

DIRECTORY 2017

A Comprehensive Guide to the Chemical
Processing Sector in North East England

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BOC supports a range of industries in the UK and Ireland with industrial and speciality gases, plus related equipment and know-how. The company's gases and expertise have contributed to advances in many industries and aspects of everyday life, including steelmaking, refining, chemical processing, clean energy, wastewater treatment, welding and cutting, food processing and distribution, glass production, electronics and healthcare. BOC is a member of The Linde Group – a leading supplier of industrial and speciality gases and engineering services across the world with a turnover of nearly 17bn Euros and operating in more than 100 countries.

For several decades BOC has been supporting businesses in the North East and in particular the Teesside process industry. BOC has built an extensive presence across the North East which includes over 100 km of pipelines supplying oxygen, nitrogen, hydrogen and argon. BOC's operations in Teesside represent the largest industrial gas facility in the UK and one of the largest in Europe. BOC's local infrastructure is a cornerstone for many companies operating in the process industries.

BOC recognises that process efficiency, safety and environmental compliance will remain fundamental drivers for successful operations in the process industry. BOC will continue to deploy specialist knowledge in these key areas to help maximise benefits for its customers. BOC is actively involved in a number of new initiatives and innovations in the region particularly in the clean energy sector.

Dr Dave Lockyer, Commercial Manager said: "BOC will continue to work closely with NEPIC and other local bodies to ensure that the region makes the most of these opportunities". BOC is also developing new digital technologies that are designed to improve all parts of its operations. Our ROC – Remote Operations Centre – remains class-leading in remote monitoring and management of plant to maximise operational efficiencies.

Since becoming part of Linde, BOC's UK operations have benefited from investments and access to new markets. Over £300m has already been invested in new UK facilities including air separation plants at Scunthorpe and in Scotland, new acetylene production on Humberside and a new hydrogen filling facility in Teesside.

Over the past 18 months BOC has invested tens of £millions in a major enhancement of its world-class hydrogen plant in North Tees to underpin operating efficiencies.

To support the growing demand for clean transport, BOC has built a number of hydrogen and LNG filling stations including an LNG facility for HGVs which is operated from its site in Teesport.

BOC takes its environmental responsibilities very seriously and encourages and supports environmental awareness in others. In conjunction with NEPIC, BOC is proud to sponsor annual environmental awards which schools and businesses from across the region can get involved in. Dave added: "The BOC-NEPIC Environmental Awards recognise and stimulate environmental awareness and involvement throughout the region. It's exciting to see young people in particular getting behind the project and addressing the challenges. It's also good to see them engaging with industry. "Hopefully some will go on to become the engineers and scientists of the future."

Working together for industry, education and the environment

BOC supplies gas and related products to a wide range of customers including; large chemical plants; power producers; metals and glass manufacturers; medical facilities; food processors; pubs and restaurants.

In Teesside, BOC operates one of the largest industrial gas pipeline clusters in the world and we have supported our major customers in the region by investing more than £100m on industrial gas related facilities in the past decade.

We are helping to create a cleaner future, being a leader in growing and developing the hydrogen economy and by offering technologies to reduce emissions and enhance process efficiency.

BOC is actively involved in the communities in which it operates, through the sponsorship of environmental awards for schools and industry and BOC's Inspiring Gases programme which encourages schools' engagement with science, engineering and technology.

For more information on BOC in the UK and Ireland please visit www.BOConline.co.uk or contact Dave Lockyer at dave.lockyer@boc.com or +44(0)7768 177 961

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WELCOME



LOUISE GWYNNE-JONES
PR & Communications
Manager, NEPIC

Dear Readers,

I take great pleasure in welcoming you to the 11th issue of the NEPIC Directory 2017. Once again, I take this opportunity to thank this year's guest contributors and supporters whom have all contributed to the success of this publication - thank you.

Through the NEPIC Directory 2017 our vision is to create a high-quality publication that will be relevant, challenging, thought-provoking, and inclusive of a diverse range of voices and perspectives from across our industry sectors.

However, as its title rightly suggests, this publication's primary purpose is to showcase the extensive range of products and services available within the network and provide a single point of connect for collaborative, inter-regional working that is at the heart of our region and industry's success.

As we now spend twice as much time on-line than a decade ago, we too must connect with our audience where they are spending time. To meet this need, this directory has been recreated as an on-line function, allowing readers to source up-to-date information and contact details wherever they may be, 24-7.

Nevertheless, despite society's desire to go digital, you simply cannot ignore the power of print media that lies in its tangibility - the feel of the paper and the smell of the ink. Therefore, for the foreseeable future, this flagship publication will very much remain in hardcopy form - allowing us to take our message and that of our members far and wide over the course of its 12-month shelf life.

Finally, I would also like to take this opportunity to thank you, our members and cluster supporters, for your continued support and endorsement. We will continue to work tirelessly on your behalf, addressing the key issues outlined by industry, to provide you and your business with a sustainable environment in which you can grow and prosper.

I am delighted that you are joining us as readers and welcome comments and suggestions that could be beneficial for us to improve the quality of this publication going forward.

Thank you

Louise Gwynne-Jones

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CLUSTER CONNECT

Developing Strong Cluster Connections

CLUSTER CONNECT brings together member companies to facilitate introductions and the sharing of business information and opportunities in a friendly and informal atmosphere.

Members of NEPIC have access to a wide network of businesses in and around the North East and these free to attend monthly sessions allow you to meet with like-minded members.

Held on the first Thursday of each month between 8am - 10am, the meet includes refreshments, a guest speaker and new member introductions followed by an informal networking session.

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CHAIRMAN'S NOTE



IAN SWALES
Director & Chair, NEPIC

It is a pleasure to report on another successful year for the NEPIC cluster. The process industry continues to grow in the North East and we are seeing major investment from a number of companies.

The total runs into billions of pounds and includes new pharmaceutical activity by GSK, SNF oilfield chemicals and SABIC UK Petrochemicals. The region is also seeing major energy investments, with a highlight being the long awaited MGT biomass plant at Teesport. Sirius have also now begun their huge project to mine polyhalite in North Yorkshire, with associated processing operations on Teesside.

These projects, and many others started or planned, are a huge vote of confidence in the region. They also represent new opportunities for many of our members and are a positive signal to other companies looking to invest in the region.

NEPIC continues to work on bringing in further new activity, with the ambition to make the North East of England one of the most attractive regions in the world for process industry investment. The existence of a strong and vibrant cluster, along with the many other regional advantages, gives a very positive message.

NEPIC reaches out on behalf of members and the year saw another successful trade mission to India. Many more members could benefit from joining these missions. There was also a highly successful Bioresources Conference that attracted top quality speakers from around the world. More locally, the networking meetings Cluster Connect and Pharma Connect continue to be very popular.

The year has been momentous on the political front following the UK's

decision to leave the European Union being highly significant for our sector. NEPIC is working hard to represent members' views to policy makers to ensure that our voice is heard as the negotiation proceeds and possible trading and regulatory scenarios emerge. We have also seen the appointment of a Tees Valley mayor, who will act as the focus in that area for issues such as economic development and skills.

2017 will be notable in the history of NEPIC also, as it marks the retirement of our long serving, founding Chief Executive, Stan Higgins. Stan is known and respected throughout the industry and has a truly remarkable record in building the NEPIC cluster and driving the success of the process industries in our region. I'm sure all members join me in wishing him well in his retirement and in whatever he does next.

I am delighted that NEPIC has secured the services of Iain Wright as the new Chief Executive. Iain has been member of parliament for Hartlepool for the last 13 years before stepping down ahead of the General Election. Throughout his time as an MP, Iain has shown his passion for both the North East and for industry. Most recently, he has been chairing the Select Committee for Business, Energy and Industrial Strategy. Stan is a very hard act to follow but I'm sure Iain will do a great job for the cluster.

I hope the next year sees members build on their successes and you can be sure that NEPIC will be there supporting you all the way.

Ian Swales

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CHIEF EXECUTIVE'S FOREWORD



IAIN WRIGHT
Chief Executive, NEPIC

It is a real honour for me, as one of my first acts as the new chief executive of NEPIC, to be able to write a few words for its award-winning Directory.

Stan Higgins has led the organisation since its formation in 2004, and has done so in an admirable fashion. His vast knowledge and experience of the industry and commitment to NEPIC as a cluster has quite rightly been acknowledged with a range of awards.

It is going to be somewhat daunting to try to follow Stan as the new chief executive, but he has been very kind and extraordinarily supportive to me, as have NEPIC's professional team and many of the members I have already spoken with.

Having been born and living in the North East virtually all my life, I'm really proud of the impact the region's industry has had on the economy over centuries. However, I'm not so much interested in the past, but on the focus of a great future.

This sector in the North East already has impressive economic weight, with half of the UK's chemical industry and a third of all pharmaceutical industry based in the region. However, a flurry of recent investments, totalling hundreds of millions of pounds, have been game changers for the industry and shown how this sector, founded on science, innovation, flexible and adaptable skills and competitive manufacturing, can and will be the basis of a bright economic future for the North East.

This is the reason I wanted to join NEPIC - I wanted to be part of a sector with a great potential future that will power economic prosperity and job creation in the region and across the country.

I look forward to meeting as many members as soon as possible. I'll never lose sight of the fact that NEPIC is an organisation run for the benefit of the members as a means of ensuring that your concerns are met and that greater collaboration, co-ordination and scale will lead to tangible benefits for you, your business, your employees and your customers.

This Directory is an important part of this aim - of being able to showcase NEPIC members to a large audience that can result in increased commercial opportunities and growth in sales.

I'm passionate about North East industry, and I can't wait to work closely with members, Ian Swales, the Leadership Team and the great staff to ensure that we build on NEPIC's success under Stan's leadership and see a great future for the industry.

Iain Wright

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FAREWELL



STAN HIGGINS
Outgoing Chief Executive,
NEPIC

As I put pen to paper, this will most likely be my final piece for NEPIC after 15 years at the head of the ship - and what a journey it has been.

I look back with affection to the start-up of the Cluster in 2004, initially as Pharmaceutical & Speciality Cluster and the leg work that was put in to get around the many business leaders to generate support for the cluster concept.

It was a valuable time, as so many understood the need to raise the profile of the sector, whilst also requiring a better understanding of the capability of their neighbours. The support and guidance of Ian Shott (Chirex), Bob Coxon (Synetix), Dai Haywood (Thomas Swan), Brian Lumsden (MSD), Gordon Ollivere and the RTC North team was crucial during this period.

Soon a growing appreciation surfaced from Wayne Barnacle and Neil Etherington that both the Teesside Chemical Initiative and the P&S Cluster were working on the same cross cutting themes; whether in the chemical, pharmaceutical, biotechnology or polymer industries.

This was hugely important in bringing all these related process sectors together and we suddenly had scale and folks started to listen. United in our association, we have together made a lasting impression regionally, nationally and internationally.

As a collaborative, the cluster undertook all the classic cluster development phases described by cluster guru, Michael Porter, and others. Agglomeration - bringing companies together; internalisation - learning how to work together and in what areas and finally, Externalisation - raising our profile outside of the region by working with national and international bodies to further the businesses of our members to the advantage of the local economy.

And we are now well on our way, such that we are far from the dying sector many believed us to be and are now recognised as the life blood of our local economy and witnessing the biggest investment spike in a generation. This must be our biggest success.

As a scientist, I like to see this enumerated, therefore, winning and supporting over 90 investments and carrying out supply chain work with more than 700 SMEs; work that has had a cumulative economic impact of £3.5 billion GVA on our local economy and now runs at ~£0.5 billion each year. NEPIC industrialists and the NEPIC team should be very proud of the part they have played in that.

I wish to thank all in the industry for your support during this journey. I know that our new chief executive, Iain Wright, will be just as well supported as NEPIC moves into the next phase of development and growth. I personally believe that this is an appropriate time for a "reboot" and reconfirm what we should be doing to support our members and to further sustain the local economy.

Good luck to Iain and the NEPIC team - I will certainly be watching on with interest and intrigue as the Cluster enters this exciting new phase.

Stan Higgins



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ABOUT NEPIC

NEPIC is an award-winning membership cluster organisation working with the chemical-using industries in the North East of England.

We cover a broad sweep of chemistry focused industries including petrochemicals, polymers & materials, fine & speciality chemicals, pharmaceuticals, biotechnology and renewables.

Together with our member companies, we work to build upon the already powerful industrial base located here and make this region one of the most competitive and successful chemical-processing locations in Europe.

We are privately-owned, led by industry and work to support cluster members to become successful and sustainable organisations, in a collaborative business environment that helps them to grow.

Formed in 2004, NEPIC was the result of the merger of two industry bodies - the Teesside Chemical Initiative, who represented the heavy base chemical in the south of the region, and the P&S Cluster who worked with the pharmaceutical and life science businesses that were predominately based towards the north.



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AND SUSTAINABLE
ORGANISATIONS IN
A COLLABORATIVE
BUSINESS ENVIRONMENT.

Steered by Michael Porter's theory of clustering for competitive advantage, NEPIC's remit was clear - reconnect the fragmented industrial sectors - a result of ICI's exit from the region in the late 90's - and create an industrial powerhouse to rival all other global locations.

In 2014, NEPIC was the first UK cluster to receive the GOLD standard ESCA accreditation for cluster excellence - and in 2016, achieved £3.5 billion of Gross Value Added to the region since inception. ■

THE TIME OF OUR

INVESTING IN THE FUTURE OF NORTH EAST CHEMICALS



THE ONLY WAY TO FORECAST IS BY USING LEARNINGS AND DATA FROM THE PAST TO INFORM THE IDEAS OF THE FUTURE.

The fact is that, right here, right now, we are seeing the highest levels of investment into the process sector of North East England, and therefore the UK, in a generation. However, it is difficult for many to appreciate this, even sector insiders.

The current elevated level of investment and the many ongoing projects are not being made by companies that are household names. Furthermore, the substances being manufactured are not those that the consumer is directly familiar with; despite these materials underpinning many day-to-day consumer products and household activities. Therefore, such a bold, comparative statement can only be made when the data has been monitored over a significant period.

Even for those working in a company in the region's process sector, it is only through the collaborative information shared and compiled for them by NEPIC, do they become aware of the investment activities of their peers. This is rarely information discussed between companies within the sector, although those supply chain companies involved in certain projects may of course be briefed. Due to the need to demonstrate the vitality and strength of the sector, the ability to

collate and put such information into context for the region's industry was one of the early drivers in the creation of NEPIC.

The reality of day-to-day life is such that while many carry on doing their jobs, most industry knowledge is supplied in "bullets" of information. Snippets of news gleaned from the TV and radio or a quick glance at the newspaper or trade magazine.

One of the roles of NEPIC is to keep industry executives and stakeholders aware of what is going on in the industry – offering a big picture view. The only way of putting this type of information into context is to keep the data, analyse and use it to not only look back but also make predictions and help forecast the future.

