past and the Future'**, focused on the significant growth in Chinese wind power since 2000. Xin Li pointed out that this rapid development has created new challenges because the growth of wind generation capacity has not been matched by a corresponding growth in transmission capacity. The paper argues that a more coordinated approach to the application of government policy and the development of more market-based price signals in the power sector could help the future development of wind power, as well its and its efficient integration into the electricity system.

The second paper, **'Achieving a Cost-Competitive Offshore Wind Power Industry'**, by Craig Brown, Rahmat Poudineh, and Benjamin Foley, looked at how wind power development has been stifled by excessive capital costs. The paper considers what policy mechanisms could be most effective in encouraging and facilitating cost reductions in the offshore wind supply chain. It argued that competitive policies are likely to be most effective when the market size is sufficiently large, whereas enhancing scale is more effective in nascent markets. However, the paper cautions that, in either case, the public costs of policies directly supporting offshore wind must be reconciled with the cost of supporting other low-carbon and zero-carbon technologies that may be equally as effective in helping governments achieve renewable energy and carbon reduction targets.

Under the theme of market regulation and policy, the programme published three papers. In the first, **'Electricity Supply Interruptions – Sectoral Interdependencies and the Cost of Energy Not Served for the Scottish Economy'**, Rahmat Poudineh and Tooraj Jamasb looked into the issue of societal cost of electricity supply interruption in presence of sectoral interdependency. The authors highlighted the importance of regulation for incentivizing electricity companies to reduce the frequency and duration of interruptions. The paper applies a dynamic inoperability input output model (DIIM) to 101 sectors (including households) of the Scottish economy in 2009 in order to explore direct, indirect, and induced effects of electricity supply interruptions. It then estimates the societal cost of energy not supplied (SCENS) in presence of interdependency among the sectors.

In the second paper in this category, **'A Holistic Framework for the Study of Interdependence between Electricity and Gas Sectors'**, Donna Peng and Rahmat Poudineh align the study of gas and power industries by providing a holistic framework for the thorough identification and discussion of power and gas sector structure, infrastructure, market, and regulatory drivers. The framework acts as a lens through which the combined gas and power supply chains of any country can be observed and understood. The UK's gas-to-power supply chain is profiled in order to illustrate how the proposed framework can be applied to integrate the various dimensions of power and gas industries.

The third paper in this category, **'The Scissors Effect'**, looks at how structural trends and government intervention are damaging major European electricity companies and affecting consumers. In the paper, David Robinson argues that the problems facing the European majors reflect a 'scissors effect', which has two interpretations. On the one hand, it is a dynamic process whereby certain revenue streams fall while costs rise, literally cutting profitability in certain European markets and business segments. On the other hand, while wholesale prices are falling, final retail prices are rising. This poses another problem for the majors, as the higher final prices not only reflect rising taxes and the costs of supporting public policies but also they create incentives for consumers to curtail demand, generate their own electricity, sell it back to the grid, and even to disconnect altogether from the system.

In 2016, there are a number of interesting projects in the pipeline which cover the three main themes of the programme. For example, Donna Peng will publish **'Sustainable Electricity Pricing in Tanzania'**, which will make a detailed analysis of gas-to-power market and tariff design in the country.

Other issues that we cover in 2016 include power sector reform and the regulation and business model of electricity network companies. For example, **'Reforming Electricity Reforms? Empirical Evidence from Asian Economies'** – by Anupama Sen, Tooraj Jamasb, and Rabindra Nepal – will look at power sector reform in Asian economies and explore its shortcomings. Under the same theme, Rahmat Poudineh will publish **'Development of Cross-Border Interconnections – A Review of the Case of Mediterranean Basin'**, a paper which looks into the issue of interconnection between north and south Mediterranean countries, and Seyed Mirnezami will author **'Innovation Incentive Under Regulation – The Case of the Electricity Networks'**, a paper that investigates the ways that regulation of electricity network companies should take into account the heterogeneity among the companies.

The Oil and the Middle Programme, established in 2009, is dedicated to the advanced study of contemporary oil markets, production, consumption and policy. With a historical focus on the resource-rich economies of the Middle East, the programme also includes other (non-OPEC) resource-rich economies, such as Russia, and emerging market economies that have become major drivers of oil demand, such as India and China. In 2015, the programme published 12 papers and 'Energy Comments' across the three distinct research streams.

This first stream focuses on the analysis of oil price behaviour, benchmark developments, fundamentals research, the impact of unconventional oil and biofuels on oil market dynamics, producer–consumer relations, and oil market financialization hypotheses. The majority of papers published under this stream concentrated on analysing the evolution of the 2014–15 oil price cycle and its implications.

'The Dynamics of the Revenue Maximisation-Market Share Trade-off: Saudi Arabia's Oil Policy in the 2014–2015 Oil Price Cycle', by Bassam Fattouh, Rahmat Poudineh, and Anupama Sen, analysed the behaviour of Saudi Arabia, challenging the popular assumption that the Kingdom would 'rescue' and 'balance' oil markets following the drop in prices. Using an analytical framework to formalize the trade-offs between revenues and market share faced by the Kingdom in its oil output decisions, the paper showed that under information uncertainty it is always safer for Saudi Arabia to assume US shale supply is elastic and not to cut output, whilst it also argued that Saudi policy could adapt accordingly as new information arrives in the market.

With regard to US shale, Trisha Curtis wrote **'US Shale Oil Dynamics in a Low Price Environment'**, which asked if relatively high-cost US shale oil could survive in a low price environment. Through a comprehensive analysis of production, activity levels, and capital expenditure cuts focusing on three major US oil plays, the paper concluded that although low prices would not end the 'shale revolution', it could put it into hibernation.

Spencer Dale took a 'big picture' view of oil market events in his comment, entitled **'The New Economics of Oil'**, which considered major changes in the oil market over the last 10–15 years. It outlined a new set of principles which will characterize the oil market going forward: first, that oil is not likely to be exhausted and there should therefore not be a presumption that the relative price of oil will necessarily increase over time; second, that the supply characteristics of shale are completely different to conventional oil; third, that in a reversal of an earlier pattern, oil is more likely to flow from west to east; and last, that while OPEC remains a central force in the oil market, the temporary or persistent nature of any oil price shock is important whilst considering its ability to stabilize the market.

'Eastward Shifting Oil Markets and the Future of Middle Eastern Benchmarks', written by Fabian Weber, considered alternatives to the implications of an eastward shift in international oil markets: a new marker for East of Suez crude in Asia (such as the ESPO blend or the Shanghai Oil Futures Contract), or a strengthening of the Middle East benchmark system. Weber argued that the second option (linking the physical Dubai market with the Oman Futures Market on the Dubai mercantile exchange) could better withstand shifting dynamics.

The second stream of the programme concentrates on the management of natural resource wealth, including resource-based development strategies and economic growth, ways of distributing natural resource rents, and domestic demand growth challenges. Research is categorized into papers on the Middle East and those on 'Other Resource-Rich Economies'.

Three papers were published covering issues on the Middle East. **'A Brief Political Economy of Energy Subsidies in the Middle East and North Africa'**, written by Bassam Fattouh and Laura El-Katiri, examined the MENA region's potential avenues into energy subsidy reform following the social unrest of the recent past – reviewing experiences from the Levant and North Africa, Yemen, Egypt, and Iran. It argued that if accommodated by effective mitigation measures, reforming energy subsidies in the region's middle-income economies could be a powerful tool for governments, addressing those very profound socio-economic grievances that have contributed to the outbreak of political protest. Also considering reform in the Middle East, Mari Luomi's paper, **'The International Relations of the Green Economy in the Gulf – Lessons from the UAE's State-led Energy Transition'**, examined how the GCC countries are positioning themselves in the international relations of the green economy. Specifically, the paper considered: what strategies and engagements the UAE and other GCC states are using to support a transition to a green energy economy; whether these engagements are providing the means of implementation for such a transition; if the national policy frameworks are aligned with such a transition; and what lessons other GCC states can draw from the UAE's experience. The third paper in this sub-stream was **'Saudi Arabia's Oil Policy – More than Meets the Eye?'**, in which Bassam Fattouh and Anupama Sen delved further into the Kingdom's domestic policy objectives – some of which are short term and others long term – shaping the fundamental trade-off between revenue maximization and maintaining market share that it faces in its oil output decisions.

There were also three papers published on 'Other Resource Rich Economies'. In **'Key Determinants for the Future of Russian Oil Production and Exports'**, James Henderson analysed the fundamental drivers of Russian oil production in the current low oil price environment, highlighting a number of dichotomies. While the low price forced Russian oil companies to cut dollar expenditure and re-assess their investment strategies, the impact of rouble devaluation and changes in the fiscal regime potentially helped offset these negative factors. A combination of measures such as import substitution, a focus on alternative sources of funding,

and a re-focusing of Russian companies on their core (and more economic) assets could similarly help to keep production flat in 2015. In **'Has the North Sea Entered a Late-Life Crisis?'**, Virendra Chauhan and Maarten van Mourik argued that despite each oil price crash bringing with it talks of decommissioning North Sea production, the outlooks for Norway and the UK differ quite substantially. While both have benefitted from several years of high prices – chasing projects at seemingly any cost – one year of low oil prices has transformed this outlook. While the UK will benefit in the next two years from new project start-ups and producers shifting capital to maximize short-term output, production is likely to fall. For Norway, the reserve base is much higher so the challenges are different: there has not been a mass exodus of major players from the basin, although rising costs and managing high declines remain tall obstacles to overcome. Third and finally, Luke Patey's paper entitled **'Oil in Uganda – Hard Bargaining and Complex Politics in East Africa'**. The paper examined future production and reserve levels and infrastructure development, along with Uganda's regulatory environment, through the refinery demands, tax disputes, and contractual negotiations between the Ugandan government and international oil companies, and how politics may impact the advancement of Uganda's oil industry.

