THE 10 POINT POD

A white paper with insight on the UK's 10 Point Plan for a Green Industrial Revolution from:

EY
Building a better working world

ENERGY VOICE
OUT LOUD

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INTRODUCTIONS

BY ROB DOEPEL, PARTNER AND EY ENERGY LEADER (UK&I)

The 10-point plan has become a defining moment in accelerating the UK's path to Net Zero. It is a great example of a clear, simple, policy framework that has provided the private sector with a clear signal of government intent.

The impact has been a very positive one for the UK, allowing more capital to flow towards the energy transition and for business to activate long term plans, safer in the knowledge that the 'tramlines' for Westminster backed investment have been laid.

And as a result, if you are not on the 10-point plan, there's an implication. You're not in the government's initial priority list for their Green Industrial Revolution. Of course, the 10-point plan lacked detail, and whilst that was not it's intent, it would have started to look very frail if we didn't have the follow up policies to support the high level commitments.

But over the last year, we've seen the UK Hydrogen Strategy, the Heat and Buildings Strategy, the Industrial Decarbonisation Strategy and the Net Zero Strategy (to name just a few) and we need this regular drumbeat of policy publication to continue. The speed of the Energy Transition has accelerated over the past 18 months, fuelled by societal changes in the wake of the COVID-19 pandemic and the hosting of COP26 in Glasgow, and we will continue to see further pressure to deliver on the 10-point plan. Already I hear less reference to 2050 and more towards 2035 as we challenge ourselves further on what can achieve in ever shortening timescales.

The 10-point plan could also act as a blueprint for other countries looking to rapidly accelerate their transition, particularly in the wake of COP26. It's designed to deliver a green industrial revolution, and whilst much of the document focuses on energy, it's a helpful reference for all sectors and there's no reason why similar, directional policy papers couldn't deliver the same benefits for other industries.

If you look back over the last decade, I think this clear, simple policy direction is something that the private sector has been missing. The fact the UK Government's 10-point plan is simple and can be digested easily just aids its efficacy.

BY RYAN STEVENSON, HEAD OF ENERGY VOICE

The UK Government's 10-point plan serves as a good blueprint (or greenprint, perhaps?) for the fundamental transition required to reimagine our economy.

There has been criticism of the UK Government in the past about its tendency to pick winners in terms of technologies, and perhaps even within technology classes as has been the case in the CCUS sector.

And while the 10-point plan repeats this to a certain extent by pinpointing 10 key focus areas, the UK Government gives equal footing to each, which is critical for the plan to succeed in delivering the envisaged green revolution.

In this case, rather than backing a single horse to win the race, the UK Government wants all 10 to be winners. This is positive, with change on such a scale only possible if the dial moves materially and simultaneously in as many sectors of the economy as possible.

Indeed, you could argue the plan should go further and that each of the points within it have their own 10-point plan. Granularity that adds to a depth of knowledge will be key to de-risking many of the areas covered and ensuring the huge amounts of investment required pour in.

We have already seen signs of this with the UK hydrogen strategy released in August and await further policy direction onthe other areas covered in the plan.

Continuity is also key, with the financial markets hoping future administrations adhere to the plan and provide some security to their investment by removing political risk.

It has been a privilege for us at Energy Voice to engage with EY in the production of this highly engaging boxset series. Their contributors have gone some way to providing the requisite depth of detail on each point necessary to decode the plan and make sense of the risks and opportunities it presents.

Thanks to everyone from EY and our external experts for their contributions. I very much hope you enjoy this white paper and the insight it offers on the Green Industrial Revolution.

POINT 1 ADVANCING OFFSHORE WIND

CFD, FLOATING OFFSHORE WIND AND SUPPLY CHAIN CONCERNS ALL IN THE SPOTLIGHT AS ENERGY VOICE AND EY'S 10 POINT POD GOT UNDERWAY

The UK Government's commitment to developing offshore wind has been unequivocal.

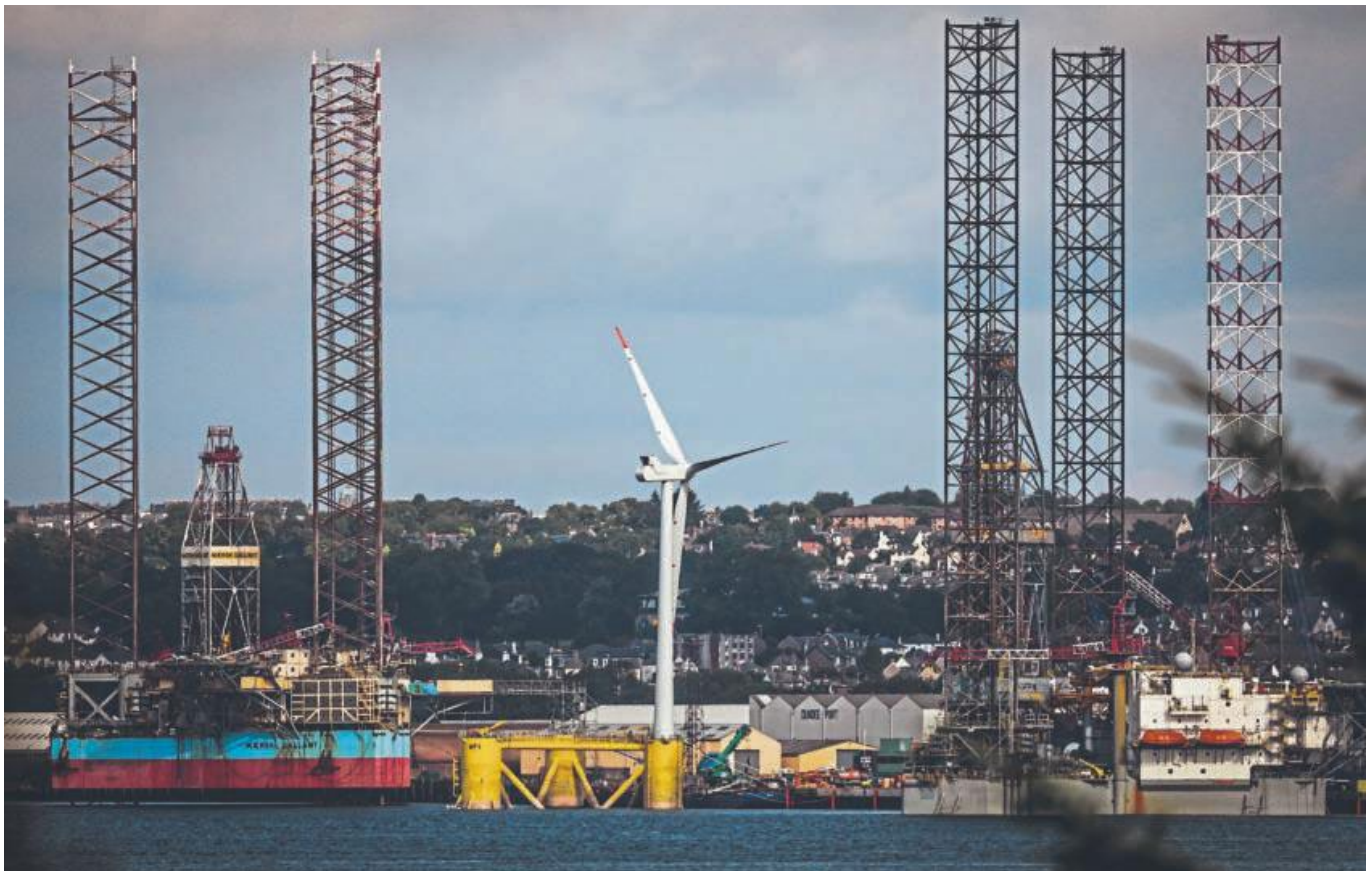
By the end of the decade, it plans to have quadrupled installed offshore wind capacity to 40 GW, creating tens of thousands of new green jobs and generating economic growth.

Such is the scale of the opportunities that even the prime minister gave his former self a slap on the wrist last year for previously sneering at the energy source's potential.

In this piece, the first of 10 chapters analysing Westminster's 10-point plan for a Green Industrial Revolution, we provide a roundup of a wider discussion between Energy Voice's Ed Reed, EY's Andrew Perkins and Orsted's Benj Sykes on offshore wind energy, its role in the future energy mix and energy companies wider pivot to renewable energy alternatives.

"We've got a lot of work to do to hit the 40 GW target."

When launching its landmark policy paper in November 2020, Westminster was quick to point out that the UK already generated "more electricity from offshore wind than any other country", with around 10.5 GW of installed capacity.



Kincardine floating wind farm at Dundee Docks in 2018.

The expansion in the clean energy industry in recent years is the result of several factors, including government policy, changing environmental sentiment and simple geography.

As Perkins points out, the UK is "incredibly well placed" to deliver offshore wind simply by the virtue of being an island.

He added: "On top of that we've got great policy – policy enablement has been very impressive in offshore wind over the last 10 years."

The UK Government's flagship offshore wind policy has been the Contracts for Difference (CfD) scheme, its "main mechanism" for supporting low carbon, energy neutral projects.

The initiative gives developers with high upfront costs protection from fluctuating energy prices, attracting investors and allowing companies to make financial decisions on wind farms with a high degree of certainty.

Sykes said: "The policy stability that we've had for at least a decade is really driving the level of investment that we've seen. But, we've got a lot of work to do if we're going to hit that 40 GW target."

On the future of the CfD scheme, which hasn't been without criticism, Perkins said he expected it to remain, as long as offshore wind energy prices stay stable.

Sykes added: "I think the financing is going to be there as long as we are able to show investors that there is certainty of revenue.

"The great thing is, with the cost reduction that the sector has achieved, we can see prices which are coming through the CfD that are below the government's own forward price curve.

"They're negative support mechanisms but they provide the certainty that's so important to keep the cost of capital down."

"I wouldn't be surprised to see several projects coming through in the next few years"

Included in the Government's target of 40 GW of offshore wind by 2030 is 1 GW of "innovative" floating offshore wind.

Currently in its relative infancy, the technology allows developers to deploy wind farms in deeper waters, where the wind is typically stronger and more reliable.

The first floating development in UK waters, Equinor's Hywind Scotland off the coast of Peterhead, became operational in 2017.

Perkins said: "Floating offshore wind has been discussed for a few years and it is right there and ready now.

"We've got the Kincardine project being built up just now off the coast of Scotland which is great.

"We've also got clients with gigawatts of floating wind in the pipeline to build out – I wouldn't be surprised to see

several projects coming through in the next few years." One of the major barriers to floating offshore wind power at the moment is its high costs, especially in relation to bottom-fixed.

Sykes said: "Floating wind is where bottom-fixed was 10 or so years ago. It's going to be an important technology, particularly in Scotland – we're very excited about the Scottish offshore wind market.

"Technology is not only getting the cost of floating wind down, it's also enabling us to push current bottom-fixed technology into deeper waters and more challenging conditions.

"If we look at the emerging technologies that are being used for floating there's still a bit of Darwinism needed to decide which are the winners and which will fall by the wayside.

"In the medium term it's going to be a very exciting technology."

"We are already at just under 50% UK content over the life cycle of our projects"

Despite the pledges from industry and government to expand the UK's offshore wind capacity, there are still widespread concerns that it may fail to translate into new jobs and economic growth.

So far, the domestic supply chain has failed to gain a proper foothold in the offshore wind industry, with the majority of work for the construction of turbines being farmed out overseas.

