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INSIGHTS

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What does your employer think about climate change?

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Petromall was founded by 4 senior industry and academic practitioners who consider the challenges faced by todayís oil and gas environment are going to require herculean acts of leadership and technical skill in the high cost provinces of the world, in order to maintain an industry that is sustainable and even recognisable compared to recent history.

Similarly nations developing an oil and gas industry face related challenges as they seek to maximise the benefits of this new wealth-creating opportunity - in a responsible manner.

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What should oil companies do about decarbonisation?

The momentum behind decarbonisation is probably now unstoppable – but that doesn't mean we will stop using fossil fuels. But does it mean the oil and gas industry needs to change its pathway?

For about 10 years, carbon capture and storage was one of the main planks of the oil and gas industry's decarbonisation plans. It makes some sense, that the fossil fuel industry should be both taking carbon out of the subsurface and putting it back in again.

But the energy industry is evolving differently to how it was anticipated. The cost of solar power has reduced faster than expected (although perhaps China will not be able to manufacture solar panels so cheaply forever), and many countries (including the UK) are anticipating phasing out coal power completely.

Carbon capture and storage so far has proved very expensive, nearly impossible to get off the ground without government support or another revenue stream from enhanced oil recovery. Carbon capture is also looking away from coal power (where it competes, perhaps badly, with renewables as a low carbon electricity supply), to industrial CO2 emissions, and gas power, where the business models are different.

Perhaps the oil and gas industry needs to look in different places to maintain its economic viability.

In an era where renewable energy is unlimited and available at zero margin cost, perhaps the big margins will be in who can provide the best option when renewables are not available or sufficient – and where the cost of generation is subject to a carbon tax penalty (so a preference for lower CO2 fuels).

But it is very hard predicting how this market will work.

Low cost batteries is the dream answer, and perhaps has the potential to put the fossil fuel industry out of business for good, if we can build enough renewables and storage to cover all our energy needs. But for now, batteries have a limited life (say 500 cycles for a lithium ion battery), are expensive, and there are no obvious indications why costs will reduce or the number of cycles will increase.

Gas power stations are a likely answer for the longer term – if they can be built cheaply enough to be viable when they are only running as back-up power, and can come on-stream very quickly. Other options are coal power with carbon capture and storage.

Another option is when electricity consuming companies do deals to reduce their consumption at times of high demand. This could be from hospitals agreeing to switch to their (perhaps dirty, diesel) back-up generators, or an industrial consumer generating its own electricity from gas rather than buying it from the grid.

Meanwhile the growth in electric vehicles seems hard to predict. Many people – including Tesla owners - see it as a 'no brainer' that electric vehicles will shortly replace the combustion engine. But not everyone is convinced. There are barely any electric vehicles in central London, despite it being one of the most viable markets in the UK (short distances and high wealth), and electric vehicles are not so easy to spot in central Oslo either. Perhaps the big question is how much governments around the world will want to encourage and incentivise them, particularly if they have political reasons to be less dependent on oil.

Professor Dieter Helm

Professor Dieter Helm of Oxford University, one of the UK's top energy economists, believes that the future has three main trends – low oil prices, continued decarbonisation, and more technology (see article later in this issue). Although the continued low oil prices he predicts are due to the supply-demand relationship, not directly linked to decarbonisation.

If he is right, that means that firstly and most importantly, the oil and gas industry had better do as much as it can to get comfortable with low oil prices. Low oil prices means more focus on marginal fields, reducing costs, better data management, better reservoir characterisation, perhaps more integrated project management, and decommissioning coming a little earlier.

The decarbonisation trend will drive more focus on gas rather than oil, and more focus on electricity rather than using fossil fuels directly (for transport and heating), also driving a focus on gas rather than oil.

And in terms of technology – the challenge of managing complex electricity supplies and matching with demand can get more difficult. Does the oil and gas industry have expertise in project management, or complex systems management, which could be applied to this? Perhaps not.

This second issue of Petromall insights contains some advice from Petromall consultants Brian Smart, David Bamford and Greg Coleman on how the oil and gas industry (and its regulators and related university research departments) might want to change – and also some thoughts from Dr Dieter Helm, one of the UK's top energy economists, based on a book launch event which Petromall Insights attended.

The world is warming and quickly

It is time for the energy industry to do more to reduce CO2 emissions to the atmosphere, writes Greg Coleman of Petromall

It is clear from the latest update from NASA that 2016 was the warmest year in centuries.

