

How carbon capture can seal the Humber's emergence as the industrial equivalent of Silicon Valley

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The Humber could be the industrial equivalent of Silicon Valley according to a leading figure behind one of the region's huge carbon capture and storage plans. Harbour Energy European president and chief executive Phil Kirk said delivering what amounts to a final piece in a decarbonisation jigsaw – involving hydrogen, offshore wind and traditional industry – could ensure prosperity for decades to come. David Laister reports.

Somewhat over-simplifying what looks likely to be a £500 million contribution to a multi-billion pound 'new industry' building on excellence in complex chemical and process engineering, Harbour Energy is "just joining the dots".

As the lead on V Net Zero, providing the transportation and storage solution behind the South Humber Bank's grand plan to clean up the refining and allied power cluster, Phil Kirk said it makes perfect sense to reverse a decades-old supply line, injecting substantial new infrastructure along the way as what once helped power major industry allows it to flourish under the Net Zero narrative.

It unites a growing number of industrial emitters, while opening up the potential for Port of Immingham to become a carbon shipping and trading hub, bringing back into play depleted gas caverns in the near North Sea to store the nasties that belch out into the atmosphere.

“The Humber region is one of the biggest areas of heavy industry in the UK, and as a consequence it is a big emitter of CO₂,” Mr Kirk said, stating that a layman – or even your gran – could see the logic in marrying up such gas infrastructure, maritime connections and heavy industry all within walking distance.

“The idea of being able to decarbonise the heavy industry, protect those jobs, and then build out on so many exciting ideas in the area, where you can use hydrogen to decarbonise smaller industries who can’t do it on their own, you can see how you begin to make in-roads.

Read more: [Humber is ‘ahead of the curve’ when it comes to delivering on UK’s Hydrogen Strategy](#)

“It is the ability for industry to plan, for entrepreneurs to start up new business that can spark off what is happening – what the government calls a super place – and it is, almost an industrial equivalent of Silicon Valley.

“Maybe we will get battery factories, people will realise Phillips 66 produces petroleum graphite and it is one of the best in Europe, if not the world, to do that, and then why don’t we have a battery plant here? Why don’t we build cars here? Suddenly you have more jobs for decades in the right region.

“You future-proof a region, attract other investment, people working in graphite, pushing the boundaries of battery technology, coming here because they have got green power, hydrogen, all the petrochemicals and all the workforce. Industries are allowed to build, you can take a 20 year view as you know

you have renewable power coming in; you are going to use wind to make hydrogen, you are going to use methane to make hydrogen so you have resilience and optionality around that, and you have electricity and a CO2 store – what a fantastic advantage.”

It is the case for the Humber to lead in the government’s sequencing plan as it rolls out carbon capture and storage funding streams, and gets its head around the business model and regulatory framework required to make it happen.

This is where the region sits strongly again, due to the proximity of all the parts – with the port opportunity an extra asset.

“A year ago, no-one joined the dots up, people internally may refer to carbon capture projects as a hobby, and while P66 and Vitol (founder members of the Humber Zero plan) have been focused for a while, over the last six to nine months we have seen government and a lot of major emitters suddenly realise this is not just energy transition and doing the right thing, but this is about whether they are going to have a UK/European-based business creating jobs and making money, or if that is going to go somewhere else. You then see the virtuous circle.



The Phillips 66 Humber Refinery and above, closer to the River Humber, combined heat and power plant VPI Immingham, the initial focus of Humber Zero.

(Image: David Lee Photography Ltd)

“People talk about carbon capture being bad as it is just prolonging hydrocarbons, but what we are doing is keeping the jobs, keeping interesting people able to build businesses off the back of that.

“We will see what happens in the cluster sequence, initially I was very sceptical, what it has done is really shake the emitters up. This is it, this is the direction of travel, and it is not just about protecting the planet, it is about the country, security of supply; security of jobs; balance of payments and not outsourcing bad stuff to other countries and saying ‘that’s not our problem’.

“I make no excuse if we in this country can still be producing oil and gas in 20 and 30 years time. It is net zero that gives us a competitive advantage with global trade – why wouldn’t you do it? Export some of that technology, some of that process engineering that we’re really good at, to other parts of the world too, train British people to construct the plants, and they are set up with good careers for 20 to 30 years, which is what it should be about.”

Formulating the business model is the challenge, due to the varying costs for emitters to capture the carbon – with waste streams and distance from networks all contributing factors.

“V Net Zero as a starter will be 10 to 11 million tonnes by 2030,” Mr Kirk said of the storage potential. “That’s the government’s initial target. The Climate Change Committee has said that’s not good enough, we need 25 to 26 million tonnes by 2030. We will see how ambitious the government is. I’m sure they are running their slide rule over things, and the costings. Government has to reconcile all of that and make sure it doesn’t waste money – that’s why we in Immingham and V-Net Zero are at such an advantage. You can draw it on a map, it is all walking distance, and the market for the hydrogen is already there with the emitters. A lot of the difficult infrastructure, the offshore pipeline, is already in place. It is a very exciting thing for everybody.”

