

40 YEARS OF GPAE AND THE GAS PROCESSING INDUSTRY

GPA Europe chairs from down the years look back on their times in office as the organisation celebrates its 40th anniversary

1983 – Harold Wind

1984 – Norman Stevenson

1985 – John Teskey

1986 – Mike Baker

1987 – Cyril Timmins

1988 – Ari Minkkinen

Ari says: "1988 and 1989. There was a lot of development of offshore, off the coast of the UK. There were a lot of projects getting gas from offshore fields and platforms to develop. Total, my company, was involved also in Aberdeen Total Oil Marine with the Alwin development.

"There was really a drive to produce the gas, to clean the gas up, and get rid of sour gases. There was not so much emphasis on CO₂ emissions in those days and so it was developing technology to get gas onshore and, and using the gas energy, which is going to be around for a long, long time, even decades to come."

1989 – Charles Wildash

1990 – Brian Stevenson

1991 – Cyril Collins

1992 – Richard Gibbons

1993 – Don Cooney

Don says: "I was chairman 1993 to 1994. We only served one year at that time, so it's a long while ago. But one of the main things taking place at the time was the development and implementation of the Interconnector pipeline, connecting the gas pipeline between UK and Europe.



"Also, I seem to remember back then the words CO₂; H₂S; Gas Sweetening; Hydrogen, all of which I see are still being used now. So, I do not know whether they've sorted the things out or not, but they're still talking about it."

1994 – Colin Woodward

Colin says: "I was chair 1994 to 95 and the gas industry was really booming at the time. Natural gas in Europe, in particular in the UK, there was a lot of new building to increase our domestic production, such that we were heading towards being self-sufficient, which we made but a few years later. So consequently, there were a lot of new plants being built."

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1995 – Amer Sarssam

Amer says: "A search for technology, a search for answers to technical problems. You've got all these people, some of them come from operating companies, some from suppliers, and they want to talk to us about their ideas. So, you organise technical meetings. During my year, there was quite a scramble to try and get some really valuable technical papers being read and presented."

1996 – Fred Okimoto

1997 – Dave Connell



1998 – David Simmonds

David says: "It was a time of real growth for the gas industry. The gas market in the UK tripled during the 1990s, and it peaked in 2000. So, my time as chair coincided with the peak of that growth. It was due to the switch to gas away from coal and oil. It was a real time of change."



1999 – Christine Errington

Christine says: "A lot of it was during the nineties, there was a big change in as much as after the USSR broke up. There was a lot of work developing in Russia itself, and in particular Azerbaijan and the CHARESE started in 1998. They were very large projects that were happening."

"Then as far as the GPA was concerned, it was really seeing the beginning of the cooperation with the Gulf Chapter. I went to their sixth conference in Bahrain in 1998 and I still have the clock they gave me."

2000 – John Sheffield

2003 – Sigbjørn Svenes

Sigbjørn says: "In that period there was several things going on. There was still the gas processing industry on the rise. There were large pipeline projects coming on from Norway. The Russian Jamal pipeline was being expanded quite significantly. Also, Egypt came on as an LNG supplier."

"So, there was a lot of new areas which needed projects to fill up. But maybe the biggest change was within the framework as the EU second gas directive was implemented at that time, which meant that industrial companies were buying their own gas from whoever they wanted."



2005 – Sandy Dunlop

Sandy says: "The gas processing industry was doing very well at that point in time. It was really the start of the development of the big LNG transportation systems. There was a lot of work being done in that area, including the establishment of the two LNG plants in Milford Haven and also the start of the development of the liquified LNG and more gas processing offshore."

"That started to become more and more of a significant aspect and thank goodness for that because we will need gas around the world for several years to come. I'm sure."

2006 – Ed Bras



2008 – Justin Hearn

Justin says: "Now I remember this well because we were getting all these strange stories coming out from major companies like ExxonMobil taking over relatively small shale gas companies in the US and realising that this shale gas was going to be quite a big thing, at least in the US and at

the time, it looked like in the UK, also here in Germany, and particularly in Poland."

"We got quite excited about all this so-called unconventional gas. And of course, it changed the face of the LNG business in the US from building, import terminals to having a lot of very cheap gas. And then the LNG business turned around 180 degrees, and they started building export terminals. So that was a huge change."



2010 – David Weeks

David says: "I think probably the biggest change was trying to integrate climate change with the gas process in business, because there was a great focus on climate change caused by CO₂ emissions and many gas projects were starting to take note of that and were being developed in

conjunction with carbon capture and storage."

"I think personally, from my point of view, that was the biggest change: trying to square that circle of burning hydrocarbons, and yet trying not to admit CO₂ into the atmosphere to contribute further to global warming."