Many argue whether it is due to people or natural but the rise is clear.

We need to do something about this or the inevitable consequences of rising sea levels, storms infringing on coastal population centres and people being displaced will risk serious unrest.

We in Petromall believe that the energy industry has a key role to play in mitigating this rise whether we are part of the problem or not.

It is the same old story:

1) Increase the use of lower carbon fuels.

2) Reduce the impact of the hydrocarbon fuels that we do use. This means increase energy efficiency. This means more natural gas and less coal and crude oil.

3) When coal and crude and natural gas is used then capture the carbon dioxide (CO2) and either use it or store it.

There are many uses for carbon dioxide from use in petrochemical processes through to injecting it in the ground to enhance crude oil recovery which is prevalent in West Texas and increasingly in onshore Canada.

The big challenge is getting the CO2 out of the waste stream and getting economically to a place where it is required.

Lastly capture the CO2 and store it for millions of years in the ground. This is referred to carbon capture and storage (CCS). It is expensive but there is now better technology, lower costs and increasing confidence that CO2 can be safely stored deep in the earth.

Persuading communities that they won't be endangered remains a challenge which industry needs to take seriously.

Greg Coleman

Industry and governments have to work together for solutions which are commercial and can deliver results in 10-30 years not in centuries.

It is time to move.

Greg Coleman is a former group president HSE and Security with BP, among other roles

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Scotland – reduce reliance on wind, develop fracking and clathrates research

Scotland should be very wary about further investment in wind power, it should develop fracking for gas, invest in energy storage, and do research into arctic methane clathrates, says Professor Brian Smart of Petromall, former head of petroleum engineering at Heriot-Watt University

Professor Brian Smart, former head of petroleum engineering and vice principal at Heriot-Watt University, Edinburgh, believes that Scotland may be pushing too hard with its efforts to switch to 100 per cent renewable electrical energy by 2020, because the country could become too dependent on now-proven intermittent wind-powered electricity generation.

It would be better developing shale gas fracking, to provide a home-grown electricity supply, which can plug the gaps when the wind is not blowing.

Scotland should also look hard at energy storage, but probably not expect a large scale energy storage solution to be available in the near future.

He also suggests that Scotland could apply some of its research capability into finding ways to mitigate the threat of melting methane clathrates sending methane into the atmosphere, including 'mining' the methane and putting it to industrial use. This could draw on Scotland's research capability in subsurface, subsea, petroleum engineering and project management.

With challenges over the EU, Scottish independence and the economy, "there are enough major uncertainties facing Scotland in the future without having to live with a self-induced uncertainty of electricity supply come 2020," he says.

Wind

Scotland's energy policy of the past few years has been largely about developing wind power. But this policy may have reached its limits, because the more a country is dependent on wind, the more dependent it is on back-up power supplies, Professor Smart says.

It has been argued in the past that sufficient wind would always be blowing somewhere to fulfil power requirements. This has been shown to be incorrect, he says. "There is enough experience now of the output and management of distributed wind power to enable strategic decisions and plans to be made."

Strategic mistakes have been made in over-reliance on wind power, without providing sufficient back-up storage.

Policy makers also assumed that it would be economically acceptable to the public, for governments to build over-capacity of wind power, and for electricity buyers to finance 'constraint payments', paying the wind sector not to generate.

As an alternative, Scotland has power available from nuclear, gas, biomass and hydroelectric, but the nuclear power is scheduled to be decommissioned by 2030. There is no appetite for coal power in Scotland, and some limited tolerance for gas and nuclear, he says.

If Scotland cannot provide its own electricity, it must be imported from England, or perhaps elsewhere in Europe, and this power is likely to be generated using fossil fuels.

The contribution which the wind power sector can make to provide a reliable electricity supply for the country can be misleading, Professor Smart says. The wind power industry will typically quote its average output, and output on particularly good days.

But customers want continuous electricity supply. This means that when it is not windy, the wind power needs to be supported by nuclear, gas, coal, hydro and biomass, and electricity imports from Europe, he says.

The picture is clear by looking at real time information about the UK's electricity generation, which is freely available online.

For example, on September 15 2016 at 10am, the UK's total demand was 36 GW, 22 per cent being supplied by nuclear, 47 per cent by gas, 16 per cent by coal, 3 per cent by hydro, 4 per cent biomass and 1 per cent by wind. 7 per cent was imported from Europe. At this time, Scotland was importing almost 1GW from England.

