

# GAS QUALITY REGULATION AND LNG SUPPLY TO THE NTS



By Marshall Hall, Senior Research Fellow, OIES

There are no quality restrictions on the LNG imported into the UK but the gas entering the National Transmission System (NTS) from the regas terminals has to meet two different sets of gas quality specifications.

The first is the statutory gas quality included in the Gas Safety (Management) Regulations 1996 (GSMR) which governs the safe conveyance of all gas in networks serving UK consumers. The second is the set of gas quality specifications described in the bilateral Network Entry Agreement (NEA) negotiated by each terminal with National Grid Gas (NGG), the operator of the NTS.

The safe use of gas in the UK, and GSMR in particular, is the responsibility of the non-departmental government body, the Health and Safety Executive (HSE), which falls within the scope of the Department of Work and Pensions (DWP). The current GSMR gas quality was established in 1996 when the UK was self-sufficient in gas produced from the UK Continental Shelf (UKCS), based on empirical research on gas safety conducted mainly in the 1980s.

The GSMR gas quality comprises a set of nine characteristics or parameters, including the key Wobbe Index (WI), which measures the interchangeability of gas and is expressed in MJ per normal cubic metre (MJ/m<sup>3</sup>). The Wobbe Index, sometimes referred to as the Wobbe Number, is calculated from the calorific value of the gas and its relative density<sup>1</sup> and varies with the composition of the gas.

The gas quality specified in the bilateral NEAs typically includes additional parameters but incorporates GSMR as the minimum gas quality for all terminals<sup>2</sup>. There is some variation in the gas quality in NEAs for NTS entry terminals, depending on the quality of the UKCS or imported gas delivered to the entry point. The terms of the NEA at each of the three regas terminals are understood to be very similar but only the South Hook Terminal (SHT) has agreed to allow them to be published by NGG.

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The most notable feature of the UK's current GSMR gas quality, compared to standards in other major European markets, is the narrowness of the WI range (47.-51.41 MJ/m<sup>3</sup>) and in particular the very low level of the upper limit. The pan-European gas industry's EASEE-Gas gas quality incorporates a WI range of 46.5-54 MJ/m<sup>3</sup>. Since most international traded LNG has a WI of between 51 and 56 MJ/m<sup>3</sup>, there is prima facie a mismatch between the WI range in GSMR and the supply of LNG which now makes up 20-30% of UK gas supply and represents a key marginal source of flexible supply.

This mismatch is managed at the regas terminals principally by nitrogen ballasting which involves the injection of low-WI nitrogen gas into the regasified LNG to reduce its heat content and Wobbe Index to bring it below the GSMR limit-value of 51.41 MJ/m<sup>3</sup>.

The higher the WI of the imported LNG, the higher the nitrogen ballasting costs and CO<sub>2</sub> emissions associated with complying with this tight GSMR limit-value. If nitrogen production and injection capacity at a regas terminal is fully utilised or unavailable, the range of LNG sources capable of being imported will, of course, be more restricted. The costs of nitrogen ballasting are borne initially by the terminal but passed on to regas capacity holders, to shippers and ultimately to UK gas consumers.

At present, Grain LNG has extensive nitrogen production and injection facilities whereas Dragon LNG and South Hook LNG possess more limited facilities relative to their capacity. In its published terms and conditions for prospective users<sup>3</sup>, GLNG sets out a maximum WI of the LNG delivered to the terminal of 53.01 MJ/m<sup>3</sup>, indicating the operational flexibility to either blend LNG in tank or to inject nitrogen in order to comply with the GSMR limit of 51.41 MJ/m<sup>3</sup>.



In contrast, the South Hook terminal was designed to receive 'lean' Qatari LNG with a relatively low WI and until early 2022 had received only LNG from Qatar or from US plants that remove most of the non-methane compounds (ethane, propane and butane) through extraction at source before liquefaction. The range of LNG supply sources at Grain and Dragon has been wider than at South Hook, reflecting both contractual supply arrangements and the greater tolerance of LNG with a higher WI.

It became increasingly evident in the early 2010s that GSMR needed to be reviewed and revised in response to three factors: the growth of UK gas imports, the closure of all LNG peak-shaving facilities which provided LNG to remote off-grid areas of Scotland and the desire to accommodate lower-carbon biomethane and hydrogen into the gas networks.