In response to the rapid rise in non-OECD energy consumption, the third stream analyses demand and supply patterns in emerging markets including India, China, Latin America, and Africa. **'Gasoline and Diesel Pricing Reforms in BRIC Countries – A Comparison of Policy and Outcomes'**, jointly authored by Bassam Fattouh, Caroline Santos de Oliveira, and Anupama Sen, investigated the impacts of gasoline and diesel pricing reforms on downstream investment in Brazil, China, India, and Russia. It found that while India and China have accounted for the largest downstream investments despite retaining price controls and a gradual approach towards price liberalization, Brazil and Russia, which liberalized prices early on, have experienced constraints in attracting downstream investments. This paper set out some broad policy lessons, including the fact that petroleum product price liberalization is not irreversible – demonstrated by the experiences of Brazil and Russia, where price controls were reintroduced implicitly. There is a need, post-liberalization, for price adjustment mechanisms which are transparent and take into account the potentially negative impacts of price controls on downstream capital expenditure.

Looking at the biggest emerging market of all, **'China – the 'New Normal'?'**, by Michal Meidan, Amrita Sen, and Robert Campbell, questioned whether the marked slowdown in China's pace of expansion in oil demand in 2014 was a blip, or if it was the beginning of a deeper change. It argued that as China's government rebalances its economy and implements an aggressive environmental agenda, oil consumption will become more efficient, slowing demand growth rates. The structural shift in the Chinese economy also heralds a change in product demand patterns and refining, with important implications for global trade flows of crude oil and related products.

2016 will see several papers following up on the oil price cycle of 2014–15 and its implications for global oil markets, including **'Drivers of the Oil Price: A Measure of the Exogenous and Endogenous Supply Shocks of Crude Oil'**. Further, two papers analyse the possibilities of output cooperation in the face of falling oil prices: **'Russia and OPEC – Uneasy Partners'** and **'Saudi-Russia Production Accord – the Freeze Before the Thaw'**.

There are also at least six new papers in progress which focus on the Middle East. Two of these delve into the content, impact, and implications of recent energy pricing reforms spurred through fiscal urgency from low oil prices. The first, **'Striking the Right Balance? Energy Price Reforms in a Low Oil Price Environment in the GCC'**, aims to show that the long-term success of reforms in the GCC involves balancing short-term fiscal objectives, longer-term economic goals, and complex political economies. The second, **'Implications of energy price reform for the manufacturing sector in Iran and the MENA region'**, investigates the important and often overlooked issue of energy subsidy reform from the vantage point of the manufacturing sector, using Iran as a case study. **'GCC Economies in a Low Oil Price Environment: Resilience has Increased but Structural Challenges Remain'** examines the altered economic outlook of the GCC and its structural resilience to low oil prices. **'Renewable Deployment in Resource-Rich Economies of MENA Region: Challenges and Solutions'** develops a policy instrument spectrum which can be applied according to MENA countries' varying contexts to resolve a key trade-off – between fiscal necessity and political acceptance – in the rollout of renewable energy. **'The Development of GCC–East Asia Energy Cooperation'** investigates cooperation between GCC states and East Asian states during 2011–15, covering hydrocarbons, nuclear, and renewable energy. Finally, **'Under the Mountains: Kurdish Oil and Regional Politics'** outlines the history and development of the KRI's hydrocarbon resources, the economic, legal, and political issues, and wider regional implications of Kurdish oil and gas.

There will be at least five papers published in 2016 within the 'Other Resource Rich Economies' sub-stream, including **'The Shifting Geography of Russia's Hydrocarbon Exports'**, which will track the move in oil and gas sales from west to east and question whether Russia may already be becoming overly dependent on one country, China, for its hydrocarbon export sales. Two papers will revisit parts of the global supply scape that have since been overshadowed by US shale and the 2014–15 low price cycle: **'The Future of Canadian Oil Sands Production amidst Regulation, Egress, Cost, and Price Uncertainty'**, and **'Oil's Golden Triangle – Medium-term Prospects for the GoM, Angola, and Brazil'**. Other planned research includes: **'Before the Boom – Prospects and Pitfalls for East Africa Oil'**, which focuses on oil industry developments in Uganda, Kenya and South Sudan; and a self-explanatory paper entitled **'The Future of the Kazakh Oil Sector'**.

2016 will see work continue on India and China. **'India's Oil Demand: On the Verge of Take-off?'** investigates whether India can replace China as the next driver of non-OECD (and by extension, global) oil demand growth, while **'An Empirical Analysis of the Fiscal Regime for Exploration in India'** focuses on efforts at meeting this demand domestically. **'The Structure of China's Oil Industry: Past Trends and Future Prospects'** will assess how the liberalization and reform of China's oil industry will impact government-industry relations, policy-making, and China's global oil profile. Finally, there are two planned papers which do not fit within the remit of the research streams but are nonetheless relevant across all of them. First, **'Fiscal Stabilization in Oil and Gas Contracts – Evidence and Implications'** will analyse how contractual stabilization devices have evolved since the late 1990s, based on a survey of 20 countries and a review of the literature and evidence on stabilization clauses. Second, **'Energy Subsidy Reforms: A Conceptual and Empirical Analysis of the Effects on Firms'** will conceptualize the various transmission channels of energy price shocks on firms, using 2013 firm survey data from Indonesia to empirically test this.

Journal and Website

Oxford Energy Forum

The institute's quarterly journal, now in its 26th year, continues to tackle topical issues facing the energy world. Issues covered in 2015 included: the energy scene in India, gas pricing, prospects for green growth in the Middle East and North Africa with the 100th edition of the OEF dedicated to Robert Mabro. Founder of OIES and its sister institutions, and his work. Our thanks go to the authors of all articles that appeared in OEF in 2015, to the editor, Bassam Fattouh, and to our guest editors.

Website – www.oxfordenergy.org

The website contains full information on OIES publications, research in progress, and dedicated sections for the OIES Natural Gas Research Programme, Oil and the Middle East Programme, and Electricity Programme. The site also has information on the research interests of our staff, many of whom provide assessments of important energy events for the website's Energy Comments section.

The catalogue of papers and comment pieces on the OIES website continued to grow during 2015.

There are now nearly 3,000 subscribers to the institute's publication notification email service, an increase of 17 per cent on the previous year. Visitor numbers to the website remained steady at 99,000 in 2015, and total traffic to the site was close to half a million visits, drawn from all but seven countries of the world. There are also nearly 2,500 people following the institute's Twitter page.

Lectures and Seminars

As part of its commitment to education and its mandate to promote scholarly cooperation between energy producers and consumers, the OIES strives to disseminate the results of its research as widely, and in as many ways, as possible. Lectures and seminars enable the institute's researchers to present the findings of completed projects and to expose work in progress to the criticism of colleagues in industry, government, and academia. In 2015, the institute's research fellows, director, and programme directors gave numerous presentations and talks at many conferences, workshops, seminars, and meetings across the globe.

Seminars

The OIES hosted 12 seminars during 2015 on a wide range of subjects, including the lessons from the African oil boom, Europe's emission trading system, 'Energiewende' in Germany and the impact of low oil and gas prices on the gas and LNG industry. The seminars, which are open to all and advertised on the University of Oxford's energy website, included presentations from invited speakers and also from OIES research fellows on their work in progress. Our thanks to all speakers in 2015.

XXVI Annual Brainstorming Meeting

Since 1990, the institute has been holding an annual 'Brainstorming Meeting', which draws together people from producing and consuming countries, national and private oil companies, governments, financial institutes, and other research organizations. The 26th such meeting was held 7-8 May in Athens, Greece with the kind support of the Olayan Group. Participants engaged in lively discussions on a wide range of energy issues, including: the world economy; the geopolitics of energy; the oil market; the gas and LNG markets; the power sector, the energy mix, and climate change.

2015 Oil Day – The Oil Supply Outlook in the New Oil Price Environment: The Long and Short Term Investment Cycles

In November 2015, the OIES successfully held its annual 'Oil Day'. This year's event, kindly supported by Aramco, the King Abdullah Petroleum Studies Research Centre (KAPSARC) and the Clingendael International Energy Programme (CIEP) focused on four main themes: The prospects for non-OPEC supply growth and investment outside North America; the US shale supply and investment response in a low price environment: what have we learnt so far?; the Middle East investment cycle: the limit to increases in productive capacity and the investment cycle in the oil sector: is it really different this time?

The conference was attended by 30 key oil industry figures, representatives from IOCs, NOCs, financial institutions, price assessment agencies, the energy business community, as well as OIES staff.

2015 Gas Day

The OIES Natural Gas Research Programme organized its tenth annual 'Gas Day' in October 2015, with three sessions dedicated to discussing current issues in the gas sector. The first session focused on the gas prices and the interaction with other commodities. The second – entitled 'LNG Markets: Evolutionary Adaptation or Back to Boom and Bust?' – discussed the looming wave of new supply against a backdrop of slower and uncertain demand growth and the potential impact of low prices on new projects. The final session on 'Russia/CIS – Response to Market Conditions' discussed the tensions between Russia and Ukraine concerning gas supplies and the emergence of 'reverse flow' from Europe. The event, held at St Anne's College, Oxford, was attended by over 90 invitees, including sponsors of the OIES and the Natural Gas Research Programme and invited guests from the academic, media, and corporate sectors.

Gas Programme Sponsors' Meetings

The OIES Natural Gas Research Programme held its bi-annual sponsors' meetings on 28–29 April and 13–14 October 2015 at St Hugh's College, Oxford. The meetings, attended by the gas programme sponsors and authors from a range of countries and backgrounds, including academia, industry, and energy journalism, discussed ongoing research projects and progress reports.

