



IN BRIEF

ISSUE 15 APRIL 2019

GAS PROCESSORS ASSOCIATION EUROPE

THE FUTURE OF EUROPE'S GAS INDUSTRY

Malcolm Harrison, CEO Harisiti Limited

Adrienne Blume, Executive Editor, Hydrocarbon Processing and Editor, Gas Processing & LNG at Gulf Energy Information

It would be a mistake to think of the European gas industry as a homogenous entity. It is not. It is a patchwork quilt of countries, with different energy reserves and different legislation. Most nations have arrived where they are today more as a result of their origin than their destination. Some are blessed with rich hydrocarbon and renewable energy reserves, while others have little. At one end of the spectrum, France produces 90% of its electricity from renewable sources; at the other, Poland produces less than 15%.

Yet, from this uneven starting point, the continent is bound by two common challenges:

- The need for more and varied energy imports.
- The EU's Parisian promise to reduce greenhouse gas emissions.

There is no silver bullet. The solution will be found in one of four avenues all of which are good news for the gas industry:

- The dependence on coal in power generation and oil in transport will be reduced. Gas usage will grow;
- The decision by many to restrict or prevent development of shale reserves should be challenged;
- Pipeline gas imports will inevitably increase and many will come from Russia with its concomitant geopolitical risk;
- LNG, whose imports are currently low, will provide both a low-cost energy source and a strategic foil, to the bear from the east.

Introduction

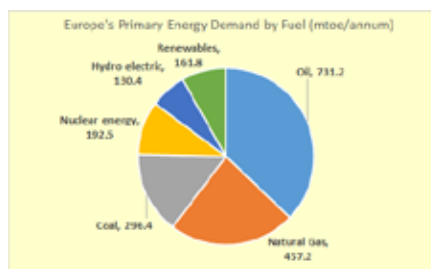


Figure 1: Europe's Primary Energy Demand 2017

Europe and its energy needs

In the last ten years, Europe's primary energy needs have fallen by about 5% as its population has grown. While there has been a large growth in renewable energy, it has been from a small base. Fossil fuels still meet 75% of primary energy needs (Figure 1); oil predominantly feeding the transport sector; gas the power, residential and commercial sectors.

But the graphic (Figure 2) hides large differences between countries. As we are focussing on gas, we will look just at power generation. Europe's record on the use of renewables in power generation is impressive. Currently about 55% of its power comes from renewable sources. The graphic (Figure 2) is

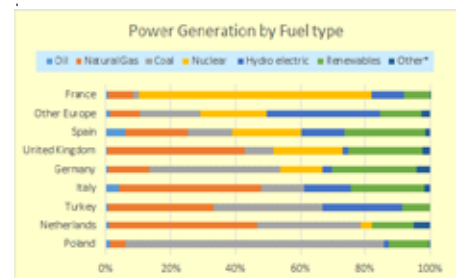


Figure 2: European Power Generation by fuel type 2017. Again, this considers nuclear energy to be a renewable energy source

Continued on page 2

INSIDE



4 VIEW FROM THE TOP

New Chairman asks: How do you value your GPA membership?



5-11 GPA EUROPE AUTUMN CONFERENCE

A report on the highlights of a great industry event in Barcelona



14 FAREWELL TO A GPA LEGEND

A heartfelt tribute to John Sheffield, who recently passed away

ranked by CO₂ emissions and so gives an indication of where the largest changes are most likely. The growth in wind and solar power is impressive but, as we shall see, with a dysfunctional system of carbon pricing it has often displaced gas instead of coal. To imagine that renewable sources could replace the 75% of primary energy provided by fossil fuels in the short term is not credible. A pincer movement with gas is more likely; but the scale of the change is gargantuan. To give some idea of scale, to replace 50% of the coal currently used in power generation with gas would require an additional 33 BSCFD—a doubling of current imports. This will never be achieved from a single source, but that Europe will see a revolution in gas and LNG import is inevitable.

Why is coal not dying?

Despite significant growth in the 1990s and early 2000s, gas is used for less than 20% of power generation, less than is generated by coal. This should not be surprising as the table below shows. When gas is traded in \$/MMBtu and coal in \$/tonne it is hard to compare the two. Convert both to \$/MMBtu and we see that, in Europe, coal is half the price of natural gas and 40% that of imported LNG (Figure 3). Coal consumption in Europe will not fall significantly unless carbon prices rise or governments legislate. As the gilets jaunes have shown, governments who legislate energy price increases risk their jobs.

Europe has the wrong kind of energy in the wrong place

There are two very good reasons why gas is not more popular in Europe. Firstly, it does not have very much. Secondly, it is in the wrong places.

At current consumption levels, Europe has nearly 100 years of coal reserves but only two years of oil and six years of gas. The gas that Europe has is far from its consumers. Take a look at Figure 5; most countries are in net deficit and make up their deficits through gas imports. Only Norway has a surplus of gas, the Netherlands is (for now) in balance, everyone else is in deficit. Germany, Italy, France and Gas imports come from one of three sources: intra-European transfers; LNG imports; or imports from non-EU countries, predominantly Russia. Russia represents about 35% of the total (Figure 6). Of the total gas imports, cross-border EU trade is unlikely to grow as production and reserves are dwindling.

Increased pipeline imports, from Russia and other non-EU sources and LNG are the most viable areas of growth. But just how dependent on Russian imports would Europe like to be? Some countries are significantly more dependent on Russian gas imports than are others. It is easy to understand the disparity of views on Nord Stream 2, the planned pipeline from Russia to Germany. This will bypass Ukraine and Poland, threatening their energy security to the benefit of Germany's.

Market Prices: 16 Feb 19		
Fuel	Units	Price
Crude oil	\$/BBI	64.5
Fuel Oil	\$/tonne	500
Gasoline	\$/USGal	2.66
Ethane	\$/US Gal	0.4
Propane	\$/tonne	430
Butane	\$/tonne	420
Natural Gas	\$/MMBtu	7.262
LNG	\$/MMBtu	9.8
Coal	\$/tonne	70.8

Energy Price		
Fuel	\$/MWh	\$/MMBtu
Crude oil	43.86	12.85
Fuel oil	43.06	12.62
Gasoline	75.72	22.19
Ethane	9.43	2.76
Propane	30.20	8.85
Butane	29.64	8.68
Natural gas	24.78	7.26
LNG	33.45	9.80
Coal	12.74	3.73

Figure 3: Why coal wins

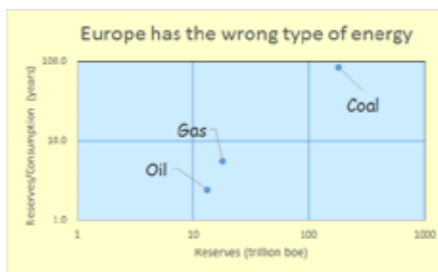


Figure 4: Europe has too much coal

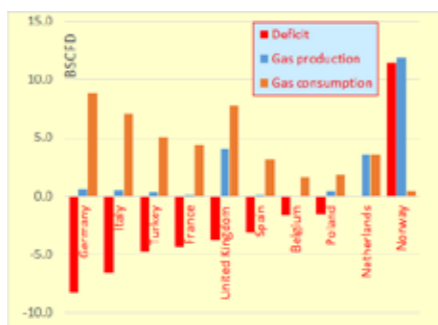


Figure 5: Gas deficits by country

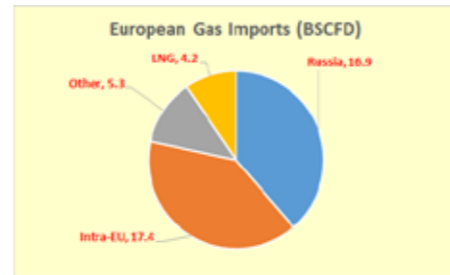


Figure 6: European gas import sources

Algeria, Azerbaijan and Iran representing about 25%, Russia the balance

So where does gas fit ?