Trade unions have been loudly making the case for a "just transition", which would allow oil and gas workers to move into the expanding renewable energy sphere.

However, with an estimated 12,000 North Sea jobs lost last year due to the pandemic and downturn, that is yet to materialise.

Perkins said: "We do produce blades, we have lots of engineers on the projects but we're not necessarily producing that much of the equipment that goes out." Responding to a question on whether the UK could do more, Sykes said: "We published a report in 2017 where we demonstrated that we are already at just under 50% UK content over the life cycle of our projects.

"If you think this is an industry that's only existed for something like 10 or 15 years at any scale, that's pretty remarkable, especially when you compare it to other longer term industries like automotive.

"We need to be careful not to suggest that offshore wind has not been building a supply chain. We have blades and we have many other really important components and services coming out of the UK. But there is more we need to do."

KEY MESSAGES

The key messages are that although there's plenty of good work going on in the UK's offshore wind sector, there's lots more that needs to be done.

The targets around ramping up renewables capacity are bold and although there are the skills and technologies there to meet them, mobilising them and doing so quickly is key.

Offshore wind projects such as Seagreen, Moray East and Dogger Bank, which are on course to be delivered in the coming years, will go some way towards closing the gap but the challenge for government now, as Reed highlighted, is trying to find the "right policy balance and financial stability" to help to "nurture" the industry in the decades ahead.

The foundations are there, it's building upon them that now matters.

EY INSIGHT FROM ANDREW PERKINS
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We welcome the substance of Point 1 of the UK Government's strategy and believe it is exactly what was needed to enable the expansion of the domestic supply chain and increased percentage contribution from competitive UK suppliers.

Also it continues to position the UK as a significant player in the offshore wind sector which attracts investors from around the globe. Their capital will be invested at very competitive rates whilst the long term CFD provides a stable underpin for the anticipated revenues.

When this point is considered alongside the other nine strategic goals in the 10-point plan it is a clear statement of intent from the UK Government that the country will reduce its carbon emission and continue to be a leader in this field.

IT'S GREEN VS BLUE AS THE 10 POINT POD PUTS LOW CARBON HYDROGEN PRODUCTION UNDER THE MICROSCOPE

Comprising around three quarters of the universe's total mass, hydrogen is perhaps the most vital element on the periodic table.

In terms of the energy transition, it will undoubtedly play a key role in decarbonising fuel sources, providing a green solution to heating homes, driving transport and powering industry.

Westminster is targeting 5 gigawatts (GW) of low carbon hydrogen production capacity by 2030, supporting up to as many as 8,000 jobs.

To facilitate these aims it has earmarked £500mn to help support the green energy focused sector.

£500 MILLION earmarked to help support the green energy focused sector.

Following on from the inaugural piece in this series analysing the UK Government's 10-point plan focusing on offshore wind energy, Energy Voice's Ed Reed, EY's Tim Calver and ITM Power's Graham Cooley put the hydrogen industry under the microscope and ask the question, is enough being done to support it?

“Not all hydrogen is created equally”

Like many aspects of the energy transition, the debate around the future role of the superfuel is far from unanimous.

As Reed points out, “not all hydrogen is created equally” and the technology is separated into two primary camps; blue hydrogen and green hydrogen.

The former involves “reforming natural gas” to make the fuel, with emissions created during production abated using carbon capture and storage.

On the flipside of that, green hydrogen is produced through the electrolysis of water, with the energy supplied coming from renewable sources.
Cooley said: “The world uses energy in two forms; electrons and molecules. The only net zero molecule is hydrogen.

“What you have with green hydrogen is a direct, clean replacement for fossil fuels.”

Calver highlighted that, currently, Westminster wants both green and blue fuel to be part of the renewable energy mix.

The UK has “some quite favourable structural advantages” for producing both types thanks to its oil and gas and offshore wind industries, as well as its geography.

Calver added: “In the long term, blue and green hydrogen will indeed compete for the same markets and eventually they can compete on cost and potentially quality too.”

One of ITM’s electrolysers.

On the ability of hydrogen to help the UK hit its net zero goals, Cooley, who joined electrolyser producer ITM power as chief executive in 2009, is clear that one type will have to be prioritised over the other.

"Green hydrogen is net zero, blue hydrogen is not", he said.

He added: "You can't get complete capture, you continue to use natural gas infrastructure, which inevitably leaks, and you then have the problem of what you do with the CO2. Are you going to store it off the coast of the UK, in which case somebody will have to take liability of that for years to come."

"Green hydrogen can be a direct replacement for grey hydrogen"

One of the main challenges for the hydrogen sector now is establishing large-scale demand for the fuel. As Calver points out, established electricity markets meant that when offshore wind was first deployed, "there was no question about the demand for it".

Looking at initial entry markets for the fuel, Cooley identified industries that rely on grey hydrogen, which is made using fossil fuels, as the obvious choice.

Europe currently uses 400 terawatt hours of grey hydrogen a year, a significant proportion of which is used to produce ammonia, which is then used as a fertiliser in agriculture.

Cooley said: "Green hydrogen can be a direct replacement for grey hydrogen and can be implemented very rapidly. For instance, you can deploy an electrolyser and put the green hydrogen directly into the refinery as a substitute."

"There's a lot of appetite for investment in hydrogen"

As with most things in life, a large amount of the debate around decarbonisation comes back to money.

If large swathes of the heating network are going to be powered by hydrogen, be it green or blue, in the coming decades, then who is going to foot the cost of kitting homes out with new boilers?

As part of its policy paper, the UK Government said the growth of low carbon hydrogen production could deliver £4bn worth of private investment by the end of the decade.

Calver is optimistic that the private sector will step up to the plate and help foot a large proportion of the decarbonisation bill.

He said: "There's a lot of appetite for investment in hydrogen and in the energy transition more widely. Generally, I think there are some important conditions for success, which relate to clarity of business models and recognising some of the specific challenges facing hydrogen.

Who is going to foot the cost of kitting homes out with new boilers?

"We're going to need to see industry standards and processes change and develop. That will create an overall belief that there is a strong and valid policy framework and that the industry is moving into a position of confidence.

"There's more than enough funding available within large companies and institutional investors to deliver that government ambition."

It is hoped that current ambiguity around business models will be cleared up in the UK Government's hydrogen strategy, which is due to be released in the coming weeks.

The document will include incentives that will be rolled out to encourage the deployment of green and blue hydrogen, including contracts for difference auctions. Indeed, Cooley said that he expects 2021 to be the "most exciting" year for hydrogen energy yet, with oil and gas majors potentially making moves into the sector.

He added: "With the right business models in place, private money will flow into hydrogen – the capital markets are now incredibly well informed about the industry. It's all about getting the right incentives in place."

KEY MESSAGES

Cooley and Calver's buoyancy and positivity about green and blue hydrogen's potential to revolutionise the energy industry is heartening.

The UK Government's target of 5 GW's of low carbon hydrogen production by 2030 is an ambitious one, especially when you consider there's now less than nine years to do it.

Questions around long-term business models, green hydrogen energy demand and wide scale private sector financing remain.

Industry thrives on clarity and providing that, sooner rather than later, will be key in getting the ball rolling.

EY INSIGHT FROM TIM CALVER

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The market eagerly awaited the UK Government's Hydrogen Strategy, which included the position on hydrogen business models and incentive mechanisms, and is key to unlocking the targeted investment.

In an international competition for capital, the UK needs to move with pace and clarity to deliver on its ambition and establish itself as a leader in blue and green hydrogen production.

THE 10 POINT POD GOES NUCLEAR AS THE TEAM ASK, WHERE IS THE BUZZ?

The success of the hit 2019 TV series Chernobyl has done the reputation of nuclear power no favours.

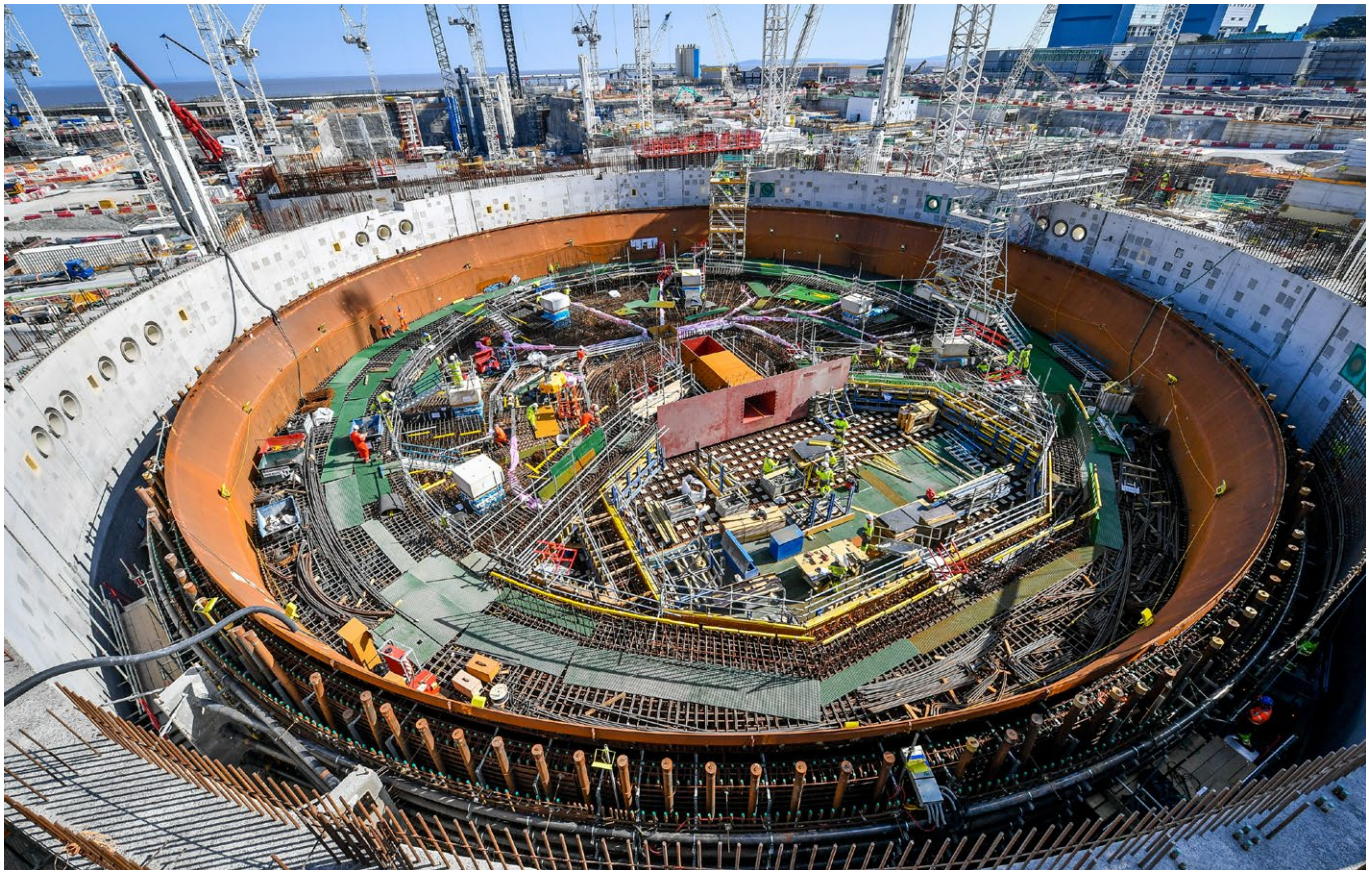
Many are sceptical about the energy source and, as Energy Voice's Ed Reed points out, it doesn't receive the same fanfare usually enjoyed by the likes of offshore wind and hydrogen.

