

Will Oil and Gas Companies Survive Action on Climate Change?

Discussion paper from Paul Gilding.

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It has always been clear that fixing climate change would require a massive industrial and technological transformation, with widespread social, market and economic consequences. The recent [IPCC Special Report](#) on 1.5 degrees however deeply challenges the dominant assumptions about the speed and scale involved.

This has profound implications for many industries and for policy makers, but perhaps most especially for the multi-trillion-dollar fossil fuel industry, particularly the oil and gas majors (the coal industry now being in terminal decline regardless).¹

For the past few years, I have been researching what to expect in such major economic transformations - from both large incumbents and disruptive new players.

The [evidence suggests](#) that when business models are overturned, the dominant tendency of large incumbent companies is to fail. That led me to question the assumption most people make, that the giant oil and gas companies would transition to become the giant energy companies of the future.

Central to any such analysis is the science as, over time, this will ultimately drive how society acts and in particular at what speed. The IPCC recently told us that to achieve a safe climate we must reduce CO2 emissions by nearly half by 2030 (vs 2010) and to net zero by 2050². The science is very straightforward. We either achieve that outcome or face the existential risk of runaway climate change and economic collapse. Doing the latter would be madness. So despite today's lack of political attention to this, it is reasonable to assume we will act dramatically and soon in the face of such an urgent existential risk.

For the oil and gas industry that has very clear implications. The market for their product (for use as energy) could halve within 10 years and then decline to zero thereafter. If you find this hard to imagine, you must assume we will knowingly accept the risk of collapse instead. I would argue humanity may be slow, but we are not stupid.

¹ Coal is of course key in terms of emissions, but also has less market controversy, with no rational analysis arguing it has a serious future. Increasingly new renewables and storage is even cheaper than written off existing coal plants, let alone new ones. Yes, there's political debate and artificial support for coal, but the market fundamentals will resolve this in the next decade, though policy can certainly accelerate that.

² IPCC 1.5 degree report <http://www.ipcc.ch/report/sr15/> Note these reductions are from 2010 levels, with the task actually greater given 2018 emissions are higher. And this is for a low level of certainty of achieving the 1.5 degree goal (about 50% likelihood). Clearly for an existential risk to the world economy and society, this likelihood is debatable as to acceptability.

It is therefore important to think realistically about how such economic transitions occur and how society and the market is likely to manage this one. Separately – and it is a *quite* separate issue - we also need to ask if there is a realistic likelihood of today's oil and gas companies transitioning as corporate entities. Do they have a future? Or will they just fail - as incumbents most often do when faced with such dramatic market change?

Let me be crystal clear on something I think most people get wrong – and as I did before this research. The question is not *could* they change, or *should* they change. Nor is it would it be better for society *if* they change. Those questions really don't matter. The future of these companies will be determined in the market, not by the anyone's preferred outcome.

Therefore, only one question matters: *“On the balance of probabilities, given the way markets work and based on real evidence, what is the likelihood they will change.”*

To answer this, I considered the combination of five key factors:

1. The speed of transition now required – 12 years to cut CO2 emissions by around 50% with continued rapid decline thereafter;
2. The *economic* viability of CCS technology for energy production vs the dramatically falling costs for renewables and storage;
3. The viability of a transition strategy for the industry – does it actually make business sense for them to become energy companies?
4. The evidence of the behaviour of large listed oil and gas companies over the 30 years since it became clear climate change was an existential threat to the industry.
5. The behaviour of financial markets with respect to incumbents and disruptors during major economic transitions.

I will return to each of these factors below, but first some framing comments on my analysis.

Timing is perhaps the most critical issue.

When it was argued we had 30 - 40 year to plan the transition to a low carbon economy, the industry had viable wriggle room. It could make assumptions about future technology like CCS and perhaps most critically, its leaders could afford to focus on making money in the next 10 years (a key determinant of share price) while managing reputation and political influence in order to slow down the rate of change. They could thus assume future leaders would have to make the tough business transformation decisions.

However, when we start thinking about what the IPCC says is needed to achieve a safe climate – reducing CO2 emissions by nearly half by 2030 and to net zero by 2050³ – there is no believable 30 - 40 year growth plan involving oil and gas.