2012 – Keith Thomas

“That was the end of the first decade of the century, just starting into the second decade. And I think the realisation was coming that, although we were pushing gas as a transitional energy source, that natural gas was always going to have a problem being a fossil fuel. The acceptance basically wasn't there.

“Funnily enough, even up until now, I don't think it's really affected the growth of how the gas industry has developed. Maybe it's developed and changed the structure of the companies involved. But that was definitely already the issue by the time that I'd taken over.”



2014 – Paul Openshaw

Paul says: “I think the biggest change that we've all seen is the change in our climate. I guess at the time when I was involved with GPA, we were starting to realise the impact that our industry was having on global warming.

“We're blessed with the most creative technologists and the most knowledgeable engineers. And it may seem it's a bit alien but pointing those guys at alternative technologies away from gas would've been a good use of results.”



2016 – Steve O'Donnell

Steve says: “The problem was the reduction in the price of gas. This is when gas used to be in line with oil, so it went up and down with the oil prices. Then it disengaged itself. Oil continued to do its own thing, and the bottom of the market just dropped out of gas. So, we had a lot of

problems with companies that were really looking after their money.

“We started to see quite a big drop in people who wanted to be members and a large drop in people attending our conferences. So, we really suffered, and we were suffering, and we had to think about things that we could do to try and encourage members to come back.”



2018 – Martin Copp

Martin says: “When I took over as GPA chair, we were starting to see acceleration of the alternative energy market space. And so, GPA had to make some decisions about where we were going to be in the future and allow us to be still relevant to the marketplace.

“So, it's really about the alternative energy and the rate of acceleration of that alternative energy market growth.”



2020 – Gary Bowerbank

Gary says: “It was really Covid; it was a big change to the industry for everyone. Certainly, working from home; virtual systems; not working in the office anymore. A big change for GPA Europe, I think it's had a lot of benefits. It made us do things a bit differently. We ran virtual

conferences, and added webinars, so that was a real positive change.

“I think in the industry itself, all of us had to do different things; conducting HAZOPs and supporting start-ups remotely, working virtual; and now coming after Covid we're trying to bring back those learnings with many of us working in a hybrid way.

“This does bring advantages of reduced commuting time and better work-life balance, but can have the challenge of a loss of connectivity to a community. This is where GPA Europe can play a role to help bring the gas processing community together.”

GPA
GAS PROCESSORS ASSOCIATION
EUROPEAN/LONDON CHAPTER

Vol 1 Issue 1 Hon. Secretary: J. Barnwell, Bechtel Great Britain Ltd. August 1983
Bechtel House, 245 Hammersmith Road, Hammersmith London W6 8DP

GPA Officers 1983/4

Chairman: Harold Wind, Maratton	Deputy-chairman: Norman Stevenson, Phillips	Deputy-chairman: Ian Hartill, British Gas	Secretary: Julian Barnwell, Bechtel	Treasurer: Werner Schweizer, Elliott

GPA/GPSA are in Europe!

GPA (Gas Processors' Association) and its affiliate GPSA (Gas Processors' Suppliers' Association) have started in Europe. In receiving directly this newsletter, you are one of the first 150+ plus paid up members of the GPA European/London Chapter. The chapter began in December 1982, with 14 representatives of interested companies meeting at Bechtel's offices in Hammersmith. At this inaugural session, an obvious need for the GPA was apparent. Subsequent enthusiasm for the chapter with attendance of up to 100 at technical meetings, showed that initial feelings were right. To date, there have been three technical sessions held at various locations in London, sponsored by Elliott, Fluor and Stone and Webster. Future plans involve two more meetings this year and a further three more in the spring of 1984, one being in Paris. A site visit to Bacton in 1984 has also been arranged, courtesy of British Gas.

Julian Barnwell

Vince Doyle, member International Committee, Bechtel
As an old-timer in the Gas Processors' Association, I am delighted to see the progress made by the recently formed European/London chapter. In my 25 years associated with this group, I have seen it change from being very domestic orientated, to one with aspirations for becoming active internationally. I believe it is the European/London chapter that will make it truly international. The GPA (its earlier label was the Natural Gas Processors' Association) continues to be an effective (technically orientated) group where people operating in the gas processing industry can share their experiences. With the advent of the International Committee, of which I have been a member since 1980, it has been satisfying to watch the growth spread, first in Venezuela and now in Europe, of this type of technical and operating expertise in a common industry. Good luck to a bigger and better European/London chapter.
Vince Doyle

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Cover of the inaugural issue of InBrief, published in August 1983.

Approaching the end of the year, and also as we reflect on the past 40 years of our GPA Europe association, I want to personally express my gratitude to all our members and volunteers who have been involved and making this a reality.

