

The Impact of High and Volatile Oil Prices on
the Super-Majors:
A Study of 2012

Nikki Jones

March 2013

Contents

| | |
|---|----|
| 1. Resource nationalism: where to invest?..... | 6 |
| 1.1 The oil price is critical given high marginal costs..... | 7 |
| 1.2 Litigation and investor flight are added risks..... | 7 |
| 1.3 Cost recovery plus a ‘cushion’..... | 8 |
| 2. High prices stimulate alternative supplies, turning oil majors into gas majors..... | 9 |
| 2.1 Diversification into gas made on faulty assumptions..... | 9 |
| 2.2 The high Brent price has contributed to serious cost overruns..... | 11 |
| 2.3 The super-majors join the fracking..... | 12 |
| 2.4 Asian gas price likely to fall..... | 14 |
| 3. Shale <i>oil</i> brings further market confusion..... | 16 |
| 3.1 Infrastructure bottlenecks cause an oil glut..... | 17 |
| 3.2 The increase in US oil supply is unlikely to dent world oil prices – but gas might..... | 18 |
| 4. Unintended consequences: coal now rivals oil..... | 19 |
| 5. Revenue from less likely sources: volatility has unexpected advantages..... | 19 |
| 6. Conclusion..... | 20 |
| 6.1 The future of the super-majors..... | 22 |

The impact of high and volatile oil prices on the super-majors

A study of 2012

High Brent prices present a paradox for the six oil 'super-majors'. Revenues of hundreds of billions of dollars per year have made the six dominant companies enormously cash-rich and their market capitalisations vast, ie. the number of outstanding shares multiplied by their value. In 2012 these stood at \$122bn for Total, \$137bn for BP ¹, \$215bn for Chevron, \$226bn for Shell and \$406bn for ExxonMobil². In the first decade of the century, the upstream (exploration and production) returns of the 'Big 6' averaged a staggering 25%³ and the super-majors continue to dominate corporate indices such as the FTSE, Fortune 500 and Standard & Poor's 500.

The 'super-majors'

In the late 1990s, when oil prices were low, several oil 'majors' merged to form the current six 'super-majors', sometimes known as 'Big Oil'.

BP acquired Amoco in 1998 and ARCO in 2000; Exxon merged with Mobil in 1999, forming ExxonMobil; Total merged with Petrofina in 1999 and with Elf Aquitaine in 2000, becoming Total S.A.; and Chevron acquired Texaco in 2001. Conoco Inc merged with Phillips Petroleum Company in 2002, forming ConocoPhillips, but in April 2012 the corporation abandoned the 'super-major' model and split into two smaller energy companies, ConocoPhillips and Phillips 66.

Although the 'super-majors' control only a few per cent of the world's reserves they are amongst the world's largest global corporations, with massive market capitalisations and profits.

Reserve replacement and ROCE

However, the two 'health indicators' the industry values most – reserve replacement and return on capital employed (ROCE) – depend upon the quality of investment opportunities available. When these indices are examined, it becomes clear that the super-majors are facing serious challenges. Paradoxically it appears that high prices have sparked or contributed to structural trends that have created a deeply uncertain forward-investment scenario for the super-majors.

Average 2012 Brent price beats 2011 record

The average price of Brent was \$111.50 in 2012, beating the 2011 record average of \$110.90. Apart from 24 days in early summer, Brent closed each day at over \$100.

[Blas, Javier \(2012\) 'Opec cartel to reap record \\$1tn', *Financial Times*, 30 December.](#)

¹ BP (2012), available at www.bp.com/extendedsectiongenericarticle.co?categoryId=9021229&contentId=7039276, accessed 10 Jan 2013.

² Y Charts (2012), available at Ycharts.com/companies/RDSA/market_cap, accessed 10 Jan 2013.

³ Chazan, Guy (2012) 'Big is no longer beautiful in oil business', *Financial Times*, 9 December.

Reserve replacement keeps CEOs awake at night

Reserve replacement is the 'raison d'être' of the super-majors and is crucial in determining their share price. Oil companies need to demonstrate that they are able to improve, or at least maintain, the level of reserves under their control, ie if a company produces a billion barrels a year it is expected to prove at the end of the year that it has access to a new billion barrels, either through exploration or through mergers and acquisitions. Steve Coll, author of *Private Empire: ExxonMobil and American Power*, likens this to asking the airline industry to fly at higher altitudes and speeds year-on-year.

There is often tension between oil companies and the reporting authorities since oil companies are more inclined to include 'Probable Reserves' which are not 'booked', ie those where reserves are confirmed but production is dependent on uncertainties around government consent, technology and price. Tar oil and shale oil were not permitted in official estimates before 2008 because they are perceived to be mining operations rather than extraction technologies, with substantially higher development costs.

Several super-majors have fallen foul of regulatory authorities on this issue: ExxonMobil, under Lee Raymond, is reported to have consistently included 'Probable Reserves' in its press releases and announcements to investors, despite challenges from the US Securities and Exchange Commission. In 2004, Shell was the subject of lawsuits and compensation claims when it was discovered that the company had over-stated its reserves by 4.5 billion barrels, approximately 23% of its total. Lee Raymond is reported to have said that reserve replacement is the one subject that kept him awake at night: it is very likely that other oil CEOs concur.

Coll, Steve (2012) Private Empire: ExxonMobil and American Power, New York: Penguin Group (p. 616, p. 56, p. 57).

