

OIES

Annual Report 2020

About the Oxford Institute for Energy Studies

The Oxford Institute for Energy Studies (OIES) 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
- 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.



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MESSAGE FROM THE CHAIRMAN

I am pleased to report that throughout 2020 – and also throughout the pandemic – the Institute continues to provide commentary and analysis to help inform the public debate and to provide insights into the workings of energy markets and of the prospects for future energy demand.

The Institute has expanded its research and remains unique in conducting academic research at the highest standard focused on oil, gas, and electricity, and on their markets and industries as well as on the policies that affect them.

There were over 100 pieces of research published last year in the form of papers, insights, comments, podcasts and the quarterly *Oxford Energy Forum*. There are now over 7,500 subscribers to the Institute’s publication notification service, an increase of 20 per cent on the previous year. Unique visits to the website number 185,000 an increase of over 40% on 2019. The Institute’s social media following continues to grow rapidly, with follower numbers increasing by 40 per cent in 2020.

The Institute continues to build its research capacity. The quality, breadth, depth, and number of publications it has produced this year, as well as its increasing presence online, is evidence of the hard work and dedication of the Institute team I wish to thank all the staff of the Institute for their continued hard work and dedication in 2020.

On behalf of the Board of Governors I want to convey our appreciation to Prof. Peter Battle, St. Catherine’s College, University of Oxford, Mr. Steve Reynish, Suncor, Mr Anwar Al Matoonq, KPC and Mr Abbas Al Naqi, OAPEC on their resignation from the Board and to welcome, Prof. Kersti Borjars, St. Catherine’s College, University of Oxford to the Board.

The Institute’s capacity to continue with its research activities depends heavily on the continued generosity and support of its funders. We were therefore very pleased to welcome as sponsors of the Institute: Baker Hughes, EnBW, Fluxys, JERA, Pavillion Energy and Petraco Oil.

Mr Laurence Whitehead – April 2021

DIRECTOR'S NOTE

The main objectives of the Oxford Institute for Energy Studies (OIES) 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, energy policy and the energy transition. 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. OIES work is detailed in this report.

Programmes

The Oil and the Middle East Research Programme and the Gas Research Programme are well established and continue to produce high-quality research of international significance, as well as work with a more regional and national focus.

The Electricity Research Programme, whose body of research and publications continues to expand is involved with a number of collaborative research projects both with institute colleagues and external collaborators.

The China Energy Research Programme, is expanding its body of work and collaboration with the institute's more established research programmes.

The content of our research across all Programmes is shaped by the overarching theme of *Energy Transition* – namely, the decarbonization of the global energy system in line with global climate targets, alongside a shift in the existing socio-technical regime from a system primarily based on fossil fuels of energy production and consumption to a system in which renewable and decarbonized energy sources are dominant. We study the drivers of the transition, the role that different energy carriers will play in enabling it, and the implications for policy and regulation, markets, consumers, networks/infrastructure and industry business models. We also analyze regional and geopolitical issues related to the transition.

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 highlights a selection of the Institute's 2020 publications. In addition to research papers, Insights and Comments the Institute now publishes the *Quarterly Gas Review* and *Oil Monthly* reports – as well as the now well established *Oxford Energy Podcast* series, which covers a variety of topics and provides in-depth interviews with some of our authors. The Institute continues to publish its quarterly magazine, the *Oxford Energy Forum*, now in its 31st year.

Staffing

Priorities for recruitment include further appointments relating to the economics and regulation of electricity, and decarbonisation and the energy transition.

We were also pleased to welcome Agnieszka Ason, Ahmed Mehdi, Alex Barnes, Aliaksei Patonia, Barbara Finamor, Gulmira Rzayeva, Klaus-Dieter Borchardt, Robin Baker, Simon Schulte and Toby Chacellor-Weale as Visiting Research Fellows, and Ilia Bouchouev, John Richardson, Ulf Henning Richter, Yan Qin and Sheryl Ruan as Research Associates. In addition, we were pleased to host, until March 2020 due to the pandemic:

Fanny Vanrykel, PhD candidate, Tax Institute Uliege, Belgium.

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:

Philip Andrews-Speed, Energy Studies Institute, National University of Singapore

Vera Blei, S&P Global Platts

Anders Hove, Project Director for the Energy Transition project at the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) GmbH

Mashal Jaffery, Senior Manager, Baringa Partners

Pierluigi Mancarella, The University of Melbourne and The University of Manchester

Domingo Penyalver, Researcher, Centre for Innovation in Transport, Polytechnic University of Catalonia

Jonty Rushforth, S&P Global Platts

Ali Al-Saffar, IEA

Peter Thompson, Director, Baringa Partners

Chao Wang, School of Economics & Management, North China Electric Power University

Sufang Zhang, School of Economics & Management, North China Electric Power University

Activities and events in 2020

With the exception of the Inaugural ‘China’ Day on *Geopolitical shifts and China’s energy policy priorities* which was held in February, all other institute events were held virtually throughout the year. There was a second ‘China’ Day event in September on *China’s power, gas and oil markets in the wake of COVID-19 and ahead of the 14th Five Year Plan*. The annual ‘Gas Day’ was held in October, and Gas Sponsors’ Meetings held in March and September. There were two ‘Oil Day’, events, the first held in April on *Oil markets in the context of COVID-19: Unpacking the Demand and Supply Shocks*, the second was held in December, on the subject of *What awaits oil markets in 2021-2022?*. The ‘Electricity’ Day events were held over three days in November. All our events were well attended reflecting the quality, depth, and breadth of the programme for each event and the calibre of speaker that the Institute’s events attract.

The Institute’s annual ‘Brainstorming Meeting’ took place virtually in June.

General

2020 was an extraordinary and difficult year for the institute, and I wish to extend special thanks to the entire OIES team for their hard work, adaptability and determination. The institute continues to depend on the dedication of all involved and I thank them all.

As shown in this report, the research productivity of the OIES is extraordinary, and its reputation and influence continue to increase.

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.

Dr. Bassam Fattouh

April 2021

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. This report highlights a selection of the papers published by the Institute in 2020 and provides an overview of ongoing research. For a list of published research in 2020, please see the end of this report or visit the OIES website, where a full list of published research can also be accessed.

The **Oil and the Middle East Programme**, established in 2009, has cemented its reputation as a leading source of independent academic research on oil market issues. The programme is structured around four main themes: global oil market dynamics; production; the policy and the economics of resource-rich economies; and consumption and the development of emerging energy markets.

The programme's 2020 research on *global oil market dynamics* continued to build on our core understanding of oil price cycles, the behaviour of oil market participants, and the impact of new supply sources such as US shale. The programme also published several *Comments* throughout the year looking at oil markets, OPEC policy, the impact of the COVID-19 shock on oil markets, oil exporting countries and benchmarks. The programme's traditional strength lies in analysing *the policy and economics of resource-rich economies*, which is its third thematic area. In keeping with the continuing wave of energy pricing and other reforms in Middle Eastern and North African (MENA) countries, in 2020 we continued tracking and analysing developments in the region and the interplay between domestic reforms, dependence on oil revenues, efforts at economic diversification and improving the resilience of the energy sector.

While the programme will continue to expand upon its traditional strengths (in oil market dynamics, production, and the policy and economics of resource-rich economies), in 2021 we also plan to expand our research on the energy transition and oil exporters' strategies in adapting to the energy transition. Also in 2021, we introduced a new OIES Oil Monthly which looks at supply and demand dynamics, OPEC policy and which contains our projections for market balances, risks, and prices in the short term.

It should also be mentioned that we significantly expanded our coverage of the Chinese oil market thanks to the formation of the China Energy Research Programme. There has been significant cooperation between the two programmes and a number of papers covering both demand and supply in China were published during the year.

In addition to our written output the Oil Programme also continued its podcast series in which research fellows were interviewed on their latest papers.

The foundation of the research output of the Gas Programme in 2020 has continued to be the future of gas in a de-carbonising energy system. The primary analysis on this topic has been continued to be led by Jonathan Stern, although a number of new authors have also now published on the topic. In particular we have continued to develop our analysis of green gases such as biomethane and hydrogen and have begun a detailed analysis of the future of gas networks and the regulatory changes that will be needed in a decarbonising European energy system. We have also been researching the importance of methane emissions in the gas value chain, as well as creating a database of decarbonised gas projects in order to help understand what companies are doing in this field.

We have also continued to develop the Gas Quarterly which focuses on shorter-term issues and prices. We have developed a number of pricing themes that we monitor each quarter, while also asking our research fellows to contribute short articles on issues that have been particularly interesting over the

past three months. As a result, the Gas Quarterly has provided a route to keeping our research topical and relevant while also creating a key commercial link to the pricing environment that is so important to all our sponsors. In addition, we also use it to highlight Key Themes at the start of each year, which can form the basis of future research as well as conversations with our sponsors.

We have also continued our more traditional research topics, with demand issues being to the fore as we have considered the impact of the COVID-19 pandemic on the consumption of gas in various countries and regions. We have produced research looking at the macro impact of the global economic recession, but have also considered specific regions such as Europe, where the impact has been most severe, and countries such as China, where demand has continued to grow, albeit more slowly. In addition, we have also considered the impact of the pandemic on gas supply, especially as prices collapsed in the first half of 2020. We have continued to examine the ability of producers to finance new projects, while also considering the relative merits of new project proposals in the US, Qatar, East Africa and Asia.

The future of hydrogen has become a major topic in the gas world in 2020, especially in Europe, and Martin Lambert has been leading our expanded efforts in this field. He has managed a series of research reports that look at both the technical aspects of hydrogen production but also the likely sources of demand and the new regulation that will be needed to expand the business in a manner that can achieve climate targets but also make economic sense. We expect this effort to expand further in 2021 as we build on the reports that have been published and events held in 2020.

In addition, our efforts to model the global gas market, led by Mike Fulwood using the Nexant Global Gas Model, have expanded to include the outlook for gas in a decarbonising world. We have presented various scenarios to sponsors and continue to develop internal thinking on the subject as a foundation for future discussions and working papers.