Professor Brian Smart

The cost of the wind power to the National Grid is also influenced by Constraint Payments, whereby the National Grid pays the wind power industry not to generate, preferring to use output from other generation sources that can't be switched off, such as nuclear.

The Scottish Government plans to get electricity generation to be 100 per cent renewable by 2020, largely without storage, and ultimately without nuclear power. This is a solution which addresses global warming, but without storage, threatens security, surety and affordability of supply.

The problem would not be solved simply by pushing the date (for 100 per cent renewables) backwards, to allow time for storage to be developed, because Scotland plans to decommission its 1.2 GW Torness nuclear power station in 2023, and decommissioning its 1.0 GW Hunterston nuclear power station in 2030. This will create a further hole in demand for reliable electricity.

Other "secure and sure" electricity capability is the Peterhead gas power station (0.4 GW), and 1.5GW of hydroelectricity, and 0.5 GW of biomass. So by 2030, the 'secure and sure' electricity capability will be reduced from 4.6 GW now to 2.4 GW. Meanwhile Scotland's electricity demand varies between 3GW and 6GW.

At the moment, wind must supply at least 1.4 GW at times of peak demand, or electricity is imported from England, if it is available.

This assumes that England has sufficient capacity, either generated in England or imported from the continent. It is likely that much of this imported electricity will have been generated by nuclear and gas, detracting from Scotland's 100% renewable vision, and potentially putting a brake on independence.

Electricity demand can be reduced through more efficient homes and smart grids. "But this will take time. Also this is not a competent solution to wind's intermittency – there are times when wind power output is reduced to zero," he says.

Electricity storage

There is a need to develop energy storage capacity, "preferably using a range of technologies," he says. This can include pumped storage and hydrogen power.

Distributed battery storage can also contribute, but will take time to build. Production of Lithium has environmental issues, so batteries are not properly green, he says.

The Scottish government did study a "Energy Storage and Management" study in 2010, which may be worth re-examining. http://www.gov.scot/Publications/2010/10/28091356/9

A revised study could get an understanding of how significant the degree of wind power intermittency is to the need to provide reliable electricity in Scotland.

If Scotland does not have enough energy storage to cover the periods of low electricity supply from renewables, it will probably have to rely on gas power, he says.

Shale gas and fracking

Shale gas (accessed by fracking) from Scotland can fill gaps in renewable electricity supply. Nothing needs to be imported. And if the gas power station has a carbon capture and storage system, it could be zero carbon.

It would be possible to build CCGT (Combined Cycle Gas Turbine) plants which can be reasonably easily cycled (power output increased and decreased) to compensate for wind's intermittency.

Many people are opposed to fracking for environmental reasons. They need to be somehow convinced that shale gas is safe, and essential in retaining current living standards, at least through a transitional phase, Professor Smart says.

"Misinformation and emotion have superseded strategic need and science and engineering, creating a powerful anti-fracking political lobby in Scotland, England and Wales."

"The anti-frackers in Scotland have also chosen to ignore the two hundred years of experience of the much more intrusive surface and underground coalmining in Scotland, which did not ruin the local environment. On the contrary, this industrial effort powered the industrial revolution, creating the foundation for the standard of living we all enjoy today. The local environmental legacy of coalmining has been managed.

"The British Government has taken the anti-fracking lobby on, and it is likely that fracking will proceed in England."

Arctic methane

A related energy issue of interest to Scotland, Professor Smart believes, is that rising Arctic temperatures might lead to a release of massive amounts of methane currently held within ice water crystals in the Arctic (known as methane clathrates). Methane itself is an especially powerful greenhouse gas. So this could lead to an irreversible and large kick in global warming.

Clathrates are "a compound in which molecules of one component are physically trapped within the crystal structure of another" – so in this case, methane molecules are trapped within ice crystals. The methane comes from bacterial decay of organic matter, or are leaked from underlying oil and gas deposits. The methane is prevented from entering the atmosphere in the first place, because of it forms into clathrates.

Scotland has all of the academic competences to develop an industrial method to 'mine' these clathrates so they can be burned as part of normal gas power supplies – including subsurface, subsea, petroleum engineering and project management, Professor Smart says.

This may be an interesting area of research for Scotland universities, given its expertise in the critical areas of subsurface, subsea, petroleum engineering and project management, Mr Smart says.

"This is a potential project with a big concept and very substantial multi-disciplinary content."

A project could begin by assembling the data, analysis and opinions already available, enabling a position to be taken. If that position is that the predicted risks are credible, the complex project scope can be outlined, at least to the point where serious discussions with the various likely protagonists can begin.