Among this muddle of history and disparity of approach lies a quasi-certainty for gas and LNG: demand will grow significantly. There are two good reason for this: we are running out of gas; and CO₂ emissions, while falling, are not falling fast enough.

We are running out of gas

Gas consumption is holding steady, but gas production and the gas gap is growing (see Figure 7). Despite some recent encouraging finds in the North Sea, reserves have fallen 40% in 10 years. The gap between gas production and consumption (Figure 7) is currently 28 BSCFD, equivalent to the total LNG export of Qatar and Australia combined. As production continues to fall, the gas gap will grow as first coal, and then oil, is displaced.

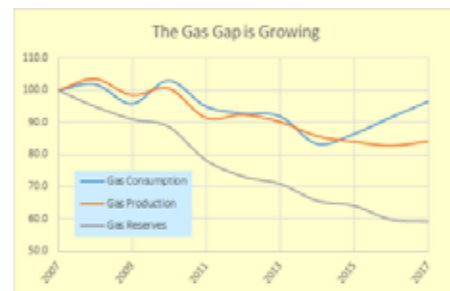


Figure 7: The gap between gas production and consumption

CO₂ emissions are not falling fast enough

The events of COP 21 in Paris in late 2015 are significant. One hundred and ninety-seven countries agreed to reduce their total carbon emissions to achieve a maximum global temperature rise of 2°C and make every effort to achieve a rise of 1.5°C. The agreed goal was for greenhouse gas emissions to peak as soon as possible, and to achieve net zero emissions in the second half of this century.¹ Can this be achieved? Probably not, but the target cannot be ignored.

As we see in Figure 8, globally, emissions are not remaining at 2015 levels, they are growing. In the last ten years, only Europe and North America have reduced their CO₂ emissions. North America through the

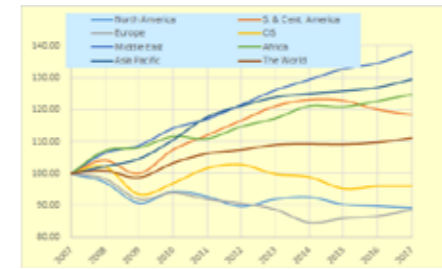


Figure 8: CO₂ emissions are mostly growing (mtpa)

explosion in gas production, which has, through commercial drive, displaced coal; Europe by the heavy subsidy of wind and solar power, which have also displaced gas. Each will benefit the other. The low gas prices in North America will spur European LNG imports and give Europe an alternative to Russian gas imports. The springboard that the EU gave to renewable energy means that it can now look after itself.

Tumbling from Figure 8 are two self-evident truths:

- The targets of the Paris Accord will not be met.
 - However fast the growth of solar and wind power, fossil fuels are here for some time, and gas will be increasingly needed.
- There are two subliminal messages for GPA Europe members:
- Carbon capture and storage is the only proven technology for removing CO₂ from the atmosphere. Make it work and tell your governments.
 - Hydrogenation of the gas network is going to be necessary for those consumers who cannot be easily weaned from fossil fuels.

Gas can come from one of four places. Uncle Sam to the rescue?

American LNG can be landed in Europe for about \$8/MMBtu. Will this be attractive to the Europeans? The answer is maybe not, or at least only for peak shaving, niche or strategic purposes. Gas on the UK National Balancing Point (NBP) trades above this point only in mid-winter.

The Barbarian at the gate?

Russia has the world's largest gas reserves. At current consumption levels, they are enough for 100 years. At only 800 miles in length, the Nord Stream 2 pipeline can easily compete with imported LNG. Gazprom will be able to supply gas to the German market at a cost of \$4-5/MMBtu. There will be few lower-cost options and none that can meet the volume needs. But Russia has been known to use gas supplies as a strategic weapon in the past.⁶



Figure 9: Dependence on Russian gas imports

Why would they not do so again? As Figure 9 shows, many of Europe's countries are already highly dependent on Russia for their gas. How much is too much? The Economist recently classified Nord Stream 2 as an entirely political venture. Existing pipelines from Russia have the capacity to meet Europe's current and future needs. Nord Stream 2 allows Ukraine and Poland to be bypassed, increasing their dependence on Russia.

The Barbarian has LNG as well

But Russia is now also a large and fast-growing LNG player. Novatek, quietly and without fanfare, has been changing the world of LNG. Yamal LNG surprised the LNG industry by not only shipping its first LNG on time at the end of 2017, but by reaching full capacity on all three of its 5.5 mtpa trains in only 12 months. Furthermore, Novatek has recently announced plans to expand its capacity to 70 mtpa—Qatar's current export capacity and 20% of the world's current export capacity – by 2030. Europe is the local market for much of this LNG. We can expect a surge in LNG import terminals many being FSRUs rather than onshore terminals^[4].

LNG import is fantastic news for European suppliers and GPA Europe members. Much of the technology in an LNG regasification plant is European in origin.

But Europe has one last option.

Don't Forget Shale

Nobody believes that shale revolution of the type seen in the USA could happen in Europe. The US Department of Energy⁷ estimate that Poland, France Ukraine and others have large recoverable reserves, the UK, Netherlands and Germany smaller reserves. To put the figures in Table 1 into perspective, they equate to five times Europe's current proven gas reserves. Yet, fracking has been banned in France, the Netherlands, Luxembourg, the Czech Republic and Bulgaria, and stopped in Germany.⁸ The UK has limited the maximum amplitude of seismic activity as a result of fracking to Richter level 0.5, 3000 times less than the limit imposed in the US.

Without drilling appraisal wells, which require

US DoE shale gas reserves (TCF)	
Poland	145.8
France	136.7
Ukraine	128
Romania	50.7
Denmark	31.7
Netherlands	25.9
UK	25.8
Germany	17
TOTAL	561.6

Table 1

fracking, which is banned or tightly constrained, these figures are far from bankable but are surely sufficiently large, and the alternatives sufficiently risky, to justify further work.

Conclusion

To us, the conclusions scream:

- The Stone Age has passed; so too has the age of coal. The end of the age of oil is nigh. The near-term future will see growth in two energy sources: gas and renewable energy.
- The world needs the ingenuity of scientists and engineers in the oil and gas industry, not just to reduce carbon emissions but also to find ways to extract and store CO₂ from the atmosphere.

References

1. The Nord Stream 2 gas pipeline moves on," The Economist, 16 February 2019.
2. Hot and bothered—Special report on climate change," The Economist, 28 November 2015.
3. "The Paris agreement summary: Climate focus," Client brief on the Paris Agreement III, 28 December 2015.
4. Songhurst, Brian, "The Outlook for floating storage and regasification units (FSRUs), The Oxford Institute of Energy Studies, July 2017.
5. Total and CNOOC make biggest UK offshore gas discovery in 10 years," Financial Times, 29 January 2019.
6. "Russia, Ukraine and gas: Pipe down—The annual gas squabble between Russia and Ukraine turns nastier—to the alarm of much of Europe," The Economist, January 2009.
7. US EIA, "World shale gas reserves," online: www.eia.gov/analysis/studies/worldshalegas/
8. Sedia, Giuseppe, "Poland's shale gas disappointment," The Krakow Post, 13 November 2013.
9. BP Energy Outlook 2019 https://www.bp.com/en/global/corporate/energy-economics/energy-outlook.html
10. The Nord Stream 2 gas pipeline is a Russian trap, The Economist, Feb 16th 2019

HOW DO YOU VALUE YOUR GPA MEMBERSHIP?