Your hard work, loyalty and dedication has been instrumental in our success and presence in the gas industry. I, and everyone in the management committee, are proud to have you as a part of the team and look forward to continuing working with you and your company for many years to come!

I hope you will take some time off with your loved ones during the holiday season and come back fully renovated for 2024.

Myrian Schenk

GPA Chairperson



GPA EUROPE CCUS WEBINAR



Samantha Nicholson

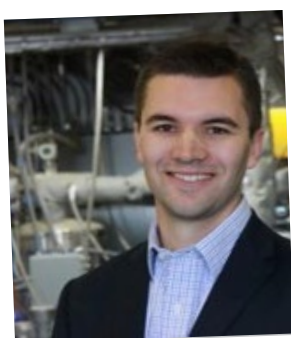
Moderated by Samantha Nicholson, Fluor

During this webinar we first heard about the novel second generation carbon capture technique using the cryogenic process from Andrew Baxter. Then we heard from Simon Weiland – he was looking at a different blend of chemical solvent to amines. Finally, we moved onto Nejat Rahmanian, who gave a huge amount of information – mainly looking at the effects of contaminants on sequestration.

Our first presentation was by Andrew Baxter, President of SES, Chart Industries

Carbon Capture Invented for a Changing World

Andrew presented the epiphany that led to the development of Chart's Cryogenic Carbon Capture technology and the unique value this technology brings to a world that is looking to decarbonise in many different ways. These include adopting renewables, low-carbon hydrogen, and sequestering CO₂ emissions from fossil fuels and industry.



Andrew Baxter

Our second presentation was by Simon A. Weiland, Optimized Gas Treating Solvents for Post-Combustion CO₂ Capture

Post-combustion CO₂ capture is an energy intensive process where chemical absorption using amines is the most mature and only commercially applied process. This presentation starts with a review of MEA as the benchmark solvent, then looks at amino acids, AMP, and CESAR1, a blend of aqueous 1.5 M piperazine (PZ) and 3.0 M 2-amino-2-methyl-1-propanol (AMP).

This is a formulation developed to significantly reduce the energy requirements of the capture process while keeping a fast absorption rate. ProTreat's thermodynamic model of AMP/PZ blends was recently optimised with new experimental data generated under the SCOPE project with special focus on the emissions (i.e. water wash sections). The updated model accurately fits experimental physical property and phase equilibria data.



Simon Weiland

Our final presentation was by Nejat Rahmanian, Bradford University CO₂ Transportation, Utilisation and Storage



Nejat Rahmanian

Several CO₂ capture plants will be built, and thousands of kilometres of pipelines will be required in the future. The capture plants will produce CO₂ and other gases. Therefore, captured CO₂ contains impurities, which subsequently its flow behaviours and thermodynamic properties differ from pure CO₂ under different transportation and storage conditions.

Transported CO₂ is either stored in saline aquifers or depleted oil and gas reservoirs or used for enhanced oil recovery. Some impurities are favourable in upstream capture plants, but this is not always the case on downstream processes either in transportation and/or storage. This presentation showed the research carried out to find a robust standard for CO₂ pipeline specification, similar to sales natural gas specification.

GPA EUROPE YOUNG PROFESSIONAL TRAINING

Moderated by Selma Manar, BASF



Left to right: Selma Manar, Georg Sieder, Myrian Schenk, Gary Bowerbank, Samantha Nicholson



Samantha Nicholson

Samantha Nicholson, Fluor

Hydrogen in the Pathway to Net Zero

Samantha gave details of how green hydrogen will be part of the energy transition approaching 2050. However renewable energy used to produce green hydrogen has hidden cost and intermittency. Blue hydrogen is not as “fashionable” as green hydrogen but needs to be an integral part of the energy transition. It is also of particular interest to the gas processing industry.

The presentation touched on cost points, how gas currently fills the gaps and how we expect blue hydrogen to fit in in the future.

A quick overview of the ‘rainbow’ of hydrogen was also given.



Myrian Schenk and Gary Bowerbank



Georg Sieder

Gary Bowerbank, Shell Global Solutions and Myrian Schenk, T.EN

Energy Transition Carbon Capture - Ways of Working

Gary and Myrian shared how engineering contractors and licensor can lower costs of carbon capture by working together, improving not only the core technology but also the project execution.

Outline was as follows:

- How the CCS market has evolved
 - CCS analysts' view
 - Shell catalysts and technologies' opportunity landscape view
- Market-driven technology developments
 - Core capture process
 - Integration optimisation
 - Engineering and construction
 - License to operate
- Market-driven project developments (Technip): Container and modular solutions

Georg Sieder, BASF

Impact of Feed Gas Composition on Amine System Design

Georg's presentation was divided in two parts. In part one the impact on non-acidic components on the design of acid gas removal units (AGRU) was discussed. Namely, the impact of hydrocarbons and BTEX on the design of the AGRU and partly operation will be presented. Beside that some focus was set on how to deal with glycols and methanol in the feed gas.

