

DRIVEN BY AMBITIOUS STRATEGY

2021 REVIEW

Chemical major proves
nothing is insurmountable

INEOS



The Grenadier is ready for launch

In a year dominated by a global pandemic, pricing volatility and widespread uncertainty, INEOS' ethos has been to adapt, evolve and grow regardless

Challenging market conditions have done little to dampen the ambitions and progress of INEOS this past year. In fact, despite the many distractions, momentum continues to build – with bold new projects, continued investment and steady progress towards its energy transition and net zero.

The situation has only served to demonstrate just how well positioned INEOS is to not only cope with whatever comes its way but to flourish.

“Nobody could ever have forecast what’s been happening but we’ve had another phenomenally successful year and any negatives have been far outweighed by the positives,” insists Tom Crotty, Director of Corporate Affairs. “One of the hangovers of the COVID-19 pandemic has been a significant change in consumer behaviour and the pull through for products has been phenomenal, which has been reflected in our strong business performance.”

“We started 2021 with the massive \$5bn acquisition of BP’s aromatics and acetyls business, and we’ve seen a lot of other investments in both sustainability and normal organic growth projects. There has definitely been a lot going on.”

The year also saw the establishment of an entirely new venture, INEOS Energy, headed by former BP CFO Brian Gilvary as Chairman and David Bucknall as CEO – and with it some very fundamental strategic decisions, which have readjusted the portfolio and repositioned the entire business for the future.

“We’ve made very significant progress across a number of fronts, particularly around the circular economy and our energy

transition,” says Crotty.

“We are strong believers that there is going to be a need for traditional oil and gas for at least the next 30 plus years,” he adds. “Whatever commitment is made to net zero by 2050, oil and gas will be in the mix. It’s naïve to think you can just turn the tap off tomorrow – but what we have to do is make sure that we are protecting our own internal business and our external oil and gas business, as well as rebalancing our portfolio so it’s well suited to that transition.”

Indeed, some of the biggest milestones this past year have been seen in terms of its sustainability strategy.

This has included a £1bn investment in the decarbonisation of the Grangemouth site in the UK, the building of a new blue hydrogen plant, and the capture and storage of a million tonnes of carbon dioxide (CO₂). On top of that, INEOS also announced a series of green hydrogen projects across Europe.

INEOS has now moved out of the Norwegian oil and gas sector and focused its interests on the more mature Danish fields, where it is eyeing the vast potential of carbon capture in the North Sea. The Danish government has certainly been supportive, providing record funding for a single grant of DKK 197m (€26m)

INEOS is investing heavily in infrastructure and operations

towards the Greensand project.

This is a particularly exciting prospect that will see CO₂ injected into depleted oil fields in the North Sea for permanent storage. The second phase has now been agreed and a pilot project planned.

“Thanks to the willingness of the Danish government to get involved and offer its support, this will be a very large scale showcase project that will prove the technology and the economics,” he adds.

As a result of this and an ever-growing list of equally ambitious initiatives, INEOS remains well on target across its sites, improving efficiencies, reducing emissions and seeing advances in recycling. The publication of INEOS’ second Sustainability Report for 2021, outlines these and many other achievements.

An important part of this energy revolution will be an increased focus on hydrogen, which is widely considered a real game changer in the pursuit of cleaner energy and a climate neutral economy.

As Europe’s largest operator of electrolysis, INEOS is uniquely placed to capitalise on these opportunities. In July last year, INEOS Energy agreed to buy £25m of shares in HydrogenOne, London’s first listed fund dedicated to clean hydrogen. Then came the €2bn announcement in electrolysis



Still growing STRONG



projects to make zero carbon, green hydrogen at various locations across the continent. Using INOVYN technology, dedicated plants are planned for Norway, Germany, Belgium, France and the UK.

“As Europe’s biggest user of electrolysis, we have a huge advantage in this space,” notes Crotty. “We very much see this as a two-track strategy: to reduce CO₂ emissions of our own existing facilities, blue hydrogen is the most sensible, and quickest, way forward. If we build blue hydrogen plants to take all the gas, convert it, capture all that carbon and put that back into the North Sea, that’s the perfect solution to decarbonize quickly at Grangemouth and indeed anywhere else.”

“As far as hydrogen as a product for industry and heavy duty transport, we are going down the green route because that is what the market is calling out for. We are looking to soon build the first big electrolyser unit in Norway where we’ve got access to endless renewable power.”

On the petrochemicals side of the business, there have been many significant successes and gains this past year – notably with the integration of BP’s aromatics and acetyls businesses, which it acquired at the start of the year.

The addition of these world class assets poses many new

opportunities and further strengthens INEOS’ portfolio and geographic footprint, says Crotty.

“We had some glaring gaps but now we have completed the chemistry set with the whole of the acetyls chain and have some big opportunities there,” he adds. “With aromatics, we’re now also integrated in the polyethylene terephthalate (PET) chain and have some potentially excellent recycling technology through Infinia that we bought as part of the deal.”

The £500m rejuvenation of the aging Forties Pipeline System also continues to make good progress and scheduled maintenance that had been delayed from the previous year has now been completed. As part of its overhaul, INEOS FPS also recently announced plans to introduce artificial intelligence (AI) technology to take energy management to another level. By harnessing all available data, AI will be able to quickly test different operating scenarios and outcomes, further reducing CO₂ emissions and potentially allowing for the technology to be applied across other sites.

The landmark €3bn Project One petrochemical complex in Antwerp, Belgium, has now been granted its environmental permit, allowing the next phase of construction to get underway.

Meanwhile, the Jubail 2 plants in the Kingdom of Saudi Arabia are also on track, says Crotty, while building on INEOS’ position in China still remains a key area of focus as well.

“The priorities for 2022? I see further integration and consolidation, while adjusting to the higher gas prices and making sure that our businesses are robust. We do have some more announcements on the horizon and inevitably, there will also be a bit more portfolio development.”

The growth of its fledgling consumer businesses continues at pace too and 2022 promises some exciting advances, he says.

INEOS Hygienics – launched during the early stages of the COVID-19 pandemic and pivotal in supporting the NHS with the supply of much sought-after hand sanitizer – has gone from strength to strength. New products

continue to be introduced and the brand is flourishing.

“In terms of progress and growth, it’s been a good year for the Hygienics business. In such a short period of time, we have established ourselves as a major consumer brand, helped the NHS and got our premium hospital grade product onto supermarket shelves – a process that normally takes significantly longer to achieve. We’ve expanded the range and been able to exploit our sports assets to help with that process.”

Similarly, it promises to be a huge year for the Grenadier, the no-nonsense off-road vehicle that will soon be rolling off the production line.

Now that reservations have opened, the prototype has toured the world and the interior has been unveiled, the team has around 120 vehicles out for testing and reviews through the first half of 2022. The first Grenadiers are expected to reach customers later in the year. A hydrogen fuel cell version is also being developed – tying in with INEOS’ focus on a new hydrogen economy.

And, of course, INEOS is still very much focused on being the best beyond the world of petrochemicals, manufacturing and healthcare too.

Under the guidance of the newly-appointed Director of Sport, Sir Dave Brailsford, INEOS is partnering with some of the world’s greatest and most successful teams in cycling, sailing, football, Formula 1 and now rugby with the New Zealand All Blacks.

The company’s philanthropic contributions have also continued through support and backing for various charities and educational initiatives. A particular highlight this past year was the donation of £100m to create the new INEOS Oxford Institute to fight antimicrobial resistance (AMR), which is becoming of increasing concern globally.

Certainly, the company’s performance has been outstanding this year despite the toughest of circumstances. In many respects, this is just the beginning of an exciting new era. “I think 2021 has just been a classic INEOS year,” says Crotty.

By Andy Brice



“We’ve had another phenomenally successful year and any negatives have been far outweighed by the positives”

Tom Crotty,
Director of
Corporate Affairs,
INEOS



Petrochemicals and intermediates perform well despite an increasingly challenging environment

INEOS businesses have, for the most part, had a remarkable year in 2021, turning in very good profits on healthy demand. This was despite the ongoing COVID-19 pandemic and related movement restrictions and the supply chain problems that stretched around the world.

For INEOS O&P Europe, last year was a record in terms of financial performance, says CEO Rob Ingram, and represented the other side of the coin that was 2020 – a very tough year for the business. Demand was strong across all sectors, such as consumer products and construction, and that has continued into the first part of 2022.

The business also gained support from supply difficulties, both in the US and in Europe. Storm Yuri that hit North America in February 2021 took some plants down, drying up exports to Europe for a period. Europe also had a heavy plant maintenance schedule across

both ethylene crackers and related polyethylene and polypropylene units, so many of INEOS' competitors were not running, allowing the company to benefit from the strong market conditions that prevailed at the time.

Looking ahead to 2022, Ingram believes there is still some pent-up demand in the markets INEOS serves, but the strong market conditions of 2021 are unlikely to be replicated. Nevertheless, he predicts a good year overall for the business, but expects a stronger first half than second.

The unknowns, that stretch across all of INEOS' businesses, centre on when the supply chain problems will ease and when – and if – gas prices, which rocketed last year, settle at more normal levels.

Ingram is keen to highlight the way his team has adapted throughout both 2020 and 2021 in responding to the restrictions imposed to combat COVID-19 and remaining focused on safely

The business has seen significant gains despite a tough year

running and maximising the firm's assets to deliver an outstanding performance.

Last year was also a big year for Project One, the ethane cracker that INEOS is building in Antwerp, Belgium. In December 2021, the local authority granted the environmental permit and the INEOS board made a final investment decision in the first quarter of 2022. Preparation and design and engineering work will continue this year and construction could start in the summer of 2022. The cracker is scheduled to start up in 2026.

The cracker will have the lowest carbon footprint in Europe, INEOS says – three times lower than the average European steam cracker and less than half of that of the 10% best performers in the region. Project One aims to become climate-neutral within 10 years of start-up. Consequently, says Ingram, customers are seeing the plant's sustainability credentials as being able to reduce their own products' carbon footprint and interest in offtake is gaining traction.

The company continues to grow its recycling product range, offering polyolefins that contain 50% or more recycled post-consumer plastic. Ingram expects to see a big step-change in sales volumes this year. He says many customers are incorporating the recycled polymers into their products and launching new ranges, which will pull more INEOS volumes through the chain. In Q1 of 2022, INEOS Olefins & Polymers Europe received International Sustainability and Carbon Certification, ISCC-Plus, across its Polyolefin facilities. The certification is proof of traceability from a sustainable source and supports INEOS' successful trials of advanced recycling technology and bio-based feedstocks, covering its butadiene & aromatics plants, HDPE and PP as well as LLDPE and LPDE plants.

Across the Atlantic, INEOS O&P USA also achieved a record sales year with the winter storm creating extraordinary margins and profitability from the supply/demand imbalance, says CEO Mike Nagle.

All the upgrades at the

Chocolate Bayou plants in Texas have now been completed, and an additional 275,000 tonnes/year of ethylene capacity started up in 2021, contributing to the record sales volumes. Another contributory factor was the addition of the Gemini HDPE assets at LaPorte, Texas. INEOS bought out partner Sasol at the end of 2020, which Nagle says brought significant growth to its PE business.

One key achievement for INEOS O&P USA was receiving International Sustainability and Carbon Certification – ISCC-Plus – across its sites in Texas and California, supporting INEOS' successful trials of advanced recycling technology to produce HDPE and PP. "Only small commercial quantities of ISCC-Plus certified recycled plastics are available at present, but they will increase in the future as customers and brand owners boost their uptake of recycled content," says Nagle.