Nevertheless, nuclear power has been on the go in the UK since the 1950s and Westminster still believes it has a part to play in getting the UK to the holy grail of net zero.

It has set aside £385mn in an Advanced Nuclear Fund to encourage the production of low carbon power, with the aim of unlocking further private sector funding.

Joining Reed in this, the third chapter in a series dissecting the UK Government's 10-point plan, are Anne Falchi, Value for Money Program Manager at EDF's Sizewell C power station, and Chris Lewis, EY UK's Infrastructure Lead, as the team set out where nuclear power fits into the net zero puzzle.

"With a small footprint you can produce a lot of energy"



Construction workers stay socially distanced as they work inside the nuclear reactor on unit 1 at Hinkley Point C nuclear power station near Bridgwater, Somerset, Europe's largest building site. Ben Birchall/PA Wire

Nuclear energy is produced by splitting uranium atoms – a process known as fission – which produces heat and in turn steam that can then be used to power a generator.

Because there is no burning of fuel in the process, there are no carbon emissions, though the use of highlight radioactive substances comes with its own caveats.

As already mentioned, nuclear doesn't seem to have the same "buzz" around it as other clean energy sectors.

This is perhaps perplexing considering its reliability, especially when compared to weather reliant sources, and its already established role in the energy system.

It is currently the largest source of low carbon power generation in the UK, making up 20%, and is "fundamental" for reaching net zero targets, said Falchi.

She said: "You can deploy as much solar and offshore wind as you want and it still won't be enough to meet the demands for energy and heat. The scaling issue makes nuclear well suited because it is so powerful, although this is also a challenge, and it doesn't require a lot of land. With a small footprint you can produce a lot of energy."

It also provides the "stability the system needs" and can directly replace carbon emitting sources, such as natural gas.

In the context of renewables, Falchi said that nuclear should be seen as a "compliment, rather than a competition", though developers "aren't too keen" to talk about that just yet.

Lewis added: "It's about building a system that can power the demand we've got at the moment, as well as transport and heat – there's quite a lot that's going to come in.

"Clearly, any new power generation capacity that needs to be put in needs to not emit carbon and that's why I think nuclear should be part of the system."

"It's about relearning skills"

As well as concerns about the potential pitfalls of using a volatile chemical element, nuclear has been criticised for being a cash heavy means of producing energy.

EDF's Hinkley Point C facility is on course to rack up a construction bill of around £23bn, half a billion more than estimated in 2019.

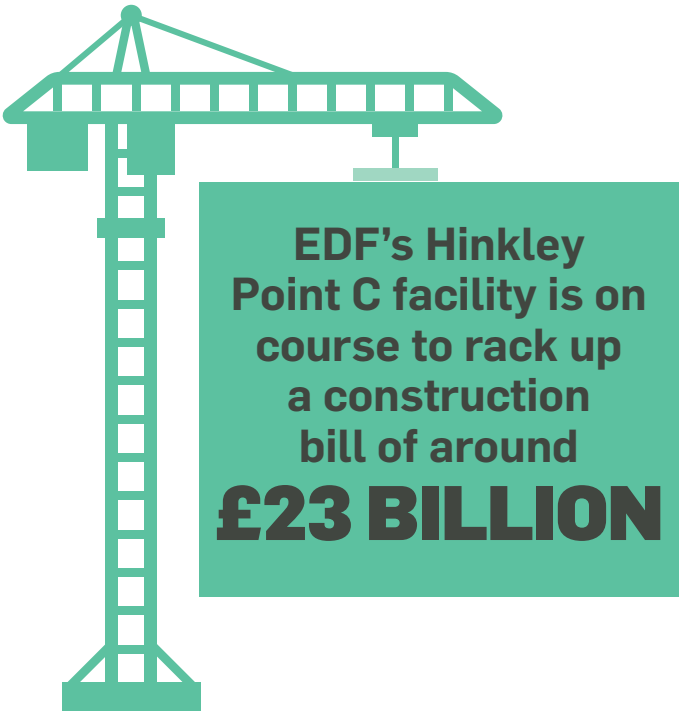
But, while acknowledging that the nuclear industry's track record on delivering projects on time and at budget hasn't been fantastic, Falchi said that "hasn't always been the case".

She added: "It's a matter of learning how to do these things again – collectively we've lost these skills. We haven't built nuclear stations in a long while and we aren't performing that well in any major infrastructure projects at the moment.

"It's about relearning skills and that is achievable. Look at offshore wind as a benchmark – the average cost of nuclear energy produced is way below, there's no doubt about that.

"We are on a journey and the industry needs to perform and relearn the cost reduction that it previously delivered – we can't be complacent."

Lewis added that, while power plants are some of the cheapest to run, it's the high capital costs to build the facilities that are the main issue.



The main challenge, therefore, is "changing the financing structure" to reduce the risk for investors, which will "lower the cost significantly".

"We're offering low carbon energy generation but in a system that works for everyone"

One issue that always crops up in discussions about the energy transition is that of local content.

Politicians, industry bodies and unions are all keen to stress the need for workers and communities, particularly in the UK's former industrial hubs, to benefit from the decarbonisation drive.

In this regard, nuclear power is actually ahead of many other sectors.

For every pound that EDF spends constructing Hinkley Point C, which is due to become operational in 2026, 65% stays in the UK, creating jobs and encouraging economic growth.

Falchi said: "It's part of the value for money – we're offering low carbon energy generation but in a system that works for everyone.

"We're offering long term jobs, training for young people and making sure that all regions of the UK feel the benefit.

"There are nuclear stations across the country and they're part of the landscape for decades, helping the economy to be fairer."

KEY MESSAGES

By the middle of the next decade, the UK Government hopes to have small and advanced module reactors in operation to put the country at the "cutting edge of the industry".

Considering the lengthy process involved in establishing nuclear energy plants – Hinkley Point C was first mooted in the 2000s – this is an ambitious target to say the least.

But therein lies the opportunity.

Projects such as Hinkley Point C and Sizewell C are creating a "competitive advantage" for the UK, said Falchi, which could then be exported to the wider world.

Given its longstanding place in the energy mix, nuclear is perhaps not viewed with the same excitement as offshore wind and hydrogen, but its capacity to generate low carbon baseload power makes it an obvious inclusion in the UK Government's green industrial strategy.

However, lowering costs will be key to nuclear's success in a decarbonised energy mix, as noted by Lewis, with change to the financing structure a pressing issue.

EY INSIGHT FROM CHRIS LEWIS
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Nuclear power has a key role in a net zero energy system. It provides always available, zero carbon power.

The UK has committed to a new set of nuclear power stations with over 15 GWH expected over the next 15 years. This represents an investment of over £40bn over the next few years.

We need to learn the lessons from the past, seeking repeatable power plants, reducing risks to secure low cost finance. This will deliver value for money for consumers, with energy costs at or below £60MwH, and reduce the carbon intensity from transport and homes.

ZERO EMISSION VEHICLES IN THE HEADLIGHTS AS THE 10 POINT POD TALKS CARS, MANUFACTURING AND URBAN MYTHS

For the majority of people, the most obvious impact of the energy transition will be on transportation.

Decarbonising cars, vans and lorries will rely heavily on the support of the general public, with the cost of many large scale changes likely to fall on the consumer.

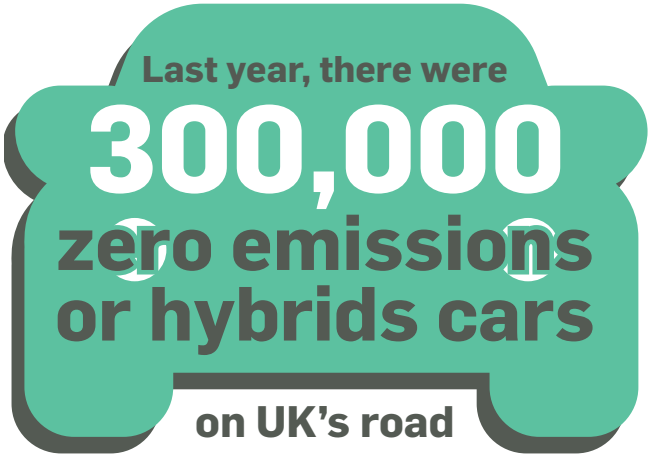
Last year, there were around 32 million cars on the UK's road network, about 300,000 of which were zero emissions or hybrids, according to the RAC.

And with the UK Government planning to wind down the sale of new petrol and diesel cars and vans by 2030 there's a significant gulf that needs to be breached.

In this, the fourth in a series of discussions picking apart the UK Government's 10-point plan, Energy Voice's Ed Reed is joined by Maria Bengtsson, EY's lead for electric vehicles, and Robert Llewellyn, Fully Charged presenter and former TV star, to set out how the UK can accelerate the shift to zero emission vehicles.

"What will it take to bring them into the prime time?"

In some regards, electric vehicles (EVs) are already cheaper than the classic petrol and diesel cars that currently dominate the roads.



According to Direct Line, the average lifetime ownership cost of an EV is £52,133 compared to £53,625 for the equivalent petrol car, with the zero carbon models coming up trumps in annual tax and maintenance.

However, steep initial costs, combined with 'range anxiety', means there is still a "really long way to go" and, without a combination of technology, financing and government support, the UK might not get to a "satisfactory situation", said Bengtsson.

In order to encourage uptake of low emission cars, both Bengtsson and Llewellyn said that dispelling the untruths around the technology would be key.

Llewellyn described 'range anxiety' – the fear that a vehicle doesn't have the required fuel to reach its destinations and a criticism commonly levelled at EVs – as a "total myth" and "corporate brutality of a fairly high level".

He said: "The term range anxiety was originally created by the General Motors PR team when they withdrew the EV1. It's historically documented – it's not a fantasy of electric vehicle fanatics! They've since backed down and they now make the Chevy Bolt in the US.

"About 2,500 people run out of diesel and petrol on roads in the UK every day – it's normal. If you ask the AA, what's the primary reason they have to go out to a call, it's because people have run out of fuel."

Bengtsson added that the electric vehicle market is awash with "urban myths", specifically around the reliability of charging points.

She said: "That's in the hands of the infrastructure owners and it's up to them to convince the public that it's working when you need it. There are a lot of apps nowadays that you can use to see where the nearest EV charger is – in a way, you're much better off."

"My real worry about hydrogen is the energy usage"

Though the zero emission vehicle market has largely been dominated by EVs in recent years, it isn't the only option being explored.

As was discussed in point two of the 10-point plan, hydrogen could also have a fundamental part to play, especially in the decarbonisation of larger machines like aeroplanes, boats and lorries.

However, there is a real debate raging currently about whether it will ever prove cost effective for commercial cars.

Bengtsson said: “I used to be slightly more hesitant about hydrogen, but it definitely has some advantages if you can make it work. It doesn’t need the same raw materials and production capacity as batteries, and it use similar infrastructure to petrol stations. In that sort scenario, I can see how it would coexist with EV infrastructure charging.

“It’ll probably develop first around contracted situations like buses and heavy transport, where you have a captive like infrastructure system. Once you’ve built that out, it could have a role for passenger vehicles as well.”

Llewellyn, while agreeing that the fuel is likely to be pivotal in heavy transportation, says there’s a lot of people that are “extremely dubious” about hydrogen fuel cell cars.