Pre-2003 when the regional development agency, like many stakeholders, thought that the chemical and pharmaceutical industry was in decline in North East England, the important work of the Cluster, in pooling knowledge of the sector was a real turning point. By 2005, 200 chemistry-using companies were identified as operating in the region, despite the numbers coming out of the Office for National Statistics. We had indeed discovered the impact of the dreaded branch office effect!

LIVES

In fact, our sector easily represented half of the region's economy. In addition, the process industry leadership, collaborating through the newly formed Cluster, identified almost £5 Billion of potential future investments into the sector. Brave enough to publish this in a report that received Parliamentary recognition, this list of projects was our first positive view of what could be achieved.

With hindsight, and using our data, we can see that this was real turning point. For the first time the many doubters, in and outside of the industry, realised that the process sector has a future here. Furthermore, that it frequently undergoes regeneration with new products and processes being introduced on a regular basis.

Everyone hears and can recall the closures that occur but rarely do they appreciate the changing landscape of the industry. This realisation has also underpinned the importance of innovation and led directly to the activities now established within the Centre for Process Innovation.

Enabling the Cluster to crystallise, and a deep industrial understanding to be shared, has made this region the real headquarters of the chemical

industry in the UK. And in the years that followed, NEPIC continued to be challenged by its industrial members to maintain this work as a key strategic aim to support the rejuvenation and growth of the sector.

Rejuvenation and growth are both enabled by helping to attract and capture investment from new and indigenous investors. Analysis and maintaining sectoral knowledge - coupled with understanding the capability of the region's infrastructure, planning, skills and supply chain - all support this growth.

These early strategic activities were then extended to help strengthen companies, in particular, small businesses. SMEs operating within the sector's supply chain were mentored into new business and innovation support provided; whether in new products, processes, working practices or benchmarking, along with the sharing best practice to improve efficiency.

The combined outcome from these actions enables us to look back and report that NEPIC's project portfolio has most certainly delivered! The Cluster have dealt with 196 significant potential investments into local industry.



FEATURE
NORTH EAST CHEMICALS



...continued.

With our support, and that of other regional partners, ninety-five of these projects have been landed, bringing much needed new economic activity to the region during construction and subsequent operation. In total, more than £6 Billion has been invested since 2005.

The reality is that some of these investments have been transformational for the UK. The SABIC Low Density Polyethylene plant turned the UK from an importer to an exporter of this important product. You can also see how this region has contributed to the renewable electricity output, with both biomass and societal waste being used as fuel.

Furthermore, if you look at the current Sirius Minerals Polyhalite and SABIC Ethane Gas projects, you can see that the first will represent 7% of UK future exports, whilst SABIC's Cracker conversion to ethane, and commitment to bringing the gas from the USA, underpins one of the most important industrial "machines" in the UK economy - the Wilton Cracker. It is only by looking back do we recognise that, contrary to

what many believe, industry has gained far more than it has lost.

However, looking forward, how does this information forecast the future? As everyone knows, the only way to forecast is by using the learnings and data from the past to inform the ideas of the future. We at NEPIC have collated and analysed the investment data for the chemistry-using industries in North East England for almost 15 years.

Using this data, and industry nous, we have become adept at assessing the investment risk factors and forecasting the overall outcome from our investment portfolio. Taking out of our portfolio those projects we believe to be low probability, the current active project portfolio includes 21 high probability investments. From this, our best estimate is that, over the 3 to 5 years, industry will invest a further £3 Billion into the region.

However, the above statement needs to be understood. To increase the probability, and deliver this investment, we cannot be complacent. We need more marketing of the region's capabilities to grow the portfolio, remembering that even high probability projects can be held up or terminated.

We are also yet to see the impact of Brexit on investment. Most importantly, industry has indicated, via NEPIC's recent integrated industry study, that we need Government support for our infrastructure projects, including carbon capture, usage and storage; coal as a raw material for our industry and private wire energy networks for our three main chemical parks at Billingham, Wilton and Seal Sands. These would be a huge incentive for greater levels of investment from the global chemical sector and its downstream industries.

North East England is thriving and very much open for business. We welcome further investments from the chemical, polymer, pharmaceutical and biotechnology sectors. This region has the supply chains, skills and supportive communities that can make projects successful in every phase of their lifespan. Bring your project to the NEPIC team and we can help with its successful delivery. ■





INDU

WE N

INDUSTRIAL STRATEGY

NEED IMPLEMENTATION NOT MORE SMOKE & MIRRORS!

The UK Government seeks to build a modern industrial strategy that will address long-term challenges and deliver an economy that works for all. Although initially delighted that Government was to introduce a strategy based on industry growth, we became somewhat despondent when the first draft barely mentioned Industry and its infrastructural requirements.

Unfortunately, it seems that the academic and politic have exerted their control, using the word innovation to mask all the detail we need to take industry forward. Such action stops industrial collaborators with real game changing projects from getting down to investment specifics, because these specifics need deep technical and business understanding, along with effective public and private collaboration and great financial commitment.

Seeking to rectify this somewhat titanic anomaly, NEPIC canvassed its members with regard to what a successful industry strategy might look like to our sector. A collective submission was put to Government, which ultimately emphasised the needed for joined-up thinking - and more importantly, joined-up doing.

First and foremost, we outlined our requirements for a strategy that provides secure, long-term, globally-competitive supplies of both energy and feedstock.

Furthermore, we highlighted that as an industry we recognise a call for further use of fossil fuels will raise flags, however, requested that any such use be aligned with climate targets. Therefore, a strategy must seek to minimise emissions by incentivising the use of carbon capture utilisation or storage and recognise the need for the chemical industry to transition from fossil-based feedstocks and incentivise the introduction of renewable alternatives.

We seek to optimise support for manufacturing clusters, as seen on Teesside, Humberside and Grangemouth, to bolster their competitiveness with similar hubs in Europe and around the world. There is a very real opportunity in places such as Teesside to develop a powerful integrated supply chain that helps create more wealth and employment. This could be achieved by a strategy that supports the creation of private wire networks and tax relief for energy created and used within these locations by energy-intensive industries.



WE HOPE THAT GOVERNMENT STAYS FOCUSED ON INCENTIVISING SCALE-UP, IMPROVING LIFE-LONG LEARNING & RECOGNISING THE IMPORTANCE OF PLACE IN THE INDUSTRIAL LANDSCAPE.

Effort is also needed to publicise the industrial capabilities of this region, and its industry, to encourage owners to collocate and relocate from abroad. Post-Brexit, this must include the opportunity to create free trade zones, as has been done in several competing locations outside the UK.

Additionally, the UK's Industrial Strategy must address the loss of EU grants post-Brexit but also take this opportunity to use any replacement funding in the most appropriate way. The materials and chemicals sectors, as the most significant exporters to EU countries, need to be able to continue to have access to this market without tariff barriers.

We must introduce targeted intervention by helping to fund infrastructure, scoping studies or policy changes to underpin the overall strategic objectives. Any interventions should pass the following tests: Does it help with energy security? Does it support our CO2 reduction goals? Interventions should also provide direct support to industrial developments and not just research-based programmes via Universities and other Centres of Excellence.

We call for an alignment of disparate local, regional and national government objectives. It's a sorry state of affairs in the North East, whereby local support to cleanly develop the region's large coal is met with national indifference. Despite the huge industrial support for clean coal technologies, we find technology developed at home is taken

abroad and used immediately by our competitors. We must have industrial leadership on such matters with policies that ensure industry meets the highest standards set by society. Hence, we need a strategy which ensures that all relevant Governmental and local Government departments are aligned.

We ask that the hugely positive impact the chemical industries have on the UK economy is recognised. Over recent years this sector's effect has been very much underplayed, as opposed to other ill-defined sectors such as Advanced Manufacturing. What are chemicals, polymers, biotech, and pharmaceuticals if they are not 'extremely advanced manufacturing'? Our leading chemistry-based, technological capabilities need to be better promoted.

There is much evidence that we need a strategy that reinforces the continuous development of a skilled workforce and improves productivity and efficiency to meet the challenges of global competition.

And last but certainly not least, more support for implementation. An Industrial Strategy fit-for-purpose needs to be owned in partnership by Government, industry, trade associations and cluster bodies. Its implementation must be supported financially with appropriate programmes and significant infrastructure projects. What is more, the voice of individual companies must not dominate in its implementation.

Looking forward, as an industry sector, we are optimistic that, following a consultation tour that invited contributions from industry, businesses, community groups and workers across the North East and the rest of the UK, Government is now far more open minded about its role in support of industry - and the role of industry clusters.

We hope that, through an Industrial Strategy, the country's productivity could be improved and economic wealth spread - and that Government stays focused on further incentivising scale-up, improving life-long learning in the skills agenda and recognising the importance of place in the industrial landscape. ■



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INNOVATION PARTNERSHIPS IN THE CHEMICAL SECTOR



GRAHAM HILLIER
Director of Strategy
& Futures, Centre for
Process Innovation,
Wilton, UK

Innovation is a complex, systematic process for any industry. Many things must be considered and many challenges are faced during the journey from invention to the market, however strategic collaboration can be the key to successful innovation.

The chemicals sector, as well as many other manufacturing industries, is facing new challenges as demand grows for increasingly sustainable low carbon processes that can produce more personalised and customised products in parallel to more conventional products. As a result there is a trend to integrate petrochemical-type processes that are driven by economy of scale with more flexible processes that can produce smaller batches of multi-functional products. In addition, there is a growing pressure in the chemicals sector to address resource productivity and efficiency. This often involves using wastes or natural products as feedstocks for the manufacturing process. This is a key step in creating a new generation of lower carbon products that are more sustainable.

To enable the industry to evolve towards these environmentally friendly and customised products, innovation is essential.

The process of innovation is sometimes misunderstood and can be confused with invention. Invention involves creating or discovering something entirely new that the market has not seen before. Innovation, on the other hand, takes inventions and transforms them into new products that create value for the economy and deliver an outcome that is desired and used in everyday life. When managed effectively the systematic stages of innovation converts an invention into a commercially-viable product and the means to produce it.

Despite the goal of commercialisation, each step in the innovation process is unique and complex. It involves addressing several different factors. If all of them are not addressed and in place the potential product cannot progress to market. *Continues...*

...continued.

For example, understanding the market need is imperative, there must be enough actual or perceived need for a new product and enough continuing demand once the product is launched; if nobody wants the product, it does not matter how clever it is, it is of no use. Also essential is ensuring that the process is capable of producing the product at an appropriate scale; if it cannot be manufactured on a commercial scale, it is not a viable product.

Innovation often requires expensive equipment to assess, prove, scale-up and develop the process; however, this can be a challenge due to the cost and the associated risk. Innovation and technology centres like CPI and its partners in the High Value Manufacturing Catapult provide these specialised innovation services to partner organisations to help them through the innovation process.

Once demand is assured and a manufacturing process has been proven at small scale the next stage of innovation requires proving and building production capacity at a commercial scale. This involves bringing together or engaging multiple businesses in the supply chain.

Without a supply chain that stretches from raw material to finished product, and taking into account the factors in dealing

with end of life, it will be impossible to manufacture the product and deliver it to market.

All of these stages of innovation, from initial concept through scale up and right up to market entry are dependent on having a system of assets and knowledge in place. These factors can include people, money, scientific knowledge, intellectual property and innovation assets.

Importantly, no single company or person can accomplish all of these factors alone. Therefore, partnerships are crucial to the success of innovation, whether it is a researcher, an SME or even a large corporation, the path to commercialisation will be difficult to complete without collaboration.

A typical collaborative innovation partnership often involves SMEs, large corporations, universities and the public sector, working together to meet a common goal. Together these partners can address all of the necessary factors for innovation. For example, an SME might have

the underpinning science, scientific expertise and intellectual property for a solution to an industry problem, larger corporations will have business competences for commercialisation and the public sector can help gain

access to financial assets. As well as partnering for shared assets, companies also collaborate to share people. Bringing together the right people at the right time is essential for successful innovation, as the need for different people will change as businesses progress along the innovation continuum.

In the chemicals industry specifically, collaborative innovation requires the combined knowledge of not only the chemicals industry. For example, the manufacture of pharmaceutical products is shifting from mass-market blockbuster drugs that treat general ailments, to targeted drugs aimed at treating a single disease for a specific patient in a manageable way. Innovation in this area will require expertise in biologics to develop these targeted drugs; formulations

to create patient specific deliverables and even printed electronics working on intelligent packaging to gather feedback for ongoing innovations.

Today, innovation centres, such as the Centre for Process Innovation (CPI), are equipped to assist the chemicals sector in moving through the innovation continuum in response to the changing market. These centres can provide the assets, people and knowledge required by chemical companies

“

INVENTION VIA
INNOVATION TO
THE COMMERCIAL
MARKET WILL BECOME
COMMONPLACE
THERE SO MUST
COLLABORATIONS

breadth of practical expertise to enable horizontal innovation. Innovation centres can not only be supportive partners themselves, but can also help companies to find the right partners and engage with the supply chain to be able to deliver a successful project into the market.

To help companies address the challenges CPI developed the Innovation Integrator® approach. This allows partners to identify whether they are at invention, innovation or commercialisation and to identify the key elements of the innovation process that need to be addressed.

The future of the chemicals sector therefore depends on its ability to embrace innovation. With the movement towards personalised and sustainable products, producers must evolve and adapt their processes. As volumes of products become smaller for more specific products, producers must understand even more about their products, the supply chain, and how to operate effectively. Moving from invention via innovation to the commercial market will become commonplace, and therefore so must collaborations at all scales of business. ■

CHILDREN 'CHALLENGE'

TO CREATE FUTURE WORKFORCE



The Centre for Industry and Education Collaboration (CIEC) focuses on highlighting Science, Technology, Engineering and Mathematics (STEM) opportunities for young people by building visible links between science education and its application in industry and related careers. Through this work, CIEC aim to increase and sustain the number of children considering a future within industry and science careers, whilst developing positive relationships with industry.

CIEC supports a relationship between schools and industrial companies, who wish to actively promote an ethos of responsible care, stimulate a positive reputation for the entire industry and their own business interests.

The 2013-formed Chemical Growth Partnership identified the need to build a strong, well prepared workforce, whilst highlighting that the sector continues to under-recruit to meet future projected demand and that despite requiring some 33,000 apprentices and 37,000 graduates by 2020, the projected in-take sits at only 21,000 and 18,000 respectively.

Among the suggested actions for tackling these issues is to support the direct work of employers into schools - an action that is fully

INDUSTRY



aligned with CIEC's aims and activity. Furthermore, the CIEC led Children Challenging Industry programme was specifically mentioned under the recommendations for skills development in the CGP strategy document.

Through initiatives such as Children Challenging Industry, CIEC can foster close links between the Chemical Industry and school children who may know very little about the practical application of science in the working world. These links help to dispel negative attitudes towards industry and generate a positive experience of STEM learning, whilst also educating students of the benefits industry has on their everyday lives.

"One of the most rewarding and inspiring aspects of our work has been taking the children on site visits to companies within their local region. We have taken these site visits to exceptional levels - providing an increasingly hands on experience for the children, inspiring them to really connect with industry" says CIEC's Development Manager, Louise Wise.