He adds that the ISCC-Plus certification also applies to INEOS O&P USA's bio-based feedstocks and trials are planned for 2022 to determine feedstock and processing specifications.

Acquisitions continue to play a part in growth and, on 31 December 2021, wholly owned subsidiary WL Plastics closed its purchase of Pennsylvania-based PE pipe fabrication firm, Charter Plastics. Nagle comments: "This is a great strategic acquisition that allows us to enter new regional markets and expand our customer base, as well as providing some backwards integration into our own PE business."

Joe Walton, CEO of INEOS Oligomers, is upbeat about prospects this year. His business had its third best-ever year in 2021, with both demand and margins for its intermediates and specialties holding up well.

The 420,000 tonne/year linear alpha olefins (LAO) plant in Chocolate Bayou, Texas, started up in February 2020, enabling INEOS to supply more volumes to the market. The site's new low-viscosity polyalphaolefin (PAO) plant will be commissioned in the first quarter of 2022.

"We've completed the first phase

of our growth strategy, which centred on a \$1bn investment at Chocolate Bayou. We're now pushing on with our second phase, which is focused on a new project in the Middle East," says Walton. That project is being done with INEOS Nitriles, both sharing the \$2bn investment. Engineering on the LAO and acrylonitrile units is well advanced. The units will be located at the Amiral complex being built in Jubail, Saudi Arabia, by Total and Saudi Aramco.

Fast-growing demand for the sophisticated lubricants used in wind turbines is driving INEOS to invest further in hiking capacity for its high-viscosity PAO. Walton says engineering is underway to "significantly expand" the LaPorte, Texas, plant to keep pace with market demand. The debottlenecking is due to go online in 2024, by when Walton expects the current capacity will already be sold out. He says demand is growing by at least double-digits every year now that climate change has become a priority and governments are being much more consistent in providing policy and financial support for wind-energy projects.

The biggest deliverable in 2021 for INEOS Aromatics was a shift to a dynamic pricing system for its customers. This, says CEO Stephen Dossett, was a difficult task but he believes the system, which allows for prices to be adjusted either monthly or quarterly, is best for everyone involved.

The contracts with customers in the US and Europe were inherited from INEOS' acquisition of BP in January 2021 and were on a fixed-margin basis, effectively handicapping INEOS in capturing any upside when opportunities arose.

Now Dossett says it can gain a fair share of oversized margins when they materialise. On the flip side, when supply and market dynamics dictate, INEOS will have to adjust prices downwards, but this will allow our customers to be competitive, says Dossett.

There is another six-to-nine months to go before the integration of the BP business is completed. But so far, INEOS has created three regional, standalone businesses – in contrast with BP's one global

operation – and set up three local leadership teams.

By the end of the third quarter of 2021, INEOS Aromatics had also exited most of the transitional service agreements that were in place with BP, at a considerable cost saving. A "tremendous" effort was made to cut run rate costs last year, which improved between 15-18% on BP's rate. "We are well on target to exit 2022 with a 25% cost saving versus the BP rate," says Dossett.

However, the polyester chain is suffering from overcapacity of key raw material purified terephthalic acid (PTA). Major investments have taken place in Asia, especially in China, making the market very challenging. "Margins were at bottom-of-cycle conditions in 2021 and that will continue into 2022," Dossett says, adding that while demand for PTA grew between 5.5-6% last year, supply rose even more. He expects it will take another 18 months before demand catches up with supply and margins improve.

In the West, while demand has also been very good, supply has been constrained, particularly by a lack of availability of containers and vessels to ship product from Asia. INEOS' plants in Europe and the US ran hard to compensate for the lack of imports for both PTA and polyester resin and benefitted from the strong call on domestic production.

Dossett sees early evidence that customers want to increase their dependency on domestic production because they were badly hit last year by the supply chain problems. It is likely, he says, that the premium that local producers can put on their products to ensure supply chain security will be bigger than in the past.

INEOS will invest in PTA debottlenecking projects as and when the supply/demand balance dictates. But, cautions Dossett, any decision to invest in new capacity will depend on whether the growth in demand for polyester will be met more by recycled material than for virgin polymer. If it turns out to the former, added Dossett, opportunities will still exist, but they will be different, referring to his business's Infinia chemical recycling development project, ▶



"We are much better than the majority of our industry with regard to emissions of CO₂ per tonne of product"

Geir Tuft,
CEO, INOVYN

► which is underway in Naperville, the US (see page 12).

INEOS Acetyls enjoyed a strong business cycle throughout all of 2021 across Europe, the US and Asia. A shift in consumer spending from services to goods underpinned demand for its products, particularly for vinyl acetate monomer (VAM). Used in adhesives, VAM saw a boost from online companies moving away from plastic packaging to cardboard.

David Brooks, CEO of INEOS Acetyls, is forecasting a “pretty

against a backdrop of rebounding demand, says Brooks. “Longer term, we will need to build, probably in Asia first, where the growth is,” he says, adding that typically, growth rates have been north of 4.5%/year in Asia. However, he expects that Asian demand in 2021 will end up between 5-10% and possible close to 5% in Europe and the US.

Hans Casier, CEO of both INEOS Phenol and INEOS Nitriles, reports that 2022 has kicked off

He echoes Dossett’s comments about European customers coming to realise the importance of securing baseload volumes from strategic domestic suppliers. “With very volatile consumer demand, the security of supply from European local producers is increasingly important to customers. There is strong interest to form European co-locating partnerships to overcome supply chain constraints and benefit from cost savings,” Hannemann says.

Fantastic demand with plants running hard to barely keep pace with consumption turned in exceptional results last year at INOVYN, according to its CEO Geir Tuft. A key achievement for the firm was the publication in October 2021 of its debut sustainability report, which includes environmental data for all its products. “This means that our customers now have actual data for the products they buy from us and it shows that that we are much better than the majority of our industry with regard to emissions of CO₂ per tonne of product, for instance,” he says.

INOVYN has also taken some strategic decisions around some of its assets, agreeing to rejuvenate certain plants, for example in Tavaux, France.

“We’re making progress on all counts and I think we really showed in 2021 that INOVYN is robust, financially resilient and runs well, even under the extremely difficult conditions that we’ve had to manage around COVID-19,” comments Tuft.

INEOS Trading & Shipping is looking to invest further this year, building on the moves it has made in the past couple of years to complete its butane supply chain, says CEO David Thompson.

The company took delivery last year of four barges that operate on the River Rhine, taking butane from the storage tank in Antwerp, which entered into service in October 2020, and delivering it to Köln, Germany. With a British dry sense of humour, INEOS named the vessels on the Indian “Bhaji” theme: Aloo, Brinjal, Onion and Argie.

“We’ve built up a nice system that enables us to supply our own internal assets but also to have the



New barges will deliver butane to Köln, Germany

decent year” in 2022, with good demand into key application areas, such as automotive coatings, paints, adhesives and lacquers, and solar panels. He adds that this year will not have the “bounce-back factor” of 2021, but he expects a more stable market with inventories returning to usual levels.

But the world does need new acetic acid capacity, says Brooks, adding that INEOS Acetyls is looking at some of the projects that were proposed by BP, including one with Zhejiang Petroleum and Chemical to build a 1m tonne/year acetic acid plant in eastern China.

“A lot of our competitors are much more highly integrated downstream than we are, and we need to rebalance that in the longer term,” he says. A debottlenecking project was due online in Nanjing, China, by the end of 2021, adding 80,000 tonnes/year, with another in Ulsan, South Korea, adding 60,000 tonnes/year, equating to a rise in INEOS Acetyls’ global capacity of about 5%.

Supply is not keeping pace

with ongoing strong demand, after a very good performance in 2021. Nevertheless, he says there is doubt trickling into the market in certain sectors in late January related to concerns over inflation.

The new world-scale cumene plant at Marl, Germany, will start up at the end of the first half of 2022, while he anticipates that the front end engineering design (FEED) study for the world-scale ACN plant in Saudi Arabia will begin later this year.

Europe’s largest producer of ethylene oxide (EO) and derivatives, INEOS Oxide enjoyed strong demand for its products – EO is used in detergents and cleaning formulations, so consumption was boosted by the COVID-19 pandemic. High-purity materials used in pharmaceutical excipients and chromatographic eluents were also in high demand last year, supported by global efforts to develop COVID-19 vaccines, says INEOS Oxide CEO Tobias Hannemann.



“We’ve built up a nice system that enables us to supply our own internal assets but also to have the flexibility to sell on the market”

David Thompson, CEO, INEOS Trading & Shipping

flexibility to sell on the market, depending on market conditions,” says Thompson.

This year, the business will take delivery of two very large ethane carriers (VLECs), one arrived in the US in early February, followed in a couple of months by the second. The VLECs’ names are Belstaff and Grenadier, a nod to INEOS’ clothing and 4x4 off-road vehicle brands.

Thompson is expecting to put in more orders for ships this year, pending board approval of the funds. With more trading on ethane and LPG, the business needs a bigger pipeline, he says, also pointing to the additional shipments that will eventually be required from the start-up of Project One.

INEOS Enterprises – the entrepreneurial arm of INEOS that comprises a number of discrete business units – sold the sulphur chemicals assets to Weylchem last year. The business, which INEOS inherited from ICI many years ago, is Spain’s largest dedicated manufacturer of sulphuric acid and oleum, with a 400,000 tonne/year plant in Bilbao.

“The timing was right for a sale and enables us to focus on bigger businesses,” says Ashley Reed, CEO of INEOS Enterprises, which is home to the former Tronox pigments and Ashland composites businesses that INEOS bought in 2019, among others.

Reed says after a couple of years of applying the INEOS “acquisition toolkit” that focuses on improving safety, health and environment working practices and operational reliability, along with reducing fixed costs, both the pigments and composites businesses are outperforming versus forecast.

Composites, in particular, has outperformed in terms of growth, demand and margin, notes Reed. “As a consequence, we are looking to grow geographically and to expand our product range, which has close synergies with the areas we currently serve.”

He adds: “We are open to new acquisitions and we hope that, in 2022, another opportunity similar to the successful ones of pigments and composites passes by our window of observation.”

By Elaine Burridge

FPS FOCUSED ON THE FUTURE

Since INEOS took over the Forties Pipeline System (FPS) in November 2017, it has been executing a programme of work to inject new life into the business, reducing operating costs, enhancing availability and making it fit for purpose for 2040+.

FPS is an integrated oil and gas transportation and processing system with 500km of pipelines and 11 sites that operate from the Central North Sea to Scotland’s Central belt. It links to 80+ offshore fields and two onshore natural gas liquids (NGL) streams that supply 40% of the UK’s oil and facilitates the supply of 35% of its gas.

Last year, major projects took place at the Cruden Bay terminal, on the Graben Area Export Line (GAEL) that connects with the Unity platform, and the Kinneil facility. At Cruden Bay, INEOS spent about £35m to upgrade the whole system, putting in new pigs receiving/launching stations and bringing all pipework above ground to make it more manageable for future maintenance.

Pigs are gadgets used to inspect the pipelines and remove build-up of solid matter, water and debris, keeping them safe and maintaining high flow efficiency.

INEOS also replaced GAEL’s pig

receiver valves on the offshore Unity collection platform. At Kinneil, work centred on preparation works for replacing the ground flares and constructing an operations building.

Andrew Gardner, CEO of FPS, expects to invest in further improvements during 2022, including spending about £10m to upgrade and modernise some of the system’s gas storage and export capabilities.