He said: “I will be so happy if there is a change in the technology and it makes them cheaper and more affordable – at the moment they are very expensive.

“My real worry about hydrogen is the energy usage and where it comes from. We are looking at a four to one energy cost – you put 4 kilowatt hours (kWh) into splitting water and get 1 kWh of hydrogen out. You can’t help but think if you put that 4 kWh into a battery, you’re losing some because there’s always energy loss, but not that much.

“I’ve got no worries about it not being safe, you’re not going to get a Hindenburg – it’s just the complexity. I’d still be really happy to be proved wrong.”

“A new golden age of British manufacturing”

EVs aren’t the only option being explored - hydrogen vehicles could also have a fundamental part to play.

In the past few decades, the decline of UK industry has been a popular theme of political, social and economic debate.

Though the reasons for it are myriad, Westminster's hope is that the 10-point plan can reverse some of the trends to create, as Reed calls it, a new "golden age of British manufacturing".

Llewellyn described developing an established domestic supply chain as a "devastating challenge" which has been exacerbated by the UK's withdrawal from the European Union.

Bengtsson added: "Big scale type industry usually likes to keep the supply chain fairly close to where the manufacturing plants for their final project is.

I don't want to sound negative, but I do feel a bit like it's probably more of a defensive play for the UK than a huge positive opportunity.

"There's loads of innovative, small scale companies but for them to be able to flourish and really develop, they need larger companies."

KEY MESSAGES

By the time 2050 rolls around and the UK has reduced its emissions to net zero, the UK's roads will be buzzing with vehicles that would have been unimaginable when the automotive industry was born at the start of the last century.

And while the UK Government's commitment is clear as laid out in the 10-point plan, the mass uptake of zero emission vehicles also requires a "carrot and stick" approach to mobilise the private sector.

It will also involve industry and experts thinking outside the box. As Llewellyn said, a system could arise where firms and individuals can sell their electricity back to the grid when they're not in use.

He added: "In 10 years' time, we could be sat here talking about powering the country on cars. Everything else was turned off, it was a cold night in the winter and we ran the whole country off a load of cars!"

There are a number of issues in the industry that need to be plugged, especially around cost and infrastructure, but as automotive giant Henry Ford famously said, "don't find fault, find a remedy".

EY INSIGHT FROM MARIA BENGTSSON

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Transport remains the largest source of carbon dioxide emissions in the UK, accounting for 34% in 2019 according to government figures. As such, decarbonising transport is key to achieving the UK Government's target of cutting emissions by 78% by 2035 compared to 1990 levels.

Electric vehicles are quickly becoming more mainstream, but we have a long road ahead of us. For mass adoption to occur, all of the parties need to come together. Initially, the charge was led by enthusiasts who came up with inventive ideas and solutions which helped them overcome the inefficiencies created by lack of scale and common standards.

However, to turn these ideas into reality will mean finding ways of meeting the needs of all key players.

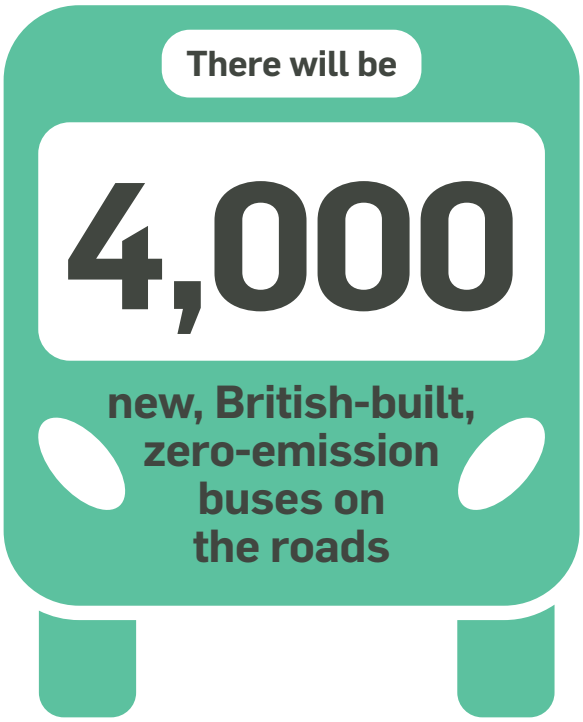
The current wave of innovation is transformational. But it isn't one organisation's endeavour – it is the coming together of multiples players, large and small, from cross sectors and industries that will deliver it. It is an opportunity for collaboration and partnerships between participants, new business models and new ways of working.

THE 10 POINT POD TALKS PUTTING GREEN PUBLIC TRANSPORT ON THE RIGHT TRACK

Behavioural changes amongst the public have a key part to play in reaching net zero by 2050.

Although many will be used to walking, cycling or catching the bus to get from A to B, many more will need to transition to "sustainable transport" in order for emissions to get where they need to be.

That is why the UK Government has developed a two-pronged approach – to decarbonise public transport and to roll out measures to help pedestrians and cyclists. This year the first of 4,000 new, British-built, zero-emission buses, which will become permanent features on our roads, is due to be delivered.



Moreover, Westminster has pledged to invest billions to electrify railway lines, expand train routes around major hubs and make the UK's towns and cities "worthy of Holland" by encouraging people to move around sustainably.

Joining Energy Voice's Africa editor, Ed Reed for this, the fifth instalment of the 10 Point Pod, a series analysing the UK Government's green energy commitments, are EY's Sayeh Ghanbari and Chris Boardman, Olympian and Greater Manchester's cycling and walking commissioner.

"The disparity between London and the rest of the country is clear"

Numerous issues beyond emissions currently exist with the UK's transport and cycling networks.

As Reed points out, currently two thirds of all rail journeys start or end in London, with residents in the capital embarking on more than double the national average of rail journeys.

Claims of government bias in favour of the city have been a long-term feature of UK politics and it's an "inequality" that needs ironing out if there is to be widespread uptake of sustainable transport.

Boardman, who won Britain's first cycling gold medal in 72 years at the Barcelona Olympics in 1992, said: "The disparity between London and the rest of the country is clear and it's now under the microscope.

"Recently, my boss, Andy Burnham, the re-elected mayor of Greater Manchester, said transport is our focus now and I think the future is actually really good at last."

Boardman went onto stress the importance of incentives and the "social sciences" in encouraging people to change their habits.

Chris Boardman, Olympian and Greater Manchester's cycling and walking commissioner

He pointed to a trip between two regions in the north-west that took an hour and a quarter at a cost of £5.30 – had that journey been in London, it would have taken about 25 minutes and cost "significantly less".

Ghanbari said: "When we talk about having a level economy, it's about equal rights in a way; why is it that the residents of one city have poorer access and more expensive transport?"

"Electric cars are one of our biggest dangers right now"

A significant focus of point five of the UK Government's plan is encouraging people to move from private to public transport. To prioritise buses over cars.

Public transport is hugely beneficial to the environment, delivering emissions reductions per head, as well as increased fuel efficiency and reduce traffic congestion, according to research.

As a result, Boardman says electric vehicles (EVs) are one of the "biggest dangers" because they give people a reason "not to change".

He added: "It (EV's) doesn't make us more efficient, it doesn't really make us a great deal greener, it doesn't make us any fitter and we're probably going to need more street space for charging points because the majority of the people in the UK don't have off road parking."

However, Boardman admitted he is a "massive fan" of EVs for green public transport and deliveries, insisting that there is a need for discussions to "change direction" so they can become "part of the solution".

Asked by Reed what can be done to encourage people to ditch the car and pick up a bike or catch the bus, Boardman said it's all about making it "relevant to people".

He said: "There are two standards that we've set for anything we build in Greater Manchester. For cycling, it must be usable and want to be used by a competent 12-year-old. Then everybody you speak to from a politician to a parent to a child understands what that means. We've stuck now to that for four years.

"For walking our standard is it must be usable and want to be used by a parent pushing a double buggy. If you stick to those two proxies, you've covered the disabled, the frail and all the people who are currently driving less than one kilometre to go to the shops because that's the easiest solution for them."

Ghanbari added: "There's a lot of things that can be done from a carrot perspective; making people feel like it is the right thing to do.

"But I really do believe that there is a bit of stick needed as well; we have to make it harder to get into a car. By that I mean closing down roads for private vehicles to be able to rat run, like a lot of the low traffic neighbourhoods are doing.

Photographer: SeongJoon Cho/Bloomberg

"I also fundamentally believe that we need to charge people for using public infrastructure, such as roads, for private transport. I don't know if it should be a right to drive your private vehicle wherever you like. We should be quite tough on this."

"You have to connect with people's emotions"

Such a drastic overhaul of cities and towns is going to require a concerted, unified effort of "citizen movements and political will."

And for that, the UK can take inspiration and heart from its neighbours in Europe.

Ghanbari said: "When you look at somewhere like Holland and why it is where it is today, there were key decisions made in the 1970s focused on changing transport policy.

"There are a few different things that brought that together. A rapid increase in wealth post-war increased car usage, which then led to a significant number of road deaths, a large proportion of which were children.

"The Dutch Government then took a step back and proposed a rethink around transport that resulted in safe cycling and walking infrastructure being put in place."

Boardman said: “You have to connect with people’s emotions. Once you’ve done that, they will want to go with you and you can get them to do things.

“But, if you beat them over the head with logic then it’s not going to be popular – that’s the stark reality.”

He also stressed the need to look beyond conventional ways of calculating prosperity, adding: “Is gross domestic product (GDP) the best way to measure success? Does that get us the best outcome?

“Every year information on the world’s happiest and most liveable cities is published. None of them have the highest GDP, but’s where people want to be. Shouldn’t that be the aim?”

Huge bicycle parking in the center of Amsterdam, Holland.

KEY MESSAGES

A cornerstone principal of much of economic theory is rational behaviour; the idea that people make decisions based on what will provide them with the greatest satisfaction, or utility.

In order to encourage someone to overhaul their way of life, obvious incentives and clear reasoning will be fundamental, perhaps even more so than the money needed to finance it.

Luckily, green public transport, cycling and walking deliver a number of immediate benefits; cheaper travel, better air quality, lower noise pollution and improved public health.

As soon as those positive effects are understood, it will be far easier for people to tell their local authorities to “get on your bike” and rethink their transport systems.

EY INSIGHT FROM SAYEH GHANBARI
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The UK Government’s 10-point plan for a greener economy is ambitious and necessary. It is also an opportunity to think beyond cutting emissions, towards positive, balanced and sustainable lives for all citizens.

Green transport, cycling and walking is just that; the opportunity for our city leaders to rapidly decarbonise travel, make effective use of limited space and create healthy, liveable neighbourhoods.

Cities are and increasingly will compete with each other for investment and talent, a trend that is only increasing with more remote working. Effective transport is one of the top 3 requirements for investors today; the importance of this to be sustainable and include safe and accessible walking and cycling options is only going to increase as citizens are becoming more eco-conscious.

PLANES, BOATS AND GREEN FUEL – THE 10 POINT POD TACKLES JET ZERO AND SUSTAINABLE SHIPPING

Advancements in international trade and travel in the last century mean that many enjoy a life that would have once been unimaginable.

But the widespread use of planes and ships brings with it one major issue.

Shipping and flying currently accounts for about 3% of the world's CO2 emissions. Flight schedules in the UK alone put around 37 million tonnes of carbon into the atmosphere every year, based on 2019 figures.

Simply stopping the use of aeroplanes and vessels is not an option, so Westminster has committed to putting the UK at the "forefront" of low carbon travel.