This paper has used news reports, principally from the Financial Times, to monitor energy prices and the super-majors' investment decisions throughout 2012. The assumption that a high Brent price is an unequivocal 'good' for the companies was found not to be true. Some of the key paradoxes inherent in sustained high prices are:

- The price-fuelled 'cycle' of resource nationalism – the phenomenon of host governments confidently asserting challenging terms for the extraction of resources – has been prolonged, barring the oil majors from investing in key areas, leaving them only high-risk and high-cost areas for exploration and production;
- The high Brent price and apparent 'safety' of some floating petro-currencies have contributed to serious cost overruns on several key projects;
- High oil prices have given an impetus to the discovery of alternative sources of energy. This includes unconventional supplies of gas which have come on-stream with inadequate infrastructure for refining and transportation, leading to the added complexity of low prices in North America;
- This modern day price-fuelled 'gold rush' is in danger of creating a more wide-spread over-supply of gas. It is likely that Asian, and therefore European, gas prices will fall, particularly if Chinese 'fracking' is successful. This could make super-major investments in expensive liquefied natural gas (LNG) infrastructure unsafe, as well as actual gas production, both conventional and unconventional;

- North American shale gas production has had an unforeseen effect on both oil and coal. As companies have switched from 'dry' shale gas wells to 'wet' shale oil, they have added to the glut which was already developing from strong Canadian tar sands production and mis-aligned transport and refining infrastructure. Cheap oil and gas in North America have displaced coal in power generation leading to large-scale exports with depressed prices. Coal now stands to rival oil as the world's primary energy source;
- Demand decline in the 'home' markets of the industrialised north has necessitated a massive organisational and infrastructure re-alignment for the super-majors.

ExxonMobil loses its ROCE crown in 2012

According to oil analysts at Barclays, ExxonMobil lost its top ROCE rating in 2012 to Chevron. Generally viewed as the most efficient of the oil majors, ExxonMobil has slipped to 20.8% behind Chevron's 24.5%. Shell trails well behind at 12.9%

Former ExxonMobil CEO Lee Raymond, who had been a director at JP Morgan Chase, is believed to have been responsible for the relatively new emphasis on 'Return on Capital Employed', ROCE, which has become the industry's own measure of efficiency. In an industry that makes long-term investments, typically 20 years, ROCE is perceived as a more accurate health indicator than share price or quarterly profits. In consequence, there is a renewed emphasis on exploration and production as the oil majors now seek only high-margin returns and are less tolerant of low profit areas, particularly in downstream activities. In December 2012 Barclays reported that, across the industry, investment in exploration and production is set to increase, from \$600bn in 2012 to \$650bn in 2013.

However, in a further paradox it appears that price volatility, which is strongly correlated with high prices, is an opportunity for profit. In an industry that requires long-term investment strategies and which also engages in physical trading, volatility might be assumed to be an absolute 'negative' for the super-majors. However, in recent years there is evidence that hedging is no longer simply for safety and that derivative trading has become a revenue stream for the super-majors. Surprisingly, periods of low price volatility have become correlated with lower profits from trading departments.



Brent, the leading benchmark, showed exceptional volatility in 2012⁴

⁴ Moneyweek (2013), available at <http://www.moneyweek.com/news-and-charts/market-data/oil>, accessed 7 Jan 2013.

1. Resource nationalism: where to invest?

Resource nationalism, the move by governments to nationalise industries or simply impose new regulatory regimes, higher royalties or taxes, is seen as a cyclical phenomenon, spurred on by high prices. It first became a significant force in the 1970s as demand rose, and resulted in the creation of OPEC. During the 1980s and 1990s, as prices slumped, governments became more willing to work with the oil majors and accept lower terms. In the early 2000s, however, resource nationalism re-emerged as prices rose, beginning in Latin America and spreading to Russia, the Middle East and Africa.

Although oil analysts watch for signs that resource nationalism is abating, with continued high prices it remains a dominant consideration for the super-majors and in 2012 there were many examples of governments asserting their control. The phenomenon poses three significant challenges to the 'Big 6' companies: they are either barred from investing in key areas, they risk making major investments and subsequently having contracts revised ex post facto, or there is increased competition from aggressive national oil companies (NOCs) whose mandate is to secure energy supplies for their home countries.

Disputes with Kazakh government delay production from mighty Kashagan

A consortium including Shell, ExxonMobil, ConocoPhillips and Total has been attempting to develop a 1m b/d oil field in Kazakhstan since 2000.

The project has been dogged by delays and disputes with the increasingly 'resource nationalist' government of Kazakhstan. In 2008 the state oil company KazMunaiGas doubled its stake and became one of the operators. The project was reported to have already cost \$30bn by 2012 – and although the first phase of production is expected to begin in 2013, the international oil companies are concerned that there will be insufficient returns before their contract expires in 2037. In November, oil major ConocoPhillips sold its stake at a loss to Indian NOC ONGC. A further \$137bn is believed to be required for the second and third phases of development.

Gorst, Isabel, Buckley, Neil and Pfeifer, Sylvia (2011) 'Kazakh PM says dispute risks oilfield delays', *Financial Times*, 22 May.
Crooks, Ed and Chazan, Guy (2012) 'Conoco sells stake in Kashagan field', *Financial Times*, 26 November.

Thailand's PTT out-bids Shell

In a bidding war with Thailand's national oil company, PTT, Shell was forced to back down in July 2012. The asset being auctioned was Cove, valuable because of its stake in Mozambique's rich natural gas fields.

Stock Market Wire (2012) 'Shell will not take part in Cove Energy auction', available at www.stockmarketwire.com/company-news/RDSA/Royal-Dutch-Shell, accessed 12 November.

Oil majors cool towards Brazilian 'pre-salt'

Government-led law suits against Chevron and Transocean, plus stiff 'local content' requirements have drained enthusiasm for Brazil's expensive and risk-laden ultra-deepwater reserves.

Sakoui, Anousha and Chazan, Guy (2012) 'Anadarko shelves Brazilian sale', *Financial Times*, 19 July.

Resource nationalism now restricts the super-majors to high-risk, high-cost investments. These are either in unconventional production, physically hostile environments where exploration is often highly speculative, expensive and high-risk – principally the Arctic, and deep water - or where property rights are less secure and partners and governments are less than desirable. In 2012 both

BP and Shell divested from sectors that were profitable but politically fractious. BP finally dissolved its difficult partnership with three Russian oligarchs in BP-TNK⁵, and Shell sold one of its on-shore leases in the Niger delta oilfield⁶. Conversely, but a further example of the limited fields open to the super-majors, ExxonMobil, ConocoPhillips and Shell all competed to get into war-torn Colombia even though the ink was not dry on the FARC peace settlement⁷.