There are "opportunities for geoengineering type and scale projects that look at capturing methane at source before it is released to the atmosphere, as well as the more conventional geoengineering projects that engage with the atmosphere," he says.

There has been studies on clathrates in an oil production context, where they can block pipelines. Work has been done by Prof Bahman Tohidi's work in the Institute of Petroleum Engineering at Heriot-Watt University. The physics are the same as with naturally occurring clathrates.

There is a growing network of foreign academics and research organisations working on these, primarily from a fuel resource of view. The Japanese are probably leaders in the field, and have successfully prospected for and produced gas from hydrates. http://www.mh21japan.gr.jp/english/

Perhaps it will be possible to develop technology which will capture Arctic methane at source, and liquefy it for transport to a market, rather than let it into the atmosphere.

Japan has managed to capture subsea hydrates, but no-one has developed techniques for capturing methane from the Tundra.

If environmentalists are presented with a dilemma of whether to support the industrial scale access to fossil fuels in the Arctic, or the risk of accelerated global warming, "It makes the anti-fracking conundrum look small in comparison," Prof Smart says.

Dieter Helm's view on the future of energy

Leading UK energy economist Dieter Helm has published a new book "Burn Out – the End Game for Fossil Fuels" – talking about how he sees the oil price, decarbonisation and technology development playing out. ***By Karl Jeffery***

Dieter Helm, Professor of Energy Policy at the University of Oxford and a member of member of the Economics Advisory Group to the British Secretary of State for Energy and Climate Change, has published a new book "Burn Out: The Endgame for Fossil Fuels," with his ideas on how he sees the oil price, decarbonisation and technology development playing out.

Dr Helm presented his ideas at a book launch event in London on April 2017 organised by think tank Policy Exchange, which Petromall Insights attended.

The book is based around the idea that there are three themes happening in the energy industry - oil prices to be low for the long term, continued momentum behind decarbonisation, and a development of new energy technology.

There's nothing new about these themes - but perhaps what is most interesting is that where most people see them as somewhat linked together, Mr Helm sees them has happening independently of each other.

For oil prices, Dr Helm believes that the current $50 or so will seem like a high price from now on. You have probably seen the graphs of the oil price from the 1860 to now adjusted for inflation, showing peaks in the early years of the industry, but then a very low and actually slow decline from 1870 to 1970, and then peaks in 1980 and 2010 and then a drop.

Perhaps we can attribute the peak in 1980 to issues in the Middle East (including OPEC's embargo) and the peak in 2010 to the growth of China, both events perhaps unlikely to re-occur.

So while there will probably be more peaks in the future (for causes very hard to predict now), perhaps we should accept that the $30 to $50 price is actually normal.

And there's no shortage of supply when you take Iran into account. Dr Helm points out that if you work on the basis that Iran has de-facto control of Southern Iraq, and put Iran's oil reserves together with those in southern Iraq, Iran has more oil reserves than Saudi Arabia.

And while OPEC is usually seen as an organisation of Muslim countries (and so there might be some glue holding the countries together), actually Venezuela was one of the founding members of OPEC, which is not Muslim at all, and there is not much glue between the Muslim countries these days. And each country has an individual incentive to maximise production whatever the oil price. So for OPEC to hold together to cut production is more unlikely than likely, Dr Helm says.

For decarbonisation, Dr Helm simply believes that the efforts to decarbonise are now unstoppable, even by Donald Trump, because so much is going on around the world. He also thinks carbon capture and storage is very likely to happen.

For technology, Dr Helm takes what could be described as a 'black box' view – enormous amounts of money and enthusiasm are going into new energy technology, including decarbonised fuels, electricity generation, storage and management, that some of it is bound to lead somewhere.

Dr Helm believes that governments may be better advised to spend money on traditional research and development, perhaps diverting some of the funds otherwise being spent on building solar farms and wind parks.

For example we could see solar films which can capture energy from much more of the light spectrum, including ultra violet and infrared, not just the visible spectrum as they do now.

Different shape industry

Dr Helm believes that the electricity system could look very different in an era where it is mainly provided by renewables.

Dieter Helm notes that oil companies can still be profitable as the industry declines, in the same way that tobacco companies are still profitable. Investors can just apply a discount to the valuation. A discount of 10 per cent means that investors don't think the company will exist in 10 years.