He expects that INEOS will probably retire one of the gas processing trains at Kinneil next year and retire another sometime in the 2030s.

Last December, INEOS FPS announced plans to deploy OPEX Group’s artificial intelligence (AI)-driven optimisation technology at the Kinneil terminal in Grangemouth to further reduce carbon emissions.

“We’re trying to give FPS a positive future,” says Gardner. “We have got an aggressive sustainability

plan. AI is part of that, using the data to try and identify areas where carbon emissions need to be dealt with.”

INEOS FPS said that once fully integrated, the software could potentially identify up to a 10% reduction in existing emissions, with further opportunities thereafter.

By Elaine Burridge



“We’re trying to give FPS a positive future. We have got an aggressive sustainability plan”

Andrew Gardner,
CEO, FPS



Governments and companies around the world are accelerating efforts towards a more sustainable and circular future. As part of its own journey along the sustainability path, INEOS announced several major steps last year as it launched new, more environmentally friendly products or made key advancements on developing chemical recycling technology.

POSITIVE STEPS FOR SUSTAINABILITY

INEOS Styrolution has made big strides on circularity, both on its polystyrene (PS) and acrylonitrile butadiene styrene (ABS) products. In 2019, the company successfully introduced the first products in its new ECO family of sustainable styrenics materials. The portfolio of new sustainable solutions has grown substantially ever since with individual grades containing up to 70% of post-consumer recycled material.

“Our ECO grades also launched around the world to very positive customer feedback,” says Steve Harrington, CEO

INEOS Styrolution. Today’s ECO portfolio includes mechanically recycled standard PS and ABS grades as well as first specialty styrenics solutions, including Novodur ECO specialty ABS and Novodur ECO high-heat grades. They are drop-in replacements for their virgin counterparts.

Another milestone was recorded in 2021 with successful proof of concept for producing ABS from recycled styrene. The EU-funded project – called ABSolutely Circulator – includes waste management firm Indaver.

INEOS Styrolution takes a global approach

with its sustainability programme. The company is also collaborating with Chinese recycling enterprise GER to produce high-quality ABS grades from post-consumer recycled electrical and electronic waste. In South Korea, a similar collaboration has been agreed with Samsung Resin. High-end luggage manufacturer TUPLUS was among the first customers to select the new Terluran ECO GP-22 ABS to offer a more environmentally conscious choice for travellers.

Some bio-attributed specialty styrenic products entered the market in April last year, namely Styrolux and Styroflex. In these thermoplastic styrene-butadiene copolymers, either 100% or 50% of the fossil-based styrene is replaced with bio-attributed styrene, which lowers their greenhouse gas footprint by 74% versus the petrochemical-based version.

Technology too is being developed, specifically for depolymerising PS back into its feedstock styrene. The advanced – or chemical – recycling process will use UK company Recycling Technologies’ fluidised bed reactor technology and is to be tested in a pilot plant at Swindon.

The plant marks INEOS Styrolution’s first investment in Europe for pilot-scale chemical recycling and production is due to start next year. “We expect to learn a lot from this pilot,” says Harrington, adding that he expects the company will take its experience and build upon this globally in the future.

As a next step, INEOS Styrolution is currently considering building a commercial-scale plant in Wingles, France, which is expected to convert 15,000 tonnes/year of PS waste into recycled styrene. Similar investments are currently in the design phase in other parts of the world.

Other projects underway by INEOS Styrolution include the 600,000 tonne/year ABS plant in Ningbo, China, which is due online in the third quarter of 2023, and a 100,000 tonne/year acrylonitrile styrene acrylate (ASA) plant in Bayport, Texas, US, which is expected to start-up later this year.

Notwithstanding INEOS Styrolution’s achievements



during the past 12 months, Harrington is also very proud of retaining the EvoVadis Platinum rating – the highest available – for its sustainability performance. He says EcoVadis, a global independent assessor of environmental, labour practices and supplier sustainability, recognised the tangible efforts the company had made in launching new products, along with the management's commitment to circularity. And while the firm retained the Platinum award, it also improved its score.

Looking ahead to 2022, Harrington expects that the focus of new investments for INEOS Styrolution will be on more circular and sustainability measures, including the mechanical recycling of PS, ABS, specialty styrenics materials and the development of sustainable styrenics solutions based on renewable feedstock.

Meanwhile, INEOS Aromatics is developing Infinia, a chemical recycling technology to enable a circular loop for PET plastic waste that is either difficult or impossible to recycle through traditional mechanical methods.

Kim Pipkin, commercial development lead at INEOS Aromatics, explains that while PET is the most recycled out of all the plastic packaging available on the market, most of the bottles recovered are typically downcycled and not used in food contact applications. For instance, they will be used in polyester clothing.

To solve the problem, Infinia is working on a chemical recycling process to break down the resin back into its constituent hydrocarbons, so they can be used again to produce virgin-quality PET.

Infinia has invested \$25m to build a pilot plant at its research and development centre in Naperville, Illinois in the US and, as of January 2022, commissioning was nearing completion.

Steve Dossett, CEO of INEOS Aromatics, says the plant will run trials during the rest of this year in order to understand what the feedstock scope of the recycling technology will be. There is a very wide spectrum of waste that ranges from good-value material down to

the lowest-value polyester, such as carpets, that are usually landfilled or incinerated.

INEOS Aromatics is working with a consortium – formed under previous owner BP – to accelerate commercialisation of the technology. The companies include major brand names such as Britvic, Danone and Unilever, along with recycling and waste management group Remondis and packaging specialist Alpla.

Pipkin believes it will be very difficult to achieve the recycling targets set by the European Commission without the help of advanced recycling because of the inherent limits with mechanical recycling technology. She comments: “There are only so many times that you can mechanically recycle material, so ultimately it will end up in either landfill or incineration.”

Infinia's focus is initially on difficult-to-recycle packaging waste, but Pipkin says one of the biggest opportunities is in textiles, the majority of which ends up in landfill at present.

INOYIN too has taken big steps on its sustainability and carbon-neutral path with its BIOVYN range of PVC products. Described by INOVYN as a “game-changer”, BIOVYN is the first commercially available bio-attributed PVC, with 100% bio-based content and a greenhouse gas saving of more than 90% versus the fossil-based version.

In May 2021, major Norwegian pipe manufacturer Pipelife launched a range of sustainable piping solutions using BIOVYN. The pipes, to be used in various applications that include water supply, cable protection and electrical housing, enable Pipelife to contribute towards sustainable and low-carbon buildings and infrastructure.

“Companies such as car, clothing and shoe manufacturers are also very interested in BIOVYN,” says INOVYN CEO Geir Tuft, pointing out that a number of automotive manufacturers are considering its use in their new models.

Another Swedish firm, this time clothing brand Farmerrain, has chosen BIOVYN for its fashion-led rainwear and high-performance workwear. Trials

also continue for using BIOVYN in medical applications and other consumer products like toys and fashion accessories, as well as the already established building and construction products, such as Tarkett's use of BIOVYN in vinyl flooring applications.

At the end of last year, INOVYN launched a bio-based epichlorohydrin, the precursor to epoxy resin. The product, called REODRIN, is manufactured at Tavaux, France, from second-generation renewable feedstock such as glycerin from used cooking oil. Customer response has again been fantastic, says Tuft.

And the work doesn't stop there. INOVYN is looking to build on its long experience with Vinylloop at recycling more complex materials, where PVC is compounded with other products, such as polyester fibre, by developing processes to separate via physico-chemical means. Traditional mechanical recycling of PVC is already well established and INOVYN says it is proud to be the largest financial contributor to VinylPlus, which collectively recycles around 740,000 tonnes/year of PVC in Europe.

INEOS O&P Europe is also moving forwards in developing food-grade recycled polymers, notably PP and HDPE. The company is working with UK project NEXTLOOPP to create circular food-grade recycled PP from post-consumer recycled packaging. Plans are to build a demonstration plant to produce 10,000 tonnes/year of food-grade recycled PP.

On HDPE, INEOS O&P Europe is partnering dairy brand Lactel to deploy chemical recycling technology for producing a circular version of the PE grade for use in milk bottles. Lactel ran initial trials at its site in Montauban, France, which was certified in April 2021 by the Roundtable on Sustainable Biomaterials as compliant with food safety regulations.

INEOS' constant push towards making its products more circular and sustainable continues among all its businesses, with plenty more innovative developments anticipated in the months and years ahead.



“Our ECO grades also launched around the world to very positive customer feedback”

Steve Harrington,
CEO, INEOS
Styrolution



ON THE PATH TO NET ZERO

As a major producer of hydrocarbon-based materials, INEOS is a large user of fossil-based raw materials and energy. But it has taken the bold step as a company to commit to net zero carbon emissions by 2050

INEOS is reducing its dependence on fossil-based resources

INEOS has signalled its intention to play its part in the fight against global warming at national and global levels, while at the same time remaining competitive and profitable.

Following COP 24 in Paris in 2015, most countries have set a goal of achieving a net zero emission economy by 2050, and are adopting regulations and legislation to support this. INEOS intends not only to be at the forefront of industry's response, but also to "stay ahead of evolving regulations and legislation."

Many actions to reduce the carbon intensity of the business are already in hand. And many new initiatives are planned to help meet the 2050 net zero target. The scale of the task is challenging. In 2019 INEOS' greenhouse gas (GHG) footprint was assessed at 20.8m tonnes of carbon dioxide (CO₂) equivalent, with 18.0m tonnes of this emanating from its chemical production sites.

To put this in perspective, the

chemical industry as a whole is responsible for 6% of global CO₂ emissions, 3% from its processes and 3% from the energy needed to run them, and INEOS is responsible for 0.7% of these industry emissions.

To ensure progress is made on short, medium and longer-term timescales, INEOS is developing a number of intermediate targets, the first of which is a 10% reduction in GHG emissions by 2025, compared with a baseline year of 2019. Over €3bn has been earmarked for investment over the next five years to reduce INEOS' footprint post-2025.

To underpin its carbon-reduction planning and initiatives, INEOS has done a huge amount of work to establish science-based methodologies for collection, traceability and validation of data from its operations across all its sites worldwide. This, explains Greet Van Eetvelde, head of climate, energy and innovation for INEOS Group, "gives us an evidence-based

reference line for setting targets and ensures that our emissions accounting is robust and aligned with the greenhouse gas protocols."

All the data is collected centrally by INEOS' Climate and Energy team and held on a sophisticated and tailor-made online platform. It includes not only CO₂ emissions and energy consumption, but also water, waste and resources. This, she adds, "has allowed INEOS to establish its [environmental] footprint for a few years now, and gives the consistency to set 2019 as the base year" for future comparisons.

It is now, she adds, "possible to draw a line to net zero by 2050, estimate where we would be by 2030 and drive the reduction roadmap further." She stresses that the line will not be a straight one – there will be periods of slow and rapid progress over the coming years. Progress will sometimes be incremental, but sometimes a step change will be possible.

Each INEOS site has been tasked

with the production of a roadmap to net zero tailored to its particular operating conditions. What energy and materials does it use and make, including co-products and waste? Does it have its own power generation on site? Does it share the site and material streams with other producers?

All these aspects, says Van Eetvelde, complicate the picture and make it essential to assess each site carefully and separately. “The drive towards net zero will not be the same for all sites and there will be differences in opportunities and options.” The pace of change may also be influenced by differences in national government regulations and timescales.

As a major petrochemicals producer, explains Peter Williams, INEOS’ Group Technology Director, “we will always need a carbon source for our products – carbon is the main element in the modern materials that we produce, for example polymers, carbon fibre and composites.”