³ IPCC 1.5 degree report <http://www.ipcc.ch/report/sr15/> Note these reductions are from 2010 levels, with the task actually greater given 2018 emissions are higher. And this is for a low level of certainty of achieving the 1.5 degree goal (about 50% likelihood).

As one of Britain's most influential energy experts [Professor Paul Stephens said](#), the choice for oil and gas companies is now stark. It is between an urgent and radical change in business model - with a strategy of managed decline but ultimate survival on a much smaller scale - or "what remains of their existence will be nasty, brutish and short."

So the question becomes – will they embark on such an urgent and radical change in their business model? Or will they wait too long and then face Stephen's "brutish and short" end? And given the market evidence to date, have they left it too late already?

Before I examine this further, let me also be clear on my view of these companies and the people who both lead and work in them. The debate on climate change and fossil fuel companies has become deeply polarised. In my view, as we see with politics in the USA, polarisation is generally not helpful to getting things done. It is a good way of getting attention and mobilising "your side's" base, but it often slows progress because it creates defensiveness and conflict. We see for example how energy technologies have become ideological weapons – almost an article of faith for certain belief systems. This is very destructive and a real barrier to progress.

I can see how this emerged. I understand the fear and anger of the climate movement – who correctly see their task as saving civilization and the fossil fuel industry as a key barrier and in some cases an active enemy. I also see why those in the oil and gas industry feel defensive and unappreciated. They have spent their lives and their careers delivering something of enormous value to society – the energy that has been the underpinning of enormous economic growth, particularly since WWII. Growth that has improved the quality of life for billions of people.

Yes, the industry did themselves no favours in its early resistance to the climate science with some, like Exxon and Koch Industries, deliberately and actively fighting against progress in clearly immoral ways. I think this behaviour will be judged very poorly by history – and possibly the courts.

But most people in the industry are not like that.

Besides, it never hurts in life to default to showing respect and I think we should acknowledge what the industry has achieved and give credit where credit is due.

That however is a moral and humanity issue. It is not a business strategy or market one and most importantly, it has zero influence on the answer to whether they will change. Markets do not consider what's fair. Therefore, what matters to this question of "will they fail" is the historical evidence of actual business and economic behaviour during major industrial transitions.

As I argued [in this earlier paper](#), it is the inherent tendency of large incumbent companies to fail when their business model is fundamentally overturned. It is certainly not always the case, but it is the default outcome. Apple, Amazon, Microsoft, Google and Facebook did not emerge from incumbent companies but rather took market value away from incumbents. Tesla is an emerging example today, as are various new energy companies.

In this context, it is also important to recognise that the business challenge involved in any attempt by the oil and gas majors to truly transform is mind boggling in speed, complexity and scale.

As I argued in some detail in [this analysis](#) this is not a change in technology (e.g. replacing coal with solar). I will return to this in more detail below.

This means a transition is inherently very difficult, even without the issue of speed. Therefore our starting assumption should be the default market outcome - that the major oil and gas companies will fail. And then we can ask - are there good reasons to believe this case will be different?

Let me repeat the point I made above, as I think this is where most people get this wrong.

The question is not *could* they change, or *should* they change. Nor is it would it be better for society *if* they change. Those questions really don't matter.

Only one question matters: "*On the balance of probabilities, given the way markets work and based on real evidence, what is the likelihood they will change.*" And then, what does that mean for investors, policy makers and others who engage with the sector.

It is a crucial question with far reaching implications.

To answer this I considered what I think are the five key factors

1. The speed of transition now required – 12 years to cut CO2 emissions by around 50% with continued rapid decline thereafter;
2. The *economic* viability of CCS technology for energy production vs the dramatically falling costs for renewables and storage;
3. The viability of a transition strategy – does it actually make business sense for them to become energy companies? (Thus would the market support them doing so?)
4. The evidence of the real business behaviour of large listed oil and gas companies over the 30 years since the existential threat to the industry's future became clear.
5. The behaviour of financial markets with respect to incumbents and disruptors. during major economic transitions.

I will address each of these.

1. Speed of transition required.

The speed is the clearest issue. The IPCC has a strong record of *underestimating* the rate and severity of climate change. Therefore, their latest report suggesting we have to cut CO2 emissions by around half in 12 years and then eliminate them on a net basis by 2050 can be considered the *least* we will have to do. Given the history of the IPCC underestimating the risks, it is likely [more urgent than this](#). But even working with this report as written the consequences are clear.