The April meeting introduced a new book project 'LNG Markets in Transition – The Great Configuration', in collaboration with KAPSARC. Other research topics discussed included: US shale gas, Chinese gas demand, Russian gas export strategy, European hubs, and gas markets of South America, Central Europe and India.

The October meeting focused on further developments to work in progress from the May meeting and also covered prospective research papers on: the impact of low prices on gas and LNG markets, the potential for floating LNG, Azerbaijan gas outlook, Canadian gas and the role of gas in UK energy policy.

Library

In 2015, the second stage of the library reorganization was completed and several new developments, including the addition of over 4,200 items to the online catalogue, were implemented. The cataloguing of the entire collection of books, which began in 2014, was finished and to provide a rich search capability many table-of-contents were included.

One immediate result of having a searchable online collection was an increase in usage, both internally as well as by visiting international researchers and students and fellows from the University of Oxford. Close to 400 books, reports and journals were borrowed in the year.

Many of the new visitors discovered OIES and its library by way of the University of Oxford's online library catalogue (OLIS) where it fills a hole in the academic library collections that is not served by other University libraries, including the Bodleian Libraries.

The institute's ongoing commitment to provide a unique leading resource in energy publications continued through 2015 with 167 publications being added to the collection. To increase the academic profile of its own research output OIES research papers from 1982 to 2015 were digitally archived in the University of Oxford's Research Archive (ORA). ORA is an exclusive research tool of the University of Oxford and provides an academic online platform where OIES research, including all issues of the Oxford Energy Forum, can readily be found.

In addition ORA also serves as a secure repository for OIES research with file formats being updated to conform to current standards over time.

Other developments in 2015 included the addition of a dedicated library webpage helping to organize the library's resources and providing a means for the online collection to be searched directly from the website and raising the library's profile to external researchers and students.

OIES would like to offer thanks to the following organizations and publications for supplying – either free of charge or at substantially discounted prices – important trade journals, statistical sources, and other materials vital to our research work, which could not have been afforded otherwise: *Argus Media, Barclays, Blackwell's, E&E Publishing, Energy Charter Secretariat, Institute of Energy Economics - Japan, Live Media & Publishers - India, MEES, Massachusetts Institute of Technology and Multi-Science Publishing.*

Research Team and Staff

Christopher Allsopp CBE, was Director of the institute from 2006 to 2013, he is emeritus fellow of New College, Oxford; editor of the *Oxford Review of Economic Policy*; a director of Oxford Economic Forecasting; and author of the *Review of Statistics for Economic Policymaking* – also known as ‘The Allsopp Review’. He has previously worked at HM Treasury and the OECD, while at the Bank of England he was an adviser (1980–83) and a member of the Court of Directors (1997–2000) and of the Monetary Policy Committee (2000–03). He has had extensive involvement with domestic and international policy issues as consultant to international institutions and private-sector organizations, and has published extensively on monetary, fiscal, and exchange rate issues, as well as the problems of economic reform and transition. His involvement in the economics of oil and other energy issues goes back to the shocks of the 1970s.

David Buchan, Senior Research Fellow, joined the OIES in January 2007. Educated in Oxford and Geneva, he began his writing career in 1970 with *The Economist*. In 1975 he joined the *Financial Times*, where he remained until 2006, rising to energy editor (2000–2002). He was a foreign correspondent posted in Brussels, Washington DC, and Paris, and when based in London he covered energy, defence, the Soviet bloc, and diplomacy. At the OIES, he specializes in the energy and climate policies of the European Union. He has written two books for the institute, namely, *Energy and Climate Change: Europe at the Crossroads* (OUP, 2009) and *The Rough Guide to the Energy Crisis* (Penguin, 2010), and is currently working on a third, with OIES colleague Malcolm Keay, on the EU’s ‘European Energy Union’ plan, due for publication by OUP in autumn 2015.

Bassam Fattouh, was appointed director of the Oxford Institute for Energy Studies in January 2014. He is also professor at the School of Oriental and African Studies and has published a variety of articles on the international oil pricing system, OPEC pricing power, security of Middle Eastern oil supplies, and the dynamics of oil prices and oil price differentials. This work has appeared in *Energy Economics*, *The Energy Journal*, and *Energy Policy*. Dr Fattouh served as a member of an independent expert group established to provide recommendations to the 12th International Energy Forum (IEF) Ministerial Meeting in Cancun (29–31 March 2010) for strengthening the architecture of the producer–consumer dialogue through the IEF. Bassam Fattouh has also written widely on non-energy related issues, with his work published in the *Journal of Development Economics*, *Oxford Review of Economic Policy*, *Economic Inquiry*, *Empirical Economics*, *Journal of Financial Intermediation*, *Economics Letters*, *Journal of Futures Markets* and *Macroeconomic Dynamics*, and in other journals and books.

Patrick Heather, Senior Research Fellow, joined the institute in June 2006. His works include: ‘The Evolution and Functioning of the Traded Gas Market in Britain’ (August 2010); a co-authored comment with Jim Henderson, ‘Lessons from the February 2012 European gas crisis’ (April 2012); and the paper ‘Continental European Gas Hubs: are they fit for purpose?’ (June 2012). His latest paper, ‘The evolution of European traded gas hubs’ (December 2015) focuses on the evolution of the gas markets across the continent in the context of the European Commission’s vision of a single energy market (in gas); the paper describes the ‘path to maturity’ of traded gas hubs and analyses their current stages of development using both objective and subjective measures. He is currently bringing the results of that research up to date and seeing whether there could realistically be more than two ‘mature’ gas hubs in Europe? Since 2004, Patrick has been an independent consultant focusing on the gas market evolution in Europe, supply and demand dynamics, the impact of regulation on market outcomes, contracting strategy, and marketing strategies to take advantage of new market opportunities. Patrick has advised and given presentations to many different organizations, including futures exchanges and various producer and end-user companies, financial institutions, regulators, and governments in Austria, Brazil, Britain, Estonia, France, Greece, Holland, Italy, Norway, the Philippines, Poland, Russia, Sweden, and Turkey. In 2006, he was appointed commercial adviser to South Hook Gas to assist them through the long commissioning phase of their world-leading LNG import facility in South Wales, which was successfully achieved in 2009. Patrick has over 35 years’ experience of broking, trading, and risk management in the natural gas, power, oil, and oil products markets, working as an expert for European utilities and gas suppliers, British investment banks, and international oil majors.

James Henderson, Senior Research Fellow, works on the OIES gas and oil programmes, covering Russia and CIS issues as well as global energy matters that affect the region. He is a BP energy professor at the Skolkovo Management School in Moscow and lectures on energy issues at a number of universities in Europe. His publications include numerous papers on the Russian oil and gas sector, a 2010 book entitled *Non-Gazprom Gas Producers in Russia*, the co-editing of *The Russian Gas Matrix: How Markets Are Driving Change* for OIES (May 2014), and the recently published *International Partnership in Russia* (March 2014).

Anouk Honoré, Senior Research Fellow, joined the OIES Natural Gas Research Programme in 2004. Her research focuses on European natural gas issues, with particular emphasis on the gas market fundamentals, energy policies, and power generation. Her main areas of expertise include building scenarios on natural gas demand and supply in 36 European countries (the 28 member countries in the European Union plus Albania, Bosnia and Herzegovina, Norway, Republic of Macedonia, Serbia, Montenegro, Switzerland, and Turkey). She also works on the natural gas markets in South America (Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Peru, Uruguay and Venezuela). She is the author of various research papers and book chapters, with her own book *European Natural Gas Demand, Supply and Pricing: Cycles, Seasons and the Impacts of LNG Price Arbitrage* published by the Oxford University Press in 2010. Before joining the institute, she worked at the International Energy Agency (IEA) in Paris. Her work focused mainly on natural gas issues in the IEA 29 member countries, but also in China and in Latin America. Dr Honoré holds a PhD in economics, an MA in environmental and natural resources economics, and an LLM in international administration (public law) from Universities in Paris.

Laura El-Katiri, Research Fellow, joined the OIES in 2009 and works on the OIES Oil and the Middle East Programme. She formerly taught at the SOAS Department of Financial and Management Studies. Her primary research focuses on oil, energy, and development in the Middle East and North Africa. Laura has published widely on sustainable energy management in the GCC states, energy pricing and subsidy reform, and energy poverty. She holds degrees from the University of Oxford and the University of Exeter.

Malcolm Keay, Senior Research Fellow, joined the OIES in January 2005. His career has ranged widely across the energy scene, including roles in: the public sector, as director of energy policy at the UK DTI (1996–1999) and division head at the International Energy Agency; the private sector, as senior managing consultant at Oxera; and the non-profit sector, working at Chatham House and the World Coal Institute. He has acted as an adviser for many energy studies, including as special adviser to a House of Lords committee inquiry into energy security in Europe, and director of the energy and climate change study for the World Energy Council. His research focuses on the implications of electricity market liberalization for the achievement of key energy policy objectives, particularly in relation to the environment. He contributed the chapter entitled ‘Can the Market Deliver Security and Environmental Protection in Electricity Generation?’ to *UK Energy Policy and the End of Market Fundamentalism*, edited by Ian Rutledge and Philip Wright (OUP, 2011). It updated the analysis and conclusions of his 2006 monograph, *The Dynamics of Power*, to argue that governments have failed to develop policies which will enable them to meet their environmental targets in the context of liberalized markets, and that more interventionist approaches would be needed. His research interests also include EU energy policy; with David Buchan, he co-authored a book published by OUP in 2016 on *Europe’s Long Energy Journey: Towards an Energy Union?*

