

Joining together in uncertain times, **taking a long-term view**



MARC SCHULLER:

'Trends will be accelerated by the crisis and we as an industry need to take this into account and act even faster and more efficiently than ever.'

➤ **The 54th EPCA Annual Meeting takes place** amid unprecedented uncertainty and volatility for the petrochemical industry, caused by the COVID-19 pandemic. Due to the exceptional circumstances, the event is taking place for the first time in a virtual format and has succeeded in attracting high-level speakers from across the world who will address key issues affecting the industry, which is a major achievement in itself, says EPCA president and Arkema chief operating officer Marc Schuller.

"I'm delighted by the level of support we've received from member companies and the commitment by leading industry figures to contribute to the meeting's business sessions," Mr Schuller says. "This is very good, it means the industry is still alive, and even in good shape. Companies are participating even though we are all going through challenging times."

Given the lack of short-term visibility, EPCA wanted this year's meeting to focus on the medium- and long-term outlook for the industry including challenges that existed before the pandemic.

"My sense is that we have had a big short-term crisis, but beyond that COVID-19 is also acting as a catalyst to accelerate changes that were already underway in society, in our industry," Marc Schuller says. "So, I don't see it as a one-off event that will then allow us to return to business as usual. I think it's important to recognize instead that many of the paradigm shifts that are taking place such as demographic changes, sustainability, digitization, and new demand patterns will likely take years rather than months to have their full effect. This is why we entitled the meeting *Beyond the New Normal!* We wanted to create an opportunity for member companies to discuss these trends from a medium- to long-term perspective. This has always been the role of EPCA and we felt it particularly important to continue this tradition in 2020 given the major uncertainties we are surrounded with."

Petrochemical companies need to adapt quickly to the constantly changing conditions stemming from COVID-19 and the accelerating industry trends, Mr Schuller says. "I think what matters today is to be very agile, have scenario-planning and risk-mitigation programs, and to adapt very well to the latest developments," he says. "I see clearly a deep need to be able to move very quickly. There is more uncertainty than ever

but still, most of the challenges we had before the crisis have not disappeared—everything around sustainability and digitization—these challenges we identified two years ago are still there today. The trends will be accelerated by the crisis and we as an industry need to take this into account and act even faster and in a more efficient way than ever."

Recovery from the crisis is likely to be uneven, characterized by ongoing uncertainty, and will not mean a return to the pre-pandemic world, according to Marc Schuller. "It's becoming accepted that a series of paradigm shifts is underway in markets as well as on a macroeconomic basis. As a result, we can no longer really talk about a normal level of demand as something fixed and permanent. Instead I think we have to accept that uncertainty is likely to continue for years rather than months even if a vaccination program is successfully carried out to control COVID-19."

The exact timing of the rebound is equally difficult to predict. "I'm inclined to believe that we have to prepare for sudden, big changes then stability then big changes again," Mr Schuller says. "It may be faster than we think. But clearly today it's a bit premature—we're still in the crisis. Some countries are to an extent faced with a second wave of the virus. On the other hand, I don't expect it will take too long to get things moving."

Marc Schuller cites mobility and the housing market as examples of how the paradigm shifts are raising doubts about likely levels of future petrochemical demand. "We know that in the West, in most countries we have an aging population with a lot of older people and this generation will dominate in the next decades. But nobody is certain yet what this means for housing demand in the new normal," he says. "In some countries there is a question over whether older people will move back into the cities from the suburbs to be near the facilities they need, or whether the pandemic will cause them to move out of the cities to the suburbs to avoid the risk of infection. We can also question whether the slowdown of the economy will lead to a return of multigenerational housing in some markets."

Mr Schuller says this demonstrates that the petrochemical industry "faces a multitude of unknowns and it's very risky to assume that we know what will be normal in 'the new normal.' That's why we need to adopt a scenario approach, testing our

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strategic resilience against a wide range of potential outcomes. This requires us to be agile and focused on developing a robust understanding of current and likely future demand patterns.”

Chemical companies are making efforts during the pandemic to improve their agility, partly through digitization, and adapt their strategies, according to Marc Schuller. “It’s nice to see that the industry step by step is starting to tackle this problem and take the necessary measures to be agile, using technology, at a time when it’s impossible to travel,” he says. “I also strongly believe that everybody is starting to reassess their business models, trying to see how they can adapt to the industry being more demand led rather than maintaining the supply-demand focus we had in recent years, and finetuning their strategies for the future. Each company has its own answer.”

The industry demonstrated its agility and innovative

‘We need to adopt a scenario approach, testing our strategic resilience against a wide range of potential outcomes. This requires us to be agile and focused on developing a robust understanding of current and likely future demand patterns.’

powers with its immediate and effective response to the outbreak of COVID-19, Mr Schuller says. “In the recent past the industry has been able to bring a lot of solutions to some of the short-term challenges brought by the virus, including helping to meet the need for disinfectants, ventilators, masks, and other items,” he says. “This is very much possible because of innovation—the industry is clearly focused on innovation to tackle this issue, and this is true from the upstream part of the industry to the downstream.”

The industry’s ability to implement digital technologies has also enabled it to maintain business continuity, particularly in the stricter lockdown periods. “Without digitization, the industry would not have been able to keep operating during all these challenging weeks and months that we have had in 2020,” Marc Schuller says.

Innovation is also at the core of the industry’s sustainability drive, with the development and use of new technologies to reduce its carbon footprint by cutting greenhouse gas emissions and increase circularity through plastics recycling. “Those are really big challenges, but also huge opportunities for the industry if we tackle this right,” Mr Schuller says.

The sustainability agenda is being driven mainly by the public. “We see increased expectations from the

general public about the capability of industry to come up with sustainable solutions taking into account the latest technology,” he says.

The industry needs to address emissions and recycling “in parallel,” says Marc Schuller. “I’m confident that all the innovation efforts made by the industry will result in major breakthroughs,” he says. “What I see almost on a weekly basis in terms of communication makes me believe that the industry is tackling these problems very seriously and I hope it will go even further. What’s even more encouraging is that instead of seeing the sustainability agenda as a threat, a constraint, companies are starting to see it as a wonderful opportunity to differentiate from each other and come up with solutions that address the expectations of the general population, which is very good for the image of our industry.”

Mr Schuller also sees opportunities in the European Green Deal, announced by the European Commission in December 2019, which aims to make the EU climate neutral by 2050. It is an ambitious target with implications for the sustainability programs of EU member states and Europe-based companies.

“I believe that the EU Green Deal is an opportunity to create a more resilient Europe,” he says. “I’m not suggesting it’s going to be easy, that it will come back with acceptable answers overnight. It certainly requires people to work together, that countries are aligned within Europe, and that companies are aligned too, so it’s very important that the industry maintains good communication and interaction with the authorities. We have a lot of requirements but the expectation from the general population is such that we must come up with a solution.”

Worldwide cooperation through initiatives such as the Alliance to End Plastic Waste (AEPW) will increasingly be a feature of the industry’s response to future challenges, Marc Schuller says. “What’s at stake is so big that it certainly requires alliances such as the AEPW, and there should be more and more initiatives like this,” he says. “Companies will need specific actions, but for those very big programs, I think that having the industry speak with one voice will be very important and I’m glad to say that step by step we are moving in this direction.”

Meanwhile, the petrochemical industry’s possible shift to a more demand-driven model could result in certain supply chains becoming less globalized, partly because of the pandemic, Mr Schuller says. “For most of my working life I’ve been in a supply-driven industry based on the principle that whatever is built will be used,” he says. “It seems to me that it is now changing a lot and we need to move to a more demand-led model. What we see happening, and this is accelerating, is that markets are becoming more local again as demand and supply balances are looked at more on a local basis than a global basis. The introduction of carbon taxes and risk of

trade wars will reinforce these trends.”

COVID-19 has also made chemical companies more aware of the need for supply security of critical raw materials, Marc Schuller says. “Now, people will think twice before relying on 100% imported products from another continent,” he says. “A few years ago, it wasn’t even a topic for discussion. People weren’t even wondering where certain products were coming from. Today they want to make sure that the percentage of dependence on imports remains at an acceptable level. That’s true for a lot of sectors including petrochemicals. For the upstream part of our industry, certain trade flows are inevitable from one continent to another. It’s more the proportion that needs to be finetuned and, as such, it can be an opportunity. I’m sure each company is assessing what it should do to manage these new challenges.”