But to remain in business and be fit for purpose, he says, INEOS has to lower its carbon footprint and reduce its dependence on fossil-based resources. “One way to view this is that the marketplace is changing and our customers as well as governments are demanding that we lower the carbon intensity of our products.”

He adds that INEOS’ customers and their customers are increasingly asking questions about the carbon footprint of INEOS’ operations and products, and selecting who they do business with on the basis of product footprint as well as quality and price.

“The whole value chain will be affected, with those downstream demanding their upstream suppliers have plans to reduce emissions and get to net zero. You can’t just think small on this – it will become part of the competitive landscape.”

INEOS has identified six main emission reduction options, five of which it is pursuing to reduce carbon emissions in absolute terms – these are fuel switching and feedstock switching, optimisation of efficiency, and carbon capture and utilisation or storage.

A sixth option, offsetting, is not a major consideration at the

present time, says Van Eetvelde, but will be needed towards 2050 to fully achieve net zero.

INEOS is thus pursuing a range of initiatives, including:

- ongoing energy optimisation of current operations;
- acquisition of renewable energy sources to run operations;
- development of clean hydrogen as a fuel;
- use of recycled and bio-based feedstocks instead of fossil-based feedstocks;
- development of new recycling technologies to produce polymer products containing recycled plastic;
- carbon capture and use or storage; and
- investment in new assets to create a step change to reduced emission.

Says Williams: “At present, almost all the carbon we use for our products is fossil-based. So, we are looking for alternatives such as biofeedstocks, biowaste and recycled plastics. However, these can be difficult to find in the volumes we need them. We are also looking at how we can use CO₂ itself as a carbon source in our operations.”

INEOS is also striving to make its processes as efficient as possible and to ensure that it loses as little carbon as possible during production. It is also exploring ways to move to natural gas from oil as a feedstock source as this is more carbon efficient in terms of lower emissions.

“We are also looking at alternative sources of energy,” says Williams. INEOS now has several long-term contracts for wind power and will do more deals in future, he says. The company is assessing how and where it can electrify its processes to enable more use of green electricity.

Hydrogen and carbon capture are two key areas for INEOS in its move to net zero and a number of concrete projects are underway, including the

Greensand CCS project in Denmark and INOVYN’s plans to build a power-to-methanol plant in Antwerp and also hydrogen electrolyzers in Norway and Germany. To this end, INOVYN is developing an extensive green hydrogen business (see page 9). Some €2bn has been earmarked for future investment in the hydrogen business.

Its very much a “do, learn, do” approach and the scale and impact of our initiatives will grow over time as our businesses invest to renew our manufacturing base to remain sustainable into the future,” he says.

A prime example is INEOS’ Project ONE ethylene cracker being planned for its Antwerp site in Belgium. Environmental permits were obtained just before the end of 2021.

The cracker will run on ethane feedstock, be fired by hydrogen-rich fuel which may eventually become 100% hydrogen, and may take advantage of carbon capture and storage at a future date to establish a carbon value chain in the Port of Antwerp.

Electrical power for the cracker will be green offshore wind energy from the recent power purchase agreements with Engie and RWE.

INEOS calculates the cracker

The business is raising efforts to make processes as efficient as possible



when operational in mid-2026 will save its customers 2m tonnes/year of carbon emissions “as they will no longer have to rely on ethylene from older plants with more emissions.”

“This is a really important step for us. It has the capability to be the first net zero cracker in Europe within 10 years of operation,” concludes Williams. It will also be a significant step on INEOS’ journey to overall net zero.

By John Baker

Image: David Hughes

The road ahead to a carbon-free future

The INEOS group of companies is setting out a series of ambitious roadmaps for its network of sites, creating the foundations for a low-carbon infrastructure that underpins its manufacturing assets, and the company's commitment to net zero by 2050

Grangemouth, Scotland's largest manufacturing site and the location for three big businesses – the Petroineos refinery, the petrochemicals complex and the Forties Pipeline System – is a first and prime example of INEOS' net zero ambitions.

Plans are for the site to be carbon neutral by 2045, in line with Scotland's Net-Zero target; the UK has pledged to be carbon neutral by 2050. Andrew Gardner, Chairman of INEOS Grangemouth, says more than £1bn will be spent to reach its goal of removing another 1m to 1.5m tonnes/year of carbon by 2030, equating to a 60-70% reduction across the three businesses.

The company has already cut total emissions at Grangemouth to 3m tonnes/year by 2020, down 40% versus its 1999-2000 benchmark of 5m tonnes/year.

The roadmap also involves a shift to the production and use of hydrogen by all businesses at Grangemouth, together with the Acorn project's carbon capture and storage of at least 1m tonnes/year of CO₂ by 2030 (see page 10). This will include capturing CO₂ from

existing hydrogen production and the construction of a world-scale carbon capture-enabled hydrogen production plant.

The use of hydrogen and carbon capture would reduce the site's CO₂ emissions to about 1.7m-1.8m tonnes/year. "A fundamental part of our roadmap is to change the energy source that goes into all manufacturing plants at Grangemouth," says Gardner, although he adds that "the big wins have gone, and it gets harder the more carbon you take out".

Hydrogen would also feed the Grangemouth power stations. There are currently two on the site that supply power and steam, one wholly owned by INEOS and the other owned jointly with Petroineos. A third facility – the New Energy Plant – is currently under construction and due for completion in late 2023. This will replace the INEOS/Petroineos power station that is nearing its end of life, also saving another 150,000 tonnes/year of carbon emissions through the use of highly efficient technology.

Gardner adds that lots of other,

smaller opportunities also exist to reduce Grangemouth's carbon footprint. These will come from further investments in energy reduction and the optimization, and electrification of key equipment. The company's shift to incorporate more recycled content in its polymer products will also play a part as we move to a more circular approach to production.

However, Gardner believes these smaller measures will be funded more by the economics of the carbon price, rather than by INEOS corporate or government funding. He explains that under Europe's carbon trading scheme, which started in 2005, companies must pay a fee for every tonne of carbon produced. That price at the start of 2021 was about €30/tonne and had jumped to about €70/tonne by the end of last year. While the higher cost has a negative impact on businesses, it nevertheless does mean that a carbon-reduction project will pay for itself in just a few years, he says.

A move to carbon-free electricity is also part of INEOS' roadmap plans and in early 2022, the group secured its third renewable power contract to date. The 10-year agreement is with green energy company Eneco for the supply of renewable offshore wind power in Belgium and will reduce INEOS' carbon footprint by another 940,000 tonnes over the length of the contract. The deal increases INEOS' total purchase of Belgian

offshore wind generation to over 200MW, reducing the company's CO₂ emissions by nearly three million tonnes.

The power will support INEOS O&P, INOVYN and INEOS Styrolution businesses, allowing the latter to switch its German plants to green power from January 2022 onwards.

Meanwhile, INOVYN expects to finalise roadmaps for all its sites by the end of 2022. The company has several sites across Europe, notably in the UK, Belgium, France, Germany, Spain, Italy, Sweden and Norway.

INOVYN's CEO Geir Tuft says the business produces a little over 3m tonnes/year of CO₂ emissions, of which 2m tonnes/year are rated as Scope 2 and largely related to the electricity it consumes. Scope 2 covers indirect emissions from the generation of purchased electricity, steam, heating or cooling.

Electrification is one area that will cut carbon emissions quite substantively, says Tuft, highlighting a project in Tavaux, France, where it is investing in a new mechanical vapour recompression unit that will decarbonise the solid salt process.

Essentially, the project will convert the brine concentration process to run on electricity rather than steam produced from gas, driving down carbon emissions by more than 60,000 tonnes/year. The unit is scheduled to start up by the end of 2023.

INOVYN, already Europe's largest operator of electrolysis, the critical technology necessary to produce green hydrogen for power generation, transportation, and industrial use, is intending to spend more than €2bn on green hydrogen production. Electrolysis is a promising option for carbon-free hydrogen, using renewable resources. The process

uses electricity to split water into hydrogen and oxygen and electrolyzers can range in size from small-scale units right up to large-scale central facilities that can be tied in with electricity generation.

A series of electrolyzers will be installed across several of INOVYN's sites in Europe. The first will be 20MW capacity to be built in Rafnes, Norway. The investment will lead to a minimum reduction of about 22,000 tonnes/year of CO₂.

Secondly, a large-scale 100MW electrolyser will be established in Köln, Germany, lowering emissions at the site by more than 120,000 tonnes/year. Hydrogen output here will be used to produce green ammonia along with offering opportunities to develop E-fuels through power-to-methanol applications. The remaining electrolysis projects are located in Belgium, France and the UK.

Another power-to-methanol project is planned at the Lillo site in Antwerp as a collaboration with ENGIE, Fluxys, Indaver, Oiltanking, the Port of Antwerp and Participatie Maatschappij Vlaanderen. A demonstration plant is being built on INOVYN's site to produce 7,500 tonnes/year of methanol from hydrogen generated from renewable energy and captured CO₂. Start-up of construction is expected this year.

Also located at Antwerp is INEOS Phenol, with the world's largest and most energy-efficient phenol unit, says Hans Casier, CEO of both INEOS Phenol and INEOS Nitriles. INEOS Phenol operates sites too in Gladbeck and Marl, Germany, along with two in the US (Mobile and Pasadena), while INEOS Nitriles' operations are in Köln, Germany, as well as in Green Lake, Lima and Aurora in the US.

"Our roadmaps are looking first at the very heart of what we

do, converting raw materials into final product, minimising energy consumption further, optimising and remaining competitive," Casier says. "For all the sites, we are defining the specific processes and step changes required so that we have a clear technological solution to reduce our emissions by 50% by 2030. This will allow us to take decisions during the next 10 years when investments are ready and justifiable."

Next to reducing raw material and energy consumption, the step changes will include reviewing switching fuels – for example, the company has already run a pilot project on its Antwerp phenol plant, replacing the natural gas used by the cogeneration unit with up to 20% of hydrogen.

The project, which is being carried out with partner ENGIE, marks the first time that such tests have been performed at industrial scale in Belgium.

"There is a lot of hope and aspiration that hydrogen will take off, but it is a huge challenge," says Casier. "INEOS can play a big role here. We have technology for this energy transition and the option to use hydrogen as an energy vector, as well as a feedstock."

Casier points to Project One, INEOS' proposed flagship ethane cracker at Antwerp, which the company says will have the lowest carbon footprint in Europe, setting a new environmental standard with the build in possibility to become CO₂ free when carbon-free hydrogen becomes available. The plant, which was granted an environmental permit by the Province of Antwerp December 2021, is due onstream in 2026.

"Sustainability has always been in INEOS' DNA," says Casier. "We are leaders in running world-scale plants economically and efficiently with supreme rates of conversion."

By Elaine Burridge



"Our roadmaps are looking first at the very heart of what we do"

Hans Casier,
CEO, INEOS
Nitriles

Grangemouth
aims to be carbon
neutral by 2045





ENERGY TRANSITION GAINING GROUND

The establishment of INEOS Energy at the end of 2020, under the leadership of former BP CFO Brian Gilvary, signalled INEOS' intention to play a significant role in the global energy transition being driven by global warming and the move to a lower carbon economy with the goal of reducing carbon dioxide (CO₂) emissions

The business incorporates all of INEOS Energy's extensive oil and gas assets and operations and will look for opportunities to invest in the broad sweep of energy sources and low-carbon technologies, from oil and gas, carbon capture and storage (CCS) and adjacent technologies.