Thanks to Steve O'Donnell

Steve O'Donnell has now handed the GPA Europe reins onto myself, Martin Copp, and left me with a hard act to follow. My thanks go to Steve for his hard work and inspiration.

Closer Ties to GPA GCC?

In edition 13, Steve O'Donnell reported on the GPA GCC Oman Conference.

I've just recently returned from the 27th GPA GCC Conference, which was held in Kuwait. This was a joint event with GPA GCC Chapter, GPA Europe and GPA Midstream. The theme was 'Improving Efficiency of Gas Processing - Wellhead to Market'. The attendance at this event was in excess of 600 delegates.

The week started with six parallel workshops, each running for two days. Even though there was a charge for these workshops, over 200 delegates attended them. Training is obviously a high priority for national oil companies. Are there lessons we can learn from this?

The main conference followed. I was honoured to be invited as a discussion panellist. LNG was a big topic of conversation and Europe is seen as a natural market for the GCC LNG exporters.

So why should we be thinking about closer ties with the GCC Chapter? The fact is that there is a natural fit between the memberships of GPA Europe and GPA GCC Chapter.

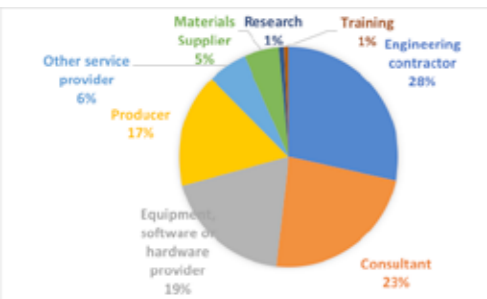


Martin Copp

GCC Chapter membership is predominantly operating companies. As can be seen from the chart below, the GPA Europe membership is mostly contractors, consultants and equipment providers. With cheap flights and large numbers of potential customers for the services our membership supplies, concentrated into a very small area, a closer co-operation is logical.

GPA Europe Membership Profile

Several GPA Europe members exhibited and presented in Kuwait. GPA GCC Chapter have again expressed their desires to have closer ties with GPA Europe as they believe their membership can gain greatly from the high level of knowledge and technology that our membership contains. We will be assessing if this desire is shared by GPA Europe members over the next few months.



GPA Europe Membership Profile

GPA Europe Value

And finally, to the headline topic of the article. In 2018 we requested you to complete a survey on GPA Europe and the services that we supply to you, our members. Despite our membership over the last few years remaining relatively static, even through the years of the recent downturn, the number of attendees at our conferences has been in decline. This is obviously of great concern to us as your attendance is indicative to how well we are meeting our members' needs. We recognise that companies will only spend their cash on activities that will generate more cash for them. Does declining conference attendance mean that cash spent on our conferences is not generating a return, or is it that we are not able to effectively demonstrate the value of the service we provide? In order to help us determine whether we do provide what our members need and more importantly value, we organised the above referenced survey.

The good news from the survey is that the membership is happy with the subjects and the quality of the papers and conferences that we provide. This coupled with the increased focus on gas places us in a strong position to reverse the decline.

The GPA Management Committee is dedicated to providing our members with the highest quality conferences. Over the coming months we will be working hard to create a clear vision and value proposition which will allow you to sell the benefits of attendance to one of our events to your management. Here's to 600 being the new norm!



GPA EUROPE AUTUMN CONFERENCE BARCELONA, 19 – 21 SEPTEMBER 2018

TECHNICAL CONFERENCE – MORNING SESSION 20 SEPTEMBER 2018

Moderated by Jason Frost, Aker Solutions

The autumn sun rose lazily over the Parc de Montjuic and the delegates, satiated by their breakfast, assumed their seats for the first morning session of the GPA Europe Autumn conference in Barcelona.

Liquid, Hydrates and Foam Detection Improves Operational Excellence in Gas Treatment

The first paper of the morning was presented by Paul Stockwell of Process Vision. Paul is well known to the GPA, as an expert in gas analysis and moisture detection, and his paper "Liquid, Hydrates and Foam Detection Improves Operational Excellence in Gas Treatment" introduced a new instrument technology, six years into development, which would help to increase gas facility and network uptime and hence capacity.

Paul highlighted challenges of the current range of gas analyser instrumentation in identifying contaminants, such as liquid hydrate and foams. Of particular note, were the difficulties associated with amine, glycol and compressor oil, which tend to bypass sampling systems. These types of liquids tend to flow along pipe walls and are hence undetectable by current methods.

The audience was taken on a natural gas journey, from the well through processing facilities, pipelines and ultimately to the users. In this journey the capacity constraints due to the issues of foaming, hydrates and liquid presence were highlighted.

Liquids in a gas network collect at low points where they cause corrosion or are swept out as a slugs of liquid that can damage sensitive equipment downstream. As a result, undetected liquids cost the industry \$millions every year in damage, lost revenue and labour costs. When pigging runs are undertaken, the flow through a pipeline must be reduced leading to a significant reduction in capacity for the duration of the operation. With a greater understanding of whether liquid is present, the timing of such pigging runs can be optimised.

The LineVu technology described by Paul is a permanently installed camera-based monitoring system operating at high pressure that can improve operational excellence by



Paul Stockwell - Process Vision Ltd



Bryan Bussell - Schlumberger OneSurface

Advancements to MEG Recovery Processes

Schlumberger's Hydrate Inhibition Technology Global Product Manager, Bryan Bussell, was next to take the floor with his paper "Advancements to MEG Recovery Processes" outlining four technological advances in Mono Ethylene Glycol (MEG) Reclamation.

In the past 15 years or so, the prevalence of MEG reclaiming packages both on and offshore has increased significantly as operators have become more aware of the uptime benefits of using such technology when MEG is likely to become contaminated with production water and its inherent salts. As the MEG recovery system is typically one of the largest processing packages within a gas plant, either

providing a continuous live video stream of pipeline activity.

By using image processing, an alarm can be activated if liquids, hydrates or foam are detected at very low levels, which can improve operational decisions, leading to lower downtime, higher process safety and increased production.

The system is currently being trialled by National Grid in the UK.

Continued on page 6

onshore or offshore, significant work has been undertaken to optimise this system.

Bryan's paper covered four new technologies that Schlumberger had developed, in order to not only improve the MEG Recovery system performance, but also have significant impact on the overall space and weight requirements for the processing module:

• **Improved Reclaimer (Flash Separator) Design**

An integrated approach taken to the vacuum reclaimer design permits the Flash Separator, Downcomer, and Salt Tank to be combined in one smaller unit, whilst eliminating the requirement for a dedicated set of Salt Pumps.

• **Desalting Hydrocyclones**

The use of Desalting Hydrocyclones instead of previously applied Centrifuge technology has resulted in a much simplified and less maintenance-hungry system. Now a static system, with no moving parts, a number of motor drives and associated controllers can be eliminated, whilst also improving the process by the minimisation of oxygen ingress, traditionally experienced by centrifuge technology.