1.1 The oil price is critical given high marginal costs

Not only does resource nationalism threaten the majors' ability to replace their reserves, but it has helped bring the marginal cost of supply close to \$100 per barrel⁸. Unlike the easy-access oil of the Middle East which in 2006 came as low as an estimated 10c per barrel⁹, the super-majors are relegated to high cost exploration. Tar sand oil is the most expensive 'unconventional' source with soaring break-even costs, now between \$60 and \$100/b depending on the depth of mines, but only \$30/b five years ago¹⁰. Analysts estimate US shale oil production to be \$44-\$68/b in 2012 and Arctic production close to \$100/b¹¹. Costs of deepwater (more than 400 metres) and ultra-deepwater (more than 1500 metres) have also risen dramatically over the last few years, exacerbated by the impact of BP's Deepwater Horizon disaster in 2010.

1.2 Litigation and investor flight are added risks

Exploration in challenging environments is not only expensive in itself but brings the risk of environmental damage, loss of production, expensive litigation and investor flight. In 2012, Shell faced claims for compensation from Nigeria¹²; Chevron and Transocean faced a bill of \$22bn for deepwater spills off Brazil¹³; Chevron was pursued for an Ecuadorean claim of \$18.2bn¹⁴; and Moscow charged TNK-BP for an alleged 784 pipeline accidents and spills in 2011¹⁵. BP has found itself unable to draw a line under the Deepwater Horizon disaster of 2011, despite major pay-outs, and Total was unable to re-start production at the stormy North Sea Elgin platform after a gas leak in March. In April 2012, just an oil sheen near a platform in the Gulf of Mexico sent Shell shares down over 4%¹⁶.

⁵ Chazan, Guy and Belton, Catherine (2012) 'Rosneft to pay \$55bn in TNK-BP takeover', *Financial Times*, 22 October.

⁶ Bream, Rebecca (2012) 'Shell sells Niger delta oilfield stake', *Financial Times*, 3 September.

⁷ Chazan, Guy (2012) 'Oil groups tussle for Colombia licences', *Financial Times*, 30 September.

⁸ Crooks, Ed and Chazan, Guy (2012) 'Energy: Drills, chills and spills', *Financial Times*, 4 September.

⁹ Bahgat, Gawdat (2006) 'The United States and the Middle East: Interdependence not Independence', *Organisation of the Petroleum Exporting Countries Review*, pp. 187 – 201 (p. 197).

¹⁰ Bawden, Tony (2012) 'Canada in danger of booming tar sands backlash', *The Independent*, 14 June.

¹¹ Crooks, Ed and Chazan, Guy (2012) 'Energy: Drills, chills and spills', *Financial Times*, 4 September.

¹² Croft, Jane (2012) 'Shell faces claim over Niger delta spills', *Financial Times*, 22 March.

¹³ Leahy, Joe (2012) 'Oil leak found in state-run field off Brazil', *Financial Times*, 10 April.

¹⁴ Mapstone, Naomi (2012) 'Chevron sued in Canada over Ecuador case', *Financial Times*, 31 May.

¹⁵ Belton, Catherine (2012) 'Moscow to bring charges against TNK-BP', *Financial Times*, 19 April.

¹⁶ 'Shell shares drop on Gulf of Mexico 'oil sheen' fears', *The Telegraph*, 12 April 2012.

BP and Shell face Arctic winds

In the mid-2000s rising oil prices lured the oil majors to the Arctic, despite its stormy seas and short summer season. However, there has been a high failure rate, with only 12 out of 400 Alaskan wells delivering commercially viable oil reserves. In July 2012 BP announced it was abandoning plans to invest \$1.5bn in the Liberty field, stating that both the costs and risks were too high. In 2008 it had been forced to abandon five years joint exploration with Rosneft since finds were not commercially viable.

In 2012 Shell was again forced to postpone its efforts to drill in the Arctic. More than seven years have been spent in preparation, and an estimated \$4.5bn. The company raced to begin work before the 2012-'13 winter set in but the movement of ice floes, whales, the inadequacy of oil recovery plans plus damage to their recovery vessel eventually forced Shell to halt all activity. Late December, just as Shell was in talks with the US government to extend its licences, its drill ship – the Kulluk – ran aground.

ExxonMobil still has plans to drill in the Arctic with Rosneft but agrees that, because of the short season, its wells are likely to be the most expensive in history. ConocoPhillips is one of the largest operators in Alaska but currently considers shale developments in the 'lower 48' to be more profitable. Norway's Statoil has 12 wells planned but is reportedly concerned about costs and has predicted more joint ventures. In January 2012 Statoil bought into Cairn Energy's exploration off the coast of Greenland, a two year investment of \$1bn that so far has had no marketable results.

Total says Arctic too risky

In September 2012 Total's CEO, Christophe de Margerie broke ranks with the other majors and spoke out against oil exploration in the Arctic, saying that the risk of a spill was simply too high.

[Chazan, Guy \(2012\) 'Arctic exploration moves at glacial pace', *Financial Times*, 13 January.](#)

[Chazan, Guy \(2012\) 'BP abandons plan to develop Alaska field', *Financial Times*, 11 July.](#)

[Crooks, Ed and Chazan, Guy \(2012\) 'Energy: Drills, chills and spills', *Financial Times*, 4 September.](#)

[Milne, Richard \(2012\) 'Statoil committed to Arctic despite setback', *Financial Times*, 2 October.](#)

[Chazan, Guy \(2012\) 'Total warns against oil drilling in Arctic', *Financial Times*, 25 September.](#)

1.3 Cost recovery plus a 'cushion'

Some oil analysts suggest companies look to cover the \$90 -\$100/b cost recovery figure with a cushion of around \$25/b¹⁷. High prices are therefore essential for the viability of investments, but the super-majors face the heightened paradox that high prices further stimulate resource nationalism *and* the supply of alternative energy sources.