The financial performance of specialty chemical companies such as Arkema since the start of the crisis has, on the whole, been relatively robust, Mr Schuller says. This reflects the diversified nature of the sector and the enormous range of uses for its products, which enables stronger demand in some segments to offset weak demand in others. “Chemicals being ‘the industry of industries,’ with a large spectrum of applications, I’m impressed to see the resistance of the industry compared with some other sectors,” he says. “Clearly, we have faced a lot of challenges as an industry, and most companies had to publish numbers that were not so good as in the previous year. It’s linked to the fact that not all sectors have had collapses and not all regions at the same

time, so companies that have a range of applications within the various regions and sectors were able to maintain an acceptable level of resilience. We have all seen a tremendous decrease in the automotive sector at least for the second quarter, although there is some recovery taking place right now. But at the same time, for example, we saw demand in the packaging sector and hygiene at even stronger levels than before the crisis. So, by making a weighted average of the demand coming from the various end applications, a lot of chemical companies in the specialties sector have been able to publish a decent level of resistance. Even so, in the end it was still normally at weaker levels than pre-crisis.”

Arkema has seen big opportunities for its Plexiglas polymethyl methacrylate (PMMA) sheet. “We saw a tremendous surge in demand for sheets used in protection applications—at a lot of counters such as in supermarkets and offices,” says Marc Schuller. “This was totally unexpected. There are several other examples that have allowed the industry to partially offset weakness in automotive, aerospace, or sometimes building and construction.”

The resilience shown by petrochemical companies and the wider chemical sector, certainly compared with many other industrial segments, can be a platform for the industry to address its challenges and adapt to rapidly emerging trends, according to Mr Schuller. “We still have a lot of challenges, but so far the industry has resisted well and been able to further innovate and develop its sustainability agenda,” he says.

Mapping and improving supply chains will deliver **continuity for the industry**

▼ **COVID-19 has exposed weaknesses and** caused disruption to international supply chains, prompting governments and companies to worry about security of supply for key products. This has prompted politicians and manufacturers to talk about “reshoring” and “re-localization” to make supply chains more secure in future crises.

Eelco Hoekstra, EPCA treasurer and CEO of tank storage market leader Vopak believes that improving existing supply chains, rather than localizing them, is the best solution for the chemical industry. “This really depends on the specific supply chain as there are many different end markets for the chemical industry. Mapping these supply chains is important to clearly

understand where products are made and where the manufacturing plants are located and how competitive they are, to be better able and prepared in case of supply disruption,” he says.

The oil, gas, and chemical sector is a “truly global market” and this is not likely to change, says Mr Hoekstra. “We know that globalization will lead to increased productivity, so we need to find ways to create an improved model of globalization instead of looking for local solutions,” he says. “One of the true lessons throughout COVID has been the importance of relationships built on trust and reliability. This means developing multiple mutually beneficial relationships. With this, one has flexibility and a

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EELCO HOEKSTRA:
'One of the true lessons throughout COVID-19 has been the importance of relationships built on trust and reliability.'

higher level of certainty."

Greater cooperation between supply-chain participants will as a result become a feature of the chemical industry following the pandemic, according to Mr Hoekstra. "Partnerships will become even more important," he says. "Chemical companies are looking for ways to further optimize both production and supply. They will search for industry collaborations to run their individual plants to optimum levels and reduce costs and increase flexibility. I also foresee them looking into more onsite infrastructure in the supply chain and for options to free up capital from non-producing assets that they employ elsewhere at higher returns, as well as the sale of assets."

COVID-19 is also likely to have made companies more aware of the need to address any fragility in their supply chains, particularly for critical raw materials where sources of supply are limited, Eelco Hoekstra says. "Security of supply is obviously very important within supply chains," he says. "Supply chains of companies with a single source of supply are much more vulnerable. It's likely that companies will now pay more attention to diversifying their supply sources. This comes back to my earlier comment on developing multiple mutually beneficial relationships."

Another certain outcome of the pandemic is the acceleration of the process of digitization in the chemical sector, partly as a result of remote working

and the need for greater automation. Vopak is making big efforts in this area, Mr Hoekstra says. "Digitization is for sure a critical success factor," he says. "In recent years, Vopak has also embarked on a journey of digital transformation. Embracing new tools, defining new interfaces with our customers, and better systems for operations are critical for our long-term success in delivering safe, clean, and efficient storage. This is why we have been making significant investments in digital modernization and innovation. Our digital transformation is progressing well. We are now developing our own software for core processes and the global roll-out of our cloud-based digital terminal management system is progressing well."

Vopak has also taken a number of measures since the start of lockdown to protect its employees and maintain continuity of operations and customer service. "Our main focus has been on the health of the people working at our locations and the service towards our customers," Eelco Hoekstra says. "There are very strict procedures in place to ensure healthy working conditions for everyone. Besides that, we are in very close contact with our customers to be able to support them in these unprecedented times. All 66 of our terminals around the world have been open since the start of the pandemic and we are doing our utmost to keep on safely serving our customers and society."

Industry must drive the sustainability agenda **as it navigates out of crisis**

➤ **The COVID-19 pandemic has impacted Europe's** petrochemical industry at an already tough time for the sector, with large new production capacities starting up worldwide, particularly in Asia. The effect of the pandemic on consumption, on the whole, has been negative with substantial falls in demand from key end-use sectors, but the virus has led to stronger demand in certain product segments, says Thomas Casparie, Executive Vice President, Shell Chemicals. The future is shrouded in uncertainty and there will likely be ups and downs before a full recovery, but the challenge represents a positive opportunity for Shell and other industry players in Europe to build in a way that meets customer and consumer demands for greater sustainability in their operations and products, he says. In short, the industry must address not

only the short- to medium-term challenge coming from COVID, but the longer-term challenge of sustainability.

"Pre-COVID, the industry was already in a downcycle," Thomas Casparie says. "There was a lot of new capacity coming onstream, by far outstripping normal demand growth. And, like all our competitors, our chemicals business saw financial results that were considerably lower than at the peak of 2017. COVID-19 clearly compounded that effect."

The impact on Shell Chemicals' business was uneven across end-use sectors, however. "Many applications that go into automotive were hard hit. But healthcare and hygiene were areas where we actually saw an increase in demand," he says. "And one of the production units we had closed, our

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isopropyl alcohol [IPA] unit in Singapore, we were able to restart and meet the much-needed demand for IPA, which goes into hand sanitizers. We also saw an increase in flexible packaging demand, as many people are working from home, and getting more deliveries.”

Looking ahead, the shape and timing of the recovery in demand remain unclear, Mr Casparie says. “My personal belief is it’s unlikely to be a V-shaped recovery, with a knock-on effect on demand for a couple of years,” he says. “Over the summer months and slightly beyond we saw a bit of a surge in demand as certain countries started to open up and get back to some normality, but we’re now getting into a phase where we’re starting to see more lockdowns again. I do expect demand to go up and down until a vaccine is in place.”

The outlook for supply is equally uncertain and Europe’s petrochemical industry will likely see some impacts from the difficulties faced by the refining sector, Thomas Casparie says. “On the supply side I also see some uncertainties, because clearly the industry is starting to react in terms of postponements or even cancellation of projects. On the other hand, the refining industry has also been hit particularly hard. That puts some pressure on naphtha pricing—whether it’s short term or long term, you can debate. Also, I do see a more structural trend where more and more refineries pivot to chemicals output, which will increase supply of petrochemicals.”

Mr Casparie says that Shell is managing the crisis and dealing with the lack of visibility in two ways: tackling the immediate challenges and focusing strategically on the longer term.

“In the short term, we’ve first and foremost made care for our people the main priority,” he says. “A good example of that is our polyethylene [PE] project in Pennsylvania, where we are in the middle of construction and we took the decision to wind down the number of workers on site and made sure we were able to put measures in place so that we could return safely. I’m pleased to say we’re now back to over 6,000 people on site and making good progress.”

Mr Casparie believes that agility, product differentiation, and operational efficiency are essential for petrochemical companies to prosper during the pandemic. “If you want to continue to thrive in this uncertain world, you need to have a differentiated portfolio and run your operations and your business as efficiently as you can, and in a way that increases your agility and flexibility to adapt,” he says.

Shell says it is well positioned to succeed in the chemicals business for the long term. “Our growth aspirations are based on four key pillars,” Thomas Casparie says. “They are technology, and we have a lot of proprietary technologies in the value chains we

operate in; feedstock cost advantage, which we derive from integration with our refineries and upstream business but also with our trading units; scale, the fact that we operate across the globe in large integrated facilities; and market access and customer-centricity—we aim to have our portfolio in all the key demand centers around the world.”