Finally, our cooperation with other Programmes has continued to benefit the research of the Gas Programme. The connection with the Electricity Programme has accelerated due to the interaction between gas and renewables in the power sector as well as the new link around hydrogen produced via electrolysis, and we expect this overlap to increase in 2021. The Gas Programme has also continued to work closely with the China Programme, as the impact of China on the gas market has expanded further over the past 12 months from both a supply and demand perspective.

In addition to our written output the Gas Programme also continued its podcast series in which research fellows were interviewed on their latest papers. Topics included the Russian and Ukraine, the outlook for hydrogen, Chinese gas demand, Russian LNG, methane emissions, shorty-term gas supply, demand and prices and also the future of gas in Europe. The podcasts are intended to provide an accessible insight into the work produced by the Programme and last around 25-30 minutes each, taking the form of a conversation between the author of the work and one of the senior fellows at the institute, and they can be found at the OIES website at <https://www.oxfordenergy.org/publication-topic/multimedia/>.

The Electricity Research Programme seeks to inform public and private sector decision-making by improving understanding of the electricity supply chain. The Programme studies the role of public policy, regulation, and markets to support the energy transition, along with implications for end-users, companies and their business strategies. The Programme's research focus is structured into three themes to cover a spectrum of relevant issues. These themes are:

- Market design, renewable integration, and electricity networks;
- Electricity pricing, electricity access and energy sector fiscal policy; and,

– Decarbonization of heat and transport and implications for the electricity sector

In 2020, the Programme published several thematic papers – some of which we highlight here – while continuing to expand its scope. During the year, electricity systems around the world experienced significant changes (for instance, higher shares of intermittent renewables in electricity generation, and variable and decentralised demand) mainly due to changes in energy consumption induced by the pandemic. Research that was published during the year included reflections on these changes. A key paper which extended previous work on market design by linking it to the changes seen in electricity generation and consumption during the early stages of the pandemic, posed the following question: if these changes or ‘glimpses’ of what could be the future electricity system, are reasonably accurate, what implications do they have for policy makers? The paper proposed utilising the ‘two-market approach’ that has been written about previously by OIES researchers, to help address the challenge of integrating intermittent renewables, especially by encouraging flexible demand to match output from renewables. One proposal made in the paper is for governments that organize centralized auctions for renewables to use them to incentivize demand-side flexibility through supply contracts that mirror the generation contracts with renewable generators.

Another key paper that was published in 2020 focused on market design for system security in low carbon electricity grids. The paper analysed two challenges from the integration of inverter-based renewable generation technologies (such as solar and wind) in the generation mix, for managing operational security. First, the intermittency inherent in renewable resources can impact on key power system parameters such as frequency and voltage. Second, renewables interface with the grid through power electronics rather than turbines, which means that the physical characteristics of turbine generation that have historically supported the stability of the grid are becoming scarce as the power system transitions away from fossil-fuel based thermal generation. The paper provided an economic characterisation of the system services necessary for power system security, based on which it proposed five emerging models of market design for system security.

Another paper which contributed to expanding the scope of expertise of the Programme in 2020 looked at whether ammonia can be viewed as an economically efficient and technologically suitable solution that can address the challenge of large-scale, long-duration, transportable energy storage in the decarbonized energy systems of the future. It compared all types of currently available energy storage techniques, and showed that ammonia and hydrogen are the two most promising solutions that, apart from serving the objective of long-term storage in a low-carbon economy, could also be generated through a carbon-free process. The paper argued that ammonia, as an energy vector of hydrogen, is preferable to pure hydrogen from economic, environmental, and technological perspectives. It analysed the available ammonia generation techniques, identifying conditions under which zero-carbon ammonia makes sense economically, and highlighted policy prerequisites for such production to be attractive for investors.

The Programme also published one of its first papers relating to energy systems – a topic that is gaining greater traction with several countries adopting targets to decarbonise their economies to ‘net zero’ by the middle of this century. Much analysis has shown that the cost of the transition could be minimized by taking a systems approach – an integrated strategy for the energy sector as a whole. The paper looked at energy systems thinking and the decarbonisation of heat – focusing on the UK. This was an update to our 2018 publication on the decarbonisation of heat and the role of ‘green gas’ – the critical development since then has been the UK Government’s adoption of a zero net carbon target for 2050. The paper used a framework derived from ‘transitions’ theory, which looks at how major transitions in technologies and practices, such as that involved in the decarbonization of the UK energy system, can be realized. Using the framework to highlight the scale of the challenge involved, the paper makes some

radical policy and institutional suggestions which would require a departure from a ‘piecemeal’ approach in policymaking that has hitherto been followed.

Other publications in 2020 included a study of the drivers of external financing for wind farms using a dataset of 318 Spanish wind farm projects commissioned in the period 2006–13. Amongst the main conclusions of the study were that the costs of a renewable project are the main driver that determines the access to external financing, whereas the capacity factor, which determines the revenues, has minor relevance. The Programme also contributed two electricity-focused issues of the Oxford Energy Forum. We published a Forum on Electric Vehicle uptake in the transport fleet which focused on the role of government policy incentives, consumer choice, and the need for consumer-centric business models. Our Forum on the role of electricity networks in a net zero carbon economy looked at the implications of the fact that in order to achieve decarbonization targets, the level of low-carbon heating/cooling and transport needs to increase substantially over the coming years; much of this technology is expected to use electricity. This means electricity networks will have a central role in achieving decarbonization targets in the electricity sector and across the economy. The growth of electricity usage along with changes in the operating environment of networks due to decentralization and digitalization mean that network companies need to transform to support decarbonization. The articles in the issue address the challenges of preparing electricity networks for decarbonization, decentralization, and digitalization.

Going forward, the Programme will continue to expand its research on networks, looking at issues such as auctions and sizing for utilisation and pricing of capacity in distribution networks, and the management of ‘common pool’ resources in electricity grids. Planned output under the market design theme will continue to expand, including new research on intermittent renewables and demand-side flexibility. We are also building our research on ‘green’ hydrogen produced from renewable electricity, focusing on policy support schemes to incentivise its production. In a significant broadening of its scope, the Programme has also begun working on the issue of the circular economy as a complement to existing instruments of decarbonisation in the electricity sector. And finally, we also plan to expand our research output on electricity market reform issues in developing economies, particularly in Asia.

The China Energy Research Programme, established in July 2019, continued to offer insight into the factors informing China’s energy policies and choices and their pivotal role in global energy markets.

In 2020, the programme published 16 research papers, spanning oil, gas, petrochemicals and the energy transition as well as geopolitical dynamics in the wake of COVID-19. Some of the key themes and takeaways from these papers were also disseminated in podcasts, with contributing authors recording five podcasts. The programme also contributed one edition of the Oxford Energy Forum which was subsequently presented in a webinar. In early 2020, before lockdowns were introduced, the programme held its inaugural China Day in Oxford. The event was attended (virtually) by Chinese officials with participants from the energy sector, academia and government in person. Throughout the remainder of the year, the programme held virtual events and discussions featuring experts on China’s domestic and foreign policies, specialising in clean-tech innovation, climate diplomacy, as well as the oil, gas and power sectors.

Research papers discussed various aspects of the COVID-19 shock, spanning short term oil, petrochemical and gas market implications as well as emerging signs of change in China’s energy policy priorities. Since 2020 was a critical year for drafting the 14th Five Year Plan, changes to China’s external environment have impacted medium- and long-term thinking, a fact that was clearly manifested in China’s announcement in September 2020 that it would aim to reach carbon neutrality. Research papers have discussed to what extent China’s green ambitions are consistent with its post-COVID recovery

path—which seems to have favoured smoke stack industries rather than a more sustainable growth trajectory—and discussed the political challenges associated with such a dramatic shift in energy uses.

The research continued to focus on the programmes key themes, namely macro, mix and markets. Discussions of the macro environment revolved around the short term outlook in the wake of the COVID demand shock but also in assessing the government’s policy priorities and their impact on the medium-term outlook. A number of papers have delved into tensions among various policy priorities—including contradictions between economic growth and environmental protection which have become more acute in the wake of the COVID-19 pandemic—or tensions between the government’s desire to liberalise markets while also retaining control over the sector through state-owned companies.

Other reports discussed the outlook for China’s energy mix and what the government’s carbon neutrality pledge implies for the future energy mix, for electrification and the role of renewables in the power sector; as well as China’s quest for technological innovation and for global leadership in the energy transition. But given that COVID-19 was a turbulent year for commodity markets, papers also assessed China’s role in oil benchmarks and its attitude toward LNG contracts.

The programme also drew on a wealth of external expertise as it welcomed four new research fellows as well as one visiting fellow (remotely) allowing it to widen and deepen the breadth of knowledge and analysis on China.

JOURNAL AND WEBSITE

Oxford Energy Forum

The Institute's discussion journal, now in its 31st year, continues to tackle topical issues facing the energy world. Issues covered in 2020 included: China's Energy Policies in the wake of COVID-19, Electricity Networks in a Net-Zero-Carbon Economy, COVID-19 and the Energy Transition, EV Uptake in the Transport Fleet, Decarbonised Pathways for Oil and Gas and Medium-term Oil Supply Outlook for MENA. Our thanks to the authors of all articles that appeared in *OEF* in 2020, 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 Gas Research Programme, Oil and the Middle East Research Programme, Electricity Research Programme, and China Energy Research 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 Publications section.

The catalogue of papers and comment pieces on the OIES website continued to grow during 2020, with over 60 new publications and 30 podcasts added.

There are now over 7,500 subscribers to the Institute's publication notification email service, an increase of 20 per cent on the previous year. Visitor numbers to the website increased by 40 per cent in 2020. The Institute's Twitter following increased in 2020 to nearly 8,000 followers, and the Institute's LinkedIn page has over 9,000 followers.

In 2020 the institute was regularly mentioned in the press by, amongst others: *Arab News*, *Argus Media*, *Bloomberg*, *CNN Business*, the *Financial Times*, *Foreign Policy*, *Gas Strategies*, *IHS Markit*, *Natural Gas World*, *New Europe*, *Oil Price*, *Petroleum Economist*, *Radio Free Asia*, *Reuters*, *S&P Global Platts*, *South China Morning Post*, the *Wall Street Journal*, the *Washington Examiner*.