¹⁷ Sankey, Paul, Clark, David T and Micheloto, Silvio (2010) 'The End of the Oil Age', Deutsche Bank, available at bioage.typepad.com/files/1223fm-05.pdf, accessed 5 May 2012, p. 50.

2. High prices stimulate alternative supplies, turning oil majors into gas majors

A normal part of the up-swing in a commodities cycle is the stimulation of alternative supplies, including the substitution of other forms of energy. There has been much investment in renewable energy and biofuels but in recent years gas – and surprisingly, coal – have emerged as serious competitors to oil. Gas has long been considered a waste product associated with oil because of the difficulties in transporting it: lack of transportation infrastructure has meant that there has been no globalised trading system and no world benchmark. Long-term contracts have been negotiated bilaterally, with prices indexed to oil. Because of the costs of development and transportation purchasers have been obliged to commit to contracts, typically 20 years, in which they are penalised if they do not take the full amount of gas originally specified.

However, rising gas and oil prices in the early-mid 2000s made the technology of liquefying gas, shipping and re-gasifying cost-effective so that gas was no longer simply a by-product to be flared, and ‘stranded’ reserves can be connected to markets¹⁸. This brought a frenzy of investment from the super-majors as well as private equity funds, banks and government sources. All the ‘oil super-majors’ have invested in liquefied natural gas (LNG) projects, particularly in Asia, Australia and the Middle East. In 2012, Shell expected to produce more gas than oil for the first time¹⁹ and BP’s annual report indicated that the number of productive wells was almost equally divided between oil and gas at the end of 2011²⁰. Both BP and Shell have invested in shipping to facilitate the development of the gas market: Shell has an interest in around a quarter of all LNG shipping vessels in operation²¹. Thus, over the last decade, the ‘oil super-majors’ have become ‘oil and gas super-majors’.

2.1 Diversification into gas made on faulty assumptions

However, investments have been made on the assumption that, first, the US would be the leading market and that, second, prices would stay above \$7 -\$8 per million British thermal units (mBtu). Analysts consider this price level necessary for the viability of LNG green-field sites²². Neither assumption has proved correct. Both have been overturned by the ‘shale revolution’ which the majors did not foresee and did not initially invest in, but which became an indisputable fact in 2012. It seems that, as with resource nationalism, high oil and gas prices have, unexpectedly, proved to be a mixed blessing, in this case spurring on investment into high-cost technologies that have been around since the 1940s²³ but which only became financially viable from 2003 onwards²⁴. ‘Wild

¹⁸ Sankey, Paul, Clark, David T and Micheloto, Silvio (2010) ‘The End of the Oil Age’, Deutsche Bank, available at bioage.typepad.com/files/1223fm-05.pdf, accessed 5 May 2012, p. 133.

¹⁹ Shell (2013) available at www.shell.com/global/aboutshell/media/speeches-and-webcasts/2012/voser-ceraweek-houston-07032012.html, accessed 13 January 2013.

²⁰ BP (2013) available at www.bp.com/liveassets/bp_internet/globalbp/STAGING/global_assets/downloads/F/FOI_2007_2011_full_book.pdf, accessed 13 January 2013.

²¹ Shell (2012) available at www.shell.com/home/content/innovation/meeting_demand/natural_gas/lng/, accessed 30 June 2012.

²² Sankey, Paul, Clark, David T and Micheloto, Silvio (2010) ‘The End of the Oil Age’, Deutsche Bank, available at bioage.typepad.com/files/1223fm-05.pdf, accessed 5 May 2012, p. 133- 137.

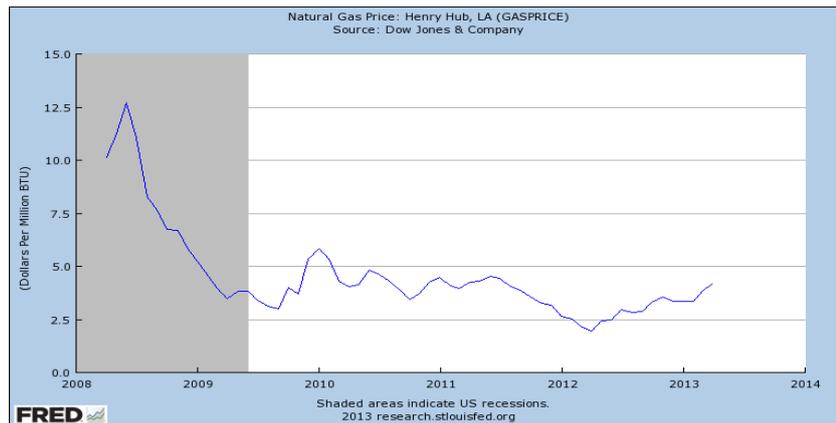
²³ Crooks, Ed and Chazan, Guy (2012) ‘Risks cloud bright future for oil and gas’, *Financial times*, 12 November.

²⁴ Coll, Steve (2012) *Private Empire: ExxonMobil and American Power*, New York: Penguin Group (p. 584).

catters' were the first to extensively use the relatively expensive techniques of hydraulic fracturing and horizontal drilling, and were ignored for several years by the super-majors.

The development has been likened to the 'dot com bubble', with much hype and speculation masking a genuine, fundamental shift²⁵. In 2012 'fracking' was likened to a full-on gold rush. However, the lack of transportation infrastructure from areas such as North Dakota has led to a glut in North America, depressing prices and creating a highly confused investment landscape. Almost unremarked around the world, the Obama administration has been slow to grant export licences, further exacerbating North American over-supply.

The US gas price is based on the 'Henry Hub' benchmark. In 2012 it dropped below \$2mBtu²⁶.



US gas prices fall to less than \$2 mBtu in 2012

Seven years of rising global energy prices have allowed companies to use the relatively high-cost technologies of hydraulic fracturing and horizontal drilling, opening up unconventional gas reserves in the US and causing a gas supply glut. Production has been so high that the US overtook Russia as the number one gas producer in 2010 and fracking now supplies 25% of US gas demand. However, the lack of pipeline infrastructure servicing production areas such as North Dakota led to the US price collapsing to less than \$2 per thousand British thermal units (mBtu) in April 2012, a 90% drop from 2005. The high point of the year was only \$3.63 in November.