Shell Chemicals also focused during lockdown on business continuity, making sure it could maintain operations at all its production plants and in its supply chains. “I feel really proud that we were able to safeguard the safety of our people everywhere in our portfolio,” Thomas Casparie says. “And, like many of our competitors we have had to take some actions to reduce discretionary costs where that was possible. Every day our teams are doing a remarkable job, largely from home, continuing to optimize our production units to achieve the best economic outcome.”

He notes that Shell is continuing to grow its differentiated chemicals portfolio. Through the Pennsylvania project, the company will be entering the PE market. Meanwhile, in January 2020 the company announced its intention to enter the polycarbonate value chain, initially through a project in China.

The critical point that Mr Casparie raises, is that the petrochemical industry must drive the sustainability agenda as it navigates its way out of the crisis. “I’m convinced that we’ll see an acceleration of expectation from society for fundamental circularity and decarbonization,” he says. “When I talk to my customers, they ask for circular products and low-carbon products. If you just look at the public debate and the sentiment, I strongly believe this is what society is going to expect.”

Thomas Casparie highlights two recent announcements from brand owners. “Those are very visible signs of what the end customer is going to ask for, and as an industry we need to act,” he says.

Shell intends to be a driving force in the shift to sustainable chemical products. “We strongly believe that there is a future for sustainable chemicals—they are needed, and it is achievable,” Mr Casparie says. “We aspire to be the leader in that space.”

Some customers have announced they are seeking a portfolio and mix of circular and low-carbon feedstocks. “I fully agree with them that there needs to be a mix, because there’s a whole range of solutions needed to actually solve this problem,” Thomas Casparie says.

Shell earlier announced plans to establish an integrated value chain, based on chemical recycling of plastics, under which it intends to use 1 million metric tons/year of plastic waste as feedstock in its



THOMAS CASPARIE:

‘To thrive in this uncertain world, you need to have a differentiated portfolio and run your business in a way that increases your agility and flexibility.’

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chemical plants worldwide by 2025. The program started last year utilizing pyrolysis technology at its Norco, Louisiana, facilities, “where we put the first product into our cracker very successfully,” Mr Casparie says.

Shell aims to trial the technology worldwide in the short term. “Ultimately, we aim to have it at demo scale very quickly before we ramp up to our target in 2025 on a commercial scale,” he says. “We are very confident that we can achieve that, working with a range of companies to help us scale this up quickly.”

Shell is also a founding member of the Alliance to End Plastic Waste (AEPW), an international non-profit organization formed in January 2019 to help solve the

‘The size of the challenge that society is facing, whether from a circular or carbon perspective, is such that we need individual and collective action. It requires a coalition of the whole industry, the whole value chain, but also ultimately working with governments to solve this problem.’

issue of plastic waste entering the environment. AEPW’s members, including representation all along the plastics value chain, have committed to share their expertise, and fund and demonstrate projects and programs that will recover and create value from plastic waste.

Collaboration on such a large scale reflects the enormity of the sustainability challenge, Thomas Casparie says. “The size of the challenge that society is facing, whether from a circular perspective or carbon perspective, is such that we need individual and collective action,” he says. “The question about energy transition and circularity is not something that an individual player can solve alone. It also requires a coalition of the whole industry, the whole value chain, but also ultimately working with governments to solve this problem. I’m very excited that we have retailers and converters in there.”

Shell’s sustainability goals in chemicals also fit with the broader Royal Dutch Shell ambition, announced earlier this year, to be a net-zero emissions energy business by 2050 or sooner, if possible. “Becoming a net-zero emissions energy business is a huge task,” Mr Casparie says. “The business plans we have today will not get us there. So, our plans must change over time, as society and our customers also change.”

Petrochemical products have a major role to play in society’s shift to a low-carbon economy and it is up to the industry to make sure this point is not lost in the

public sustainability debate, Thomas Casparie says. “I want to make sure we continue to remind not only ourselves but especially society that finished products made from petrochemicals are critical to our daily lives and the energy transition, whether it is in lightweight materials in vehicles, components of solar panels and wind turbines, or even something as simple as being able to wash laundry at lower temperatures with detergents made of alpha-olefins. You can’t see the transition to a low-carbon world without petrochemicals,” he says.

However, nor should petrochemical producers lose sight of the fact that, “it’s critical that we address the carbon intensity of our industry,” Thomas Casparie says. “I see a hierarchy of steps on how to achieve that, and the first and often most easily accessible is to increase the energy efficiency of our existing units.”

Shell Chemicals has launched a number of energy-efficiency projects at its production sites. The business announced recently a plan to reduce the number of furnaces at its Moerdijk, Netherlands, steam cracker by half while maintaining the plant’s production capacity. The program is intended to reduce the facility’s CO₂ emissions by 10%.

“The next step in our mind is to really look at electrification,” Mr Casparie says. Shell has started working with Dow to develop, design, and eventually scale up electrification of furnaces at its steam crackers.

Shell is also evaluating other uses of low-carbon energy sources at its chemical sites. The company is already using solar power at Moerdijk as well as a hydrogen electrolyzer at its Rhineland plant in Germany. Shell Chemicals has a clear benefit here from being part of a bigger energy company, according to Thomas Casparie. “This is where I believe we differentiate ourselves from some of the more chemicals-only companies because we have a new energies arm as part of Shell Group that is really looking to develop low-carbon energy, so we believe that brings us an advantage.”

Shell is leading the development of carbon capture and storage (CCS), and has an operation at Scotford, Alberta, Canada, that started up in 2015. The company is also looking with partners at a CCS project in the port of Rotterdam. And Shell is looking to develop innovative technologies such as making chemicals from biomass but these are still at a relatively early stage.

Regulation has a part to play in driving the chemical industry’s sustainability agenda, but it cannot be the main driver, Mr Casparie says. And better cooperation between industry and the regulatory authorities would result in strong legislation, he says.

“Companies should not wait for regulations to drive the sustainability agenda and we certainly

won't," Thomas Casparie says. "Having said that, we do support appropriate regulations that would help to accelerate and progress the journey to net zero. I sometimes feel that as an industry we are really good at telling regulators what will not help us, saying 'no.' We need to get better at articulating what would be helpful."

Shell believes that chemical recycling should be recognized and incentivized by regulators in the same way as more traditional forms of plastics recycling. "That's just one example of where Shell would like to play a role," Mr Casparie says. "Shell supports policies that promote reuse, recycling, and energy recovery of plastics and consider impacts over the lifecycle. These will support the unlocking of the economic value of plastic waste and the creation of a circular economy for plastics."

Given the immediate impacts of COVID-19 and the ongoing sustainability shift, not to mention the pre-existing cyclical challenges, the European

petrochemical industry faces a tough task to stay competitive. But Mr Casparie is confident the sector has what it takes to succeed in the long term.

Despite frequent predictions of the European petrochemical industry's demise, "it's a thriving industry," he says. "This region has the ability to re-invent itself continuously through product differentiation, efficiency, and I believe that the region will lead in terms of sustainability. Therefore, I'm very confident that it will continue to reinvent itself, be it through a sustainability lens, a product differentiation lens, or deeper integration."

Thomas Casparie is sure that in 30 years Europe will still have a thriving petrochemical industry. "It will look very different, but it will be thriving, nevertheless," he says. "But it will need individual action and Shell wants to be a leader in that, and it will require collective action and I really hope that the pandemic actually gives us a springboard to do it."

Working together to address plastic waste, **finding solutions to societal challenges**

➤ **The use of plastics to tackle the COVID-19** pandemic has demonstrated their versatility and importance, says Sonia Bingham, an EPCA board member and product executive/global basic chemicals at ExxonMobil. Plastics used in essential applications can also present a recycling opportunity, she says.

"The chemical industry is playing a key role in meeting today's societal challenges," Ms Bingham says. "Plastics are critical components to many life-saving products in the medical industry, including facemasks, shields, and gowns for medical professionals treating patients with COVID-19 and other medical conditions. These items are instrumental in preventing the spread and managing the treatment of the virus. The chemical industry is working on solutions to enable discarded medical plastics to be recycled and reused, such as advanced recycling."

Plastic waste in the environment is nevertheless a concern for many and one of the major challenges of our time. "ExxonMobil shares society's concern about plastic waste in the environment and agrees it must be addressed," Sonia Bingham says. "Plastic waste in the

environment is part of a larger issue related to global waste-management infrastructure. At least 3 billion people worldwide lack access to controlled waste-disposal facilities. As a result, a significant amount of solid waste leaks into the environment. ExxonMobil is taking action to address plastic waste in the environment by increasing plastic recyclability, supporting improvements in plastic waste recovery—for example, through our founding membership in the Alliance to End Plastic Waste—and minimizing plastic pellet loss from our operations."

