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BRIEFING PAPER February 2017

PATHWAYS TO 1.5/2°C-COMPATIBLE OIL IS MANAGED DECLINE THE ONLY WAY?

INGRID HOLMES

In Paris in December 2015 world governments agreed to limit global warming to below dangerous levels. To achieve the target of holding the increase in global temperatures to well below 2°C and pursuing efforts to limit it to 1.5°C, countries agreed to increase their climate action commitments on a 5-yearly cycle. Further specific targets were added: to achieve global peaking of greenhouse gas emissions (GHG) as soon as possible and to reach GHG neutrality in the second half of the century¹. This goes further and faster than anything previously agreed and signals that unabated combustion of fossil fuels must end by 2060.

In November 2016 the Paris Agreement came into force as governments responsible for at least 55% of total global GHGs deposited their instruments of ratification. The huge task that lies ahead in terms of delivering an economic transition that keeps the climate safe will now require an informed and sustained engagement between fossil fuel companies and the rest of society. Tackling a problem of this magnitude will need all stakeholders to play a part – not just ‘energy decision-makers’. This paper focuses on the challenges faced by one subset of fossil fuel companies, the oil and gas majors, and sets out their options to plausibly respond.

¹ Current Intended Nationally Determined Contributions (INDCs) submitted by countries currently add up to 50% probability of limiting global forecast temperature rise to 2.7°C by 2100, but more momentum can be expected – especially given rapid technology innovation and growing support/awareness of risks from progressive business, investors and city networks.



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Executive summary

- The international oil companies (IOCs) and national oil companies (NOCs) face an existential threat from the transition to a low-carbon economy consistent with the Paris Agreement and its goal of a 1.5°C/2°C limit to global warming. The IOCs and NOCs are simply too big to be allowed to fail. The industry does need to adapt and change: ‘do nothing’ is not viable option.
- In terms of reserves, in 2012 the NOCs' share of the world's total oil reserves had reached nearly 70% (and 50% for gas) compared to <10% in the 1970s. Given access to low cost reserves is mainly controlled by NOCs, this means potentially a higher proportion of IOCs' reserves could be ‘stranded’ compared to NOCs’.
- For the IOCs decisions about changes in business strategy, and notably changes to capital expenditure and dividend policy, must be taken in the face of significant uncertainties. To limit asset stranding risk, key questions need to be answered about over what timeframe, where and how should they respond to changing policy and market dynamics to maximise value to shareholders and to society?
- Answering these questions will require a different approach to business strategy and planning to that used in the past. IOC shareholder value may be better secured by investors engaging with companies to deliver a managed transition towards business strategies/models compatible with a 1.5°C/2°C warming limit.
- Five plausible, though not necessarily credible, strategies to evolve IOCs to become 1.5/2C-compatible are identified. ‘First one out’, ‘Last one standing’ and ‘Planned transformation’ are all credible responses to serious loss of demand due to climate policies (and carry the risk of what to do if demand is not destroyed.) ‘Drift’ and ‘Ostrich’ – as the names imply – are not. All are plausible responses from the companies, which is why they are assessed here. Planned transformation – both to renewable energy (RES) and to services tie up with NOCs - are the only strategies that are representative of real diversification and carry with them the option of splitting the business.
- ‘First one out’ is a capital return-based strategy deployed by a company that has a strong portfolio of high producing and low cost assets that ‘sees the writing on the wall’ regarding the 1.5/2°C target. There is a strong argument to be made that this approach is the most preferable since it allows financial markets to reallocate capital to other sectors instead of the IOCs.
- A ‘Last-one standing’ strategy would be deployed by a financially strong company that prioritizes becoming the biggest and lowest cost producer with vast low cost



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reserves and downstream assets based where they can be used to maximise control over local markets. The closest current example of this strategy appears to be that of ExxonMobil or Shell. A Last one standing strategy will need to have a strong analytical underpinning of market opportunities and how the 1.5/2°C transition might unfold and affect those markets.

- ‘Drift’ is a mix-and-match strategy that would be adopted by a company aiming to optimize its portfolios within shrinking markets. There is a deliberate wait-and-see approach. This strategy risks the company remaining the same size or shrinking as markets are squeezed, especially if one of the other companies in the market is deploying a Last one standing strategy. Much the Drift strategy’s success will also be linked with the fate of NOCs and home governments struggling to deal with falling public revenues from oil. It is not deemed a credible approach.
- ‘Planned transformation’ comprises a company strategy to diversify out of oil into gas and/or clean energy. Investors are likely to be skeptical about this strategy not least because stock markets traditionally undervalue the stocks of conglomerate businesses. A subset of Planned transformation is ‘Services tie-up’ where a technically strong IOC would manage projects for an NOC and be rewarded by some mixture of cost recovery and profit sharing.
- ‘Ostrich’ is a default strategy adapted by a company failing to take a proactive approach to managing its fortunes. This is not deemed a credible option.
- With a growing number of investors calling for oil and gas groups to align themselves with the low carbon transition embodied in the Paris Climate Agreement, managements will now need move quickly to take a clear view on how to respond to industry headwinds. Much of the internal management conversation will concern whether to focus on maximizing dividends or optimising longer term value through advantaged capex and over what timeframe.
- After selecting a strategy, and in the face a great uncertainty, managements will need to hold their nerve and be willing to adapt as events unfold. They will also need a strong story to tell both to investors and wider stakeholders. The risks of each strategy need to be considered in the context of an early or late energy transition and against a backdrop of NOC dynamics.
- To support decision-making, the energy outlooks used by the IOCs need to be improved to better inform analysis and discussion of the energy transition choices. In addition, war gaming against a backdrop of different possible real-world 1.5/2°C transition scenarios to understand how business planning decisions and strategies by the IOCs and later the NOCs might affect company value will be useful.



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1. Introduction

Major oil and gas companies, both IOCs and NOCs, face an existential threat from the transition to a low-carbon economy consistent with the Paris Agreement and its goal of a 1.5°C/2°C limit to global warming. New technologies, uncertain energy demand, rising energy efficiency, competitive resource landscapes and policy and regulatory changes all have potential to disrupt oil and gas company business models and strand assets. In the private sector, shareholder value in the IOCs may be better secured by investors engaging with companies to deliver a managed transition towards business strategies and, ultimately business models, compatible with a 1.5°C/2°C warming limit. This could be achieved through a managed decline or through rapid diversification from the current commercial offer².

For NOCs there is the additional question of how the company will contribute to the diversification of national economies that currently depend on continued exports of oil and gas. NOCs control between 80% and 90% of proven global oil reserves – and most NOCs engage with IOCs in variety of contractual arrangements that affect the opportunities open to IOCs.

For the IOCs themselves decisions about changes in business strategy, and notably changes to capital expenditure and dividend policy, must be taken in the face of significant uncertainties. These include: macroeconomic assumptions; reductions in total primary energy demand; oil and gas demand by sector; OPEC and non-OPEC production levels; the electrification of light duty vehicles; oil prices; future power generating options; and carbon dioxide emissions³. **These dynamics all point to an erosion of demand for oil and gas – indicating ‘do nothing’ is not viable option.**

For the publicly listed IOCs in particular, the key questions both they and other stakeholders (including investors, civil society and governments) need to answer are:

- over what timeframe;
- where; and
- how should they respond to maximise value to shareholders and to society?

For the IOCs, adequately answering these questions will require a different approach to business strategy and planning to that used in the past. As one observer notes: “oil company managements have believed with quasi-religious fervour in perpetually rising oil demand. Therefore finding new reserves seemed more important than

² P. Stevens (2016) International Oil Companies: The death of the old business model. Chatham House

³ Ibid



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maximizing cash distributions to shareholders”⁴. **A new approach is needed and some, but by no means all, of the oil majors are now starting to seriously consider how to do this. This is arguably long overdue.**

Since the early 1990s, a number of problems have undermined the IOCs old business model including, but not limited to, pursuit of ever higher cost reserves and unsustainable dividend policies. This has been aggravated by two more recent problems: issues associated with the collapse in crude oil prices seen since June 2014 and growing concern among investors about the risks from ‘unburnable carbon’. While the IOCs have been able to survive the last 25 years, more recently real cracks have begun to show⁵.

There has been a structural change in market sentiment towards the IOCs as doubts about climate change have receded. This has moved the conversation on from ‘if’ to ‘when’ and ‘how rapidly’ the energy transition will happen, as well as how the companies will respond. Poor financial performance and growing concerns about business models rooted in assumptions of ever-growing oil demand, oil scarcity and the need to increase bookable reserves means growth assumptions for the sector are increasingly challenged. As a result, the IOCs can no longer count on unqualified support from government as climate action and technology innovation degrade the previously strong alignment of interests.

A new report by Wood Mackenzie, one of oil and gas industry’s leading research providers, warned that oil companies risk being left behind in the transition to low-carbon energy and that the industry is not investing enough in green technology. Paul McConnell, Director of Global Trends for Wood Mackenzie said: “It is clearly existential because you are talking about what happens to producers of hydrocarbons in a world where demand for hydrocarbons is slowing.” The report also calls out the “strong rhetoric” from oil companies on diversification into renewables; “a much greater proportion of [their] capital will be needed to deliver a material shift”⁶.

