



**THE ENERGY GROUP**  
The Geological Society  
Burlington House - Piccadilly - London

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**Annual Report 2021**

## Executive Summary

In 2021 the Energy Group held 6 events and co-badged a further 4 events. The Geopressure, Core Values, and UKCS Atlantic Margin conferences, which were all rescheduled from 2020, were held as fully virtual events in the first half of the year when government restrictions prevented physical meetings. As restrictions eased in the second half of 2021 we were able to return to hosting a limited number of delegates at Burlington House and we ran the Petroleum Systems, Petroleum Geology of the South Atlantic and 8<sup>th</sup> UK Geothermal symposium as hybrid virtual and in person events.

I greatly thank the efforts of the conference convenors and Conference Office staff who worked very hard with the logistics and planning of the rescheduled events and hybrid and delivered a technically excellent programme, following our ethos of being at the forefront of energy geoscience. With the demonstrated success of the hybrid format, including virtual field trips, we will offer this as the basis for all future events in order to make the events as widely accessible as possible.

We would like to thank our corporate sponsors BP and Equinor for their continued financial support and also thank the conference sponsors for their support in 2021. We would also like to thank Chrysoar, Total, Badley Ashton, BHPB, ALS, Shell, Western Geco, Siccar Point, ERCE and Seequent for sponsoring conference events throughout the year. Because of this support we were able to offer a competitive price for the online events and to include free places for student members of the society.

Financially the Energy Group had a strong 2021 and returned a surplus of £84,952 to the Geological Society.

Once again in 2021 as a result of the pandemic the Annual Dinner was not held. The Energy Group Awards were presented at the 8<sup>th</sup> UK Geothermal Symposium which was held in November.

In 2022 the Energy Group will be delivering an extended programme of seven conferences with a further two co-badged events on a broad range of topics. We are pleased to note that 2 events are planned which reflect the widened remit of the Energy Group beyond the historical focus of the Energy Group – Application of Hydrocarbon workflows to CCS and 9<sup>th</sup> UK Geothermal Symposium.

Our sixth Committee self-evaluation survey was issued in November 2021 and the outcomes reviewed in the December 2021 meeting.

## Conference Report

The Energy Group hosted 6 events in 2021 which were attended by a total of 676 registered delegates and maintains a long term average of 100-120 delegates per event.