The plastic waste challenge cannot be addressed by one company alone. It requires cooperation all along the whole value chain, Ms Bingham says. "As a company we support the efficient use of resources and the prevention of plastic leakage into the environment," she says. "Plastics are valuable. They should not end up in our oceans or in the environment. Solutions to the plastic waste challenge will require the support, innovation, and global collaboration of the entire plastics value chain: resin producers, converters, consumer brands, retailers, consumers, NGOs, governments, waste management companies, and recyclers."



SONIA BINGHAM: 'Plastics have value throughout their lifecycle, including at end of life.'

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Santoprene elastomers produced at ExxonMobil's Newport, UK, plant can be processed like plastic and reprocessed for reuse. They are used in automotive, industrial, and consumer applications.

There is a growing need for innovative recycling processes and ExxonMobil is developing technologies that it says will address the need for circularity and reduce plastics' overall carbon footprint. "Plastics have value throughout their lifecycle, including at end of life. Technology solutions are required to maximize the value of plastic waste by converting it to valuable raw materials and products," Sonia Bingham says. "Providing a valuable outlet for plastic waste is a way to incentivize its collection and sorting. We are working on potential solutions, such as advanced recycling, that would capture value from plastic waste and reduce overall greenhouse gas emissions on a full lifecycle basis. We are well-positioned to add value through our expertise in hydrocarbon molecule management and our industry-leading R&D capabilities, and we are making significant investments in high-impact technologies to deliver sustainable solutions, including new processes, feedstocks, and products. This includes technology options to convert plastic waste to petrochemical raw materials by leveraging safe, reliable, and economic processes."

Regulation has a part to play in driving the plastics sustainability agenda, but it needs to be balanced and consistent, and encourage the development of infrastructure and technology, Ms Bingham says. "There is a role for policy that stimulates innovation, enables markets to capture value from the hydrocarbon content of plastic waste, and accelerates investment in scalable solutions," she says. "Plastic waste policies should be unambiguous, science-based, material- and technology-neutral, and resource- and cost-efficient. Policies should not pick technological winners and losers in the absence of sound science. Where possible,

policies should also be harmonized and coordinated between localities, countries, and regions to preserve simplicity, predictability, and efficiency."

In January 2019, ExxonMobil was a founding member of the Alliance to End Plastic Waste (AEPW). "We worked with companies from multiple sectors to form the world's largest organization of business and non-profit partners committed to help address plastic waste," Sonia Bingham says.

The membership has grown to include almost 50 organizations from North and South America, Europe, Asia, Africa, and the Arabian Gulf. Together, they have collectively committed more than \$1 billion—with the goal of investing \$1.5 billion over the Alliance's first five years—to help address plastic waste in the environment. "The alliance is focused on developing safe, scalable, and economically viable solutions," Ms Bingham says. "It aims to accelerate additional investment by proving the effectiveness of these solutions, particularly in markets with the highest levels of plastic waste in the environment."

One example is AEPW's funding to RenewOceans for a project that is on schedule to divert 100,000 pounds of ocean-bound plastics from the Ganges River in India in the first year. It is also working with Project STOP to design and develop an integrated waste-management system in Bali Province, Indonesia, to prevent 1,500 metric tons of plastic waste from leaking into the environment each year.

"The Alliance is a very good example of collaboration. I am convinced that if we all work together we can continue to enjoy the benefits of plastics while successfully addressing the challenge of plastic waste," concludes Sonia Bingham.

Feedstock fluctuations reset Europe's competitiveness

➤ **The feedstock competitiveness of Europe's** petrochemical industry has been up and down since the beginning of the COVID-19 outbreak. The collapse in oil prices in March sent naphtha prices into a tailspin, increasing the competitiveness of steam crackers in Europe, most of which are naphtha based. For a period in March and April, Europe's naphtha crackers were the most competitive olefin plants in the world, having historically been the least competitive. An IHS Markit analyst said that the pandemic had "scrambled the cost curve" for ethylene production. Oil and naphtha prices have since staged a recovery, but the shape of the cost curve is still not what it was at the beginning of 2020. The volatility has also had implications for operators of ethane crackers in Europe, including companies such as Ineos that have revamped some plants to consume ethane imported from the US. These investments were made to profit from a feedstock that is traditionally advantaged versus naphtha in Europe.

"It's a bit of a rollercoaster," says John McNally, an EPCA board member and CEO/Project One at Ineos. "For a while we saw naphtha quite advantaged against ethane pricing. Some of our naphtha crackers benefited from low-priced naphtha."

Ineos operates two crackers in Europe that consume US ethane, at Grangemouth, UK, and Rafnes, Norway. And, via Project One, it is investing €5 billion to build a large ethane cracker and propane dehydrogenation (PDH) unit at Antwerp, Belgium, with a combined capacity of 2.5 MMt/y, a program for which Mr McNally has overall responsibility.

Oil prices have moved back up since the spring and now stand at about \$40/bbl compared with \$20/bbl in April. "We never thought oil would stay that low for long. Among other pressures, there was a clear link to the pandemic and the shutdown of a lot of industries," John McNally says. "As the oil price has recovered, the naphtha price has come back up too."

However, ethane prices have also risen in the US as shale production slowed there due to COVID-19. "Ethane has come up a bit," says Mr McNally. "From our perspective, we have felt comfortable with the whole situation. In the long term we still expect ethane to be an advantaged feedstock. We have ships coming into Grangemouth and Rafnes every day. That supply chain has not skipped a beat."

The experience of the last six months has validated

Ineos's decision to feed its two ethane crackers with US ethane, John McNally says. "It has been tested. We continue to run Grangemouth and Rafnes on ethane. On most days US ethane will be a less expensive feedstock and always a more environmentally friendly feedstock for us than naphtha with half the CO₂ footprint per ton of ethylene production. Naphtha sank to the floor, but it shows that our businesses are robust against that."

The feedstock rollercoaster has also not shaken Ineos's confidence that it is the right decision to build an ethane cracker at Antwerp. "There's been no change in the view that ethane is the way to go," Mr McNally says. "The advantage of cracking ethane for us is that this is a much more selective way to produce ethylene, which gives you significant advantages in feedstock and energy efficiency, and CO₂ emissions. The same is true of selecting propane dehydrogenation to produce propylene." Ineos founder and owner Jim Ratcliffe has said he wants to select "dial-in" products, and "we wanted ethylene and propylene," John McNally says.

The pandemic and its severe economic impact have also not undermined Ineos's commitment to the project. "We've seen nothing over the spring and summer to change that view in any sense," John McNally says.

COVID-19 has impacted the petrochemical industry in Europe, but its effect has not been devastating, Mr McNally says. "The industry has been shaken up a bit, and some markets have suffered more than others," he says. "For example, the automotive industry basically stopped in Europe and is only now beginning to recover. However, demand for cleaning and healthcare products, medical applications, and food packaging has been good throughout, and after a very quiet period during lockdown, demand from the construction sector has picked up strongly."

The long-term impacts of the crisis are open to speculation, but John McNally believes there will be a fundamental uptick in downstream demand within a year. "None of us would have ever predicted what happened in the second quarter of this year," he says. "The question we ask ourselves, and that is the most important, is what will happen in 6-9 months from now, and will there be any fundamental long-term changes? I think things are slowly going back to normal. The risk is that there will be a second or third



JOHN MCNALLY: 'In the long term we still expect ethane to be an advantaged feedstock.'

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wave of the pandemic, which would cause demand to falter in some parts of the world. The lack of predictability is a key challenge for the whole of the petrochemical sector.”

But Mr McNally sees “nothing intrinsically weak, if you look at the fundamentals” in the markets Ineos serves, apart from the impact of the pandemic. He asks, “why would the fundamentals of the market not go back to where they were late last year and early this year?” The current situation is unlike the recession of 2008, which was caused by an intrinsic problem—the financial market crash—that took a long time to correct, John McNally notes.

Ineos has managed to keep all its 180 sites worldwide running during the pandemic apart from three in India that were mandated to shut down. “All of Ineos’s nine polymer and chemical divisions supply products used in medical and pharmaceutical applications. They play a very important role in these sectors, supplying over 300 products. These are typically EU/US Pharmacopoeia and US FDA approved. Many are active in some way in slowing the spread of COVID-19, treating those infected, or finding a cure,” he says. Ineos produces chemicals that are used to make retro- and antivirals, antibiotics, steroids, anti-inflammatories, paracetamol, aspirin, and the reagent chemicals used in COVID-19 testing kits. It also produces the plastics going into medical equipment, face masks, ventilators, sterile gloves, eye visors, and respiratory care tubing. The list goes on and on.