Scotia Gas Networks (SGN) undertook an Ofgem funded study in Oban in 2015-16 to assess the impact of using higher WI gas and concluded that the upper limit could be safely relaxed from 51.41 to 53.25 MJ/m<sup>3</sup>. It observed that the current GSMR allows only 10% of the world's LNG supply to enter the UK market without further processing; if the WI limit were to be relaxed to 53.25 MJ/m<sup>3</sup>, then 90% of the world's LNG supply could do so<sup>4</sup>.

In describing the cost of maintaining the current GSMR range as 'grossly disproportionate to the risk of raising the upper WI limit to 53.25 MJ/m<sup>3</sup>', SGN cited an estimate by NGG that if the upper limit were raised, an estimated £325m per annum could be saved in projected nitrogen ballasting costs in 2020. A more recent estimate by NGG puts the operating cost savings in 2021 close to £90m p.a.

In 2016, the Institute of Gas Engineers and Managers (IGEM), the professional body responsible for technical standards in the UK gas industry, set up a working group, with a wide range of participants and the approval of the HSE, BEIS and Ofgem, to consider the establishment of a new gas quality standard.

Over the course of five years, the Gas Quality Standard Working Group (GQSWG), which included National Grid Gas and the HSE, commissioned and reviewed empirical research from a variety of sources concerning gas safety, security of supply and the decarbonisation of gas. It finally concluded its work by drafting a proposed IGEM Gas Quality Standard, submitting all the evidence to the HSE and publishing its final report in May 2021<sup>5</sup>. Figure 1 summarises the WI range of traded LNG, GSMR and the proposed IGEM standard.

Figure 1: Wobbe Index Range of LNG and Gas Quality Standards

Source	Wobble Index	Comments
Traded LNG sources	51 - 56	Aprogimate range
Existing GSMR standard	47.2 - 51.41	Unchanged since 1996
EASEE-Gas standard	46.5 - 54.0	National variations within EU
IGEM proposed standard	46.5 - 52.85	Recommended by GSWG May 2021
HSE GSMR recommendation	46.5 - 51.41	Impact assessment Oct 2021

Source: GIGNL, GSMR, EASEE-Gas, IGEM and HSE

In October 2021, the HSE released its initial impact assessment of the IGEM proposal<sup>6</sup>. It identified its 'preferred option' which entailed a lowering of the lower end of the GSMR WI range (from 47.2 to 46.5 MJ/m<sup>3</sup>), permitting greater access to the NTS for low-CV gas from some fields in the Southern North Sea, but it rejected the IGEM proposal to increase the upper limit-value from 51.41 to 52.85 MJ/m<sup>3</sup> on safety grounds.

It also proposed extending the exemption on oxygen content to permit greater use of biomethane and to simplify GSMR by removing two minor unnecessary parameters. In the view of the HSE, increasing the WI upper

limit-value would slightly increase the already exceptionally low risk of fatalities through carbon monoxide (CO) poisoning and that such an increase in risk was 'not tolerable within UK law'.<sup>7</sup>

In its assessment of the IGEM proposal, the HSE concluded that the safety-related evidence presented by the GQSWG in favour of an increase in the upper limit of the WI was either too limited or inconclusive. However, its reasoning in the impact assessment is less than persuasive. The HSE recognises that the safe use of gas primarily depends on the installation, servicing and inspection of gas appliances and proper ventilation to prevent the accumulation of flue gases.

Yet it appears to have concluded that gas quality limits have to be set in a way that compensates for deficiencies in the installation, servicing and inspection of gas boilers and room ventilation.

Its assessment does not refer to gas safety evidence from EU countries which permit a higher upper WI limit-value without an assessed increased risk of CO poisoning. Furthermore, the HSE gave limited weight to the continued safe use of gas with a WI of up to 53.25 MJ/m<sup>3</sup>, higher than the upper limit proposed by IGEM, in Oban and other localities since 2016 under a specific exemption from GSMR granted by the HSE itself.

After initial agreement of the HSE position by BEIS ministers, the HSE launched a public consultation on its 'preferred option' in January 2022 which effectively precluded any relaxation of the upper WI limit-value<sup>8</sup>. The submissions to the consultation on this issue revealed some opposition to the HSE position and scepticism over its approach to both risk assessment and the tolerance of risk.