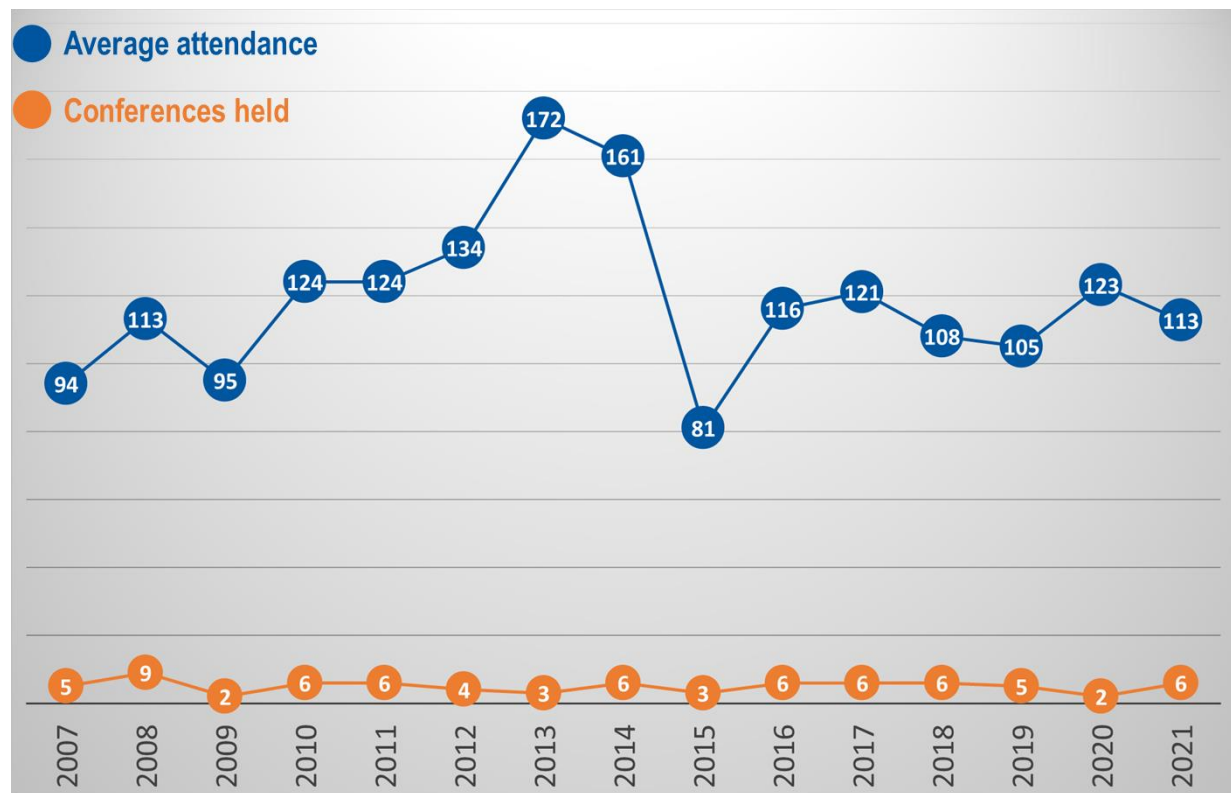


Figure 1 Summary of Petroleum Group / Energy Group conference held each year

## Geopressure 2021: Managing uncertainty in geopressure by integrating geoscience and engineering.

### 23-25<sup>th</sup> March 2021. Virtual Conference

This conference was co-badged with Durham University and follows successful conferences on the same topic in 1995, 2008 and 2015. Each has brought together an international group of between 85 and 115 geoscientists; a mixture of academics (both research staff and students) and industry professionals. At the 2021 event there were 134 registered delegates. The event was sponsored by Total and Chrysoar.

Geopressure is the area of geosciences relating to rock and fluid pressures, and their prediction is required for successful and safe drilling of boreholes for both production and injection of fluids and gases. Traditionally the main application has been in drilling oil and gas wells, but prediction is also required for CO<sub>2</sub> injection/storage, hydrogen storage as well as operating conditions for deep geothermal energy schemes. And this was reflected in the programme

The Geopressure 2020 (March 2020) was postponed due to the international escalation of the Coronavirus (COVID-19). Following an early decision to postpone conference planning could focus on a virtual online 'Zoom' event in 2021. We were able to assemble a three-day programme (10:00 to 15:30) which included 33 technical presentations and 12 flash talks. This

was followed by a full day master-class presented by Richard Swarbrick the day after the conference.

There was broad range of excellent technical and engaging talks which reflected the global network of colleagues and contacts that both Richard Swarbrick and Stuart Jones could draw upon. This made it a truly international conference of considerable relevance. Geopressure is a global phenomenon, and many of the papers explore data and interpretations using case studies from around the world. Utilising Zoom facilitated the global reach and diversity of presenters and delegates. And given familiarity with the technology did not present a barrier to discussion and debate.

We are presently in the process of compiling a thematic set of papers from the conference which will be available online – hopefully on Q2 2022.

### **Core Values: the role of core in 21<sup>st</sup> century reservoir characterisation.**

#### **4-7<sup>th</sup> May 2021. Virtual Conference.**

Core has traditionally played a key role in the characterisation of conventional and unconventional hydrocarbon reservoirs, from exploration to mature production, as it provides the only means to observe and make measurements on actual reservoir rock. However, recent oil-industry downturns have driven many to question the value of routinely taking core, given the associated costs and potential risks to well operations. In tandem, advances in other reservoir visualisation techniques, such as seismic and borehole imaging, give weight to the contention that coring now represents a much less significant means of characterising reservoirs than it once did. In May 2021, the Geological Society's Energy Group convened the virtual conference 'Core Values: the Role of Core in 21st Century Reservoir Characterisation' to ask, "Does core have a future?" There were 144 registered delegates at the conference and the event was sponsored by Badley Ashton, BHP, Total and ALS.