Such site visits allow the students to witness first-hand the science in action and whilst providing an experience they will never forget. Louise continues: "The children love seeing how industry works, and the experience is hugely rewarding for each of our industry host companies who are inspiring a new generation of scientists and engineers to take science further in their academic careers."

The Children Challenging Industry programme also provides staff training by introducing teachers to real-life industrial, science-based activities to further engage the children in the classroom. This important aspect of the programme supports the continued professional development for teachers and focuses on Working Scientifically, exploring the wealth of CIEC resources that can be accessed on-line, creating contextualised classroom links with industry.

This year marks the 20th anniversary of CIEC's Children Challenging Industry programme, in which time over 45,000 children and 10,000

teachers have taken part in the initiative. The North East has always been one of the programme's greatest supporters, with a vast number of these site visits hosted by chemical companies in the region - the majority NEPIC members.

Over the course of the relationship, NEPIC companies have donated tens of thousands of pounds in support of CIEC's work and introduced them to many fantastic industry partners - and without your support they simply could not continue to engage our scientists for the future.

Louise concluded: "CIEC simply could not fund this activity without the continued generosity of NEPIC members, so thank you! We know how important it is to continue this type of outreach and hope that you might continue to support us to take Children Challenging Industry into another hugely successful 20 years."

If you would like to know more about the programme or for opportunities to support the work of CIEC please contact Louise Wise at louise.wise@york.ac.uk

INDUSTRY 4.0; REVOLUTIONISING THE CHEMICAL INDUSTRY

A lot of positive hype has built up about Industry 4.0 over the last few years, with many manufacturers agreeing that what is being referred to as the Fourth Industrial Revolution will have a substantial impact on the sector.

Industry 4.0 is essentially the trend of automation and data exchange in manufacturing technologies. This has been made possible by developments in technology and digital computing; sensors collecting data - converting the physical to digital - along with real-time analytics and automation control that allows optimisation, for example, of product and process control and utility use.

Industry 4.0 and big data can also help predict the outcome of a research and development investment - increasing understanding and potential new combinations. Furthermore, it will allow automation of manufacturers' maintenance and supply chain planning and better forecast demand, management of stocks and work-in-progress, labour and ultimately impact the bottom-line.

Driving such innovation is the

realisation that much time is being wasted through production and back office systems not being connected. By creating smart factories, we can transfer data in real time and understand exactly what is happening ahead of problems long before they would normally be apparent. And with downtime sometimes costing as much as £20k per minute, smart factories will certainly revolutionise the way we do business.

Industry has found many ways to collect data and use it independently. One of the problems, however, is that all those many IT systems will have the data in several different formats. Even on the same multi-unit chemical plant, if built up or modified over several years, the construction data and operations systems may well be different for each unit. While almost the same asset and operations information is collected, collated and used, the data management systems will differ. This challenge is to integrate these systems to produce real time, meaningful information.

Despite the unarguable benefits, inevitable concerns regarding cost and increased cyber security risk

ASSET PROTECTION IN THE PHYSICAL AND DIGITAL DOMAINS



In today's complex and ever-changing world, protecting your assets goes beyond the simple maintenance of physical equipment. The increase in 'smart' systems and the 'Internet of Things', extends the range of your critical assets to include data, networks and web-based customer interfaces. Achieving the optimal balance between costs, risks and performance across both physical and digital assets requires a sustainable, whole-system, whole-life approach that is aligned with your key business drivers.

To be truly effective, your asset management strategy needs to cover the asset's full life cycle. It can be applied from initial concept design, through procurement and construction, into operation and maintenance, and on to degradation, decommissioning and replacement. Facing this challenge – to manage your assets, safely and in compliance with legislation, while still maximising production and return on investment – is no mean feat.

Frazer-Nash can help

We can provide the tools, techniques and technologies that enable you to manage your critical assets, underpinned and informed by the best-practice expertise we've developed from our work across a range of market sectors. Below are just three examples of how we can help you.

Helping you to manage your risk

Identifying and understanding the drivers that affect the through-life safety and reliability of your assets allows you to predict their degradation and define an appropriate inspection regime, and informs your decision-making about maintenance and replacement.

Using risk-based inspection techniques, coupled with fitness-for-service assessments of plant integrity, can help you to operate your assets safely

and reliably, enabling you to manage potentially dangerous defects that might otherwise result in failures, unscheduled outages and extensive repairs. Fitness-for-Service assessments are completed before pre-scheduled inspections are undertaken. They define inspection acceptance criteria before any outage begins, in anticipation of discovering defects. Through reducing the need to respond reactively to inspection findings, maintenance managers are empowered to make rapid, informed decisions and adhere to planned outage schedules.

The data gathered during these assessments about the state of the system can then be used to make asset management decisions, informing future improvements that yield significant safety, cost or reliability enhancements.

Helping manage your ageing assets

Ageing system and infrastructure issues are a threat to your safe and uninterrupted business operations. Whether these are control systems that have exceeded their design life, key components that are no longer supported by the manufacturer, or incompatibilities between modern and legacy systems' integration, they can result in downtime, production issues and financial losses. Further costs are incurred in acquiring the specialist knowledge required to maintain or repair these ageing assets from a diminishing pool of companies.

Through applying a structured approach to your asset management you can identify your process-critical systems and components, and consider the adequacy of sufficient spares for their remaining lifespan. Considering timely forward planning for the replacement of ageing systems will help avoid the extended downtime and unplanned outages that can occur if systems or components fail.

The qualification of new components need to be assessed, to make sure they meet the same reliability requirements as the obsolete ones they replace, and that they perform their intended task correctly, without introducing any unforeseen operational issues. Similarly, extending ageing plant to include new or additional functionality requires extra thought and planning, to manage the interfaces between the new and old plant.

Helping you to manage cyber threats

Your computer-based process control and IT systems may be the targets of attack, and changes in technology are increasing the risk. The installation of replacement components with 'smart' capabilities, such as wireless networking, can result in an open connection between your network and the Internet. An attack can compromise your safety-critical systems, or cause control system degradation that affects production targets and your ability to achieve contract deadlines.

Through helping you identify your key assets and points of vulnerability we can identify your cyber-based business risks, aligned with both your commercial priorities and regulatory obligations. In drawing up risk management and incident recovery plans that reflect the realities of your business, you gain the confidence of those who will be putting the plans into practice. The need for cyber protection applies as equally to legacy systems, as it does to upgrade or renewal programmes, and cyber security should be designed in from the start and last throughout the asset's life.

Frazer-Nash is a leading systems and engineering technology company. We excel in solving complex engineering challenges for clients in the process, aerospace, transport, nuclear, marine, defence, power and energy and oil and gas sectors.

are being raised. At a time when manufacturers face challenging trading conditions, they can also be cautious about investing further.

However daunting this may seem, it is being done with the eyes on the big prize: improved business performance. By organising its data, a company can compile it from multiple sources, reorganise it and use it innovatively to improve its overall operations.

Many executives will be alarmed at the overwhelming complexity that big data management appears to present. However, as John Gilbert said about implementing total quality management - on naming his book on the subject *How to eat an elephant? - the answer is 'one slice at a time'*. This has to be the approach a big data project must take. The only feasible way is to break it down into sizable, yet manageable, parts.

The availability of people with the necessary IT and mathematical skills, and with chemical industry know-how, is limited. A bite sized approach should enable some people already in the organisation to pick up and run with these skills with some external guidance. Writing in *Speciality Chemicals Magazine*, Sean Milmo reports that this is the approach taken by Eastman Chemical, which has set up a business analytics group comprising

'people who are voracious learners and exhibit incessant curiosity and persistence'.

Meanwhile, other businesses have taken the slice-by-slice approach to bring early results. AkzoNobel has begun to use its big data to improve customer service, for example, it is using a digital tool to accurately predict potential fuel and CO₂ savings offered by anti-fouling coatings in its marine coatings business.

Milmo also reports that manufacturers of crop protection products and seeds - Dow, DuPont, Monsanto and Syngenta - are becoming digital farming specialists through the provision of guidance based on big data from the analysis of weather, agronomy and specific soil conditions. Indeed, Hugh Grant, chairman and CEO of Monsanto has recently revealed that his company is aiming to transform itself into a data science company.

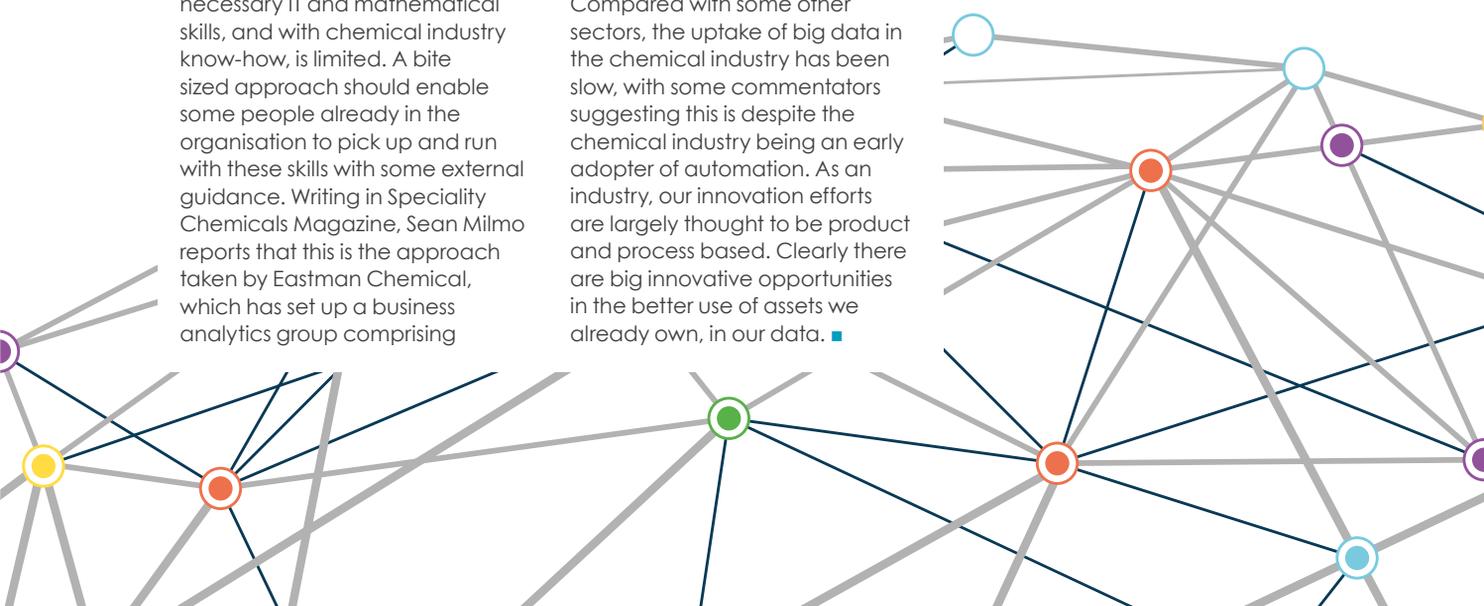
Compared with some other sectors, the uptake of big data in the chemical industry has been slow, with some commentators suggesting this is despite the chemical industry being an early adopter of automation. As an industry, our innovation efforts are largely thought to be product and process based. Clearly there are big innovative opportunities in the better use of assets we already own, in our data. ■



ONE SLICE AT A TIME. THIS HAS TO BE THE APPROACH A BIG DATA PROJECT MUST TAKE.

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A HEALTHY OUTLOOK FOR NORTH EAST PHARMACEUTICALS

North East England boasts a healthy and growing pharmaceutical sector and, with several post-referendum, large-scale investment announcements, global manufacturers pledge both their confidence and commitment to this thriving industry.

Home to some 160-life science and healthcare firms, and supported by 85 specialist supply chain companies, North East England's pharmaceutical sector generates a combined turnover of £10.5 billion.

It produces 33 per cent of the UK's GDP in pharmaceutical manufacturing, with some 95 per cent of finished products exported to global markets.

The region's highly developed scientific and engineering skills have attracted many of the world's largest pharmaceutical and biologics manufacturing companies, including global players such as MSD, GSK, Aesica Pharmaceuticals UK, Piramal Healthcare and Sterling Pharma Solutions.

A HEALTHY SECTOR

The world's second largest pharmaceutical manufacturer, GSK, employs over 1,000 staff at its 60-acre Barnard Castle site and recently announced a £94 million investment to boost production. The investment, which includes a new advanced 'factory of the future' and associated works, will support next generation medicines to treat auto-immune diseases, oncology, pre-term labour and HIV.

FEATURE

PHARMACEUTICALS

The Barnard Castle site was the FTSE-100 firm's first manufacturing and packaging suite launched in the 1940s. Citing this latest investment as the business' vote of confidence in the UK and heralding the region for its skilled workforce and world-leading scientific capabilities, the pharmaceutical will continue to make a significant contribution to the local economy for many years to come.

Meanwhile, MSD's Cramlington site is a global centre for stability testing; enabling the firm to be a worldwide supplier of bulk tablets and regional supplier of finished packs. MSD is the UK subsidiary of Merck and, via its North East base, supplies approximately 20% of the company's tablet volume. Merck has also selected their Cramlington site for their first investment into continuous manufacturing further validating the site as a world leading pharmaceutical manufacturing centre.

Morpeth-based Piramal Healthcare is a leading global pharmaceutical contract development and manufacturing organisation. The North East site, which employs 350+ staff,

specialises in API development and manufacturing, formulations development and manufacturing, commercial packaging and clinical trials manufacturing and supplies. The site underwent a £15m capacity expansion for Hormonal manufacturing in 2013, with further investments on the horizon.

Furthermore, Arcinova, an Alnwick-based research and drug development company, is expanding its capabilities, including the construction of a new active pharmaceutical ingredient manufacturing plant. The expansion project will include a suite of drug development activities to be offered at the site, in addition to the construction of a 20-litre scale API manufacturing plant. In September 2015, the Alnwick site, an operation site for Covance, was proposed for closure. Arcinova acquired the site from Covance in February 2016.

Teesside is the base of biologics-giant, FUJIFILM Diosynth Biotechnologies, a world leading cGMP Contract Development and Manufacturing Organisation supporting partners in the





THE EFFECT OF BREXIT ON THE PHARMACEUTICAL SECTOR IS TO DIFFICULT GAUGE...THE REGION HAS AN ESTABLISHED MANUFACTURING INDUSTRY AND NEWLY DEVELOPED TECHNOLOGY SUPPORT ORGANISATIONS.

biopharmaceutical industry with the development and production of therapeutic candidates.

Developing a new biopharmaceutical is an expensive and advanced technical process, which the firm are continually looking to optimise. Built on this knowledge, FUJIFILM are investing £9m in expanding process development capabilities to meet growing global demand for the manufacture of mammalian antibodies. The Wilton-based facility is scheduled to be operational in summer of 2017.

The region is also home to finished dose and active pharmaceutical ingredients manufacturer, Aesica Pharmaceuticals UK. The fast-growing Northumberland firm was formed following a management buyout in 2004, before being sold to international healthcare company, Consort Medial plc, for £230m.