• **Wide Gap Plate Heat Exchangers**

Use of this exchanger technology in place of the traditionally used spiral exchangers has eliminated capacity constraints of the maximum size of spiral exchanger, and also allowed full drainage of the units, resulting in lower precautions required for maintenance personnel, whilst being easier to clean. Additionally, the new technology provides better, more even heat distribution over the plates achieving an improvement in thermal efficiency.

• **Dynamic Crossflow Filters**

Further optimisation and simplification of the system has been achieved through the use of Dynamic Crossflow Filters, in lieu of previously used technology, including filter presses, pre-coat type filters or sometimes disk stack centrifuges, all of which require a host of sundry equipment to support operation.

Together these technologies can result in up to a 45% decrease in the overall module size and up to a 25% reduction in the weight, leading to expected cost reductions of approximately 30% for the MEG Recovery plant.



Valeska Villablanca - Kelvion

Double-tube safety heat exchangers for the regasification of LNG on ships

Following the coffee break, Valeska Villablanca of Kelvion (formerly GEA Heat Exchangers) introduced us to the potential of "Double Tube Safety Heat Exchangers for the Regasification of LNG on Ships".

Firstly, Valeska educated us in the design and benefits of using the double-walled safety heat exchangers (DTSHX). They do not require separation with an intermediate circuit, which can lead to savings in the design. The DTSHX is equipped with a leak sensor, installed in the leakage chamber which activates an alarm in the control system in the case of a leakage of steam, water glycol or CNG. Furthermore, a leak does not impair the function of the heat exchanger, which can increase the level of system availability.

Once we were familiarised with the technology, Valeska presented several case studies for DTSHX on Floating Storage and Regassification Units (FSRUs). These studies indicated savings of up to 40% over the shell and tube, plate heat exchangers and printed circuit heat exchangers traditionally used in ship regasification systems. The principle savings are those associated with the provision of an intermediate circuit to separate the media (e.g. hot water, water glycol, steam or propane, and natural gas), as well as expensive safety facilities to reliably detect leaks and to prevent gas emission. Increases in efficiency and reliability were also presented as benefits.



Peter Martin - Johnson Matthey

Increase Uptime & Lower Lifecycle Cost Using Novel Hg Absorption Technology

Peter Martin of Johnson Matthey brought the morning session to a conclusion presenting the latest developments in PURASPEC™ mercury removal technology with his paper "Increase Uptime & Lower Lifecycle Cost Using Novel Hg Absorption Technology". The paper demonstrated how these advances could save gas processors up front and in the long run in the aim of protecting downstream equipment from mercury contamination.

Peter firstly reminded the assembled audience of the reasons for mercury removal and the basic premises of the absorption technology, associated kinetics, and principles behind removal efficiency, whilst highlighting the benefits of a mixed metal oxide solution where surface porosity is altered during the sulphiding step. We were then educated on the differentiators in the manufacturing processes of the impregnation and granulation routes.

The latest PURASPEC CORE™ Hg Guard product was presented as having improved kinetics and no leaching or performance issues associated with impregnation. This results in a product with improved mercury pick-up and increased bed life. Benefits would be realized by either smaller bed design or less frequent bed change-out.

The papers were all well received, and our thanks go to all the presenters for their work in preparing and presenting their ideas clearly and competently.

GPA EUROPE AUTUMN CONFERENCE BARCELONA, 19 – 21 SEPTEMBER 2018

TECHNICAL CONFERENCE – AFTERNOON SESSION 20 SEPTEMBER 2018

Moderated by Bryan Bussell, Schlumberger OneSurface

Leveraging Performance Benchmarking to Improve Efficiency and Availability

After delegates caught up with old friends over lunch, the first paper of the afternoon was delivered by Dr Brad Wood from Juran Benchmarking. The focus of the presentation was the drive to achieve Operational Excellence and with over 20 years of experience in this field Brad provided us with great insight to setting the cornerstones to drive improvements in the industry. With the ever-increasing downward pressure on costs and higher expectations for safety, availability, reliability and environmental performance, the challenges facing gas processing asset operators are immense.

All oil and gas operators need to meet demand requirements on time and within specification at optimal cost and, most importantly, within acceptable levels of risk. Output demand is dependent upon availability, reliability and



Dr Brad Wood - Juran Benchmarking

throughput levels. Costs relate to operations, maintenance and support services and include labour costs as well as materials and chemicals.

Key risks encompass personal safety, process safety, asset integrity and environmental impact. All such factors need to be addressed by an effective Operational Excellence Management System.

Brad emphasised that any performance improvement activity needs to commence with a clear understanding of current performance levels and the improvement opportunity potential. Through performance benchmarking, operators can identify their areas of strength and weakness, quantify the gaps in their performance and learn from best practices to implement change that closes the gaps to achieve the optimal balance between cost, quality and risk.

Brad highlighted, with many examples, how performance benchmarking provides the evidence base and learning opportunities to improve performance and realise improvement potential in both efficiency and effectiveness.

Unlocking Efficiency Gains in Indirect Heating - Fuel Savings From Improved Process Temperature Control Using Thermosyphon Technology for Indirect Heating on a Gas Networks

The second paper was delivered by Stefan Romocki of Proheat Systems Ltd. Stefan's youthful looks belie his 20-year career in the industry where he has been an innovator finding technical solutions for the energy industry.

Process heat accounts for nearly half of industrial energy use and is a critical input to operation of the energy system. A key challenge for process heating is where loads change frequently, resulting in imbalances between supply and demand. Where processes heat is provided indirectly, minimum temperatures are commonly met by accepting some degree of overheating.

Stefan's paper presented results of a heat study carried out to assess fuel use associated with the oversupply of heat from indirect heating installations at gas pipeline pressure reduction stations. Results indicate that



Stefan Romocki - Proheat Systems Ltd

overheating can account for up to 25% of annual fuel use for both the boiler house and water bath heater installations.

Stefan introduced us to the Immersion Tube Thermosyphon Heater (ITTH) as a solution to improve energy performance. The use of latent heat in a two-phase system provides rapid, flexible and controlled response. Installations on gas distribution networks show a 90% reduction in overheating, providing a basis for energy savings through adaptive temperature control.

The paper highlighted unrealised opportunities within the gas network to improve energy performance, reduce energy losses and reduce carbon dioxide emissions.

Smart Advisory Tool for Rich DGA Mole Loading Optimization

The afternoon's third paper was written by Ibrahim Albrahim and co-authored by Abdulaziz Alshammary, both of Saudi Aramco, and was presented by a very dapper looking Ibrahim.

The paper covered a debottlenecking study undertaken on several gas sweetening trains at an Aramco facility. The plant was experiencing severe corrosion and erosion problems due to unexpectedly high levels of acid gases (carbon dioxide and hydrogen sulphide) in the rich DGA (diglycolamine). The high acid gas loading had been largely undetected due to faulty instruments. As part of the study it was decided to focus on the three key variables:



Ibrahim Albrahim

DGA concentration; DGA circulation rate; and sour gas rate, that could be easily manipulated at site. This in turn led to the development of their Smart Advisory Tool which enabled the impact on the rich DGA mole loading to be assessed when one of the three variables were modified.

To resolve the high loading issue, either the strength or the circulation rate of the amine needed to be increased, depending on the scenario. In general, increasing DGA strength was the most appropriate solution in terms of reducing the rich DGA mole loading value. In some cases, increasing the circulation rate would be more practical than increasing the strength. This heavily depended on the sour gas feed flowrate along with its acidity, because at certain scenarios, the circulation rate might exceed the maximum recommended value, which would impact the integrity of the pipes. In case of processing high sour gas rates or high acid gas content (1.3%), Ibrahim highly recommended to maintain the loading at 0.4 rather than 0.35, as it would be very challenging to achieve it.