David Ledesma, Research Fellow, is an independent gas and LNG consultant focusing on gas and LNG strategy along the value chain, including the structuring of commercial arrangements, financing, and markets for pipeline gas and LNG projects. Since joining the institute in November 2007, he has contributed chapters to several of the institute’s books, namely: *Natural Gas in Asia* (2008), *Natural Gas in the Middle East and North Africa* (2011), and *The Pricing of Internationally Traded Gas* (2012). He has also published a number of papers, including: ‘The Changing Relationship between NOCs and IOCs in the LNG Chain’ (July 2009); ‘East Africa Gas – Potential for Export’ (March 2013); and ‘The Future of Australian LNG Exports: Will Domestic Challenges Limit the Development of Future LNG Export Capacity?’ (September 2014). David is currently Technical Editor for the next OIES book the *LNG Markets in Transition, The Great Reconfiguration*. David also contributed the book chapter ‘Project Financing LNG Projects’ to *The Principles of Project Finance* (Gower Publishing, 2012). David also gives numerous commercial training courses on gas and LNG in the UK and overseas, writes on gas and LNG, and presents regularly at conferences. During 30 years in the energy and utilities sector, David has worked on the development of complex integrated energy projects, negotiations at government level, and in the management of joint ventures. With Shell, he worked in Malaysia and the Netherlands, travelled extensively

to Oman and Asia, and was a key member of the team that closed a major LNG project in the Middle East. He is an experienced commercial manager with hands-on experience of developing and closing commercial gas transactions as well as developing business strategy. From 2000 to 2005, as director of consulting then managing director of the Gas Strategies Group (formally EconoMatters Ltd), David worked on and managed LNG and gas consulting assignments around the world. In May 2013 David was appointed as a Non-Executive Director of Pavilion Energy, a subsidiary of the Singapore investment firm Temasek Holdings. He has a degree in economics and geography from the University of Exeter.

Xin Li, Research Fellow, joined the institute in December 2013. He holds an MSc in management from Leeds University Business School and a PhD in ecological economy from the School of Earth and Environment, University of Leeds. Prior to joining the Oxford Institute for Energy Studies, he worked as a research fellow at the Sustainability Research Institute, University of Leeds. Xin Li specializes in input-output analysis and hybrid life-cycle analysis. His research focuses on assessing the environmental impacts of energy technology in both developed and developing countries, measuring emissions embodied in trade, and constructing multi-regional input-output tables. His current research focuses on economic development in China and its implications on energy consumption and CO₂ emissions. He took up a position at the University of Strathclyde in January 2016.

Robert Mabro, CBE, Honorary President, was director of the OIES until April 2003. He is an emeritus fellow of both St Antony's College and St Catherine's College, Oxford, and is honorary secretary of the Oxford Energy Policy Club. Robert Mabro stepped down as OIES president in November 2005, before the board elected him honorary president in November 2006.

Keun-Wook Paik, Senior Research Fellow, joined the OIES in January 2007. He is an acknowledged authority on Eurasian energy, in particular on Sino-Russian oil and gas cooperation, China's natural gas industry, and DPRK's offshore oil exploration. He is also currently an associate fellow of the Chatham House Energy, Environment and Development Programme. He is the author of *Gas and Oil in North-East Asia: Policies, Projects and Prospects* (London: Royal Institute of International Affairs, 1995), and co-author/supervisor of *China Natural Gas Report* (China OGP, Xinhua News Agency, and RIIA, 1998). Dr Paik has contributed almost 50 papers to a myriad of publications including: *Energy Policy*, *Journal of Energy and Development*, *Geopolitics of Energy*, *The Pacific Review*, *Oil & Gas Journal*, *Petroleum Economist*, *FT Asia Gas Report*, *China Daily Business Weekly*, *China Brief*, and *Asia-Pacific Review*. His book *Sino-Russian Oil and Gas Cooperation – The Reality and Implications* (OUP, 2012) has also been published in Chinese (in January 2013) and Korean (in March 2014), with a Japanese version (in January 2016). In 2013, he was invited as adjunct professor by both Yonsei University (South Korea) and by China Petroleum University (Beijing). In 2015, he was also invited as guest professor by Jilin University.

Beatrice Petrovich, Research Fellow, joined the OIES in November 2012 after conducting European gas hubs research with the institute in August 2012. Her first paper on European gas hub price correlation was published in October 2013. In 2014 and 2015 she published a two papers on gas hub price correlation and volatility, which investigates the possible barriers to the creation of a single European gas market and the corresponding costs. Since April 2016 Beatrice is researcher and Phd candidate at the Institute for the Economy and the Environment at the University of St Gallen (Switzerland). Before that she worked for 5 years as researcher and consultant at REF-E, a leading energy consultancy based in Milan (Italy). Among other activities, she worked for the REF-E Energy Observatory, specializing in the analysis of the natural gas market and energy regulation, and contributed to the editing and writing of the observatory's monthly newsletter. She holds an MSc in economics from the University of Milan Bicocca and completed a one-year exchange at the University of Glasgow. While at university, she collaborated on a research project in the field of experimental economics.

Simon Pirani, Senior Research Fellow on the OIES Natural Gas Research Programme, joined the institute in September 2007. His research focuses on the development of natural gas markets and changing consumption patterns in the former Soviet Union. Most recently, he was co-author of "Russian Gas Transit Across Ukraine Post-2019: pipeline scenarios, gas flow consequences and regulatory constraints", and editor of and contributor to *The Russian Gas Matrix: How Markets Are Driving Change* (OUP, 2014). Other publications include: (as author or co-author) a series of OIES publications on the Ukrainian gas sector and Russo-Ukrainian gas relationships, including 'What the Ukrainian Crisis Means for Gas Markets' (2014); OIES working papers including 'Elusive Potential: Natural Gas Consumption in the CIS and the Quest for Efficiency' (2011) and 'Central Asian and Caspian Gas Production and the Constraints on Export' (2012); and, as editor, a book entitled *Russian and CIS Gas Markets and Their Impact on Europe* (OUP, 2009). Simon is currently working on a history of global

fossil fuel consumption 1950–2014, alongside his work on gas issues. He studied Russian at the University of London, wrote a doctoral dissertation at the University of Essex, and is the author of *The Russian Revolution in Retreat* (Routledge, 2008) and *Change in Putin's Russia: Power, Money and People* (Pluto, 2009). Prior to joining the institute, he covered the Russian and Ukrainian economies as a journalist. Since 2012, he has been teaching Russian and Soviet history at Canterbury Christ Church University.

David Robinson, Senior Research Fellow, joined the OIES in July 2007. He is a consulting economist who advises on public policy and corporate strategy, especially in relation to energy and climate change. Recent research published by the Institute includes analysis of the following issues, among others: problems facing the European electricity sector; a comparison of US and European electricity prices (Oxford Energy Forum); the implications of the COP21 for the natural gas industry; electricity demand response in Shanghai, China; the challenges of integrating renewable power in Europe; the prospects for coal and natural gas in the US electricity sector; and problems with regulation of wind power in Colombia. David runs his own consulting company (DR Associates), is an academic adviser to The Brattle Group of Economic and Financial Consultants, and was previously a director of NERA, where he was the co-chair of European Operations and of the Global Energy and Telecom Practices. He also worked at the International Energy Agency (IEA), and wrote his doctoral dissertation at the University of Oxford on the vertical disintegration of the international petroleum industry.

Howard Rogers, Director, Natural Gas Research Programme, joined the institute in January 2009 and succeeded Jonathan Stern as director of the gas programme in October 2011. Prior to joining the institute, Howard was with BP for 29 years, mostly in business development, strategy, planning, mergers and acquisitions, and negotiation roles in upstream oil and gas in European, North American, Middle East, and FSU locations. In 1999, Howard joined BP Gas and Power, becoming head of global gas fundamental analysis in 2003. He has a degree in chemical engineering and is a fellow of the Institution of Chemical Engineers.

Howard has published research papers and authored book chapters on: LNG price arbitrage between the regional markets of Asia, Europe, and North America; shale gas in the US and UK; the interaction between wind power generation and gas in the UK; and the outlook for gas with CCS. More recently, Howard and Jonathan Stern have jointly written papers on the transition to hub-based pricing in Europe and the changing roles and risks of key players, and also on the challenges to JCC pricing in Asian LNG markets.

Howard enjoys the challenge of ensuring the gas programme identifies the key current and upcoming issues in natural gas, matching these with researchers, and producing high quality publications. This is enhanced by an ongoing and dynamic interaction with programme sponsors and stakeholders.

Anupama Sen joined the Institute in 2009. Her expertise lies in the applied economics of energy in developing countries, and her research has spanned the oil, gas and electricity sectors, focusing largely on South Asia and particularly India. She has published extensively on topics including gas pricing, auctions for natural resources, petroleum subsidy reforms and electricity market reforms. Anupama is a Fellow of the Cambridge Commonwealth Society and has been a Visiting Fellow at Wolfson College, Cambridge. She is also a Region Head on the Asia Pacific Desk at Oxford Analytica. She holds a B.A. (Hons) from the University of Mumbai, M.Sc. from the London School of Economics and Ph.D. from Cambridge University where she was a Nehru Scholar.

Jonathan Stern, Senior Research Fellow and Chairman of the Natural Gas Research Programme, has a range of other roles, including: honorary professor at the Centre for Energy, Petroleum & Mineral Law & Policy, University of Dundee; visiting professor at the Centre for Environmental Policy, Imperial College London; fellow of the Energy Delta Institute; a member of the board of advisers for the Center for Energy Economics, Bureau of Economic Geology at University of Texas at Austin; and, since 2011, the EU Speaker for the EU–Russia Gas Advisory Council. He is the author and editor of several books, including: *Natural Gas in Asia: The Challenges of Growth in China, India, Japan and Korea*, the second edition of which was published by OUP in 2008; co-editor with Bassam Fattouh of *Natural Gas Markets in the Middle East and North Africa* (OUP, 2011); and editor of *The Pricing of Internationally Traded Gas* (OUP, 2012). In 2014, his publications included papers (co-authored with other members of the gas programme) ‘Reducing European Dependence on Russian Gas – Distinguishing Natural Gas Security from Geopolitics’ and ‘The Dynamics of a Liberalised European Gas Market: Determinants of Hub Prices and Roles and Risks of Major Players’. His main research in 2015 will result in chapters for the Institute’s book on LNG Markets in Transition to be published in 2016.