The firm is now established as one of the UK's fastest growing companies employing over 1,300 people - increasing 10-fold from just 130 in 2004. The company has six pharmaceutical development and manufacturing sites across Europe with its UK Head Office based here in Newcastle upon Tyne.

Dudley-based Sterling Pharma Solutions concentrates on contract research, custom synthesis and contract manufacturing services for Active Pharma Ingredients and intermediaries for the pharmaceutical industry. It is leveraging its expertise in a wide range of chemistries and ability to deal safely with hazardous chemicals and expects to show significant short term annual growth of around 40%.

A SUPPORTED SECTOR

The region's pharmaceutical manufacturers benefit from the wider, cross sectoral culture and expertise in highly efficient and lean manufacturing, resulting in several pharmaceutical sites being world leading in quality and unit cost of production.

Whilst North East England is mainly recognised for its strength in pharmaceutical manufacturing, it is home to a full capability in the pharmaceutical value chain,

drug discovery and development, clinical research and development, clinical trial management, pilot-scale manufacturing, full-scale pharmaceutical ingredient and intermediate manufacturing, as well as final product formulation, packaging and distribution.

The region is also home to the rapidly growing drug discovery company, Shield Therapeutics, and the ground-breaking DNA diagnostic company, QuantumDx. In addition, we have specialist biotech and pharmaceutical facility construction companies such as WH Partnership who make factories in modular format in Gateshead for assembly across the globe.

Fundamental medical research is undertaken in this region's two Russell Group universities. The University of Newcastle was the first in the UK to receive a licence to perform research on embryonic stem cells and is today a leading Centre for such activity. Newcastle has built on this expertise and is now a leading Centre for induced Pluripotent Stem Cells (iPSCs) used for pre-clinical research.

The region also has two highly respected Pharmacy schools. These not only contribute pharmaceuticals expertise to the regions' pharmaceutical companies but also high calibre graduates.

Continues...



MEET THE MEMBERS

The region's chemical-processing networking event of the year

NEPIC's Meet the Members Conference & Exhibition has over the past 8 years grown into the networking conference for chemical-processing businesses and suppliers in North East England.

The 2018 conference will return to the Wynyard Hall and investment project opportunities remain high on the agenda - along with one-2-one mentoring sessions and networking in an abundance with members of the UK's most influential business cluster.

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...continued.

In addition, both Newcastle and Durham Universities have considerable research strengths in the exciting field of continuous pharmaceutical manufacturing.

Translational research is channeled through the Clinical Trials Unit and the £4.5 million Newcastle Clinical Research Facility that links medical research in the University of Newcastle to the clinical excellence of the regional NHS trust.

A DEVELOPING SECTOR

Most recently, the £38m National Biologics Manufacturing Centre (NBMC) based in Darlington has opened its doors. The new Centre will provide companies with open access facilities and expertise to help them develop, prove and commercialise new and improved processes and technologies for biologics manufacture.

A new Medicines Manufacturing Innovation Centre is also planned, an API-focussed counterpart to the NBMC. A partnership has been set up by CPI and the University of Strathclyde to

develop the MMIC, with strong recommendations that the proposed Centre should have a presence in the North East.

Furthermore, a National Formulation Centre is currently under construction at the NETPark science park near Sedgfield. The £28m project will also increase the region's innovation capacity for drug development and manufacture. The region also hosts the National Innovation Centre for Ageing, a £40m investment working with business to develop therapies for the ageing population.

Looking forward, the effect of Brexit on the pharmaceutical sector is to difficult gauge. The potential loss of the European Medicines Agency from London could be negative. However, the region has an established manufacturing industry and newly developed technology support organisations.

We have also witnessed recent investments by MSD, GSK, Arcinova, Accord Healthcare and plans for growth from Piramal, Aesica and Sterling. Local Universities continue to develop the talent needed to support this growth and organisations, such as NEPIC, are in place to help exploit the natural synergies that exist in all significant clusters. ■



ENGINEERING OUR FUTURE

Derived from two Latin words - Ingenium meaning "Cleverness" and Ingeniare "to Contrive" or "Devise", engineering has shaped all of our lives for thousands of years. There are many branches of engineering that together service everything from the research, design and procurement through to fabrication, installation, commissioning to manufacturing, maintenance and decommissioning of ALL capital projects and installations.

Due to the vast role it plays, engineering can't be pigeonholed into a sector in its own right because it is a necessary part of all sectors and impacts every tangible aspect of modern life.

To attract inward investment and new capital infrastructure to a region it is essential for investors and operators to have access to business support organisations, such as a significant and effective engineering supply chain.

North East England is synonymous with engineering. Historically, the region's formidable engineering reputation was built on heavy industries such as shipbuilding, railways, coal, iron and steel. With the passage of time, engineering has diversified and expanded into the emerging industrial sectors with equal recognition for excellence.

Far from being a 'parochial' resource, engineering companies in North East England support national and global industrial enterprises and in doing so make a significant contribution to the regional and UK economy.

It is estimated that there are 2,800 engineering companies based in the region, together employing some 13,000 people. Stockton-on-Tees, situated in the south of the region, was recently cited as housing the highest concentration of engineering and architectural businesses in Europe.

Since its inception, NEPIC has attracted a considerable number of engineering supply chain companies as members, with many playing leading roles in developing the profile of engineering in the region. They have been significant in recognising the need for the region to be perceived as an effective supplier of good engineering support. To this end, they have taken part in numerous knowledge sharing events designed to improve productivity and competence.

Many of NEPIC's engineering member companies deliver excellent support in many areas of engineering. Yet of course, most, if not all, process industry manufacturers have their own

internal engineering resources, which our engineering supply chain augments on a permanent or a "as and when" basis.

NEPIC is always on hand to offer experienced advice to potential inward investors and other organisations on how the local industrial relations scene and traditional working practices might impact their projects. On the rare occasions when problems bubble up to cause industrial action, NEPIC has been able to offer advice to investors. All other local companies are appraised of the situation and its potential to impact them.

To help manufacturers and the supply chain to assess the need for engineering resources, NEPIC has always managed a regional Project and Overhaul Schedule, displaying current and future workload information that helps in the assessment of engineering resource requirements and potential pinch points.

Furthermore, issues such as health and safety, regulatory compliance, workload and workforce compliance are frequently discussed via the NEPIC Tees Valley Engineering Forum, which is attended by the region's manufacturers, Engineering Managers.

Continues overleaf...

ENGIE

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...continued.

NEPIC is intrinsically linked to the Engineering "sector" and has helped many companies to benefit from its networking opportunities and in some cases, establish a presence in the North East.

Stewart Brennan, Managing Director of Tanton Industries, advises:

"When I was the senior project manager for Lotte Chemical LC1 project, which saw their Korean parent invest around £58 million in a new Polyester production facility at Wilton International site, Redcar; we utilised NEPIC's vast experience of the industry and well-recognised source of expertise and advice. It was most useful when developing a contracts and industrial relations strategy to successfully deliver our major project.

Stewart continued:

"NEPIC have a detailed understanding of the engineering construction industry and the supply chain's capabilities locally and nationally. Their grasp of the fundamentals of what works well and what are the potential pitfalls is excellent and I have always found this advice pragmatic and well informed."

Similarly, Ben Elsworth, CEO, brought the MGT Biomass Power Station Project into NEPIC's office during its early stage development. Ben reports that:

"Very early in MGT Teesside's decision-making process to invest £650 million into a new biomass power plant on Teesside, we were advised by several organisations to speak to the local Process Cluster's (NEPIC) engineering expert, who could advise us on issues that may impact on our project implementation.

"NEPIC advised us on contract types, labour and union issues and about the effectiveness of local suppliers in the engineering and construction supply chain. Later, they also met with our chosen engineering construction sub-contractors to ensure they were up to speed with local and national issues that might have an impact during the construction of the project."

North East England is witnessing its biggest spike in chemical-processing sector investment in a generation - further testament to the strength of the region's engineering capability and collaborative approach we adopt to ensure we are always ready to engineer our future! ■

CIRCULAR ECONOMY AND CRADLE TO CRADLE

Back in 1989, two environmental scientists put forward the idea of a circular economy. In their book, "Economics of Natural Resources and the Environment"^[1], Pearce and Turner argued that current economies operated in a linear fashion, with no thought about the reuse of materials and, as a result, humans were using the environment as a seemingly limitless waste disposal unit.

Since that time, there has been much written about how to tackle this problem and many ideas have developed to aid the recycling, reuse or reduction in the use of materials. Despite the application of such thinking, and there are literally hundreds of articles, books and examples of reduced use, recycling and reuse of the Earth's materials, we have not yet enabled a sustainable long-term future for the materials used by our consumer led society.

By 2002, however, the proposition that we "design in" the ability to reuse materials was suggested

when Braungart and McDonough published a seminal book entitled "Cradle to Cradle - Remaking the Way We Make Things"^[2], blending combinations including energy storage, demand side response (DSR), smart networks and raising interconnectivity.

The pair proposed that more creative design ideas were needed to prevent the landfill or incineration of the materials we use - and argued that the well minded proponents of reduce, reuse, recycle strategies were still perpetuating cradle to grave outcomes. The end-game remaining the same, with materials still being wasted and such downcycling of materials not changing the ultimate outcome.

New manufacturing strategies were proposed with the goal of "upcycling" of materials. The big idea being that industry must encourage lifecycle development design into their use of all materials, such that when products do reach the end of their useful lives they

can become either biological or technical nutrients.

We all understand biological nutrients but the concept of technical nutrients? This is the big idea, designing in properties such that materials remain within closed loop industrial cycles - the ultimate scenario for industrial symbiosis whereby waste products turn into raw materials.

Adoption

Over the last 5 years the idea of closed loop industrial cycles has permeated industrial thinking and the term "Circular Economy" has become more common place. It is a phrase that is now often used by politicians, and many other commentators, yet with little understanding of the technical difficulties and extent that societal attitudes must change for these ideas to be effective.

These are big concepts and whole economies and countries need to adopt them if they are



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to be effective. Even if there is extensive adoption and many successes in the future, there will be some materials where the outcomes will not be compliant.

Industry consultants, as they always do, have jumped on the Circular Economy bandwagon. McKinsey^[3] state that "The circular economy aims to eradicate waste - not just from manufacturing processes, as lean management aspires to do, but systematically, throughout the life cycles and uses of products and their components."

Meanwhile, Accenture^[4] state that "A circular economy aims to continuously keep products, components and materials at their highest utility and value. With this model, the materials are constantly cycled back through the value chain for re-use, resulting in less energy and resource consumption."

the gradual acceptance and promotion of these ideas in sectors downstream of the chemical industry is beginning to present new opportunities to the chemical sector.

Acceptance of the Circular Economy concept is being driven faster by the fact that consumers are becoming much more aware of the importance and environmental value of cradle to cradle outcomes for the products that they use.

More and more companies are adopting these strategies for new products coming to market. For example, carpets and fabrics, construction materials - such as cladding, roofing and adhesives - nappies and packaging materials, plus many, many more that are already out there - so much so, that the Cradle to Cradle product certification is building momentum.





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The Cradle to Cradle Certified™ certification mark is licensed to assessors by the Cradle to Cradle Products Innovation Institute, a non-profit organisation that administers the Cradle to Cradle Certified™ Product Standard. This standard was gifted to the Institute by its founders, William McDonough and Michael Braungart in 2010.

Assessment

There are now many international assessment bodies working with companies to deliver these standards. One assessor is SGS, an international quality audit specialist. SGS suggest that Cradle to Cradle Certification has become a rigorous assessment process that can help demonstrate that a product is better for both humans and the environment.

Such certified products can gain market leadership recognition, while helping to meet customers' and market demands. SGS states that their growing portfolio has 209 participating companies in the programme, with more than 5000 product variations in 10 product categories. As of September 2016, the programme reached 440 certifications.

Organisations that certify Cradle to Cradle products assess the material content of the product; how its materials can be reutilised; the carbon management and renewable energy used in its production; how water is conserved through usage minimisation and optimisation of waste water. The product's social fairness is also assessed to determine how it impacts on people and natural systems during its creation, use, disposal and/or reuse.

Cradle to Cradle Certification

There is no doubt that Cradle to Cradle ideas and their extensive adoption will result in greater reuse of carbon molecules. Such developments will ultimately minimise the need for fossil fuel raw materials being extracted from the earth.

To scientists it is clear that, in order to achieve this, we will need to take account of the significant energy input that will be needed to reuse or recycle many manufactured goods in the future. Furthermore, expertise in materials symbiosis and brokerage will grow in importance. This will remain the case even when increased recyclability is designed into all the products that society uses.

There are many Cradle to Cradle ideas that have already been adopted by downstream industries. For example, in electronic or manufactured products components are being removed and reused. This will no doubt increase and material brokerage businesses will grow.

In the chemical industry some products, such as ethanol, are now being made from renewable biological materials, which also produce animal feed and ultimately agricultural nutrients, as well as recyclable water and carbon dioxide which is captured for use in the soft drinks industry.

Many polymers are now reused from plastic engineered components and packaging materials. For example, in the UK, plastic from half of the county's milk bottles is already collected and recycled with the overall goal of 100% recovery. Plastic bottles

are relatively easy to sort and well-established technologies already exist to recover many polymers with developed markets for this recycle. Polyethylene terephthalate and High-Density Polyethylene accounting for some 90 per cent.

Acceptance

The European Chemical Council, CEFIC, promotes several examples whereby Europe's chemical sector has implemented circular economy products. These products include renewable aircraft de-icing fluids; utilisation of new technologies that enable improved water purification and its greater re-use; reuse of waste materials from paint; chemistry that allows carpets to be 100% recycled with a 95% reduction in energy used during their production; extraction and reuse of rare earths from fluorescent lamps; several examples of reduced CO₂ emissions but also new chemistry using this material as an alternative carbon resource.

Be in no doubt, the chemical industry is already identifying the possibilities and bringing several Cradle to Cradle products to market and playing its part in creating a circular economy. ■

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FUTURE RAW MAT FOR THE CHEMIC



What has changed since Doris Neukirken wrote in *Process Worldwide* in 2007? She said "Whether coal, gas or even biomass will replace petroleum as the chemical raw material of the future is not yet clear. However, one thing is certain. Alternatives will be needed in the long term despite that fact the even pessimists predict that oil will be available for the next forty years."

Neukirken continue: "High prices, increasing consumption in Asia and the chaotic political situation in the oil producing countries add an element of urgency to the discussion on diversification of the raw material base. The industry is looking for an intelligent mix and an evolutionary approach to the supply of raw materials."

The chemical industry reportedly uses approximately 2% of annual oil production, yet many companies are researching for alternative feedstock. In 2017, some 10 years later, the chemical

process industry is still at these crossroads. Furthermore, the uncertainty has been "Trumped" as we look to the USA with its shale gas reserves coming into play and further clouding future outcomes.

Despite these efforts, the use of bioresources to make the chemicals needed by society has not yet had a significant impact - nor has the use of municipal solid waste as a raw material - yet both have been shown to be useful for the manufacture some basic solvents. What is more, the technologies clearly have excellent outcomes in terms of climate change, however, they are but a tiny drop in the ocean in the global petrochemical and chemical markets.