Following conclusion of the consultation in March 2022, the HSE originally expected the government to adopt the new GSMR gas quality in secondary legislation in the summer of 2022 for implementation later in the year. However, a final decision and implementation was delayed by the changes of government in 2022 and the



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energy price crisis which highlighted the importance of access to LNG markets for UK security of supply.

There is little in the HSE impact assessment to show how the assessment of gas safety risks was conducted and how the trade-offs between competing policy objectives and the costs and benefits of raising the upper WI limit were considered. There is, at present, no comprehensive cost-benefit analysis in the public domain that includes the potential energy security and economic benefits for UK consumers.

But there is a more fundamental question as to whether the HSE is assessing risks and risk tolerance consistently and sensibly. In particular, it seems to have placed excessive weight on the minimal increase in absolute risk of CO poisoning if the upper limit of the WI were increased and too little weight on two other elements (1) the extremely low existing level of risk faced by consumers in the use of gas compared to other activities and (2) the significant improvement in gas combustion safety observed since the 1990s<sup>9</sup>.

As other submissions to the consultation point out, the HSE's analysis did not include the risk of winter fatalities arising from higher gas prices and fuel poverty in low-income groups<sup>10</sup>.

The HSE's refusal to approve even a modest increase in the upper WI limit-value will have an adverse impact on UK gas security of supply because the UK gas market has become, and will remain, more dependent on flexible uncontracted LNG and pipeline imports to meet peak winter demand. This promises to far outweigh the smaller, welcome benefits of allowing more inflexible low-CV gas from the UKCS and biomethane to enter the NTS.

The HSE's decision will also continue to restrict the volume of flexible Norwegian gas delivered by pipeline to St Fergus. It



may require additional investment in nitrogen ballasting at South Hook, raising the cost of delivering LNG to the NTS, or will constrain the sources of LNG available to UK regas capacity holders, especially when lean Qatari LNG is not being delivered to the UK.

The increased competition for LNG within Europe since the Russian invasion of Ukraine has brought these supply-side issues to the fore. The question of what happens if, for any reason, the UK no longer has access to low WI sources of LNG is simply not addressed by the HSE impact assessment.

The HSE's position was approved by government in early 2023 and adopted in law through a statutory instrument on 9 March 2023 as the Gas Safety (Management) (Amendment) Regulations 2023. The first revisions to GSMR came into effect on 6 April 2023 and the reduction in the lower WI limit-value will be effective from 6 April 2025. At this stage, the seven-year long process to review and revise the GSMR gas quality appears to have been a major missed opportunity.

The reduction of the lower WI limit is welcome and sensible but the decision not to raise the upper limit of the WI range is paradoxical. The GSMR review process was expressly initiated to accommodate rising pipeline gas and LNG imports but has ended with no changes in GSMR that facilitate imports.

The outcome favours small-scale, inflexible domestic sources of gas but does nothing to facilitate large-scale, flexible imported sources of supply. All the sources of flexible, uncontracted gas available to the UK are from imported sources, whether by pipeline or as LNG, and the competition for gas within Europe has already become more intense. Furthermore, the UK remains an anomaly in Europe regarding the narrowness of the WI range in its national gas quality standard.

If the LNG market remains tight throughout 2023-25, there may be reasonable calls to review the new GSMR, long before the proposed five-year review period. In the current circumstances, DESNZ would be well-advised to devise some contingency

arrangements for a rapid relaxation of the WI range if LNG and gas markets once again become very tight.

In contrast to the inertia over GSMR, the gas quality limits in an NEA may be amended if the terminal or capacity holder applies successfully to modify the Uniform Network Code. In 2016, Grain LNG applied to change the maximum oxygen content in its NEA from 0.001mol% (10ppm) to 0.02mol% (200ppm) to broaden the range of LNG the terminal could handle, in particular to accommodate US LNG cargoes which might lead to gas with up to 60 ppm oxygen entering the NTS or the LDZ, especially during vessel discharge.

Despite some unsubstantiated concerns expressed by storage operators, the UNC Modification 581S was approved and

quickly implemented. In a similar move in May 2018, South Hook LNG terminal successfully raised a UNC modification (UNC 645S) to relax the oxygen content in its NEA by the same magnitude. The purpose was to widen its commercial range of LNG supply sources and to ensure that nitrogen ballasting did not entail a breach of another GSMR parameter, the Incomplete Combustion Factor (ICF), which could lead to NGG curtailing gas flows from the terminal.