Mr Helm also noted that the hot issue for economists today is valuing systems. Economists want to work out what is the best system for managing something, not look at value of different inputs and outputs, as they usually do. We don't yet know what the best system will be for managing electricity supply and demand, in a world where electricity is basically free, so long as the sun is shining.

Professor Dieter Helm

Why renewables count 3 x more

Also at the book launch event, another panel member Tom Burke, chairman, E3G, an environmental think tank, said something very interesting. Two thirds of all fossil fuel use ends up as waste heat, whereas renewable energy can be used 100 per cent efficiently (e.g. in an electric motor).

So when we see charts saying that (for example) renewables only provide a few percent of today's total energy, you should bear in mind that it would be fair to multiply its contribution by three, or remove two thirds from the contribution to world energy provided by fossil fuels and burning biomass.

Mr Burke also noted that most people think that the problems with UK electricity is about hardware (investment in equipment), not software – but actually it is more about software. This can be seen when you consider that the UK has about 74GW of electricity generating capacity, and peak demand is 54 GW and usual demand is 30 GW. We have plenty of 'hardware', but (if we are worried about black-outs), it is the 'software' and the systems which is lacking.

Why are oil majors calling for a carbon tax?

All the oil majors, and some of the national oil companies, seem to be aligned in calling for a carbon tax, which they would need to pay for CO2 emissions from the process of extracting oil and gas. Why would they do this? David Bamford of Petromall explores the issues

It seems like the oil majors (and some of their national oil company friends) are aligned in appealing for a carbon tax, specifically a tax on carbon emissions from oil and gas operations.

The cynics amongst you might question the motives of the folk appealing for this – does it 'knife' a significant number of competitors for example* - but I prefer to see it as a quest for some sort of certainty as the low-carbon world approaches.

It seems like $50 - $100 per tonne on a CO2-equivalent basis is the range contemplated. It's worth working through the arithmetic to see what this means, using a couple of companies as examples.

Shell

First of all, they are to be congratulated on the extent to which they report, the assurance they reveal. Things changed for them in 2016 due to the BG takeover so it's best to look at 2015.

With respect to greenhouse gas (GHG) emissions from operated facilities, they reported 72 million tonnes on a CO2 equivalent basis, with total production of 2,954 thousand boepd, giving a total of 1.078 billion boe for the year. OK, this is for a mix of operated and non-operated but bear with me.....

On that basis, a carbon tax of $50 per tonne would lead to a total charge of $3.6 billion, or just over $3.3 per boe.

Premier Oil

Slightly more opaque reporting than Shell but the relevant information can be found in the CSR part of the Annual Report for 2015.

With respect to GHG emissions from operated facilities, they reported 822 thousand tonnes on a CO2 equivalent basis, with total production of 57.6 thousand boepd, giving a total of a tad over 21 million boe for the year. OK, this is again for a mix of operated and non-operated but bear with me again.....

On that basis, a carbon tax of $50 per tonne would lead to a total charge of $41 million, or slightly less than $2 per boe.

What does it mean?

You can take two different views of these numbers I guess.

If you look at the per boe numbers, and I'm guessing $2 - $4 per boe would cover it for most companies, then the oil price swings by this amount every month, or so it seems, so why worry?

David Bamford

On the other hand, if Shell and Premier could completely mitigate their GHG emissions (yes, I know how tough that is to do!), then $3.6 billion per annum and $41m per annum would flow to their respective bottom lines. And these sums give them an incentive to invest a proportion of them in such mitigation, especially if they can do it collaboratively through such as the OGCI. Indeed, these numbers give some context to the $100m that companies such as BP, Shell, Statoil, Total, ENI are each going to invest in the OGCI.

*Mind you, it does threaten those lesser companies who do not reduce their emissions!!

David Bamford of Petromall is a former global exploration lead with BP, and a former non-executive director of Tullow Oil and Premier Oil

Getting along in a "lower for even longer" decarbonising world

How should oil companies manage in a 'lower for even longer' decarbonising world? By focussing on gas, forget deepwater, and get better at marginal projects, writes David Bamford

How do companies get along in this "lower for even longer", decarbonising world?

Not in priority order, here are some conclusions that might be drawn from these insights:

Gas assets are probably preferable to oil ones in a decarbonising world.

Exploring for deep water oil does not necessarily make sense, even with plunging costs, if the eventual outcome is a small-to-medium sized company taking on unsustainable debt to pay for projects that may turn out to be late, over budget, and disappointing in terms of production outcome.