Overall, Mr McNally estimates that European demand for petrochemicals is currently down on the five-year average in revenue terms, although volumes are doing better. “Across Europe there has definitely been a drop in overall demand as a result of the lockdown,” he says.

Jim Ratcliffe has consistently argued the point that Europe’s olefins capacity is relatively old and in need of renewal, and that Ineos’s planned Antwerp cracker is part of that process. According to John McNally, the current uncertainty and upheaval should not slow the rejuvenation of Europe’s steam cracking capacity. “In Europe, you have an olefins capacity that has aged enormously,” he says. “The youngest cracker is now more than 20 years old. The US has had a renaissance with crackers and derivatives—Europe has not.”

Ineos’s new cracker will operate the latest best-in-class technologies and hence will have less than half the CO₂ emissions of the next best cracker in Europe.

There could be closures of some older plants among Europe’s 42 crackers, not necessarily because of the current challenging environment. “I think it’s possible,” John McNally says. “Old plants have to shut

down some time. If you have 42 units in Europe, there has to be renewal in this industry eventually.”

The alternative is losing the industry from Europe and letting it migrate to China and other locations. Ineos is “committed to Europe and supporting and growing with our European customers. We’re putting €5 billion into it. If there’s pressure on markets and feedstocks, you need to have units that can compete with units in other parts of the world,” he says.

John McNally chairs an integrated team that oversees the various components of the Antwerp cracker and PDH project, which is at the FEED stage with a final investment decision targeted in 2021. “It is looking positive at this stage,” he says. “And it’s full speed ahead. Since we’re in engineering, the lockdown didn’t slow us down. In some ways it made our engineers more efficient because they were travelling less or not at all. If we’d been in construction, it would have been a different story.”

Land preparation is due to take place in mid-2021 with construction to start later that year and completion scheduled in 2025. The new complex will make Ineos largely self-sufficient in olefins in Europe. “We’ll be the largest producer of olefins and an equally large consumer,” Mr McNally says.

Meanwhile, Ineos, in the current crisis, has become more involved in the consumer healthcare sector with its recently launched Ineos Hygienics business. The business makes and sells a range of sanitizer products based on the company’s advantaged position in the key ingredients, pharma-grade synthetic ethanol and isopropyl alcohol. “It’s a good bet that people will be using hand sanitizer for years to come,” John McNally says.

In the middle of the pandemic, Ineos also announced the \$5-billion acquisition of the rest of BP’s petrochemical business, having bought the Innovene assets from BP in 2005. “We have not been on the back foot during the pandemic,” Mr McNally says. “We’d always shown an interest in that particular set of BP assets and, despite the pandemic, there was an opportunity and we struck. It’s a good deal for both sides.”

The deal will give Ineos a bigger presence in Asia and gives it an entry into businesses such as para-xylene and purified terephthalic acid. “Jim Ratcliffe has said that when you are a company our size, you like to have assets spread globally. There are times when there’s an advantage and you’re seeing that right now—China is picking up faster than Europe.”

Ratcliffe has “put his money where his mouth is” with the Antwerp project and BP deal, John McNally says. “We’re still optimistic about petrochemicals in Europe,” he adds.

Emerging from the crisis more agile, resilient, and connected

➤ **The COVID-19 pandemic has had a huge impact on the petrochemical industry and is changing the way it operates as well as the way its employees work.** Much of the impact is demanding but there are also positives, says Katja Wodjereck, an EPCA board member and commercial director/ industrial solutions, EMEAI at Dow. The crisis is a big challenge for petrochemical producers including Dow, and she says the company has adapted well and will emerge “more agile, more resilient, and more connected.”

“The COVID-19 crisis will change many industries in Europe and around the globe, including the petrochemical industry,” Ms Wodjereck says. “At Dow, we live by our founder’s philosophy ‘If you can’t do it better, why do it.’ This philosophy rings true as we find ways of doing things and working better while we navigate through this pandemic.”

Dow has adapted successfully to the current conditions “by leveraging several key drivers,” she says. “Our strong network of manufacturing sites around the world, including our 37 manufacturing sites in 15 countries in Europe, Middle East, Africa, and India (EMEA), and global supply chain capabilities have allowed us to be agile in finding creative solutions to get product to our customers on time.”

The work Dow has done on its digital transformation has been crucial to managing all areas of its business during the crisis, Katja Wodjereck says. “These digital capabilities have helped us adjust our operations at our plants, adhering to social distancing rules and putting new safety processes in place,” she says. “And like other companies, digital ways of working were key as we moved our office-based employees, who make up over half of Team Dow, to a work-from-home environment. Digital capabilities have enabled us to adopt new ways of serving our customers and quickly bring solutions to the market that help address critical societal needs. As markets and the economy begin to come back, doing business digitally, as well as the renewed focus on resilient supply chains and working faster and more collaboratively to solve real challenges, can and should remain.”

The pandemic has also brought about new employee experiences at Dow. “Recognizing the stresses employees are feeling during these uncertain times and having an inclusive and empowered

culture with strong leadership from the top down has enabled teams to be more connected, more resilient, and more agile,” Ms Wodjereck says. Employee Resource Groups (ERGs) have been another way to drive engagement through new spaces, helping employees connect and work together in ways they had not before, she says.

COVID-19 has caused big declines in demand for petrochemicals and their derivatives from certain key customer industries. However, demand from some industries has grown and signs of recovery are already visible in a number of regions.

“We have seen the financial impact of the pandemic across the petrochemical industry. We have also seen that the pandemic impacts industries differently,” she says. “We have seen in Europe that some industries like consumer durables and automotive have had large declines in demand, while other consumer staples such as home care and health and hygiene have demonstrated growth. We have also started to see notable improvements in geographies leading the way in economic recovery, first in Asia and now here in some European countries and markets.”

Although there is still little clarity around the timing and speed of a full recovery, Ms Wodjereck is confident that demand and growth will return to pre-crisis levels in Dow’s key customer sectors. “While full visibility into the return to pre-pandemic operations remains limited, we know that demand will return and as it does, the fundamentals in marketing segments—packaging, consumer, and infrastructure, and others—remain,” she says. “And with a huge addressable market, these segments will continue to grow. We also know that coming out of this pandemic, resiliency and adaptability will be critical for long-term growth. Like other industry shifts we have done before, we will need to adapt to these shifts that arise out of the pandemic, regardless of the market segments we serve.”

Katja Wodjereck also anticipates that consumers will attach greater importance to sustainability issues in the new environment following the pandemic, and that this will accelerate the petrochemical industry’s shift to sustainable operations. “Rises in consumer trends during the pandemic will impact how the industry does business. One acceleration we have seen is the consumer focus on



KATJA WODJERECK:

‘Digital capabilities have enabled us to adopt new ways of serving our customers and quickly bring solutions to the market.’

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sustainability,” she says. “While sustainability has been of increasing relevance in recent years, the push from consumers has been further downstream. The pandemic has brought it to the forefront of consumers’ minds and now more than ever, petrochemical companies will need to adapt to meet new environmental and regulatory sustainability trends. We will need to understand how to shift our product mix and how to serve our evolving customer needs to reduce our risk and continue to grow.”

Governments, including the European Commission, are also saying that the eventual recovery from

‘The pandemic is teaching the whole industry that we need to mitigate the risk of slowing demand in some markets while capturing growth in others. More than ever, we need to listen to our customers, work on the efficiency of our supply chain and inventories, and be flexible.’

COVID-19 is a chance to become more sustainable, reduce environmental footprints, and achieve a circular economy, in a “green recovery.”

Ms Wodjereck believes that the petrochemical industry, including Dow, will have an important part to play. “The world needs environmental leadership now. The industry, and we, as Dow, are committed to accelerate our actions towards a sustainable planet,” she says. “The petrochemical industry will play a key role in this recovery. This means for us, investment in lower-carbon and more circular manufacturing operations, development and marketing of more sustainable products through technology and innovation, and collaboration with third parties. We have a responsibility and actually I don’t call it green recovery—our commitment to sustainability is permanent, whether we have a crisis such as COVID-19 or not.”

Major initiatives such as the European Union’s Green Deal, happening now, underline the opportunity for the region’s petrochemical industry to lead the way in establishing future competitiveness, Katja Wodjereck says. “These are global trends. In Europe the EU Green Deal sets a clear sustainability agenda with many important initiatives, including a new climate law expected to call for higher GHG reduction targets by 2030. We won’t be competitive without being sustainable. And we need to stay competitive to keep generating qualified jobs in the petrochemical industry.”