LECTURES AND SEMINARS

As part of its commitment to education and its mandate, 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 2020 the Institute's research fellows, Director, and programme directors gave numerous virtual presentations and talks at many conferences, workshops and seminars across the globe.

With the exception of the Inaugural 'China' Day on *Geopolitical shifts and China's energy policy priorities* which was held in February, all other institute events were held virtually throughout the year.

There was a second 'China' Day event in September on *China's power, gas and oil markets in the wake of COVID-19 and ahead of the 14th Five Year Plan*. The annual 'Gas Day' was held in October. There were two 'Oil Day', events, the first held in April on *Oil markets in the context of COVID-19: Unpacking the Demand and Supply Shocks*, the second was held in December, on the subject of *What awaits oil markets in 2021-2022?*. The 'Electricity' Day events were held over three days in November. All our events were well attended reflecting the quality, depth, and breadth of the programme for each event and the calibre of speaker that the Institute's events attract.

XXXI Annual Brainstorming Meeting

Since 1990 the Institute has held 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 31st such meeting was held virtually in June. Participants engaged in lively discussions on a wide range of energy issues. These included: Macroeconomic trends and energy demand in the wake of COVID-19, pricing pressures post COVID-19 and investment and financing of the energy transition; the domino effect of COVID-19.

2020 Oil Day events

This year's events took place in April and December, the first, on *Oil markets in the context of COVID-19: Unpacking the Demand and Supply Shocks*, focused on three main themes: China's rocky road to recovery, India's energy demand in the context of COVID-19 and supply dynamics. The second on *What awaits oil markets in 2021-2022?* focused on: Oil demand: A very uneven recovery, OPEC+ dynamics during COVID: key lessons and future challenges and North America's oil production: already peaked? The events were well attended by key oil industry figures, representatives from national and international oil companies, financial institutions, price assessment agencies, the energy business community, and OIES Fellows.

2020 Gas Day

The OIES Natural Gas Research Programme organized its twelfth annual 'Gas Day' in September 2020, although this year it was a virtual event due to the pandemic with two sessions dedicated to discussing current issues in the gas sector. The first session focused on the short-term outlook for the global gas market, and was of course dominated by the expected recovery from the decline in demand seen in 2020 due to the pandemic and its associated economic downturn. Ann-Sophie Corbeau, the Head of Gas Analysis at BP, opened the discussion with some thoughts on the gas demand recovery in Europe and was followed by Fabian Kor, the Head of Strategy at Pavilion Energy, who focused on a similar theme in Asia. Andrew Walker from Cheniere then presented his thoughts on the future of LNG supply, before James Huckstepp from S&P Global Platts concluded with some points on gas and LNG prices in Europe,

Asia and the US. The ensuing discussion focussed on the likely speed of the recovery, given that the decline in 2020 had been less dramatic than expected, and provided a relatively optimistic outlook for gas markets over the next five years.

The second session then considered the longer term, with the provocative title “Methane has to go: is hydrogen really the answer in Europe?” Tim Gould from the IEA opened proceedings with an introduction and overview that provided the context of the declining role of hydrocarbons in the European and ultimately the global energy systems, with gas being seen as the cleanest hydrocarbon but ultimately needing to be removed or at least abated. Klaus-Dieter Borchardt from the European Commission then presented on the EU Hydrogen Strategy before Andy Lane, from Net Zero Teeside discussed the hydrogen project in the north-east of England as a case study of the key criteria needed to make a successful investment in this area. Jacques Merley from EDF then discussed what other options there are for decarbonisation, with a particular focus on electrification, but overall the session concluded that there is likely to be a role for gaseous fuels in the energy mix, albeit perhaps with a much lesser role for methane.

2020 Gas Programme Sponsors’ Meetings

Both the bi-annual sponsors’ meetings in 2020 were held virtually and took the form of a week of webinars rather than a concentrated two days of activity. Although it was a shame not to be able to meet sponsors in Oxford as usual, the benefit of the virtual meetings was that they could be made available to many more company representatives than usual. Over both weeks we welcomed around 1000 sponsor representatives overall to the webinars that we held.

The April sessions started with a review the short-term gas market issues, which looked at the key drivers of the current low global gas price, the outlook for 2020 and the potential for gas storage in Europe to be overwhelmed in the summer months. Webinar 2 saw Bassam Fattouh, the Director of OIES, present his bi-annual view on the state of oil markets and the outlook for the next 12 months. This was obviously particularly relevant on this occasion as we reflected on the impact of the Covid-19 pandemic and the collapse of the OPEC+ agreement at the recent OPEC meeting. Webinar 3 then discussed the potential for a hydrogen economy, with a number of speakers from across Europe debating the potential form that a hydrogen economy could take if implemented by the EU member states. Webinar 4 continued the European theme, focusing on gas markets in SE Europe, with a particular emphasis on Turkey and its neighbours and addressing the key issues of supply sources and security. Webinar 5 then looked at the interaction between gas and coal in Asian energy markets, reviewing the potential for gas demand to grow rapidly as it displaces coal in a number of sectors. Webinar 6 then saw a debate about the importance of methane emissions. The discussion covered methane emissions from the full gas chain, the environmental consequences for gas compared to other sources of energy and some of the measures being taken to improve emissions performance. Webinar 7 then looked at Russian and CIS gas markets, considering the aftermath of the Ukraine transit debate at the end of 2019 as well as the future of Russian pipe and LNG exports to European and Asian markets. In particular, the debate centred on the future of the Nord Stream 2 pipeline and what effect the outcome might have on Russian gas strategy.

The October sponsors’ week again began with a review of short-term gas markets and pricing, in particular examining the supply and demand on the European market, including the competition between pipeline and LNG suppliers. It also considered the impact of the Asian market, especially in the event of a cold winter or a sharp rebound in demand post-COVID 19. Webinar 2 discussed the financing and optimisation of LNG projects and looked at examining the supply and demand on the European market, including the competition between pipeline and LNG suppliers. Webinar 3 considered LNG demand in Asia, with the discussion based on a recent paper that analysed the smaller countries

in the region and concluded that the potential for growth in demand is significant. China and India were also discussed, though, given their dominant position in the region. Webinar 4 discussed the challenge posed to Russian gas by the pandemic, as well as the longer-term threat from decarbonisation strategies in Europe. The session also discussed the gas market implications of worsening political relations between Russia, the US and the EU. Webinar 5 then took a look at the outlook for hydrogen on a global basis, looking at the approaches being taken in Australia, Japan, China and selected European countries, considering government strategy, technology development, supply and demand drivers, and likely development timelines. Webinar 6 then focused on the regulation challenges for gas decarbonisation in Europe, with the speakers discussing a recent OIES paper on the topic and explored the question of whether the current EU regulatory framework can deliver decarbonisation of gas. Webinar 7 then discussed the potential for gas to provide a back up role for renewables in the electricity sector, and the presenters offered their ideas about a flexible framework for analysing gas and renewables in the electricity mix, identifying key interdependencies between the two sources as the whole economy decarbonises, and discussing three components of such a framework: policies, markets and resources. Webinar 8 then offered thoughts on the EU Methane Strategy in a conversation between Jonathan Stern and Klaus-Dieter Borchardt, who discussed the broad outline and objectives of the strategy as well as the more important details around the measurement, reporting and verification of methane emissions. Webinar 9 then provided a round-up of the week in a discussion between the key OIES fellows who had taken part in the previous eight webinars.

2020 Electricity Day

The ‘Electricity’ Day events were held over two days in November. The first focused on the emergence of the system operator – gas and electricity networks in a decarbonising world. The second on building more vs. using it better – European electricity network infrastructure. The event was well attended by participants from academia and the electricity, oil, auto, mobility, finance and technology sectors.

2020 China Day

The Inaugural ‘China’ Day on *Geopolitical shifts and China’s energy policy priorities* was held in February, in Oxford. Themes covered during the day included: China’s economic slowdown and its implications for energy policy, the US-China decoupling: implications for technology, innovation and energy security, liberalisation in the gas market and opening up the oil market: the Shandong independents vs. the new mega-refiners.

The second ‘China’ Day event in September on *China’s power, gas and oil markets in the wake of COVID-19 and ahead of the 14th Five Year Plan* and focussed on: China’s power sector ambitions, prospects and challenges for gas market liberalisation and China’s evolving role in global oil markets. Both events were well attended by Chinese officials with participants from the energy sector, academia and government.

LIBRARY

In 2020 due to COVID-19 the institute's library has not been open to visitors and the difficult decision to no longer have a librarian was made.

The OIES would like to offer thanks to the following organizations and publications for supplying – either free of charge or at substantially discounted prices – important journals, statistical sources, and other materials vital to our research work, which could not have been afforded otherwise: Argus Media, IEA, Kpler, MEES and S&P Global Platts.

RESEARCH TEAM AND STAFF

Andreas Economou, Senior Research Fellow, joined the Institute in July 2015. His research interests lie in natural resource and energy economics with a particular focus on the empirical analysis of crude oil markets, the dynamics of oil prices and OPEC behaviour. The central topic of his research is largely the causes and consequences of oil price shocks, using advanced econometric techniques to model the world oil market. Other aspects of his research focus on OPEC's behaviour and pricing power in the oil market, the relationship between oil prices and the global economy, and the real-time analysis of oil price risks using forecast scenarios. Previously he was an OIES-Saudi Aramco Fellow. Andreas is currently completing his PhD in Energy Economics at UCL Energy Institute. He holds an MSc (Hons) in Oil and Gas Enterprise Management from the University of Aberdeen with specialization in petroleum economics and international fiscal systems analysis, and a BSc in Business Administration from the University of Macedonia, Greece.

Bassam Fattouh is the Director of the Oxford Institute for Energy Studies (OIES) and Professor at the School of Oriental and African Studies (SOAS). He has published a variety of articles on energy policy, the international oil pricing system, OPEC behavior, the energy transition, and the economies of oil producing countries. 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 and reducing energy market volatility. He is the recipient of the 2018 OPEC Award for Research. He acts as an advisor to a number of governments and companies. He is a regular speaker at international conferences.