We either achieve that outcome or accept a material level of existential risk of runaway climate change and economic collapse. Doing the latter would be madness. So despite today's lack of political attention it is reasonable to assume we will act dramatically and soon in the face of such an existential risk.

Therefore, this objective is not a thing we *should* do, it is what we *must* do to avoid economic and social chaos. Given that objective translates to an approximate halving of the use of the industry's product⁴ in around 10 years, the outcome is clear.

Conclusion: Their current business is finished. Nothing short of dramatic and rapid transformation will see them survive.

2. Economic viability of CCS for Oil and Gas.

Carbon capture has long been held up as the saviour of the fossil fuel industry. All major player talks about it as key to their future. The proposition is that fossil fuels are cheaper than renewables and a more consistent supply source, so even with the added cost of CCS fossil fuels have an important future. The market evidence shows this is not correct, but most policy makers think it is.

However, any financially driven and rational business analysis of the technology's potential soon concludes it is an enormous stretch *as a saviour for the oil and gas industry* (as opposed to it being an interesting and useful technology in other circumstances).

It is largely irrelevant to oil, while gas will increasingly struggle to compete against solar and storage for electricity generation anyway, even without the added cost of CCS. Most business CCS investments today are driven by [enhanced oil recovery or regulatory or technical obligation](#).

The rational market question to ask is this: If it was really the future for oil and gas – the only chance of survival, couldn't we expect the oil and gas industry to be seriously investing in it? They are not. They are smart people. They know it makes no economic sense to do so.

Conclusion: CCS may well be useful for society, but it will do little or nothing to support the use of oil and gas for energy. Given this is where most oil and gas is used, it will not save the industry.

3. Is it viable for oil and gas companies to become energy companies?

There has long been talk about oil and gas companies becoming energy companies. This is perhaps *the most misguided idea in the debate*. Except in very limited applications, there is no economic, business or market logic to today's oil and gas majors becoming energy

⁴ It doesn't translate directly because of the question of the mix of coal, oil and gas and timing of each's decline, but on the other hand as described above, the target of halving CO2 in 12 years is likely significantly too conservative, so the principle guidance remains the same.

companies. The new energy market is so different than the present one that it requires entirely different skills. A distributed solar and battery-based energy system with autonomous electric vehicles has as much to do with the oil industry as Facebook had to do with the Postal Service, despite both being about connecting and communicating between people.

As I mentioned earlier, this means the business challenge facing oil and gas majors is mind boggling in speed, complexity and scale. I argued in some detail in [this article](#) that the business ecosystem of energy in 2025 will have more in common with that around an iPhone than with today's oil and gas industry.

This is not a change in technology (e.g. replacing coal with solar). It is total business system change – different technologies, different market valuation methodologies, different supply chains, different business cultures, different price and cost cycles. It is a distributed consumer technology business vs a centralised long-life resource business. It simply couldn't be more different, meaning in turn that the transition could hardly be more challenging - to actually deliver in the real market.

It's not that oil and gas companies *couldn't* become energy companies, it's just no more logical than them becoming any number of different types of companies where large capital is deployed. And there are options that are much easier stretch than being energy companies, except in relatively minor ways such as geothermal or wave power.

Many would have views about the core skillset and competitive advantages of oil and gas companies, but it is not energy. I see it as complex engineering in difficult circumstances, resource trading, managing large assets and capital projects and leveraging their huge political and incumbent's influence.

Conclusion: In many ways, becoming energy companies would be the *most* difficult transition strategy for oil and gas companies. This is the case anyway, but it is all the more so when the now required speed is taken into account. There are different, more logical transition strategies, outside energy, but they imply smaller, leaner companies than the large companies of today, as argued by Paul Stephens above.

4. What can we learn from the strategies and culture of large listed oil and gas companies?

It has been some 30 years since it became clear climate change was an existential threat to the industry. This is a *very* long time in business terms and we can learn a great deal from the *evidence of what they have done*, which is more important than what they say they could or will do. There is much to say on this topic, but to summarise the key lessons:

- They have made no serious attempts to change. There have been false starts, with the best example being under Sir John Browne at BP. But this was squashed by the Board who reverted to the core business and an aggressive focus on fossil fuels and speed, arguably increasing the likelihood of the Deep Horizon disaster which costs

the company around \$65 billion. (Imagine if that had been spent on Browne's transition vision.)