Dow recently announced a new set of global

sustainability targets, which align to and build on the company’s 2025 sustainability goals. They include reducing by 2030 the company’s net annual carbon emissions by 5 million metric tons (MMt), or 15% from its 2020 baseline. “A significant part of this reduction is expected to come from our European operations. This will keep us in line with the current EU goal of a 40% reduction in CO₂ emissions by 2030 relative to 1990 and position us to work towards possible reductions of 50-55% relative to 1990 if these are agreed in the new climate law,” Ms Wodjereck says.

Dow also intends to be carbon neutral by 2050, in alignment with the Paris Agreement. Also, by 2030, Dow says it will help “stop the waste” by enabling 1 MMt of plastic to be collected, reused, or recycled through the company’s direct actions and partnerships. Dow also says that by 2035, it will help “close the loop” by having 100% of its products that are sold into packaging applications reusable or recyclable.

The petrochemical industry has historically been resilient in times of crisis. However, COVID-19 has shown that the industry cannot be complacent and must constantly guard against future challenges, says Katja Wodjereck. “The petrochemical industry has always adapted successfully to changing external factors such oil prices, macro-economic trends, and shifting customer requirements. Nevertheless, the COVID-19 pandemic is again teaching the whole industry that we need to mitigate the risk of slowing demand in some markets while capturing growth in others. More than ever, we need to listen to our customers, work on the efficiency of our supply chain and inventories, and be flexible,” she says.

Dow’s adaptability and agility were demonstrated by the company’s quick response to COVID-19 by converting its plants to make products needed to tackle the pandemic, Ms Wodjereck says. “When we started the year, Dow was not thinking of expanding into hand sanitizer production, but in March we announced that five Dow sites—one of them in Germany—were ready to produce more than 200 metric tons, equivalent to more than 880,000 eight-ounce bottles. Dow’s asset flexibility allowed for a meaningful volume of sanitizer to be produced with little to no impact to normal operations,” she says. “A month after, we announced that Dow had developed a simplified, lightweight design for face shields to help protect healthcare professionals, shared as an open-source design to encourage additional production. We learnt to be even more flexible, agile, and ready to respond to customer and societal needs.”

Transition to a circular economy remains a critical target

➤ **The COVID-19 pandemic has boosted demand** for virgin plastics in some applications. However, this is not necessarily a setback for the development of plastics recycling or long-term ambitions to create a circular economy, says Richard Roudeix, an EPCA board member and senior vice president/olefins and polyolefins, Europe, Asia, International at LyondellBasell.

“We should separate these two items,” Mr Roudeix says. “In the short term, the COVID-19 pandemic has reminded consumers of the importance of plastic packaging. It keeps food safe during transportation and storage. The role of plastic in medical supplies, such as face masks, ensures hygienic standards and helps to keep people safe. These applications have always been the domain of virgin plastics due to the high regulatory requirements where recycled material is currently not able to meet those regulatory specifications. Although the COVID-19 pandemic may have shifted priorities in the near term, we believe that transitioning to a circular economy remains critical to keep these valuable resources in use for as long as possible, to help eliminate plastic waste, and provide essential materials.”

LyondellBasell continues to invest in mechanical and advanced recycling of plastics during the pandemic. “We have seen progress in the past months in both areas,” Richard Roudeix says. “In mechanical recycling, we have been able to increase the quality of the polymers we produce at our Quality Circular Polymers (QCP) joint venture. More and more we are seeing our products going into high-quality applications such as household cleaners, soaps, and shampoo bottles. Our proprietary advanced (molecular) recycling technology, which we call MoReTec, is taking the next step towards potentially realizing implementation on an industrial scale with the startup of our small-scale pilot facility in Ferrara, Italy, just a few weeks ago. The pandemic is not pushing these efforts back.”

Meanwhile, governments including the European Commission are urging a “green recovery” from the pandemic with an emphasis on sustainability. This should provide a further boost to the polymer industry’s circularity drive, Mr Roudeix says.

“The COVID-19 crisis offers an opportunity for the

polyolefins industry to take a step forward towards circularity, the reduction of plastic waste, and efforts to produce material that is as climate neutral as possible. The European Recovery Plan addresses this by accelerating investments into the green and digital transition, in line with the EU Green Deal,” he says.

Richard Roudeix believes that the chemical industry will play a critical role in this transition, by delivering the products needed to support the EU’s sustainability goals. “We are actively supporting this transition by investing in mechanical and advanced recycling and producing polymers from renewable feedstock,” he says. “But it is important for industry to also transform its own production processes and deliver solutions that help advance a low-carbon economy. We continuously work to reduce the impact of our operations through a variety of initiatives. These include efforts to reduce emissions and energy usage and prevent plastic pellets from entering the environment.”

It is also essential that Europe’s petrochemical industry stays competitive as it transitions to being more sustainable. “Our priority is to ensure that we are able to make this transformation while maintaining our production capacity in Europe,” Mr Roudeix says. “This will only be possible if industrial competitiveness is maintained throughout the transition. We therefore underline the importance of accompanying the Economic Recovery Plan with the implementation of the EU Industrial Strategy, embedding it firmly in the Green Deal actions. This will ensure that the recovery funding achieves an industrial transformation that will be resilient over time.”

International cooperation efforts across many sectors are helping to tackle COVID-19, just as worldwide initiatives such as the Alliance to End Plastic Waste (AEPW)—of which LyondellBasell is a founding member—are promoting plastics sustainability. “From philanthropy to production, from supply chains to waste management, cooperation has sprung up everywhere, and businesses are aiding the fight against the pandemic in the communities they serve,” Richard Roudeix says.

LyondellBasell is actively involved and leveraging its value chains to help employees, customers, families, and contractors stay safe and healthy while



RICHARD ROUDEIX: ‘From philanthropy to production, from supply chains to waste management, cooperation has sprung up everywhere.’

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still working to meet demand in these challenging times. “Ramping up production, donating generously, diverting resources—it’s all-hands-on-deck to protect our communities,” he says. “At LyondellBasell, we have continued to provide our customers with materials for food packaging and medical applications, and we have ramped up production where needed to support the COVID-19 response.”

LyondellBasell is also supporting the communities in which it operates by producing hand sanitizer, donating masks and protective equipment, and supporting people in need. Being a good neighbor “is part of our DNA and something we have been doing for many years,” Mr Roudeix says.

‘We believe that investments in recycling technologies, infrastructure for collecting and sorting, innovative materials, and smart packaging solutions should be pushed as part of the recovery. The circular economy is an important economic engine.’

AEPW members remain fully engaged in their sustainable development ambitions despite the new priorities created by the pandemic. “Members of the Alliance are not walking back on their Sustainable Development Goal commitments and the Alliance holds the ecosystem accountable for the long-term need to reduce plastic waste in our environment,” he says. “Together with nearly 50 members of the AEPW, we are fully committed to the mission to ensure the responsible use and disposal of plastic. It is a complex issue, and if there is anything that COVID-19 has taught the world, it is that complex issues can only be solved through collaboration.”

Richard Roudeix notes that polymer producers and brand owners started to collaborate “years ago, well before the COVID-19 pandemic,” to improve the sustainability of packaging. “Looking at it from an industry perspective, the sustainability of packaging—to make packaging easier to recycle or to use less material in its production—is an established trend,” he says. “Preventing plastic waste and improving the circular economy are problems that are too big for one company or one initiative to tackle single-handedly. We believe the most effective way to address these challenges is through broad collaboration that spans the value chain, and we see a lot of this happening. We are working together with industry associations such as Cefic, PlasticsEurope, and the Polyolefin Circular Economy Platform (PCEP)

in order to increase sustainability and circularity and to find joint solutions.”

The crisis and its economic consequences could delay investment in some areas, Mr Roudeix says. “But we believe that investments in recycling technologies, infrastructure for collecting and sorting, innovative materials, and smart packaging solutions should be pushed as part of the recovery,” he says. LyondellBasell is investing in R&D into advanced recycling, the company’s Circular Steam Project in The Netherlands, and together with its joint venture partner Suez, in mechanical recycling. “The circular economy is an important economic engine,” he adds.

The crisis has caused disruption to international supply chains and led to calls from governments to make supply chains more local and for essential products to be manufactured domestically. However, Richard Roudeix does not think this will lead to a halt or even a reversal of the globalization trend. “We do see some governments increasing their efforts by starting to produce medical equipment such as protective masks nationally, but this is a special case,” he says. “The world’s economy simply depends too much on one another to entirely localize supply chains.”