In both cases, the original and the revised limit values for oxygen content were more stringent than the GSMR limit of 0.2mol% (2000ppm). In both cases, the industry-led process of UNC modification proved its worth in correcting outdated gas quality limit-values which might restrict LNG flows to the NTS.



## REFERENCES

- 1 The Wobbe Number is defined in the Gas Safety (Management) Regulations 1996, Schedule 3.
- 2 National Grid's Gas Ten Year Statement (GTYS) 2021 includes the reference parameters and limit values which serve as guidance for NEAs (Table A3.1, p.75). Variation of both oxygen and CO<sub>2</sub> content will be considered by NGG.
- 3 'New Shipper Access Code Version 1, National Grid Grain LNG, 15 May 2020, p.3789 The Wobbe Number is defined in the Gas Safety (Management) Regulations 1996, Schedule 3.
- 4 'Opening up the gas market', Scotia Gas Networks, October 2016
- 5 Gas Quality Standard Working Group Project Closure Report, IGEM, May 2021
- 6 Impact Assessment: Summary Intervention and Options, HSE, October 2021.
- 7 The primary legislation, the Health and Safety at Work 1974, does not permit the HSE to approve changes to any regulations which would increase the safety risks faced by workers or consumers.
- 8 HSE public consultation 'Revision of GSMR 1996', 28 January-21 March 2022.
- 9 'Comments on HSE proposal not to increase upper limit of WI', Dave Lander Consulting, IGEM Technical Services paper, March 2022.
- 10 'Decision factors relevant to the increase in the upper Wobbe Index limit', DNV, IGEM Technical Services Paper, March 2022.

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# COUNTDOWN TO GPA EUROPE'S 40TH ANNIVERSARY

By Myrian Schenk, GPAE Chairperson

It's already June 2023 – time seems to be flying...

According to the IEA reports, natural gas accounts for about a quarter of global electricity generation, and while its long-term usage remains uncertain, in the mid-term it is still expected to play a major role.

In Europe, the natural gas industry remains facing some uncertainties after the shock of 2022. The strong policies by the European governments, reducing the energy-intensive consumption and a record intake of LNG, have succeeded to alleviate the crisis. At the same time, climate challenges are still growing. Are business sectors ready to achieve net-zero by 2050?

Path and timescales for decarbonisation remain uncertain, still with the clock ticking. It is clear that this move to net-zero is creating a fundamental shift for oil, gas and chemicals businesses.

For a couple of years now, and especially during this half of 2023, the gas industry, among others, is capitalising and having sustainable growth, planning, and implementing energy transition projects.

Many skills, capabilities and technologies from the gas industry, are being utilised to lead the hydrogen, carbon capture, utilisation, and storage (CCUS) and even wind and solar markets. Let's not forget, the long-term efforts of the industry on energy efficiency and management, as well as reduction on fugitive emissions.

In Europe, the UK is leading the market and we are starting to see more and more leading economies positioning themselves for 2050.



Myrian Schenk

In the meanwhile, here at the GPAE we are also extremely busy organising our 40th Anniversary. We are proud to be celebrating at BASF, a GPAE founder member, in Ludwigshafen, Germany.

We are preparing a strong panel discussion with leaders in the gas industry on 'Europe's energy transition: How can hydrogen and decarbonisation activities become accelerators for the European gas processing industry'; and a workshop on 'Gas treatment to reduce emissions'. These will be followed by a line-up of high-quality technical papers.

We are looking forward to welcoming our members and participants. Networking is also something we know how to do. It will be great to have you celebrating with us.

As always do check out the monthly Newsletter, connect with us on LinkedIn, follow us on Twitter or join us on Facebook.

In the meantime, have an enjoyable summer!

*Myrian*





# GPA EUROPE YOUNG PROFESSIONAL TRAINING DAY

## *Morning Session*

*Moderated by Myrian Schenk of T.EN*

**Our first presentation was by Christina Nenu of Shell Global Solutions.**

### **From developing CCU technologies to implementable solutions**

This introduction to CCU started from the richness of the space and further lead to the understanding of affordability and competitiveness of the CCU solutions. As the scale of CCU is smaller than the larger solution of CCS, CCU is seen as a valuable addition but not a replacement of CCS. CCU value is complex, and it needs to be built into each application as shown by two industrial cases. Examples to think outside the box in novel ways are offered as only in this way CCU can be implemented. Finally, the message was on building each CCU solution starting from the technology but adding the full ecosystem around it.