The development of a globalised gas market

The price in Europe and Asia, however, is substantially different because currently only the US and UK consistently use liberalised spot markets. The lack of transport infrastructure for gas has, up till now, inhibited the development of a global market and sales have generally been regional, with prices agreed in private, bilateral negotiations but generally based on long-running contracts indexed to oil. In consequence, the 2012 price in Europe was much higher at around \$10 mBtu, and \$17 in Japan. However, in the later months of 2012 several Japanese utility companies, the biggest gas importers in the world, announced that they were signing long-term contracts linked to daily US gas prices.

Meyer, Gregory (2012) 'Natural gas price dips below \$2', *Financial Times*, 11 April.

Terazano, Emiko (2012) 'Japan's LNG in crucial pricing shift', *Financial Times*, 18 December.

²⁵ Chazan, Guy (2012) 'Size matters in the energy revolution', *Financial Times*, 7 October.

²⁶ Federal Reserve Bank of St Louis economic research (2013), *Henry Hub natural gas price*, available at <http://research.stlouisfed.org/fred2/graph/?id=GASPRICE#>, accessed 25 May.

2.2 The high Brent price has contributed to serious cost overruns

The high Brent oil price has contributed to a further problem for the super-majors. Many of the LNG projects have run over-budget and been subject to serious delays. It appears likely that the super-majors' failure to control costs comes from a complacency derived from a high Brent crude price, as well as currency movements as post-financial crisis investors have sought safety in floating petro-currencies. Paradoxically it appears that the high Brent price has contributed to a lack of safety for the super-majors' round of expensive conventional gas investments.

Costs too high for Arctic gas

In August, after five years of planning, Gazprom finally called a halt to its joint venture with Total and Statoil to develop the massive Shtokman natural gasfield in the Arctic Barents Sea. The US had been the intended market for the gas.

Total, Statoil and partners also abandoned plans to expand the Snøhvit gas field after revising estimates of its reserves. The Norwegian national oil company Statoil maintains that it will continue exploration in the Arctic, having built a LNG plant inside the Arctic Circle. The facility, which services gas from Snøvit, opened a year late in 2007, 50% over the original budget.

Chazan, Guy (2012) 'Gazprom puts Shtokman project on ice', *Financial Times*, 31 August

Chevron and ExxonMobil face massive cost hikes on LNG investments

The Gorgon LNG plant in Australia will cost an extra \$15bn, Chevron announced in December 2012. This brings the project costs up 40% to \$52bn and, since the project is only half complete, it is likely that there will be further delays and budget revisions. Shell and ExxonMobil have 25% stakes in Gorgon.

Oil major ExxonMobil has gone furthest in its investment in gas production but its Papua New Guinea plant is now well over-budget at \$19bn. Exchange rate fluctuations in particular are reported to have added to the extra \$3.3bn cost.

Hume, Neil (2012) 'Gorgon LNG project cost jumps \$15bn', *Financial Times*, 6 December.

Hume, Neil (2012) 'Exxon warns of cost blowout at PNG LNG', *Financial Times*, 12 November.

BP joins US fracking

In 2008, when oil and gas prices were at record highs, BP announced various joint ventures with US gas fracking company Chesapeake. Even without the fall in prices, the \$1.75bn paid for a 90,000 acre basin in Oklahoma appeared generous. However, in 2012 the companies were arguing in court over whether Chesapeake actually had the rights to about 7% of the land it sold to BP. Undeterred and determined to join the fracking bonanza, BP announced a separate acquisition of acreage in Ohio in March 2012.

However in May 2012 it was announced that BP-TNK had been out-bid by rivals Shell and Chevron to begin exploration in the Ukraine.

Forbes (2012) 'BP and Chesapeake to fight in court over land deal gone sour', 10 June, available at www.forbes.com/sites/christopherhelman/2012/10/06/bp-and-chesapeake-in-legal-fracas-over-land-deal-gone-sour/, accessed 25 May 2013.

2.3 The super-majors join the fracking

Having missed out on the initial round of fracking investments, the super-majors have moved in, believing that the US gas price must eventually rise. ExxonMobil has gone furthest, buying XTO, a major US gas fracking company, for \$41bn in 2010 and has acquired shale gas acreage in Asia and Europe. The other super-majors have followed suit, along with a whole range of smaller companies. The biggest reserves in Europe were initially believed to be in Poland, France, Norway and the Ukraine²⁷ although it now appears that Russia has vastly more than any other country.

Super-majors failed to predict shale boom

The super-majors simply did not see the shale gas revolution coming. In 2003, Lee Raymond of ExxonMobil is reported to have argued that US natural gas production had probably peaked, and he urged Alan Greenspan to back the construction of LNG *import* terminals for fear that the US would run out of domestic gas supplies within two decades.

Coll, Steve (2012) *Private Empire: ExxonMobil and American Power*, New York: Penguin Group (p. 581).

2.3.1 Fracking adds to the super-majors' risk profile

Although it may appear paradoxical that the super-majors have bought into the 'shale revolution' that is endangering gas prices, acquiring small companies has given their critical reserve replacement ratios a much needed boost, most notably ExxonMobil which, with the acquisition of XTO, jumped from a liquidation-level 45% to an extraordinary healthy 209%. However, the new ventures

Exxon picks up shale bargains in Canada

Many small shale companies have been unable to tolerate the low US gas prices. In October 2012 this enabled ExxonMobil to pick up an apparent bargain when it bought Canadian shale oil and gas assets from Celtic.