Mike Fulwood, Senior Research Fellow. Mike Fulwood joined the OIES in October 2017. Mike has over 40 years of experience in the gas industry. Before joining the OIES, Mike worked as a consultant, with Energy Markets between 1997 and 2008 and then with NexantECA as Director, Global Gas & LNG. Before working as consultant, Mike worked for British Gas from 1979, latterly as a Director at British Gas Transco, in charge of the price control review, and prior to that President of British Gas Americas during which time he oversaw many successful acquisitions and projects including the acquisitions of Metrogas (Argentina), NGC (now Dynegy), the Bolivia – Brazil pipeline and Trinidad LNG project.

While working as a consultant Mike undertook a wide range of projects in all areas of the gas chain, covering regulatory matters, gas pricing and tariffs, gas sales and transportation contracts, market studies and price forecasting, as well as helping develop NexantECA's *World Gas Model*. Between 2009 and 2018, Mike was Chairman of the International Gas Union's Gas Pricing Group, and still undertakes the IGU's Wholesale Gas Price Survey. He also speaks widely at gas conferences all over the world, particularly on gas markets, gas trading matters and gas pricing.

Marshall Hall, Senior Research Fellow, spent 35 years working in and around the European oil and gas industry between 1981 and 2016. He began his career in oil trading and refining at BP and worked as an oil analyst at the IEA, an equity and commodity analyst at SG Warburg/UBS in the financial sector, and in gas and LNG markets analysis at BG Group until 2013. He then moved to Oil & Gas UK as Energy Policy Manager, dealing principally with EU energy and climate policy and gas market regulation until late 2016. He joined the Natural Gas Research Programme of the OIES in 2017 as a Visiting Research Fellow and published a paper on the prospects for Norwegian gas production and export in March 2018. He is currently preparing a second paper on the outlook for gas production from the UK continental shelf and the potential impact on future gas output of the regulatory and fiscal reforms introduced in 2015–16.

Since joining the OIES Gas Research Programme, he has contributed to research papers on the UKCS, Norwegian gas, emission reduction in the upstream industry and energy -related methane emissions.

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 paper, ‘The evolution of European traded gas hubs’ (December 2015) focused 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 described the ‘path to maturity’ of traded gas hubs and analysed their stages of development using both objective and subjective measures; he brought the results of that research up to date in a co-authored Insight with Beatrice Petrovitch, ‘European traded gas hubs: an updated analysis on liquidity, maturity and barriers to market integration’ (May 2017); ‘The SPIMEX Gas Exchange: Russian Gas Trading Possibilities’ co-authored with James Henderson and Tatiana Mitrova (Jan 2018) exposed the path that Russia is taking in developing a traded gas market; ‘A Hub for Europe: the Iberian Promise?’ (March 2019) focused on whether the Iberian Peninsula could be a ‘gateway’ for more diverse supplies of gas to Europe; another Insight “European Gas Hubs: a decade of change” (July 2019) reviewed the progress of European hubs’ development over the whole decade, including the smaller and emerging hubs; followed by a Comment “European Traded Gas Hubs: the supremacy of TTF” (May 2020), which detailed how the Dutch TTF has become the European hub as well as a global price marker.

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 the European Commission, the EBRD, the APX and ICE futures exchanges and various producer and end user companies, financial institutions, regulators, and governments in Australia, Austria, Brazil, Britain, China, Estonia, France, Greece, Holland, India, Italy, Japan, Malaysia, Norway, the Philippines, Poland, Russia, Sweden, Turkey and Ukraine. 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. Prior to 2004, Patrick established PowerGen’s (now E.on UK) gas trading capabilities and later set-up their electricity trading desk; he later joined BG Group as Trading Manager to set-up their trading capability from scratch. Patrick has nearly 40 years’ experience of broking, trading, and risk management in the natural gas, power, oil, and oil products markets, and working as a gas market expert for European utilities and gas suppliers, British investment banks, and international oil majors.

James Henderson, Director, Gas Research Programme. Dr James Henderson is Director of the Natural Gas Programme at the Oxford Institute for Energy Studies (OIES), having taken over from Howard Rogers in 2016, and he has been writing for and working with the Institute since 2010. He produces research for both the Gas and Oil Programmes covering Russia and CIS issues as well as global energy matters that affect the region. He is a Visiting Professor at Masaryk University in the Czech Republic and has lectured on energy economics and security of supply at a number of universities in Europe and the US. He has worked in the oil sector for US company Amerada Hess, as well as spending time as a consultant and investment banker. He obtained a PhD in Social Sciences from London University in 2010. With OIES he initially published a monograph on “Non-Gazprom Gas Producers in Russia” before contributing numerous working papers on the Russia oil and gas sectors and their connection with the global energy economy. In particular he co-edited the 2014 book entitled “The Russian Gas Matrix: How Markets are Driving Change” and has more recently published papers on the future of Russian oil production, tight oil in Russia, Arctic oil, East Siberia’s hydrocarbon export potential,

Russia's gas export strategy and Russia's energy relations with China. He has also published a book on "International Partnership in Russia" (Palgrave Macmillan) and is currently writing a book on the history of Rosneft for Columbia University Press.

Anouk Honoré, Senior Research Fellow, is a Senior Research Fellow in the Gas Research Programme. Her research at the OIES focuses on gas issues in the EU and in individual countries in Europe and South America, with particular emphasis on energy policies, decarbonisation of the heating sector, decarbonisation of road transport, gas market fundamentals and power generation. Before joining the Institute, she worked at the International Energy Agency in Paris. Her work focused mainly on natural gas issues in the member countries but also in China and in Latin America. Dr Honoré holds a PhD in Economics, a MA in Environmental and Natural Resources Economics and a LL.M. in International Administration (public law). Dr Honoré is author of *European Natural Gas Demand, Supply & Pricing, cycles, seasons and the impact of LNG price arbitrage* (Oxford University Press 2011), and the author and co-author of chapters in other books, including OIES books such as *Pricing of Pipeline Gas and LNG in Latin America and the Caribbean*, with D. Ledesma in J. Stern (ed.) *The Pricing of Internationally Traded Gas* (Oxford University Press 2012), *The Gas Exporting Countries' Forum: Global or Regional Cartelization?*, with L. El-Katiri in J. Stern (ed.) *The Pricing of Internationally Traded Gas* (Oxford University Press 2012), *LNG Demand Potential*, with H. Rogers, S. D'Apote and A-S Corbeau in A-S. Corbeau and D. Ledesma (eds.) *LNG Markets in Transition, The Great Reconfiguration*. She is also the author of several working papers on natural gas demand in Europe and in South America, decarbonization of heat and implications for natural gas demand, decarbonization of the industrial sector, and some country-specific analysis of their gas market. A selection of the latest publications in this series includes *Natural gas demand in Europe: The impacts of COVID-19 and other influences in 2020* (2020), *Decarbonization and industrial demand for gas in Europe* (2019), *Decarbonisation of heat in Europe: implications for natural gas demand* (2018). At present, Dr Honoré's main area of research is on decarbonization policies in the EU and individual European countries; interaction between gas and renewables in electricity generation, decarbonization of heat and road transport, all with a focus on potential impact on future gas demand (both natural gas and decarbonized gases).

Adi Imsirovic, Senior Research Fellow. Adi Imsirovic has over 30 years of experience in oil trading. He held a number of senior positions, including Global Head of Oil at Gazprom Marketing & Trading, Director of Petraco and the Head of their Singapore office and The Regional Manager of Texaco Oil Trading for Asia.

Adi also taught economics at Surrey University for several years: Energy Economics as well as Resource and Environmental Economics. He has written a number of papers and articles on the topic of oil and gas prices, benchmarks and energy security. He is the author of the book: 'Trading and Price Discovery for Crude Oils: Growth and Development of International Oil Markets', published by Palgrave in August 2021.

He has an honours degree (B.Sc.) in Economics and a Master of Science (M.Sc.) degree in Energy Economics from Surrey University. He is also a Fulbright Scholar and he studied at the Graduate School of Arts and Sciences, Harvard University.

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 Department of Trade and Industry (1996–9) and division head at the IEA; 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 (OIES/OUP, 2011). This updated the analysis and conclusions of his 2006 monograph for the OIES, *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 entitled *Europe’s Long Energy Journey: Towards an Energy Union?* Recently his research has focused on electricity market design and the decarbonization of heat, with an emphasis on a whole system approach.

Recently, he has published a number of papers on electricity market reform for a decarbonised system, and on the decarbonisation of heat in the UK.

Maggie Kumar joined the Institute in 2018 as OIES-UNITEN Supernumerary Research Fellow in Malaysian Energy Studies. Her research addressed the gas industry and electricity market reform in Malaysia. Her research focussed on the evolution and design of competitive gas and electricity markets in the Malaysia. Her previous research expertise includes energy system modelling and working on energy system models such as OSeMOSYS, MESSAGE and MAED to develop optimal and near-optimal decarbonisation scenarios and technology transition pathways for energy and climate policy analysis. She is currently completing her PhD in Energy Economics at UCL Energy Institute.

Martin Lambert, Senior Research Fellow. Martin Lambert joined OIES in 2017 and now specialises in renewable gas and hydrogen, while also writing occasionally on global LNG. He also works as an independent consultant. His areas of expertise include commercial strategy, project development and structuring, economics, gas and LNG marketing and trading. Martin’s 34 year career with Shell included several senior leadership positions in the gas and LNG businesses. His overseas assignments included Japan, where he was responsible for marketing Shell’s LNG to gas and power companies, the Philippines where he was commercial manager during the development of the Malampaya gas field, and Australia where he was seconded to North West Shelf Australia LNG as Senior Vice President Marketing. From his UK base, his career also included frequent international travel, and was a key member of the team which closed a major LNG project in the Middle East. Martin’s career also included several years in related areas outside the core gas business: managing research teams developing products from Gas to Liquids and leadership roles in Shell’s biofuels business. Martin holds an MA in economics and engineering from the University of Cambridge

David Ledesma, Chairman, Gas Research Programme & Senior Research Fellow. David Ledesma 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), *The Pricing of Internationally Traded Gas* (2012) and was Co-Editor of the institute’s book *LNG Markets in Transition, The Great Reconfiguration* (2016). 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); ‘The Future of Australian LNG Exports: Will Domestic Challenges Limit the Development of Future LNG Export Capacity?’ (September 2014)

and New Players New, Models a research think piece (March 2019). David also manages the OIES Podcast series and is a regular presenter. David also contributed the book chapter 'Project Financing LNG Projects' to The Principles of Project Finance (Gower Publishing, 2012). David also writes on gas and LNG, and presents regularly at conferences. During over 40 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 a non-executive Director of Pavilion Energy, a subsidiary of the Singapore investment firm Temasek Holdings in 2013. He has a degree in economics and geography from the University of Exeter.