⁴ Ibid

⁵ Historically, an effective OPEC has been an important crutch to the IOCs’ business model. By controlling supply, it ensured price levels well above any competitive equilibrium, which made the IOCs’ higher-cost upstream projects viable. Notwithstanding OPEC’s very recent decision to cap production to 32.5m bbl/day, down from 33.4m bbl/day, OPEC’s (or rather Saudi Arabia’s) general strategy now is to make sure the supply curve goes the right way by pushing high-cost producers out of business. This effectively buries the old business model. By taking that position, OPEC has arguably abdicated any role in controlling the market. In so far as OPEC is no longer effective, so too is the old IOC business model. The IOCs are – as a result – challenged. From P. Stevens (2016) International Oil Companies: The death of the old business model. Added to this, OPEC is now under competitive pressure with US shale in a way that it wasn’t before. So although OPEC and the Saudis can rein in their own supply (which is already uncertain and suffers from cheating/defection) any rise in prices brings online considerable amounts of US shale oil, keeping the price equilibrium ‘lower for longer’. From: The Economist (2014) *Sheikhs vs Shale*

⁶ See <https://www.ft.com/content/ba3719e6-ad41-11e6-ba7d-76378e4fef24>

Diversification to renewable energy is not necessarily a given. There are several possible ways forward the IOCs can pursue. Some are already being partially enacted.

This is driven by a growing consensus that the IOCs cannot assume that, as in the past, all they need to survive and flourish is to increase their technical capacity to make them attractive partners for NOCs with undeveloped reserves, to position their own projects as low as possible on the cost curve of opportunities available to them and to wait for crude prices to resume an upward direction⁷. Certainly being as low on the cost curve as possible and investing in shorter cycle projects will help, but there are larger questions of capital allocation. Facing up to the growing inadequacies of this model will require a major change in the corporate culture of the IOCs. **It remains to be seen whether their senior managements can handle such a fundamental shift to confront head-on the wide array of uncertainties they face.**

2. Why does this matter?

In terms of the political economy of the transition to a low carbon economy, the significance of the oil and gas companies cannot be underestimated.

Table 1 Top 10 oil and gas companies by production.⁽ⁱ⁾

	Company	TICKER	Revenue ⁽ⁱⁱ⁾		Employees ⁽ⁱⁱ⁾	Ownership ^{(iii)*}
			2015 [US\$mm]	2014 [% change]		
1	Saudi Aramco	-	378,000*	ND	65,266	NOC
2	Gazprom	MICEX: GAZP	84,954	19	449,000	GSE (40%)
3	National Iranian Oil Co.	-	ND	ND	ND	NOC
4	Exxon Mobil	NYSE: XOM	259,488	(34%)	73,500	IOC
5	Rosneft	LSE: ROSN	72,028	(6.4%)	261.5	GSE (70%)
6	PetroChina	SEHK: 857	277,620	(25%)	521,566	GSE (86%)
7	BP	LSE: BP	222,894	(36%)	79,800	IOC
8	Royal Dutch Shell	ENX: RDSA	264,960	(37%)	94,000	IOC
9	Petroleos Mexicanos	-	67,786	(37%)	135,228	NOC
10	Kuwait Petroleum Corp.	-	252,000*	ND	18,571	NOC

(i) WoodMac via Forbes <http://www.forbes.com/pictures/mef45egjmi/10-kuwait-petroleum-corp/>

(ii) CapIQ

(iii) Company's annual reports.

- Data available only for 2014

As Table 1 sets out, significant economic value is a stake. **Unlike the large coal-based energy companies, the oil and gas companies – both international and national - are simply too big to be allowed to fail⁸. Yet the industry does need to adapt and change.** The three key beliefs held by the sector: that the world would always need

⁷ Ibid

⁸ For example RWE's market cap is around US \$8.4bn compared to Exxon Mobil's US \$314.5bn



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their products; energy technologies change slowly; governments will not act decisively to tackle climate change, no longer hold.

This changing landscape has not escaped the attention of the financial community. Shell-BG's merger is a case in point with long-standing major shareholders both for and against the deal. While 83% of Royal Dutch Shell's shareholders did vote in favour of the company's US \$52bn takeover of sector peer BG Group, the deal came under intense scrutiny. Much of this sentiment was due not to the impact of action on climate change, but the impact of the prevailing low oil price (which was ~US \$30/bbl at the time the deal was signed) and dynamics at play between the international and national oil companies⁹. Dissenting investors, including Standard Life, have stated opposition to the merger as "value destructive".

3. Politics and technology innovation are driving structural changes to the global economy

Structural changes to the global economy have several different drivers. First, **demand for oil and gas is falling in many regions** as energy efficiency policies bite. Demand is likely to be further curtailed in future partly by the substitution of other fuels and partly by the development of low carbon technologies and increased energy efficiency. **This will also limit the trend for oil and gas prices to rise in the long term**¹⁰.

Second, **the economic cost of climate change mitigation has fallen far more rapidly than was forecast**. Because of this, in 2013 annual increases in renewable energy capacity exceeded fossil fuel capacity for the first time – and this trend continues¹¹. Investment in renewable energy also reached a record level of US \$348.5bn in 2015, despite the crash in fossil fuel price¹². This means renewables are also penetrating more rapidly into energy markets previously dominated by the fossil fuel industries. While 2016 investment levels are 18% down – at US \$287.5bn – this is partly due to falling technology costs and partly due to a pause in some key markets (notably China and Japan) to ensure proper integration of existing renewable energy capacity rather than a reversal of this trend¹³.

⁹ See <https://www.ft.com/content/469635d6-c4ed-11e5-b3b1-7b2481276e45>

¹⁰ This was compounded by 13 CEOs from the car industry, led by Renault, who chose the Paris Agreement weekend to commit themselves to decarbonising transport over the next 'two to three decades'. They anticipate 2 billion vehicles on the road by 2050 but are clear that 'We cannot continue to rely on fossil fuels to power those vehicles...'

¹¹ <http://www.bloomberg.com/news/articles/2015-04-14/fossil-fuels-just-lost-the-race-against-renewables>

¹² <https://about.bnef.com/press-releases/clean-energy-investment-2016-undershoots-last-years-record/>

¹³ Justin Wu, head of Asia for BNEF notes China and Japan are cutting back on building new large-scale projects and shifting towards digesting the capacity they have already put in place. China is facing slowing power demand and growing wind and solar curtailment with the Government now focused on investing in grids and reforming the power market so that the



Third, **the agreement reached in Paris was better than expected**. Unusually for any international treaty, as negotiations came down to the wire, ambition on some key issues increased. This sets up **expectations of a dynamic of future policies that go further than the current nationally determined contributions (NDCs)**: the Paris Agreement sets up a review in 2020 with this objective in mind¹⁴.

4. The specific challenge posed by national oil companies

The business model of the IOCs has, in a nutshell, to date been predicated on rising demand and prices, financial strength and access to reserves. In the short term, it is the actions of NOCs – rather than climate action – that pose the most significant challenges, notably around "stranded assets".

Since the 1970s, IOCs have had to face significant challenges from NOCs. Competition mainly manifests itself around access to and control over oil and gas reserves and market share of oil and gas production. This is significant because when valuing companies, investors put weight on the growth and volume potential of the companies in which they invest. **In terms of reserves, in 2012 the NOCs' share of the world's total oil reserves had reached nearly 70% (and 50% for gas) compared to <10% in the 1970s¹⁵; in comparison the IOCs control only ~5% of the world's oil reserves (and ~20% of production)**. Figure 1 sets out the market share of the top 10 players between 2010-2014.

Because of this shifting control, the IOCs have refocused their businesses on developing hard-to-access (e.g. deepwater, Arctic) and hard-to-recover (e.g. oil sands, shale oil) reserves that cost more than the current price of oil to develop¹⁶. The shift to hard-to-access and unconventional reserves, mostly by companies from advanced market economies, has significantly increased capex and operational costs and led to a fall in return on capital employed (ROCE) and so the operating profits of IOCs.¹⁷ **Thus as oil prices fall and low prices are sustained, the exploitation of such**

renewables in place can generate to their full potential. In Japan, future growth will come not from utility-scale projects but from rooftop solar systems installed by consumers attracted by the increasingly favorable economics of self-consumption.

¹⁴ The policies of the new US Administration, when they become clearer, are likely to at least delay and possibly derail this process. It seems likely that the federal Clean Power Plan which was a key feature of the US NDC, will be dropped. However many American states have individual power plans which will restrict the burning fossil fuels and/or mandate the greater use of renewables in power generation. Whether the US will find a way to withdraw from the Paris Agreement, and the impact that may have on other signatories, remains to be seen.

