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I·C·I·S Chemical Business

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Feedstocks at risk from electric vehicles

Naphtha supplies will be threatened as refineries close following the growth in electric vehicles. Chemical companies need to plan now for the inevitable end of the petrochemicals age

Paul Hodges New Normal Consulting

"How did you go bankrupt?" Bill asked.

"Two ways," Mike said. "Gradually, then suddenly."

These lines from Ernest Hemingway's classic novel 'Fiesta' (US title: 'The Sun also Rises'), summarise the potential challenge for the petchems industry as we move into a net-zero world.

As Hemingway reminds us, this challenge has been building for some time, as discussed here a year ago:

"Understandably, many people and companies hate the idea of having to leave the comfort zone of 'business as usual', where tomorrow is likely to be much the same as yesterday."

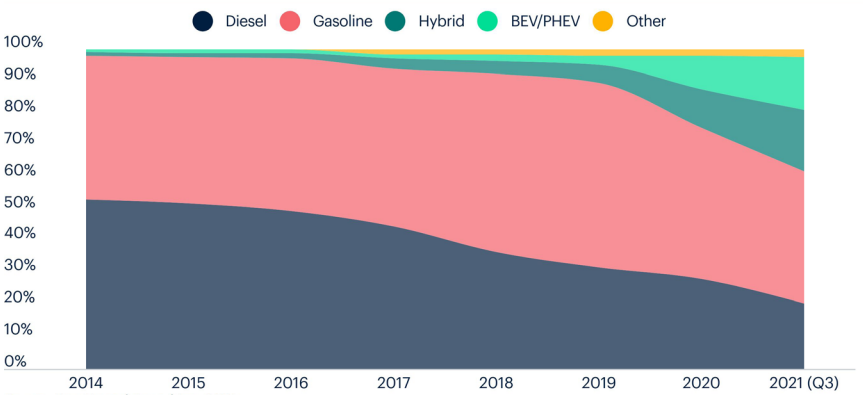
And since then, the net-zero agenda has become increasingly important. It will accelerate the split between potential winners and losers, as the transformation gathers momentum.

The issue is that transformations take place along an S-curve, not in a linear fashion. They start slowly, by creating a virtuous circle to support the new innovation, while the disadvantages of current offerings steadily become more obvious. And then they accelerate exponentially.

Auto industry developments highlight this issue. As the European industry association, ACEA, reports for the period 2014 – Q3 2021:

- Plug-in/battery electric vehicles (EVs) were just 1% of the market in 2014, and 3% in 2019, as the chart shows. But by Q3 2021, they had reached 19% as they entered their exponential growth phase
- They have already overtaken diesel volume, which used to be more than 50% of sales as recently as 2016. And EVs are now impacting gasoline sales, which have fallen by a third since 2019, as the chart shows

EU & UK new car market share by fuel type



Source: New Normal Consulting, ACEA

These trends are not just confined to Europe. China is currently 51% of the EV market, and the USA is moving rapidly to catch up after a slow start. Consumers clearly like to drive EVs, and find them easier to maintain. Insurance costs are usually cheaper, and the ongoing decline in battery costs means EVs will soon be cheaper than either diesel or gasoline cars. And resale values for diesel and gasoline cars will also soon start to weaken as governments prepare to ban internal combustion engine (ICE) vehicle sales.

In turn, this transformation is starting to impact oil and refining markets. Oil companies including Shell, BP and Repsol are accelerating their push into renewables and recycling, whilst TOTAL has changed its name to TotalEnergies to highlight the paradigm shift. Investors, too, are voting with their wallets as they realise refineries are likely to become stranded assets.

These developments will soon begin to impact petchems as refinery closures start to reduce available supplies of naphtha, the core feedstock. And at the other end of the value chain, brand owners are accelerating their moves to meet consumer demands for recycled plastic:

- Global companies including Coca-Cola, PepsiCo and Unilever aim to use 25% recycled plastic by 2025; Nestle and Mars are aiming for 30%, whilst L'Oréal is targeting 50%
- In Europe, 300 players along the value chain, including the European Commission, aim to boost the market for recycled plastics to 10m tonnes by 2025

Essentially, therefore, the petrochemicals industry as we have known and loved it, may well start to move into an endgame as it is squeezed from both ends of the value chain.