These components are sometimes added to natural gas as hydrate inhibitor, but the presence of such components can have a significant impact on the design and performance of the AGRU.

In the second part of the presentation Georg gave details on how to deal with carbonyl sulfide, and mercaptans in natural gas. Finally, an alternative process configuration was presented for acid gas ($\text{CO}_2 + \text{H}_2\text{S}$) rich natural gases, which allows a more OPEX optimised plant design in combination with a low H_2S specifications.



GPA EUROPE ANNUAL CONFERENCE: 40 YEARS OF SHARING IDEAS



Left to right: Leorelis Vasquez Quevedo, Adriaan Roux, Fiona George, Carmella Alfano, Sjaak Van Veelen, Gerald Vorberg, Tobias Eckardt

Monday 09 October, Workshop

Moderated by Myrian Schenk, T.EN

The first day began with a three-hour workshop organised by BASF SE, MPR Services, Comprimo and Axens, on the topic of 'Gas Treatment to Reduce Emissions'.



Sjaak van Veelen

Sjaak Van Veelen, MPR Services

An Environmentally Responsible Approach to Amine Renewal and Hygiene in Sulphur and Carbon Capture Applications

The need for amine renewal to remove unwanted contaminants many times depends on the gas treating application. Sjaak discussed two different application cases, with differences in both contaminants and incursion mechanisms. In a sour gas treating, amine refurbishment may be needed after a sudden incident of SO₂ breakthrough in the Tail Gas Treating (TGT) Unit within a Sulphur plant. In comparison a Carbon Capture application was also presented; the incursion of contaminants from treatment of flue gases in this application is rapid and ongoing such that continuous amine renewal is needed, and a permanent on-site amine renewal unit needed to be installed.



Carmella Alfano

Carmella Alfano, Axens

Carmella presented two case studies...

Sales Gas Production from a Lean Natural Gas containing Mercaptans; Simplified Integrated Solution with Improved Economics

Lean acid gases with mercaptans are difficult to treat. This case study showed an industrial design realized by Axens for a new project in the Middle East. A different and simplified scheme has been implemented with optimised and efficient process solutions in order to deliver sales gas at commercial specifications, reducing the overall investment and production costs.

1100 MMSCFD Single Train AGRU Treats Lean Gas with BTX Within an Integrated AGRU + Low BTX Enrichment Section + TGTU Absorber for a Middle East LNG Plant

Carmella's second case study showed the evolution of the new process scheme that was implemented to include a new gas sweetening unit and the integration of the unit with a new sulphur recovery unit (SRU). As there was limited plot space available and challenges on the acid gas quality to feed the new SRU, Axens was able to propose an integrated solution of gas sweetening, acid gas enrichment and tail gas treating with a common regeneration.

Fiona George, Adriaan Roux and Leorelis Vasquez, Comprimo

Sulphur Recovery Technologies

Fiona, Adriaan and Leorelis initially provided an overview of options for sulphur recovery, then presented three different case studies. Gas treating is required for the removal of contaminants and separation of components from raw sour gas streams to meet the required specifications in the product streams.

This is achieved through the combination of different process units, and an optimal design considers the integration of all units. For each study there was a requirement to remove hydrogen sulphide, carbon dioxide and mercaptans from the sour gas and to produce sales gas, sulphur and carbon dioxide export streams.

Key decisions included the selection of the locations for the removal of CO₂ and mercaptans and the most suitable technology to be used in the acid gas removal, acid gas enrichment and sulphur recovery units.



Leorelis Vasquez Quevedo, Adriaan Roux, Fiona George

Gerald Vorberg and Tobias Eckardt, BASF

Gas Processing for CO₂ Emission Reduction

Carbon Capture Utilisation and Storage (CCUS) is a rapidly growing approach to reduce CO₂ emissions globally. One major challenge with CCUS is the numerous sources of CO₂ with countless impurity profiles. The type and level of impurity can significantly impact the CO₂ treatment required and therefore the cost of the CCUS project.

Amine-based carbon capture process is the most commercially-proven technology for separating CO₂ from the flue gas stream. Once separated, the CO₂ requires purification prior to transportation or utilisation. Due to the impurities in CO₂ flue gas, degradation reactions can occur in the separation process that impact the downstream treatment. In order to achieve overall lower treatment costs, a robust package comprising specialty amines and unique catalysts and adsorbents for CO₂ purification are critical.