¹⁵ A. Bereznoy, Global Big Oil On the Way to Business Model Innovation? (2015) Basic Research Program Working Papers, National Research University, Higher School of Economics. Available: http://papers.ssrn.com/sol3/papers.cfm?abstract_id=2613897

¹⁶ Ibid

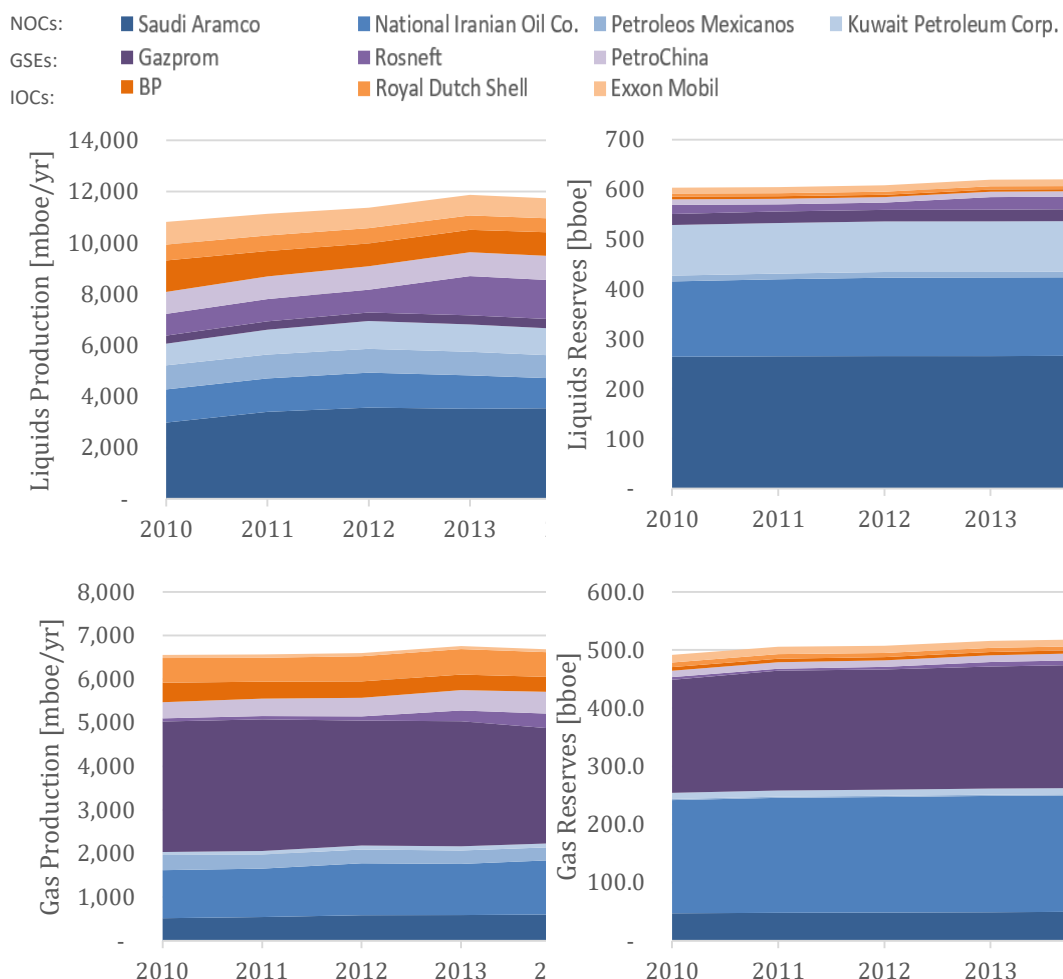
¹⁷ Production indicators at three of the IOCs (Shell, ExxonMobil and Chevron) for the period of 2009-2013 shows a dramatic increase in investment taking place simultaneously with significant fall in production numbers, *ibid*. The annual shortfall



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reserves becomes economically unjustifiable – and raises significant questions about the future viability of this as a business strategy.

Figure 1. Market share of the top 10 players between 2010-2014 (Data drawn from OPEC Report, SEC filings)



Analysis by Carbon Tracker Initiative has started to highlight the issues well. It concluded that if oil companies are to create optimum value for shareholders they need to focus on lower cost, lower risk projects that give better returns. Carbon Tracker Initiative assumed that under a 2°C scenario an US \$80/bbl breakeven price was needed and found that at that level ~20% of IOC projects and 16% of NOC projects are not commercially viable¹⁸. Costs are being reduced and there have been very substantial reductions in the spending plans of both IOCs and NOCs. In 2015, Shell made a decision to halt drilling in the Chukchi Sea in the Arctic, after spending a

between cash earnings and spending of world's major oil and gas companies has widened from US \$18bn to US \$110bn over the last three years <https://www.eia.gov/finance/review/pdf/q32015.pdf>

¹⁸ Carbon Tracker Initiative (2015) Carbon supply cost curves: Evaluating financial risk to oil capital expenditures



total of US \$7bn in exploration costs¹⁹. With the current low price of oil the risk of further write-offs/asset stranding only increases.

While recent analysis by Wood Mackenzie predicts increased investment in 2017, expected new projects are generally smaller and more efficient and higher capex deepwater projects continue to look challenged²⁰. **This means potentially a higher proportion of IOCs' reserves could be 'stranded' compared to NOCs, especially those NOCs with low marginal production costs such as in the Middle East.**

The interplay between NOCs and IOCs is further complicated by to the ongoing trend for IOCs to enter into joint ventures with NOCs, offering their technical expertise and access to financial markets in return for access to lower cost reserves²¹. **This means the commercial outlook for IOCs is to a large extent wrapped up with the commercial outlook for NOCs.**

Untangling the diverse and strengthening headwinds facing the industry, and starting to draw conclusions on how the various stakeholders – including investors but also governments and civil society – should respond is not an insignificant task. However, **given the economic value at stake and the imperative to deliver an economic transition that keeps the climate safe without damaging financial stability²², it is important that stakeholders come together to better understand the challenges and options for creating a future pathway for 1.5/2°C-compatible oil and work constructively toward that goal.** This is particularly important for shareholder engagement both with the companies and with governments.

5. Untangling the complexity and figuring out a pathway to 2°C-compatible oil and gas companies

Questions remain to be answered about when and how a transition to become 2°C-compatible will come to pass. As noted above, IOCs control only ~5% of the world's oil reserves which are equal to around 10-20 years of their production. Uncertainty over how and when the 1.5/2°C target must be reached will create space for a number of potential risk-management strategies to be pursued. **Some industry insiders believe**

¹⁹ According to Shell, this decision would knock out around US \$4.1bn of its future earnings as although it is unclear what the final bill will be, <http://www.theguardian.com/business/2015/sep/28/shell-ceases-alaska-arctic-drilling-exploratory-well-oil-gas-disappoints>

²⁰ WoodMac predicts the number of global FIDs will rise to more than 20 in 2017, compared with just nine in 2016. While it's still short of the 2010-14 average of 40/year, See <http://www.ogj.com/articles/2017/01/woodmac-new-upstream-projects-to-double-globally-in-2017.html>

²¹ Examples include Rosneft-Exxonmobil joint venture at the Black Sea and BG-Petrobras gas joint venture at Santos Basin.

²² In his speech "Resolving the Climate Paradox" (September 2016) Mark Carney cites the need both to avoid the catastrophic effects of climate change and to ensure financial stability is protected by avoiding too rapid a move towards a low carbon economy that could cause what he refers to as a "climate Minsky moment"



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that within the next 10-15 years the IOCs will be able to monetise their reserves, scale down their expenditure of high cost exploration and development for post-2030 production and return cash to shareholders for reinvestment elsewhere: a drastic change from the investment-for-growth model of the past 150 years²³. However other options may be possible. These are set out below.

6. Potential business strategies and models for IOCs

Several approaches might be deployed by businesses. Only some of these might lead to the creation of commercially viable 2°C/1.5°C-compatible business strategies and models. The analysis below sets out five possible strategies, possible risks to implementation and possible key interests/incentives for different stakeholders in evolving the business model in this way. **The key factors considered are capex deployment decisions, the potential return generated from that expenditure and how it might affect dividends.** Potential strategies revolve around choices to stay in the business of ‘molecules’ or diversify into ‘electrons’ or ‘services’. The business strategies are named: ‘First one out’; ‘Last one standing’; ‘Planned transformation’ (and as a subset of this option, ‘Services tie-up’); ‘Drift’ and ‘Ostrich’.

First one out, Last one standing and Planned transformation are all credible responses to serious loss of demand due to climate policies (and carry the risk of what to do if demand is not destroyed.) Drift and Ostrich – as the names imply – are not. All are plausible responses from the companies, which is why they are assessed here. Planned transformation – both to renewable energy (RES) and to services tie up with NOCs - are the only strategies that are representative of real diversification and carry with them the option of splitting the business.

All of the IOCs are adopting some elements of these business strategies and much of the internal management conversation will revolve around whether to focus on maximizing dividends or optimising longer term value through advantaged capex, and over what timeframe. Where there is a strong push toward one or another of these strategies by the IOCs, this is noted. The analysis is summarized in Table 2.

As a general comment, and as touched on earlier, the feasibility of the described IOC business strategies is also dependent on NOC behaviour since private oil and gas companies are generally excluded from the lowest cost opportunities open to state companies, for example in the Middle East. If State-controlled NOCs fragment, or are listed so that IOC’s can acquire strategic shareholdings, there may be increasing scope to access companies with good/low production cost assets.

²³ P. Mitchell



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Table 2. Barriers to implementing different potential 1.5/2°C-compatible business strategies

	Barriers to implementation											Companies exhibiting elements of this strategy
	Culture	Internal decision-making on resource allocation	Skills base	Approach to business planning assumptions	Market access	Ability to sell off assets	Design of energy policy for power generation in target markets	Making the case to investors	Value-add for NOCs	Loss of corporate sovereignty and identity	Voices of reason in the company	
First one out	Y	N/A	N/A	Y	N/A	Y	N/A	N/A	N/A	N/A	N/A	None
Last one standing	Y	N/A	N/A	Y	N/A	Y	Y	N/A	N/A	N/A	N/A	ExxonMobil Shell
Drift	Y	N/A	N/A	Y	Y	N/A	Y	N/A	N/A	N/A	N/A	All
Planned transformation & services tie up	Y	Y	Y	N/A	Y	N/A	Y	Y	Y	Y		Total
Ostrich	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	Y	Chevron

Y – Yes; N/A – Not applicable

Comment on plausibility

First one out: Given the headwinds facing the industry, appears the most credible and feasible option. However not all IOCs can be the first one out – so the key question is who moves first to maximise the return of value to shareholders.