Michal Median, Director of the China Energy Programme at the Oxford Institute for Energy Studies. Before joining OIES in July 2019, she headed cross-commodity China research at Energy Aspects. Prior to that, she headed China Matters, an independent research consultancy providing analysis on the politics of energy in China. Michal also held senior analytical roles at Eurasia Group in New York and London, and at Asia Centre-Sciences Po, Paris. She taught undergraduate courses on China's political economy at the Hebrew University in Jerusalem and has authored numerous academic articles. Michal also regularly provides comments for a wide variety of media outlets and is featured as a speaker at industry conferences. Michal holds a PhD in Political Science and East Asian studies from Sciences Po, Paris. She is fluent in Mandarin and French.

Tatiana Mitrova, Senior Research Fellow, is Professor and Research Director at the Energy Centre, Moscow School of Management, SKOLKOVO, Scientific advisor at the Energy Research Institute of the Russian Academy of Sciences (ERI RAS), Research Scholar at the Center on Global Energy Policy at Columbia University, Distinguished Research Fellow at Institute of Energy Economics, Japan (IEEJ). She has more than twenty years of experience in the analyses of the Russian and global energy markets, including production, transportation, demand, energy policy, pricing and market restructuring. She is Head of the annual "Global and Russian Energy Outlook up to 2040" project and a Board Member of Schlumberger and NOVATEK. Tatiana is a Visiting Professor at the Institut d'Etudes Politiques de Paris (Sciences Po) Paris School of International Affairs. She has more than 200 publications in scientific and business journals and eight books.

Mostefa Ouki, Senior Research Fellow, Dr Mostefa Ouki is an independent energy consultant and has over thirty years of experience in developing, executing, and managing gas and energy-related techno-economic projects throughout the world. He led numerous consulting and advisory assignments commissioned by governments; national and international energy companies; and, international financial institutions. He also executed and led a number of consulting assignments on the planning and implementation of oil, gas and petrochemical infrastructure projects in key hydrocarbon producing countries in the Middle East and North Africa (MENA) region.

Dr Ouki worked closely with government and private sector policy decision makers in a number of countries on the formulation, funding and implementation of energy and infrastructure projects and policies. He advised project lenders and financial advisors on the development of energy and infrastructure projects.

Dr Ouki is presently involved in research work on plans and developments in the MENA region to reduce greenhouse gas emissions and achieve carbon neutrality targets. He is also undertaking work on the preparedness of MENA hydrocarbon producing countries to address potential international decarbonisation measures.

Dr Ouki started his career with the gas exports division of Algeria's national oil and gas company, Sonatrach, in Algiers, and worked in Washington, D.C. as a consultant on gas development projects for the World Bank. He was Vice President in Nexant's Energy & Chemicals Advisory division based in London. Prior to Nexant, he was with the US engineering, procurement, construction and project management company Bechtel and worked for the international pipeline engineering and project management company Penspen.

Dr Ouki holds a diplôme d'ingénieur d'état in petroleum engineering economics from Algeria's Institut National des Hydrocarbures and MSc in Energy Resources, MA and PhD in Economics from the University of Pittsburgh, Pennsylvania, USA. He is a member of the American Economic Association; Association of International Petroleum Negotiators; and the International Association of Energy Economics.

Luke Patey, Lead Senior Research Fellow, is Lead Senior Research Fellow of the Africa oil and gas programme at OIES. He is also senior researcher at the Danish Institute for International Studies and fellow at the Rift Valley Institute. Patey is author of *How China Loses: The Pushback abasing Chinese Global Ambitions* (OUP, 2021), *The New Kings of Crude: China, India, and the Global Struggle for Oil in Sudan and South Sudan* (Hurst, 2014), which was short-listed for the Africa-Asia Book Prize, and co-editor of *Sudan Looks East: China, India, and the Politics of Asian Alternatives* (James Currey, 2014) with Daniel Large.

Patey has written for *the New York Times*, the *Financial Times*, *Foreign Policy*, *Foreign Affairs*, *The Guardian*, *The Hindu*, and *VICE News*. His commentary has appeared in *Bloomberg*, *The Wall Street Journal*, *The New York Times*, the *Financial Times*, *Reuters*, *Al Jazeera*, *China Central Television (CCTV)*, the *BBC World Service*, and *Radio France*. He has also published scholarly articles in *African Affairs*, *the Journal of Modern African Studies*, *Journal of Contemporary China*, *Middle East Policy*, and *Third World Quarterly*. He has been a visiting scholar at the Centre d'études et de recherches internationales (Paris), Peking University (Beijing), the Social Science Research Council (New York), and the United Nations University (Tokyo). He holds a BSc (Hons.) in commerce from Queen's University (Kingston) and a MSc and PhD from the Copenhagen Business School.

Simon Pirani, Senior Research Fellow on the OIES Gas Research Programme, has published widely on the development of natural gas markets, and changing consumption patterns, in the former Soviet Union. He was editor of, and contributor to, the programme's multi-author volumes *The Russian Gas Matrix: How Markets are Driving Change* (OUP, 2014) and *Russian and CIS Gas Markets and their Impact on Europe* (OUP, 2009). He has written and co-written a series of papers and articles on the Ukrainian gas sector and Russo-Ukrainian gas relationships, and on Central Asian and Caspian gas markets.

Simon is honorary professor in the School of Modern Languages and Cultures at the University of Durham. His most recent book is *Burning Up: A Global History of Fossil Fuel Consumption*, published by Pluto in 2018.

Prior to joining the Institute in 2007, Simon wrote about Russia and Ukraine as a journalist and historian. He is the author of *The Russian Revolution in Retreat* (Routledge, 2008) and *Change in Putin's Russia: Power, Money and People* (Pluto, 2009).

Rahmatallah Poudineh, Senior Research Fellow & Director of Research, Electricity Programme. Rahmat joined the institute in November 2014 to design and setup the electricity research programme. He is Senior Research Fellow and, since 2019, Director of Research. Rahmat is an economist and engineer by training, with several years of experience in the economics and regulation of the electricity sector. He has published numerous peer-reviewed academic articles on a number of key issues relating to the energy sector, including: network regulation, electricity market design, power system flexibility, renewable support schemes, gas and power interdependence, power sector reform in developing countries, and the implications of the energy transition for oil companies. He has also co-authored a book on ‘The Economics of Offshore Wind Power: Challenges and Policy Considerations’. Rahmat’s main research interest lies in the design of markets and regulation for future decarbonised energy systems.

Rahmat has been involved in a number of policy oriented projects, including a European Commission funded project on developing a regulatory framework to ensure the security of the European power grid against natural, accidental and malicious damage. He also led a project on sustainable electricity pricing for Tanzania funded by International Growth Centre (IGC).

Rahmat holds a BSc in aerospace engineering from Amirkabir University of Technology (Tehran Polytechnic), a graduate diploma in economics from Queen Mary University of London, MSc in energy economics and policy from University of Surrey, and PhD in energy economics from Durham University, where he received the best thesis prize for his doctoral dissertation on economic regulation of electricity distribution networks.

David Robinson, Independent consultant and a Senior Research Fellow at the Oxford Institute for Energy Studies. He is an economist who advises on public policy and corporate strategy, especially in relation to energy and climate change. His recent research includes analysis of the following issues, among others: policies to replace coal with decarbonized energy resources in China; the impact of Covid-19 on the global energy transition; the integration of intermittent renewable electricity; the lessons of the Texas and California electricity blackouts for reform of the energy sector; and future energy market design for a decarbonised energy sector. David runs his own consulting company, is an academic adviser to The Brattle Group, 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.

Anupama Sen, Executive Director, Electricity Programme. Anupama Sen joined the Institute in November 2009. She is Executive Director of the Electricity Programme and Senior Research Fellow. Her research interests lie in the applied economics of energy in developing countries and her research has spanned the oil, gas and electricity sectors. In addition to publishing at OIES, her work has appeared in top peer-reviewed academic journals, professional publications, as well as in several books and Op-Eds. Anupama is a Fellow of the Cambridge Commonwealth Society and has been a Junior Research Fellow and a Visiting Fellow at Wolfson College, Cambridge. She also teaches on the MSc Energy Systems at Oxford University. Anupama holds a B.A. (Hons) from the University of Mumbai, M.Sc. from the London School of Economics and Ph.D. from the University of Cambridge.

Jack Sharples, Research Fellow. Dr Jack Sharples is a Research Fellow on the Gas Research Programme at the Oxford Institute for Energy Studies (OIES), having joined the Institute in January 2018. He holds a PhD and MSc in Russian and East European Studies from the University of Glasgow, and a BA in Politics from the University of York. Prior to joining the Institute, he spent four years as a Lecturer in Energy Politics and International Relations at the European University in St Petersburg.

Outside OIES, he has been the author of the ‘Gazprom Monitor’ monthly analytical reports for the European Geopolitical Forum (Brussels) since June 2012.

Beyond his OIES publications, he is also the author of several academic journal articles and book chapters, including: ‘The international political economy of Eastern European energy security: Russia, Ukraine, and the European Union’ (2018); ‘Europe’s largest natural gas producer in an era of climate change: Gazprom’ (2017) ‘Energy transitions in carbon-producing countries: Russia’ (2016); ‘Building the Energy Union: the problem of cross-border gas pipeline interconnections in Baltic, Central, and South-Eastern Europe’ (2016); ‘The importance of gas storage facilities in the European gas and power markets’ (2016); ‘The shifting geopolitics of Russia’s gas exports and the impact on EU Russia gas relations’ (2016); and ‘Russian gas supplies to Europe: the likelihood, and potential impact, of an interruption in gas transit via Ukraine’ (2016).