- The industry is not courageous or entrepreneurial - the culture needed to make the bold transformation required. This is no surprise, and not at all a criticism. It's just how incumbents are. Why did Tesla drive the electric car revolution rather than Ford or VW? Because risk aversion and caution are (understandably) dominant in the incumbent culture - and very hard to breakout from.
- The industry, like all incumbents, biases its analysis to suit its self-interest. Thus, like everyone did in the fossil fuel market, including the IEA, the oil and gas sector totally missed the speed of the renewables revolution. They are still today in denial about the speed and disruptive nature of the change underway, as evidenced by their forecasts.

Conclusion: The industry has already lost the race to become energy companies. They could perhaps have done it starting 30 years ago, or even 20. But they are now up against "built for purpose" companies that are large, well-financed and way ahead of them. They will never catch up and the market wouldn't support them trying to, as per my next point.

5. The behaviour of financial markets with respect to incumbents and disruptors.

This is perhaps the single most important issue in this analysis. It is also the one that gets the least attention, except by organisations like the [Carbon Tracker Initiative](#), perhaps because it lacks the drama, technology excitement and morality of other factors. It is in the end however, the issue that will probably have the most impact on the future success or failure of Oil and Gas companies.

This is the way the financial markets are likely to respond to a transition like the one described above.

On the attitude of investors to this question - of radical disruption and innovation - the evidence is clear. Financial markets value disruptors highly and incumbents poorly. The showcase example of recent times is Tesla vs GM. (Which is about a *much* simpler transition than Oil and Gas companies face today).

- Both had electric car programme's, both of which were highly risky.
- Tesla had excitement, an iconic leader and a "Silicon Valley feel", but huge risks, a radically unproven business model of taking orders and deposits before production had even started and no history of manufacturing.
- GM had many advantages – large capital, established distribution network, market credibility and, perhaps most importantly, they were making a profit and knew how to build cars.
- Yet at a time when GM was producing around 9 million cars per year vs Tesla's 80,000, the market valued Tesla as being worth more than GM.

On the financial fundamentals, this made little sense. But that didn't change the investors behaviour or the valuations they made. Perhaps it's a case where the market valuation – a

kind of crowd sourced intelligence – recognised countless examples in technology and related fields where incumbents fail while some disruptors succeed in spectacular fashion.

Today's Oil and Gas companies are the GM's of energy. GM also made serious but relatively (to the rest of their business) small investments in electric cars, the Oil and Gas companies are making relatively small investments in non-O&G based businesses. The markets won't reward them for these, for the same reason they didn't reward GM. As a result, the Oil and Gas companies' investments will continue to be cautious and risk averse.

A common response is can't they just wait until the market has "arrived" and then use their large size and capital to diversify by acquisition? The short answer is no.

The longer answer is that the market is ruthless in judging value. On that issue, even without considering the climate emergency we face, and the timing involved, these companies already face their own "existential risk".

The core competition to oil and gas are now technology businesses – electric and then autonomous electric vehicles in the case of oil. Wind, distributed solar, batteries and other storage in the case of gas (even without the costs of CCS, let alone with it). The history of these technology disruptions are almost always bad for the incumbents and they tend to happen very fast once they get momentum. The electric and autonomous vehicle question is still hotly debated, but will soon be resolved. [Some, like Tony Seba from Stanford University argue](#) for example that all new cars will be electric by 2025. If you want to go deeper on this I recommend starting with the think-tank [RethinkX's analysis](#).

Valuations of companies, despite public perception, is not just based on short term profitability but long-term growth and the valuation of assets that will generate future income (especially in this case reserves of oil and gas that are only valuable assuming future demand).

The way this is likely to develop is that one day, not literally a day but perhaps close to it, the market will recognise that *in 10 years' time* there is a serious risk that oil consumption will start to fall, not grow and the gas generation will soon follow. On that day, investment in new exploration *today* will be seen to be wasted cash and the valuation of reserves will be dramatically reduced.