Tobias and Gerald highlighted several of those aspects along the entire amine-based carbon capture process including the CO₂ purification steps at its tail-end.



Tobias Eckardt and Gerald Vorberg



Left to right: Alessandro Mari, Adriaan Roux, Sigbjorn Svenes, Fahad Al-Doassary, Abdullah Bagazi, Srinivas Vadlamani, Paul-Emmanuel Just, Piet Geerts, Gerald Vorberg

Tuesday 10 October, Keynote Speech

The second day began with the keynote speech by Dr Lars Kissau. As head of the Net Zero Accelerator Unit, he explained BASF's strategy for achieving the set goal of "zero emissions by 2050". The focus was on the circular economy, renewable energies and carbon abatement.

Morning Session "Gas Processing" Moderated by Gerald Vorberg BASF SE

We started the technical sessions looking the impact of high pressure regeneration and an enhanced amine blend.



Paul-Emmanuel Just

Paul-Emmanuel Just, Shell Global Solutions

Recent Improvements and Cost Reduction in the CANSOLV CO₂ Capture Process

An extensive pilot plant test was performed to obtain operational data at higher regeneration pressure (4 bara instead of 2 bara) while using an enhanced amine blend of CANSOLV DC-103. The key performance indicators (KPIs) monitored included regeneration energy, amine degradation rate and emissions.

DC103 Alpha, in combination with high pressure regeneration (4.0 bara), achieved the largest reduction in reboiler duty compared to the base case (DC-103 at 2.0 bara) with up to -10% reduction in specific energy (GJ per ton of CO₂ captured). The amine degradation rate remained constant for both amine regeneration pressures.

The combination of a small relative increase in temperature and the inherent resistance of DC103 amine structure against degradation may explain this stability at increased pressure. The emissions at stack were monitored and the 24 hours average amine emissions remained significantly below the emission target level of 0.2 ppmv, excluding few events of abnormal operating conditions, such as plant trip. It was established that the use of the enhanced DC-103 blends can still meet the amine emissions commitments.

The session moved to looking at an approach to licensing and designing SRU trains that align with emission targets.

Alessandro Mari, Saipem and Adriaan Roux, Comprimo

Improving Sulphur Recovery Unit Flexibility and Performance through Reaction Furnace Fuel Gas Co-firing and Oxygen Enrichment

Alessandro and Adriaan presented on the work carried out in recent years for the Tanajib Gas Plant project, together with Saipem, Comprimo Worley and Aramco. Their presentation outlined solutions to address some technological innovations for the treatment of increasingly H₂S-poor acid gas with significant presence of BTEX in plants where maximum flexibility is required in all operating scenarios, while ensuring the important environmental objective of minimising acid flaring during emergencies and T&I (Testing & Inspection) with minimum footprint.

The final two presentations in the session moved to looking at CO₂ separation.



Alessandro Mari and Adriaan Roux



Piet Geerts

Piet Geerts, SDS Separation Technology

RotaSep for Combined Liquid and Solid Separation from Gases without Replaceables or Shutdowns

This presentation from Piet showcased RotaSep as a breakthrough solution in reducing liquid carry-over, downtime and maintenance cost. A short technology introduction with animations and application range and then a comparison with existing solutions after which some of the current applications were shown.

Meanwhile improved solutions are developed for increased product recovery by separation and CO₂ flue gas scrubbing. There has been an increased industrial energy efficiency (~3x) per unit production since 1990. Evidence that there is more than just legislation to achieve sustainable goals. We need both progressive and conservative ideas.

We closed the session with a look at the use of horizontal CO₂ separation membranes.

Srinivas Vadlamani, SLB

Horizontal Separation Membranes for CO₂ Capture - First in Southeast Asia

Srinivas' presentation showcased the use of horizontal CO₂ separation membranes for one of the world's largest offshore carbon capture and sequestration (CCS) projects and the first such venture in Southeast Asia. The Phase 2 project objective is to recover hydrocarbons from CO₂-rich natural gas permeating from the Phase 1 facilities, eliminating 3.3 metric tons of CO₂ emissions per year.

Horizontal CO₂ separation membranes were selected as the most economical solution for this application. The membrane technology offers numerous advantages over other acid gas removal technologies, especially for natural gas streams with high concentrations of CO₂. Key advantages include the membrane's compact and modular design, no need for solvent or pumps, long operating life, high energy efficiency, no foaming or other operational issues, and low capex and opex, leading to the lowest overall life-cycle costs.

Additionally, a digital solution has been integrated for continuous performance monitoring, which enables operational tuning and proactive membrane replacement over the life of the project.



Srinivas Vadlamani

Afternoon Session "LNG"

Moderated by Sigbjørn Svenes, Equinor

The final two presentations of the day focused on LNG.