Manal Shehabi, OIES-KFAS Supernumerary Research Fellow at the Oxford Institute for Energy Studies since 2018. She is also SCR Member of St. Antony’s College, University of Oxford, and Research Associate of the Economic Research Forum (ERF). She is an applied economist with expertise in economic modeling and economic, energy, and resource sustainability in resource economies, especially in the Middle East and Gulf region with a focus on Kuwait.

Using economy-wide modeling with oligopoly and political economic analyses, her research made important contributions to the analysis of economic adjustment and policy alternatives in the face of the recent declines in oil prices and demand, offering a unique and powerful mathematical model of the Kuwaiti economy, which is translated to other economies. Her published papers on the model and its applications offered new perspectives on economic diversification, expatriate labor, and oligopolistic behavior in resource exporters and the management of both resource and non-resource oligopoly rents. She published papers, journal articles and chapters on energy subsidies reform, private sector and oligopoly regulations, impacts of COVID-19 on oil economies, Kuwaitization, energy transition, economic and energy sustainability in Kuwait and resource economies. Her current projects include: modeling energy outlook in Kuwait; the hydrogen economy in Gulf states and Kuwait; decarbonization in Saudi Arabia; and modeling effects of climate change response measures on developing countries. She presented at various international conferences and seminars.

Manal’s research has impacted policymaking. Her research was featured in key policy debates and capacity building (such as at the WTO, IEA, UNFCCC). Her modeling research will be used in Kuwait in policy making and she provided capacity building to policy makers. With a team, she completed a pilot project under the UNFCCC’s mandate to develop an economic toolkit to analyse impacts of response measures to climate change, the results of which are scheduled to be delivered at COP26 in Glasgow. She (co)authored numerous policy reports, including the Intergovernmental Panel on Climate Change (IPCC) Special Report on the Ocean and Cryosphere in a Changing Climate (2019); ocean sustainability policy brief by the International Hydrographic Organization (2019); and Kuwait Energy Outlook 2020.

Prior to joining the OIES, Manal was a researcher at the University of Western Australia, where she also taught courses in economics, and a Visiting Research Fellow at the OIES 2016-2018. Beyond academia, she was the in-house expert for a multinational mining and oil services company in Western Australia; as well as economist/consultant in the US and Australia advising multinationals, including Fortune 500 companies, primarily in petrochemical, energy, and mining industries on transfer pricing and relevant modeling. Prior to that, she successfully launched and managed a business public policy project in Texas and examined investments in the oil industry in West Asia at the UNCTAD.

Manal holds a PhD in economics (The University of Western Australia); an MIA-Economics (Texas A&M University); a BA (Honors) magna cum laude (Ursinus College, where she was Queen Noor-Ursinus College Scholar); and diplomas (Harvard Business School Publishing; and Université Marc Bloch). She is recipient of various grants, honors, and awards. A polyglot, her language capabilities include Arabic, English, French, Spanish, and Mandarin Chinese.

Jonathan Stern, Distinguished Research Fellow of Oxford Institute for Energy Studies, he founded the OIES Natural Gas Research Programme in 2003 and was its Director until October 2011 when he became its Chairman and a Senior Research Fellow, he became a Distinguished Fellow in October 2016. He is 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 and a Distinguished Research Fellow of the Institute of Energy Economics, Japan (in Tokyo). From 2011-16 he was the EU Speaker, and remains a member of 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), editor of *The Future of Gas in the Gulf: continuity and change* (OIES, 2019). He is author of two chapters in: eds. Anne-Sophie Corbeau and David Ledesma, *LNG Markets in Transition: the Great Reconfiguration*, published by OIES and KAPSARC in 2016. His most recent papers published by the Institute in 2019 and 2020 are: *Narratives for Gas in Decarbonising European Energy Markets*, *Challenges to the Future of LNG: decarbonisation, affordability and profitability*, and *Methane Emissions from Natural Gas and LNG Imports: an increasingly urgent issue for the future of gas in Europe*.

Katja Yafimava, Senior Research Fellow. Dr. Katja Yafimava is Senior Research Fellow on the Oxford Institute for Energy Studies Gas Research Programme. She holds a D.Phil. in Geography and an M.Phil. in Russian and East European Studies from Oxford University. She has been an expert at the UNECE Group of Experts on Gas since January 2015 and was an expert at the EU-Russia Gas Advisory Council during 2012-16. Her main research areas include EU pipeline gas and LNG regulation, regulation of decarbonisation, transit security of Russian gas exports to Europe.

Dr Yafimava is the author of *The Transit Dimension of EU Energy Security: Russian Gas Transit Across Ukraine, Belarus, and Moldova* (OUP 2011) and the author and co-author of chapters in other books, including *The Russian Gas Matrix: how markets are driving change* (OUP 2014), *Research Handbook on International Energy Law* (Edward Elgar 2014), *The Pricing of Internationally Traded Gas* (OUP 2012), *Russian and CIS Gas Markets and their Impact on Europe* (OUP 2009). She is also the author and co-author of several working papers on Russia-Ukraine, Russia-Belarus, and Russia-Moldova gas transit disputes, the latest in this series is a co-authored OIES paper ‘Implications of the Russia-Ukraine gas transit deal for alternative pipeline routes and the Ukrainian and European markets’ (2020). At present, Dr Yafimava’s main area of research is EU regulation, including regulation of pipeline gas and LNG as well as regulation of decarbonisation, reflected in many OIES publications, including ‘Finding a home’ for global LNG in Europe: understanding the complexity of access rules for EU import terminals’ (2020), ‘EU hydrogen strategy: regulatory opportunities and challenges’ (2020), ‘Gas Directive Amendment: implications for Nord Stream 2’ (2019), ‘Building New Gas Transportation Infrastructure in the EU – what are the rules of the game?’ (2018), ‘The EU Competition Investigation into Gazprom’s sales to central and eastern Europe: a detailed analysis of the commitments and the way forward’ (co-authored) (2017). Her most recent paper is ‘The OPAL Exemption Decision: a comment on the Advocate General’s Opinion on its annulment and its implications for the Court of Justice judgement and OPAL regulatory treatment’.

Vitaly Yermakov, Senior Research Fellow, Vitaly's research focus is on oil and gas in Russia and CIS. Before joining OIES in 2019 he worked for over 20 years in the industry holding positions of Commodity Strategist for Sberbank CIB, Visiting Researcher at KAPSARC, Saudi Arabia, Director of Research at Cambridge Energy Research Associates (CERA) and IHS CERA and a manager at TNK-BP, an oil company.

Vitaly's recent publications include papers for Oxford Institute of Energy Studies on the issues of Russia-OPEC cooperation, Russian refining, Russia's LNG and pipeline strategy, Russian gas spare productive capacity, gas demand flexibility, and gas taxation. He also published a paper for KAPSARC, Saudi Arabia on price competitiveness of US LNG and Russian pipeline gas in Europe. Mr. Yermakov is also the author of over 50 CERA and IHS CERA analytical private reports, including analysis of gas demand issues and gas price regulation in Russia and Ukraine, analysis of tax changes for Russian oil and gas industries, regulatory reform in the Russian energy sector and comparative analysis of oil and gas transportation tariffs in Russia and North America. He also led numerous consulting projects for the CERA and IHS CERA clients, including Russian tax reform for the oil sector, developing gas strategy and developing strategy of marketing LPG for major Russian companies, analysing gas transportation in Russia for a major Western company.

Vitaly has been lecturing for Energy Delta Institute's executive MBA program on a wide range of topics, including natural gas and LNG developments and pricing, China's gas demand, and Russian gas developments. He also works with Higher School of Economics in Russia and is a frequent speaker at major industry conferences in Russia and abroad. Mr. Yermakov holds a master's degree from Duke University and a PhD from Samara State University.

The following staff contributed to the work of the OIES in 2020. Their dedication and professionalism are essential to its continued smooth running.

- **Karen Clark** is responsible for the Institute's accounts.
- **Jo Hott** provides administrative support for the Gas Research Programme.
- **Andrew Hudson** is the institute's librarian.
- **Susan Millar** is responsible for the Oxford Energy Seminar.
- **Hannah Shipton** provides administrative support.
- **Kate Teasdale** is administrator and Company Secretary.

VISITING RESEARCH FELLOWS

Agnieszka Ason, Visiting Research Fellow. Agnieszka specialises in energy law and international dispute resolution. She has particular expertise in gas price reviews. Having started her career at the Berlin Institute for Energy law and worked on major energy deals and disputes in European and Asian markets for a decade, Agnieszka currently lectures in international commercial and investment arbitration and energy law and trading at the London School of Economics, Technische Universität Berlin, Freie Universität Berlin and Queen Mary University of London. Agnieszka has published high-impact research quoted by judges and arbitrators (including on challenges to arbitral awards in national courts) and regularly offers guest lectures and presents at conferences. She holds law degrees from Freie Universität Berlin and the University of Warsaw. Agnieszka is fluent in Polish (native), English, Russian and German.

Robin Baker, Visiting Research Fellow, has over 35 years' experience in energy finance; with the Chase Manhattan Bank where he headed the Oil & Gas Group's Asia Pacific region and subsequently with Société Générale, heading their Global Energy Finance Group. He is currently a Managing Consultant with Gas Strategies. He has been particularly active in advising and lending project finance to the energy sector and has provided financial advice to many projects throughout the energy chain; from upstream oil and gas to power generation. He has been actively involved in LNG since leading the first international LNG project finance (for Woodside's share of the first Northwest Shelf LNG project) in 1987 and has advised LNG projects in Qatar, Egypt, Indonesia, Russia, Australia, PNG, the USA and Mozambique. Prior to energy finance he worked in various refining and supply planning positions in the UK and Asia with the Royal Dutch/Shell Group. He has a B.Sc. in Chemical Engineering from Imperial College and an MBA from Cranfield School of Management, and is a Fellow of the Energy Institute.