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Last one standing: Feasible but ability to execute depends on the cost of extracting bookable reserves

Drift: Much the Drift strategy's success will be linked with the fate of NOCs and home governments struggling to deal with falling public revenues from oil. The election of Trump as US President indicates a possible shift toward protectionism. That makes this strategy less feasible to lack of access to lower cost NOC reserves resulting from a shift toward resource nationalism

Planned transformation: Feasible but will require very strong leadership and change management since the nature of the business and skill set within the business will need to change radically.

Services tie up: While possible in theory looks to have weak feasibility – the lack of skills and highly competitive nature of the services business, which has also just gone through massive cost-cutting, makes credible diversification look like a very hard sell.

Ostrich: Given the value at risk and strong headwinds this is not a credible strategy but may be the one adopted in practice.



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6a. First one out

First one out is a capital return-based strategy deployed by a company that has a strong portfolio of high producing and low cost assets that ‘sees the writing on the wall’ regarding the 1.5/2°C target. The business model would be based on sweating existing assets and cutting costs to keep dividends high while investment in the upstream part of the company declines. The focus is on running down the company while returning value to shareholders through dividends and share buy backs while there is still a reasonably buoyant market for its products (as the tobacco companies have done very successfully). Inevitably, this means that the company must shrink its areas of operation, functionally and geographically, to where they can maintain an acceptable return. Extensive company restructuring would occur. Exploration would be highly focused on potential low-cost projects and, where elements of the upstream or downstream portfolio are deemed to be at risk of failing to meet profit targets in the short term (5 years), these would be disposed of, potentially at a cost, so as to pass on decommissioning costs/liabilities where possible or reflect them in the pricing of the assets²⁴. Where this is not possible, ‘good’ (i.e. low cost and good producing) assets may be ring-fenced from higher risk assets through a possible legal and operational separation of the business. The feasibility of doing this will depend on the mix of oil and gas; upstream and downstream; and geographic location of assets.

Risks to implementation

Cultural: For the very large IOCs this business model challenges the current specialisation of European and American majors in high cost (e.g. deep sea offshore, Arctic) reserves. The management must adopt an entirely different mindset moving away from assumptions that the old way is the best way. A shift from an engineering-driven culture to a shareholder value profit-driven culture will be especially difficult for older employees as the focus shifts from projects to the business entity. This is not new, it has been going on for years, but to a lesser extent. IOCs also tend to be adept lobbyists with excellent government access, used to lobbying for climate and energy policy and wider fiscal decisions in their favour. There are signs this influence is starting to decline but to deliver a new strategic direction convincingly there would need to be a further attitude changes. Not to do so props up the old business model, making First one out look potentially less credible to investors as a business strategy.

Business planning assumptions: For the oil-focused parts of the businesses in particular there needs to be a realistic assessment of demand growth and related oil pricing to inform business planning and decisions on whether to sweat or dispose of assets. Companies have a portfolio of projects with a range of costs and therefore

²⁴ The issue of passing on/sharing decommissioning costs is a fast-evolving field see <https://www.bloomberg.com/news/articles/2017-01-31/shell-shows-how-to-remove-obstacles-to-north-sea-oil-deals>



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different oil price-related breakeven points. Tough decisions about disposal of projects at the higher end of the cost-curve (as well as downstream assets) will need to be made. This must be done in light of credible assessments of where markets will be strongest and identification of the triggers (policy and technology etc) that will materially impact prices and market sizes during the period over which decline will be managed (perhaps 10 years). The skill will be in making good judgments about the scale and pace of change. For example, Carbon Tracker Initiative analysis from 2014 shows for ExxonMobil there are a wide range of market prices required for upstream projects to be viable. Around 75% of the project pipeline requires a breakeven oil price of US \$80/bbl and with a market-based oil price at US \$50/bbl²⁵ realizable reserves will be further halved²⁶. **Since 2014 expected project costs had been reduced through technological advance and more selective project management, and the proportion of marginal projects in current portfolio has decreased as the portfolio is narrowed. For a First one out company an even lower oil price might need to be assumed to determine which parts of the portfolio to sell off to minimize exposure** and ensure a focus on maximizing revenues and therefore dividends can be maintained during the run off period.

Ability to sell off assets: If company reserves are simply too expensive relative to the price of oil to realize they become worthless and non-saleable, blocking this option. Some asset swaps – as proposed between Shell and Gazprom - may be possible (encompassing some of the ‘Drift’ strategy’s characteristics, see later). Downstream, the IOCs’ strategy of divestment has faced a number of problems. There are many examples of refineries being sold by the IOCs for US \$1. However, refineries purchased at knockdown prices can generally afford to maintain production and do not reduce the surplus of product on the market. This may not matter to the IOC seller if it is withdrawing from the market completely, as in some African countries and Australia. In addition, physically closing refineries in most OECD countries entails high clean-up costs, and therefore many refineries are kept notionally in service as storage facilities. Finally, in many countries refineries are still seen as an issue of security of supply and closure attracts considerable political attention and therefore sales may be blocked²⁷.

Key interests/incentives for different stakeholders

For companies this strategy will be at odds with the culture of high risk upstream-dominated companies such as ExxonMobil and BP. Nonetheless **there is a strong value case to adopt this strategy, based on maximizing value to society and**

²⁵ This is undiscounted. The price at time of writing [6 February 2017] is US \$56.79 for Brent Crude on ICE <https://www.bloomberg.com/energy>

²⁶ See <http://www.carbontracker.org/wp-content/uploads/2014/09/Exxonresponse-Full-110914.pdf>

²⁷ P. Stevens (2016) International Oil Companies: The death of the old business model



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shareholders. Such a move would be based on an understanding that ‘the writing is on the wall’. Companies and shares can and have done well in an ex-growth sector (e.g. tobacco) given the right management strategy, and such a strategy could also reduce liability risk (e.g. class action brought against companies as a result of climate change damage²⁸). Moving early also means the company can have more control in setting prices while there are still many buyers in the market. Timing will be critical to maximise value. Finally, this strategy also enables decommissioning of operations to be dealt with through disposal of assets early (so others take on this cost) and otherwise being able to factor costs into the company’s wind down.

For investors this should/could be a welcome move. Even before the financial crisis there had been growing disillusion with large long-term, high-risk projects. Since these are precisely the sort of projects undertaken by IOCs, it is not surprising that their shareholders have become increasingly disenchanted. The US \$1 trillion of capex cuts made since the oil price collapse give companies a chance to recalibrate their forward investment decisions²⁹. **There is a strong argument to be made that this approach is preferable since it allows financial markets to reallocate capital to other sectors – which should be an investor’s role after all - instead of the IOCs.** In the interim, revenues and therefore dividends over for the next ten years or so could be little affected since it is only after 2025 that oil demand is expected to peak and fall. ‘Growth’ style cash-flows could be expected for the next five years or so³⁰. After that a decline should be expected as the company winds down – and a key remaining issue is how decommissioning costs are covered.

For governments this model will **quickly expose the wider economy to the effects of the transition.** Governments currently dependent on taxing upstream oil revenues – notably developing country exporter countries - will need to think actively about how tax revenues from the sector will be replaced or spending cut back.

6b. Last one standing

The Last-one standing strategy would be deployed by a financially strong company that prioritizes becoming the biggest and lowest cost producer with vast low cost reserves and downstream assets based where they can be used to maximise control over local markets. The focus would be on how to maximise the value from capital expenditure in an ultimately shrinking market. **The company bets on creating for itself a long-term future.** It may well borrow to keep dividends and capex up while

²⁸ Given the global Paris Agreement, size of the companies and cost of dealing with increasingly frequent and extreme weather events this is a clear risk – one cited by Mark Carney in his 2015 Tragedy of the Horizons Speech.

²⁹ Wood Mackenzie and Dolomites report US\$ 1 trillion in cuts for 2016-20 Upstream Intelligence *Newsletter* June 27 2016. See also IEA (2016) World Energy Outlook Table 2.4 most companies have cut by a third or more compared to previous projected figures. Projects in the deep North Sea, pre-salt Santos Basin, and Gulf of Mexico have been deferred

³⁰ Carbon Tracker Initiative (2016) Engaging for a Low Carbon Transition



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aggressively taking competitors out of the market to maintain size (and potentially even grow). It would be a purchaser of assets from other producers wanting to get out of/too weak to stay in the market. The company will prioritise quality, profitability and resilience of the portfolio to high impact uncertainties (e.g. electric vehicles, energy policy) and deploy robust lobbying tactics to achieve this. As a result it bets that demand will hold up for the foreseeable future and that as the overall market for oil and gas shrinks it will be the last one standing. When the market for oil and gas finally ends (the exact date is of course unknown), it could shrink the business to be a monopoly supplier of non-fuel petroleum based products.

The closest current example of this business model appears to be that of ExxonMobil, the world's largest internationally traded IOC. However, recent analysis published by the Institute for Energy Economics and Financial Analysis (IEEFA) raises doubts about how strong Exxon really is. IEEFA analysis shows deep financial weakness in the company, including a 45% drop in company revenues in the last 5 years, a growing reliance on debt to cover dividends, a decline in capital expenditure, end of year cash balances and free cash flow. In January this year Exxon Mobil posted its ninth-straight quarter of year-over-year profit declines³¹. The main contributor to this was Exxon's de-booking 4.6bn bbl (19% of its proven reserves). This was in recognition of persistent lower oil prices catalysed by the Securities and Exchange Commission's inquiry into Exxon's reporting of its reserves and asset valuations³².