Ministers have pledged to invest in research and development (R&D) to drive the creation of sustainable aviation fuels (SAF), while a Jet Zero Council has also been launched to promote the adoption of new technologies.

Flight schedules in the UK alone put around 37 million tonnes of carbon into the atmosphere every year

Joining Energy Voice's Ed Reed to pick the bones out of point six of Westminster's 10-point plan – jet zero and green ships – are Mike Parr, EY Parthenon partner, Jacob Sterling, head of decarbonisation at A.P. Møller – Maersk, and Chris Gear, project director for the Aerospace Technology Institute's (ATI) FlyZero initiative.

“There’s a chicken and egg dilemma”

Both the shipping and aviation industries are likely to continue to grow in the coming decades, making the need for decarbonisation even greater.

It’s a “pretty significant” challenge and one that’s likely to require the brightest and best minds, as well as a lot of cash.

FlyZero, which is the ATI’s project to explore the design challenges and market opportunity of decarbonising aviation, is currently focused on “two primary areas”. Gear said: “One of those is SAF and the other is a zero emission aircraft. I’m focused on the latter, looking at the different fuels that we could use to actually fly those vehicles.

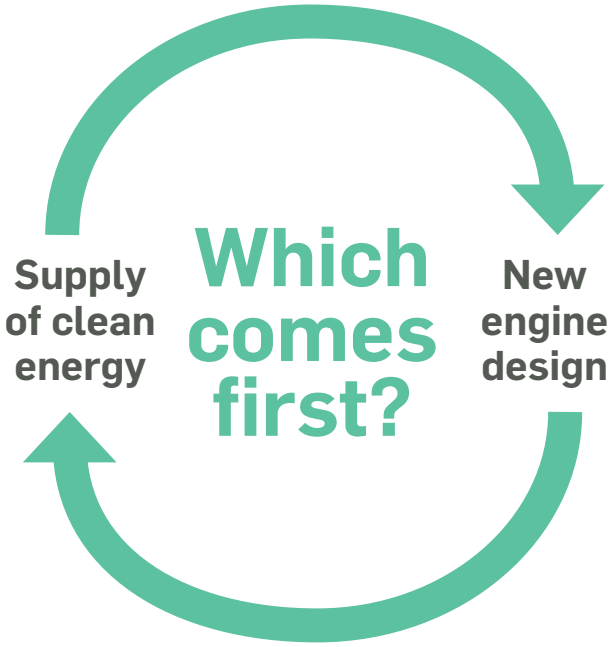
“It is a big challenge. The energy required getting a plane into the air and flying for long distances is a step change away from the cars that you see on the road today, which are fully electric. Our biggest obstacle is finding an energy source.”

As part of its 10-point plan, Westminster promised to invest £15mn into FlyZero, which brings together about 100 industry experts.

On the shipping side of the issue, Sterling said that, with the climate emergency growing, things needs to start moving “pretty soon” if the industry is to survive.

He added: “We’ve been looking into what can we do now – a fuel like methanol can actually be scaled today. In the future, we’ll probably look at ammonia and other fuels, but there’s big question marks about how to get started on this.

“We can see customer demand picking up and we can also see potential fuel producers are gearing up for this challenge.



“There’s a chicken and egg dilemma. As a shipping line, it’s pretty hard to decide to build a ship with an engine that, currently, you can’t get any fuel for. Likewise, why would you scale up clean fuel production when there are no customers?”

Nevertheless, A.P. Møller – Maersk is leading the field and is planning to build its first “carbon neutral vessel” in the next couple of years.

Parr added: “What’s happened recently with COVID-19 has accelerated a lot of these decarbonisation trends. Both the consumer and the government intent is going to be to accelerate that process to carbon neutrality.

“The challenge in aviation, which is a sector I’m more familiar with than shipping, is similar. The chicken and egg analogy is there as well. For an aircraft to fly transatlantic you need to be able to fuel up on both sides – the supply is not there in a consistent manner globally yet.”

“We see customer demand for green shipping picking up exponentially”

AP Moller Maersk intends to launch its first carbon neutral, methanol-fuelled vessel in 2023, although supplies may be challenging.

As already mentioned, decarbonising the shipping and aviation sectors will require technology, expertise and vast sums of money.

The UK Government support will be needed, not only to pick up some of the bill, but also to pull the levers and set the regulations needed to foster change.

And the rewards for getting it right are clear, with estimates the SAF industry could support more than 5,000 jobs.

Sterling said: "We see customer demand for green shipping picking up exponentially right now. But, at some point we will need regulation to kick in because not all our customers will want to go down that route voluntarily.

"There's currently quite a significant price difference between the new green fuels and the old fossil fuels – that needs to be levelled out by regulation at some point. Hopefully it happens sooner rather than later because that could really help the transition."

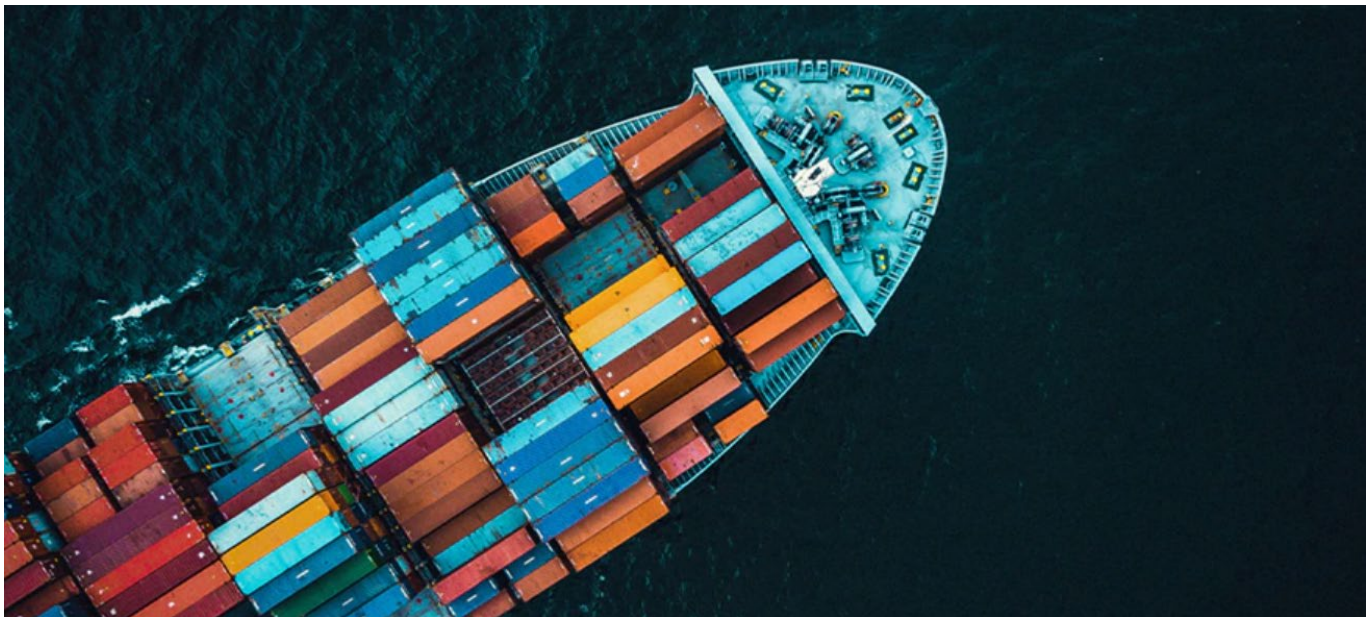
Parr said that government intervention is an "absolute requirement", but that there is a lot aviation and shipping can do as well.

He said: "On SAF, a big challenge is just the inability to generate sufficient volumes at the moment. Creating that supply chain and, from an airline's perspective, having sufficient confidence in that supply chain is going to be a key driver of being able to get to the next steps.

"A concerted effort is needed to put the infrastructure in place, put the supply agreements in place and move forward so that they can operate on a routine basis with SAF.

"British Airways has had partnerships and operated flights using it, but that's on a test basis rather than a full scale operational basis – they need to keep accelerating and focusing on that."

"We need to retrain quite a few of our engineering community"



AP Moller Maersk intends to launch its first carbon neutral, methanol-fuelled vessel in 2023.

Aviation and shipping support thousands of skilled, well-paid jobs in the UK, from engineers to consultants. Maintaining and growing the number of positions, as the industries drive for decarbonisation is fundamental to Westminster's aspirations.

For that to happen, Gear says there will need to be to retrain workers, particularly those involved in engineering.

He said: "To refuel with liquid hydrogen or SAF, there will be different requirements and we're trying to analyse those impacts, as well the infrastructure that will be needed.

"There's a lot of challenges. On the capability in the skill set, we need to retrain quite a few of our engineering community. But, we also need to develop new engineering capabilities on the chemistry side."

Gear added: "One of the roles of FlyZero is to look at the UK. What is our technology capability? What's our industrial capabilities? What are our skills are in the workforce? And what some of these new solutions will be, in terms of the fuels and also the equipment that might be used in an aircraft."

KEY MESSAGES

As with much of the 10-point plan, point six is going to drastically alter the way people approach air and sea travel.

But decarbonisation of planes and ships is essential if standards of living are to keep improving across the globe.

There's still work that needs to be done to find the optimum solution and many of the details will be thrashed out along the journey.

It's likely to be a bit of a bumpy ride, but the destination is one that has to be reached.

EY INSIGHT FROM MIKE PARR

EY PARTNER

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The need for UK Government intervention in the energy transition for the aviation and shipping industries is abundantly clear. These industries are significant contributors to carbon emissions but face complex challenges to realise decarbonisation, which mean many industry participants are targeting 2050 for carbon neutrality.

Both sectors were capital constrained even before the COVID-19 pandemic. The impact of the pandemic has been dramatic and the future outlook is uncertain, both with respect to the future shape of each industry and the timing of the recovery. This squeezes further the capital, technology and eco-system available to support the transition to sustainable fuels.

In the face of such challenges, a co-ordinated international effort is required to invest in the decarbonisation acceleration so that we can avoid the emergency that both industries face with their fuel consumption.

GREEN HEATING AND THE HOMES OF THE FUTURE – JOIN THE 10 POINT POD FOR A FIRESIDE CHAT

Though the energy system of the future will be a far cry from the one in place today, the demands of it will be broadly the same.

Whether it be in 2021 or 2050, people want to enjoy the same, high living standards that easily accessible power brings, and nowhere is this more pertinent than in their own homes.

Irrelevant of the low carbon solutions in place, the demand for central heating and air conditioning is not going anywhere.

But fossil fuels need to be taken out of the equation and a complete overhaul of power systems in buildings up and down the country is on the horizon.

With this comes a chance to make workplaces, flats, houses, school, hospitals and pubs more energy efficient, creating tens of thousands of jobs along the way.

The UK Government has recognised this and has made greener buildings the seventh point of its 10-point plan.

Joining Energy Voice's Ed Reed round the virtual fireplace for this discussion are Frances Warburton, associate partner at EY, and Guy Newey, strategy and performance director at the Energy Systems Catapult.

“The house of the future”

The UK Government has pledged to put homes, workplaces, schools and hospitals at the “heart” of the green recovery.

It is aiming for 600,000 heat pump installations per year by 2028, while also taking measures to increase the energy efficiency of buildings.

But almost all of the UK’s 25 million houses will need attention and there are many finer points that need to be thrashed out.