Jan Lambrichts - Dow Chemical Company

Achieving Significant Improvements in Amine Unit Performance by Upgrading to Formulated Acid Gas Removal Solvents

Following on in the theme of the third paper, this paper was presented by Jan Lambrichts (a true stalwart of our industry) for The Dow Chemical Company. Jan's paper presented

several case histories of operators who upgraded their standard amine chemistry to a formulated solvent, comparing plant performance, plant availability, capacity and energy consumption before and after the upgrade. Applications included natural gas, ammonia, and refinery systems. By utilizing innovation through chemistry many operators have achieved significantly improved performance without any hardware modifications.

Some of the drivers for change have been increasingly stringent environmental regulations, increased pressure on operators to reduce energy consumption, reducing erosion and corrosion as well as making improvements to plant throughput.

The first case study was for a plant in Uzbekistan that changed from MEA to a formulated solvent. The results were quite astonishing with a saving in steam consumption of over 80%. The plant has now been operating for over two years during which time it has shown good resistance to corrosion, solvent losses and foaming whilst accumulation of heat stable salts, suspended solids and degradation products have remained within industry norms.

A second MEA plant in Georgia when changed over to a formulated solvent, saw significant reduction in the corrosion potential (or acid gas mol loading) whilst also reducing its energy demand by over 40% alongside an 8% increase in production capacity.

The second part of Jan's paper looked at case studies where DEA was exchanged for a formulated amine solvent. Whilst maybe not as dramatic as the MEA case studies, both the USA and the African DEA systems showed significant improvements in their performance after the changeout.

The final case study considered a carbon dioxide removal plant utilizing 2-(2-aminoethoxyethanol) solvent which was replaced with a formulated MDEA based solvent. Again, energy savings were realized but perhaps the biggest benefit to the operator in this case was the reduction in solvent degradation, whilst corrosion was almost entirely eliminated and processing capacity was increased due to the reduction in foaming.

The conclusion was that upgrading to a formulated tertiary amine (such as MDEA) offers the opportunity to improve plant processing rates and reduce operating costs without significant impact to existing plant hardware.



Tim Ochel - BHS - Sonthofen GmbH

Fully Automatic Precoat Candle Filters

The final presentation of the afternoon session was written and delivered by Tim Ochel from BHS Sonthofen, giving an overview of the precoat candle filter and its potential uses in the industry.

The presentation covered some specific applications, such as: amine sweetening; water scrubbing; and MEG reclamation. These are applications where very fine particulates are often present in the process which would prove difficult to remove by either centrifuging or by standard filtering techniques. The presence of these fines can lead to equipment blockages, severe corrosion and erosion and loss of instrument readings.

By precoating the filter cloths, a suitable cake can be formed prior to filtering of the process. This cake effectively forms the filtering media to trap fine particles. The precoat also serves to prevent blinding of filter cloths to maintain throughput over the filtering cycle. A further advantage of having a good precoat material is to enable the solids to break-away from the filter cloth at the end of the filtering cycle for easy collection and removal from the vessel.

BHS offers a fully automated precoat system from bag handling, media storage, precoat preparation through to the coating and operation of the candle filter(s). This avoids the handling of hazardous materials, the need for manual cartridge (candle) replacement and a significant reduction in operator interventions. Whereas the candle filter itself has the capability of producing an easy to handle, dry filter cake for disposal.

Tim's case study showed a reduction in OPEX costs of approximately 35% when compared with a standard cartridge filter whilst also achieving better performance in the removal of fine particles.

GPA EUROPE AUTUMN CONFERENCE BARCELONA, 19–21 SEPTEMBER 2018

TECHNICAL CONFERENCE – MORNING SESSION 21 SEPTEMBER 2018

Moderated by Myrian Schenk - KBR (UK)

It was an exciting final morning at the autumn conference in Barcelona. After a fantastic dinner with marvellous views of the city, everyone was ready to listen to the last morning's presenters.

Evolution and Analysis of Optimal Design Concept for an add-on LPG Recovery Unit for Local Demand

The session kicked-off with David Limb, a consultant and study manager for Petrofac Facilities Management Ltd. David presented a paper entitled "Evolution and Analysis of Optimal Design Concept for an add-on LPG Recovery Unit for Local Demand", an option review for recovering LPGs from stabilized condensate using Exergy analysis.

The example David showed was an onshore oil field development in North Africa which will have a Central Processing Facility (CPF) to separate crude oil from water and associated gas. The stabilised oil is exported by pipeline - water re-injected. Sales gas is dew-pointed using mechanical refrigeration prior to export.

De-ethanised condensate is also exported via pipeline. The study for the paper focused on the LPG extraction in this development - a portion of the de-ethanised C3+ condensate stream is more than sufficient for the design LPG production to be used in the local market.

Usual methods to derive alternative concepts for the recovery of this LPG were screened against the criteria of safety, simplicity and low capital and operating cost. Using this method, a single column process over the alternatives was favoured. However, during the analysis an unexpected result was found: increasing the feed rate reduced the column reboiler duty up to a point, but after this minimum point the traffic of liquid and vapour in the column increased and with that, the reboiler duty also increased.

This motivated David to use an Exergy Analysis to fully understand the phenomenon. David continued to explain that the actual reason for the minimum in reboiler duty resulted from a combination of several factors some of which increase as the feed flow rises while some



David Limb - Petrofac Facilities Management Ltd

decrease. The analysis did not reveal clearly any single factor. The separation energy and thermal effects were shown by examining the individual terms in the Gouy-Stodola Equation.

I suggest you read David's full paper - a very good summary of simple and sometimes forgotten chemical engineering basics!



Henry Balston - Genesis Oil and Gas

Increasing Plant Throughput Using Hydraulic Process Simulation

The next paper was presented by Henry Balston, a software development engineer from Genesis Oil and Gas. The paper, written in collaboration with Christian Aaserud from Gassco AS, was entitled "Increasing plant throughput using hydraulic process simulation".

Henry presented the Genesis process of building and benchmarking hydraulic process models, including digitalisation areas of workflow automation and software product synergy.

He continued by showing how data is collected from process simulators, design software, and operational data and then how this data is transformed into a dynamic graphical user interface, using Excel.

He discussed how the different pieces of information are analyzed to make sure that the simulation will return proper results, every time it runs. He also showed some examples of how findings from different areas and from the team have been used to improve efficiency, to challenge operating limits and in turn to increase plant throughput.

This approach has been used to replicate the Norwegian gas infrastructure, without compromises in process safety and lowering cost. This is how, Genesis and Gassco have created a suite of as-built process simulation, with the use of data processing, benchmarking and lots of attention to detail!

Digital Gas Plant: Leverage Digital to Improve Efficiency and Boost Profitability, While Better Managing Risk

The following paper was presented by Simon Crawley-Boevey, Product Manager for Continuous Process Management (CPM) for Offshore at Baker Hughes, a GE company (BHGE). Simon is also an active Member of GPA Europe Management Committee and Technical Committee Member.

Through a very interesting presentation, Simon showed the audience that the gas industry is changing, and moving into digitalization with his paper entitled "Digital Gas Plant: Leverage digital to improve efficiency and boost profitability, while better managing risk" (co-authored by Alessandro Bettini, also of BHGE).