Alex Barnes, Visiting Research Fellow, is an independent consultant specialising in energy market design and regulation. He has nearly thirty years' experience in the oil and gas sector, most of it spent in the liberalisation of gas and electricity markets. He has worked for a range of companies including Total, BG Group and Gazprom, helping them manage the impacts of energy liberalisation, both exploiting new opportunities and defending existing positions. At BG Group he led the team which secured an exemption from third part access regulation for the Dragon LNG terminal, enabling investment to go proceed. He established the Regulatory Affairs function for Gazprom Marketing & Trading in 2009, supporting its rapid expansion in gas and power trading in Europe, and also advised Gazprom on gas market liberalisation related issues. He has helped draft gas market rules as an industry representative on expert panels for the European Network of Transmission Operators for gas (ENTSOG) and the European energy market regulator ACER. He has also represented the European Federation of Energy Traders at the Madrid Forum organised by the EU Commission. He is a regular speaker at conferences and seminars, and on the advisory board for the European Annual Gas Conference and the European Gas Conference. He has a degree in Politics, Philosophy and Economics from Oxford University, and an MBA from Henley Management College.

Farhad Billimoria, Visiting Research Fellow, is an energy professional with over 14 years of global energy experience. He has covered electricity (renewable and conventional) and gas markets across Australia, New York, and California. He is currently with the Australian Energy Market Operator (AEMO) responsible for the design and analysis of electricity and gas markets in Australia, focusing on decarbonized market design for reliability and security. Prior to AEMO, Farhad was an active energy investor in US and international markets, as an energy and infrastructure specialist at the State of California (CalPERS) managing a \$5 billion portfolio of energy and infrastructure assets, and as Vice

President at AMP Capital in New York. Farhad has Bachelor's degrees in Electrical Engineering and Laws (both with Honours), and holds a Masters in Energy Systems from the University of Melbourne with a focus on energy market modelling, forecasting, and system design.

Klaus-Dieter Borchardt, Senior Visiting Research Fellow, is since October 2020 a Senior Energy Advisor at the European Competition Law Practice in the Baker McKenzie Brussels office. Before this, Klaus-Dieter worked for 33 years at the European Commission, including four years at the European Court of Justice. He spent 12 years in the Commissions' Legal Service where he was responsible for state aid, internal market and agriculture, worked as a Head of the private office for the Danish Commissioner for Agriculture and Rural Development and spent the last 8 years in DG Energy, first as a Director for the internal Energy Market and the last 2 years as a Deputy Director General for Energy. Klaus-Dieter is also a Professor at the Julius-Maximilians-University, author of a standard textbook on EU Law and co-editor of a commentary of the EU Treaties.

Julian Bowden, Senior Visiting Research Fellow, worked for BP for four decades in a variety of mainly planning, strategy and business development roles in downstream oil and international gas. His international roles included postings to BP's offices in Moscow and Brussels. He was involved in the planning for Caspian crude oil exports (culminating in the BTC pipeline) and latterly in the development of the southern gas corridor. Publications include chapters on Azerbaijan and Georgia in an OIES book on CIS gas, a chapter on SE Europe's gas markets in an European Commission sponsored book on gas in the EU's energy union and research papers on gas pricing for the IGU. He has also published an academic journal article on Soviet oil marketing in the UK in the 1930s. Principle interests remain in gas and broader energy issues in Eurasia.

Michael Bradshaw, Senior Visiting Research Fellow, joined the OIES in August 2008 and is also a professor at Warwick Business School, teaching in 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 at the interface of economic and political geography, business and management, and international relations. In 2007, he was awarded the Royal Geographical Society's Back Award for his applied research on economic change in post-socialist economies. 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 to the publication of his book, entitled *Global Energy Dilemmas* (Polity Press, 2013). He has also 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* 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.

Toby Chancellor-Weale, Senior Visiting Research Fellow, is an independent consultant specialising in Natural Gas Processing and Liquefied Natural Gas (LNG) facilities. He has 30 years' experience working for a range of oil & gas contractors and consultants including Bechtel, Granherne, KBR and Wood. He has worked with client teams including ADNOC, BP, Chevron, Eni, Equinor, NCOG, NLNG and Shell on the design and operation of both on and offshore hydrocarbon processing facilities in Africa, Australia, the Caspian region, the Middle East, Norway and Russia.

Toby is currently Chair of the Institution of Chemical Engineers (IChemE) Oil and Natural Gas Special Interest Group (SONG). Toby is a Fellow of the IChemE, he holds an MBA from Imperial College and a BEng in Chemical Engineering from Bradford University.

Michael Xiaobao Chen, Senior Visiting Research Fellow, is a leader at Equinor's marketing and trading division, after having previously worked with Equinor's global upstream strategy and business development. Before joining Equinor, Michael worked as a senior energy economist in the Chief Economist's Office of the IEA, leading on the Asian/China energy outlook, G20 global fossil fuel subsidy initiatives, global oilfield decline rate analysis, and energy poverty. Michael is an editorial board member of the prestigious journal *International Petroleum Economics* of the China Petroleum Society and a senior advisor of the China Energy Research Society. Michael is also an advisor to Enrupt Energy Startup Accelerator in Singapore. His areas of expertise include: the Chinese gas markets and origination; energy reforms and economic transition; national oil company strategy; ASEAN energy markets; offshore wind partnerships; and oil industry upstream trends. Since joining the Institute in 2011, he has contributed a chapter to *The Pricing of Internationally Traded Gas* (OIES/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.

Gabriel Collins, Senior Visiting Research Fellow, is the Baker Botts Fellow in Energy & Environmental Regulatory Affairs at Rice University's Baker Institute. He was previously an associate attorney at Baker Hostetler, LLP, and is the co-founder of the China SignPost™ (洞察中国) analysis portal. Collins has worked in the Department of Defense as a China analyst and as a private sector global commodity researcher, authoring more than 100 commodity analysis reports, both for private clients and for publication. Collins' research portfolio is global. His work currently focuses on legal, environmental and economic issues relating to water — including the food-water-energy nexus — as well as unconventional oil and gas development, and the intersection between global commodity markets and a range of environmental, legal and national security issues. His analysis draws from a broad swath of geospatial and other data streams, and often incorporates insights from sources in Chinese, Russian and Spanish. Collins received his B.A. from Princeton University and a J.D. from the University of Michigan Law School. He is licensed to practice law in Texas.

Ralf Dickel, Senior Visiting Research Fellow, has worked as an independent expert on international energy trade since leaving the Energy Charter Secretariat in October 2010. In October 2004 he joined the Energy Charter Secretariat as Director for Transit and Trade, after heading the Energy Diversification Division at the IEA from 2001, being responsible for policy analysis of energy markets and energy market reform. Before joining the IEA, he worked as Senior Specialist for Oil and Gas Policy at the World Bank, after a long career with Ruhrgas from 1980 to 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, amongst them: *Security of Gas Supply in Open Markets* (IEA, 2004) and *Putting a Price on Energy* (Energy Charter, 2007).

Nikolai Drahos, Visiting Research Fellow, is a senior economist at the Office of the Chief Economist in the Australian Department of Industry, Innovation and Science. His work focuses on Australia's domestic gas market, global LNG markets and resources and energy forecasting. Nikolai holds a Bachelor of Arts (Honours) and a Graduate Diploma in Economics from the Australian National University, where he is currently undertaking a Master of Environmental and Resource Economics. He is a co-author of the OIES paper *Prices and crisis – LNG and Australia's East Coast gas market* and the Department of Industry, Innovation and Science's *Resources and Energy Quarterly*.

Barbara Finamore, Senior Visiting Research Fellow, is a senior leader and environmental advocate with over 40 years of experience in environmental law and China climate and clean energy policy. In 1996, she founded the Natural Resources Defense Council (NRDC) China Program in Beijing, the first clean energy program to be launched by an international NGO. She helped to develop China's first energy codes for residential and commercial buildings, first research and development program for fuel cell vehicles, first utility-based initiative for energy conservation, and first nationwide emission control regulations for the shipping industry. She served as the Senior Strategic Director for Asia at NRDC, the President and Chair of the Professional Association for China's Environment (PACE), and the co-founder and President of the China-U.S. Energy Innovation Alliance. Ms. Finamore also worked for the U.S. Departments of Justice and Interior, the United Nations Development Programme, and the Center for International Environmental Law. In 2017, she was named a member of Foreign Policy's "The U.S.-China 50", a group of 50 individuals who are powering the world's most complex and consequential relationship. She holds a J.D. degree with honors from Harvard Law School, and is the author of "*Will China Save the Planet?*" (Polity Press).

Sam Geall, Senior Visiting Research Fellow, is executive editor of chinadialogue.net and associate faculty at the Science Policy Research Unit (SPRU) at the University of Sussex. His research focuses on climate policy and politics, energy transition, environmental governance and civil society in China. He edited *China and the Environment: The Green Revolution* (Zed Books, 2013). Sam's writing has appeared in many leading publications, including BBC Chinese, the Guardian, Foreign Policy, Index on Censorship and Nikkei Asian Review. He has been interviewed extensively by media outlets including the BBC, PRI, Al Jazeera and Monocle 24. Sam was formerly departmental lecturer in Human Geography of China at the University of Oxford. He has a PhD in Social Anthropology from University of Manchester, a BA in Modern Chinese Studies from University of Leeds and was a Kennedy scholar at Harvard University. He is a fellow of the RSA and on the board of the EU-China NGO Twinning Exchange.

Ieda Gomes, Senior Visiting Research Fellow, is a researcher and consultant 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 spent more than 13 years with BP, where she held senior positions such as: vice president of new ventures for South Asia and the 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 boards of directors of Bureau Veritas, Saint Gobain, Exterran Corporation, Odebrecht SA, 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 on the executive committee and currently being vice-chair of the Task Force, Strategic Communication and Outreach. She has presented at several energy conferences and training courses and she is a member of the programme committee of LNG 19. She is a regular columnist for the specialist magazine *Brasil Energia*. Ieda has a degree in Chemical Engineering from Universidade Federal da Bahia, an MSc in Energy from Universidade de S. Paulo, and a troisième cycle diploma from École Polytechnique Fédérale de Lausanne.

Michael Hochberg, Visiting Research Fellow, is an energy industry professional with expertise in power project development, electricity markets, and regulation. Michael began collaborating with the Institute as the OIES-Saudi Aramco fellow in 2017, when he led a study evaluating auctions as policy tool for renewable energy procurement. His experience includes renewable project origination & development at Hecate Energy, management consulting in the Global Energy & Utilities practice of PA Consulting Group, and research related to the economics and regulation of the power sector. He holds

a master's degree focused on energy economics from Universidad Pontificia Comillas, and graduated summa cum laude with a BA in Political Science from Tulane University.