Speaking at the time of his appointment, Gilvary said: "I believe very strongly that the combination of the assets and technologies that INEOS

Hydrogen will play an integral role in the business moving forward

owns, along with its drive and determination to get things done means the company can play a leading role in the coming energy transition."

The aim, says INEOS, "is to become a powerful force in the coming energy transition."

The driving force behind energy transition, Gilvary explains, is the need to minimise the extent of global warming from greenhouse gas emissions, as agreed at the Paris COP 24 meeting in 2015 and reinforced

at the recent COP 26 in Glasgow, but still meet the growing energy demand that will rely on abating the carbon from fossil fuels through the transition.

This requires a reduction in the carbon intensity of energy sources. But, he adds, this has to be achieved without prejudicing the ability of poorer countries to develop economically. "This is so important. If we can't limit global warming, the effects are not palatable."

INEOS has several areas of

expertise it can bring to bear in the transition effort, so that it can cut emission from its own operations on the journey to net-zero by 2050, and help other companies to do the same.

CCS will be an important element in the earlier stages of the energy transition, allowing businesses to use fossil fuels but reduce emissions by storing the CO₂ produced in power and steam generation and chemical processes.

INEOS is already involved in several CCS projects in the North Sea area and will begin trials to store CO₂ from its operations in the next few years (see page 16).

A second very important step, says Gilvary, will be to develop hydrogen as an alternative fuel and energy source, using either electrolysis of water (green hydrogen) or conversion of methane with carbon capture (blue hydrogen).

Here, says Gilvary, "INEOS can compete in various parts of the value chain," adding that "INEOS is one of only a handful of companies in the world that understands the entire hydrogen value chain." The company has long experience of electrolysis in its INOVYN chlor-alkali business and already produces some 400,000 tonne/year of hydrogen.

There will, he says, be economic returns available and the entrepreneurial bent of INEOS will be an advantage.

Gilvary points to no less than €2bn of investment earmarked by INOVYN for green hydrogen capacity over the next 10 years in Europe. INOVYN will build hydrogen production units in

Norway, Germany and Belgium, with others potentially to follow in the UK and France.

As well as producing and selling hydrogen, Gilvary sees an opportunity for INEOS to participate in the market trading of hydrogen, as it plays a key role in optimising the use of a number of traditional and alternative energy products.

The reason hydrogen is so important, he explains, is that it can be used not only as fuel in its own right, but can also act as an energy store to smooth out the irregularities of electricity production using renewables such as wind and solar technologies.

Specific steps that INEOS has already taken in the hydrogen area include the launch of INEOS Hydrogen, its new clean hydrogen business, in November 2020. The business is based in the UK and will invest in clean hydrogen production across Europe on its own and with partners.

The first new unit to be built will be a 20MW electrolyser in Norway, to produce clean hydrogen through the electrolysis of water powered by zero-carbon electricity. The project will lead to a minimum reduction of an estimated 22,000 tonne/year of CO₂ by reducing the carbon footprint of INEOS' operations at Rafnes and serving as a hub to provide hydrogen to the Norwegian transport sector.

This will be followed by construction of a 100MW electrolyser to produce hydrogen at INEOS' Köln site in Germany. The output will be used to make



"INEOS is one of only a handful of companies in the world that understands the entire value chain"

Brian Gilvary,
Executive Chairman,
INEOS Energy

ammonia which will be used as a fuel on the site, cutting carbon emissions at Köln by 120,000 tonne/year when operational. In addition, hydrogen will be made available to other producers at the site and in the local region.

INEOS also develops electrolysis technology for both chlor-alkali and hydrogen through INEOS Electrochemical Solutions.

In addition, says Gilvary, INEOS Energy has taken a 20% stake in HydrogenOne Capital Growth, which has established a £250m fund to help support start-ups that are developing clean hydrogen technologies. The investment, "will help accelerate and diversify INEOS' existing clean hydrogen strategy."

But, cautions Gilvary, it is early days for hydrogen technology. He believes it has a future as part of an overall integrated energy solution and will be a fast-growing energy source, but it will be 2040-2045 before it really starts to make a sizeable impact. In the longer term, he adds, hydrogen might account for 15% of the global energy mix by 2050.

At the same time as making these investments, INEOS Energy has been repositioning its North Sea oil and gas portfolio to balance its oil and gas production and improve its growth prospects and its ability to exploit CCS through its Greensand Project.

In March 2021, INEOS sold all its interest in the Norwegian continental shelf to PGNiG of Poland for \$615m, and in August acquired HESS Denmark for \$150m, bringing its ownership of the HESS-operated Syd Arne oil field to 98.3%.

As Gilvary explains, "The [HESS] deal represents a major step in reshaping our energy business... and opens up prospects that can be developed in Denmark's offshore oil and gas sector, supported by a very promising CCS project." The two deals, he adds, released some \$500m of cash and give INEOS a major growth vehicle going forward, with an emphasis of building up the oil side of its portfolio by 2040 to 45%, from today's 15%.

By John Baker

The transportation sector will see significant change



CARBON CAPTURE KEY TO CO₂ GOALS

INEOS will inject the first carbon dioxide (CO₂) into a disused part of its North Sea Siri oil field later this year as its Greensand storage project gets underway

If successful, an ambitious project, being implemented by a 23-strong consortium led by INEOS, will support Denmark's ambitions to cut CO₂ emissions by 70% by 2030.

Progression to the pilot proof-of-concept stage follows a promising study into the feasibility of storage in INEOS' Siri field in the Danish part of the North Sea. The award late last year by the Danish Energy Agency of a €26m grant to support the necessary demonstration work has given the green light to proceed.

"Carbon capture and storage is critical to INEOS Energy's strategy. It protects our licence to operate and ability to grow. It is great to see our team in Denmark take a leadership position. This has generated a lot of interest in the industry," says David Bucknall, CEO of INEOS Energy.

"The entire consortium has been waiting in the starting blocks and we are ready to begin work on the project so we can support Denmark's climate ambitions as soon as possible," adds Mads Gade, country head of INEOS Energy Denmark.

The Danish project is one of Europe's leading CCS contenders and could store 0.5m-1.5m tonne/year of CO₂ from 2025, rising to 4m-8m tonne/year by 2030. But it is not the only one INEOS is interested in.

Andrew Gardner, Chairman of INEOS Grangemouth, explains that the company is in the process of joining the Storegga/Shell/Harbour Energy-led Acorn consortium that also has plans to inject CO₂ into North Sea oil fields, this time off the northeast coast of Scotland. A memorandum of understanding was signed with Acorn in mid-2021 and a decision could be

made this year if the project is backed by UK government.

When operational, the project, one of several being progressed in the UK, would take CO₂ from INEOS' Grangemouth site, using an existing pipeline, to an export terminal at St Fergus for transmission to the North Sea injection site. Start-up could be as soon as 2027.

Both initiatives are part of INEOS' strategy to reduce its own carbon footprint in coming years and achieve significant further net zero greenhouse gas emission reductions by 2030. The CCS technology is just one approach that INEOS is focusing on (see article on commitment to net zero on page 8), but it is one where it believes it has the expertise and capability to make a major contribution.

Grangemouth, says Gardner, is a major CO₂ emitter as it runs two power plants on the site as well as an upstream facility, a refinery and chemical production. One of the power units is about to be replaced by a new modern station that has been designed to switch over to hydrogen fuelling in the future. But in the meantime, the site could contribute 1.0m-1.5m tonne/year of CO₂ to Acorn.

The emissions reduction roadmap for Grangemouth sees GHG emissions falling from 3m tonne/year currently, already a 40% reduction from the 5m tonnes emitted in 2005, when INEOS acquired the site, to closer to 1.7m-1.8m tonnes/year by 2030. This will undoubtedly involve CO₂ being permanently stored offshore says Gardner.

"The reduction aspiration is fixed and investment is underway to reduce methane as a fuel to increase

hydrogen usage and capture CO₂. But the technology still needs some development." The ultimate goal is to safely and efficiently reduce CO₂ emissions to zero by 2045.

INEOS' position in the Greensand Project is significantly different as here it has the lead role in the consortium and owns, together with Wintershall Dea, the oil fields that will be the reservoir for the stored CO₂. Carbon dioxide is expected to be collected from large emitters in Denmark, such as power, biogas, and cement producers, and transported by ship to the North Sea injection platform. The dedicated ships are expected to be capable of carrying 8,000-12,000 tonnes of CO₂.

Mads Gade points out that INEOS has years of expertise in the logistics of North Sea operation, as it has been bringing oil from the field to shore by boat for many years. For the first trials, INEOS will source liquid CO₂ from its INEOS Oxide operations in Antwerp, Belgium, where it is already capturing the gas from its process operations.

Gade anticipates volumes starting at 0.5m to 1.5m tonnes/year by 2025 if all goes well.

Once fully operational, INEOS will charge a fee for injecting the CO₂ in the field, running the operation as a commercial business. As the collection and transmission is not by pipeline, Gade stresses the flexibility of the operation, explaining that CO₂ waste could be shipped from locations around the North Sea basin eventually.

A full investment decision in the Greensand project is expected to be made in the second half of 2023, says Mads Gade. Carbon storage would be fully operational from 2025.

By John Baker



The Siri oil field will be used to store carbon dioxide

Few, if any, major petrochemical producers could establish a branded consumer products business and win space on major retailers' shelves in little under two years

HYGIENICS BUSINESS LOOKING HEALTHY

INEOS Hygienics, founded in July 2020 to make and distribute hand sanitiser products to meet the huge demand spurred by the COVID-19 pandemic, has already made great strides and proved successful.

INEOS responded quickly to the worldwide call for alcohol-based sanitiser by rapidly equipping six bottling facilities from scratch in the UK, Germany, France and the US, each capable of filling 1m bottles/month, using a 75% alcohol formulation.

The company was able to leverage its position as the world's largest producer of pharmaceutical-grade ethanol, with production at three plants, in Lavera, France, Herne, Germany and Grangemouth, UK. Initially, INEOS gave the sanitiser free of charge to national health services to help fight the spread of COVID-19 by hand and surface contact.

When COVID-19 really took off in early in 2020, explains George Ratcliffe, then COO of INEOS Hygienics, "INEOS looked around to see what it could do on a global scale. We had lots of requests coming in for help, but we hit on hand sanitisers as there was such a shortage and not much production around the world."

With rapid success of the ramp-up in production and acceptance of the sanitiser, INEOS decided within months to create a new business unit and to start selling INEOS-branded product to the public. INEOS Hygienics was launched in August 2020 at the British Formula 1 Grand Prix, taking advantage of INEOS' sponsorship of the Mercedes/AMG Petronas F1 team and the support of lead driver Lewis Hamilton as the face of its "High-Performance Hygiene" campaign.

Today, the UK-based business is

well established, says Ratcliffe, and is expanding its range of offerings. Production has been focused on just two locations – Newton Aycliffe in the UK and Herne, Germany – to make production more efficient. The UK facility can now produce 50m bottles/month of sanitiser, while Herne produces 35m bottles/month.

"Both plants are built to full pharmaceutical Good Manufacturing Practice standards and are highly automated. We now have a smaller, slicker operation that gives us a foot in the market. We are a business now, not a charity, and it is a large undertaking to build a consumer product business in Europe." The US operations are no longer operational.

Since launch, the sanitiser product range has been expanded from hand gel products to include hand and surface sprays, single sachet and multi-pack surface wipes and automated sanitiser dispensers. INEOS has also introduced moisturising aloe vera-containing formulations and a distinct sports range of products, capitalising on the company's wide support of sporting teams in Formula 1 motor racing, cycling, sailing and athletics.