Katja Yafimava, Senior Research Fellow, joined the OIES Natural Gas Research Programme in November 2006. She holds a DPhil in geography and an MPhil in Russian and East European studies from Corpus Christi College, Oxford. She is the author of *The Transit Dimension of EU Energy Security: Russian Gas Transit across Ukraine, Belarus, and Moldova*, a book published by OUP in 2011, which was launched in London (Chatham House) and Brussels (CEPS). She is also the author and co-author of several chapters in *The Pricing of Internationally Traded Gas*, edited by Jonathan Stern (OUP, 2012), and *Russian and CIS Gas Markets and Their Impact on Europe*, edited by Simon Pirani (OUP, 2009), as well as co-author of several working papers on Russia–CIS gas transit disputes together with Simon Pirani and Jonathan Stern. She also reviewed several papers for *Journal of European Integration* and *The Energy Journal*. In 2013, she began to work on EU and Russian gas regulation which has led to publication of three working papers: ‘The EU Third Package for Gas and the Gas Target Model’ (2013), ‘The Evolution of Gas Pipeline Regulation in Russia – third party access, capacity allocation and transportation tariffs’ (2015), ‘Russian Gas Transit across Ukraine Post-2019: pipeline scenarios, gas flow consequences, and regulatory constraints’ (2016) (co-authored) whereas a new working paper on EU regulatory issues ‘Building New Gas Transportation Infrastructure in the EU – what are the ‘rules of the game?’ is in progress. In addition, she has continued her work as an expert for the EU–Russia Gas Advisory Council and for the UNECE. Prior to joining the institute, and in parallel with her doctoral studies, she interned at Shell (2005) and at the Energy Charter Secretariat (2006).

The following staff contributed to the work of the OIES in 2015. Their dedication and professionalism was essential to its continued smooth running.

- **Karen Clark** is responsible for the institute’s bookkeeping.
- **Jo Ilott** provides administrative support for the OIES Natural Gas Research Programme.
- **Susan Millar** manages the Oxford Energy Policy Club and Oxford Energy Seminar.
- **Scott McLachlan** is responsible for the reorganization, modernization, and maintenance of the institute’s unique library.
- **Hannah Shipton** provides administrative support.
- **Kate Teasdale** is administrator and company secretary.

Visiting Research Fellows, Research Associates

Ali Aissaoui, Visiting Research Fellow, retired from the Arab Petroleum Investments Corporation (APICORP), and has returned to the Oxford Institute for Energy Studies as a visiting research fellow. He is also acting as an independent consultant, providing advisory in his field of experience and expertise.

Ali has been involved in extensive research on the political economy of petroleum for many years, with a particular interest in exploring how political, institutional, socio-economic and technological factors combine to shape energy policy. During his time at APICORP, he broadened his research perspective and sharpened his focus on energy investment, investment climate, and financing across the region of the Middle East and North Africa (MENA).

In addition to informing policy decision-making, Ali regularly shares his research findings as a speaker, discussant and peer reviewer.

Ali's involvement in relevant professional associations has provided him opportunities to interact with fellow experts and keep abreast of fast-changing global trends. In addition to the International Association for Energy Economics, he is a member of the Oxford Energy Policy Club, the Arab Energy Club, and the Paris Energy Club.

Robert Arnott, Research Associate, is currently Chairman of Hurricane Energy plc and IOT AS. of. He has previously held board-level positions at various E&P companies, most recently with Rocksource ASA, Core Energy AS, and Spring Energy AS. He worked as a senior fellow at the OIES from 2001 to 2005, focusing on all aspects of mature oil and gas provinces, as well as the corporate strategies of the major upstream energy companies. He has a strong background in all aspects of exploration and production and is recognized for his research into the oil and gas industry. After working as a geologist and economist with Royal Dutch Shell, he began working in the City of London in 1991, holding senior positions as an oil and gas equity analyst at Goldman Sachs and Morgan Stanley for 10 years.

Juan Carlos Boué, Research Associate, is an oil industry consultant who started his career working for the international trading arm of Petróleos Mexicanos (PEMEX). He rejoined the OIES in 2010, having previously been a fellow at the institute from 2000 to 2004. His professional activities have focused on petroleum, alternating between academia and industry. From 2005 to 2009, he was special adviser to the Venezuelan energy and petroleum minister and sat on the boards of most of Petróleos de Venezuela's (PDVSA) refining ventures abroad. He has written widely on the industrial economics of oil and gas exploration and production, petroleum refining industries, as well as on taxation and the political economy of oil in general. His current research concerns the governance mechanisms and legal structure underpinning the international oil industry. He is author of *A Question of Rigs, of Rules, or of Rigging the Rules? Upstream Profits and Taxes in US Gulf Offshore Oil and Gas* (OUP, 2006).

Michael Bradshaw, Senior Visiting Research Fellow, joined the OIES in August 2008 and is also a professor at Warwick Business School, teaching on the global energy MBA programme. Before taking up this post in January 2014, he was professor of human geography at the University of Leicester. His PhD is from the University of British Columbia, Canada. His research is on resource geography, with a particular focus on the economic geography of Russia and global energy security. In 2007, he was awarded the Royal Geographical Society's Back Award for his applied research on economic change in post-socialist economies. Most recently, his research has focused on energy-related issues, including the development of the Sakhalin oil and gas projects in the Russian Far East and energy security in North-East Asia. From 2008 to 2011, he was engaged in a programme of research funded by a Leverhulme Trust Major Research Fellowship that examined the relationship between energy security, globalization, and climate change. This led – in October 2013 – to the publication of his book, entitled *Global Energy Dilemmas*. He also recently completed projects on the *UK's Global Gas Challenge* (2014) and *The Future Role of Gas in the UK* (2016), funded by the UK Energy Research Centre. He is co-editor of *Global Energy: Issues, Potentials, and Policy Implications*, published by OUP in 2015. He is currently writing a book on the geopolitical economy of Natural Gas for Polity Press. He is editor-in-chief of Wiley-Blackwell's *Geography*

Compass, co-editor of *European Urban and Regional Studies*, and contributing editor of *Eurasian Geography and Economics*. In addition to his involvement with the OIES, he is an honorary senior research fellow at the Centre for Russian, European and Eurasian Studies at the University of Birmingham and visiting professor of human geography at the University of Leicester.

Michael Xiaobao Chen, Visiting Research Fellow, is a leader at Statoil's Marketing and Trading after previously worked with Statoil's global upstream strategy and business development. Before joining Statoil, Michael worked as an energy economist in the Chief Economist Office of the International Energy Agency, leading Asian energy outlook, G20 global fossil fuel subsidy initiatives, and global oilfield decline rate analysis. His areas of expertise include: the Chinese gas & LNG markets, gas pricing, energy reforms and economic transition, strategy of NOCs, ASEAN energy markets, and upstream industry trends. Since joining the institute in 2011, he has contributed a chapter to *The Pricing of Internationally Traded Gas* (OUP, 2012) and published a paper entitled 'The Development of Chinese Gas Pricing – Drivers, Challenges and Implications for Demand' (July 2014). Michael holds an MSc in economics from University College London and an MSc in development from the London School of Economics.

Virendra Chauhan, Visiting Research Fellow is currently an Oil Analyst at Energy Aspects in London. Prior to his current role, he worked as an equity analyst at Nomura covering the European Integrated Oil companies for 18 months. Virendra's work at Energy Aspects centres on crude markets. He analyses global supply demand fundamentals, with a particular emphasis on the upstream and tight (shale) oil. He also examines the impact of shale on oil markets, trade flows and benchmarks, producing analysis that is regularly referenced by leading media outlets. His research covers specialist areas such as the economics of tight oil for independent US producers. More broadly, he reviews the potential for tight oil on a global scale, applying data-rich analysis to wider developments in the energy market. He holds a Ph.D in Chemical Physics from Imperial College, London with a focus on renewable energy technologies. During this time he wrote several papers for peer-reviewed and leading journals in the field of materials engineering, Chemistry and Physics.

Sylvie Cornot-Gandolphe, Research Associate, is an independent consultant on energy and raw materials, focussing on international issues. Since 2014, she has collaborated with the Oxford Institute for Energy Studies (OIES) as a Research Fellow. She also works with the Energy Centre of the French Institute of International Relations (IFRI) as a Research Associate, with Cyclope, the reference publication on commodities, and with CEDIGAZ, the international centre of information on natural gas of IFPEN. Sylvie Cornot-Gandolphe has a long and proven experience in global gas and energy markets, gained during her past positions at IFPEN/CEDIGAZ, the UN/ECE, the IEA and ATIC Services. She is the author of several reference publications on energy markets. Her latest publications include reports on gas, coal and shale oil and gas: COP21, Haro sur le charbon (IFRI, January 2016), The European Gas Market Looking for its Golden Age? (IFRI, October 2015, co-author), US coal exports: the long road to Asian markets (OIES, March 2015), The US shale oil revolution: the test of the business model is underway (IFRI, January 2015), China's Coal Market: Can Beijing Tame 'King Coal'? (OIES, December 2014), China's Gas Strategy (IFRI, November 2014), Gas and Coal Competition in the EU Power Sector (CEDIGAZ, June 2014), The impact of the US shale gas revolution on Europe's petrochemical industries (IFRI, November 2013), Underground gas storage in the world (CEDIGAZ, June 2013), Global coal trade: from tightness to oversupply (IFRI, January 2013).