Ahmed Mehdi, Senior Visiting Research Fellow, is an energy consultant who advises oil companies and trading houses on oil and gas pricing, country strategy and energy economics. He previously acted as an advisor to BHP Petroleum's strategy division and spent several years working with PricewaterhouseCoopers (PwC) in London. Ahmed comments widely on energy issues in the media, including the New York Times, Bloomberg, Foreign Affairs, Middle East Economic Survey (MEES), Petroleum Economist and S&P Global Platts. He is the founder of the London-based Commodities Intelligence Network. Ahmed was educated at the University of Oxford and University College London.

Stephen O'Sullivan, Senior Visiting Research Fellow, began his oil and gas career with several years' experience as an oil trader, economist and corporate planner in the downstream and trading divisions of BP, as well as the North Sea upstream and gas divisions of Total. In 1989 he joined Coopers & Lybrand as a strategy consultant in the oil and gas consulting business, working on the privatization and restructuring of the energy sectors across emerging markets, as well as in the nuclear power and transport sectors. He lived and worked in China, Russia, Central Asia, Eastern Europe, Southern Africa and the Middle East. In 1995 he was appointed Head of Research and Oil & Gas Analyst at MC Securities in London, where the team was ranked number one in EMEA oil and gas. Following the sale of that business to JP Morgan in 1998, he moved to Moscow as a Partner and Head of Research at United Financial Group, where he and his team were ranked the number one oil and gas research team and the number one Russia country team for seven years in a row. After the sale of UFG to Deutsche Bank in 2005, Stephen became Head of EMEA and Latin American Research where his research team was ranked number one across all sectors, in Russia and South Africa and across the broader EMEA region in 2006 and 2007. In 2007 he moved to Hong Kong as Head of Asian Research for the Australian bank Macquarie. In 2009 he joined Barclays to lead the build-out of its Asia ex-Japan equity research business. In 2013 he joined Trusted Sources, focusing on China energy based in Hong Kong. His major research themes include China's gas sector reform and nuclear renaissance. In 2016, following the merger between Trusted Sources and Lombard Street Research to form TS Lombard, he took on an additional role as CEO of TS Lombard Research Partners, TS Lombard's market-facing independent analyst platform.

Aliaksei Patonia, Visiting Research Fellow, is currently reading for a Master's in Public Policy at the University of Oxford specializing in sustainable energy policy. Prior to that, Aliaksei was a fellow at the Open Development Cambodia, an NGO focusing on promoting sustainability in the Greater Mekong Sub-region, where he participated in drafting the Environment and Natural Resources Code of Cambodia while being a policy advisor to the local authorities on achieving SDG 7. Alex holds an MSc in International Management (Oil and Gas) from the University of Liverpool and an MSc in Sustainable Development from the University of St Andrews (both with distinction).

Gulmira Rzayeva, Visiting Research Fellow, is an advisor to the World Energy Council's Global Gas Center based in Geneva and visiting research fellow at the Center on Global Energy Policy of Columbia University. She is also on the board of directors of the Institute for Effective Governance and Stabilization based in Stockholm, Sweden, and the Trade Forest trading company based in London. She is a founder and managing director of the London-based Eurasia Analytics Ltd consulting company. She was a senior research fellow at the Center for Strategic Studies (SAM) under the President of the Republic of Azerbaijan for ten years until January 2019. Her area of expertise includes energy security, covering issues such as the energy policy of Azerbaijan and the East Europe/Caspian region, the Turkish domestic natural gas market, SEE gas market.

Simon Schulte, Senior Visiting Research Fellow, analyses the economics and regulation of hydrogen and natural gas. He is Manager and Head of Gas Markets at the Institute of Energy Economics (EWI) at the University of Cologne. His responsibilities include the acquisition, operation and execution of projects for industrial clients and the public sector. In applied research and consulting projects, he has examined the European and global perspectives of hydrogen and natural gas markets. He has advised, e.g. the German Federal Foreign Office, the German Ministry for Economic Affairs and Energy (BMWi) and the European Commission. Furthermore, he worked as a consultant in the Energy Market and Security Directorate at the International Energy Agency (IEA) in Paris. His research focus lies in the economic modelling and analysis of energy markets. Simon Schulte holds a PhD in economics from the University of Cologne. Before, he studied industrial engineering with a major in chemical and energy engineering at the Münster University of Applied Sciences, the University of California in Los Angeles, the Norwegian School of Economics and the Dresden University of Technology.

ACCOUNTS

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

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

For the Year Ended 31 December 2020

	Notes	Unrestricted funds 2020 £	Endowment funds 2020 £	Total 2020 £	Unrestricted funds 2019 £	Endowment funds 2019 £	Total 2019 £
Income from:							
Voluntary income	3	730,023	-	730,023	899,287	-	899,287
Incoming resources from charitable activities	4	948,677	-	948,677	1,338,694	-	1,338,694
Incoming resources from investments	5	256,608	-	256,608	279,922	-	279,922
Total income		1,935,308	-	1,935,308	2,517,903	-	2,517,903
Expenditure on:							
Raising funds	6	43,503	-	43,503	45,191	-	45,191
Charitable activities							
Projects and publications	7	1,240,362	-	1,240,362	1,344,807	-	1,344,807
Support costs	7	397,399	-	397,399	384,825	-	384,825
Total charitable expenditure		1,637,761	-	1,637,761	1,729,632	-	1,729,632
Other expenditure	12	60,998	-	60,998	44,016	-	44,016
Total resources expended		1,742,262	-	1,742,262	1,818,839	-	1,818,839
Net gains/(losses) on investments	11	121,970	11,147	133,117	675,392	499,529	1,174,921
Net movement in funds		315,016	11,147	326,163	1,374,456	499,529	1,873,985
Fund balances at 1 January 2020		5,927,076	4,410,303	10,337,379	4,552,620	3,910,774	8,463,394
Fund balances at 31 December 2020		6,242,092	4,421,450	10,663,542	5,927,076	4,410,303	10,337,379

The statement of financial activities includes all gains and losses recognised in the year.

All income and expenditure derive from continuing activities.

OXFORD INSTITUTE FOR ENERGY STUDIES (REGISTERED NUMBER: 01676971)

Summary Income and Expenditure Account

At 31 December 2020

	All income funds	
	2020	2019
	£	£
Gross income	1,935,308	2,517,903
Gains on investments	121,970	675,392
	<hr/>	<hr/>
Total income in the reporting period	2,057,278	3,193,295
	<hr/>	<hr/>
Total expenditure from income funds	1,742,262	1,818,839
	<hr/>	<hr/>
Net income for the year	315,016	1,374,456
	<hr/> <hr/>	<hr/> <hr/>

OXFORD INSTITUTE FOR ENERGY STUDIES (REGISTERED NUMBER: 01676971)

Statement of Financial Position

At 31 December 2020

	Notes	2020		2019	
		£	£	£	£
Fixed assets					
Tangible assets	13		7,828		17,749
Investments	14		9,434,911		9,499,999
			<u>9,442,739</u>		<u>9,517,748</u>
Current assets					
Debtors	16	169,177		196,590	
Cash at bank and in hand		1,148,484		741,470	
		<u>1,317,661</u>		<u>938,060</u>	
Creditors: amounts falling due within one year					
Taxation and social security		34,693		35,088	
Other creditors		62,165		83,341	
		<u>96,858</u>		<u>118,429</u>	
Net current assets			<u>1,220,803</u>		<u>819,631</u>
Total assets less current liabilities			<u><u>10,663,542</u></u>		<u><u>10,337,379</u></u>
Capital funds					
Endowment funds - general			4,421,450		4,410,303
Income funds					
Unrestricted funds			<u>6,242,092</u>		<u>5,927,076</u>
			<u><u>10,663,542</u></u>		<u><u>10,337,379</u></u>

OXFORD INSTITUTE FOR ENERGY STUDIES (REGISTERED NUMBER: 01676971)**Statement of Cash Flows**

At 31 December 2020

	Notes	2020		2019	
		£	£	£	£
Cash flows from operating activities					
Cash (absorbed by)/generated from operations	24		(46,251)		464,005
Investing activities					
Purchase of tangible fixed assets		(1,548)		(11,201)	
Decrease in cash within investment portfolio		53,048		-	
Purchase of other investments		(947,998)		(1,379,800)	
Proceeds on disposal of other investments		1,093,155		903,682	
Investment income received		256,608		279,922	
Net cash generated from/(used in) investing activities			453,265		(207,397)
Net cash used in financing activities			-		-
Net increase in cash and cash equivalents			407,014		256,608
Cash and cash equivalents at beginning of year			741,470		484,862
Cash and cash equivalents at end of year			<u>1,148,484</u>		<u>741,470</u>

MEMBERS

Affiliations as at the time of joining:

The University of Oxford

St Antony's College, Oxford

St Catherine's College, Oxford

Nuffield College, Oxford

Organization of Arab Petroleum Exporting Countries (OAPEC)

Swedish Energy Agency

Institut Français du Pétrole

Secretary of State for Trade and Industry, UK

Arab Banking Corporation

Arab Petroleum Investments Corporation

The Institute of Energy Economics, Japan

Instituto Mexicano del Petróleo

Rogalandsforskning, Norway

Ministry of Petroleum and Mineral Resources, Saudi Arabia

Canadian Petroleum Studies Inc.

The State of Kuwait

The OIES is registered as a company limited by guarantee (without share capital). It is also a registered charity that operates as a non-profit educational organization. It is conceived as an association of various Members, who may be divided into two groups. On the one hand are the University of Oxford and three of its colleges; on the other hand is a selection of governments, public institutions, and international and regional organizations, from oil-producing and oil-consuming countries. With the exception of the university and its colleges, each Member has made a once-and-for-all financial contribution. These sums are treated as an endowment, providing for the long-term security of the OIES. All Members of the Institute have the following rights:

- to appoint one or several representatives on the Board of Governors. This gives the Member an active part in the management and supervision of the Institute since the Board is the body empowered with all executive functions
- to attend the Annual General Meeting of the Institute

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