Converging ideas from process and automation, his paper looked at how operators integrate asset performance management solutions with process simulation models and data analytics to allow them to predict and quantify operations, thus increasing profitability. Simon presented two cases, one

for offshore production and one for an LNG plant to illustrate the workflow and the outcomes.

He told us that digital capabilities can allow companies to unlock different sources of value by combining knowledge, experience and technology. Step changes can be expected then in productivity across assets, people, processes and systems. The connecting data removes silo operation in companies and as such, result in higher efficiency and profitability.

Simon also reminded us that historically, our industry has been slow adapting to innovation, however today, with the rapid advance of innovation and digitalization the industry needs to move quicker or risk losing out.

Simon informed us that the gas industry cannot delay in taking advantage of the digital transformation the world is going through. This digital transformation is a convergence of systems, people, operations and maintenance. Today we have the tools, we as the industry need to start applying them....



Simon Crawley-Boevey - BHGE

Improve Plant Efficiency and Availability Through Standard Compressor Control Systems

The next speaker up was Luigi Calviello, Managing Director of Energy Control Technologies Europe. Ezio Pasqualon of Tecnimont co-authored the paper, entitled "Improve Plant Efficiency and Availability through standard Compressor Control Systems".

He presented design concepts derived by looking at existing processes. He told the audience that the lessons learned during operation, and changing ways of working through a more collaborative way, will allow the industry to find new and innovative solutions.

He demonstrated his point by focusing on the design of control systems for compressors. Currently, this design is based on OEM standards, while in some cases homogeneity across the OEM Packages is reached through Third Party Systems packed into a dedicated hardware or DCS.

Through his presentation he showed us a different way: a standard Compressor Controls System (CCS) integrated into open platform. Standardisation benefits everyone in the value chain - OEMs, Contractors and Operators alike. By combining qualified and independent vendor standards together with a similar standard approach across the turbo-machinery packages in the contractor's world, the proposed design leads to efficient operations: i.e. reducing surge damage; tripping; flaring; poor product quality; and excessive power consumption, at the same time reducing the overall cost for contractors and operators.

“ Changing ways of working through a more collaborative way, will allow the industry to find new and innovative solutions. ”



Luigi Calviello - Energy Control Technologies



Barcelona Speakers and Moderators

Predictive Monitoring of Acid Gas Membrane Performance

The last, but by no means least, speaker in this interesting morning session was Ankur Jariwala, Senior Product Manager & Domain Head- Gas from Schlumberger. Ankur's paper was entitled "Predictive Monitoring of Acid Gas Membrane Performance".

Ankur walked us through a new digital solution to predict the remaining life of acid gas membranes based on field data performance. Because gas membranes are compact and efficient, they are widely used onshore and offshore for acid gas removal from natural gas. The performance of these membranes is heavily dependent on the conditions of the feed gas and the operational practices. If these conditions are not maintained near the design conditions, then the membranes can deteriorate and lead to out-of-spec product gas with the undesired consequences of contractual penalties, unexpected downtime, and ultimately risk of environmental impact.

However, if changes to the membrane or membrane elements are implemented too quickly, excessive costs are incurred which might not be required.

In his presentation, Ankur showed the technique that was developed in two years of gathering field information to allow the



Ankur Jariwala - Schlumberger

system operator to anticipate the performance of the membranes and allow the operators to optimize membrane and membrane elements expenditure.

This predictive monitoring and active machine learning using field operational data allows the operators to predict and manage membrane performance thereby optimising the membrane replacement expenditure.

We had a very interesting morning - we reviewed chemical engineering fundamental principles through an exergy analysis and we moved on from there to the world of digitalization, though simulation and standardization...

The Gas Industry from early years, has always been engaged with innovation: new technologies; big data; digital ideas etc and today, we believe that the industry has started to pay more attention to environmental issues, energy choices, emissions and/or hydrocarbon sources. It has started being connected and using multiple technologies and different digital platforms. The industry has also begun to process and analyse data quickly to utilise all the available storage and connectivity, which allows for real-time decisions and execution to serve all the customers and the stakeholders. We hope the audience took some good ideas/ examples from these presentations to implement in their own companies. The morning session came to a close as did the GPA Barcelona meeting in 2018. We look forward to seeing you all at next GPA Europe conferences.

GPA EUROPE AGM AND TECHNICAL CONFERENCE LONDON, 22 NOVEMBER 2018

MORNING KNOWLEDGE SESSION

Moderated by Nick Amott, Fluor Ltd



London Speakers and Moderators

Avoiding Common Pitfalls in Separator Design and Analysing Operational Problems

Over the years the GPA Europe AGM held in London every November has transformed into a high value technical conference as well as a chance to contribute to the business of GPA Europe and network with friends and colleagues. This value has more recently been augmented by adding a Knowledge session with a particular aim to enhance the training and insight of our younger Engineers. The morning session was dedicated to a "master class" delivered by Tom Ralston and Wim Moyson of the company MySep to address "Avoiding common pitfalls in separator design and analysing operational problems".

We were treated to two sessions where the presenters neatly switched topics between each other, kept immaculate timing and answered a significant number of questions in tandem. The session chairman had already been privy to a sneak preview of the slides and content for the session. Part of the presentation centred on a case study Troubleshooting liquid carryover in gas compression systems. This paper is included on the GPA Europe website, but if you were not able to make the session you missed a truly impressive series of slides that are not available, which colourfully illustrate many of



Tom Ralston - MySep Pte Ltd.

the problems experienced and issues addressed through the use of plant photos and extensive static and dynamic CFD illustrations. When questioned whether these were CFD plots generated to illustrate certain points, we were informed that these are taken from real life situations which makes the lessons learned all the more pertinent.

Tom introduced us to the history of MySep from the origins of CDS through the acquisition by FMC to the present day and in particular the



Wim Moyson - MySep Pte Ltd

specialist services available from the team including the MySep software. Wim moved us on to illustrate through images of separators using CFD why some separators don't work. To some extent it becomes self-evident once you see the CFD results, but the clever insight comes through applying the CFD and the software to predict performance for various configurations. The audience relished the Q&A session using both the HelloCrowd app to good effect and follow-up questions taken from the floor.

After coffee, Tom took us through an interactive session using the software to illustrate the impact of design choices that are made in vessel sizing but perhaps more importantly the application of internals to improve (or not!!) separation. Wim then moved us on to discuss the paper as provided and how the active two way link into a selection of steady state and dynamic process simulators that are available can allow true process performance emulation and optimisation. With our minds fully stimulated and stomachs rumbling, we finished off the session before lunch with another Q&A session. We would like to thank the folks from MySep for what was clearly a great introduction to the topic of separation and "warm-up" for the technical papers later in the afternoon.

GPA EUROPE AGM AND TECHNICAL CONFERENCE LONDON, 22 NOVEMBER 2018

AFTERNOON SESSION 22 NOVEMBER

Moderated by David Weeks, O'Donovan Weeks Ltd

Following the Annual General Meeting, GPAE held its traditional technical conference which continued and expanded upon the morning's Knowledge Session theme of Separators. In the afternoon program, a total of three papers were presented, each dealing with a different aspect of separator innovation, design or operation.