Hakim Darbouche, Research Associate, is Asset Manager with OMV Upstream, working in the North Sea. He joined OMV in January 2013 after spending three and a half years at the OIES, where he led research on MENA natural gas markets and North African energy issues. He was also an independent consultant with clients in the public and private sectors. He holds a BA from Sussex University and a PhD from the University of Liverpool.

Ralf Dickel, Senior Visiting Research Fellow, has been an independent expert on energy trade since October 2010, when he left the Energy Charter Secretariat after six years as director for transit and trade. As head of the energy diversification division at the International Energy Agency, from 2001, he was responsible for policy analysis of energy markets and of energy market reform. Before joining the IEA, he worked as senior specialist for oil and gas policy for the World Bank, this after a long career with Ruhrgas (1980–1998), where he held various management positions both in the gas purchase and the gas sales departments. He managed and co-authored several publications at the IEA and the Energy Charter Secretariat, including *Security of Gas Supply in Open Markets* (IEA, 2004) and *Putting a Price on Energy* (Energy Charter, 2007). He authored OIES Paper NG 85 on *The New German Energy Policy: What Role for Gas in a De-carbonization Policy?*

Andreas Economou, OIES-Saudi Aramco Fellow, is a Doctoral Researcher at UCL Energy Institute, University College London. He also works as an Associate Energy Economist at West Texas Research Group Economics (WTRG Economics). His core areas of expertise are the natural resource and energy economics, with specialisation in oil and gas. His research focuses on the relationship between the oil price and its drivers across different oil market regimes, with a special focus on the supply determinants. Prior to starting his PhD, Andreas worked as Operations and Commercial Analyst in various contractor companies in Cyprus that deal with the physical supply of petroleum finished products and petrochemicals for transport-use, commercial and industrial-purposes and bunkering (ExxonMobil, SKP Enterprises, Primus Oil Supplies). Andreas holds an MSc in Oil and Gas Enterprise Management from University of Aberdeen, with a specialisation in petroleum economics and the international fiscal systems analysis.

John Elkins, Research Associate, joined the OIES in January 2008. In addition to editing many of the gas programme working papers, he wrote the paper 'Natural Gas in the UK: An Industry in Search of a Policy?' published in 2010. Elkins was formerly managing editor of the Gas Strategies publications department, responsible for *Gas Matters*, *Gas Matters Today*, and other publications. He is still actively involved as associate editor, and is a regular presenter at the Gas Strategies 'Gas Chain' training course. He joined Gas Strategies as a consultant in 1995 after leaving British Gas HQ, where he held various posts involving liaison with regions on annual and peak forecasting methodology, and preparation of amalgamated national, annual, and peak supply and demand forecasts. He was secretary of the matching panel, which advised the British Gas board on supply/demand issues for company plans and negotiations with Ofgas, OFT, and the Monopolies Commission.

Chris Le Fevre, Senior Visiting Research Fellow, joined the OIES in September 2012. He has published working papers on gas storage in Great Britain (January 2013) the potential for natural gas as a transportation fuel in Europe (March 2014) and the impact of UK energy policy on the gas sector (September 2015). Chris has worked as an independent energy consultant since 2002, specializing in commercial, strategic, and regulatory issues in the natural gas sector, with particular focus on European and former Soviet markets. Chris has worked in the oil and gas industry for over 30 years. He has held a variety of positions to executive director level at Transco plc (now National Grid Gas plc) and British Gas. At Transco, he was the director responsible for implementing the 'Network Code' and the introduction of domestic competition. His roles at British Gas included establishing operations in a number of European countries, including Spain, the former German Democratic Republic (East Germany), Hungary, and the Czech Republic. Before British Gas, he worked for Shell in exploration and production companies in the Netherlands and Malaysia. He is also a contributor to Oxford Analytica and, until 2011, sat on the boards of the Northern Ireland Utility Regulator and the South Central Strategic Health Authority.

Andy Flower, Research Associate, works as an independent consultant specializing in the LNG business, particularly: strategy, marketing, project structures, shipping, pricing, supply and demand, and project economics. He retired from BP in 2001 after 32 years of service, which included 22 years involved in LNG and natural gas business activities, culminating in his role as global LNG senior adviser. At various times during his career, Flower was involved in liquefaction projects in Nigeria, Abu Dhabi, Australia, Qatar, Indonesia, and Trinidad. He has provided advice to companies planning LNG receiving terminals in North America, Europe, and Asia, and has negotiated LNG sales contracts with buyers in all the major LNG markets.

Ieda Gomes, Senior Visiting Research Fellow, is the director of Energix Strategy Ltd, a consultancy specializing in energy strategy, natural gas and LNG supply, pricing, contracts, and market fundamentals. In a career spanning 30 years in the gas and energy industry, Ieda has spent more than 13 years with BP, where she held senior positions, such as: vice president of new ventures for South Asia and Middle East, president of BP Brasil, and vice president of regulatory affairs for BP Gas and Power. Prior to BP, Ieda was the CEO of the S. Paulo Gas Company (Comgas), the largest gas distribution company in Brazil. Ieda is currently a councillor at the Brazilian Chamber of Commerce in Great Britain, a director at the Department of Infrastructure of the S. Paulo Federation of Industries, a member of the advisory board of Comgas, and sits on the board of directors of Bureau Veritas, Exterran Corporation and InterEnergy Holdings. Ieda is a senior adviser of the Brazilian think tank FGV Energia and is an active member of International Gas Union (IGU), having served in the executive committee and is as vice-chair of the Task Force Strategic Communication and Outreach. She has made presentations at several energy conferences and training courses, most recently at the World Gas Conference, and she is a

member of the programme committee of LNG 17. She is a regular columnist for the specialized magazine *Brasil Energia*. Ieda has a degree in chemical engineering from Universidade Federal da Bahia, an MSc in energy from Universidade de S.Paolo, and an MSc from Ecole Polytechnique Fédérale de Lausanne.

Elham Hassanzadeh, Visiting Research Fellow, joined the institute in 2012 as a research fellow and became a visiting fellow in 2014. Elham is the managing director of Energy Pioneers, a consulting company, focusing on Iran's energy sector investment and development. She holds an LLB in judicial law from Azad Tehran University, an LLM in international commercial law from the University of Cambridge (where she was a Shell Centenary Scholar), and a PhD in oil and gas law from the Centre for Energy, Petroleum and Mineral Law and Policy (CEPMLP), University of Dundee. Her areas of expertise include petroleum contractual regimes in the Middle East and North Africa (MENA), the politics and economics of the Iranian oil and gas industry, and reform of energy subsidies in energy producing countries. Elham is a qualified barrister at the Iranian Central Bar Association, a visiting fellow at the Global Subsidies Initiative (GSI) of the International Institute for Sustainable Development (IISD), and a political economy advisor to the World Bank on energy sector management and energy market reforms.

Marianne Haug, Senior Research Adviser, teaches energy policy and sustainable development at the University of Hohenheim in Stuttgart, Germany and serves as a member of the HORIZON 2020 Advisory Group on Energy at the European Commission. Following a career at the World Bank in Washington DC (inter alia as director and senior adviser to the president), she served as director at the International Energy Agency (IEA) in Paris (2001–05), and as chairman of the board at the Forum für Zukunftsenergien in Berlin (2006–09). Her present research and advisory interests focus on the innovation dynamics and growth of clean energy within a rapidly changing global economy.

Charles Henderson CB, Senior Research Adviser, retired from the Department of Trade and Industry in 1996, where he was head of the energy directorate. He is a former chairman of Total's oil business in the UK (1998–2005) and former member of the Monopolies and Mergers Commission.

Paul Horsnell, Research Associate, is head of commodities at Standard Chartered Plc. He was previously managing director and head of commodities research at Barclays Capital, joining in 2003 from his role as JPMorgan's head of energy research. Prior to that, he was assistant director for research at the OIES and a research fellow in economics at Lincoln College, Oxford University. He is the author of *Oil in Asia: Markets, Trading, Refining and Deregulation* (1997), and (with Robert Mabro) *Oil Markets and Prices: The Brent Market and the Formation of World Oil Prices* (1993). He holds a degree in philosophy, politics, and economics, and a doctorate in economics, both from Keble College, Oxford.

Majid Kazemi, OIES-Saudi Aramco Fellow, has recently finished his PhD in economics at the School of Oriental and African Studies (SOAS), University of London. His PhD research investigated the effect of oil income on the industrial sector in Iran. Alongside his doctoral research he has collaborated on a number of research projects on the economics of growth in the MENA region. He has also taught at the Department of Economics at SOAS for three years. His main research interest lies in the fields of energy economics, productivity analysis, industrial policy and political economy of growth. He has an MSc in International Business Economics from Aston University and a BSc in Theoretical Economics from Shahid Beheshti University.

Chris Llewellyn Smith, Research Associate, is a theoretical physicist. He is currently Director of Energy Research, Oxford University President of the Council of SESAME (Synchrotron light for Experimental Science and Applications in the Middle East), and a Visiting Professor in the Oxford Physics Department.

He has served as chairman of the council of ITER (2007–09) and of the Consultative Committee for Euratom on Fusion (2004–09), and was director of UKAEA Culham (2003–08), with responsibility for the UK's fusion programme and for operation of the Joint European Torus (JET). While at Culham, he developed and promoted the 'fast track' development of fusion energy. He was provost and president of University College London (1999–2002), director general of CERN (1994–8), and chairman of the University of Oxford's Department of Physics (1987–92). During his time as CERN director, the Large Hadron Collider (LHC) was approved and construction started.

After completing his doctorate at Oxford in 1967, he worked briefly in the Physical Institute of the Academy of Sciences in Moscow, before spending periods at CERN and the Stanford Linear Accelerator Center, after which he returned to Oxford in 1984. Chris Llewellyn Smith has written and spoken widely on science funding, international scientific collaboration, and energy issues. He has served on many advisory bodies nationally and internationally, including the UK Prime Minister's Advisory Council on Science and Technology (1989–92). His scientific contributions and leadership have been recognized by awards and honours in seven countries on three continents.