Shell's 2016 purchase of BG also shows aspects of this strategy. The BG portfolio included a majority of reserves deemed productive at oil prices of US \$20/bbl and was in part used to justify the purchase to shareholders³³.

Risks to implementation

Risks are as for First one out but with key differences with respect to management attitudes and how advantaged is the asset base.

Cultural: This business model challenges the current specialisation of European and American majors in high cost projects. The management must therefore adjust their expectations of rising demand and rising prices that have been used to justify high risk high capex investment - and rigorously adjust plans to reflect a reduced the demand and price growth trajectory. High cost projects may not be developed in the foreseeable future unless there is government support based on security considerations – but given technology innovation around electric vehicles this seems unlikely.

³¹ See <https://www.bloomberg.com/news/articles/2017-01-31/exxon-misses-estimates-as-recovery-from-slump-proves-elusive>

³² See <https://www.ft.com/content/53f66878-9d13-11e6-a6e4-8b8e77dd083a>

³³ See <https://www.ft.com/content/469635d6-c4ed-11e5-b3b1-7b2481276e45>



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Business planning assumptions: As for First one out, for the oil-focused parts of the businesses in particular there needs to be a realistic assessment of demand growth and related oil pricing to inform business planning and project investment. As set out for First one out, much of the existing portfolio may need to be shelved, at least for the time-being³⁴ (for ExxonMobil for example this could be half the existing reserves, which would need to be aggressively replaced with acquisition of further lower cost reserves from other IOCs/NOCs). This must be done in light of realistic and sophisticated assessments of where markets will be strongest and risk assessments of the triggers (policy and technology etc) that will materially impact prices and market sizes in the next 5, 10, 15 years. Planning could also be confounded by governments wishing to intervene to prevent a change in strategy and thereby retain tax revenue and dividend streams, however unstable.

Energy policy for power generation: For gas the ‘golden age’ may similarly not materialize as expected, especially as the cost of RES continue to fall. To retain potential future market share the IOCs will need to try to negotiate a space for gas in the power generation systems of developed countries where it could substitute for existing assets (mostly coal) to gain a share of growth markets. This could be justified to governments on the basis of diversification of supply and/or improved air quality – which could in turn justify the investment in gas transportation infrastructure. Achieving this will require a clear focus on targeting lobbying to the highest potential value opportunities to grow markets.

Ability to sell off assets: As for First one out, if company reserves are simply too expensive relative to the price of oil to realize they become worthless and non-saleable, blocking this option. (More detail on challenges is as set out for First one out.)

Key interests/incentives for different stakeholders

For companies with strong balance sheets there is a strong incentive to do this: to buy market share and political power when the market is looking challenged. Although the ExxonMobil story does seem to indicate that political power is waning: most of (78%) of the de-booked reserves are at Exxon’s Kearn oil sands project in Canada, which started in 2013 and expanded in 2015. **A Last one standing strategy will need to have a strong analytical underpinning of market opportunities and how the 2°C transition might unfold and affect those markets. It must be delivered with an accompanying aggressive and covert lobbying strategy** to maximise market opportunities and drive demand for products up as far as possible for as long as possible. In addition, where assets can’t be sold but must be retired, the issue of mothballing versus

³⁴ In due course, with sufficient market control, higher costs reserves could be realised later.



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decommissioning operations will need to be addressed. **For a Last one standing strategy there would be a strong incentive to sell residual assets to less reputable market players** (possibly at a negative cost) who will run assets down and not undertake clean up, so as to preserve shareholder value³⁵. In some cases the alternative will be to mothball in the hope prices pick up as they control more market share and therefore product volumes. Options around such decisions will need to be carefully balanced.

For investors this strategy could meet with approval, but only if the portfolio of assets justifies it and blatant lobbying is avoided³⁶. The commercial resilience of the company (a factor of its large low cost portfolio and growing size relative to the shrinking market) could well **imply lower risk and therefore a lower cost of capital**³⁷.

For governments where near-end-of-life assets are sold on, the issue of decommissioning operations should be a priority issue. Governments should pay close attention to how assets are disposed of and to whom, and insist legal clauses are included in sales to ensure sufficient funds are retained for decommissioning. Where assets cannot be sold, governments should insist a separate decommissioning entity and/or fund is set up.

6c. Drift

Drift is a mix-and-match strategy that would be used by a company aiming to optimize its portfolios within shrinking markets. There is a deliberate wait-and-see approach, with the company reacting to rather than anticipating changes in market dynamics. The focus is on consolidation and asset swapping with very tight controls of capex. The IOCs are, to a greater or lesser extent, all exhibiting some elements of this model already.

Consolidation is a natural feature of markets and it is arguable that IOCs should take this approach given the strong headwinds the industry is facing. Under this scenario the business model is focused on keeping dividends steady by optimising its portfolio

³⁵ This has, in effect, happened with the sale of Vattenfall's German lignite assets – 4 mines and 7600 MW of power generation capacity. The portfolio has now been 'sold' to Czech company EPH at a de facto negative price of around €1.6bn, with EPH expected but not obligated to deploy funds to decommission the mines and power stations.

³⁶ For example in the IIGCC's Updated Guide: Investor Expectations of Oil and Gas Companies 2016 one of the key areas of scrutiny is whether the company engages with public policy makers and other stakeholders to support development of cost-effective policy measures to mitigate climate-related risks and low carbon investments. See <http://www.iigcc.org/publications/publication/updated-guide-of-investor-expectations-of-oil-and-gas-companies-2016#sthash.rbRSi2pY.dpuf> Four US oil majors are currently facing shareholder resolutions calling on them to disclose anti-climate change lobbying activity. <https://www.environmental-finance.com/content/news/four-us-oil-majors-face-shareholder-resolutions-on-climate-lobbying.html>

³⁷ This would represent a change in sentiment since in the past investors might only have favoured such a strategy if it was clear that the asset base was sufficiently advantageous to justify it.



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of revenue-generating assets and sweating those assets. If the company can grow, it will be slowly, investing less and very cautiously on the basis of incremental decision-making to avoid embarking on potentially value-destroying acquisitions. What is **more likely is the company remains the same size or shrinks as markets are squeezed, and especially if one of the other companies in the market is deploying a Last one standing strategy.** The ability of the Drift approach to be sustained is also dependent on NOC behaviour, since private oil and gas companies are generally excluded from the lowest cost opportunities open to state companies in the Middle East, for example.

There are significant risks with this strategy. **Assets obtained via acquisitions and swaps are, alongside existing assets, at risk of significant disruptive technological change.** Management may shift slowly toward a portfolio of only good existing assets with very limited and shorter time-at-risk projects (success in US Shale may become crucial given its much shorter term nature) and perhaps a very few large colossal total cost projects, depending on the oil price, to reduce this risk.

For gas there are particular challenges, and its fortunes are linked to choices about power generation, which are highly political. Due to the high cost of transporting gas over long distances there has more recently been a focus on developing gas regionally³⁸. In developing countries where access to power is not universal, there could potentially be space for gas in the generation mix but cheaper coal will be a strong competitor³⁹. However, this is likely to be driven by demand for replacing coal capacity rather than energy access. This is because most of those without access to energy are the rural poor whose needs will be best suited to distributed and clean energy sources. Furthermore, it is far from a given whether, given the falling costs of RES and the high sunk cost of centralized gas distribution infrastructure, gas can compete.

Risks to implementation

Culturally and in terms of business planning assumptions risks are likely to be limited since an incrementalist approach to decision-making is being applied. There will be risks in relation to market access and energy policy for power generation.

Market access: Many low cost opportunities exist in the Middle East and are held by NOCs, which are state owned companies. **Much of the Drift strategy's success will be linked with the fate of NOCs and home governments struggling to deal with falling**

³⁸ J. Mitchell & B. Mitchell (2016) Paris Mismatches: the impact of COP21 climate change negotiations on the oil and gas industries. In addition, it is not certain LNG import/export infrastructure will be built – LNG was oversupplied through 2024: <https://www.mckinseyenergyinsights.com/insights/lng-market-oversupply.aspx> Due to drop in oil price, LNG price also dropped, so incentive to build infrastructure removed

³⁹ Ibid

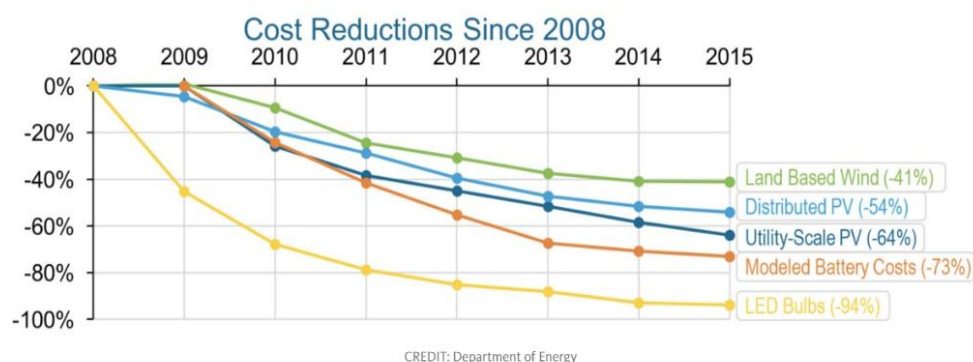


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public revenues from oil. In Saudi Arabia the response has been to focus on privatization, opening up opportunities to access low cost assets. The impending sale of parts Saudi Aramco presents possible opportunities. Further fragmentation of NOCs could also deliver acquisition opportunities – and will be dependent on broader geopolitical factors and choices covered in the real-world scenarios. In the US a retreat to resource nationalism and attitudes to climate change, which look likely under a Trump Presidency, may preclude opportunities to acquire low cost shale assets through company acquisitions.