Similarly, a more inward-looking approach would undermine international partnerships to help the environment, Mr Roudeix says. “Plastics have helped to support sustainable development, and the increase in living standards around the world. Our products provide the delivery of clean water and help avoid the issue of food waste,” he says. “What we need to do is ensure plastic waste does not end up in the environment, and work to advance a circular economy for plastics. To do so, we need global, collaborative actions that transcend one industry or even one nation. Initiatives such as the AEPW are doing just that. So, a move back to a narrower, national view would not provide the opportunity for sharing of ideas and the concerted action required to address the effects of climate change and plastic pollution. We believe that this cannot be in anybody’s interest.”

However, new investments in the collection, sorting, and recycling of waste “will help to reduce dependence on strategic secondary raw material imports and can promote innovative technologies such as advanced recycling, which will accelerate the transition to a circular economy,” Richard Roudeix says. “Circularity always has to be local in order to be effective. If we look at mechanical recycling for example, it reduces waste and has a more favorable CO₂ footprint in particular when the post-consumer waste stream is sourced locally,” he says.

Digitization, diversification prevent supply-chain disruptions during pandemic

➤ **COVID-19 is accelerating digitization in many industries, including chemicals production and logistics.** Jan Arnet, CEO at chemical logistics and transport company Bertschi AG (Durrenaesch, Switzerland), says measures taken to maintain continuity during COVID-19 and prevent the spread of the pandemic have boosted the digitization process at the company. These included precautionary measures with customers, employees, and partners/suppliers working from home. Meanwhile, truck drivers, locomotive drivers, and workers at terminals and cleaning stations were asked to work contactless.

“From day one, contactless work had the highest priority, less informal communication was possible, and new communication channels had to be implemented leading immediately to a need for streamlined working procedures,” Jan Arnet says. “Offline processes were transferred online, so they needed to be integrated with our existing ERP processes, which meant standardizing working processes, resulting in efficiency gains along the value chain.”

The need for visibility increased immediately. “Customers and receivers of product working at their home offices had to rely on their IT systems much more than in the past because the offline information stream was lacking,” he says.

The uncertainty surrounding COVID-19 also raised concerns about the functioning of supply chains and boosted intermodal transportation. An intermodal service offering such as Bertschi’s includes trucking operations with local drivers for loading and unloading, while the long-haul service goes by rail. “Rail was excluded from any border-related closures meaning reliability was very high,” Jan Arnet says. “Milestone tracking with real-time processing of such milestones on platforms or directly in customers’ ERPs has been a great comfort and provided a lot of information. Intermodal has truly become a major backbone of the European chemical industry supply chain during the lockdown.”

Bertschi has taken a number of specific steps since the lockdown began to strengthen digitization of its intermodal operations. “The most crucial was the full implementation of digital transportation management through our self-developed Truck

Tracer App TTA,” Jan Arnet says. “After order placement to drivers, they are confirming more than 40 events and timestamps during their journey including real-time GPS transmission through our ERP into our customers’ ERP or platforms. This has enabled full visibility of all first- and last legs of intermodal transport. For each event, there is also an ETA available, allowing the planning department to plan and manage precisely including seamless customer information through digital channels. Even the signed CMR can be uploaded after successful completion of the unloading process at the consignee.”

In parallel, Bertschi’s IT department was challenged to finalize the real-time milestone-tracking interfaces from the major suppliers down to all mid-sized suppliers. “By doing this we also have milestones along the rail- and shortsea part of the intermodal supply chain in real time in our ERP, for visibility reasons,” he says.

However, COVID-19 has exposed weaknesses in international supply chains and caused governments to worry about security of supply for key products. This has prompted politicians and companies to talk about “reshoring” and “re-localization” as a means of making supply chains more secure in future crises.

Jan Arnet says reshoring could happen for some essential products but is not likely for basic petrochemicals. “Reshoring may take place for certain elements of crucial importance to our society, be it hygiene products, sanitizers, and pharmaceuticals. Reshoring may also take place for certain high-end technological products, where the risk of having such production abroad seems too high,” he says. “For the typical chemical products we are in, I rather see a diversification of supply chains, on the one hand to become independent of a single source or a single sourcing region and exposed to disruption, but also simply to be able to get the best deal at any given time.”

Jan Arnet notes that traditional chemical supply chains featuring parcel tankers with compartments of up to 1,000 deadweight metric tons are being disrupted by tank containers, which benefit from economies of scale, flexibility, and much



JAN ARNET: ‘Intermodal has truly become a major backbone of the European chemical industry supply chain during the lockdown.’

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lower working capital tied up in product inventory in the supply chain. “Even palletized global shipping of liquid products is in question and being replaced by tank containers so product can be drummed at a later stage in the area of the consignee to maintain the highest level of packaging flexibility,” he says.

Digitization has the potential to make chemical supply chains more resilient after COVID-19 through greater visibility and planability, but additionally with resource planning, Jan Arnet says. “Having transparency in transport flows enables the provider to choose the right mode and routing and perform in terms of

timing as though the products were made nearby,” he says. “This acquired business intelligence is a base for predictive planning and in the medium term for a fully digitized supply chain with vast possibilities to automate. We are just at the start of imagining everything that will be possible in the future.”

Digitization also enables completely new working models for lead logistics providers with their producers and/or receivers, such as control tower concepts. “Even inventory management at both ends is possible by interlinking all partners in the supply chain, automating models to steer production and demand,” Jan Arnet says.

Taking a medium-term and structured approach to recruiting new staff



LUSSY MRUSEK: ‘We at Helm witness every day that a diverse workforce with different perspectives leads to better results.’

➤ **The COVID-19 pandemic is a big challenge for companies in the chemical industry and has caused many to review their human-resource requirements. Companies are adapting their personnel needs to the current tough conditions, but they also need to continue recruiting staff and planning for an eventual recovery from the crisis, ensuring that their workforce can meet future needs.**

Helm AG, a chemicals marketing, trading, and distribution company with annual sales of about €5 billion, takes a longer-term approach to recruitment, and has only made small adjustments to help it cope with the pandemic, says Lussy Mrusek, human resources manager/talent and diversity at Helm.

“Helm generally follows a medium-term hiring strategy, which enables us to react flexibly even during challenging situations,” she says. “Based on our company’s planned projects for 2020 and according to the hiring strategy, Helm already developed a structured recruiting strategy at the beginning of this year. Corresponding to the COVID-19 pandemic, this strategy was only adapted in small parts as we continue to pursue the implementation of the projects planned for this year. As recruitment of new employees and specialists is still required for these projects, we are continuing the application procedures as planned.”

COVID-19 has caused companies to change

working practices and conditions, to keep their staff safe and healthy. As a result, millions of people worldwide are now working remotely, mostly from home. This has highlighted a need for certain skills and expertise, which Helm has been prioritizing for some time, Ms Mrusek says.

“From what we have seen during this time, two aspects are crucial in this context: modern leadership skills and IT infrastructure,” she says. “Since professional and positive leadership behavior is essential to attract and retain employees, Helm has been investing in leadership development for several years now. There is a binding development program for all national and international leaders on modern leadership behavior and a bottom-up feedback process on leadership behavior. In that regard Helm has also developed leadership principles, which display our understanding of global leadership. This is how we at Helm ensure that we constantly develop the leadership skills of our employees.”

Working from home, and its various technology requirements, has accelerated digitization in many industries and markets, including chemicals. Helm, with approximately 1,600 employees across 30 countries, has been able to meet this challenge, Lussy Mrusek says. “Our global IT infrastructure is working very well,” she says. “As a result, we were able to switch all our global companies to remote

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working at short notice. Respective hardware and software worked perfectly. As a result, direct exchanges were replaced by virtual meetings.”

However, working remotely can potentially cause employees to feel isolated, which could affect their work performance. “During the time when nearly all of us worked from home, we carried out a ‘pulse check,’ a voluntary online survey of all Helm employees at our headquarters in Germany, to get a better assessment of how employees feel about the current situation,” Ms Mrusek says.

The result was that despite the physical distance, 92% of the company’s employees who answered the questionnaire said they felt well supported by their leaders, 97% stated that they had a good exchange with their colleagues and leaders, and 88% even noticed a growing cohesion within their team. “We can proudly conclude that we were remotely accessible to each other and to our customers and suppliers, as if we were in the office,” she says. “In other words, the strengthening of our leaders, that we have been doing in the past, is bearing fruit and the Helm Leadership Principles are becoming increasingly visible and implemented.”