I emphasise, this shift will happen not when the actual market for oil and gas changes, but when the financial markets believe it's a strong possibility *in 10 years' time*. As the excellent work of the [Carbon Tracker Initiative](#) details in extensive and comprehensive analysis, this is not currently adequately priced into the valuations of Oil and Gas companies.

Given the world's top scientists now argue we have to slash CO2 emissions by 50% in the next 12 years, this "day of reckoning" may literally be any day now.

Therefore, short of a truly courageous transformation strategy that shakes the industry up, these companies will first face an inherent competitive disadvantage in the financial market's valuation of them vs their competitors in the new energy space. Then, when the

transition is clear and underway, they will not be supported by the market to then undertake an inherently difficult and risky transition. Their death spiral will then be underway.

Conclusion: The combined weight of the issues 1 – 4 detailed above makes it very hard for Oil and Gas companies to avoid the default outcome of failure. But when the attitude of the financial markets is taken into account it seems almost inevitable.

Conclusion to the core question – “On balance will O&G transform or fail”.

On balance the only reasonable conclusion, that is based in the evidence vs wishful thinking, is that it is highly unlikely most, perhaps any of these companies will survive – at least not in anything like their present form, size or valuations. They will indeed “fail”.

“Fail” does not mean they will necessarily cease to exist as corporate entities – though many of them probably will, through collapse or mergers. But it does mean that will be nothing like they are today, in size, value or influence.

I’m not saying it’s not *possible* for them to transform, but I am saying you’d have to ignore the evidence to assume transformation is a reasonable possibility.

Interpretation and commentary

How is this likely to all unfold?

The Oil and Gas companies will most likely follow the incumbents’ traditional and well-worn path:

- They will make relatively token investments in diversifying their businesses – sufficient to tell a good story and one that they will believe themselves. Serious money, but not compared to their core investments.
- Most of these investments will not be able to compete with the new players for a combination of the reasons detailed above, in particular culture.
- They will continue to underestimate the pace and scale of change in the energy sector, as they have been for decades. They have to do so - to justify their strategy and to avoid the “day of reckoning” referred to above.
- They will believe their own analysis about having decades to change and so won’t make substantial or bold decisions because in their wrong-headed analysis, these decisions won’t make commercial sense.
- When the markets turn on them, they will no longer be strong enough to recover because their investors will conclude that their money is better in the energy sectors’ “Teslas” than in its “GMs”.

Does any of this really matter? Given this is how markets have always behaved, and we have got through many other disruptive market changes, can’t we just let this unfold? In other words, just let the Oil and Gas companies get it wrong, fail and be replaced?

It's not quite that simple. The difference vs other examples is that this is not just another disruptive market change resulting in a transfer of value between companies and investors. What's at stake, as well articulated in the latest IPCC report, is the future stability of the global economy, with very large social and geopolitical consequences – not to mention the ecological ones. This truly is an existential risk, with collapse of civilisation a serious possibility.

This question of speed is therefore now the single most important question in climate action.

If we enter into this process with false assumptions – and make policy and investment decisions based on them - we risk making some serious errors with far reaching consequences, in particular slowing down the rate of change.

The oil and gas sector is very large, but it is also very influential in the climate debate. That is of course reasonable as one of the most affected stakeholders. However, much of the debate around their role – and resulting policy decisions being made - assumes their ongoing economic contribution and their critical importance to the way forward for society overall.

If in fact there is an “on balance” likelihood they will fail, it could significantly change how we respond to their arguments and change how policy is set. That is why this matters. If we are to be science based – we simply don't have the time to back the wrong horse.

Let me finish by returning to the issue of respect. I think most or all of the Oil and Gas companies will fail. I think the evidence suggests this is the most likely outcome. We need to be aware of this and act firmly in terms of policy as well as investment and economic assumptions. However, we should not make this personal or ideological.

I think of this as being like a soldier returning after serving her/his country. In that example, we need to show respect for what they have done – after all it was for our benefit and at our request - but we then help them face up to their new world. A world where shooting people is no longer OK, even though we asked them to do that just previously - and even celebrated them for doing so.

This is how it should be with the oil and gas industry. They have served us well and we shared, with them, the great benefits that resulted. But we now all have a new world to live in. One where the use of oil and gas is no longer acceptable, where in fact it poses an existential risk to our society.

We should thank them sincerely for the service – and then say goodbye.