Even the best of new technologies find it hard to be financially viable in the light of the fall in oil and related gas prices in recent years. The so called "valley of death" in the technology innovation pathway has for this reason become somewhat deeper.

ERIALS AL INDUSTRY



Cellulose, lignin and glycerine all have their proponents as industrial feedstock that can be utilised with new technologies such as ionic liquids, enzymatic transformation as well as heat intensive processing to create so called "synthetic" gases. Meanwhile, more recent developments in pyrolysis techniques have enabled the conversion of municipal solid waste, agricultural waste and biomass to useful products. However, none of these have yet been scaled to provide industry wide alternatives products suitable for high through put bulk chemical manufacture.

As an alternative, and because it has large coal reserves, China has been improving new coal liquefaction and gasification technologies in order to reduce its dependence on oil. Furthermore, processes developed before the Second World War have also been used for coal liquefaction in both Germany and South Africa.



EVEN THE BEST OF NEW TECHNOLOGIES FIND IT HARD TO BE FINANCIALLY VIABLE IN THE LIGHT OF THE FALL IN OIL AND RELATED GAS PRICES IN RECENT YEARS.

The Fischer-Tropsch process, for example, converts coal to a synthetic gas that can be liquefied for use as a fuel or as raw material in the chemical industry.

The collection of carbon dioxide from power generation and chemical manufacture is also a potential raw material for the industry if the thermodynamics

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A RECENT INDUSTRIAL STUDY CARRIED OUT BY NEPIC HAS IDENTIFIED THE MEDIUM-TO-LONG TERM NEED FOR THE UK CHEMICAL INDUSTRY TO FIND ALTERNATIVE RAW MATERIALS SUPPLY.



...continued.

of the conversion of CO₂ to useful products can be overcome. Work is already underway to convert CO₂ chemically to carbonates and cyclic carbonates, which are useful in batteries and plastic technologies. Alternatively, the use of cheap energy sources to reduce the gas with hydrogen to alkanes and indeed photosynthetically in artificial leaves is already described in the literature. These are all futuristic opportunities for supplementation of the chemical raw materials.

The biggest opportunity to supply the chemical industry with the carbon it needs may in fact be the combination of these technologies - gasification of coal and carbon dioxide capture; what is now being described as Clean Coal. This requires gasification of coal deep underground to manufacture syngas before returning any carbon dioxide made during this activity (and in the processes in which the syngas is used) to the coal fields where the original gasification took place.

As an alternative, any carbon dioxide produced can be put to use as raw material for products described above or sent into other underground storage areas, such as deep-sea water (saline) aquifers. Most of the carbon extracted as syngas in the chemical industry will be locked into polymers and construction materials products for example.

Clean Coal also has the potential of supplying the UK with all its energy and chemical industry raw material needs.

The UK lies on some very big coal reserves, with British Geological Society and Coal Board surveys showing that the Durham coalfield alone has the potential to supply the UK with all its carbon needs for over 10,000 years.

A recent industrial study carried out by NEPIC has identified the medium-to-long term need for the UK chemical industry to find alternative raw materials supply. In its study of 46 companies based in the Tees Valley, it highlighted the large-scale potential to use syngas from coal as a basic raw material.

NEPIC is proposing to Regional and National Government that a Clean Coal Pilot plant be built in the region to prove the syngas supply techniques. Investors need to know the cost of engineering scale up, cost of production and the stability and quality of the gas supply. The technology proving step must be done in the local coal field. Industry believes that the technologies to be tested are not in the R&D nor innovation phase, they are industrially available and just need proving in the field.

The Cluster contend that these proposals must be considered as a collaborative infrastructure development project, the results of which could underpin the UK manufacturing industry for many years to come. NEPIC members would be prepared to take responsibility and provide leadership for such a project. Other investors are also being sought. ■



BUILDING STRENGTH THROUGH A STRONG SUPPLY CHAIN

Small and medium businesses have significant impacts on value chain performance, taking the roles of suppliers, producers, distributors, and customers. The backbone of the UK economy, they drive growth, open new markets and create jobs.

They are seedbeds for innovation, encouraging competition and bringing fresh ideas that challenge the norm - and in turn, incentivise others to adapt. Put simply, the contribution of small businesses is vital and we should encourage them to thrive.

And many are. Confidence in an improving and positive economic outlook sees flourishing ambitions for growth. The road to recovery is most certainly paved with opportunity.

At NEPIC, we understand the importance of SMEs and the vital role they play in the long-term success of the region's chemical industry. That is why the success of these businesses remains at the fore of our interest.

A very large and extensive supply chain supports the Process Industry in North East England and essentially underpins the sector. The key strengths of North East

supply chain companies are their long-term competency and knowledge, combined with a real understanding of the chemical industry's needs.

As a true supply chain cluster, NEPIC actively engages with the entire value chain and has recently witnessed an increased desire from the major manufacturing companies within the region to spend more of their budgets locally.

In 2012, the cluster set upon a path to further develop the SME community by providing the incentive to advance their businesses, in turn bringing about economic benefit and reinforcing the North East as a region of excellence and innovation. The Business Acceleration for SMEs programme was subsequently rolled out and, via the mentoring of 500 companies, generated £50 million in new sales and over 1,000 new jobs for North East small businesses.

Never happy to rest on our laurels, NEPIC is continuing this work via two new programmes launched in 2016. Through Innovate Tees Valley, we are assisting companies to innovate by improving their goods and services and sharpening

their business processes. And through SME Growth, we will work to give firms a competitive edge, strengthen their pitch, support exporting efforts and obtain new customers in the sector.

Accelerating growth from ideas

More specifically, Innovate Tees Valley has been established to help Teesside's vibrant small business community achieve growth through service and product innovation. Assisted by the programme's network of experts, nepic and programme partners are helping businesses to take their ideas forward, whilst also overcoming growth barriers to achieve success here and overseas.

Innovation remains a long-standing debate within the SME sector, however, one thing is definite - innovation is a crucial element within the SME ecosystem that is here to stay. Every SME needs to create an innovative environment to foster growth and success.

"Our knowledge of the process industry will allow us to provide intelligence on market needs and introduce companies to

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markets both in Tees Valley and outside the region. The world is changing and NEPIC can help SMEs understand global challenges and opportunities in the process industry and across other sectors" said programme lead, Joanne Rout.

Joanne, a former ICI research scientist and product development manager, added: "A year in and over 30 companies have signed up with NEPIC for innovation support. Over the project's three-year duration, NEPIC will help more than 50 SMEs with ambitions to develop new products and processes, and enter new markets, along with those seeking better ways of doing business.

Joanne concluded: "If change is afoot in your organisation, or market environment, no matter how big or small, perhaps we can help support you on the way."

Helping small businesses achieve great things

In addition to this innovation focus, NEPIC is also continuing its generic growth support via the SME Growth Programme. The programme, launched in spring 2016, supports businesses in Durham, Tyne and Wear and Northumberland to become established suppliers within the region's chemical processing industry.

The programme, which is a direct spin-off from NEPIC's highly successful Business Acceleration for SMEs project, utilises the cluster's extensive knowledge and network to mentor companies into new business.

The NEPIC project team is assisting a diverse range of SMEs operating in areas such as engineering, biotechnology, environmental, chemical, consultancies and support services, all of which can be sold into the NEPIC network of businesses.

However, this support extends beyond NEPIC's experienced team and includes senior managers from within the Cluster's extensive membership base, whom have all pledged their time to support the programme and mentor businesses into growth. Furthermore, our participating SMEs also benefit from a full sales and marketing training programme.

SME Growth programme manager, Philip Aldridge, said:

"Industry's message is loud and clear. They want to buy locally from a strong regional supply chain that can support a growing sector long into the future - and they are prepared to put the leg work in to achieve it. Through their support of this programme we offer invaluable knowledge and advice, coupled with direct access to an established network.

"The model is simple, yet highly effective. We work with companies to understand their business and offering. An access approach is agreed and industry mentors assigned. Once in place, companies then work with their mentors and the team at NEPIC to develop everything from positioning and pitch, right through to product placement and exporting. Companies also gain access to the Cluster's established network of businesses and likeminded contacts" said Philip.

Philip concluded: "There are no catches. This is a fully funded programme designed to arm local suppliers with the skills, approach and contacts that will enable them to play a strong role in the success of the sector and ultimately help them achieve business growth.

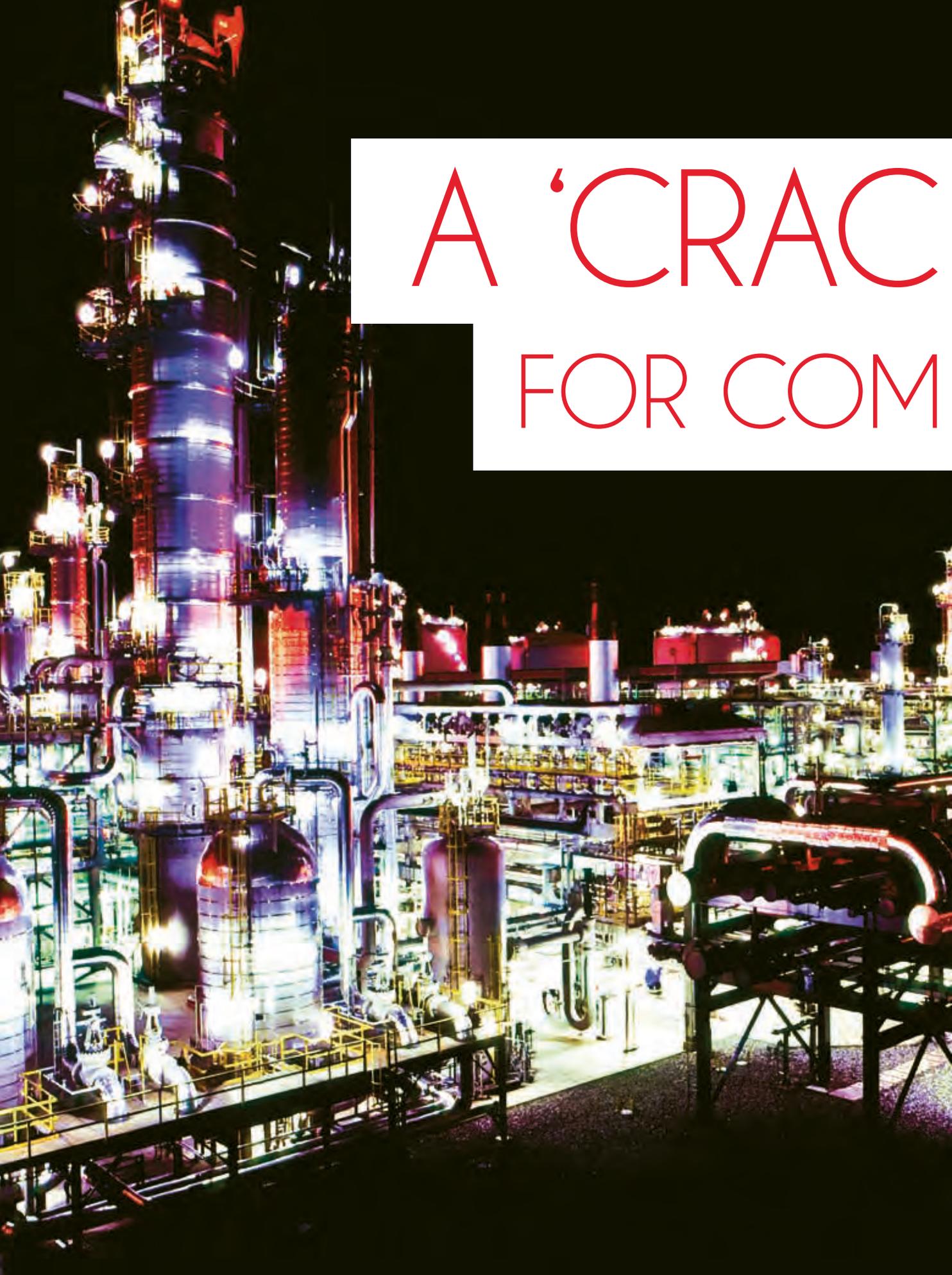
"We urge businesses to get in touch today, find out more and tap into this vital free support." ■

For further information regarding supply chain and SME support provided by the NEPIC core team and that of the Innovate Tees Valley and SME Growth programme, please contact the office directly via 01642 442560 or visit www.nepic.co.uk/smes

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AND SUPPLY CHAIN
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SUPPORT YOUR
PROJECT AND TO
HELP YOUR BUSINESS
GROW.

The region's base and petrochemical cluster is one of the foremost in Europe.

It is a vibrant collaborative community of companies with many global leaders represented and is quite simply thriving!

The commodity chemical industry, predominately based on Teesside, stretches back over 170 years during which time there has been a continuous stream of world leading products and processes. This legacy and the continual business rejuvenation, driven by innovation and investment, has cemented the region as a leading location for the process industry.

Teesside is hot-wired into the North Sea for the supply of oil and gas raw materials, whilst the port makes it a central point in the North Sea basin, giving access to both the European and wider global markets.

The sector feeds into benefits from other industries in the region. Many of the plants are integrated through a network of pipelines ensuring that the

end product of one company becomes the raw material of another.

Game changing investments

Most recently, Teesside has seen a great deal of new activity and investment in the chemical sector including both new plants and facility upgrades.

A successful multi-million-pound upgrade of SABIC's Olefins 6 plant at Wilton was completed in the first quarter of 2017, after the largest single investment in the Teesside chemical industry in a generation.

The 37-year-old Cracker underwent complex changes to allow it to process US-imported ethane gas as an alternative raw material.

The plant will also continue to process propane, butane, naphtha and condensates as feedstocks, making it the most feed flexible cracker in Europe.

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...continued. The ambitious project, which took two years to complete, also involved the building of an extensive ethane terminal at SABIC's North Tees site, including the construction of Europe's largest cryogenic ethane tank. A pipeline will carry ethane from the new North Tees storage tank through a series of pipe trenches under the River Tees to connect to the cracker complex at Wilton.

Two ships have been commissioned, designed and built to transport the ethane from the US to Teesside, while the automation platform and software was upgraded to ensure the operation worked from the control rooms. Work will continue over the coming months as the firm decommissions inherited and redundant facilities at both Wilton and North Tees, clearing the way for the next big project!

In addition, 2017 saw construction work formally commence on the long-awaited Sirius Minerals Potash mine. The mine, when it goes into production, will be the world's largest potash mine - extracting polyhalite from a large underground area and conveying it by tunnel to a berth in the River Tees.

By extracting polyhalite from deep beneath the North York Moors, this project is set to generate 2,000 direct jobs and pump billions into the economy. The polyhalite mine will be a world-first and the largest single investment in recent years in North East England. The mine, which will take 5 years to build and produce for 100 years, will operate processing facilities on Teesside.

Furthermore, MGT Power are making great strides in the construction of their £650 million Teesside Renewable Energy Plant. Fuelled by wood chip and pellets, the plant will generate electricity for the equivalent of 600,000 homes, creating hundreds of construction jobs and then more than 100 full time roles.