The intrinsic value of core to sedimentological and structural reservoir description and characterisation was demonstrated in a series of talks (Levell, Wells, Fossen, Laubach, Gale), whilst its 'ground truthing' capacity was exemplified by a series of presentations on borehole image studies with and without core. The potential for successful outcomes without conventional core depends on regional understanding, prospect maturity and the nature of the reservoir (Neal, Jude), whilst Gutteridge's talk demonstrated that for depositionally complex reservoirs core is indispensable even with excellent BHI coverage.

There is a growing awareness that the decommissioning of North Sea fields is resulting in unwanted core finding its way into landfill and the question "Does legacy core have a future?" was a key theme at the conference. National core repositories are a veritable treasure trove of information, as exemplified by talks from Jeannine Honey at the USGS Core Research Center, and Mike Howe, at the BGS National Geological Repository (NGR). These institutions are under pressure to prove their value and reduce costs, despite their resources being available for education, geoheritage, research or commercial purposes at a fraction of the cost of drilling new core. Their utilisation spares money, time, and environmental impacts.

Traditional methods for core analysis use only a small fraction of the data available from core. The increasingly important role of AI in core characterisation, through cost-effective automated high-resolution multi-sensor scanning technologies, was ably covered by

presentations from Damasckle, Linton, and Shreeve. These also showed how the value of core was in fact enhanced rather than diminished by developing technologies.

Core alone cannot provide all the answers. However, when integrated with AI and complementary datasets, core provides the only mechanism to quantitatively ground-truth models and answer many field-development questions. To realize the full value of core, we must bridge the gap between the thin-section, seismic, and reservoir dynamic model analysis, using descriptive and interpretative schemes that allow data and understanding to cascade up and down the scales of investigation.

The article “Have we passed peak core?” was published following the conference in Geoscientist Autumn 2021.

### **New learning from exploration and development in the UKCS Atlantic margin.**

#### **19-21<sup>st</sup> May 2021. Virtual Conference**

This three day virtual conference was held from 19th-21st May 2021 via MS Teams. It included two associated events: a half-day virtual core day on the morning of 18th May and a two-day virtual field trip to the Isle of Skye on 13th-14th May. This conference was originally planned as face-to-face in 2020 and was postponed by one year due to the COVID pandemic. Conference specific sponsorship was received from Total, Western Geco, Shell and Siccac Point Energy.

All of the events were well attended, with an average attendance of 60 people at each conference day with a total of 90 registered for the event. The virtual field trip was run by Nicholas Schofield and John Howell from Aberdeen University, using their proprietary LIME software, which enabled integration of photogrammetry, LIDAR, seismic, well and other data in a very effective way. While many aspects of a face-to-face field trip were lost, other learning opportunities were gained and significant cost saved. The core day included guided tours through core from Clair basement and Devonian, Schiehallion field gravity deposits and Rosebank field Palaeocene reservoirs and volcanics. Participants fed back that the events together enabled a great opportunity to get up to speed with latest thinking on the geology and hydrocarbon development of the UK Atlantic Margin.

### **Basin and petroleum systems modelling: Best practices, challenges and new techniques**

#### **28-30<sup>th</sup> September 2021. Hybrid Conference**

The conference was originally schedule for September 2020, however, was deferred to 2021 due to COVID. This meeting was designed to discuss the importance of Basin and Petroleum System Modelling in exploration and evaluation of resources, focussing on best practices, recent developments, novel applications, and opportunities for the future. The full 3 day technical programme was successfully delivered as a hybrid event by the Geological Society. A total of 120 delegates 33 in person and 87 virtual attended the conference. Despite a few minor technical teething problems the feedback from the delegates was positive and the conference was well received. The convenors also received valuable comments on the (new) hybrid event format which was fed back to the Geological Society. This will hopefully be useful for shaping the planning and delivery of future hybrid conferences.