Tobias Eckardt, BASF Process Catalysts Group

First Installation of Durasorb LNG MAX to Address Coldbox Freezing and Increase LNG Production

Tobias presented on Durasorb natural gas treatment solutions. Coldbox freezing by heavy hydrocarbons (HHCs) causing reduced LNG throughput is a known problem in the industry. This challenge is particularly acute in the US, where LNG facilities are fed by lean pipeline gas, but also a concern in other parts of the world where plants are faced with changing feed gas compositions.

To address this problem, and restore maximum throughput to LNG facilities, BASF has proposed an adsorbent solution for the removal of HHCs from lean gas.

BASF, working with Kinder Morgan at the Elba Island LNG facility, has implemented Durasorb technology, which eliminated deriming events, decreased operational complexity, and increased LNG production. In Summer of 2022, molecular sieves were removed from the dehydration unit and replaced with Durasorb products. After change out of adsorbent materials and minor modifications to cycle times, the two trains running Durasorb are removing water to LNG specifications and heavy hydrocarbons (C8+, BTX) to levels that do not cause freezing.

The removal of HHCs in the adsorption section has resulted in steady pressure drop (dp) readings in the cold section, eliminating the need for deriming events, and increasing LNG production throughput. This simple drop-in solution did not require CapEx.



Tobias Eckardt

For our next presentation we moved online for a virtual presentation from Linde Hellas.

Nikos Xynopoulos, Linde Hellas

Liquid Hydrogen-NH₃ and LNG Storage Comparison

Nikos presented a comparative techno-economic analysis of short-term storage and transportation options between LH₂ (liquid H₂), LNG, and NH₃. The physicochemical properties, potential hazards, current production maturity level, and current transportation-storage options for the three energy carriers.

More specifically, the main storage tank types for LH₂, LNG, and NH₃ are reviewed focusing on liquid stratification issues, boil-off phenomena, material compatibility, the role of He/N₂, design considerations, pressure relief systems, and energy requirements. A simple recirculation/leakage simulation is conducted using ASPEN HYSYS for each storage tank option in order to highlight the similarities among them, as well as the challenges of each particular case.

Their onshore and offshore storage feasibility status and future perspectives are finally discussed on the basis of these associated challenges, including potential ways to overcome them.

Our Gold Sponsors, Aramco closed our first day of technical presentations with a presentation on one of Aramco's largest gas processing plants, Uthmaniyah.

This was followed by a sponsor keynote speech by Fahad Al-Dossary about Aramco Leadership in Environmental Excellence and Energy Efficiency. As one of the world's largest integrated energy and chemicals companies, Aramco has a role to play in helping to build a lower carbon economy, while delivering the energy and materials needed to support economic growth and societal well-being in the world.

Abdullah Bagazi, Aramco

Innovation and Technology Deployment in Gas Processes

Uthmaniyah is located in Udhailiyah 170 kilometres south west from Dhahran. Uthmaniyah Gas Plant (UGP) was commissioned in 1981 as part of Aramco's Master Gas System to process associated gas from oil wells. UGP has been recognised by the World Economic Forum as a 'Lighthouse' manufacturing facility, a leader in technology applications of the Fourth Industrial Revolution, which enabled Aramco to be the first global energy company in the oil and gas sector of such recognition.

Aramco's long term investment in innovation, technology deployment and operational excellence has made UGP to be one of the world's most efficient facilities in gas processing, environment and energy management.

Abdullah's presentation detailed the latest deployed programmes including Enhanced Liquid Hydrocarbon Recovery, Flare Gas Recovery System (FGR), Combined Heat & Power Systems, and Steam Turbine Generator (STG).



Abdullah Bagazi

Wednesday 11 October

Panel Discussion

Moderated by Gauthier Perdu

Panellists:

Torsten Katz, Head of BASF's Global Gas Treatment, BASF

Tilman Bechthold, Vice President Research & Development, RWE Power AG

Wouter van der Bijl, Executive Director Business Development & Strategy, Fluor

Jean Jouet, CTO John Cockerill

Europe's energy transition: How can hydrogen and decarbonisation activities become accelerators for the European gas processing industry?

2023 has seen again a year of alarming signals from the evaluation of climate. We see indirect consequence at a never seen – by modern humans – scale of wildfires.

In the meantime, Europe has faced a crisis of gas supply, with the suspension of the deliveries of Russian gas. What is the consequence for the energy transition, today H₂ and decarbonisation?

One can say that the energy transition efforts have gained their momentum, accelerating the transition to a cleaner and more sustainable economy because of shortage of gas. Which ones?