Energy policy for power generation: As set out for the Last one standing model, the gas ‘golden age’ may not materialize as expected, especially as the cost of RES continues to fall. For gas there could be opportunities to develop local markets, but this is contingent on the politics of electricity system restructuring, which is far from certain. For example in Germany where the power company Eon ‘bet’ on future growth in gas demand, the company is now under considerable stress (cutting dividends, falling share price) to the point it has now spun off its ‘bad assets’ into Uniper but still continues to underperform⁴⁰. A key consideration for IOCs would therefore be what and whether political influence could be achieved alongside company acquisition to ensure a future market share. RES investment is also dependent on policy clarity, but with falling costs and more disaggregated investments for onshore investments at least, the risks are lower (see Figure 2 from US DoE).

Figure 2. US DoE Clean energy technology cost reductions 2008-2015



Key interests/incentives for different stakeholders

⁴⁰ Ibid; I. Holmes (2015) Future-proofing the Capital Markets Union.



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For companies, the Drift business strategy, a soft variation of Last one standing, ekes out the current business model. **IOC company managements may be attracted to it simply because it would enable them to continue much as they were rather than having to take tough decisions.** That said the uncertain timeframes of technology innovation⁴¹ (as well as policy) could be highly disruptive to the revenues needed to cover the cost of long-term investments. This may lead to assets being stranded and shareholder value lost. For this reason the company will need to have robust internal scenarios that they use to predict the timelines of such change – and be able to explain these to investors.

To ensure continued access to markets there will be a strong incentive to lobby against policies supportive of new technology deployment. There will need to be a rigorous focus on cost cutting across the business. Given that climate change is increasingly a concern for investors, any visible counter-lobbying by companies may well be deemed unacceptable and so the company may need to become passively engaged in the transition, creating value where it can be based on oil prices but not actively blocking progress. For gas, again the focus should be on cost cutting but also working with developing country governments in particular to embed gas as a transition fuel in the power sector, promoting coal to gas not coal to RES switching.

For investors one of the key controversies around the stranded assets debate is the issue of timing. Under the First one out strategy, the company would take a proactive approach to managing timing, by running down the business while maximizing the value of assets. Under this Drift strategy **a more passive ‘horizon-scanning-and-response’ approach is taken by the company, which still risks a relatively sudden correction with significant share value loss. Investors may well assume – as some currently do – that while the company continues to generate revenues they are a good bet and that when they cannot, they will be the last one out before the crash.** Greater scrutiny of this philosophy is advisable. **Investors may be better off engaging with the company to seek a shift in strategy from this pathway to either the Last one standing or first one out strategy.** If neither happens the share price may fall to a level where the company becomes a takeover target.

For Governments, in the absence of a clear policy to reduce oil and gas demand in countries buying these commodities (recipient countries) either through electrification or with the aim of reducing price volatility/boosting energy security, the ongoing tax receipts to home governments may make this option attractive. This will be the case for recipient countries with a laissez-faire approach to markets who are

⁴¹ The most profound challenge to business as usual for the oil companies and their dependent stakeholders comes from the motor industry. All the major motor manufacturers now have a mass market electric car offer. They are being positioned for the moment the huge reduction in the cost of driving a car with electrons rather than molecules outweighs the additional cost of the vehicle. T. Burke (2015) The road not taken.



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not actively thinking through how their economies will need to restructure in response to the climate transition. Those recipient countries actively thinking through these issues will need a clear view of options available to them and their consequences (for example the opportunity cost of building gas infrastructure as a transition fuel instead of moving direct to RES). Without clear policies, **recipient countries and companies leave themselves hostage to fortune with respect to the timing of innovation shocks – market not policy driven – which will be hard to predict and leave governments to manage the financial and economic fallout of asset stranding and decommissioning costs.**

6d. Planned transformation

Planned transformation comprises a company strategy to diversify out of oil into gas and/or clean energy. The IOCs' past diversification efforts have been notoriously poor, almost always destroying value and resulting in massive asset write-downs. Such efforts have included coal mining but also fish-farming, pet food, typewriters, software and high street retailing that are rarely discussed in the media nowadays but are remembered by many investors⁴². Many previous efforts to date in clean energy also proved relatively short lived. For example, Shell's push into solar was regarded by some as a license to continue with its core business of oil extraction. It ended with the sell off of the solar business in 2006/2007. Similarly there has been some 'dabbling' with carbon capture and storage (CCS), but again this has been at the margins, with a focus on research rather than large scale demonstration or deployment. The internal company discussion seems to have been focused on the role of government not companies in delivering market development opportunities to drive investment.

Given current global energy trends, diversifying 'closer to home' – to gas and RES - and with a more enduring approach may prove more fruitful. An example of this type of approach is, in the case of gas, Shell – which acquired BG in a US \$52bn mega purchase. In the case of RES, Total is increasingly pushing into the renewable and storage market. In April 2016, Total announced the creation of a gas, RES and power division, saying it wanted to become a "leader" in RES and electricity storage within 20 years. In May 2016 in bought battery manufacturer Saft⁴³. A smaller company, Dong Energy has appointed JP Morgan to perform a strategy review that could result in a sell of its oil and gas assets and focus on wind assets, four decades after it was set up to manage Denmark's North Sea oilfields. This would complete its transformation from an oil and gas to a RES company and represent a planned transformation from the market.

⁴² LAPF & Carbon Tracker Initiative (2016) Engaging for a Low Carbon Transition

⁴³ Other diversification strategies are potentially feasible but would require an IOC convincing shareholders to tie up capital in order to fund diversification. This could be possible, especially given their privileged position in the FTSE-100 index. This would be about complete re-invention of the business.



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Regarding diversification into gas, this is – in reality – a version of the Drift strategy but with a focus on just gas assets. As such it carries a specific set of controversies. The first is around the expected future market share for gas and whether this too will soon become an ex-growth sector. The second factor is around the fact that diversifying into gas means acquiring reserves and infrastructure on a scale that would have a meaningful portfolio diversification effect given the size of the IOCs involved. This potentially leads to megamergers on a scale that has caused quite some concern to investors already. For RES, there are questions about whether the IOCs can attract the right skills needed to successfully move into RES and the culture challenges this may bring to the business.

Risks to implementation

Culture: Already the IOCs that have diversified into gas are struggling with managing the differing cultures within the business. In the case that a Planned transformation approach is focused on RES, another layer of challenge lies in trying to bring in engineers with the right expertise, who are likely to be younger and highly values driven. This will be at odds with the idea of ‘propping up’ the fossil fuel business models. Added to this, RES is a completely different business model and there is absolutely no guarantee that an IOC management team can run it well, or indeed better than, a specialist management.

Internal decision-making on allocating resources across oil, gas and RES: Management will have to decide and justify the allocation of resources to the different parts of the business – a non-trivial task given the different risk profiles and opportunities⁴⁴.

Skills: This is a particular issue for diversification to RES/storage. IOCs are increasingly seen as the latest ‘pariah’ companies on a par with tobacco companies and arms manufacturers and this hampers their efforts to attract talent. The IOCs were always very proud of the fact that they were able to attract very high-quality graduates. However, in the last 20 years or so, it appears that the ‘best and brightest’ have been switching their interest to greener forms of energy. Whether they can be attracted back at the level and in the number need to deliver a renewable diversification strategy remains to be seen, but will be a core internal consideration in relation to evolving company culture⁴⁵.

⁴⁴ The culture of gas companies is very different from that of oil companies. In an oil company, the strategy and underlying culture is driven by the geosciences being used to discover crude oil, with a market for the resultant oil taken as a given. By contrast, gas is concerned with securing markets and customers, which is outside the expertise of much of the senior management in the IOCs. From P. Stevens (2016) International Oil Companies: The death of the old business model

⁴⁵ Financial Times 27 October 2016: Oil Industry struggles to fill hole left by baby boomers.
<https://www.ft.com/content/f0c72686-9761-11e6-a80e-bcd69f323a8b>



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Energy policy for power generation: Challenges will be as set out for the Drift strategy. Related to this is whether energy systems shift more toward decentralization and the degree of digitalization will all have impacts – and to a greater or lesser extent could be driven by policy and regulation.

Making the case to investors: A strong and credible story to investors will be needed in terms of how the pathway to diversification into clean energy will be managed including. **Investors are likely to be skeptical about this strategy not least because stock markets traditionally undervalue the stocks of conglomerate businesses.** Robust representations will need to be made to investors on how decisions will be made to allocate capex across different sectors of the business to maximise value; clear ROCE and return on investment (ROI) targets and reporting on a comparable basis; how the skills needed will be attracted; and how the newer parts of the business will be able to deliver profits without cross subsidy from other part of the business.