Dag Kvamsdal - Schlumberger

"Three-in-One" Design Approach to TEG Contactor Tower

Dag Kvamsdal of Schlumberger opened the afternoon session with a presentation entitled "Gas Dehydration - "Three-in-One" Design Approach to TEG Contactor Tower". Dag described how Schlumberger had integrated two separator vessels, the inlet separator, normally installed to keep hydrocarbons and free water out of the contractor, and the outlet scrubber, provided to recover entrained glycol and return it to the process, with the main TEG dehydrator contactor tower. The integration achieves significant savings in fabrication, piping, instrumentation and civil foundation costs. Cleverly, the demisting cyclones in the inlet separator were installed within the chimneys of the chimney tray, which divides the inlet separator from the TEG contactor. This design innovation leads to an overall reduction in column height, thereby also providing additional cost savings.

Making Sure Your Separator Can Handle Pigging Liquids

After a well-earned coffee break, our second speaker of the afternoon, Katerina Souskova of Bryan Research and Engineering presented her paper, 'Making sure your separator can handle pigging liquids'. Katerina emphasised the importance of calculating liquid hold up in pipelines to ensure the inlet separator is designed with sufficient volume to contain the pigged liquids without flooding. In Katerina's example problem, liquid hold up was determined using ProMax GIS, which utilises satellite imagery to establish the pipeline profile (lengths and elevation changes). This, coupled with the Beggs and Brill two-phase flow correlation, calculates phase slip and liquid accumulation. Rigorous quantification of liquid hold-up was then tested against three simplifying assumptions; 1) neglecting inclusion of chemical additives such as methanol into the pipeline fluids, 2) reducing the number of segments/elevation changes included in the pipeline model and 3) simplifying characterisation of the C6+ in the pipeline gas by 'lumping' components.



Katerina Souskova - Bryan Research and Engineering



Logan Grim - Wood

A Model for Evaluating Inlet Systems to Gas/Liquid Separators

The finale of the afternoon, 'A Model for Evaluating Inlet Systems to Gas/Liquid Separators' was presented by Logan Grim of Wood. Logan demonstrated the importance of the inlet piping configuration, both fittings and pipe straight lengths, on flow regime, droplet size distribution, flow maldistribution and ultimately, separator disengaging height and separation efficiency. Equations for performing the pipe work evaluation were recommended and the research sources, both old and new, from which the equations were derived were duly identified and acknowledged. Logan's paper includes a worked example that clearly illustrates the simplicity of the method as a screening tool for selecting between different separator inlet piping arrangements.

Conclusion: Within steady state process simulators, separators are one of the simplest unit operations, modelled as an equilibrium flash, with the vapour exiting overhead and liquids under flowing. The reality of course is that separation is not 100% efficient and operations are dynamic, not steady, so it should come as no surprise to us all that innovation, research and design tools continue to evolve in efforts to optimise separator design and performance and minimise operational problems.

GPA Europe Chairman's Annual Report - 2018

By Steve O'Donnell, GPA Europe Chairman



John Sheffield receives Best Paper Award from Steve O'Donnell - a fitting tribute to an industry legend

Ladies and Gentlemen, friends and colleagues, welcome to the 2018 Annual General Meeting of GPA Europe Ltd.

2018 has seen a fundamental shift in our industry and although we are not yet at the levels of activity we enjoyed in the past, the future looks so much better. The issues of climate change will surely impact our whole industry. As governments struggle with how to react, GPA Europe has a role in providing a forum where we can share thoughts and even influence decisions

With our thoughts very much still on budgetary restraints, we have tried to provide a cost effective program, whilst maintaining the high quality of technical content and attracting a very high level of presenter, to whom we are very grateful.

Our first conference held between the 6th - 8th March, was the joint GPA-GCC and GPA Europe event held at the prestigious Shangri-La Barr Al Jissah Resort in Muscat, Oman. This event was highly successful, attended by 500, and provided a huge

opportunity to interact with all of the major Operators in the Middle East. In addition to the workshops and technical conference, the feedback from our members who sponsored and exhibited was very positive. The operators in the Middle East are keen to talk to suppliers, both service and equipment, in Europe. A business and technical opportunity for our members.

This joint event will be repeated in 2019 in March in Kuwait. Our website has all of the details. You'll hear more in our newsletters to come. If you are not doing it already you really should follow us on Linked In and Facebook.

We followed this with our highly successful Young Professional Training Day held on the 27th March once again in Rueil-Malmaison, Paris and again hosted by IFP Energies Nouvelles and the IFP School. Our thanks go to Sandy Dunlop for helping with the organisation of this event despite having retired as our Executive Administrator. We had about 90 delegates and they were entertained by a total of eight stimulating

papers, five during the morning session ably chaired by Marieke Maenhaut of TechnipFMC and three during the afternoon session this time chaired by Stacey Wilding, Genesis Oil and Gas. Thanks too to Stacey who led our Young Professional Committee and helped to structure the event. Stacey has left the industry now and handed the baton over to Joe Fisher, of Genesis who now leads the Young Professionals. Next year the YP event will be in Amsterdam, so if there is anything you would like to hear about, or talk about for that matter, do get in touch with Joe, or of course Malcolm or Helen at our Admin office.

Although not part of our program, several GPA Europe members attended the GPA Midstream Convention held in April in Austin, Texas where we were able to support Tony Wimpenny, winner of the Best Paper Award 2017 during his presentation. A point worth considering for all of you upcoming presenters that winning the best paper award entitles you to the opportunity to present to a major audience during the Midstream Convention. Colin

Woodward organised an International lunch which was very well attended. Amazingly, this was the 35th year that Colin has attended and supported the convention and our thanks go out to Colin for his commitment and dedication. Our Annual Conference held between the 16th - 18th May in Rome provided our delegates not only with the opportunity to listen to a diverse range of gas processing papers but also to sample one of the most interesting cities in the world. For those of you that were also able to bring your partners then I am sure that you all enjoyed what the city had to offer.

We kicked off the conference with a morning session chaired by Lorraine Fitzwater, Petrofac who is long serving officer of our organisation and a stalwart of our industry. Following a great lunch we were then treated to the afternoon session chaired by another of our amazing team who has been in the industry almost as long as there's been an industry, John Sheffield, John M Campbell/PetroSkills. The final morning session on the last day was chaired by Sandy Dunlop and those of you with memories like mine may need to be reminded that he is a previous "retired" Executive Administrator, so you see we never let go once we have you in our grasp.

I would like to express my sincere gratitude and thanks to all of the chairpersons, presenters and delegates that make it so worthwhile putting on these conferences and without such the world of gas processing would be so much duller.

This brings me right up to date with this event today - our AGM and Technical Conference held once again at this excellent facility here at the Hilton, London. For those of you who attended our knowledge session this morning, I do hope you now know how to avoid some of the common pitfalls and will be better placed to evaluate both existing and future separator designs. For this afternoon, we continue with three superb technical papers and finally wrap-up with our networking reception where I hope to see all of you.

Looking forward I feel optimistic. The industry is both hiring and investing again. Our members have often said that they would like to hear more from the industry operators. Well, Shell are hosting our Annual Conference in Amsterdam in May next year and several very

senior members of Shell will be speaking. We have a workshop on carbon management technology and how we might all respond to the challenges ahead, a keynote address from an advisor to Shell's board and a panel session of knowledgeable and senior industry decision makers. All that and our conventional fayre of high quality technical papers AND excellent facilities for our members to exhibit their wares. The response has already been very good. If you are interested, register that interest soon. We expect to be over subscribed. We will open for bookings early in the New Year.