Growth of the biomass industry is being driven by the global shift to low-carbon fuel sources. The Teesport-based project, which will reach full operating capacity in 2020, will alter the landscape as we know it and include silos for biomass that stand at 36m high that will sit alongside a 75m high boiler and a 93m high flue.

Situated on the banks of the River Tees, a joint venture between Eco2 Ltd and Temporis Capital LLP is also under construction. The Port Clarence Energy Project will provide 40MW of renewable energy to the UK energy market through the combustion of waste wood. The project will have the capacity to process 325,000 tonnes of waste wood per year from construction, demolition and civic amenity sites and packaging.

Furthermore, SNF Oil and Gas - part of SNF Group, the world's largest producer of water soluble polymers - have invested £150 million in a new polymer plant for the production of oilfield chemicals in Billingham.

Australian firm, Peak Resources, have also named Wilton International as the preferred location for its £70m rare earth minerals processing plant.

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The refinery would process minerals for use in a range of products, including mobile phones, wind turbines and for the automotive sector. If the proposal gets the go-ahead, production is expected to start in 2019.

In addition to the large-scale investment projects, growth is too being reported. CropEnergies Ensus, the company behind one of Europe's largest bioethanol plants, has recently reported its first profit after being plagued by market conditions that forced the site to be mothballed in 2014. Brought back on-line in July 2016, the facility has an annual capacity of 400,000 cubic metres of bioethanol, 350,000 tonnes of dried protein animal feed and supplies CO₂ to neighbouring firm, Praxair.

Looking at the Landscape

Teesside's commodity chemical industry is concentrated across a relatively small geographical area on both sides of the River Tees, approximately 12 miles from west to east, with three main sites - Wilton International, Billingham and Seal Sands-North Tees.

The 2,000 acre Wilton International site is one of the UK's principal manufacturing sites. Owned by Sembcorp Utilities, the site is home to Huntsman, Lotte Chemical UK, Biffa, Invista and International Power GDF Suez, along with the aforementioned SABIC UK Petrochemicals, CropEnergies Ensus and Praxair.

With a 60-year heritage and originally a cornerstone of the ICI business, today 3,000 people work on the site and some 50 companies, including suppliers of key maintenance and engineering services.

The site has extensive existing infrastructure including power, steam and water and underpinned by one of the largest Crackers in Europe. There are also more than 120Km of corridor carrying pipelines, cables and distribution systems - important links saving investors time and money in getting new projects off the ground quickly.

One of only a few sites in Western Europe with special development status for heavy industrial use, it sits alongside one of the largest research and development centres in Europe - the Wilton Centre.

Billingham's chemical heritage began in the 1920s with the production of ammonia, fertiliser and plastic by then owners ICI. Today chemical, biotechnology and engineering companies continue to operate at the multi-company Billingham Chemical Park and include CF Fertilisers, Johnson Matthey and Fujifilm Diosynth Biotechnologies. Lucite International's Billingham-based plant is the powerhouse of the company's methacrylates business and the largest methyl methacrylate production site in the Mitsubishi Chemical Lucite Group. Adjacent to this is the 62 acre Belasis Business Park - home to companies such as Cambridge Research Biochemicals, ABB and nearby water treatment specialists, Biochemica.

Situated in the mouth of the River Tees on recovered land from the sea, an area of Seal Sands became an industrial park for the Chemical Industry in the 1960s. Operators here include Ineos, Fine Industries, SABIC, Vertellus, ConocoPhillips, Wood Group (operators of BP Cats Terminal), Inter Terminals, Navigator Terminals, Harvest Energy, Greenergy, px group, Victrex and Air Products.

The ConocoPhillips Ekofisk oil pipeline & BP Cats natural gas pipeline both landfall here also - 20 per cent of the UK's natural gas is brought in here before being transferred onto the national grid. Butane, ethylene and condensate are also supplied.

Commodity Specialities are also made in this region such as PET by Lotte Chemicals, Perspex by Lucite International and Titanium Dioxide and polyurethane intermediates by Huntsman. Several new technologies, such as graphene applications, polylactic acid polymers and printable electronics, are also being developed here.

Come and join us

The message to the Global chemistry-using industries, that may be looking to invest, is that North East England has the infrastructure and supply chain capabilities to support your project and to help your business grow.

Whatever process you want to operate, this region can help you to achieve it. NEPIC represents a world-class process industry location with unprecedented levels of supply chain expertise and experience; come & join us. ■

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We carry out precious metals recycling thanks to close connections with specialist companies in the REMONDIS Group network.

Photo/X-ray waste

We ensure that all recyclable materials contained in photographic and X-ray waste is recovered and returned to production cycles.

Printing waste

We provide a comprehensive waste management service for all printing waste streams.

To find out more about how we can help, please contact us on 0151 230 8800 or email sales@remondisuk.co.uk
www.remondis.co.uk





LET US H

WOULD YO

ELP YOU GROW

DO YOU LIKE TO GROW YOUR BUSINESS BY BECOMING AN ESTABLISHED SUPPLIER TO NORTH EAST ENGLAND'S LARGEST INDUSTRIAL SECTOR?

NEPIC is a proactive membership organisation working on behalf of the chemical-processing sector and its associated supply chain in the North East of England. Owned by our member companies and guided by a strong team of industrial leaders, we are one of the most influential clusters in the UK.

For more than a decade, NEPIC have delivered high quality business growth support, working with member companies of all shapes and sizes. Our activities to date have generated in excess of £3.5 billion of GVA for the region.

Our network includes member and partner companies that work within or would like to become involved in the region's largest industrial sector. If your organisation is looking to grow or be part of the sector or supply chain, we have the network and expertise available to help you win new business and succeed.

Tangible benefits

Membership of NEPIC offers immediate connectivity to a

wide and diverse process industry incorporating petrochemicals, pharmaceuticals, fine & speciality, biotechnology, polymers, bioresources & renewables and significant supply chain.

As well as providing our members with the tangible membership benefits, we are also continually working on key projects and industry issues to ensure the long-term sustainability of the chemical-processing sector in North East England and creating a business environment in which you can thrive.

Join us today and benefit from:

- Face-to-face business support and signposting via NEPIC's highly experienced team, along with access to a wealth of knowledge via industry mentors and the wider network.
- Support and guidance relating to access to finance, innovation channels, exporting, tactical PR and much, much more.

Continues...



attric

Process Plant Information Management

From Conception, Control to Retention Management

Information management is an essential function for companies operating within the process industry. Poor quality or poorly managed information can lead to human and organisational failings, often leading to reduced performance and in some cases, the indirect cause of incidents.

Attric provide a complete information management service, assisting clients in achieving compliance with legislation, standards and practices. We have over 40 years experience of delivering the following information management services:

Information Management

- ◆ Information strategy and governance
- ◆ Document retrieval and access control
- ◆ Document version and workflow control
- ◆ Document storage and retrieval
- ◆ Retention management services

Integrated Services

- ◆ Fully managed service
- ◆ Embedded technical personnel
- ◆ Innovative processes and practices
- ◆ Autonomous and self-managing
- ◆ Scalable, efficient and cost effective

Technical Documentation

- ◆ Operating procedures
- ◆ Maintenance procedures
- ◆ Operations and training manuals
- ◆ Competency assessment
- ◆ Technical review and updates

All services certified to: ISO 9001:2015 - ISO 14001:2015 - OHSAS 18001:2007

Telephone 01642 438 345 or email sales@attric.co.uk

Teesside Office: Wilton Centre, Redcar, Cleveland, TS10 4RF, United Kingdom

...continued.

- Save £££'s via NEPIC's strategic utility partners and reduced rate advertising and marketing services.
- Free or reduced event entry including free-to-attend monthly breakfast meetings via Cluster Connect and access to events and exhibitions with networking and knowledge sharing at their core. Plus, speaker opportunities and award entry access.
- Access to Members Hub – an on-line platform that provides a single digital destination for you and your business to develop strong cluster connections. Members Hub has an array of features to help maximise your membership and most importantly maximise your engagement with fellow members.
- Company promotion and sign-posting via free profile listings both on-line and within NEPIC's award winning Directory publication.
- Publicise your news and thoughts with free editorial opportunities in print through Focal Point Magazine, online at Members' Hub and via various social media platforms.

- Complimentary copies of NEPIC publications including the NEPIC Directory and Focal Point Magazine, along with subscription to membership and industry e-updates.

- And whilst you are busy networking and building your business through these services, we are also hard at work tackling the key issues facing industry such as Brexit, talent attraction and retention, integration, sustainability and of course, attracting inward investment!

With annual subscription fees starting from as little as £300 and pro-rata fees available, why not join us today and become part of North East England's most powerful industry Cluster. Together, we can Cluster. Connect. Grow.

To start your journey with us, contact our Membership & Engagement Team or visit

www.nepic.co.uk/join-now

Ebba McGuigan
ebba.mcguigan@nepic.co.uk
07711 375 426

Liz Rooney
liz.rooney@nepic.co.uk
07802 255 118



**FACE-TO-FACE
BUSINESS SUPPORT
& SIGNPOSTING VIA
NEPIC'S EXPERIENCED
TEAM & INDUSTRY
MENTORS.**





PHARMA CONNECT

Developing Strong Cluster Connections

Pharma Connect is an informal quarterly meet that focuses upon the development of the region's pharmaceutical community through engagement, introductions, best practice sharing and of course, networking.

If you are a member of the cluster and active within this arena, we would love for you to join us.

Visit www.nepic.co.uk/events to find out more or alternatively contact NEPIC's pharmaceutical specialist, Philip Aldridge:

philip.aldridge@nepic.co.uk
0191 516 4400



NEPIC ANNUAL INDUSTRY AWARDS

CELEBRATING THE REGION'S BEST & BRIGHTEST



The NEPIC Annual Industry Awards honours the outstanding achievements of the companies and individuals who make up the chemical-processing industries in North East England.

There are fourteen awards up for grabs that fall under seven categories and have a staggering total prize fund of £20,000; £12,000 of which will be donated to local STEM education projects. ★

Visit www.nepic.co.uk/annual-awards for award categories, table bookings and sponsorship opportunities. ★



PROFILES

NEPIC MEMBER COMPANY PROFILES 2017

Your comprehensive guide to the
chemical-processing sector in North
East England

Companies Listed A - Z



21 Degrees Limited



EMPLOYEES
30

21 Degrees provide service and maintenance to HVAC equipment in the petrochemical, process and biotechnology industry. At present we maintain a variety of buildings in the sector including offices, laboratories, clean-rooms and manufacturing plant. Our multi-skilled engineers are experienced in air-conditioning, heating boilers, ventilation, air-conditioning, refrigeration and water chillers. We are fully accredited to the latest industry standards and we are members of Gas Safe, HVCA, Safe Contractor and Refcom. We also design and install and refurbish HVAC systems for our clients.

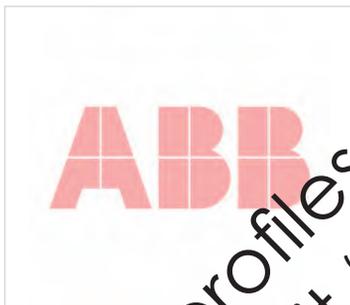
MAIN CONTACT



CONTACT DETAILS



ABB Consulting



EMPLOYEES
500+

ABB Consulting provides technical and engineering services to help companies in the global process industry achieve operational excellence. We offer expertise in: Inspection, integrity management, operations improvement, process safety, project services, start and asset closure, technical engineering, technical software, technical training and competency. We identify and implement practical solutions based on technical expertise and industry expertise which reduce risk, optimise costs and improve manufacturing efficiency.

MAIN CONTACT



CONTACT DETAILS



Abfad Limited



EMPLOYEES
-

Providing specialist protection for storage tanks with solvent free single skin coatings and Fuelvac® double skin lining system with 24/7 vacuum leak detection monitoring, for above and underground tanks. Protecting pipelines with the unique Pipevac® pipeline protection system which provides an inspection and maintenance free solution to corrosion prevention, including corrosion under insulation, by holding a permanent vacuum around the pipe circumference and allowing for complete monitoring of the pipeline. Abfad also supply rope access trade personnel for innovative access solutions, inspection, repair/maintenance, blasting/coating and other activities, including Emergency Rescue and Safety Cover for people working at height or within Confined Spaces.

MAIN CONTACT



CONTACT DETAILS



To view profiles, login to Members' Hub or visit 'Join Now' to find out about membership

Absolute Antibody



Absolute Antibody is a privately funded start up company developing engineered antibodies for use in research and for manufacturing diagnostic kits. We have developed a proprietary manufacturing platform based on transient transfection for the production of sequenced and engineered antibodies (AbAbs). The manufacture of AbAbs is fast, inexpensive and animal-free, with 100s of mgs produced within two weeks. They also provide a number of benefits over antibodies produced using traditional methods, including ultra-low batch-to-batch variability leading to improved reproducibility of results, and the ability to eliminate undesirable properties or add desirable features.

MAIN CONTACT

[Redacted]

CONTACT DETAILS

[Redacted]
 [Redacted]
 [Redacted]
 [Redacted]

EMPLOYEES

10

Absolute Quality Consultancy & Training Ltd



Absolute Quality provide management systems and training built around your business. We build management systems with our Clients in mind. Our business and manufacturing systems are based on the ISO 9001, ISO 14001 and ISO 18001. We develop a structure for clients to manage and supports continual improvement, to enable them to drive their business forward. Absolute Quality works with clients to design a program for many different type of training ranging from a single short brief to fully managed training programs. We are a register training centre for Safety Pass Licence, Chartered Institute of Environmental Health and the Royal Society for Public Health. For more information visit www.aqch.co.uk

MAIN CONTACT

[Redacted]

CONTACT DETAILS

[Redacted]
 [Redacted]
 [Redacted]
 [Redacted]

EMPLOYEES

-

Academy of Joint Integrity



The Academy of Joint Integrity is a member of the Flexitallic Group of companies, providing a range of Accredited/Certified training courses in Flange Assembly and Sealing Technology to ensure safe working practice whilst preventing Loss of Containment issues. Dedicated training facilities with unique training rigs located in Teesside, Humberside, West Yorkshire and Aberdeen, provide coverage for all Industry Sectors. Mobile rigs also available for onsite delivery. E learning and CBT Units also available for staff and contractors to latest Industry Best practice in Mechanical Joint Integrity. Courses are COMAH compliant and accredited by ECITB/ Energy Institute/ Cogent Gold Standard.

MAIN CONTACT

[Redacted]

CONTACT DETAILS

[Redacted]
 [Redacted]
 [Redacted]
 [Redacted]

EMPLOYEES

3

WorleyParsons Europe Limited



WorleyParsons is a leading provider of professional services to the resources & energy sectors and complex process industries. Our services cover the full facilities spectrum both in size and lifecycle - from the creation of new assets to services that sustain and enhance operating assets. In four customer sector groups - Hydrocarbons, Chemicals, Power, Minerals & Metals and Infrastructure & Environment, WorleyParsons offers extensive expertise delivered by local specialists across our comprehensive global network. The WorleyParsons core services in its UK Northern Operations cover brownfield operations and are focused on the delivery of small to large projects, upgrades, de-bottlenecking, maintenance projects, project portfolio management and support services to sustain assets and improve business performance.