## **Petroleum Geology of the southern Atlantic**

### **6-7<sup>th</sup> October 2021. Hybrid Conference**

The Petroleum Geology of the Southern South Atlantic hybrid conference was held at Burlington House from 6<sup>th</sup>-7<sup>th</sup> October 2021. The aim of the conference was to bring together both academic and industry geoscientists to discuss the current state of understanding of the geology and petroleum systems in this emerging petroleum province.

In total there were 34 presentations covering both margins of the Atlantic with a mixture of in-person and virtual speakers. There were 94 delegates of which 30 attended Burlington House in person. The event was sponsored by Total and ERCE.

The oil and gas industry has been at the forefront of the acquisition of huge volumes of data to understand the Southern South Atlantic margins; in conjunction with the academic world, this has led to a significantly improved understanding of the processes that work on the margins. The conference brought these two worlds together showing that not only have we advanced our knowledge of what these margins are comprised of (a static observational view), but now we can additionally say more sophisticatedly why they are so comprised and how they have evolved (a time-dynamic or evolutionary view).

This conference was initially proposed after the results from both the Brulpadda-1X well in South Africa and the first Argentine license round pointed to the level of potential that this area was felt to have by the global exploration community. The pace of exploration has only continued since then and there are a number of exciting wells coming up on both sides of the Atlantic which will soon put the science to the test.

It is the intention of the Convenors to publish a GSL Memoir based on the conference.

## **8<sup>th</sup> UK Geothermal Symposium**

### **17<sup>th</sup> November 2021. Hybrid Conference**

Development of the UK's geothermal resources to provide heat and power is gaining pace in-line with demands for urgent climate action. Headlining from Cornwall, two much anticipated commercial deep geothermal energy projects are being developed following over a decade of preparation. Mine water thermal energy is also gaining major traction across the former coal mining areas of the country with NE England taking the lead. The first mine water heating project is delivering MW's of low-carbon heat to Lanchester Wines in Gateshead and two more will be operational within 24 months. Innovation in repurposing of oil and gas industry assets is becoming a reality. Examples of hot sedimentary aquifer exploration and development in Ireland and Northern Ireland have been driven by a great example of linked up policy and research agendas.

The 8<sup>th</sup> UK Geothermal Symposium showcased the latest developments in the UK's geothermal sector. The first theme show-cased four project examples of the three main resource types: granites, sedimentary basins and flooded coal mines. The second theme walked the audience through the de-risking processes related to geological uncertainty, drilling risk and commercial and financial risk in geothermal systems. The third theme highlighted the latest examples of pioneering research being carried out by industry-academic partnerships in the UK. The fourth and final theme was an interactive discussion

panel with leaders from the public sector to debate the current and future policy and regulatory landscape for the industry in the UK.

There were 134 delegates of whom 68 were virtual attendees and 66 attended Burlington House in person. Sponsorship was provided by Seequent.

## **Co-badge Event - Collaboration Showcase PETEX**

### **23-25<sup>th</sup> November 2021. Hybrid Conference**

Due to COVID PETEX 2020 was deferred for 1 year. In the run up to PETEX 2021 the Energy Group at the request of the PESGB delivered two “Collaboration Showcase Sessions” (in January and June 2021) designed to promote PETEX, in addition the Energy Group was represented on the PETEX Technical Committee which was responsible for pulling together the technical programme of talks and posters. In contrast to previous years all the Collaboration Showcase talks were integrated into the main technical programme which provided a great platform for individuals from academia to present their work. We were successful in attracting 12 high calibre talks and 2 keynote speakers which not only covered conventional oil and gas but also touched on various challenges associated with the Energy Transition. We also provided a platform for 6 of the award winning MSc students from across the UK to present their summer projects as part of the PETEX Fringe Events Programme.

## **Co-Badge Events**

During 2021 the Energy Group Co-Badged the following

- Geological Society - Energy Transition series of webinars
- Geological Society – William Smith Mapping conference
- PESGB/EG Joint Lecture.