Michal Meidan, Research Associate, is director and founder of China Matters, an independent consultancy focusing on the politics and geopolitics of the Chinese energy sector. She is also an associate fellow at Chatham House's Asia programme. Previously Dr Meidan was a Senior Analyst at Eurasia Group in New York and London, prior to which she headed the Energy and Environment Program at Asia Centre-Sciences Po, Paris. She was also a lecturer in the East Asia department at the Hebrew University in Jerusalem, where she taught courses on China's political economy and Chinese integration into global politics and trade. She has authored numerous academic articles and edited the book 'Shaping China's Energy Security: The Inside Perspective'. Dr Meidan holds a PhD in Political Science and East Asian studies from Sciences Po, Paris. She is fluent in Mandarin and French.

Robin Mills, Research Associate, Robin, is Non-Resident Fellow for Energy at the Brookings Doha Center, and CEO of Qamar Energy (Dubai), he is an expert on Middle East energy strategy and economics. He is the author of two books, *The Myth of the Oil Crisis* and *Capturing Carbon*, columnist on energy and environmental issues at *The National*, and comments widely on energy issues in the media, including the *Financial Times*, *Foreign Policy*, *Atlantic*, *CNN*, *BBC*, *Bloomberg* and others. He worked for a decade for Shell, concentrating on new business development in the Middle East, followed by six years with Dubai Holding and the Emirates National Oil Company.

He holds a first-class degree in Geology from the University of Cambridge, and speaks five languages including Arabic and Farsi.

John Mitchell, Research Associate, is also an associate research fellow at Chatham House and honorary fellow at the Centre for Energy, Petroleum and Mineral Law and Policy at the University of Dundee. In November 2007, he received a lifetime achievement award for research from Saudi Arabia's King Abdullah at the opening of the 3rd OPEC Summit in Riyadh. He retired in 1993 from British Petroleum, where he held roles including: special adviser to the managing directors, co-ordinator for BP's subsidiaries in the western hemisphere, and head of BP's Policy Review Unit. In 1976–77, he was an academic visitor in the Department of Economics at the University of Cambridge. Mitchell is the author of numerous reports and briefing papers, including: 'Structural Crisis in the Oil and Gas Industry' (*Energy Policy*, January 2014), 'Asia's Oil Supply: Risks and Pragmatic Remedies' (Chatham House, 2014), 'US Energy: the New Reality' (Chatham House, 2013), and 'What Next for the Oil and Gas Industry', with Valérie Marcel and Beth Mitchell (Chatham House, 2012). He has written three books: *The New Economy of Oil* (Earthscan/Chatham House, 2001); *The New Geopolitics of Energy* (Chatham House, 1996); and, as editor, *Companies in a World of Conflict* (Earthscan/Chatham House, 1998). He was a contributor to *States and Markets in Hydrocarbon Sectors* by Andrei Beyli (Palgrave Macmillan, 2015) and *Oil Titans* by Valérie Marcel (Brookings/Chatham House, 2006) and *Oil and Gas Mismatches: finance, investment, and climate policy* with Valerie Marcel and Beth Mitchell (Chatham house 2015)

Syed Mirnezami, Visiting Research Fellow, joined the institute in June 2015. He is an energy economist and holds graduate degrees from Universities of Montreal and Edinburgh, and Sharif University of Technology. He currently works on technology development in regulated markets, from both empirical and theoretical perspectives.

Mari Luomi, Research Associate, is a thematic expert and writer at the International Institute for Sustainable Development Reporting Services. Her core areas of expertise are natural resource and environmental policy and politics, with a special focus on sustainable energy and climate change policy in the Gulf Cooperation Council states and international climate politics. Her research currently focuses on the Gulf and Brazil. She holds a PhD in the politics of the Middle East from the University of Durham. From 2011 to 2013, she was research associate and a CIRS post-doctoral fellow at the Georgetown University School of Foreign Service in Qatar. From 2006 to 2010, she held various research positions at the Finnish Institute of International Affairs, on both the Middle East

Project and the Research Programme on the International Politics of Natural Resources and the Environment. She has also worked as adviser and senior researcher for the government of Qatar on environmental governance and international climate politics.

Donna Peng, OIES-Saudi Aramco Fellow, is currently pursuing a joint Master degree in engineering and policy analysis, and electric power industry at Delft University of Technology and Comillas Pontifical University, respectively. She holds a MASc in chemical engineering from University of Waterloo, where she conducted simulation-based feasibility studies of utility-scale energy storage projects, and a BEng in chemical engineering from McGill University. Her interests are focused on the interdisciplinary study of complex systems in the field of energy: from the design and operation of energy technologies, infrastructure, and markets, to the social arena that incubates and regulates them.

Luke Patey, Research Associate, is senior researcher at the Danish Institute for International Studies. He is author of *The New Kings of Crude: China, India, and the Global Struggle for Oil in Sudan and South Sudan* (Hurst Publishers, 2014) and co-editor (with Daniel Large) of *Sudan Looks East: China, India, and the Politics of Asian Alternatives* (James Currey, 2011). His articles have appeared in *African Affairs*, *Middle East Policy*, *Third World Quarterly*, and the *Journal of Modern African Studies*. He has also written for the *Financial Times*, *The Guardian*, *The Hindu*, and *VICE News*. He has been a visiting scholar at Peking University (Beijing), the Social Science Research Council (New York), and the Centre d'études et de recherches internationales (Paris).

Jun Rentschler, OIES-Saudi Aramco Fellow, is a Doctoral Researcher at University College London, Institute for Sustainable Resources (School of Environment, Energy and Resources), and works as a consultant at the World Bank. Prior to starting his PhD, Jun was a Research Analyst at the World Bank's Chief Economist's Office for Sustainable Development, working on topics around climate change economics, green growth, risk, and resources. Before joining the World Bank, he worked as an Economic Adviser at the German Foreign Ministry, based at the German Embassy in Tokyo, where he focused on economic and energy policy. He has worked on energy, environment and development projects at the European Bank for Reconstruction and Development (EBRD), Grameen Microfinance Bank in Bangladesh, and the Partners for Financial Stability Program by USAID in Poland. Jun holds an MSc in Economics from University College London, with a specialisation in time series econometrics, and development economics.

Gulmira Rzayeva, Research Associate, joined the Oxford Institute for Energy Studies in 2013. She is a senior research fellow at the Center for Strategic Studies (SAM) under the President of the Republic of Azerbaijan and a contributing analyst for the Jamestown Foundation's *Eurasia Daily Monitor*. Her areas of expertise include the energy policy of Azerbaijan, Black Sea and Caspian region energy security, and Turkey's domestic natural gas market. Ms Rzayeva has published numerous articles and commentaries on Azerbaijan's gas strategy and the 'Southern Gas Corridor' initiative, and has previously worked at the Moscow Carnegie Center, as a visiting research fellow, and at the Aleksanteri Institute of the University of Helsinki. She has a BA in international relations from Baku Slavic University and an MA in global affairs from the University of Buckingham, UK.

Ivan Sandra, Research Associate, is CEO of Sierra Oil and Gas, a Mexican independent oil and gas company. Prior to becoming CEO of Sierra, Ivan held a number of leadership and technical positions, including senior partner at EY London, where he was responsible for global oil and gas in emerging markets, and president at Energy Intelligence. Until mid-2011, he was vice president of global strategy and business development at Statoil. He played an important role in Statoil's strategy re-set and in the origination of business development and M&A efforts worldwide. Prior to Statoil, he held other positions in industry, including: head of oil supply at OPEC, whom he represented at the UNECE Expert Group on Resource Classification at the UN in Geneva; vice president in the O&G investment banking team at Citigroup; associate vice president for oil and gas equities at Merrill Lynch; exploration geologist at BP; and commercial positions in Venezuela, Norway, and Egypt. He is also a member of the Oxford Energy Policy Club and co-founder, board member, and lecturer in strategy at the executive energy MBA program at Vienna's Wirtschaftsuniversität (WU). He was recently appointed as a trustee to the Energy Policy Research Foundation, Inc. (EPRINC) in Washington DC. He has published and contributed to a number of books and publications. Ivan holds a BSc in geology from Baylor University, an MSc and MBA from Edinburgh University, and attended the Berkeley Executive Leadership Program at the University of California at Berkeley.

Paul Segal, Research Associate, is senior lecturer in economics at the International Development Institute, King's College London. He works on economic development, the distribution of natural resource revenues, and the macroeconomics of resource-rich countries. In 2006, he completed his DPhil in economics at Nuffield College, Oxford, having previously been a consultant economist at the UNDP in New York, a research fellow at Harvard University, and a lecturer in economics at the University of Sussex. He has been a visiting scholar at the National Bureau of Economic Research in Cambridge, Massachusetts, and at the Centro de Investigación y Docencia Económicas in Mexico City.

Amrita Sen, Research Associate, is the founding Partner and Chief Oil Analyst at Energy Aspects. Amrita leads Energy Aspects' analysis and forecasting of crude and products markets. Her specialism is in energy commodities, particularly oil and oil products. Amrita's deep understanding of the complex relationships within the global energy sector, her wealth of industry contacts and 10 years of experience, allow for a unique perspective on market outlook. She holds an MPhil in Economics from Cambridge University, a BSc in Economics from the University of Warwick, and is pursuing a PhD in Economics at the School of Oriental and African Studies, University of London. She is a Non-resident Senior Fellow at the Atlantic Council a Research Associate at the Oxford Institute of Energy Studies and was formerly Chief Oil Analyst for Barclays Capital. She is frequently featured in leading media outlets, including the Financial Times, BBC News, Reuters, Bloomberg, CNBC, Wall Street Journal, and Sky News, and at leading industry events as a speaker, and is regarded as a leading authority on oil markets.