As Newey points out, currently around 30,000 homes per year switch to low carbon heating. By 2030, around the same number need to be transferring every week in order to hit targets.

Warburton, who recently worked for energy regulator OFGEM, said: “The buildings of the future are going to have to be substantially different.

“Today, buildings produce about a third of the UK’s carbon emissions. They need to be almost entirely decarbonised by 2050 – they’re not one of the sectors where we can have some residual emissions.

“First and foremost, it’s about improving the energy efficiency of the existing building stock. Of those 25m homes, only about 10m of them are currently at the target of an energy performance certificate (EPC) of C.

“Homes, like refrigerators and appliances, have an efficiency rating all the way from A down to G. There’s a significant number that are below that standard of C.

The first target is to try and get all existing homes up to EPC standard C by 2035 – that’s a huge task”

Although the blueprint for homes in the future remains unclear, Newey agrees it’s going to be “very different”, but says the demands of them will be “very similar”.

“People want reliable electricity supply, reasonable

prices, to be able to get warm, stay warm and be reasonably cool in the summer. In the future there will also be many more than want their house to charge their electric vehicle. It's really important that we remember these basics."

"Consumer choice will be really important"

The start and end point for greener buildings is clear, it's the details in between that need to be worked out.

There's still a debate raging in the energy sector about the technologies that should be deployed, with fans of heat pumps and hydrogen often at loggerheads.

Throw into that the question of who foots the bill and what should be deployed where and you have a perfect cocktail of ifs, buts and maybes.

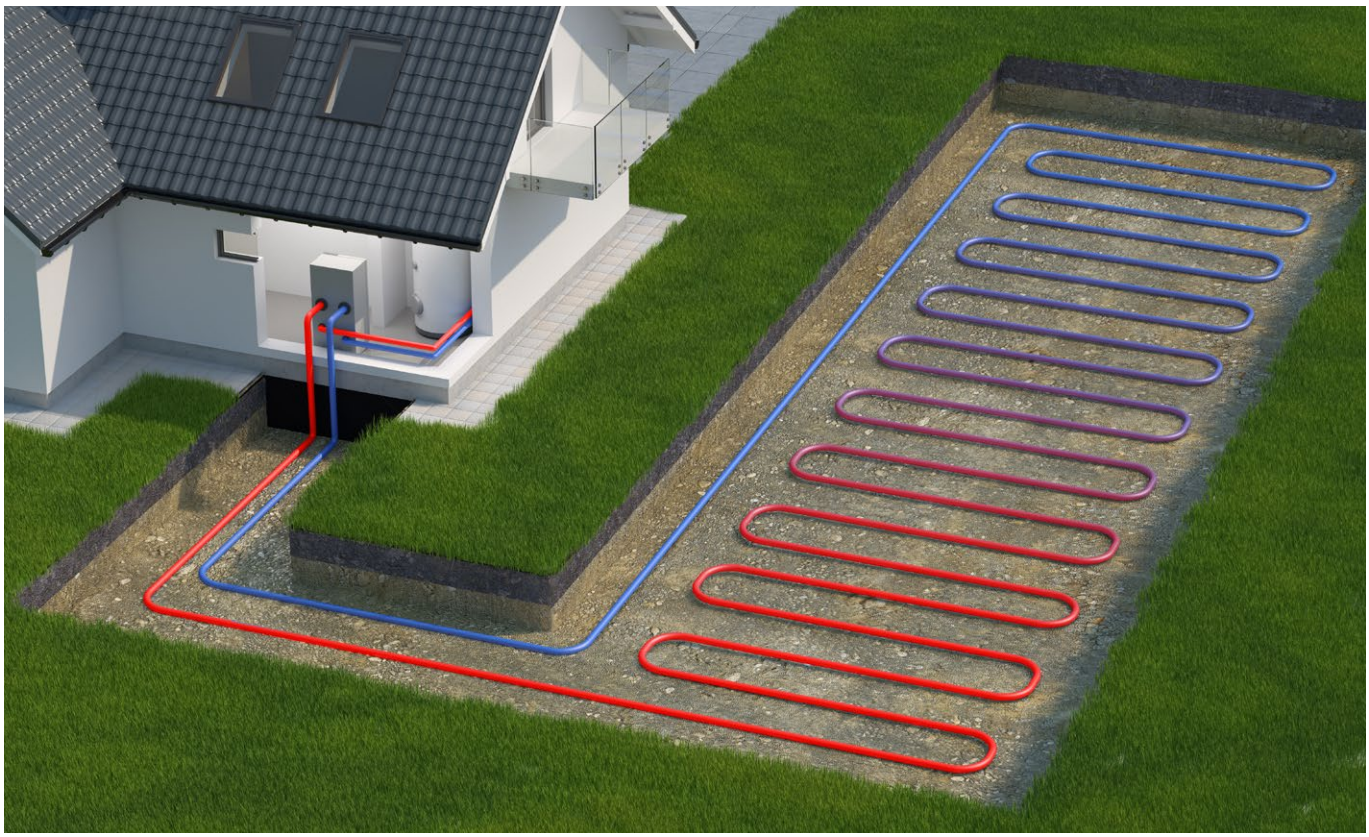
Necessity means that many things will be worked out along the way and Warburton says consumers will be "central" in shaping that.

She said: "It's unlikely that there will be a magical solution that all consumers will accept. The role of consumer choice will be really important.

"People in some areas may want to be able to choose between some of these competing technologies and if someone has gone ahead and got themselves a heat pump in the 2020s, are they really going to want to switch over if hydrogen comes in the 2030s? I cannot understate the importance of bringing consumers on this journey."

Newey said that while the "arm wrestle" between technologies is important, more onus should be given to improving the energy experience for consumers.

He said: "Take room by room control of the heating system. It's something that exists already in a limited



Heat pumps

capacity but once you can do it on an app and set a schedule, it's a totally different experience.

"These new technologies have the potential to really improve the consumer outcomes and if it's low carbon at the other end then people will be more relaxed about it.

"The absolute focus should be on making households' heating better so that they've got the demand for it and people aren't forced into it.

"From a policy point of view, it needs to get to a stage where there's the hard edged regulation to do it, but that's much easier when you've got things which are desirable."

The challenge now for UK Government is to give "enough of a signal" to the market to encourage companies to begin investing.

Over the course of the decade, ministers hope decarbonising buildings will leverage about £11bn worth of private investment.

Once the markets click into action, Newey says it will quickly become far easier for people to decarbonise buildings.

"A local solution"

Although hydrogen and heat pumps dominate the green homes limelight, local heat networks have a "significant" role to play too, Warburton said.

As it stands, only about 2% of the UK's heat supply comes through a heat network – estimates predict that could rise to 18% in the coming years.

Around £18bn needs to be invested in the technology by 2030, but a system could one day be in place that would allow residual heat from the London Underground to be piped into homes.

Warburton said: "Heat networks are useful when there's a really high density of homes and particularly where there's waste heat.

"Rather than spending lots of money generating new heat, excess heat that would otherwise dissipate into the atmosphere can be captured and piped into people's homes – it doesn't get more sustainable than that. It is a really exciting area.

"It is very local but in Amsterdam you're starting to see sprawling big citywide networks where people are injecting heat into different systems across larger urban areas."

Having a regional system would also allow planners to create a bespoke scheme, designed to meet the needs of any given area.

"Heat is local. You need to understand the state of the building stock, how efficient they are, how dense the housing is and what sources of heat could work," Newey said.

"The pattern of decarbonising the heating system of Cornwall is very different from Glasgow. Right now, from a policy point of view we don't really have a way for local authorities to deliver in a consistent and sophisticated way."

KEY MESSAGES

Decarbonising homes, offices and buildings won't be solved by people putting on a few more jumpers in the winter.

Industry and government will have to go through the entire heating system with a toothcomb, integrating new technologies that don't threaten access to affordable energy.

Whatever happens, any changes put into effect need to be taken with the end user in mind.

EY INSIGHT FROM FRANCES WARBURTON

EY PARTNER

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The need for decisive policy has never been clearer – or more loudly called for – than in setting out the next steps in decarbonising heat and buildings. However, it is unsurprising that this clarity is taking a while to arrive, as there are no easy or inexpensive solutions. All of the options for decarbonising heat and buildings will involve significant change to people's homes and business' premises, and the infrastructure transporting energy to them.

However the destination is an exciting one – more comfortable, healthy and safe homes and premises – and the elimination of a third of total carbon emissions. If the transition is undertaken in an orderly way and with consumers engaged, there is time to plan and undertake the necessary improvements to homes and businesses to make sure they are 'low carbon heat ready'. The big questions facing policy makers is how to smooth the costs of this transition over the coming decades and between those consumers who move early and those later in the process.

For businesses and investors, the opportunities are immense – it will take £18bn to roll out low carbon heat networks to consumers alone. Added to that is the opportunity for firms themselves to contribute to reducing emissions, and meeting ESG expectations from their own investors and employees. A few years ago, the idea of banning petrol and diesel vehicles was unimaginable; however with EVs now showcasing an improved mode of transport, consumers are keen to support the move. If the decarbonised homes of the future can offer similar improvements, and disruptions are carefully managed, then consumers and businesses will likewise embrace it.

THE 10 POINT POD DELVES DEEP INTO THE HEART OF CCUS

The role that carbon capture utilisation and storage (CCUS) will have to play in the future energy mix currently splits opinion.

Some perceive it as an expensive distraction, which robs renewables projects of funds and allows for the continued production of oil and gas.

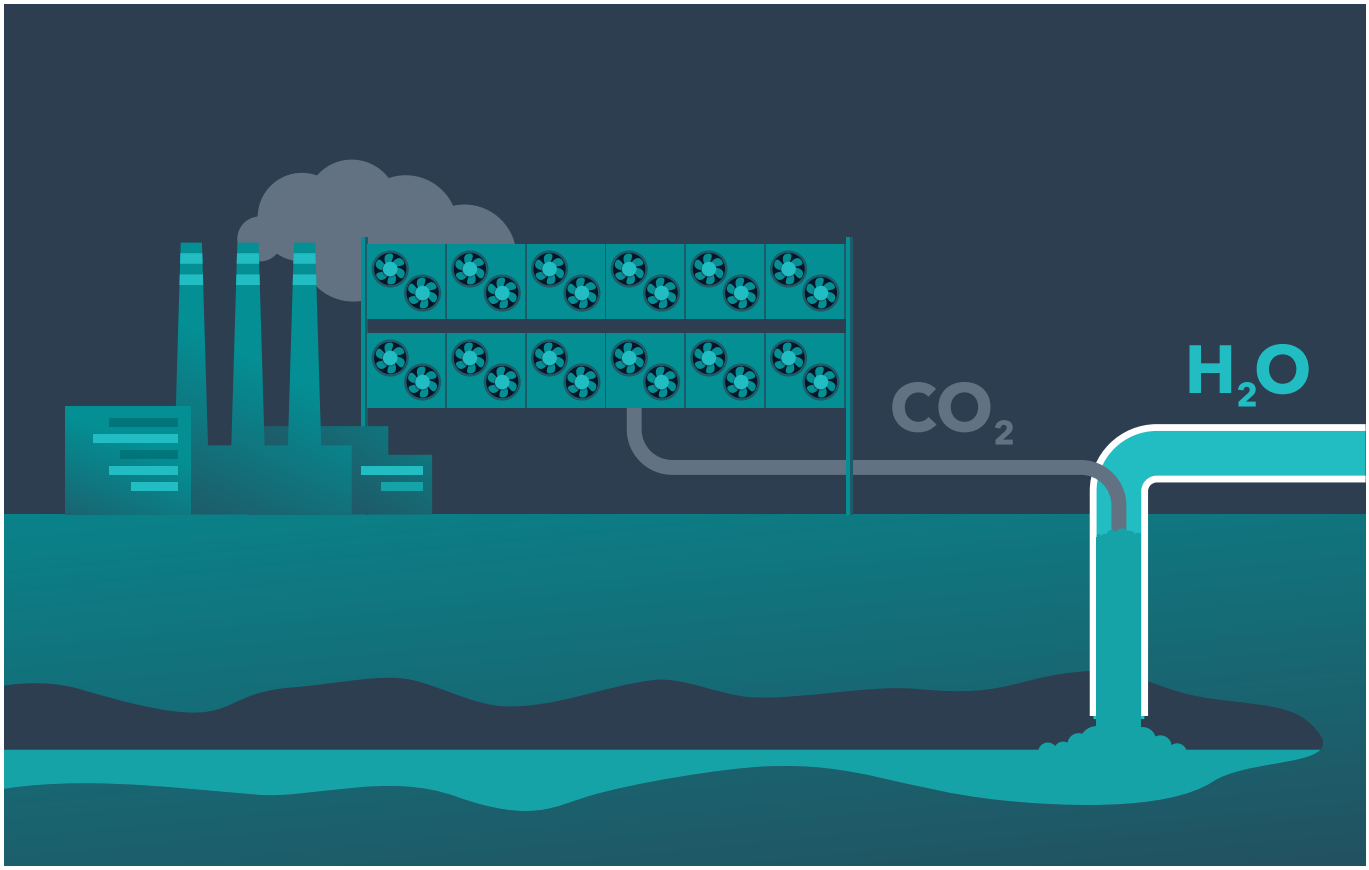
Others hold CCUS up as the solution to decarbonising particularly hard to abate sectors, such as concrete production, shipping and aviation.