Key interests/incentives for different stakeholders

For companies it gives managements the opportunity to continue to manage and do deals rather than shrink the business and give money back. To make the case to diversify to gas, as in the Drift model, the IOCs will need to try to negotiate a space for gas in the generation systems of developed countries where it could substitute for existing assets (mostly coal) to gain a share of generation growth. Also as for mix-and-match, a key consideration for IOCs would therefore be what political influence could be achieved alongside company acquisition to ensure future market share. Gas could be an effective medium term (10-15 year) strategy depending on where assets are purchased and what price, but is perhaps not a long-term strategy for survival.

In the case of diversification to clean energy, this is a more radical shift – but one that makes the strong statement of acknowledging that the world they are operating in is changing but that the company plans to change and stay in business. **It will entail a radical culture change that in turn will require a strong story and a demonstrable track record to convince investors that it will successfully run the new business in a way that delivers returns that are superior to those that could be achieved with investors reinvesting their capital elsewhere.** (This will necessarily include through direct investment in companies already established in the power sector in which the IOCs have neither experience nor structural advantage.) The location of much, although not all of, the high value renewable energy is to be found in politically challenging countries (the Middle East and autocratic African nations for example), and difficult environments (deep offshore wind, wave and tidal) and IOCs have expertise in managing large-scale projects (albeit often late and over budget) in these



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environments and so it is not inconceivable they could become important market players in these specific spaces.

In the case of CCS, which will be needed for deep decarbonisation of industry⁴⁶, the IOCs are perhaps the best placed companies to build a CCS network that could be used to manage waste from industrial and gas power sector players with balance sheets too small to manage this type of capex investment. In a sense, by investing to demonstrate CCS retrofit at scale, the IOCs (and indeed NOCs) could build themselves a future business model. However, so far this has not proved a feasible option.

For investors questions will be raised over **whether the IOCs rather than financial markets are best placed to reallocate capital across sectors, especially given challenges with how well IOC legacies are matched to the challenges of delivering value in new sectors.** That said, it is plausible that investors may not be resistant to this approach⁴⁷. One key issue to consider therefore is whether there should be – in due course – a legal and operational separation of the fossil fuel parts of the business and operational RES assets on the basis of different risk profiles. Doing this would, however, implicitly admit the weaknesses and risks of the IOCs investing outside their normal field of operation

In the case of the **RES business Special Purpose Vehicles (SPVs) could be considered for RES assets once operational. The IOCs could adopt a forward model of developing and selling on assets to institutional investors, retaining an equity tranche and retaining control over operations (effectively becoming an electricity generator) and recycling cash into the business.** This is the model DONG is using – with investment coming from CIP, a subsidiary of PensionDanmark set up for this purpose. In some countries the tax regime could permit the use of a master limited partnership to achieve a somewhat similar result in oil development and infrastructure projects. An SPV structure for the fossil business looks less viable simply because of the risk those assets carry – not least from asset stranding. This then leaves the question of who pays for decommissioning (which is well defined in some jurisdictions such as the UK but not in all). However, if the business gets to a point where more revenues are being generated by RES than by fossil fuels a case could be made for structural separation of the business, with a managed decline for the oil and gas side of the business and growth of the RES business.

⁴⁶ CCS is also potentially important in the context of growing debate on the role of hydrogen in heating in the Northern hemisphere.

⁴⁷ One of the challenges investors have in the current low interest rate environment is getting yield and IOCs still offer yield. If they withdraw capital from IOCs they have to find equally 'profitable' places to put it – those are lacking at present. So out of 'panic' investors may prefer a diversification strategy by the selected IOCs rather than accept further buybacks.



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For **Governments** the issues are not straightforward. For some ‘home governments’, i.e. those that receive corporate tax returns, **the RES options could prove a ‘double-edged sword’**. On the one hand, diversification to survive long-term – if successful – would **potentially address the developed country government’s ‘headaches’ around loss of oil revenue and the need to shore up of companies in the short term (notionally at least) through tax credits**⁴⁸. On the other hand **pension funds and insurers would need to develop other sources of reliable returns as dividends paid by the oil companies dwindle**. However, this strategy would also mean those less progressive home governments (arguably the UK and the US both fit into these categories) would need to **move forward fast on enabling the low carbon transition through appropriate fiscal and regulatory policies to promote clean energy investment**. This may actually be helpful for civil society actors advocating for accelerated climate action because it would potentially become in the interests of a clean energy-diversified IOC to lobby for an end to fossil fuel subsidies, to shore up the clean side of the business and give them a competitive advantage in the sector⁴⁹. In the case of diversification to gas, the issues are as set out for Drift above.

Planned transformation: Services tie-up

Production-sharing contracts and production-sharing agreements are forms of cooperation widely used in the relations between IOCs and NOCs. These would be the key elements employed in an IOC “Services tie-up”. In a service-based partnership, a technically strong IOC would manage projects (reducing their costs) for an NOC and be rewarded by some mixture of cost recovery and (in some cases) profit sharing. The upside is that by giving up insistence on “equity oil” and shifting more to a service-based model – extraction, project management and also possibly trading services – the IOC retains access to low cost production assets and further low cost exploration opportunities. The downside is that the IOC faces political risk (of changes in the terms of the contract). Finally, ownership of the assets (but also the risk of their being stranded) remains with the NOC.

Risks to implementation

Value added for NOCs: In the 1990s, the IOCs believed that they could bring three key benefits to any upstream project: risk capital for exploration and development, technology for upstream operations and an ability to manage the risk of large projects. In the following decade, all three factors began to look less relevant. The rise in oil prices after 2002 meant that capital became less of a constraint for existing

⁴⁸ In the case of NOCs, developing countries this approach could be part of a credible programme of diversification of export-dependent economies (such as in Saudi Arabia’s “Vision 2030”).

⁴⁹ This will depend on the geography in which they are operating and who their competitors are. Whether this would be the best outcome for shareholders and society is highly debatable.



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producer governments⁵⁰. The service companies to whom the IOCs outsourced much of their technical capacity in the past 20 years can now supply much of the technology required by NOCs. The IOCs' reputation for managing large projects came into question as a result of failures such as the Kashagan Field in Kazakhstan and the Deepwater Horizon spill in the Gulf of Mexico⁵¹.

Skills: Skills are related to the value-added issues. Historically, the IOCs had played a key role in developing technology for the oil and gas industry⁵². However, there has been a progressive move by IOCs to outsourcing technology and skills to contractors such as Halliburton. In trying to deliver the hybridised model, many of these roles played by the IOCs would either not be missed or simply be taken up by service companies, NOCs and smaller non-integrated private companies⁵³.

Access to markets: Opportunities to access to NOC market have in more recent history been limited. However the falling oil price may open up more opportunities. For example, in Saudi Arabia's 2016 "Vision 2030" the key theme was a reduction in dependence on oil revenues (in 2015 42% of Saudi GDP came from oil revenues) through economic diversification. As part of this, there are plans to sell shares (but not a controlling interest) in part of Saudi Aramco as well as public companies providing services to it. The intention is for the Saudi public investment fund to hold controlling shares but for there to also be diverse private shareholders. Revenue raised this way realises the value of assets that might otherwise be stranded. Other examples of such sell offs include 2016's sale by Petrobras of its controlling share of the Carcara oilfield by to Norway's Statoil for US \$2.5bn⁵⁴. Here the large balance sheets of IOCs appear again to be an attractive resource for cash-strapped NOCs and their owner governments.

⁵⁰ It is important to note the prevailing oil price has again reversed this situation, with most producer government unable to maintain previous levels of domestic expenditure at current export prices, and are borrowing to help bridge the gap.

⁵¹ P. Stevens (2016) International Oil Companies: The death of the old business model

⁵² In the integrated business model, research and technical services were often located within the company. As the industry fragmented in the 1980s, international service companies expanded to meet the needs of NOCs as well as those of private-sector companies that were outsourcing technical competence. IOCs and service companies drew on technical developments outside the industry (e.g. increasing computing power, communications, materials and sensors) to achieve incremental as well as step-change improvements in the technologies of oil and gas production, transportation and processing. The result has been a continuous reduction in the costs of exploration and development, reduction of environmental impacts, and a steady increase in the resources that can potentially be developed. Horizontal drilling and 'fracking' are the most recent and well-known examples of these technologies, but they are built on the legacies of the development of 3-D and 4-D reservoir modelling, measurement; while drilling, coiled drill tubing, dynamic positioning of rigs and platforms offshore, and liquefaction and gasification of natural gas. The IOCs were crucially important in the development of offshore oil production (though they played virtually no part in the shale technology revolution that has been so important in recent gas and oil developments). Source *ibid*

⁵³ The prices of offshore services has fallen by 50 percent and in shale oil and other fields by as much as 35 percent. Schlumberger and Halliburton have cut thousands of jobs. Source

<http://www.oilandgasinvestor.com/further-price-cuts-are-difficult-oilfield-service-companies-836646#p=full>

⁵⁴ See <https://www.bloomberg.com/news/articles/2016-07-29/cost-cutting-petrobras-gets-2-5-billion-from-statoil-field-sale>



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Loss of corporate sovereignty and identity: The quality of NOC partner and their ability and willingness to take advice and risk manage project delivery will be key. In addition, given geopolitical instability in some regions, there is potentially the risk of future nationalisation of assets. Given that the nature of the business will change substantively there may also be issues with attracting and keeping a sufficiently high quality workforce.

Key interests/incentives for different stakeholder

For companies the cost pressures on oil exploration and the need to develop gas reserves close to where they will be used mean there is an incentive for companies to pursue a Services tie-up strategy. **The question will be on what terms and where - as the size and scope of opportunity will be geography and asset-specific.** This is because, unlike IOCs, NOCs have much larger reserves and ties to national governments, which arguably imply a greater risk of stranding. Given this and the shift from developing and owning assets to providing services the company may consider the legal and operational separation of the NOC-related business from the rest of the company.