It is with sad reflection that today is my last day as your chairman, the time has just flown by and that always seems to be the case when you are doing something that you really enjoy. It has been an honour to represent GPA Europe and to be able to work with a quite excellent team. The breadth of knowledge and experience on our Management Committee is something that makes me very proud; even if we have been known to procrastinate from time to time we eventually come to a majority consensus and get on with the important role of managing this great organisation.

I would like to wish Martin Copp of Parker Hannifin Peco Facet, as our new Chairman, and Gary Bowerbank of Shell, his Deputy, the very best of luck and to pledge them my full support.

Before I close, I would like to finally express my sincere thanks to the Directors, Management Committee and Technical Committee who give their time generously to GPA Europe and who have helped steer us to where we are today. Finally, a very big thank you to our administrators who without their constant support, "nagging" at times and superb organisational skills we would not be able to provide the successful conferences that we have. So firstly, my personal thanks go to Sandy Dunlop (and Ann) for looking after me during my first year, and to Malcolm Harrison and Helen Hall, for your exceptional support during my second year.

On behalf of GPA Europe, thank you all for coming today and I would also like to take this opportunity to personally thank you all for your support throughout 2018 and I hope to see as many of you as possible at our events in 2019.



John Sheffield

Farewell old friend

John Sheffield has been a director and active supporter of GPA Europe for many years.

On Thursday, January 30th, after a short illness, he passed peacefully to the next world, firmly grasping the hand of his wife, Mary, his daughters Jo and Laura at his side.

John was a giant in the world of LNG and gas processing. He took joy in enthusing the next generation with the same passion. He was a regular feature at GPA Europe conferences.

Loved by his family, admired by his friends and colleagues. John had a gift. He brought humour and warmth to every situation yet coupled with his expertise and commitment could influence an entire room with just one sentence.

Fittingly, John won the GPA Europe 2018 Best Paper Award for his presentation on Small Scale LNG, due to top the bill at our Young Professional Conference in Amsterdam in May and now to be presented in his honour.

In tribute to John, our Annual Best Paper Award will now be known as the John Sheffield Award, that his name might live on.

God bless you John Sheffield. You did it all. You reached the top of the tree but never lost sight of the ground. You kept a smile on your face and a smile on ours. You changed the world. You may be gone, but will not be forgotten.

FORTHCOMING EVENTS

2019 YOUNG PROFESSIONAL TRAINING DAY

14 May 2019

Shell Technology Centre, Amsterdam

This Free Training day has been designed by the GPA Europe Young Professional Committee, focusing in four areas:

- Industry Overview
- Current Industry Challenges
- Technical Awareness
- Future Technology

2019 SPRING CONFERENCE

14 - 17 May 2019

Shell Technology Centre, Amsterdam

A new type of event for us. A conference and networking event organised by GPA Europe and hosted by Shell, on the theme of, and organised for, the European Gas Industry.

Our programme will be broken down into the following areas:

- Large Capital Project Execution
- LNG and FLNG
- Operations Troubleshooting
- Advanced Modelling Techniques / Equipment Advances

2019 ANNUAL CONFERENCE & AGM

13 - 15 November 2019

Macdonald Berystede Hotel & Spa, Ascot, UK

With a range of speakers and conference sessions, and multiple networking events, our Annual Conference is the place to discuss strategy, build networks and collectively shape the future of the gas processing industry.

There will be a wide range of technical topics at our Annual Conference, with no central theme. There will be something for everyone.

Come along and discover some innovative ideas that can enhance your business operations.

The conference combines a Technical Meeting with high quality presentations, with the company's AGM.

FOLLOW US ON SOCIAL MEDIA FOR ALL THE LATEST NEWS



www.linkedin.com/company/gpa-europe-ltd/



www.twitter.com/GPAEurope

CORPORATE MEMBERS

This listing of current Corporate Members represents the status as at 1st April 2019.

Level 1 Members

ABB Consulting
Air Liquide Global E&C Solutions Germany GmbH
Aker Solutions
Amines & Plasticizers Ltd
Arkema France
Atlas Copco Energas GmbH
Axens
Baker-Hughes, a GE Company
BASF SE
Bechtel Ltd.
BP Exploration Operating Co. Ltd.
Burckhardt Compression AG
Cabot Norit Nederland BV
CB&I Ltd
Costain Ltd
DEA Deutsche Erdoel AG
DNV GL
Dow Chemical Co.
ENGIE - CRIGEN
ENI Div E&P
Equinor
Fives Cryo
Fjords Processing France SAS
Fluor Ltd.
Gassco AS
Genesis Oil and Gas Consultants Limited
Grace GmbH
Huntsman Belgium BVBA
Jacobs UK Ltd
Johnson Matthey
Kellogg Brown & Root
Pall Europe
Parker Hannifin - PECO
Perenco
Petrofac Engineering Ltd
Saipem SpA
Sazeh Consultants
Schlumberger OneSurface
Schlumberger Purification Solutions
Shell Global Solutions International BV

Siirtec - Nigi S.p.A.
SIME
Sulzer Chemtech Ltd.
Taminco BVBA
Techint S.p.A.
Technip FMC
Tecnimont S.p.A.
TOTAL S.A.
Uniper Technologies GmbH
William Blythe Limited
Wintershall Holding GmbH
Wood Group UK Limited
WorleyParsons

Level 2 Members

Aragon AS
Axiom Angewandte Prozesstechnik GmbH
BASF Catalysts Germany GmbH
BHS-Sonthofen GmbH
Bryan Research And Engineering
CDB Engineering SpA
Chart Energy and Chemicals Inc
E.I.C. Cryodynamics Division
Enerflex (UK) Ltd
Energy Recovery Inc.
Escher Process Modules BV
Frames Process Systems BV
GDF Suez E&P Deutschland GmbH
GESMEX GmbH
Granherne Ltd.
Hatch
Heatric
ISG
Iv-Oil and Gas
JGC UK
KBC Process Technology Ltd
Kelvion Ltd
Liquid Gas Equipment Ltd
Oil & Gas Systems Limited
Orbital Gas Systems Ltd
OSL
P S Analytical
Paqell B.V.

Petroskills
PGNiG SA Oddzial w Odolanowie
Pietro Fiorentini
Process Systems Enterprise Ltd
Process Vision Ltd.
Rotor-Tech, Inc
SBM Schiedam
Technip E&C Ltd.
Teesside Gas & Liquids
TGE Gas Engineering GmbH UK Branch
Tracerco Ltd.
Tranter
Twister BV
UOP BVBA.
Vahterus Oy
VTU Engineering GmbH
Wärtsilä Oil and Gas Systems
WinSim Inc
Zechstein Midstream
Zeochem AG

Level 3 Members

Abbey Industrial Sales Co Ltd
Gasconsult Ltd
Kirk Process Solutions
Matrix Chemicals BV
McMurtrie Limited
MPR Services
Optimized Gas Treating
Petrogenium
Phillip Townsend Associates Ltd.
ProHeat Systems
Rowan House Ltd
Softbits Consultants Ltd
Sulphur Experts
Thermasep

Academic Members

Hydrocarbon Processing
Politecnico di Milano
University of Bradford
University of Surrey

In Brief editor:

Claire Haycock
07780 996897
claire.haycock@sulzer.com

GPA Admin Office

GPA Europe,
14 Campbell Close,
Yateley,
Hampshire GU46 6GZ,
United Kingdom
T: +44 (0)1252 625542
E: admin@gpaeurope.com
W: www.gpaeurope.com

Contacts:
Malcolm Harrison and
Helen Hall

InBrief is published by
GPA Europe Ltd.
For advertising enquiries,
please call 01252 625542.