Crooks, Ed (2012) 'Exxon seals C\$3bn deal for Celtic', *Financial Times*, 17 October.

represent more high-cost and high-risk production. Extraction involves the blasting of rock with a high pressure mixture of sand, vast amounts of water and undisclosed chemicals. This makes the production method far more expensive than conventional oil or gas extraction. Moreover, wells dry up very quickly so there is a constant need for more drilling. In an age of increased

environmental awareness and concern regarding global warming, there is also the risk that populations and governments will not tolerate the high level of methane released, water-supply contamination, and the increased number of earthquakes. Much of Europe, most notably France which has large shale reserves, maintained a moratorium throughout 2012: in December, however, the UK government gave the go ahead to Cuadrilla, with the proviso that there would be strict monitoring of earth tremors²⁸.

²⁷ Energy Information Agency (2012) available at www.eia.gov/analysis.studies/worldshalegas, accessed 5 May.

²⁸ Clark, Pilita (2012) 'UK gives green light to fracking', *Financial Times*, 13 December.

A further risk for the super-majors is that acquiring acreage will not necessarily translate into production. This is particularly true in Europe. In 2012, estimates of Poland's reserves – which were believed to be the biggest in Europe - were slashed by 90% and ExxonMobil pulled out, leaving Chevron and ConocoPhillips to continue their exploration²⁹.

Link between fracking and earthquakes confirmed

In February 2012, a link between fracking and earthquakes was confirmed by the US Geological Survey: the number of quakes in Oklahoma alone has gone up from 50 per year to 1,047 in 2010.

However, a 'green light' was given to the industry in the US when in April the Environmental Protection Agency released new guidelines giving companies till 2015 to deal with methane and other pollutant gases. Crucially there was no mention of waste water, and therefore the industry faces no major new costs.

Makan, Ajay (2012) 'US government releases 'fracking' gas rules', *Financial Times*, 19 May.

Daly, John C.K. (2011) 'Fracking Hell: Hydraulic fracturing confirmed as cause for increased earthquakes in US', *EconomyWatch.com*, 16 November.

2.3.3 The low North American gas price hits earnings

Although the extremely low price of gas in North America has allowed some companies to acquire assets from distressed smaller companies, the super-majors also now find themselves with severely dented profits. In the second quarter of 2012, Shell reported earnings down by 13%, ConocoPhillips was down by a third³⁰, BP down 35%³¹ and ExxonMobil were only saved from a \$2.3bn drop by the sale of a Japanese refinery.

Low US gas price kills China-Alaska pipeline

BP, ExxonMobil and ConocoPhillips were in discussion with the state of Alaska to build a pipeline through Canada that would unlock a proven reserve of 35 trillion cubic feet of gas, approximately one eighth of the US reserves.

However, the low US price has now stymied this project. The majors are reported to be 'cautiously optimistic' with regard to a smaller, \$40bn pipeline that will bring gas to an LNG plant on the south coast of Alaska, ready for shipment to Asia. The project will take at least ten years, a time-frame that makes market predictions a matter of conjecture.

Crooks, Ed (2012) 'Alaska champions \$40bn pipeline plan', *Financial Times*, 21 March.

Rex Tillerson, CEO of Exxon is reported to have admitted that all energy companies are 'losing our shirts' because of low gas prices³². ExxonMobil is typical in having sharply cut the number of its US rigs in operation³³: across the industry, approximately a third were cut between October 2011 and April 2012³⁴. However, the threat to the super-majors is not only on their gas investments in North America, but also on gas and oil investments worldwide.

²⁹ Cienski, Jan (2012) 'ExxonMobil ends shale gas tests in Poland', *Financial Times*, 18 June.

³⁰ Bream, Rebecca (2012) 'ConocoPhillips hit by split and price fall', *Financial Times*, 25 July.

³¹ Chazan, Guy (2012) 'BP on defensive as earnings plunge', *Financial Times*, 31 July.

³² Chazan, Guy (2012) 'Shale gas glut dents oil major earnings', *Financial Times*, 26 July.

³³ Crooks, Ed (2012) 'US natural gas prices weigh on ExxonMobil', *Financial Times*, 26 April.

³⁴ Meyer, Gregory (2012) 'Natural gas price dips below \$2', *Financial Times*, 11 April.

2.4 Asian gas price likely to fall

It appears that the risks for the super-majors are not confined to the environmental or human impacts of the technology, nor the risks of failed production or high costs affecting investor sentiment. The biggest risk is that the Asian gas price will fall by 2015. Several factors are at work: one is the movement towards an international spot model, with contracts becoming de-linked from oil³⁵. The price arbitrage between the different continents is seen as fundamentally unsustainable and pressure is on the US government to grant export licences that will relieve the 'glut' in the US and make the commodity internationally trade-able, as with oil.

First US gas export facility shakes up market

Developments in 2012 towards a gas spot make it likely that eventually the US gas price will rise, bringing some relief to the super-majors there, but European and Asian prices will come down, making other investments unsafe. Developments in the US have been slow: the government has been unwilling to issue glut-relieving gas export licences, for fear of puncturing its own return to growth. In 2012 only Sabine Pass in Louisiana, being built by Cheniere Energy, has been granted such a licence, although plans for a further 19 export projects have been proposed. In January 2013 it was reported that US companies such as Dow and Alcoa were vigorously lobbying the US government to limit gas exports, putting them head-to-head with the super-majors, particularly ConocoPhillips and ExxonMobil, who are building export facilities. Canada is willing, but currently lacks the infrastructure.

However, even the one licensed export facility looks set to destabilise the energy markets. Cheniere plans to abandon the 'take or pay' system which currently forces buyers to pay a penalty if they don't take the volume promised, usually a 20-year contract. Cheniere also plans to abandon the indexing to oil prices. Russia's Gazprom, which in early 2012 had a price of \$13 mBtu has already been affected: Gazprom has agreed to link up to 15% of its sales to spot prices, a net price reduction of 10% with some of its customers, and some will be released from 'take or pay'.

Crooks, Ed (2012) 'Why Canada is better bet for gas exporters', *Financial Times*, 16 December.

Crooks, Ed (2013) 'Gas users call for limits on LNG exports', *Financial Times*, 11 January.

³⁵ Blas, Javier (2012) 'Japan pushes Asia gas price close to high', *Financial Times*, 17 May.