As a marketing tool, says Ratcliffe, "we have a fantastic suite of sports teams and where appropriate we will make use of these to help promote INEOS Hygienics as a brand. We have INEOS on the [product] label, but not a lot of consumers in the street know us – creating awareness costs a lot and takes time, so it is great to have the sports connection."

The boost in sanitiser demand from COVID-19 has worked in INEOS' favour though, and it has rapidly gained space on shelves in major retail outlets such as



Boots, Sainsbury's and Morrisons in the UK, for instance. It is also a big seller on Amazon and home-delivery service Ocado.

To maximise this presence, INEOS is now planning and launching new consumer products. Later this year soap-based hand cleansers will be launched, and domestic surface cleaners are also in the pipeline, to sit alongside the sanitiser products.

These, explains Ratcliffe, are much larger markets than sanitisers and ones in which INEOS will come up against other multi-product majors such as Unilever and other fast-moving consumer goods (FMCG) specialists.

"The challenge in this business is to get on the shelves and we feel we have already had great success here. R&D, formulation and production are not big issues for us, given our core expertise. It is marketing that is the challenge."

INEOS Hygienics now has around 110 people in the business, having hired around 65 last year. Its sales are split 60% retail, 20% medical and 20% industrial applications, such as offices, schools and factories. The latter sector is very fragmented with lots of distributors, but it is an area with continuing potential as employers and such like look to product employees in the workplace.

Ratcliffe expects to maintain growth going forward from what he admits is a small base in the overall market. But he sees INEOS Hygienics and its consumer branding leading the way for INEOS as a whole. And one where he can leverage the popularity of the sports sponsorships the company has established over recent years.

By John Baker

The nascent business has already enjoyed great success



"The challenge in this business is to get on the shelves and we feel we have already had great success here"

George Ratcliffe,
COO, INEOS
Hygienics

This year sees the launch of the INEOS Grenadier – the rugged 4X4 built on purpose to tackle extreme workloads in the toughest terrains across the world

The Grenadier 4X4 is on the verge of going into production. What began in 2017 as Sir Jim Ratcliffe's vision for a "capable, durable, reliable 4X4" will become a reality in 2022. That's when the first launch series production Grenadiers will roll off the assembly line. The culmination of five years of monumental team effort.

Over the last 12 months INEOS Automotive has taken major steps forward. Acquiring and transforming a factory in Hambach marked the final transition from 'project' to 'OEM', as INEOS Automotive moves towards series production. Alongside a testing programme set to hit 1.8m km, new prototypes being developed, customers getting in the passenger seats of those, and design launches, including the vehicle's interior, 2021 was quite a year.

Taking over the former Mercedes-Benz plant, at Hambach on the German border, 200km from INEOS Automotive's operational base in Boblingen, Stuttgart, was a crucial factor in driving the Grenadier's development. Major upgrades and expansions included an all-new body shop and paint shop. The fully automated body shop contains more than 250 robots, while the paint shop is pioneering the use of thin-layer, anti-corrosion technology called eco-Oxycylan.

In addition, its quality lab houses a suite of highly advanced equipment. Zeiss Eagle Eye sensors – acquired specifically for the Grenadier – measure and inspect all parts of the vehicle without interrupting production. The inspection system takes around 3,500 measurements on a

completed Body-in-White (BiW) shell, to an accuracy of 0.1mm.

Hambach has already started producing the first pre-production vehicles to accompany the Magna-assembled prototypes already out and about, off and on road. Prototypes are currently busy continuing to prove their capabilities through a brutal testing programme.

The Grenadier has been developed to handle the harshest of environments – and that's been backed up by the testing. Conquering the extreme Schöckl mountain track in Austria – considered too tough for most 4X4s – being one good example.

Alexander Quint, Head of Engineering at INEOS Automotive, says: "We're well underway with fine-tuning processes – ahead of full series production. We used the Grenadier's performance on the mountain's hard rock trails as a key development barometer."

In 2021, INEOS Automotive tested more than 130 second-phase (2B) prototypes – racking up just under 1.8m km in the toughest environments. Engineers carried out extensive cold weather engine calibration in the icy wastes of northern Sweden and the high peaks of the Austrian Alps. Later, they subjected the Grenadier to intense hot-weather testing in the sand dunes of the Moroccan Sahara.

The next phase of testing is now underway, using the first Production Try Outs (PTO1s) to roll off the Hambach production line. This testing will also include crash testing, plus more extreme temperatures, high altitude and rough, tough off-road terrain.

The 2B prototypes also went 'on tour' to 12 countries – and more than 75 locations – last year. These included the Goodwood Festival of Speed and Dubai International Motor Show. They proved a huge help in exceeding the original reservations target set for the end of 2021.

The Grenadier has been engineered to be as light as possible, with a focus on strength and durability. For this reason, it has a steel chassis and body cell for maximum strength, with some body parts – including the doors, hood and split rear doors – made of aluminium.

In July 2021, INEOS Automotive unveiled the Grenadier's interior design – which combines comfort with practicality, and exercises 'function over form'.

Toby Ecuyer, Head of Design at INEOS Automotive, says: "When we started thinking about the interior, we looked carefully at modern aircraft, boats and even tractors for inspiration."

These influences can be seen everywhere. Including in the

GRENADIER

marches towards full launch



"The interior layout is functional and logical – designed with ease of use in mind"

Toby Ecuyer,
Head of Design,
INEOS Automotive

The interior combines comfort with practicality





The first Grenadiers are available from July 2022



"We are focusing on getting the basics right: customer convenience, parts availability and service quality"

Mark Tennant,
Commercial
Director,
INEOS Automotive

switches and controls. Toggle switches and dials – on both central and overhead consoles – are easy to use while wearing gloves, well spaced and clearly labelled. Extra switches are built in and pre-wired, to support auxiliary accessories such as winches and work lights.

Advanced technology – such as a dedicated off-road navigation system called Pathfinder – adds practicality. At the same time, the interior benefits from hard-wearing materials designed to stand the test of time. Drain plugs in the rubber flooring – combined with wipe-down upholstery – allow the interior to be partially hosed out when required. But carpets and leather upholstery are options too.

"The interior layout is functional and logical – designed with ease of use in mind," says Ecuyer.

Among all the details of factory improvements and design details, potential buyers have been craving one vital piece of information: how to get their hands on a Grenadier.

INEOS Automotive answered this by announcing plans for a target network of 200 sales and service points across the world. In the UK, for instance, there will be 23 retail sites set to go ahead of launch, with a number of formal agreements already in place. This strong physical presence on the ground will be matched online. So customers can choose to do as much of the process online or face-to-face as they like.

Mark Tennant, Commercial Director at INEOS Automotive, says: "Customers in our main markets will be able to buy their Grenadier online. But we fully

accept most will want to try before they buy – so an extensive network on the ground is essential."

The company has been taking reservations for the Grenadier since September 2021 and will make the first deliveries shortly after launch series production begins later in 2022.

Partners will include established dealer groups and 4X4 specialists. In some markets, BMW partners have expressed a strong interest in representing INEOS Automotive, partly down to their expertise in servicing the BMW engines in the Grenadier. Owners needing support further afield will have access to over 10,000 Bosch Car Service outlets across 150 countries.

"We're focusing on getting the basics right: customer convenience, parts availability and service quality," says Tennant.

The first Grenadiers off the production line will be powered by highly efficient 3.0-litre six-cylinder petrol and diesel BMW engines. But, INEOS Automotive is already looking at alternative power sources. No stone will be left unturned to find what works best for the Grenadier as part of its future powertrain strategy, including a zero-emission hydrogen fuel cell demonstrator version.

Testing on this demonstrator vehicle will begin by the end of this year, to assess how best to optimise and integrate the fuel cell technology. INEOS Automotive will then determine which parts it can carry over from its combustion engine programme – and which it will need to develop for a fuel cell vehicle. The team is also investigating the possibility of producing a BEV version.

INEOS group is already a major player in hydrogen, producing and using around 400,000 tonnes every year. It also intends to invest €2bn in new production of green hydrogen across Europe.

Sir Jim Ratcliffe – founder and Chairman of INEOS – calls hydrogen "the fuel of the future". He says electric cars are ideal for short journeys, but hydrogen is better for longer journeys and heavier loads.

"When used in a fuel cell, hydrogen only produces water

– and is the UK's best chance of reaching its carbon reduction targets," he says.

The Grenadier has been out in the field helping with one of the toughest jobs on the planet – clearing landmines. In 2019, the HALO Trust – the world's largest landmine charity – became a development partner for the Grenadier, with INEOS Automotive Head of Aftersales, Steve Graham, joining an active operation in Angola to see the conditions HALO's 4X4s operate in. And what they need from their vehicles.

Getting on the ground with HALO in other regions – such as Kosovo – has helped INEOS Automotive assess the Grenadier's on- and off-road capabilities and address the challenge of performing repairs in the field. Seeing how drivers handle vehicles on near undrivable roads and rough terrain – and repair them using only basic tools – continues to influence the ongoing development of the Grenadier.

The aim is to launch the Grenadier in 35 markets around the world this year. These include Germany and the UK, as well in the Middle East, Africa, Asia-Pacific and South-East Asia. Mark Tennant says, "No markets are off limits." And it's not just about the Grenadier. INEOS Automotive is already looking at plans for a second product line at Hambach.

Launching a new vehicle – especially by a company new to the automotive market – was always going to be an enormous challenge.

For Dirk Heilmann, CEO of INEOS Automotive, the Grenadier is a unique proposition – a capable and durable workhorse that embodies the spirit of 4X4s of the past while meeting the needs and expectations of modern users.

"INEOS set out to create a no-frills utilitarian vehicle – and has stuck to that vision. The Grenadier is designed and engineered for a 30-year life – not the seven- or a 10-year life typical of most vehicles today," he says. With what it's accomplished in the past year, and is setting out to achieve in the coming one, INEOS Automotive continues to forge ahead with its mission.

By Lou Reade



Belstaff

Return of an icon

A new era for an iconic brand. That's the vision that Fran Millar has for Belstaff, the contemporary clothing brand that INEOS purchased in November 2017

Fran Millar, who was appointed CEO on 1 October 2020, is a fresh pair of eyes for the firm and her remit is to reach breakeven by the end of 2022 and return to profitability in 2023.

When she took over, Belstaff had been suffering from several legacy issues and was losing money. The company was hamstrung by several problems that included dated processes, poor infrastructure and systems, and inconsistent brand messaging.

Part of the problem also was that the retailer was focused on just one particular group of customers – notably men, aged 55+. “If we want to grow the business, we need to broaden our audience to younger men and into womenswear to look at readdressing our direction,” she says. “We need to be really clear about customer segmentation and our offering.”

Now though, Belstaff looks to be back on track. “We expect to have significantly improved our EBITDA by the end of 2021 and show a significant growth in revenue of between €10m and €12m,” she says.

Belstaff is taking a much

more INEOS-like approach to the business, with a strict focus on cost control and optimising operations. Consequently, the firm has undertaken a series of objectives that include a 50% reduction of overheads and marketing, rationalising the product range in order to increase its contribution margin, retaining its flagship retail locations, and driving e-commerce.

It closed the former headquarters in Italy, consolidated its presence in London, UK, overhauled its digital infrastructure, and appointed new people.

Moving forward, Belstaff is working to increase its wholesale footprint, make its stores more profitable and expand its online shopping presence.