This squeeze highlights why the concept of transformation is critical. The challenge today is to repeat the bold moves made by the industry's visionary founders in the 1950s and 1960s, when they transformed it from being coal-based to use oil and gas. That visionary move set the scene for decades of growth in revenue and profits. In 2022, we have to focus on repeating this success by moving rapidly to use recycled feedstock.

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Of course, the timing for this transformation is not ideal. We are already coping with the coronavirus pandemic and new Omicron variant, as well as the ensuing supply chain chaos. And we are not helped by the return of geopolitics in the shape of rising oil and gas prices. As a result, we cannot rule out the risk of recession in 2022, as inflation forces consumers to cut back on the discretionary spending that drives the economy.

But 2025 is not very far away. The pressure to move forward with net-zero targets is increasing, alongside downstream demands to reduce plastic waste. And there are plenty of potential disrupters longing for us to fail. We therefore need to grasp our once-in-a-lifetime opportunity to develop a truly circular economy. Waste plastic needs to be transformed into a valuable resource, and recycled back into the plastic products needed by the local community.

The need now, as I noted here ahead of COP26 ('A look back from 2030', 8-14 October 2021) is for companies "to introduce Challenge Workshops for their key staff, to develop the new business models and strategies that will be required for success". Having worked through these areas, strategy teams will need to focus on the implementation issues that will arise:

- Inevitably, the transformation means that some of today's crackers will become stranded assets over time as refineries start to close. They will also be squeezed by lower operating rates, given that more than half of all polyethylene, and a third of polypropylene, is currently used in plastics packaging. The box below highlights five potential criteria to help judge their survival prospects. It also suggests that some crackers could survive by proactively replacing lost naphtha supplies with pyrolysis and other feeds from chemically recycled plastic
- At the same time, the teams will need to develop the pathways which will enable today's waste plastic to be turned into a valuable resource, based on the concept of renewable carbon. The EU's Holy Grail project will be a critical element in designing the new business model, as its digital watermarks will allow high-speed sorting of post-consumer waste into the relevant streams for recycling. The chart suggests a possible model for this development, based on the need to establish a circular economy focused on building collaboration across the whole value chain.

Possible model for the EU's Holy Grail project

Source: New Normal Consulting

It suggests that a city-based hub-and-spoke model for recycling is likely to prove most effective. One practical reason is that consumers are unlikely to take kindly to the idea of millions of tonnes of waste plastic being transported across countries for hundreds of kilometres. And the CO2 emissions generated by all this trucking would make net-zero targets even harder to reach. Instead, the new model will enable companies to focus on introducing a range of new technologies, including 3D printing, with the aim of turning post-consumer waste back into plastic products for sale into the local community.

2022 is therefore likely to prove an exciting, if challenging, time for those prepared to embrace change and new opportunities. As the CEO of Stellantis, the world's fourth largest auto company has highlighted, "This transformation period is a wonderful opportunity to reset the clock and start a new race." ■

Five criteria for steam cracker survival

- **Scope 3 emissions.** These are usually the largest volume of CO2 emissions as they include all the indirect emissions that occur along the value chain. Crackers responsible for the highest emissions will be at risk, unless management can find a way of making major reductions in collaboration with upstream and downstream partners.
- **Derivative viability.** Not every product is going to be hit at the same time, or to the same extent. Those most at risk will be those linked to areas such as plastics packaging, where demand will disappear most quickly. Brand owners are already highly focused on this issue, and are unlikely to suddenly abandon it.
- **Feedstock availability.** Refiners' priorities for survival are unlikely to include supply into crackers, as the volume is too small to matter. Those most at risk will be linked to countries/regions where moves to EVs are fastest. Some companies have already reconfigured their sites to become biorefineries, but the scope for this is not universal.
- **Cracker size.** Over the next few years, size will be a strategic issue. World-scale and smaller plants will be most at risk, as they will lack the flexibility required to navigate the likely very uncertain future ahead. Many European sites, however, consist of 2 adjoining crackers and so will be easier to rationalise.
- **Location.** Integration has been a critical success factor in the past, but this is likely to be less important in the future. Those most at risk will be plants where the local and national authorities see no overwhelming need for their survival, when set against their environmental impact.

Paul Hodges is chairman of New Normal Consulting, who offer Challenge Workshops on Net Zero strategies. He also publishes *The pH Report* and writes the ICIS Chemicals & the Economy blog.