For investors this could be a **viable approach, but companies will need to present a strong rationale and reassure investors concerned they are committing capital with fewer controls.** Investors may also believe that an NOC/service company or NOC/more sophisticated NOC model would be more credible. It will be important to explain how an IOC will manage the policy-related stranded asset risk arising from country governments instituting tighter climate policies once their financial interests in the sector are diminished. The flip side of this is whether by undertaking such purchases the IOCs may seek to block the climate transition in those countries through requiring, as a condition of sale, guaranteed access to local market opportunities, for example.

For Governments that own NOCs, access to capital is growing in importance as an economic diversification strategy (away from oil and gas) and so this looks to be potentially attractive, if the terms are right.

6e. Ostrich

Under the Ostrich strategy, the IOC starts with weak (i.e. few/high cost/short time horizon) reserves, believes the Paris Agreement will not be delivered and is confused about where residual market value can be found. **Instead of taking a proactive approach to managing its fortunes, it falls back into the comfort of the old beliefs that demand for oil and gas will ultimately keep rising, oil prices will recover, and**



that if they just ride out the current market stresses there will be a return to business as usual. The business closest aligned with this approach is Chevron, which has a poor record on engaging with the climate debate and is the most exposed in terms of having exploitable reserves based on the current oil price. In January 2017 Chevron disclosed its first annual loss in 37 years⁵⁵.

Risks to implementation

Voices of reason inside and outside the company: This model looks unviable because of all the drivers listed earlier – tightening climate policy, low oil price, technological innovation, changing behaviour and so on. The change model for the industry will ultimately be driven by regulation. This in turn will be informed by voters, who in turn will be influenced by events and consumer influences, which will be determined by choices available to them. As such **it will be necessary for the company to have a view on the impact of these drivers on their business model.** Without this clear focus such a company is likely to see its share price fall, perhaps to a level at which it looks likely to be taken over or management change is forced.

Key interests/incentives for different stakeholder

For companies in a world where high risk and high uncertainty factors threaten the business it can simply be more comfortable to ignore the megatrends and take a passive approach in the face of threats to the business.

For investors this strategy will look increasingly unviable. As the share price falls, the company is likely to become vulnerable to takeover.

For governments there should be significant concern – specifically around who pays for decommissioning costs and how potential financial shocks impact the wider economy from a disorderly transition.

7. Conclusions

A growing number of investors are calling for oil and gas companies to align themselves with the low carbon transition embodied in the Paris Agreement. In November 2016, 19 investors with more than €5tr of assets under management called for an indefinite moratorium on oil and gas activity in the Arctic high seas⁵⁶. Added to this, a report by CDP also released in November “In the pipeline, which oil and gas

⁵⁵ See <https://www.pipelineme.com/news/international-news/2017/01/chevron-posts-first-annual-loss-in-many-years-misses-estimates/>

⁵⁶ See <https://www.ipe.com/countries/france/french-pension-investors-call-for-moratorium-on-arctic-oil-gas-activity/10016002.fullarticle>



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companies are preparing for the future?” sets out how European companies are investing more in low carbon technologies and shifting toward gas – with US companies increasingly left behind. Statoil, Eni and Total were marked out as the best performing companies. Norway’s Statoil was ranked first, in part because it had the highest share of gas in its stock of proven reserves. Italy’s Eni scores second, because it has big gas projects in the pipeline, such as the Zohr field off the coast of Egypt, and plans to spend €1bn over the next three years on fossil fuel alternatives such as solar projects in Italy, Algeria and Pakistan. Total’s purchases of US solar panel producer SunPower and the Sift battery maker helped the French oil major achieve a third-place ranking in CDP’s scorecard, followed by Royal Dutch Shell and BP.

Suncor, ExxonMobil, and Chevron ranked lowest of companies assessed. Three major companies, all NOCs, Saudi Aramco, Russia’s Rosneft and PetroChina – were unranked in the report because they refused to respond to the organisation’s questions. The difference between US and European companies has been cited as an important consideration for asset managers. For example Meryam Omi, head of sustainability at Legal & General Investment Management (LGIM) said “There is an inevitable divergence in their commitments and transparency, which this report demonstrates” and that “LGIM will be using many of the findings to guide its overall engagement strategy with this sector.” It is perhaps not surprising then that the oil and gas climate initiative announced a new US \$1bn fund over the next 10 years to help fight climate change was widely pilloried⁵⁷.

Each of the strategies described here carries risks for the IOCs. The major risk is around the actual timing and speed of the energy transition. This is a highly contested space. **Some believe a lack of investment in oil development will restrict economic growth and generate disruptively high prices⁵⁸; others cite growing concerns about a global ‘oil glut’⁵⁹. Others still have concerns about whether investment outside the oil industry in RES and demand reduction will accelerate stranding of oil and gas investments.** The credibility of such scenarios will need to be considered as decisions are made by IOCs – and **managements will need to hold their nerve and be willing to adapt as events unfold – and have a strong story to tell both to investors and government.**

In addition the strategies pursued by individual IOCs may be more or less beneficial (to their stakeholders) depending on what the NOCs choose to do in a world adjusting

⁵⁷ See <http://www.telegraph.co.uk/business/2016/11/04/oil-chiefs-under-fire-over-pathetic-new-climate-investment-fund/>

⁵⁸ Khalid al Falih (18-19 October 2016) Oil and Money Conference, London.

⁵⁹ BP’s Energy Outlook 2017 identifies twice as much technically recoverable oil available as the world is expected to need between now and 2050, making it likely that some oil reserves will never be extracted. BP cited estimates that there are 2.6tn barrels of oil recoverable using current technology, more than twice cumulative global oil demand to 2050 under most scenarios. See <https://www.bp.com/content/dam/bp/pdf/energy-economics/energy-outlook-2017/bp-energy-outlook-2017.pdf>



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to oil prices of around US \$50/bbl. For example the Last one standing may in reality be an NOC (Saudi Aramco being the notable candidate), not an IOC, by dint of having access to the lowest cost productive reserves. As such **a key early conclusion is that the risks of each strategy need to be considered in the context of an early or late transition – and against a backdrop of NOC dynamics, which the next phase of this work aims to do.** Some more general conclusions can be drawn. They are:

- The **energy outlooks used by the businesses need to be improved to better inform analysis and discussion of the energy transition choices.** The recent World Energy Outlook published by BP for example has come under criticism for barely adapting its forecasts, despite the fact the Paris Agreement has now come into force⁶⁰.
- **Ostrich is not a credible option given the headwinds facing the industry.**
- Many of the assets of IOCs consist of unexplored reserves, as such **options to split off the ‘bad businesses’ from ‘good assets’ as Eon/Uniper has done in the electricity world are limited.** There are also intangibles in brands, intellectual property and management competence to be considered. Depending on the strategy deployed the businesses could think about ring-fencing, SPVs and structural separation of parts of the business under certain circumstances. These are:
 - Under the Last one standing strategies, decommissioning residual operational assets may require the setting up of a separate decommissioning entity and/or fund.
 - Under a Planned transformation strategy, legal and operational separation of the fossil fuel parts of the business and operational RES assets could be considered once RES assets hit ‘critical mass’ on the basis of the different risk profiles.
 - If the business transition gets to a point where higher returns are being generated by RES than by fossil fuels a case could be made for structural separation of the business, with a managed decline for the oil and gas side of the business and growth of the RES business.
 - Under a Planned transformation strategy, SPVs could be considered for RES assets once operational – and the IOC could adopt a forward model of developing and selling on assets to institutional investors, retaining an equity tranche and control over operations (effectively becoming an electricity generator) and recycling cash into the business.

⁶⁰ For example the latest outlook has CO₂ emissions from fossil fuel use reaching 32.2bn tonnes in 2035, less than 3% lower than BP’s pre-Paris expectation of 33GtCO₂. It now thinks emissions will rise by 23% between 2015 and 2035, rather than the 25% increase it expected a year ago. See full analysis by Carbon Brief at <https://www.carbonbrief.org/analysis-how-the-bp-energy-outlook-has-changed-after-paris>



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- Under the Services tie-up strategy, companies may consider the legal and operational separation of services/NOC assets from the rest of the company to manage the risks of nationalisation and/or asset stranding.

Following on from this initial scene-setting paper, E3G along with the Smith School and Chatham House will **undertake war-gaming against a backdrop of different possible real-world 1.5/2°C transition scenarios to understand how business planning decisions and strategies by the IOCs and later the NOCs might affect company value**. We will also look at how investors, governments and civil society might respond to these challenges. The findings will be published later in 2017.

Acknowledgements

Thanks go to Tom Burke, Nick Mabey, Shane Tomlinson and Shin Wei Ng at E3G; John Mitchell, Beth Mitchell, Paul Stevens and Owen Grafham at Chatham House; Ben Caldecott and Lucas Kruitwagen at Oxford University; and Ian Temperton for their extensive input into this paper.

About E3G

E3G is an independent, non-profit European organisation operating in the public interest to accelerate the global transition to sustainable development. E3G builds cross-sectoral coalitions to achieve carefully defined outcomes, chosen for their capacity to leverage change. E3G works closely with like-minded partners in government, politics, business, civil society, science, the media, public interest foundations and elsewhere.

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