Christina Nenu



Taras Grigoryev

**Our second presentation was by Taras Grigoryev of TechnipEnergies.**

### **Knowledge Management as a competitive advantage**

In this presentation Taras provided details on what Knowledge Management (KM) is and its foundational elements. He also covered the benefit of adopting KM in an organisation and how it helps “brain intensive” companies like TechnipEnergies achieve business results in more effective and innovative ways.

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Our final presentation of the morning was by Katerina Hejnova of Bryan Research & Engineering.

### Troubleshooting operating plants using process simulation – case studies

This presentation emphasised the role of process simulation in getting insight into operations. It showcased the benefits of combining good knowledge of simulation and expertise in operations. Several case studies were covered focusing on gas purification and equipment design.



Katerina Hejnova

### Afternoon Session

Moderated by Taras Grigoryev of TechnipEnergies



Michael Crawshaw

Our first presentation of the afternoon was by Michael Crawshaw of Schlumberger.

### Liquid vs. fixed bed H<sub>2</sub>S scavengers. Working in harmony or against each other for H<sub>2</sub>S removal.

Natural gas sweetening extensively utilises both liquid scavengers and fixed bed adsorbent technology. Typically, an operator uses one of these chemical treatment options for the selective removal of Hydrogen Sulfide in crude oil and natural gas processing. Few suppliers provide both liquid and fixed bed adsorbent and are therefore unable to look objectively an optimised natural gas sweetening solution using both technologies together.

In this presentation, Michael discussed the advantages and disadvantages of each natural gas sweetening technology. This review focused on an overview of both liquid scavenger and fixed bed adsorbent, including a process description, chemistry, equipment required, footprint, method of monitoring performance, system maintenance, and the resulting economics.

A successful case study demonstrating hybrid system operation is included. This case study demonstrates how a hybrid system, using a liquid scavenger followed by a fixed bed adsorbent can be more effective in meeting a customer's specific requirements. A hybrid system can improve control of both CAPEX and OPEX and provide flexible operation.

Our second presentation was by Thierry Gorilliot of TotalEnergies.

### Gas liquefaction – comparison of different liquefaction technologies

Thierry's presentation first discussed the two main criteria to classify the natural gas liquefaction processes – type of refrigerant and number of cycles involved, and who has the largest market shares.

Relative efficiency and typical size of the different liquefaction processes was explored, before focusing on two popular liquefaction processes: Chart IPSMR and Air Products C3-MR, detailing the principles, advantages and drawbacks of each.



Thierry Gorilliot





Souhall Ben Ali

**Our third presentation was by Souhall Ben Ali of TechnipEnergies (T.EN).  
World premiere LCO<sub>2</sub> marine loading arms**

GHG emissions increasingly threaten our planet, Carbon Capture and Sequestration has become a key focus. As a technology pioneer in the transfer solution industry, T.EN loading systems manufactured the three world's first liquid CO<sub>2</sub> marine loading arms.

T.EN have conducted a comprehensive design and qualification program for our swivel joints, emergency release system and sealing system to ensure full compatibility with CO<sub>2</sub> specific properties.

Souhall presented the lessons learnt of the world's first LCO<sub>2</sub> loading arms manufacturing.

**Our fourth presentation was by Renaud Cadours of TotalEnergies.  
Sulfur components: A challenge for sour gas production**

The specifications on sales gas and environmental emissions are the main targets when designing a sour gas plant. But the presence of sulfur components such as mercaptans or COS is also a key parameter to define the optimum configuration.

Recent studies will be used to highlight the impact of several parameters on the optimum design, considering the specific context of the project. The presentation focused also on the consequence of technology selection for AGRU, LPG treatment, SRU-TGTU on the overall plant performance, including also OPEX and CAPEX optimisation.



Renaud Cadours

**Our final presentation was by Martin Copp of Parker Hannifin.  
Filtration in field troubleshooting**

Filters and coalescers are used in all walks of life where we produce, utilise or consume fluids are processed or used. Our cars (at least those with internal combustion engines) are only able to provide the reliable, economic and ever lower emissions that we expect as a result of the fuel, lube and air filters they use.