Similar comments might be made about 'big gas' i.e. gas in sufficient volumes to underpin LNG schemes.

The majors, and a few of their friends, may be robust enough to take on the risks associated with deep water oil, LNG.

But not smaller-to-medium sized E&Ps. What then for them? Will they wither away or are there things they can do better than the behemoths?

For example, they could be late-life managers/decommissioners of fields in mature provinces such as the North Sea, and/or exploiters of "marginal" discoveries in these mature provinces.

Regional energy providers: typically of gas-to-power (but also potentially renewables) in regions such as East Africa, the Caribbean, and North Africa.

And whatever assets they are working with, they need to deliver "zero CO2 and CH4 emissions" from their own operations.

What does your employer think about climate change?

ExxonMobil's CEO believes that oil and gas will dominate energy supplies for 50 years – and also that carbon driven climate impact is real and we need to do something about it. It may interesting to find out what your employer thinks, writes David Bamford of Petromall

Most of you will have noticed that Rex Tillerson, former boss of ExxonMobil - also multi multi-millionaire courtesy of his remuneration package - is now the US Secretary of State, running that great country's international diplomacy.

Having bumped into his former employer's ideas as to international business – or more accurately, been bumped into by his former employer – I look forward to observing what happens!

Many of you might have missed the fact that he seems to believe two things:

1) Oil and gas will dominate energy supplies for another 50 years

2) Carbon driven climate impact is real and we need to do something about it.

That at first seems conflicting, contradictory. Shades of F Scott Fitzgerald – "The test of a first-rate intelligence is the ability to hold two opposed ideas in mind at the same time and still retain the ability to function."

So, here's a question: what does the company that employs you (or pays your pension, or you buy your fuel from) believe and what are they doing about it?

Being slightly more precise, assuming they believe 1) and why wouldn't they if they are in the oil and gas business, what are they doing about 2), if anything?

The European Majors (and one or two others) appear to be in action via their OGCI initiative and their most recent funding announcements.

I think the Oil and Gas Climate Initiative (OGCI) is a potential game changer, despite no US companies signing up for it, and the annual amount per company being "less than Bob Dudley's remuneration". It specifically talks about CCS and Emissions Reduction (and maybe we should add Utilisation) so is addressing CO2 and CH4.

Thus BP, Shell, Statoil, ENI and Total seem to have all committed themselves to this 'Tillerson view'. They have all signed up to $10m a year.

Digging down into the asset portfolios of any one of them will reveal producing assets that will go on for another 25 years (at least).

Of course they have very generous remuneration policies that reward production growth and cost cutting but only nod in the direction of CO2 and CH4.

So for them, a decent question is "what exactly are you doing?"

But there is another group of companies, for example the so called FTSE E&Ps with lower market caps, for example Tullow, Premier, Enquest, Ithaca, who probably believe 1), have equally or arguably more outrageous remuneration polices, have not signed up to OGCI (maybe they weren't asked), for whom the question might be "why are you doing nothing?"

Why should you not ask these questions as either employees, pensioners or shareholders?

Time to recognise the risk of stranded reserves

It is time for E&P companies to plan for the big shift to low carbon fuels in future, writes David Bamford of Petromall

The International Energy Agency (IEA), in a joint report with the International Renewable Energy Agency is warning that "$1.3 trillion of oil and gas could be left stranded" (March 2017).

http://www.irena.org/DocumentDownloads/Publications/Perspectives_for_the_Energy_Transition_2017.pdf

See Daily Telegraph article http://www.telegraph.co.uk/business/2017/03/20/iea-warns-13-trillion-oil-gas-could-left-stranded/

The report states that to limit the temperature rise to below 2 degrees, with a probability of 66 per cent, would mean that "emissions would need to peak before 2020 and fall by more than 70% from today's levels by 2050. The share of fossil fuels in primary energy demand would halve between 2014 and 2050 while the share of low carbon sources, including renewables, nuclear and fossil fuel with carbon capture and storage

CCS), would more than triple worldwide to comprise 70% of energy demand in 2050."

However, the question then emerges, whose oil and gas would be "left stranded"?

I think the answer is simple.

If all the majors (and some of the national oil companies) are responding, the folk left without a seat when the music stops will be those E&Ps who do not recognise the risk now and do nothing.

They will collect the wooden spoon (usually presented to the team which comes last in a competition) and we will have found that analysts who recommend them are blowing smoke!

Maybe you should ask what your company is doing.

All in my humble opinion, of course!