ICE moves to create European gas benchmark

In September, the IntercontinentalExchange (ICE), home of the Brent oil benchmark, bought a majority stake in a Dutch energy exchange. The deal will allow wider spot trading of gas in the UK, Belgium and Holland and ICE is hoping to greatly expand derivatives trading, as with crude.

Gazprom's hold on European gas prices weakens

In a separate development, the EU commission began an anti-monopoly investigation of Gazprom, suggesting that the Russian giant may have used its position as primary supplier of gas to Europe to prevent competition and drive up prices in central and Eastern Europe. Although the Kremlin has acted to protect Gazprom, in 2012 Russia was forced to make concessions to a liberalised market.

Stafford, Philip (2012) 'ICE push into Europe with Dutch purchase', *Financial Times*, 16 September.

Chaffin, Joshua (2012) 'Brussels opens probe into Gazprom', *Financial Times*, 4 September.

2.4.1 A gas glut in Asia by 2015

However, the super-majors expensive investments face a risk beyond the internationalising of prices. There is also a risk in the widespread increase in supply. Some analysts suggest that the rush to construct LNG facilities in Australia, Indonesia, Singapore and in North America may lead to a gas glut in Asia by 2015. It is also possible that just as LNG investments were made on the assumption that the US would be the primary market but were over-turned by North American shale production, China will, similarly, tap its own resources. The International Energy Agency estimates that China has shale gas reserves almost 50% greater than those in the US, approximately 31 trillion cubic metres³⁶. The country currently has almost no shale gas production but expects its output to exceed 100bn cubic metres by 2020 and the government has been encouraging small Chinese energy companies to bid for licenses³⁷. In 2012 some doubt has been thrown on this optimistic production forecast as ExxonMobil has found that some shale was not responding to current drilling techniques³⁸. However, in the long-term it remains highly probable that reserves will be unlocked. In May it was reported that Shell had completed 11 shale gas wells in China with 'encouraging flow rates', and was planning another 11 in 2012³⁹.

Shell's commitment to gas deepens

In 2012 Shell announced that it would be committing \$1bn per year to shale exploration in China. Of all the majors, Shell has the largest presence in China. It is also investing in an export terminal in Canada to serve the Chinese market, likely to cost around \$12bn. The new plant will face competition from others being built to serve the same need. Shell's CEO Peter Voser said in May that he expects gas prices to reach \$4 - \$6 mBtu in 2014-15.

Hamilton, Gordon (2012) 'Shell Canada to go ahead with Kitimat LNG projects despite billion-dollar Chinese gas investment', *Vancouver Sun*, 21 August.

³⁶ Forbes (2012) 'China closer to joining shale gas fracking craze', available at www.forbes.com/sites/kenrapoza/2012/02/13/china-closer-to-joining-shale-gas-fracking-craze, accessed 13 April 2012.

³⁷ Hook, Leslie (2012) 'Chinese groups flock to shale gas projects', *Financial Times*, 25 October.

³⁸ Carroll, Joe (2012) 'Fracking failing to crack China, Europe shale, Exxon says', *Bloomberg*, 8 March.

³⁹ Chazan, Guy (2012) 'Shell warns on US natural gas bounce', *Financial Times*, 16 May.

As oil analysts are fond of saying, the stone age did not end because the world ran out of stone and it seems that again, rising prices and improved technology are delivering a more cost-effective alternative. Over the last few years, gas has become that contender, a serious alternative energy source. However, the threat to the super-majors is from the price schism between North America and the rest of the world. The super-majors are unable to ignore shale technology, even though it is possible that they will undermine their own investments already made in natural gas. Expensive infrastructure projects are particularly at risk. Moreover, it appears they risk repeating the mistake of investing based on one major import market which, interestingly, in 2012 was reported to be slow in ordering gas turbines and converting its energy production, indicating that it may be waiting till its domestic gas production has come on-line⁴⁰. Just as high oil prices have enabled the US to develop its own shale gas supplies, it appears likely that China will follow suit. Energy-hungry Japan, which since Fukushima has been pushing up European gas prices, may find adequate and closer supplies on its Chinese doorstep.

3. Shale oil brings further market confusion

However, the risks for the super-majors go beyond their gas investments. The US gas glut has had a knock-on effect on oil supplies for the last two years, as shale producers have switched from 'dry' wells that only produce gas, to 'wet' wells that produce a mixture of gas, oil and natural gas liquids, such as ethane and propane. Not only has the increase in oil added to supply but crucially for the majors, it has exacerbated the bottlenecks already caused by massive production of tar sands oil in western Canada. As with gas, the existing US infrastructure has not been able to accommodate the new areas of production: the US is geared towards oil imports on the East Coast, not from the mid-West or North.

Second biggest gas producer in US moves to liquids

Chesapeake Energy, second only to ExxonMobil in US gas production, shifted resources away from shale gas and virtually doubled its oil and natural gas liquids output in 2012. The company reported nearly \$2bn in post-tax losses in November, despite massive borrowings and sales throughout the year.

[Crooks, Ed \(2012\) 'Writedown drives \\$2bn loss for Chesapeake', *Financial Times*, 1 November.](#)

The result in 2012 was that natural gas liquid prices fell to ten year lows, and the North American boom in shale oil production increased competition for pipeline capacity⁴¹. The bottleneck made west Canadian oil the cheapest in the world: in December the regional benchmark fell to less than \$45/barrel, more than \$40 lower even than the alternative world benchmark *Western Texas Intermediate*⁴². This matters for Chevron and Shell who have an expensive joint project in the Athabasca oil sands⁴³, and for BP which has been considering expansion into Canadian tar sands following the sale of its TNK-BP partnership⁴⁴.

⁴⁰ Crooks, Ed (2012) 'GE sees demand for gas-fired power', *Financial Times*, 26 September.

⁴¹ Crooks, Ed (2012) 'Oil sands: Environmental concerns come head-to-head with economics', *Financial Times*, 19 November.

⁴² Blas, Javier (2012) 'O Canada – the land of cheap oil', *Financial Times*, 14 December.