The UK Government has sided with the latter school of thought and, as part of its 10-point plan, set a target to capture 10 megatonnes (Mt) of carbon dioxide a year by 2030.

To facilitate this, it has pledged to invest up to £1bn to support the creation of four industrial CCUS cluster that will act as the foundation for the new industry, which could support up to 50,000 jobs in the UK.

The process involves bagging carbon emissions and trapping them underground, where they can be locked away permanently or used in industrial processes.

Joining Energy Voice's Ed Reed to discuss the role of CCUS in the law carbon future are Graham Beal,



partner at EY, and David Richardson, director of decarbonisation solutions at Costain.

"I see a complete, transformational change this time around"

Despite the UK Government making investing in CCUS the eighth point of its 10-point plan, it's not the first time ministers have made a foray into the sector.

Westminster previously ran a £1bn competition to develop the technology at power stations, with two schemes, in Yorkshire and Aberdeenshire, vying for the cash.

However, the initiative was axed in 2015, prompting fury from Scottish Government ministers and industry chiefs.

This of course begs the question, what has changed?

"What's different this time round is that we actually have a firm target for removal of CO2. Not only that, but the government has a pathway to net zero and a commitment to achieving that by 2050," Beal said.

He added: "In previous programmes and projects, those targets didn't exist. There were issues around value for money and certain key risks that investors weren't prepared to take. This time round it's different because there are hard targets and an overall commitment to achieve net zero."

Richardson added: "I was involved in past opportunities around CCUS and I see a complete, transformational change this time around.

"Stakeholders from across a number of areas are really heavily engaged and starting to focus on what will make a difference for them for the industry.

"The fact that the government has set clear plan and clear objectives has allowed those stakeholders to really focus in on their projects."

Another important difference this time round is that CCUS is "not seen as a competition".

Although there will be "kudos" for the initial clusters, Beal said government has "come to a dawning realisation" that many of the initial costs will fall on the public purse.

He said: "Therefore, what it's actually doing is running a process which will support a number of clusters, removing that competitive element, which last time around, I think didn't really work."

"If the market comes forward and invests, projects will take off"

The CCUS process started life as a method used by oil and gas operators to increase hydrocarbon yields from dwindling fields.

And while the objective of capturing and injecting gas into reservoirs has now changes, it's still hoped the sector could act as a new home for oil and gas workers.

In order for that to happen, government and industry need to work together to turn ideas into reality.

One of the key mechanisms for getting the CCUS ball rolling will be a designated business model, designed to ensure projects have the cash they need.

As part of the 10-point plan, Westminster promised to publish details of a "revenue mechanism" this year to leverage private sector investment into industrial CCUS and hydrogen.

Richardson said: “The business models that the UK Government, through Business, Energy & Industrial Strategy (BEIS), is seeking to establish and is going to consult on, those will be the real seed for this new industry. They will set the base from which others can decide how they best approach the market.

He added: “Realistically, if the models can bring something attractive to the market, the market will come forward and invest. And if the market comes forward and invests, projects will take off. That is a big key difference to what we saw a number of years ago.”

Beal said that the onus is on UK Government to examine the CCUS landscape and identify “market failures” that are occurring and need to be addressed.

From there, it can come up with a way to stimulate the market, either by creating a business model or by working out how it will cover the costs of initial investments.

Beal said: “Everybody knows about climate change you can see the impact of it in the world around us. But, at the moment there is a huge cost involved in the removal of CO2.

“Ministers role at the moment has to be to stimulate that investment in the first instance and then, as we all face the burden of green taxes going forward, work out how to wean government off that subsidy and move it more to consumers.”

“There’s always an opportunity to reuse existing assets”

As already mentioned, large deployment of CCUS could give oil and gas assets, workers and products a new or continued lease of life.

One project that is pioneering this idea is Acorn, which is based at the St Fergus gas terminal, Aberdeenshire, and is being developed by Storegga, Shell and Harbour Energy.

Possibility of using existing North Sea oil and gas pipelines in the CCUS and hydrogen process.

The scheme is assessing the possibility of using existing North Sea oil and gas pipelines in the CCUS and hydrogen process.

Under current plans, infrastructure would be used to trap carbon in natural gas reservoirs that have been depleted.

Companies to have already teamed up with Acorn include petrochemicals giant Ineos and US supermajor ExxonMobil.

Richardson said: "There's always an opportunity to reuse existing assets and the should always be the first port of call. We should try and minimise the cost and disruption that new infrastructure brings.

"Realistically for most regions, as industry seeks to capture CO2, it's going to be looking for a route to export it and that is going to head towards the coast, be it to a port where it can be shipped or to a terminal where it can be distributed by pipeline.

"If you look at any geographical region, laying new infrastructure pipelines is a challenge no matter where you are."

KEY MESSAGES

Although CCUS is far from a new solution, there is a large gulf currently between the reality and the rhetoric.

If UK Government is to hit its carbon capture targets, the industry will have to accelerate at eye watering speeds.

Fortunately, CCUS already has some of the energy industry's largest players, and biggest spenders, on side.

Moreover, the internationally renowned Committee on Climate Change has previously said that CCUS is essential to the UK's net zero goals.

While it may seem like a futuristic technology, it is one that humanity is going to need all too soon.

EY INSIGHT FROM GRAHAM BEAL
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The Sixth Assessment Report of the Intergovernmental Panel on Climate Change (IPCC) makes for grim reading.

It warns that the world is heading for calamitous temperature rises and points to the need for economies to decarbonise.

The UK has set firm and ambitious targets and a pathway to net zero and CCUS will be one of the tools which is used to achieve this.

The UK Government's plans on CCUS are well advanced but there are still hurdles to be overcome and challenges to be addressed.

FROM THE BEES TO THE TREES - THE 10 POINT POD ON PROTECTING THE NATURAL ENVIRONMENT

Environmental, social and governance (ESG) criteria have quickly risen up the list of key priorities for businesses in recent years.

Companies are now all too aware they will be assessed not just on the strength of their balance sheets or quality of their service, but also on their ethical stance.

Preserving and nurturing the world's natural environment and the creatures that live in it is one of the rationales driving efforts to tackle climate change.

And in order to promote this in the UK, Westminster has made the issue the ninth pillar of its 10-point plan.

It has committed to increasing the green recovery fund to £80mn - with the hope of delivering over 100 nature projects over the next two years – and spending £5.2bn on flood defences, a pledge that could create up to 20,000 jobs.

For the penultimate edition of the 10 Point Pod, a series dissecting the UK Government's flagship policy, Energy Voice's Ed Reed is joined by Richard Betts, associate partner in climate change and sustainability services at EY and Tim Kirkwood, chief executive of Danish billionaire Anders Holch Povlsen's Wildland conservation organisation in Scotland.

"Do we still need to worry about biodiversity?"

Unlike the other points included in Westminster's blueprint, the economic and industrial benefits of

‘protecting our natural environment’ aren’t overtly obvious.

The majority of people across the UK live in urban areas, far from rolling mountains and stretching coastlines.

Moreover, there is an increasing need for more development so, as Reed points out, “do we still need to worry about biodiversity?”

Betts said: “We need to remember what biodiversity is. The connections between different species, including our own - we have to remember we’re part of nature.

“Our world is rapidly urbanising and we often don’t think about the natural world. Many have become detached or desensitised. But biodiversity is the foundation for everything, including our economy, so we need to worry about it.”

Kirkwood added: “If you’re in Sub Saharan Africa, for example, you live your life very close to nature.

“If your environment can’t support your needs, it becomes apparent to you very quickly. There’s no wood to cook with, no bush meat to harvest, your water supplies run out.

“You know pretty quickly that you are outstripping the resources that you’re relying to live on.”

“They’re minuscule amounts of money in terms of the problems that we’re facing”

As set out in the 10-point plan, UK Government has made several financial commitments to protect the natural environment and to encourage it to flourish.

But whether the sums of cash being deployed are enough to truly tackle the challenges is up for debate. Kirkwood said: “Fundamentally, this is an investment in

conservation and restoration, to increase our stock of nature and its ability to regenerate.

"The 10-point plan is quite good; it addresses a number of these. But these numbers that are spat out by governments - have £40mn here, £50mn there - they sound a lot, but actually they're minuscule amounts in terms of the problems that we're facing."

In order to enact material change, Betts says that "systemic solutions" are required.

He added: "We need to look at the full picture. Yes, there are lots of good initiatives that are ongoing but we need to look at what else we're doing with our money.

"There have been important studies that have come out recently looking at the scale of harmful subsidies that governments around the world are providing.

"One such report looked at the grants that were provided to agriculture globally on an annual basis. It found that 90% of those subsidies - and it was around $500 billion - were actually going towards harmful agricultural activities."

"We've got to repair our balance sheet"

Committing to 'protecting our natural environment' might have been something the UK Government felt it had to include, rather than something it wanted to.

The jobs figures and commitments to improve standards of living do not take centre stage in the proposals.

Responding to a question from Reed about whether it's "a cost" or an "opportunity", Kirkwood was unequivocal in his stance.

"Nature is fundamental to our balance sheet and we've been raiding it over a long period. We've drawn down on the balance sheet and not noticed it happening.

"We measure outputs in terms of gross domestic product, built capital and all the rest of it – we congratulate ourselves as that goes up. But that's just a measure of output along the other side.

"We've been damaging the fundamentals that have been providing for us so we've got to look at this in a different way, and our politics have to address that. We've got to repair our balance sheet."

Beyond preserving the natural environment as a necessity, Betts says there are opportunities to gain off the back of doing so.