## **Energy Group Dinner**

Due to Government restrictions that were in place during 2021 as a result of the Coronavirus Pandemic the annual dinner at the Natural History Museum was again not held in 2021. The Energy Group received a refund of the deposit for the 2020 event which was held over to 2021.

## **2021 Financial Report.**

In 2021 the Energy Group has returned a surplus of £84,952 to the Geological Society. The surplus was ahead of the original 2021 budget as a result of:

- higher delegate income from the addition of the 8<sup>th</sup> UK Geothermal Symposium to the EG 2021 program,
- reduced conference costs as the events were primarily held online,
- a one off payment from the Natural History Museum who returned the deposit which had been paid in November 2019 for the 2020 Annual Dinner and was held over by the Museum for a 2021 event.

We thank our corporate sponsors BP and Equinor for their continued support.

	2020		2021		2021		2022	
	Actual		Forecast		Actual		Forecast	
<b>Income</b>	Conference Income	£ 46,712.00	£ 77,950.00	£ 99,235.00	£ 92,000.00			
	Annual Dinner	£ -		£ 14,150.00	£ 24,000.00			
	Corporate Affiliate Sponsorship	£ 22,000.00	£ 22,000.00	£ 22,000.00	£ 22,000.00			
	<b>Total</b>	<b>£ 68,712.00</b>	<b>£ 99,950.00</b>	<b>£ 135,385.00</b>	<b>£ 138,000.00</b>			
<b>Expenditure</b>	Conference Costs	£ 3,386.00	£ 40,900.00	£ 15,433.00	£ 53,900.00			
	Publications	£ -	£ -	£ -	£ -			
	Dinner Expenses	£ -	£ -	£ -	£ 24,000.00			
	Administration	£ 35,093.00	£ 39,900.00	£ 35,000.00	£ 36,900.00			
	<b>Total</b>	<b>£ 38,479.00</b>	<b>£ 80,800.00</b>	<b>£ 50,433.00</b>	<b>£ 114,800.00</b>			
<b>Net Surplus/Deficit</b>	<b>£ 30,233.00</b>	<b>£ 19,150.00</b>	<b>£ 84,952.00</b>	<b>£ 23,200.00</b>				

Table 1 Energy Group Accounts- 2021

### [Energy Group Awards](#)

In 2021 the Annual Awards were represented at the 8<sup>th</sup> UK Geothermal Symposium which was held in November. The following awards were made.

#### [Energy Group Medal - Phillip Ringrose](#)

##### [Proposed by Mads Huuse, Supported by Alexander Reid](#)

As a specialist in Carbon Capture and Storage (CCS) and Reservoir Geoscience at Equinor and an Adjunct Professor of CO2 Storage at NTNU, Philip Ringrose is at the forefront of the push for a low carbon economy and energy transition. During his 30 years of Energy Industry and Academia experience he has built a strong reputation as an expert in reservoir geoscience and in the last ten years as a widely respected world leader in the theory and application of CCS. His strong background in reservoir geoscience has acted as a springboard for building his world-renowned position in CCS. He has worked on numerous CCS projects for Equinor such as the Sleipner and Snohvit gas fields, whilst advising around the world on committee and advisory boards to build CCS knowledge and frame future policy.

He has been a regular convenor and speaker at conferences on reservoir and CCS topics and advisor to numerous scientific committees around the world, currently sitting on the Geological Societies Energy Transition committee. He is also Chief Editor of the Geological Societies Petroleum Geoscience Journal, has been a former President of the EAGE and served on its board for 3 years (2012-2014). Dr Ringrose has been honoured with the following awards: Mobil (North Sea) Ltd Prize for outstanding performance in geophysics, Edinburgh University, 1981; Dr James MacKenzie Prize for excellence in postgraduate research, Strathclyde University, 1987; and an Honorary Professorship (2018–2021) at the University of Edinburgh, School of Geosciences.