We are able to turn on the tap and safely drink fresh water as a result of the filtration and purification processes that the water goes through. Planes can fly at high elevation and temperatures well below freezing point due to the filters and coalescers used in the fuelling procedure. Milk, beer, wine and carbonated drinks are safe for us to consume due to harmful bacteria being removed via filtration.

Filtration and coalescing technologies are also widely used in every processing environment. The economics of hydrocarbon processing is heavily affected by the effectiveness of the filters and coalescers utilised. Plants are only able to produce on

spec products and operate at the highest energy efficiency, highest throughput, highest reliability and lowest maintenance costs if the correct filtration and coalescing technology is installed and correctly maintained.

Even when the correct filtration solutions are installed, operational issues can occur which affects the performance of this critical equipment. This hands-on session gave an overview of filtration and coalescing; common filtration technologies; and common problems and how to identify them.



Martin Copp

# ANNUAL REPORT 2022: A YEAR OF PROGRESS

*Chairperson Gary Bowerbank delivers  
GPA Europe's Annual Report 2022*

Ladies and Gentlemen, friends and colleagues, welcome to the 2022 Annual General Meeting of GPA Europe Ltd.

As is traditional, the Chairpersons report provides a summary of what happened in the current year. So here we go.

Let me first reflect on the webinar series. These short sessions, typically over a lunchtime, provided us the opportunity to cover a wide range of themes: Hydrogen, CCUS and Renewable Gas. They were provided to our members for free and are available to members via our website [www.gpaeurope.com/category/presentations](http://www.gpaeurope.com/category/presentations).

Over the sessions we had 477 participants, with approximately 159 per session. I would personally like to thank everyone who attended for making them a success, but most of all I would like to show my appreciation for the various speakers.



Gary Bowerbank

Our May Technical Conference, on the theme of 'Roadmap for the Transition', was our first chance to get to gather face to face in more than two years. The opportunity to network, making new connections and reacquainting with some old faces, was really appreciated by everyone.

This is a good time to give you some updates on the GPA Europe Vision, Goal and Strategy (introduced in the 2019 AGM). In particular our goals as follows...

**Membership increase of 20% by 2025:** Following COVID-19 we found a loss in membership numbers, however these have increased in 2022 with 22 new corporate members.

**Increase diversity of the organisation:** Over the last couple of years we have seen a 5% increase in the number of female members. We have also seen a shift in the central location of our members, being less UK-centric.



Speakers from our May Technical Conference



The BASF headquarters in Ludwigshafen, Germany will host the GPA Europe Annual Conference in October

**YP attendance at Annual Conference of 15% by 2025:** Our YP attendance at our Annual Conference has doubled over the last three years with more YPs staying on from the YP Training Day.

We will still have much to do supporting the overall GPA Europe Vision, Goal and Strategy, and we will be exploring what other areas, including events and training we can offer to do so.

November has seen us launch our rebranding with a new logo and colour scheme. Our new logo represents the transition of our industry towards the new energy future and our commitment to support our members within the gas processing community during this time.

Our logo symbolises our movement towards promoting a cleaner, greener, energy future. We have a key role to play in Europe as the future of energy is changing. However, we want to be clear that our mission hasn't changed, we are still here bringing the European gas processing industry together but feel the fresh new logo resonates better with the focus areas of our members.

A look ahead to next year. We will continue the virtual webinars and we see those linked to the

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It has been an honour to be chairperson for the last two years, and I am very proud of how the whole of the GPA Europe community came together and adapted to the challenges we have faced.”

future energy themes and they will continue throughout the year. Next year GPA Europe turns 40! To celebrate, our Annual Conference will be heading to Germany and will be hosted by our long-standing members, BASF, 9-11 October 2023. Save the dates! Keep checking the website and follow GPA Europe on LinkedIn to keep up to date with all the events and activities.

Today is my final day as Chairperson of GPA Europe and I'll be handing over this privilege to Myrian Schenk of T.EN. It has been an honour to be chairperson for the last two years, and I am very proud of how the whole of the GPA Europe community came together and adapted to the challenges we have faced.

This includes the Technical and Management Committees, the members of the various Key Strategic Initiatives groups and last but not least our excellent Executive Administrator Helen (the glue that really holds this together). I will continue to be active in GPA Europe, I really feel it has a role to support the industry now and well into the future and look forward to seeing many of you at future events.