A return to its roots as a pioneer of clothing with technical performance/materials is the way ahead for Belstaff, building on its iconic and heritage branding while raising customer awareness. The firm will launch a major rebrand of its clothing collection in its stores from late July for the 2022 autumn/winter collection.

By Elaine Burrridge



NEWLY-FORM SILENT P

The past few years have proven just how vitally important the latest medicines and vaccines are to our long-term health and wellbeing

After a breakthrough year with the launch of INEOS Hygienics (see page 17) and the support offered during the COVID-19 pandemic, INEOS also pledged £100m to the University of Oxford – one of the largest donations ever made to a UK university – to set up the Ineos Oxford Institute and fight antimicrobial resistance (AMR).

Bacteria are constantly evolving in response to our current stock of antibiotics, which in turn inevitably reduces the options that we as a society have to combat bacterial infections. AMR is widely regarded as one of the most significant and pressing health challenges facing us today.

The Ineos Oxford Institute for Antimicrobial Research (IOI) was launched in January 2021 to





ED IOI FIGHTS ANDEMIC

urgently progress research and innovation to tackle this growing threat. The aim is to help develop new drugs, to better manage the use of existing medication, and to work to map and monitor the true global scale of the issue.

“We continue to see massive rises in antibiotic resistance across the world and that’s a major problem for all of us,” says Tom Crotty, INEOS Director of Corporate Affairs. “In some cases, certain well-used antibiotics are just not effective anymore and simply do not work. We all take antibiotics for granted, but healthcare could soon reach a post-antibiotic era; what we’re trying to do is to prevent the unthinkable becoming the inevitable.”

AMR was estimated to be responsible for about 1.2m excess deaths in 2019 and it is anticipated that this figure will well exceed 10m per year by 2050 without intervention – overtaking the number of cancer related deaths worldwide. To put this in context, we are already seeing more deaths from AMR across the globe than HIV and malaria



“This is a very typical INEOS challenge – it’s far from easy. It is complex, multi-layered and there really is no easy fix”

David Sweetnam,
Chair of the
IOI board

combined. Increased resistance will compromise all modern healthcare, and make childbirth, surgery and cancer treatments extremely risky. The effect on global economies could also be as high as \$100 trillion by the middle of the century.

The last meaningful antibiotic was discovered in the mid-1980s and there is an increasing realisation within the scientific community that the pharmaceutical industry has taken its eye off the ball for drug discovery, for understandable reason.

Antibiotic development is hugely expensive and time consuming – and treatment courses as well as patents mean there is simply little incentive for big pharma or SMEs to develop expensive new antibiotics. Launching a new wonder drug that sells in its millions and is taken for a long time is far more lucrative than spending the same amount of time and effort researching a groundbreaking antibiotic that will be most effective if its distribution and use is limited.

“This is why the philanthropic model is really important,” he says, “and why we urgently need to find a way of encouraging research to discover new molecules that can replace those that are becoming less effective.”

The overuse of antibiotics, and their leakage into the wider environment is thought to be rapidly driving up the rate at which bacteria evolve resistance – so we need to be globally rigorous about stewardship of these precious resources. In some countries, 80% of human antibiotics by weight are used not on humans but on animals in agriculture. In some instances they are still used for growth promotion, but are largely used to prevent disease from occurring within the often cramped conditions of industrial scale farming. The IOI is making the development of animal-specific antibiotics a top research priority, in the hope of preserving our human drugs from resistance for longer.

“This is a very typical INEOS challenge – it’s far from easy. It is complex, multi-layered and there really is no easy fix,” says surgeon David Sweetnam, the Chair of the

IOI board. “The INEOS Oxford Institute is a catalyst for ongoing research and we will collaborate and hopefully lead the way for other organisations to join the fight. With this funding we can afford to be ambitious in our scope of influence and involvement, and to act as a hub for antimicrobial research across the world.”

The aims of the newly-founded IOI are fivefold: to find effective novel antimicrobials that can be used specifically for animals; to discover new molecules for human antibiotics; to research the scale of the problem around the world; to educate the next generation of game-changing AMR scientists, and to raise awareness support from others to address this important issue.

The Institute is working collaboratively with Cambridge and other universities, as well as international organisations like the WHO, Wellcome and GARDP, the Global Antibiotic Research and Development Partnership. Its so far 35-strong team is based at the laboratories of the William Dunn School of Pathology in Oxford, where the original work on developing penicillin into a viable human drug was carried out.

“If there is one silver lining to the COVID-19 pandemic, it’s that the public now has a better understanding of the way in which microorganisms continuously adapt to become resistant to available treatment,” says Sweetnam. “We’re trying to raise awareness about this looming crisis because if we don’t it’ll be too late to act. AMR is essentially a silent pandemic that is steadily building momentum.”

“This funding provides a long term commitment to the crucial work being done by some brilliant scientists and we’re really excited to be working with INEOS and in particular making the most of their world class project management expertise,” he adds. “This is not your traditional pharma model but a hybrid of industry working hand in glove with academics, and ultimately with government, to create a tripartite that mimics that model which led to successful scaling up of penicillin production back in the 1940s.”

By Andy Brice

FUNDING THE “FORGOTTEN FORTY”

Over the years, INEOS has supported many projects to help children boost their health and wellbeing and further their education

The “Forgotten Forty” project, hopes to help improve the lives and futures of some of

the up to 40% of primary school children in the UK who are currently living below the poverty line.

The issue was put in the spotlight a few years ago when UK-based newspapers, *The Times* and *The Sunday Times*, launched a Christmas appeal to provide ongoing school care and food to thousands of children through school holidays, when families were struggling to support them at home.

It struck a chord with INEOS owner Sir Jim Ratcliffe and led to the launch of the Forgotten 40 initiative. INEOS pulled together a small team of experts formed of ex-teachers and school inspectors to see what else could be done to improve thousands of young childhoods.

“While they said there isn’t a silver bullet with something like this, and no single thing that can be done to solve the problem, they agreed that there were ways to support the headteachers in some of the most deprived schools to help enrich the lives and ambitions of their children,” says Tom Crotty, Director of Corporate Affairs. “It might be something as simple as giving them some breakfast, a pair of shoes they can get to school in,

premise that actually made the world of difference to children’s experiences. Despite living only a few miles from the coast, many of the children had never even seen the sea.

“What we are trying to do is learn from the experiences of these teachers to see whether there are common threads and challenges, so we can go to other educators and show that a real difference can be made with some holistic interventions and the right funding,” adds Crotty.

“If it means some children can have a better life and broader

horizon because of what we’re doing, then that’s a good start. For these teachers, this is the first time ever they have ever had complete control over a sum of money that’s been given to them. The only requirements we have of the schools is that they don’t spend it on their buildings and they don’t spend it on staffing. Otherwise, it’s at their discretion what they put the money towards - and the results so far have been fantastic.”

After that successful initial rollout, there are now 100 schools involved in the programme across the UK – taking INEOS’ total contribution to over £6m over the next three years.

By Andy Brice



The initiative opens up opportunities for children

or taking them on the trip because they’ve never been on one before.”

A pilot project was launched, with the team deciding on a set of key criteria to select 20 schools serving some of the most deprived areas of the UK. INEOS offered each of them £20,000 every year for three years for them to do whatever they thought would improve the lives of those children and help their education. Creativity was encouraged, and the team hoped that some of the initiatives trialled would provide inspiration for other schools in similar situations around the UK.

Pupils at a school in Teesside, for example, were taken to the seaside for the day – a seemingly simple

TURNING THE TIDE ON SALMON CONSERVATION

Where there were once millions of North Atlantic salmon swimming in hundreds of rivers and the sea, their numbers are rapidly diminishing. Affected like countless other species by the past century's growth in human population and environmental changes, the iconic fish is now threatened across its entire habitat range

INEOS' Chairman Sir Jim Ratcliffe, a passionate fly fisherman who became aware of the plight of the salmon several years ago, has developed a unique conservation programme to try to protect pristine rivers in the North East of Iceland, a unique environment to study and better understand potential causes of dwindling numbers.

The not-for-profit 'Six Rivers Conservation Project', based in a remote corner of North East Iceland, protects some of the last pristine river systems in the Atlantic salmon's habitat. World populations have reduced by about 70% since 1970. Only about 20% of world's salmon rivers were regarded as sustainable in 2019. The rest are at risk or no longer have salmon at all. And while the decline in numbers is also being seen in Iceland, many believe protecting these last havens will be key to turning the situation around.

Now managing several rivers, including the Selá, Hofsa, Sunnudalsá and Midfjardara, working with community, the Six Rivers Project hopes to nurture this vibrant eco-system to protect the species and boost the population in a sustainable way. This unique environment provides the perfect conditions for scientific research to monitor and manage their feeding behaviour, growth and migration.

The conservation work is funded from all profits made from exclusive, world class angling experiences, with strict catch and release and fishing pressure reduction principles – with all proceeds reinvested in the conservation activities, whilst subsidising local farmers who have relied on fishing revenue for generations.

The project is working hand in hand with world class academics from Imperial College London, and Iceland's Marine and Freshwater Research Institute (MFRI). Together, they are managing and monitoring the impact of several sensitive interventions including the planting of vegetation along riverbanks to enhance the ecosystem and bolster food supplies; the extension of river breeding grounds through the

creation of salmon ladders; and on a temporary basis, planting eggs in novel areas of the rivers, to expand breeding grounds and reduce survival competition. The team is also monitoring the impact of water quality, temperature, predators and invasive species, and tagging and tracking young fish to understand more about their movements throughout their life cycle.

Importantly, the Six Rivers Project is also making sure these research findings are shared, for the benefit of all working in salmon conservation around the world and collaborating with experts across the habitat to share best practice. In 2021, it hosted its second annual conference on salmon conservation in Reykjavik,



Salmon planting is helping boost the population

bringing together some of the brightest minds in salmon research internationally.

"We have to pool capability, knowledge and expertise if we're to tackle issues like this," says Peter Williams, INEOS Group Technology Director & Head of Investor Relations. "There's no point working in isolation from other groups around the world. There are finite resources going into conservation work and the only way to make sure they're really well used is to make sure the community comes together to tackle issues like this one."

"The world is now looking to Iceland and the Six Rivers Project to help inform conservation in other countries," he adds. "It is a holistic programme that brings together disciplines that consider the river, the land, catchment areas and the marine environment. We are underpinning this approach by state-of-the-art data, technology and science."

By Andy Brice



BRITANNIA COLLABORATION PROVES THE PERFECT FOIL

One of the world's oldest and most challenging sporting events, the America's Cup, has often been described as the Formula 1 of sailing. So, for the Mercedes-AMG Petronas F1 team to be lending its support to INEOS Britannia's pursuit of the elusive Auld Mug seems the perfect fit

As Challenger of Record, The Royal Yacht Squadron Racing's team INEOS Britannia hopes it will edge even closer again to relinquishing the grip of Team New Zealand on the trophy when the next competition takes place in 2024.

At the helm, Sir Ben Ainslie will be joined once again by double Olympic gold medallist Giles Scott. James Allison will take the role as the technical lead of the British America's Cup challenge as Chief Technical Officer of the Mercedes-AMG Petronas F1 Team and INEOS Britannia.

Though disappointed with the result in the previous attempt last year, valuable lessons were learned. While there's no doubting the technical and physical challenge that lies ahead, motivation is high given the combined efforts of all the engineers, designers and sailors onboard with the project, says Ainslie, INEOS Britannia CEO and Team Principal.

"The commitment and support that Jim, Andy, John and the whole INEOS family show is an inspiration to the rest of us to work harder and do what's required to get the job done. Knowing we have this amount of support behind us is a huge motivation," he says.