Adnan Shihab-Eldin, Research Associate, is the director general of the Kuwait Foundation for the Advancement of Sciences (KFAS) and OPEC's former acting secretary general/director of research. He served earlier as director of the IAEA's Department of Technical Co-operation (Vienna), director of UNESCO's Regional Office for Science & Technology (Cairo), director general of the Kuwait Institute for Scientific Research, and vice rector of Kuwait University (Kuwait). Dr Shihab-Eldin serves as board member/adviser to many national and international institutions and corporations. He received a BSc in electrical engineering, and an MSc and PhD in nuclear engineering, all from the University of California at Berkeley. He has published extensively and is a regular invited speaker at many international and regional meetings, covering many fields, including: energy policy, economics, technology and the environment; oil markets; nuclear power; and the management and development of science & technology in developing countries.

Ian Skeet, Research Associate, is a consultant to the OIES and former editor of *Oxford Energy Forum*. Between 1953 and 1985 he worked for Shell, where he was in charge of government and international relations from 1975 to 1985. Widely travelled in the Middle East, his publications include *Oman and Muscat: End of an Era* and *OPEC: Twenty-Five Years of Prices and Politics*.

Robert Skinner, Research Associate, is a former director of OIES and has previously held roles as vice president of Oil Sands Total E&P Canada Ltd, director of the International Energy Agency's policy office, assistant deputy minister for energy commodities (Canadian Government), and senior vice president at Statoil Canada. He is an executive fellow at the School of Public Policy and energy research strategy adviser at the University of Calgary, and consults for industry, governments, and academic institutions in Canada and abroad through Kimacal Energy Strategies, his private consultancy based in Calgary. He is on the external advisory board of the Center for Energy Economics of the Bureau of Economic Geology at the University of Texas.

Brian Songhurst, Research Associate, has an honours degree in chemical engineering from Imperial College London and is a fellow of the Institution of Chemical Engineers. He has 50 years of experience in the oil and gas industry, working for engineering contractors, operators, and specialist consultants. He is a past chairman of the Institution of Chemical Engineers Subject Oil & Natural Gas Group (SONG), which provides technical networking among its members to deliver best practices within the chemical engineering community. He has held senior positions in engineering, projects, and sales, and has led engineering and process design teams for gas processing, offshore oil & gas, refinery, and petrochemical facilities around the world. He recently retired and his last position was director of LNG for London-based consultancy ThyssenKrupp Uhde Energy and Power and managed a variety of LNG projects for both onshore and offshore (FLNG) applications. He was previously engineering manager with MW Kellogg, one of the world's leading LNG contractors, and facilities engineering manager with J Ray McDermott, one of the world's leading offshore contractors.

Paul Stevens, Research Associate, was educated as an economist and specialist on the Middle East at Cambridge and at SOAS. From 1973 to 1979, he taught at the American University of Beirut in Lebanon, interspersed with two years as an oil consultant. From 1979 to 1993, he lectured in economics at the University of Surrey, after which he became professor of petroleum policy and economics at the University of Dundee's Centre for Energy, Petroleum & Mineral Law & Policy (a chair created by BP), where he was appointed to an emeritus chair in January 2008. He has now joined, on a part-time basis, Chatham House in London as distinguished fellow. He has published extensively on energy economics, the international petroleum industry, economic development issues, and the political economy of the Gulf. He also works as a consultant for many companies and governments.

Philip Wright, Research Associate, is a fellow of the UK's Energy Institute and was formerly professor, then honorary professor, of energy policy and economics at the University of Sheffield. Over more than three decades, his research, publications, consultancy, and teaching have covered the gamut of energy industries and companies that operate in them. As well as contributing a critical perspective on the liberalization of gas and electricity industries, his work has also addressed the fiscal regime of UK oil and gas. His views and expertise have been sought by government organizations, international organizations, companies, trade unions, and universities in Europe and Latin America. Fluent in French and Spanish, he has been a visiting professor at the University of Montpellier 1 and at the University of Cartagena de Indias, Colombia. He is currently scientific director at the Observatorio del Caribe Colombiano in Cartagena de Indias, where he has been involved in various projects to improve the performance of the electricity supply in the nation's Caribbean region. These have included the development of a monitoring system to provide early warnings of problems which would delay the timely commissioning of new electricity network investment projects and, with his colleague Carmen Ocampo, an evaluation of the impact of a government electricity subsidy designed to assist the very poorest of households. Most recently, he and his colleague Lina Moyano have written a study of the extent to which Colombia's new system of distributing resource industry royalties has had a direct impact on poverty in its Caribbean region.

Accounts

STATEMENT OF FINANCIAL ACTIVITIES (INCORPORATING AN INCOME AND EXPENDITURE ACCOUNT)

For the Year Ended 31 December 2015

Independent Auditors Statement To The Members of Oxford Institute For Energy Studies

	Notes	Unrestricted funds £	Endowment funds £	31.12.15 Total funds £	31.12.14 Total funds £
INCOMING RESOURCES					
Incoming resources from generated funds					
Voluntary income	2	616,325	–	616,325	807,757
Incoming resources from charitable activities	3	688,984	–	688,984	629,810
Incoming resources from investments					
Corporate Bonds		28,365	–	28,365	23,650
Quoted Securities		150,105	–	150,105	147,064
International Bonds		6,832	–	6,832	12,456
Deposit account interest		330	–	330	132
Other incoming resources	5	–	–	–	5,500
Total incoming resources		<u>1,490,941</u>	<u>–</u>	<u>1,490,941</u>	<u>1,626,369</u>
RESOURCES EXPENDED					
Costs of generating funds					
Costs of generating voluntary income	6	36,859	–	36,859	31,889
Charitable activities					
Projects and publications	7	1,222,279	–	1,222,279	1,634,472
Governance costs	9	27,892	–	27,892	44,903
Total resources expended		<u>1,287,030</u>	<u>–</u>	<u>1,287,030</u>	<u>1,711,264</u>
NET INCOMING/(OUTGOING) RESOURCES					
Realised gain/(losses) on investment assets		11,473	–	11,473	156,399
Net income/(expenditure)		<u>215,384</u>	<u>–</u>	<u>215,384</u>	<u>71,504</u>
Unrealised gain/(losses) on investment assets		83,281	104,788	188,069	(22,772)
Net movement in funds		<u>298,665</u>	<u>104,788</u>	<u>403,453</u>	<u>48,732</u>
RECONCILIATION OF FUNDS					
Total funds brought forward		<u>2,807,473</u>	<u>3,532,466</u>	<u>6,339,939</u>	<u>6,291,207</u>
TOTAL FUNDS CARRIED FORWARD		<u><u>3,106,138</u></u>	<u><u>3,637,254</u></u>	<u><u>6,743,392</u></u>	<u><u>6,339,939</u></u>
CONTINUING OPERATIONS					
All incoming resources and resources expended arise from continuing activities.					

OXFORD INSTITUTE FOR ENERGY STUDIES
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Balance sheet

At 31 December 2015

		Unrestricted funds £	Endowment funds £	31.12.15 Total funds £	31.12.14 Total funds £
FIXED ASSETS					
Tangible assets	13	12,266	–	12,266	14,463
Investments	14	2,375,681	3,637,254	6,012,935	5,964,892
		<u>2,387,947</u>	<u>3,637,254</u>	<u>6,025,201</u>	<u>5,979,355</u>
CURRENT ASSETS					
Debtors	15	142,257	–	142,257	10,141
Prepayments and accrued income		19,997	–	19,997	234,985
Cash at bank and in hand	16	68,478	–	668,478	190,948
		<u>830,732</u>	<u>–</u>	<u>830,732</u>	<u>436,074</u>
CREDITORS					
Amounts falling due within one year	17	(112,541)	–	(112,541)	(75,490)
NET CURRENT ASSETS					
		<u>718,191</u>	<u>–</u>	<u>718,191</u>	<u>360,584</u>
TOTAL ASSETS LESS CURRENT					
LIABILITIES					
		<u>3,106,138</u>	<u>3,637,254</u>	<u>6,743,392</u>	<u>6,339,939</u>
NET ASSETS					
		<u><u>3,106,138</u></u>	<u><u>3,637,254</u></u>	<u><u>6,743,392</u></u>	<u><u>6,339,939</u></u>
FUNDS					
	19				
Unrestricted funds				3,106,138	2,807,473
Endowment funds				<u>3,637,254</u>	<u>3,532,466</u>
TOTAL FUNDS				<u><u>6,743,392</u></u>	<u><u>6,339,939</u></u>

These financial statements have been prepared in accordance with the special provisions of Part 15 of the Companies Act 2006 relating to small charitable companies.

Independent Auditors Statement to the Members of Oxford Institute for Energy Studies

We have examined the summary financial statement for the year ended 31 December 2015.

Respective responsibilities of trustees and auditors

The trustees are responsible for preparing the summary financial statement in accordance with applicable United

Kingdom law. Our responsibility is to report to you our opinion on the consistency of the summary financial statement with the full annual financial statements, and its compliance with the relevant requirements of section 427 of the Companies Act 2006 and the regulations made thereunder.

We conducted our work in accordance with Bulletin 2008/3 issued by the Auditing Practices Board. Our report on the charity's full annual financial statements describes the basis of our opinion on those financial statements.

Opinion

In our opinion the summary financial statement is consistent with the full annual financial statements of Oxford

Institute for Energy Studies for the year ended 31 December 2015 and complies with the applicable requirements of section 427 of the Companies Act 2006, and the regulations made thereunder.

Jonathan Cross FCA (Senior Statutory Auditor)
for and on behalf of Carter Backer Winter LLP
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66 Prescott Street
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