And then [sails in a huge import opportunity](#), be it domestic or continental.



Port of Immingham's existing terminals for liquids, biomass and fuel. CO2 could be next with infrastructure required to discharge from vessels and pressurise for transportation into the V Net Zero system.

(Image: Jon Corken)

"The port gives us the ability to look at places like Wales, the Thames Estuary and power stations on the South Coast, where they could capture relatively pure stream CO2 emissions, and put them on a small ship. It is not that high pressure, not that low temperature, it is not like LNG – and that shipping market is going to develop, particularly around Europe. Initially it may develop in the UK, but then we can set up Immingham, so emitters elsewhere, perhaps on the Rhine, perhaps in Benelux – have got an option."

The scale of the pipeline network gives Mr Kirk, who hails from Chesterfield and is passionate about the industrial cluster heading east from South Yorkshire and northern

Derbyshire, confidence that two or three ships could be handled alongside the 'plugged-in' industry.

"The UK has the momentum, Norway was ahead but we have the momentum," he said, echoing words of a colleague across the North Sea. "To say as a country the 10 Point Plan said 10 million tonnes by 2030, the cluster plans that are on the table with the emitters that link up to them are probably 30 to 40 million tonnes, something of that order.

"If the government has the ambition to steal a march on everybody else and try and secure the engineering, the jobs and some of the technology, that would be great.

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“This is billions of pounds of investment for P66, for Vitol, for EPUKI, for Prax, and that would be billions of pounds and tens of thousands of construction jobs, and then jobs afterwards to look after the plant, and security of knowing that a world-class refinery that P66 is, is going to continue, but actually using hydrogen for heating and power, capturing the CO2, future-proofing all of that industry and those jobs.”

Harbour anticipates a transportation and storage fee in the model that emerges, part or wholly regulated to protect if market competition does not materialise, with an agreed fixed price, factoring in infrastructure cost and risk.

“Everyone is taking a bit of a leap of faith,” Mr Kirk said. “Government, emitters, transportation and storage has all got to be in the same place at the same time, we shake hands and then we all go. If one bit it is missing, none of it works, and everyone wastes a load of money.

“We are cracking on, we will spend £10 million at least this year just on V Net Zero. We are hoping to start negotiating with the government, then have enough certainty that everyone is in the right place to sanction late 2023 and to be operational by 2027, maybe 2026.

“The momentum is with us, and in a way I’m very glad COP26 was delayed, as it has actually let government think about the full piece, the jobs, security of supply and future prosperity – which it should also be about hand-in-hand with doing the right thing.”



The former Theddlethorpe Gas Terminal.
(Image: Upstream Online)

Anchored to the Humber by legacy investment

Harbour's involvement comes from owning the southern North Sea assets once operated by ConocoPhillips.

The upstream and exploratory arm of the Humber Refinery's US owner sold them off in 2019.

As Chrysaor, Harbour swooped, with a name change following a recent merger with Premier Oil Plc.

Despite early seeds of CCS being sown well over a decade ago, it wasn't initially front of mind as decommissioning works began.

"It wasn't high up on the list of interests, but we have a long heritage on the back of the ConocoPhillips acquisition around Lincolnshire, with LOGGS (Lincolnshire Offshore Gas Gathering Systems) running to Theddlethorpe and obviously with the refinery, P66, where people in my team know people who are

still there.

“There are lots of connections, and really early on – prompted by an engineer – we started looking at the pipelines that used to transport gas and liquids.

“We have 2,000 km of pipelines offshore, three different systems, all the depleted gas fields that we bought, all with 30 or 40 years of history, and the prompt was ‘why don’t we talk to the emitters?’ We’ve got onshore pipelines, lots of gas storage, and all the original studies on CO2 that show these are the best stores in the UK with the lowest risk, why don’t you just join it up?

“You look at a map and a layman, your gran, could see that it makes sense. We started having conversations, and P66 and Vitol had been working on their own carbon capture plans for a little while, and we just began to start joining the dots.”

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It is the established route rather than the pipelines that has become key as further work has been done.

“There is a lot of talk about reusing infrastructure, but whenever you are dealing with process engineering and keeping things at pressure, you don't necessarily want to reuse old stuff unless you are certain it is going to be super safe. We are going to lay new lines from Immingham down to Theddlethorpe, we have rights of way, we are just starting public consultation and it will generally use the routes we have already.

“We will reuse the terminal site and we will reuse the offshore gas pipeline that operated at a super high pressure only a few years ago, we have all the inspection data, we will have another inspection, but we have over an inch thick of steel for over 150km, which if you relaid it would probably be the best part of £500- or £700-million.

“You then have to dig the dunes up, worry about what nasty stuff may be done as you lay a new line or go through a wind farm – it is already there.

“It all made an enormous amount of sense which is why we have super credible partners like P66 and Vitol, having joined with us, then EPUKI, the power station and Prax, the other refinery, joining more recently.”

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