The company is not changing the way it recruits during or after the COVID-19 pandemic, because its traditional recruitment policy, based partly on Germany’s vocational education and training system, has served it well until now.

“Helm, a non-manufacturing company, has for decades relied in a special way on recruiting university graduates as well as high school graduates,” Ms Mrusek says. “Thanks to the dual training system institutionalized in Germany, we are in a position to secure the next generation of skilled workers. In order to gain additional know-how for the company, we also recruit graduates in natural sciences and economics. Since we have without exception had good experience with this strategy in the past, we see no reason to adjust it even under the consequences of COVID 19.”

Diversity is also a pillar of Helm’s hiring strategy because of the many benefits it brings to the company. “We at Helm witness every day that a diverse workforce with different perspectives leads to better results,” she says. “Helm profits from a good exchange across national borders through the global Helm Group. By recruiting internationally and using several platforms, we make sure that we reach diverse applicants.”

Helm also focuses strongly on internal career development. “The more role models, such as female leaders, and success stories—for example when young talents can develop themselves



quickly—we generate, the more diverse talents see their own career opportunities at Helm,” Lussy Mrusek says. “As our own employees are the best advocates we could wish for, we see that our talented staff talk about their development opportunities at Helm within their personal networks, which then leads to respective and diverse job applications.”

Issues of ethnic diversity have been in the news for the last few months following the emergence of the Black Lives Matter campaign in the US and worldwide. This has caused many companies to look at their own approach to diversity on various levels.

‘Promote Diversity’ is one of Helm’s Leadership Principles. “All leaders know that and are asked to live the Leadership Principles every day,” Ms Mrusek says.

One defining sentence of the Principle says, ‘I build my organization on a diverse mix of backgrounds: countries / cultures / ethics / gender / education / talents / characters / age / experience.’ “In other words: we reject discrimination of any kind,” she says. “Additionally, we were already before the Black Lives Matter campaign dealing with the topic of unconscious bias. This initiative was driven by our internal diversity management and is available for all employees worldwide. We are convinced that only by becoming aware of one’s (un)conscious biases and by actively working on them, can they be eliminated.”

Helm has been investing in leadership development for several years.

Demographics, climate, environment will shape the petrochemical industry's future



ADAM CZYZEWSKI: 'Integration of production is most crucial to surviving the crisis.'

➤ **The COVID-19 pandemic has been a major challenge for Europe's petrochemical producers and the immediate future remains uncertain. However, the fundamentals of the industry, and its major trends, are unchanged, particularly those related to sustainability and the environment, says Dr. Adam Czyzewski, chief economist at PKN Orlen (Plock, Poland).**

"The future of the petrochemical industry is shaped by global megatrends, the main ones being demographics and climate and environmental protection," he says. "The COVID-19 pandemic does not change these trends, so it does not change the future of the petrochemical industry. Humanity needs materials that must be produced sustainably. Climatic and environmental footprint studies show that materials produced by the petrochemical industry have advantages over other materials, but on one condition, which applies to all materials: When they are used up, they will not be thrown away, but will be returned to production as secondary raw materials."

The crisis has caused big declines in demand for petrochemicals and their derivatives. But the impact has not been the same across end-use industries, Dr. Czyzewski says.

"Petrochemicals are ubiquitous, and there is no industry that does not consume them in production," he says. "Therefore, the volume of petrochemical production in the short term is strongly correlated with GDP. The decline in demand related to the COVID-19 pandemic has not been spread evenly across the economy. Transport suffered the most, which moved to the automotive and aviation industries."

This soon became visible in decreasing consumption of petrochemicals, "which was felt very much by companies with a narrow production profile," although a market rebound will follow, Adam Czyzewski says. "The deep drops in demand caused by COVID-19 are not permanent, as most of it is postponed demand rather than lost demand. Companies and consumers have not given up on car purchases or air travel forever. They will start buying and flying and the time of accumulated, postponed demand will bring a new upcycle for petrochemical companies."

But, in the meantime, the current challenging conditions could trigger some restructuring in Europe's petrochemical industry through mergers and acquisitions.

"Before demand recovers, some petrochemical companies will experience financial difficulties and will dispose of some assets. Others, in a better situation, will be willing to buy these assets, particularly since deferred demand is followed by deferred investments, so there will also be temporary supply shortages and the attractiveness of producing assets will increase," Adam Czyzewski says. "Hence we can see two responses to the COVID-related changes in demand. Some will seek diversification of products and, in turn, of risk. Others will focus only on their core businesses, strengthening their financial position through divestments. But regardless of the choice, it is integration of production that is most crucial to surviving the crisis."

Petrochemicals is a cyclical business, even though the industry grows faster on average than the overall economy. Companies can reduce their vulnerability to cyclical swings by tailoring their product portfolios to meet changing market requirements, Dr. Czyzewski says. "In the long run, the consumption of petrochemical products grows faster than GDP, because these products, thanks to their properties, displace other materials," he says. "Economic cyclicalities cannot be avoided, and petrochemical installations have a long lifecycle, counted in decades. They cannot be adapted to the business cycle. However, it is possible and necessary to adapt the offer of final products to the needs of recipients."

Companies can make improvements along the entire petrochemical value chain, by moving closer to the end user, increasing flexibility, and widening the range of applications of their products including making them suitable for recycling, Adam Czyzewski says. "The petrochemical industry will slowly start to function in the 'Product as a Service' and 'Material as a Service' models. This is essential to control petrochemicals throughout the value chain and is a prerequisite for a circular economy," he says.

Global megatrends, rather than the COVID-19 crisis, will determine how petrochemical companies shape their portfolios, but the potential for diversification is not unlimited, Dr. Czyzewski says. "Since the world needs materials and hydrocarbons are perfect for their production, the petrochemical industry will grow and enter sectors such as construction with new materials," he says. "Going further up the value chain is necessary and

Beyond the new normal



PKN Orlen is increasing production of net-imported products to Central and Eastern Europe under its petrochemical development program.

beneficial. However, it is impossible to shift the industry as a whole to products with the highest added value. Someone will have to produce basic petrochemicals. Here, too, there is room for profound technological changes. The direction is versatility and adaptation to recycling.”

Environmental concerns do not represent an existential threat to the petrochemical industry because of the essential nature of its products. And it can play a key role in the transition to sustainability and a circular economy through the increasingly innovative and sophisticated products it manufactures, says Adam Czyzewski.

“The problem is the increase in the number of people who must be provided with the necessary means to live. This is related to an increase in demand for all kinds of materials that need to be produced from something. Crude oil that is displaced from transport is perfect for this. There is plenty of it,” he says. “In addition, the materials produced from it are characterized by a huge range of applications, both existing and new. And they leave behind less of a climate footprint than other materials. You just need to focus on innovation in the field of the circular economy. This is a challenge for the petrochemical industry, but also for other industries that produce materials.”

One outcome of the pandemic for Europe’s petrochemical industry is likely to be more localized production, says Dr. Czyzewski. The lockdown highlighted weaknesses in some petrochemical supply chains and drew attention to the region’s dependence on imports for some major products.

“I think that the ‘just in time’ production organization model will be supplemented with a ‘just in case’ model, which will increase the attractiveness of having

production nearby. That’s a great opportunity for the petrochemical industry in Europe,” he says. “PKN Orlen is addressing this by increasing production of net-imported products to the region, which is the core principle of our Petrochemical Development Program. Our intention is to give our customers the comfort of having a reliable, local, and regional supplier of petrochemical raw materials. Our investment will be the backbone of the development of the chemical industry in Poland and Central and Eastern Europe.”

The industry also now understands better the importance of close and reliable supplier-customer relationships, as well as maintaining financial strength and strong logistics to support supply chains, Adam Czyzewski says. “We have learned that sometimes the quality of the provider is just as important as the price of the products,” he says. “Reliability and strong financial standing in times of pandemic proved to be crucial to continuous operation of many businesses. The pandemic showed us that the role of distribution and storage infrastructure is much more important than expected and we should invest in strategic logistics assets.”

Plastics will also continue to have a central role in Europe because of their range of uses and adaptability, Dr. Czyzewski says. “I think Europe should not be doctrinal about plastic, treating it as an absolute evil,” he says. “Our civilization is built of plastic, because it is the best material we know. Its flexibility of applications drove the development of petrochemicals.”

Plastics’ durability in combination with the linear production model—manufacture, sell, use, discard—“led to a plastic disaster,” Adam Czyzewski says. “The solution to the problem is not to give up plastic, but to produce it in a closed cycle, a circular economy,” he says.