His enthusiasm for reservoir and CCS geoscience and early adoption of the use of CCS in the low carbon economy has inspired many students and professionals to embrace the energy transition and look for new ways to help the world achieve net zero emissions. His energy and enthusiasm is clear to see as he has promoted the use of new technologies and ideas in the low carbon domain. It is inspirational people like Philip who will help the energy industry to strive forwards and support society in meeting its goals of a future where access to sustainable energy for all and a clean environment can exist together.

### **Early Career Geoscientist Award. - Lucy Cotton**

#### **Proposed by John Gutmanis, supported by Lucy Crane**

I have known Lucy since her first summer placement with GeoScience Limited in 2011, then she went on to have longer duration internments in between doing her B.Sc and MSc. She joined GeoScience as a staff member in 2017 and has made a huge impact with her commitment to the geology team, her knowledge and perhaps most of all her sheer enthusiasm for the subject she loves, especially for fieldwork and operations. This is inspiring to the rest of the company staff. She is currently Site Geologist for the Eden deep geothermal project and part of the companies' Geothermal business team.

She is a strong advocate for the industry, and is heavily involved in outreach and engagement to encourage the next generation into geoscience – including being a founding member of Women in Geothermal UK (WING). She speaks regularly in both schools and at international technical conferences (for example at the World Geothermal Conference this year) – communication across the spectrum really is one of Lucy's stand-out skills. In summary, confident, knowledgeable and dynamic. And not afraid to ask questions of her seniors if she's not sure of something technical.

### **Petroleum / Energy Group Publications**

Three Special Publication were released in 2021, and two were made available via online first.

SP493: Subsurface Sand Remobilisation and Injection (printed)

SP504: The Basins, Orogens and Evolution of the Southern Gulf of Mexico and Northern Caribbean (printed)

SP509: Seismic Characterization of Carbonate Platforms and Reservoirs (printed)



Online First Publication

SP494: Cross Border Themes in Petroleum Geology I: The North Sea

SP494: Cross Border Themes in Petroleum Geology II: Atlantic Margin and Barents Sea

### Looking forward

In 2022 a diverse program of events that are planned.

- Applicability of hydrocarbon workflows to CCS
- Development and production geology of carbonate reservoirs.
- The impacts of volcanism on sedimentary basins and their energy resources
- Biannual Operations Geology conference
- Oceanic Gateways
- Seismic Imaging
- 9th UK Geothermal Symposium

In the future we intend to offer all Energy Group events as a hybrid format of virtual and in-person attendance. In 2021 we have successfully hosted virtual and hybrid conferences virtual core viewing and virtual field trips and believe the multi-delivery formats are an invaluable tool for keeping the Energy Group at the forefront of Energy Geoscience and reaching as wide an audience as possible. d

### Finally.

Several members are stepping down and new members are joining the committee. We take this opportunity to acknowledge the contribution of the members who are stepping down and welcome the new members who will take the committee forward.

The Committee is extremely grateful to the retiring members for their contribution and dedication to the events and conference programme over their time on the committee.

### **Retiring Committee Members**

Caroline Gill – Chair (Shell UK)

Jonathan Hull – Treasurer (ERCE)

Lauren Mayhew – Publications Officer (Cairn Energy)

Kirstie Wright – Communications Officer (Rocktype)

Noah Jaffrey (Shell UK)

Emma Jude (BP)

Robert Newbould (Harbour Energy)

### **2022 – 2023 Officers of the Energy Group Committee**

The following were appointed as officers of committee for the period 2022 – 2024.

Mads Huuse – Chair (University of Manchester)

Ivan Fabuel-Perez – Treasurer (ExxonMobil)

Tina Lohr – Publications Officer (ERCE)

Helen Robinson – Communication Officer (University of Glasgow)

### **Joining Committee Members**

The following were appointed to the committee for the period 2022 – 2024.

Mark Wood – (Shell UK)

James Todd – (Aecom)

Amrit Hamechan Madhoo – (Schlumberger)

Helen Doran – (Ola Geo0)

Robert 'Woody' Wilson – (BP Exploration)

Gareth Farr – (Coal Authority)

### **Jonathan Hull**

**Energy Group Treasurer**