*Stay safe and have fun!*

# GPA EUROPE HYDROGEN



A webinar moving through examples of Hydrogen projects being developed across the world, both in the UK and the US.

*Moderated by Myrian Schenk, T.EN*

**Our first presentation was by Chris Martin, Senior Process Engineer for Hydrogen, bp.**

## Decarbonising Teesside and the UK Showcase Tees Valley

A review of bp's four Teesside projects in low carbon energy. Teesside is a great example of what can be done at scale – there are several global projects that bp is involved in, with multiple Hydrogen Hubs coming online in future years. The Northern Endurance Partnership project is the CO<sub>2</sub> compression pipeline and storage network, taking CO<sub>2</sub> from Teesside and the Humber to the Southern North Sea and the Endurance saline aquifer.

Vanguards hydrogen generation projects: H2Teesside, which is up to 1GW blue hydrogen plant and HyGreen up to 500MWe Green hydrogen plant. The Net Zero Teesside Power project is a first of a kind, combined cycle gas turbine with CO<sub>2</sub> capture and post combustion capture from the flue gas.

The Northern Endurance Partnership is the enabler to H2Teesside and Net Zero Teesside Power as well as other businesses in the East Coast Cluster to be able to store CO<sub>2</sub> emissions in the North Sea. It's going to be big... it's happening now... bp is in action!



Chris Martin

**Our final presentation was by Tim Ballai, Senior Product Manager for Carbon Capture and Hydrogen Technologies, Honeywell UOP.**

## Scaling up the H2 economy with carbon capture

To meet net zero emissions targets, demand for hydrogen is expected to have to increase up to ten-fold by 2050, and industry reports predict that 8% to 24% of the world's energy demand will be supplied by hydrogen. Hydrogen has a unique ability to be a decarbonised fuel of the future in the refining, chemicals, heating, long-haul transport and long-term power storage sectors – all of which currently produce significant CO<sub>2</sub> emissions.

Traditional hydrogen production still emits a significant amount of CO<sub>2</sub>; for hydrogen to be effective in reducing emissions, it must be produced with significantly lower carbon intensity than is practiced today. Further, each of these sectors will require the supplied hydrogen to meet purity and product conditions that are tailored to the end use.

This presentation shared the playbook for scaling the hydrogen economy through the production of low carbon hydrogen in the next decade, while providing examples of

Honeywell's pre-combustion and post-combustion CO<sub>2</sub> capture systems optimised to serve various end-use applications. Additionally, this presentation highlighted Honeywell's solutions for CO<sub>2</sub> emissions reduction in 'hard to decarbonise' sectors such as power, steel and cement.



Tim Ballai



## YOUNG PROFESSIONAL TRAINING DAY

**9 October 2023**

 **BASF SE, Ludwigshafen, Germany**

Running in parallel to the first day of our Annual Conference, a FREE 1-day Training Day for graduates and chartered engineers with up to 5 years' experience.



## ANNUAL CONFERENCE

**9-11 October 2023**

 **BASF SE, Ludwigshafen, Germany**

2023 will be our 40th Birthday and we will be celebrating at our Annual Conference at BASF SE in Germany and hope to see many of you there!

### What's on?

- Free Young Professional Training Day
- Technical Conference
- Workshop
- Keynote Address
- Executive Panel
- Companions Tour
- Social Activities



## ANNUAL GENERAL MEETING

**23 November 2023**

 **The Clermont Hotel, London**

A 1-day event in London alongside our AGM.

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# CORPORATE MEMBERS

This listing of current Corporate Members represents the status at 1 June 2023

## Level 1 Members

Air Liquide Global E&C Solutions Germany GmbH  
Amines & Plasticizers Ltd  
ANDRITZ AG  
Arkema France  
Atlas Copco Energas GmbH  
Axens  
BASF SE  
Bechtel Ltd.  
BP Exploration Operating Co. Ltd.  
CB&I Ltd  
Costain  
DNV GL  
Dow Chemical Co.  
ENGIE – CRIGEN  
ENI Spa  
Equinor  
Fives Cryo  
Fjords Processing France SAS  
Fluor Ltd.  
Gassco AS  
Huntsman Belgium BVBA  
Johnson Matthey  
Kellogg Brown & Root  
Pall Europe  
Parker Hannifin - PECO  
Petrofac Engineering Ltd  
Saipem SpA  
Saudi Aramco  
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