Coming from the natural gas industry, we want to understand if those fast-emerging sectors (are they so fast, by the way?) will complete and support the existing industries of gas or go to something else, with new segments of markets, new business and totally independent infrastructures.

Our panel answered 4 questions:

1. Where are we in term of energy transition in Europe: do hydrogen and CCS contribute as expected?
2. Are hydrogen and decarbonisation so specific? We will focus on the new actors of H₂ and decarbonization: technology, customers and projects of ET. Are they different than the ones of the gas industry?
3. Are emergence of H₂ and decarbonisation infrastructures a question for the gas industry?
4. Finally, for the Gas Processing Association Europe, how we can help? The point to conclude: complementary or competing?

Morning Session "Green Hydrogen, CO₂ Capture and Utilisation"

Moderated by Gary Bowerbank, Shell

We started the session looking at how rigorous modelling tools can be used to manage the challenge of variable renewable power on the production of green ammonia.



Laura Fiorillo

Laura Fiorillo, Siemens DI PA SW

Implementation of Rigorous Modelling and Optimisation Tools for Sustainable Production of Green Ammonia

Laura, one of our young professionals presenting at this year's conference, explained some of the challenges with producing hydrogen via the Haber-Bosch process when the availability of Green H₂ varies. With the advanced modelling, the overall economic operation of such systems can be optimised, while also identifying the limitations with respect to ramp-up and turndown with the use of dynamic simulations.

With better awareness of the limitations in turndown, then it may be possible to further improve the design, for example improving turndown in the reactor section, and/or optimising the H₂ and ammonia storage.

With the inherent variability in the availability of green electrons, the importance of optimising and ensuring a system is robust to a range of operating mode, will be key to making Green Ammonia a success.

The session moved further up the value chain and looked at a novel alternative to the more mature electrolysis-based concepts.

Dr Hasan Ozcan, Clean Hydrogen Ltd

Hybrid Water-Splitting Technology as a Novel Approach to Efficiently Produce Green Hydrogen

Hasan presented a novel process which greatly improves the efficiency (up to 90%), while also producing half of the green hydrogen at pressure (1-200bar). The feed water quality specifications are more relaxed than for typical electrolyzers. In addition, the waste heat produced is higher grade (150°C-400°C) than seen in more conventional processes.

The line-up combines “hydrothermal” and “electrochemical” processes and has been demonstrated at lab-scale.

The process is currently being scaled up, with a design developed containerised system that will allow rapid large-scale development. The process is well suited to generate green hydrogen from various renewable electricity in a range of locations. Clean Hydrogen Ltd continue to look for partners to help further develop and de-risk the technology.



Dr Hasan Ozcan

The final two presentations in the session moved to looking at CO₂ capture and Utilisation.



Eduard Karslyan

Eduard Karslyan, BASF SE

Greening up the Fossil Fuels: CO₂ Capture

Eduard discussed some of the challenges with CO₂ capture (based on amines) in a range of different applications from natural gas or LNG, syngas at ammonia and blue H₂ plants and flue gases (from a wide range of sectors).

He shared his insights into some of the challenges on a range of areas including contaminants, degradation, energy efficiency and particularly for flue gas CO₂ capture the environmental emissions. It is clear that CO₂ capture will never be ‘cheap’ but by applying energy efficient line-ups, at the expense of increased capital investment, significant savings can be achieved.

We closed the session with a detailed look at how with the right combination of electrocatalyst materials a wide range of valuable products can be produced from CO₂.

Mansoor Al-Shamri, University of Bradford

The Electrochemical Reduction of CO₂ to Useful Products: A Review

Mansoor explained how the research at the University of Bradford is demonstrating the feasibility of producing organic acids, alcohols and other hydrocarbons. The process of electrochemical reduction (ECR) was explained, together with how the product slate can be adjusted based on the transition metals used for coating electrodes.

While there remains a number of challenges to scale up the processes, such as high costs of electrocatalyst material, selectivity and reactor sizing, it is hoped that these processes will be able to help produce low carbon products at scale in the future.



Mansoor Al-Shamri

Afternoon Session “Operations” Moderated by Samantha Nicholson, Fluor

The final two presentations of the conference moved to looking at Operations.



Paul Stockwell

Paul Stockwell, Process Vision

See What’s Happening in Your Pipeline: The Future of Gas Plant Management

Paul’s presentation explored both the financial and safety issues of allowing liquids into gas transmission networks that lead to millions of dollars in lost revenue and pose serious safety threats.

The two fiscal measurements of flow and calorific value are compromised when liquids are present in dry gas streams. Monitoring gas flows with a new camera system is showing that many gas supplies, thought to be dry, actually contain liquids in mist flows and stratified flows.

Paul shared videos of real-world installations and tests showing that many gas processors are giving away BTUs in the form of NGLs without knowing it.