EMPLOYEES
1200

MAIN CONTACT

[Redacted contact information]

CONTACT DETAILS

[Redacted contact details including icons for globe, email, and phone]

WRL Glass Media



Ward Recycling was created in February 2007 and began life as a 3rd party contractor to a small kerbside recycling operation. The next year the work ethic of Ward Recycling and client commitment resulted in further work being passed working as a 3rd party contractor to Palm Recycling Limited. During the following 5-6 yrs the business trends were ahead of time along with W.R.L developing a cost effective attitude with a service that always exceeded expectation. Today Ward Recycling Limited operate kerbside collection services nationwide, various styles of kerbside collections nationwide and recycling sorting and various styles and types of recycling collections as a 3rd party contractor.

EMPLOYEES
-

MAIN CONTACT

[Redacted contact information]

CONTACT DETAILS

[Redacted contact details including icons for globe, email, and phone]

York Potash



York Potash Ltd is a wholly owned subsidiary of Sirius Minerals plc. Sirius is a UK-listed, potash development company. The York Potash Project, a proposal to build a state-of-the-art potash mine south of Whitby and transport the mined ore, via an underground system, to a materials handling and granulation facility in Teesside, is the company's flagship project. It represents a £1.5 billion investment and has the potential to help Sirius to become a leading global potash and multi-nutrient producer. The project will create thousands of jobs and a range of opportunities for businesses across the region.

EMPLOYEES
60

MAIN CONTACT

[Redacted contact information]

CONTACT DETAILS

[Redacted contact details including icons for globe, email, and phone]

To view profiles, log in to Members' Hub or visit 'Join Now', to find out about membership



CLASSIFICATION

ANALYTICAL SERVICES

Alcyomics Ltd
 Biochemica UK Ltd
 Cambridge Research Biochemicals
 Durham University
 Evolution MRO Limited
 Hall & Angus Ltd
 High Force Research Limited
 Intertek Wilton
 Materials Processing Institute
 MP Storage & Blending Ltd
 Newcastle University
 Northumbria University
 SGS UK Limited
 Siemens PLC, Industry Automation & Drives Technology
 Sterling Pharma Solutions Limited
 Suez Industrial Water Ltd
 Teesside University
 Thermal Compliance Ltd
 Tracerco
 University of Bradford
 University of Newcastle School of Chemical Engineering
 & Advanced Materials

BIORESOURCES & RENEWABLES

Air Products
 Armstrong Energy Limited
 Bio-Sep Limited
 CPI (Centre for Process Innovation)
 Ensus UK Ltd
 Interserve Industrial Services Ltd
 NNFC The Bioeconomy Consultants
 Nova Pangaea Technologies Limited
 O'Brien Waste Recycling Solutions Ltd
 PYReco Ltd
 Thermitech Solutions Limited
 Vertellus Specialties UK Ltd

BIOTECHNOLOGY, INDUSTRIAL

Absolute Antibody Ltd
 Air Products
 Armstrong Energy Limited
 Boulting Environmental Services Ltd (BES)
 Bouygues E&S Contracting UK Limited
 Calysta (UK) Limited
 CPI (Centre for Process Innovation)
 Northern Balance Ltd
 ProSys Sampling Systems Ltd
 SeerPharma (UK)
 Shott Trinova LLP
 Williams Process Limited

BIOTECHNOLOGY, MEDICAL

Absolute Antibody Ltd
 Air Products
 Alcyomics Ltd
 Bouygues E&S Contracting UK Limited
 Cambridge Research Biochemicals
 Fujifilm Diosynth Biotechnologies
 NHS Innovations North
 Northern Balance Ltd
 Onyx Health Limited
 Thermal Compliance Ltd

Thermo Fisher Scientific
 Vertellus Specialties UK Ltd
 Victrex Manufacturing Ltd
 Williams Process Limited

BUSINESS SUPPORT

ARCH
 Attric Ltd
 Bionow
 Bonaccord
 Britain's Energy Coast Business Cluster (BECBC)
 BWC Performance (Beyond World Class)
 Chemical Industries Association
 Chemie-Cluster Bayern GmbH
 Department for International Trade
 Eclipse Translations Ltd
 Falck Fire Services UK Ltd
 HGF Limited
 Induchem UK Ltd
 Institution of Chemical Engineers (IChemE)
 Lisam Systems Limited
 Marketwise Strategies Ltd
 NECC (North East Chamber of Commerce)
 NHS Innovations North
 NNFC The Bioeconomy Consultants
 NOF Energy
 North East Process Industry Cluster
 Northumbria University
 PricewaterhouseCoopers LLP
 ProSalus Ltd
 Protel Associates Limited
 RDW Creative Ltd
 RTC North
 SeerPharma (UK)
 Tait Walker
 Techconsult UK Limited
 Tees Valley Combined Authority
 Teesside University
 The Wilton Centre
 University of Sunderland
 Ward Hadaway Solicitors

CONSTRUCTION

Abfad Ltd
 Bakercorp UK Ltd
 Balfour Beatty Kilpatrick
 Bilfinger Industrial Services UK Ltd
 Cavendish Northern Ltd
 CSC Services UK Ltd (Confined Space Contract Services (UK) Ltd)
 Doosan Babcock Limited
 Esh Facilities
 Haden Freeman Limited
 Inter Terminals
 Interserve Industrial Services Ltd
 Jacobs Group
 K Home International Limited
 KDC Contractors Limited
 Pipetawse Limited
 Plenary Project Solutions Ltd
 Primat Recruitment
 px Group
 Royston Ltd
 SPIE Ltd
 Tanton Industries Ltd

CLASSIFICATION

Tolent Construction Limited

CONSULTANTS - BUSINESS & MANAGEMENT

ABB Consulting
ARK Associates
Ashville Management Ltd
Athena Risk
Attric Ltd
Bionow
Boomerang Consultancy
BWC Performance (Beyond World Class)
DJS Process Consulting Ltd
Evolution MRO Limited
FoCul Ltd
Leven Consultancy Ltd
Parsons Brinckerhoff
Peak Performance Partnership (3P)
RDW Creative Ltd
SeerPharma (UK)
Shott Trinova LLP
Tanton Industries Ltd
Teesside University
The Parker Consultancy
Think Global Growth Ltd
TUM International GmbH

CONSULTANTS - CONSTRUCTION

Interserve Industrial Services Ltd
IRIS Engineering and Technology Ltd
KDC Contractors Limited
Nortech Group
Shott Trinova LLP
Tanton Industries Ltd

CONSULTANTS - EHS & RISK MANAGEMENT

ABB Consulting
AECOM
Ashville Management Ltd
BWC Performance (Beyond World Class)
Chemical Industries Association
DRD Consultants
Enviresearch Ltd
Falck Safety Services Ltd
FoCul Ltd
Frazer-Nash Consultancy
GexCon UK Ltd
GSE Systems Ltd
Hawkes Fire
HFL Consulting Ltd
Imvelo Ltd
Institution of Chemical Engineers (IChemE)
IRIS Engineering and Technology Ltd
Jacobs Group
JBA Engineering
Media & Crisis Management Ltd
MMI Engineering Ltd
North Functional Safety Management Limited
Nusafe Europe Limited
Oranmore Environmental Services Ltd
Parsons Brinckerhoff
ProSalus Ltd
Rosen UK
RVA Group
Synergy FTP Ltd t/a totrain
Tees Safety Training Ltd
TTE Technical Training Group
Williams Process Limited

CONSULTANTS - ENGINEERING

Academy of Joint Integrity
AECOM

AMP Consultants
Ashville Management Ltd
Attric Ltd
Axiom Engineering Associates Ltd
Bakercorp UK Ltd
Bilfinger Industrial Services UK Ltd
Blackmonk Engineering Ltd
BLH Nobel (VPG Systems UK Ltd)
Boulting Environmental Services Ltd (BES)
Datum360 Limited
Derwent James Ltd
DJS Process Consulting Ltd
FEG Ltd
Frazer-Nash Consultancy
G. Robinson Design Engineering Services Ltd
GexCon UK Ltd
GSE Systems Ltd
Haden Freeman Limited
Hawkes Fire
Industrial Technology Systems (ITS) Ltd
Institution of Chemical Engineers (IChemE)
IRIS Engineering and Technology Ltd
Jacobs Group
JBA Engineering
K Home International Limited
Klüber Lubrication Great Britain Ltd
Leven Consultancy Ltd
Lokring Northern (UK)
Lynas Engineers
MMI Engineering Ltd
Nortech Group
Parsons Brinckerhoff
Phusion IM Limited
Plenary Project Solutions Ltd
Process Systems Enterprise Limited
ProSalus Ltd
ProSys Sampling Systems Ltd
Rosen UK
RVA Group
SeerPharma (UK)
Siemens PLC, Industry Automation & Drives Technology
Suez Industrial Water Ltd
Tanton Industries Ltd
University of Newcastle School of Chemical Engineering
& Advanced Materials
Veolia Water Technologies UK
Williams Process Limited
WorleyParsons Europe Limited

CONSULTANTS - GENERAL

Absolute Quality Consultancy & Training Ltd
Academy of Joint Integrity
Chemie-Cluster Bayern GmbH
Cordstrap UK Ltd
DRD Consultants
Durham University
ENGIE Fabricom
Forrest Digital
GexCon UK Ltd
GSE Systems Ltd
JBA Engineering
Jumping Rivers
Marketwise Strategies Ltd
NNFCC The Bioeconomy Consultants
Northumbria University
Parsons Brinckerhoff
ProSalus Ltd
Publicity Seekers
Rosen UK
SeerPharma (UK)
Shott Trinova LLP
Teesside University

The Parker Consultancy
Think Global Growth Ltd
TTE Technical Training Group
Williams Process Limited

CONSULTANTS - HR

Chemical Industries Association
DBA HR Solutions
HR2day Limited
Populus Select
PricewaterhouseCoopers LLP
ProSalus Ltd
Wolviston Management Services

CONSULTANTS - IT & TELECOMS

ecom instruments UK
FoCul Ltd
Industrial Thinking Limited
IT Accessed Ltd
Quorum Development Ltd
Tekgem (UK) Limited
WayMark IT

CONSULTANTS - PRODUCTIVITY & RESOURCE EFFICIENCY

Ashville Management Ltd
Biochemica UK Ltd
BWC Performance (Beyond World Class)
Datum360 Limited
DRD Consultants
HFL Consulting Ltd
Jumping Rivers
Lokring Northern (UK)
SeerPharma (UK)
Shott Trinova LLP
Siemens PLC, Industry Automation & Drives Technology
Veolia Water Technologies UK
Williams Process Limited

CONSUMER PRODUCTS

SCA Hygiene Products UK Ltd
Symbol Signs & Screenprint Limited
WRL Glass Media

CONTRACT MANUFACTURING

Absolute Antibody Ltd
Bakercorp UK Ltd
British Rema Processing Ltd
Doornbos Equipment
Exwold Technology Ltd
Fine Industries Limited
Kiowa Ltd
MP Storage & Blending Ltd
Pollywood Ltd
Sterling Pharma Solutions Limited
Thomas Swan & Co Ltd

DESIGN

Attric Ltd
FEG Ltd
Horizonworks Marketing Ltd
House of Type (HOT)
JBA Engineering
Mech-Tool Engineering Limited
Nortech Group
Process Systems Enterprise Limited
ProSys Sampling Systems Ltd
SPIE Ltd
Symbol Signs & Screenprint Limited

Teesprint & Design

DISTRIBUTOR

Derwent James Ltd
Eastern Seals (UK) Ltd
Hawkes Fire
JULABO UK Ltd
Prosafe Engineering
ProSys Sampling Systems Ltd
Shaw Lifting Company Limited
Symbol Signs & Screenprint Limited

EDUCATION & TRAINING

Absolute Quality Consultancy & Training Ltd
Academy of Joint Integrity
ARK Associates
Bionow
Bonaccord
Chemie-Cluster Bayern GmbH
CIEC Promoting Science
Complete Material Handling
DBA HR Solutions
DRD Consultants
Durham University
Durhamlane
Emerson Automation Solutions
Falck Safety Services Ltd
GexCon UK Ltd
Hall & Angus Ltd
HFL Consulting Ltd
HR2day Limited
Imvelo Ltd
Industrial Technology Systems (ITS) Ltd
Institution of Chemical Engineers (IChemE)
Klüber Lubrication Great Britain Ltd
Lifestyle Architecture
Media & Crisis Management Ltd
Middlesbrough College
NECC (North East Chamber of Commerce)
New Results Training
Newcastle University
North Functional Safety Management Limited
Northern Skills Group
Northumbria University
Peak Performance Partnership (3P)
Prosafe Engineering
ProSalus Ltd
Redcar & Cleveland College
Roxby Training Solution
RTC North
SeerPharma (UK)
Solutions Recruitment
Synergy FTP Ltd t/a totrain
Teesside University
The Parker Consultancy
TTE Technical Training Group
University of Newcastle School of Chemical Engineering
& Advanced Materials
University of Sunderland
Wolviston Management Services

EHS & RISK ASSESSMENT

Abfad Ltd
Axiom Engineering Associates Ltd
BWC Performance (Beyond World Class)
Engica Technology Systems International
Falck Fire Services UK Ltd
GexCon UK Ltd
Hawkes Fire
JBA Engineering
K Home International Limited

CLASSIFICATION

Lisam Systems Limited
Lockout Tagout Safety Ltd
Oranmore Environmental Services Ltd
Rosen UK
Safesol

ENERGY

Bakercorp UK Ltd
Big Solar Ltd
Energy Drive Systems Ltd
Interserve Industrial Services Ltd
Oakes Energy Services
Quorum Development Ltd
REstore
Samson Controls Ltd
SGS UK Limited
SPX Cooling Technologies UK Limited
Thermitech Solutions Limited
Trinity Energy Management
Utility Alliance
Utilitywise plc

ENGINEERING

ABB Consulting
Abfad Ltd
AECOM
Attric Ltd
Axiom Engineering Associates Ltd
Balfour Beatty Kilpatrick
Bignall Group
Bilfinger Industrial Services UK Ltd
BLH Nobel (VPG Systems UK Ltd)
Boulting Environmental Services Ltd (BES)
Bouygues E&S Contracting UK Limited
Cavendish Northern Ltd
Chemical Process Solutions Ltd
Datum360 Limited
Doosan Babcock Limited
E&I Solutions Ltd
ENGIE Fabricom
Evolution MRO Limited
FEG Ltd
Graham Hart (Process Technology) Ltd
GSE Systems Ltd
Haden Freeman Limited
Indecom
Industrial Technology Systems (ITS) Ltd
Inter Terminals
JBA Engineering
Kawasaki Heavy Industries (UK) Ltd
Kawasaki Robotics (UK) Ltd
Kellbray Environmental Solutions Ltd
KGM Refrigeration Ltd
Materials Processing Institute
Mech-Tool Engineering Limited
Megator Ltd
Nortech Group
Nova Pangaea Technologies Limited
Oranmore Environmental Services Ltd
Parsons Brinckerhoff
Pipetawse Limited
Plenary Project Solutions Ltd
Precision Processing Services Limited
Primat Recruitment
Process Systems Enterprise Limited
Prosafe Engineering
ProSalus Ltd
ProSys Sampling Systems Ltd
px Group
Rosen UK