He said: "There is massive potential here for job creation on a really large scale. In our prevailing system - with very intensive agriculture, intensive fishing and the like, - you don't see many people on the land. There are very few people actually employed in large parts of the country.

"If we can move from being planet takers to planet caretakers, that's going to require a lot more intervention. There's the need for rewilding and there's a role for new technologies - drones and the like. And there can also be many opportunities for local jobs to be created in helping to manage and restore landscapes."

KEY MESSAGES

It would be a difficult task to track down someone who disagreed with the idea that the natural environment needs to be protected.

Where the debate lies is around the best way to act and if society should be prepared to give things up in order to achieve it.

While there is no easy solution to effective, holistic conservation, the economic benefits of doing so should spark widespread interest and cause green shoots to grow.

EY INSIGHT FROM RICHARD BETTS

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In our modern, hectic, urban lifestyles, we often haven't thought much about the environment or nature and have tended to think of the environment as being of marginal importance to our lives and the economy.

Yet, as the high-profile Dasgupta Review has recently underscored, in fact, nature is the foundation for our economy, our livelihoods and our well-being. The economy is not separate to the nature, then, but embedded within it. Nature provides us all with many "services" including food and water, shelter, regulating our climate, maintaining nutrient cycles and oxygen production; as well as providing us with spiritual fulfilment, being the source of much cultural inspiration and providing opportunities for recreation and recuperation, which can enhance our health and well-being.

Many recent studies have highlighted how nature loss is now a global crisis that imperils the prosperity of current and future generations and how tackling the biodiversity crisis needs to be a global and national priority by itself and also because we cannot tackle effectively other systemic crises like the climate crisis without tackling the nature crisis in parallel as they are heavily interconnected.

Faced with the magnitude of these risks, we need rapid, transformative change and a new paradigm including how we measure success. Under our prevailing unsustainable model our demands on nature far exceed its capacity to supply. This presents extreme risks for our economies. Hence, the need for us to embrace sustainable economic growth, well-being and investing in preserving and restoring our most precious asset, nature. Doing so as can help us thrive in the 21st Century and to ensure the collective well-being of current and future generations.

LET'S TALK MONEY! THE 10 POINT POD SHAKES THE GREEN PIGGY BANK

It seems fitting that the UK Government chose to round off its 10-point plan with a focus on what will fuel the energy transition – cold hard cash.

As oil and gas has become a less attractive proposition for many investors, they've been forced to shop around for lucrative new opportunities.

Low carbon technology is an exciting offer, a chance to be part of the financial muscle in the fight against climate change.

To unleash green finance and innovation, UK Government has committed to raising total research and development (R&D) investment to 2.4% of GDP by 2027.

Moreover, a £1bn Net Zero Innovation Portfolio aims to aid the development of a range of low carbon technologies, such as floating wind and hydrogen.

Joining Energy Voice's Ed Reed for this, the last in a series exploring the nuts and bolts of the UK Government's 10-point plan, are Tom Groom, partner in financial Services, strategy and transactions at EY, and Joost Bergsma, chief executive and managing partner at Glennmont Partners.

"When you're looking at new technologies, they come with a level of risk"

In many ways, money and energy are two sides of the same coin; each relies on the other.

So, if the UK, and the world as a whole, is going to decarbonise at the rates that have been suggested, serious amounts of bankrolling will be needed to fuel the fire.

But persuading investors and businesses to part with their hard earned cash isn't an easy proposition, something that's especially true for yet unproven low carbon technologies.

On whether financing has matched innovation so far, Groom said: "It's difficult crudely for financing to keep pace with technology changes.

"Every industry in the real economy needs to go through some form of transition between now and 2050, largely relying on new technologies to do so.

"But they're new. When you're looking at new technologies, they come with a level of risk that banks need to evaluate. Will it be the technology that is adopted en masse by that industry or its customer set? Will it work? Will it be superseded by another type of technology?"

Reassuringly, several low carbon solutions that were once viewed with trepidation have established themselves as serious players.

Green energy sources like wind and solar have proven their worth and have pulled in "really significant" support from investors.

But nobody wants to end up backing the transition equivalent of Betamax, so putting money in the right places is key.

Bergsma said that the success of some renewables technologies has created a barrier to entry for others; some are already so cheap that there's no incentive for governments to look elsewhere.

He said: "Where the money is needed now is in enablers that tie these power generation technologies together.

"In that sense I think it's relatively safe, to some extent, to back energy storage, and lithium iron type solutions seem to be well ahead of other solutions in getting the cost curve down."

"Government support at the right time can really help"

Government has a critical role to play in giving investors confidence by providing effective frameworks to mitigate risk.

In the UK this can be clearly seen through the Contracts for Difference (CfD) mechanism that has enabled private money to flow into the offshore wind sector.

In doing so, it has brought the cost of the technology right down, prompting the "extraordinary growth" that's taken place in recent years.

On the increase in offshore wind deployment, Bergsma said: "Government support can be quite effective. The cost curve did come down because governments and the European Union set targets.

"Then a whole series of countries started to adopt an international energy plan and incentive schemes.

"That's really helped to attract capital. It gave investors that secure cash flow and opened the door for banking and equity financiers to come in. Government support at the right time can really help."

Groom said that he's "confident" that private finance will be able to drive the energy transition, but that incentives may be needed to coax it out.

He said: "There's not a financial institution client that I talk to that doesn't want to be associated with facilitating transition.

"But as we discussed, they do all observe incremental risks in doing that because of the new technologies, a lack of precedent and a lack of adoption.

"When you've got that incremental risk, you've got incremental pricing – to some extent that's a market failure.

"Industry is suggesting that they could move faster, but the private financing markets are pricing it wider than would be ideal. That unwinds over time as confidence increases.

"A big question for government is, if you want to bring that pricing in sooner, then are there policy roles that it can play to facilitate that."

"There is pressure on financing organisations to be more of an influencer of the economy"

The role that private finance should play in the energy transition is an interesting one.

As Groom points out, there's a "philosophical argument" at play; should the sector simply fund the economy, or should it seek to influence it?

Though it has not have always been the norm, the rise of environmental social governance in the private sector

means the latter may now well be the dominant school of thought.

Groom said: "If you think about geopolitical pressure and populism, actually a lot of that ends up being driven by customer, stakeholder, shareholder preferences and the extent to which you want to take that broader objective on board about influencing the economy.

"Given the extent to which we're just asking fundamentally really great questions about energy transition in the UK and in Western Europe means that there is pressure on financing organisations to be more of an influencer of the economy than a passive financier.

"The pressure I observe for global banks, particularly those that are multi located, from shareholders and customers is very different.

"I think that stands us in good stead in the UK for thinking about having a lower cost of capital and financing more transitions. The demand from all the stakeholders set is more is more clear and present."

KEY MESSAGES

Energy transition presents private financiers with a fresh and enticing proposition.

A market that is rapidly expanding while also helping the world to move to a cleaner and, fingers crossed, more prosperous future.

That investors are moving into the space in droves should come as welcome news to governments, and more importantly taxpayers.

There's a long stretch left to run though and innovation, both practical and intellectual, will be central to reaching net zero.

The financial sector will have to do a lot of the heavy lifting but, as always, the rewards are there for those that call the shots correctly.

EY INSIGHT FROM TOM GROOM

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Over the next 30 years all industries need to undertake some form of transition.

Typically this will involve new technologies (some of which are not proven yet), new production lines, new suppliers, new methods, and leveraging assets that we don't know enough about yet (what will residual values be, will components be recyclable).

All of these uncertainties lead to both real and perceive risk when banks and investors consider financing transition projects, and those risks give rise to increased return expectations / higher costs of debt.

To better understand and mitigate those risks and in doing so bring down that so called 'green financing premium' it is imperative that finance providers and operators work together – it was great to scratch the surface of that when Joost and I met to talk about the financing of the energy transition.

CONCLUSION

THE GREEN INDUSTRIAL REVOLUTION ONE YEAR ON

It has been a year since Prime Minister Boris Johnson set out the UK's plans for a green industrial revolution – the 10-Point Plan.

While UK Government often receives criticism for not providing enough strategic direction to industry, it is remarkable how well received the 10 points have been across the majority of stakeholders in the Energy sector. Over the 12 months, the UK Government has continued to provide additional policy guidance through key documents such as the UK hydrogen strategy and the heat and buildings strategy, providing additional heft to the framework set out in November 2020.

The 10 Point Pod has charted the ups and the downs of the UK Government plan. In the 11th episode, Rob Doepel, Partner and UK&I Energy Market Leader at EY, Amber Rudd, former Secretary of State for Energy and Climate Change and Energy Voice editor Ed Reed come together to talk about where we started, how we're doing and where next.

Front and centre throughout the series has been the role of government. This will continue to be crucial in providing support to early-stage industries.

"Boris Johnson wants the UK to be leading the world in this huge transformation. If we get that right, if the UK does (that), then it will be able to export its technology and expertise, becoming a centre for green industry," former Secretary of State for Energy and Climate Change Amber Rudd said, speaking on the concluding episode of the 10 Point Pod.

One of those areas seeing a groundswell of interest is hydrogen.

"Every conversation with clients" is about hydrogen, Doepel noted, in part because of the way in which it is seen as a major contributor to the challenge of energy storage.

Primed

The UK strategy has been one of governmental pump priming, paving the way for companies to come in and do the heavy lifting.

In hydrogen, for instance, the UK Government has said it will provide £240mn through a Net Zero Hydrogen Fund (NZHF), while expecting more than £4bn of support from the private sector by 2030. A similar move can be seen in its support for heat pumps, where it will cover some of the costs for some installations in the next few years.

All told, the net zero strategy should trigger around £90bn of private sector investment.

There are times when the government will have to provide clear policy direction. For instance, a choice on hydrogen and national gas infrastructure "is a policy decision. They're really hard policy decisions ... but there are some things government needs to lead on", Doepel said.

The benefits of the UK taking the lead are apparent, with the transition generating new domestic jobs and creating export opportunities.

The UK Government has said some 250,000 jobs could be created under its 10-point plan. However, amid this shift, some sectors – such as oil and gas – will lose out and jobs will be lost.

Picking winners and losers is a politician's nightmare, Rudd said. One area where government has seen some success is in the contracts for difference (CfD) system "Prices will come down so fast and the market will produce so quickly that quite soon there are people making out like bandits on taxpayer money," she continued.

Long-term support

As technology improves, and companies find ways to do more with less, there is a need for government to reduce subsidies. Here, the challenge becomes one of how to bring about change without shocking the market.

CCUS has seen some false starts in the past, with failures at the Longannet and Petershead projects, as Rudd acknowledged.

Governments can change track dramatically during their own times in power, let alone when elections bring about a new government. There is a challenge in a democratically elected government seeking to provide long-term policies and industry support. Cross-party support can play a role here, alongside a broad agreement about the ultimate goals.

Amid the discussion of a green industrial revolution there have been some fascinating discussions on new sectors. International trade in carbon, which companies could capture at industrial sites and ship to storage, under the North Sea is one instance.

Other new areas of technological change include floating wind and new ways of delivering energy security, such as energy storage.

The recent, and ongoing, collapse of a number of retail companies shows the challenge of liberating the energy market and the concerns that this can cause among consumers.

The UK Government will need to provide reassurance to companies and consumers that it can deliver net zero on time and without costs rising too much. The stakes are high – but so too would the rewards be if the UK can leverage this expertise into a new export industry, while helping to prevent catastrophic climate change along the way.

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