Susanna Voges, Voovio Technologies S.L.

How Enhanced Reality Technology Increases Operator Competency and Reduces Human Error

Susanna presented the challenges around onboarding and shortcomings which directly impact operational productivity due to long onboarding times and unplanned equipment downtime as a result of operating errors, and how Enhanced Reality (ER) technology has been proven to solve these challenges.

It allows simulating standard operating procedures in a photorealistic 3D environment (digital replica) for users to review, practice and test on standard operating procedures on-demand and on any device. Manufacturing organisations can capture their practical procedural expertise (Tribal Knowledge) and are able to measure and track procedure competency across their operators. This methodology has been labelled Digital Twin of the Person (DTOP) by Gartner (1), referring to the human-centric approach of this technique.

Susanna’s presentation included case studies from some of the process industries biggest companies that demonstrate the impact of improved procedure clarity and more consistent execution, which reduces unplanned events and speeds up operator onboarding while capturing more ‘tribal knowledge’.



Left to right: Gary Bowerbank, Mansoor Al-Shamri, Dr Hasan Ozcan, Eduard Karslyan, Laura Fiorillo, Paul Stockwell, Samantha Nicholson

SOCIAL EVENTS

Monday 9 October

BASF Plant and Visitor Center Tour



Our delegates delved into the world of BASF with a visit to the company's Visitor Center, as well as a guided tour around the Ludwigshafen Plant to show how chemistry enriches daily life.



Left to right: Chris Wai, Michael Grosse-Sommer

Welcome Drinks Reception

BASF hosted our Welcome Drinks Reception to kick start our anniversary celebrations at its Gesellschaftshaus, or "Casino".

Chris Wai, Vice President Global Chemical Market Catalysts and Michael Grosse-Sommer, Head of Technical Marketing Europe, Africa and CIS for BASF's Gas Treatment Solutions welcomed guests on behalf of BASF and shared some entertaining and informative facts about BASF and the city of Ludwigshafen.

Myrian Schenk, Chairperson of GPA Europe introduced a video compiled for the 40th Anniversary showing the gas processing industry through 16 of our past GPA Europe chairs, before handing over to "Germany's best sommelier" who gave an overview of the wine cellar, its history and details of the wines offered to our guests.

Tuesday 10 October

Companions Tour

Back for 2023 in celebration of our 40th anniversary we invited companions of the GPA participants to a guided tour into the beautiful wine area of the Palatinate.

We started with a sightseeing tour through the old town of Speyer. A guide giving some insights to the history of the over 2000 years old city, which is located on the Rhine river.

Later, we travelled to St. Martin, a tiny and typical village in between the vineyards. There, our companions enjoyed a private wine tasting.



St. Martiner Castell



Delegates on the GPA Companions Tour

ANNUAL CONFERENCE PICTURE GALLERY



GPA-GCC present awards to Helen Hall and Myrian Schenk of GPA Europe



Technical Poster presenter, Dr. Hamideh Ahi

New for 2023 we offered a Digital Technical Poster session within the exhibition area.

Each presenter had a five-minute slot to present their poster.

Digital Posters:

- Improving the output from LNG trains or reducing its footprint for greenfield projects, using dual enhanced surface tubes in non-cryogenic exchangers – Nicolas Bilbault, Kelvion Thermal Solutions
- Oxygen in post-combustion CO₂ – Efficient removal for transportation and utilisation – Simon Saul, Johnson Matthey
- Post-combustion Carbon Capture: from onshore to offshore – Lee Ming Yang, Sulzer Chemtech Ltd
- Support of design engineers and plant operators by a digital platform – Ralf Notz and Kai Binder, BASF SE
- Sustainable biogas purification via mobile filters using renewable activated carbon – Frank Gänshirt and Charles-Elie Lefaucheur, Desotec
- Filtration & separation technologies selection improving efficiencies in the blue hydrogen and carbon capture – Pavlos Papadopoulos, Parker Hannifin
- Low-DP blowback filter for flue gas contaminant treatment – Dr Lara Heberle, Pall Corporation
- Sustainability solutions by BASF process catalysts – Dr. Hamideh Ahi, BASF SE
- The role of digitisation in delivering decarbonisation of CCUS projects – Laura Fiorillo, Siemens DI PA SW

Exhibitors

ANDRITZ

BASF
We create chemistry

PALL Pall Corporation

DISTRAN
SWITZERLAND

Process Vision

VOOVIO

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GCC Chapter

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Celebratory Dinner

Our dinner took place at the stunning Gutshof Ladenburg within the beautiful Rhine-Neckar region. The perfect venue to celebrate 40 years of GPAE!

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CORPORATE MEMBERS

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

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