"There are so many similarities between INEOS as a business and INEOS Britannia as a sports team. Carrying the continuity of drive, focus and ambition into our team helps us strive for the same level of success that INEOS has achieved as a business."

There will certainly be plenty to keep everyone busy. The next competition aims to be less expensive and more inclusive, with the newly-announced Protocol requiring reduced team operating costs without compromising the technical development that the Cup is so famous for, says Ainslie.

"Rigour is a word that gets used a lot at INEOS and it's behind everything that we do with INEOS

Last year's competition was an unforgettable experience

Britannia. It applies to every element of the team, from the design team's focus and attention to detail, the sailing team's rigorous training regime, to the look and feel of the boat. Rigour is a fantastic word. It is something that we can continue to strive for as a sports team."

The Protocol and class rule for the competition highlights some notable changes from Britannia's previous attempt in 2021. Not only will the specification and mechanics of the boat require a significant overhaul but the new AC75 class vessel will now only have room for eight sailors rather than 11. In addition to being able to build only one 75-foot sailing monohull, there will also be restrictions on the number of foils and components used.

A smaller AC40 boat with space for a four-strong crew will also be built for training and testing purposes. This smaller 40-foot version will then also be used for the inaugural America's Cup Women's Regatta as well as the America's Cup Youth event.

Ainslie and the INEOS Britannia crew are also firmly focused on harnessing cleaner technologies and reducing their overall footprint. In fact, the latest Protocol for the America's Cup puts sustainability front and centre of its requirements.

"Sailing is a sport that is often seen as being environmentally friendly due to the affiliation with the oceans. However, within the sport of sailing, there is a lot that we can do better, and that we must do better, to be more efficient and cleaner for the environment," says Ainslie. "The new Protocol for the America's Cup highlights the changes and efforts that we are all making to help our sport develop technology that will make a difference to the environment."

There has been a lot of activity this past year developing and testing designs for these prototypes, which will not only reduce everyone's carbon footprint but will showcase the potential of this exciting technology for the marine sector. Entrants have also been told of the new mandate to construct two hydrogen-powered foiling chase boats.

The use of a life cycle analysis tool is also helping to find better ways to source the materials

and resources needed without hindering performance. Ainslie adds that they also recently achieved ISO20121 certification for the seventh year in a row – a proud moment having been the first sports team to receive the award back in 2015.

This kind of approach is hardly a sea change for the team, however. The demands and rigours of sailing are reliant on new and innovative technologies and processes to help shave valuable seconds of racing times – and that is what makes the support from INEOS even more invaluable.

"From a sports team perspective, sustainability is key to what we stand for," he adds. "INEOS are hugely supportive in many ways. We look at the same processes that are used in their business and why they're so successful and implement those learnings across the team. INEOS has helped us a lot in our approach to make sure we're leaving no stone unturned."

"The team has got a huge challenge ahead, but knowing we've got the backing from INEOS to continue to stick to our core principles means we are confident we can achieve our goals."

The experience of the 36th America's Cup campaign certainly whetted everyone's appetite for success, agrees Allison. "For that campaign we came in quite late into the process and tried to add as much as we could through the design and engineering expertise of our Applied Science division. It was immediately clear to us that the America's Cup is a very exciting, and very difficult, challenge. This time we are one team, INEOS Britannia, with the team's design base embedded in our Formula 1 HQ, and the clear goal to bring the America's Cup back to Britain. We feel very lucky to be involved in this opportunity and we can't wait for the challenge ahead. It's a mouth-watering prospect."

By Andy Brice

DRIVE AND AMBITION

Despite the mixed emotions following the Abu Dhabi GP and the conclusion of the 2021 season, there was still plenty to celebrate for the Mercedes-AMG Petronas F1 Team both on and off the track this year.

Certainly, 2021 proved to be a tough and dramatic season. Newly-knighted Sir Lewis Hamilton cemented his place as the most successful driver ever, breaking the 100 win barrier, and picking up even more points, poles and podiums, while Valtteri Bottas brought an end to his phenomenal time with the team by helping bring home a record eighth consecutive Constructors' Championship.

It once again highlighted the truly outstanding performance of not only those at the track but of everyone working behind the scenes too. An important part of this was the team's continued commitment to improving efficiency and becoming more sustainable.

It all starts back in Brackley in the UK where the site already harnesses renewably-sourced energy to power its wind tunnels, data centres, simulators and test benches. At the Brixworth technology centre, over half its electricity is generated from solar photovoltaic panels and an onsite combined cooling heating and power (CCHP) plant that captures waste heat and converts it into

usable power.

Finding ways to enhance sustainability also extends to the team's travels around the world, and the transporting of all the equipment and personnel to the different circuits. This means offsetting some of the associated CO₂ emissions, as well as other measures such as minimising single-use plastics and selecting low-impact hotels for their stays.

The Mercedes F1 Team is also driving change within Formula One by taking a leading role in the FIA working group for sustainable fuels and looking at the enormous potential of renewable fuels and electric power.

By Andy Brice

It's been a team effort both on and off the track



Although INEOS has had its fair share of successes these past few years with its cycling, sailing, football and Formula 1 teams, it is now tackling an entirely new sport thanks to a first-of-its-kind deal with the world's most successful international rugby team



KICKING OFF A NEW RUGBY PARTNERSHIP

INEOS seals deal with the world-famous All Blacks

The addition of a six-year partnership with the New Zealand All Blacks to its roster of elite teams will allow INEOS to further explore synergies across the sports group to share best practice and collaborate on performance innovation.

The deal, announced in July 2021 and officially kicking off this year, includes New Zealand Rugby's (NZR's) seven "Teams in Black" – the All Blacks, Black Ferns, All Blacks Sevens, Black Ferns Sevens, Māori All Blacks, All Blacks XV and the All Blacks Under-20s.

"To partner with INEOS and be part of such a unique and diverse global sports performance group is an exciting new venture," says

NZR CEO Mark Robinson. "We are committed to nurturing the development of rugby over the next six years with INEOS Sport and are looking forward to working alongside some of the best sports teams in the world."

The new performance partnership was proposed in early 2021 by NZR during INEOS' visit to New Zealand to support Sir Ben Ainslie and INEOS TEAM UK in their bid to win the America's Cup.

"We wanted this to be bigger than just a shirt sponsorship deal so between us, we developed this idea of a performance partnership," adds Tom Crotty, Director of Corporate Affairs. "We already have a big INEOS sport family

headed by Sir Dave Brailsford but we're very excited with the new deal as there's a lot you can learn from the All Blacks. They are, after all, the most successful team in the world – with the best win percentage of any professional sports team ever."

In recent years, INEOS has united some of the best coaches, players and sports scientists – allowing it to foster close collaboration and shared learning across the teams themselves and the rest of the business. From nutrition and training programmes to technologies and processes, there have been plenty of synergies that have helped make a real difference.

By Andy Brice

Image: (Getty Images Phil Walter)

RE-CYCLING THE TOUR STAGES FOR CHARITY



Each year INEOS staff emulate their cycling heroes

As the INEOS Grenadiers endured the rigours of three weeks of professional racing in the Tour De France last summer, INEOS employees around the world played a supporting role by facing their own challenge to raise money for charity.

Each year, INEOS' Tour de France Challenge puts employees through their paces as they attempt to emulate the professionals by riding the exact same distances in teams, to raise money for charity.

While Ecuadorian Richard

Carapaz rode his way through France to take the podium in last year's race with a fantastic third place finish – capping an excellent season and the accolade of podium finishes at all three Grand Tours – back home, teams across INEOS involving thousands of staff were trying to match his efforts.

A total of 2,430 riders, split into 113 teams across 86 sites, raced to complete the equivalent of each gruelling stage and covered over 1.3m km combined – about the same as three and a half trips to the moon or 33 times around the globe.

Of all those who took part, 92% covered more than 50km, while 57 people managed to ride over 2,000km.

INEOS awarded every team that completed the challenge £1,000 for them to donate to a local charity of their choice.

By Andy Brice

Image: INEOS

INEOS AND KIPCHOGE TO BE RUNNING MATES AGAIN

Such was the success of Eliud Kipchoge's record-breaking sub-two hour marathon in 2019 with the support of INEOS, the recent announcement of their new Performance Partnership is perhaps no surprise.

The INEOS 1:59 Challenge proved that, with the combination of the very best of knowledge and expertise from various disciplines in sport and science, even the seemingly impossible was possible.

This new collaboration aims to build on those principles, while breaking barriers – and more records – along the way.

Making the announcement alongside his manager Valentijn Trouw and Sir Dave Brailsford, INEOS' Director of Sport, the two-time Olympic champion expressed his excitement of treading new ground together.

"We have had a wonderful relationship since we first started working together and have already changed the world together once,"

says Kipchoge. "I am excited to keep breaking barriers with the support of INEOS on our side. I believe that we can make a strong impact across all sports by sharing our knowledge and experiences with each other. To utilise the greatest minds in sports will continue to allow us to keep pushing the boundaries of running."

The 37 year old, widely described as a once-in-a-generation athlete, hopes to add to his Olympic Gold medals in Rio and Tokyo by winning a third in Paris in 2024 – and becoming the first person in history to ever achieve such a feat.

The new performance partnership, says Brailsford, is geared around "the cross pollination of ideas, knowledge management and learning from one another".

Rather than a traditional sponsorship deal, this agreement echoes that of the agreement with New Zealand Rugby and the All-Blacks, bringing together some of the best minds and talent in the

sporting world to tackle sports greatest challenges.

"Collaborating with Eliud, his performance team and INEOS on the 1:59 Challenge was a truly inspiring experience," says Brailsford. "Eliud epitomises an INEOS athlete. The opportunity to come together again to tackle new ambitious challenges with Eliud and the wider running team is incredibly exciting."

By Andy Brice

FOOTBALL TEAMS HAVE CLEAR GOALS

This season has seen a string of positive match results for OGC Nice. With the benefit of significant data analysis coupled with the independent analysis of a team of seasoned scouts, targeted investments have been made in key player signings.

The addition of several promising young players together with the continued development of earlier signings has galvanised the club and helped it climb up the rankings. Its current position, at the time of going to press, is among those at the top of the league table shows that progress at the club is being made.

Although just over halfway through the season, there have already been notable highlights including the clean sheet against PSG in the Ligue and the Coupe

de France win over the current holders. OGC Nice has now accrued almost the same number of points as it did in the entirety of last season – and has scored the most points away from home in any season. But it remains a very competitive league with a top cadre like the Premiership which OGC Nice is striving to join and not just for one season

Meanwhile, across the border in the Swiss Super League, INEOS-owned FC Lausanne-Sport has fully settled into its 12,000 capacity stadium which is now the hub of the club for all sporting and commercial activities. It is looking to add to its points tally in what has so far been a very tough campaign. The club remains firmly focused on the continued development of its



young talent so it can build the foundations for future success in the league.

The Academy build in Abidjan that INEOS helps fund is continuing apace and is expected to be one of the best bases in West Africa

By Andy Brice

OGC Nice is planning for the future



Founded in 1998, UK-headquartered INEOS has grown to become one of the world's largest chemical companies. It comprises 34 businesses, employs 26,000 people globally and achieved sales in excess of \$61bn. The vertically-integrated chemicals producer has 194 manufacturing sites in 29 countries, and boasts a diversified portfolio serving the petrochemicals and oil & gas markets.

INEOS Group Headquarters

38 Hans Crescent

Knightsbridge

London SW1X 0LZ

UK

www.ineos.com

 @INEOS

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