Royston Ltd
Siemens PLC, Industry Automation & Drives Technology
Suez Industrial Water Ltd
Tanton Industries Ltd
Tracerco
University of Bradford
WorleyParsons Europe Limited

ENGINEERING - FABRICATION

Bakercorp UK Ltd
Bignall Group
Hawkes Fire
Kawasaki Heavy Industries (UK) Ltd
Megator Ltd
ProSys Sampling Systems Ltd

ENGINEERING EQUIPMENT

Bakercorp UK Ltd
BLH Nobel (VPG Systems UK Ltd)
BOC
Chemical Process Solutions Ltd
Derwent James Ltd
Doosan Babcock Limited
E&I Solutions Ltd
ecom instruments UK
Emerson Automation Solutions
Energy Drive Systems Ltd
Haden Freeman Limited
Houghton International Electrical Services Limited
IPS Flow Systems Ltd
John Morfield Ltd
JULABO UK Ltd
Kawasaki Heavy Industries (UK) Ltd
Kawasaki Robotics (UK) Ltd
KGM Refrigeration Ltd
Kiowa Ltd
Lockout Tagout Safety Ltd
Lokring Northern (UK)
Perry Process Equipment Ltd
ProSys Sampling Systems Ltd
Quantum Controls Ltd
Rain for Rent International UK
Rondean Machinery
Samson Controls Ltd
Sandvik Materials Technology UK
Shaw Lifting Company Limited
Siemens PLC, Industry Automation & Drives Technology
STS Resources & Technology Ltd
Thermal Compliance Ltd
Thermal Detection Ltd
Tomlinson Hall & Co Ltd - Pump Engineers
Williams Process Limited

ENGINEERING MAINTENANCE

21 Degrees Ltd
Abfad Ltd
Attric Ltd
Bakercorp UK Ltd
Bilfinger Industrial Services UK Ltd
Chemical Process Solutions Ltd
CSC Services UK Ltd (Confined Space Contract Services (UK) Ltd)
Doosan Babcock Limited
E&I Solutions Ltd
Emerson Automation Solutions
GSE Systems Ltd
Haden Freeman Limited
Houghton International Electrical Services Limited
Indecom
Industrial Technology Systems (ITS) Ltd
Kellbray Environmental Solutions Ltd
KGM Refrigeration Ltd
Kiowa Ltd

Klüber Lubrication Great Britain Ltd
 Lokring Northern (UK)
 Opus Medigas
 Phusion IM Limited
 Pipetawse Limited
 Precision Processing Services Limited
 Rain for Rent International UK
 Royston Ltd
 Samson Controls Ltd
 SGS UK Limited
 Shaw Lifting Company Limited
 SPIE Ltd
 SPX Cooling Technologies UK Limited
 STS Resources & Technology Ltd
 Suez Industrial Water Ltd
 Team Valve and Rotating Services Ltd
 Thermal Compliance Ltd
 University of Sunderland
 Veolia Water Technologies UK

EVENT MANAGEMENT, MARKETING & PR

AlphaGraphics North East
 Bionow
 Eclipse Translations Ltd
 Forrest Digital
 Horizonworks Marketing Ltd
 Hospitality Guaranteed
 House of Type (HOT)
 Intimation Creative
 RDW Creative Ltd
 Rockcliffe Hall Ltd
 Slatley Hall Hotel
 Teesprint & Design

FINE & SPECIALITY PRODUCTS

Air Products
 Biochemica UK Ltd
 BOC
 Brenntag Birtley
 Cambridge Research Biochemicals
 Chemoxy International Limited
 CPI (Centre for Process Innovation)
 Exwold Technology Ltd
 Fine Industries Limited
 High Force Research Limited
 Huntsman Pigments
 Huntsman Polyurethanes (UK) Limited
 Johnson Matthey Catalysts
 Kemira Chemicals (UK) Limited
 Klüber Lubrication Great Britain Ltd
 Lucite International Speciality Polymers and Resins Ltd
 Lucite International UK Ltd
 Maritime Safe Passage
 Molekula Limited
 NewChem Technologies Limited
 ProSys Sampling Systems Ltd
 Samson Controls Ltd
 Shaw Lifting Company Limited
 Shott Trinova LLP
 SNF Oil and Gas Ltd
 Thomas Swan & Co Ltd
 Vertellus Specialties UK Ltd
 Victrex Manufacturing Ltd

FOOD

Samson Controls Ltd

LABORATORY EQUIPMENT

Derwent James Ltd
 JULABO UK Ltd

Labtex Ltd
 Northern Balance Ltd
 ProSys Sampling Systems Ltd
 SGS UK Limited
 Veolia Water Technologies UK

LEGAL & FINANCIAL SERVICES

Bonaccord
 Bond Dickinson LLP
 HGF Limited
 Murgitroyd
 PG Legal
 PricewaterhouseCoopers LLP
 Square One Law LLP
 Tait Walker
 Ward Hadaway Solicitors

LOGISTICS

Agility Logistic Solutions Ltd
 Auto Executive Corporate Travel Ltd
 AV Dawson UK Ltd
 BOC
 Bulkhaul Limited
 Complete Material Handling
 Cordstrap UK Ltd
 David Fox Transport
 Durham Tees Valley Airport
 Esh Facilities
 Graypen Ltd
 Inter Terminals
 MP Storage & Blending Ltd
 Navigator Terminals Seal Sands Limited
 PD Ports
 SeerPharma (UK)
 Stiller Warehousing & Distribution Ltd
 Think Global Growth Ltd

MANUFACTURING

Absolute Antibody Ltd
 Aesica Pharmaceuticals Ltd
 Air Products
 Arcinova
 Armstrong Energy Limited
 Big Solar Ltd/Biochemica UK Ltd
 Bio-Sep Limited
 BOC
 British Rema Processing Ltd
 Calysta (UK) Limited
 Cambridge Research Biochemicals
 Cavendish Northern Ltd
 CF Fertilisers UK Limited
 Chemical Process Solutions Ltd
 Chemoxy International Limited
 ConocoPhillips Petroleum Co. UK Ltd
 ecom instruments UK
 Emerson Automation Solutions
 Ensus UK Ltd
 Envirowatch
 Epax Pharma UK Ltd
 Exwold Technology Ltd
 Fine Industries Limited
 Fujifilm Diosynth Biotechnologies
 GlaxoSmithKline
 Hawkes Fire
 High Force Research Limited
 Huntsman Pigments
 Huntsman Polyurethanes (UK) Limited
 Induchem UK Ltd
 Inter Terminals

CLASSIFICATION

Interserve Industrial Services Ltd
Johnson Matthey Catalysts
Kawasaki Heavy Industries (UK) Ltd
Kawasaki Robotics (UK) Ltd
Kemira Chemicals (UK) Limited
Kiowa Ltd
Klüber Lubrication Great Britain Ltd
Lotte Chemical UK Limited
Lucite International Speciality Polymers and Resins Ltd
Lucite International UK Ltd
Mech-Tool Engineering Limited
Megator Ltd
MP Storage & Blending Ltd
MSD Limited
North Star Coatings
PD Ports
Pollywood Ltd
ProSys Sampling Systems Ltd
px Group
PYReco Ltd
Royston Ltd
SABIC UK Petrochemicals
Samson Controls Ltd
Sandvik Materials Technology UK
SCA Hygiene Products UK Ltd
Sembcorp Utilities (UK) Ltd
Shaw Lifting Company Limited
SNF Oil and Gas Ltd
Teesprint & Design
Thermal Detection Ltd
Thermo Fisher Scientific
Thomas Swan & Co Ltd
Vertellus Specialties UK Ltd
Victrex Manufacturing Ltd
Wood Group

PACKAGING & PRINTING

Cordstrap UK Ltd
House of Type (HOT)
Symbol Signs & Screenprint Limited
Teesprint & Design

PETROCHEMICALS & COMMODITY CHEMICALS

Armstrong Energy Limited
Bakercorp UK Ltd
Brenntag Birtley
CF Fertilisers UK Limited
ConocoPhillips Petroleum Co. UK Ltd
Huntsman Polyurethanes (UK) Limited
Induchem UK Ltd
INEOS Nitriles UK Limited
Interface Polymers Ltd
Interserve Industrial Services Ltd
Kemira Chemicals (UK) Limited
Lotte Chemical UK Limited
ProSys Sampling Systems Ltd
SABIC UK Petrochemicals
Safesol
Samson Controls Ltd
SNF Oil and Gas Ltd
Tanton Industries Ltd
Think Global Growth Ltd
Wood Group

PHARMACEUTICALS

Aesica Pharmaceuticals Ltd
Arcinova
Attric Ltd

Bakercorp UK Ltd
Boulting Environmental Services Ltd (BES)
CPI (Centre for Process Innovation)
Epax Pharma UK Ltd
Fine Industries Limited
Fujifilm Diosynth Biotechnologies
GlaxoSmithKline
High Force Research Limited
Induchem UK Ltd
Interserve Industrial Services Ltd
MSD Limited
NewChem Technologies Limited
Northern Balance Ltd
ProSys Sampling Systems Ltd
Samson Controls Ltd
SeerPharma (UK)
Shott Trinova LLP
Sterling Pharma Solutions Limited
Thermal Compliance Ltd
University of Bradford
Williams Process Limited

POLYMER & RUBBER

Bakercorp UK Ltd
Interface Polymers Ltd
IPS Flow Systems Ltd
Lucite International Speciality Polymers and Resins Ltd
Samson Controls Ltd
SNF Oil and Gas Ltd
Victrex Manufacturing Ltd

PROJECT MANAGEMENT

Abfad Ltd
Attric Ltd
Bakercorp UK Ltd
Balfour Beatty Kilpatrick
Bilfinger Industrial Services UK Ltd
Bouygues E&S Contracting UK Limited
BWC Performance (Beyond World Class)
Cavendish Northern Ltd
CSC Services UK Ltd (Confined Space Contract Services (UK) Ltd)
Doosan Babcock Limited
Energy Drive Systems Ltd
ENGIE Fabricom
FEG Ltd
Frazer-Nash Consultancy
GSE Systems Ltd
Haden Freeman Limited
Hall & Angus Ltd
Induchem UK Ltd
Industrial Technology Systems (ITS) Ltd
Inter Terminals
Interserve Industrial Services Ltd
IRIS Engineering and Technology Ltd
JBA Engineering
K Home International Limited
Nortech Group
Parsons Brinckerhoff
Plenary Project Solutions Ltd
Precision Processing Services Limited
Prosafe Engineering
ProSys Sampling Systems Ltd
px Group
SPIE Ltd
Tanton Industries Ltd
The Parker Consultancy
Think Global Growth Ltd
Tolent Construction Limited
TUM International GmbH
Williams Process Limited
WorleyParsons Europe Limited

R&D

Absolute Antibody Ltd
 Alcyomics Ltd
 Arcinova
 Big Solar Ltd
 Cambridge Research Biochemicals
 Chemie-Cluster Bayern GmbH
 CPI (Centre for Process Innovation)
 Durham University
 High Force Research Limited
 Interface Polymers Ltd
 Intertek Wilton
 Kawasaki Heavy Industries (UK) Ltd
 Materials Processing Institute
 Newcastle University
 NewChem Technologies Limited
 Northumbria University
 Nova Pangaea Technologies Limited
 Precision Processing Services Limited
 Process Systems Enterprise Limited
 ProSys Sampling Systems Ltd
 Rosen UK
 Samson Controls Ltd
 SCA Hygiene Products UK Ltd
 Sterling Pharma Solutions Limited
 TUM International GmbH
 University of Bradford
 University of Newcastle School of Chemical Engineering
 & Advanced Materials
 WayMark IT

RECRUITMENT

Attric Ltd
 CDS Recruitment Ltd
 CK Group
 CY Partners
 DBA HR Solutions
 DRD Consultants
 Fifth Element Recruitment Ltd
 JBA Engineering
 KDM Partnership Limited
 Nortech Group
 Populus Select
 Primat Recruitment
 Solutions Recruitment
 SRG (Science Recruitment Group)
 STS Resources & Technology Ltd
 Techconsult UK Limited
 Wolviston Management Services

RESEARCH

Abfad Ltd
 Absolute Antibody Ltd
 Cambridge Research Biochemicals
 Chemie-Cluster Bayern GmbH
 Durham University
 GexCon UK Ltd
 High Force Research Limited
 Interface Polymers Ltd
 Intertek Wilton
 Materials Processing Institute
 Newcastle University
 NewChem Technologies Limited
 NNFC The Bioeconomy Consultants
 Northumbria University
 Populus Select
 Precision Processing Services Limited
 Profel Associates Limited
 Teesside University
 The Parker Consultancy
 University of Bradford

The Wilton Centre
 University of Newcastle School of Chemical Engineering
 & Advanced Materials
 University of Sunderland

SOFTWARE SOLUTIONS

Attric Ltd
 Datum360 Limited
 ecom instruments UK
 Energy Drive Systems Ltd
 Engica Technology Systems International
 Evolution MRO Limited
 Excelpoint
 FoCul Ltd
 Industrial Technology Systems (ITS) Ltd
 Industrial Thinking Limited
 IT Accessed Ltd
 Lisam Systems Limited
 Phusion IM Limited
 Process Systems Enterprise Limited
 Quorum Development Ltd
 REstore

UTILITIES & FACILITIES MANAGEMENT

21 Degrees Ltd
 Bakercorp UK Ltd
 Biochemica UK Ltd
 Esh Facilities
 Evolution MRO Limited
 Falck Fire Services UK Ltd
 Induchem UK Ltd
 Interserve Industrial Services Ltd
 KGM Refrigeration Ltd
 Maxim Facilities Management Ltd
 Oakes Energy Services
 O'Brien Waste Recycling Solutions Ltd
 OPUS Medigas
 Precision Processing Services Limited
 px Group
 Rain for Rent International UK
 REstore
 RTC North
 Sembcorp Utilities (UK) Ltd
 The Wilton Centre
 Utility Alliance
 Utilitywise plc

WASTE MANAGEMENT & RECYCLING

AECOM
 Augean PLC
 Bakercorp UK Ltd
 Chemical Industries Association
 Esh Facilities
 Haden Freeman Limited
 Indecom
 Interserve Industrial Services Ltd
 KDC Contractors Limited
 Kemira Chemicals (UK) Limited
 Mourik
 O'Brien Waste Recycling Solutions Ltd
 Pericula Ltd
 Precision Processing Services Limited
 PYReco Ltd
 Rain for Rent International UK
 Remondis UK Ltd
 Suez Industrial Water Ltd
 Thermitech Solutions Limited
 Veolia Water Technologies UK
 WRL Glass Media





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