⁴³ Hoyos, Carola (2010) 'Shell defends Canada oil sands investment', *Financial Times*, 12 April.

⁴⁴ Cattaneo, Claudia (2012) 'BP back in growth mode, eyes oil sands', *Financial Post*, 12 July.

Keystone XL pipeline likely to test Obama's second term

Throughout 2012 President Obama resisted pressure to sanction the controversial Keystone-XL pipeline which would bring tar sands oil from Canada and Nebraska to refineries on the Gulf of Mexico. However, TransCanada, the company that hopes to build the pipeline has submitted revised plans and a conclusion is expected before the end of the financial year. Although the tar sands industry predicts an almost doubling of production to 3.17m b/d by 2020, opposition to the Keystone project and the Northern Gateway pipeline through British Columbia is deferring the likelihood that tar oil will be exported to world markets. Future investment in tar sands looks unlikely if WTI stays below \$85/b.

Crooks, Ed (2012) 'Oil sands: Environmental concerns come head-to-head with economics', *Financial Times*, 19 November.

3.1 Infrastructure bottlenecks cause an oil glut

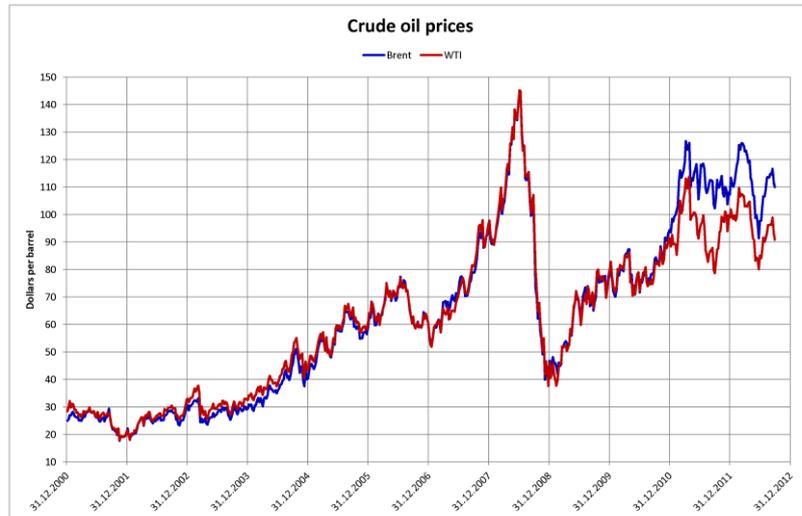
Of even greater significance than Canadian prices, however, is the impact on Western Texas Intermediate (WTI). The bottlenecks that prevent oil from getting to refineries have, for the second year running, caused WTI to trade at a significant discount to Brent, reaching a top figure of only \$109 in February 2012 and a low of \$78 in June. This is expected to continue throughout 2013, possibly dropping as low as \$50/b. Such a price crash, though unlikely to be sustained, would make all oil investments in North America unprofitable. Even the price range of \$70 - \$90 makes investments questionable.

Shell wrong-footed on refinery expansion

In a further example of the shifting sands below the majors' feet, Shell's decision to expand its Port Arthur refinery in collaboration with Saudi Aramco now looks questionable. The decision was made in 2007 to invest \$7bn and double the capacity of the Gulf of Mexico refinery, to allow it to process heavy Saudi crude and tar sands oil. However, as the new facility came on line in 2012, there was no progress in the Keystone XL pipeline project, necessary for bringing Canadian oil to the south, and US requirements for refined products overall were down to 16.57m b/d from a 2005 peak of 18.65m b/d. At the same time, competition from Asia has increased with another 2.7m b/d of refining capacity.

Crooks, Ed (2012) 'Largest US refinery kick-starts operation', *Financial Times*, 30 May.

WTI's traditional slight premium over Brent has been reversed. In 2012, Brent traded approximately 25% above WTI because of US infrastructure problems.



3.2 The increase in US oil supply is unlikely to dent world oil prices – but gas might
 Even though the US is set to become the world's largest oil producer by 2017⁴⁵ it is not likely that increases in North American oil supply will significantly dent global prices: even if bottle-necks are relieved and more North American oil is released for domestic and international consumption, the Brent price is far removed from the realities of demand and supply (See '**High and Volatile Oil Prices: A Study of 2012**'). Fundamentally, as analysts at Deutsche Bank comment, the market cannot be rationalised through more supply, only through less demand⁴⁶.

However, it is likely that, long-term, gas demand will puncture oil prices as the price arbitrage is unsustainable. Gas can fairly easily be substituted as a fuel source in heating and electricity production, and could become a substitute for oil derivatives in thermoplastics. An effect has already been felt on coal in the US, where consumption for energy production is at a 35-year low and now causing a coal export glut⁴⁷. At the

The end of the oil monopoly in transport

In 2009, over 50% of world oil production went to transport and almost 95% of the energy used in transport was supplied by petroleum.

However, high prices and climate change initiatives have propelled the world towards a greater use of natural gas and electricity, as well as efficiency measures. In 2012 Iran became the world leader in dual-fuel cars, with 2.95 million now able to run on compressed natural gas. Pakistan, Argentina, India and Brazil are pursuing similar policies. The US is the world's biggest market for hybrid electric vehicles, where electricity is generated on board from a petroleum engine. Six per cent of US vehicles are expected to be HEVs by 2030, while plug-in hybrids (PHEVs) are likely to rise to 2%. Analysts believe that HEVs will have a noticeable effect on demand for oil.

Mitchell, John, Marcel, Valerie and Mitchell, Beth (2012) 'What next for the oil and gas industry?', Chatham House, October 2012 (p. 6, p. 8-9).

⁴⁵ Crooks, Ed and Chazan, Guy (2012) 'Risks cloud bright future for oil and gas', *Financial Times*, 12 November.

⁴⁶ Sankey, Paul, Clark, David T and Micheloto, Silvio (2010) 'The End of the Oil Age', Deutsche Bank, available at bioage.typepad.com/files/1223fm-05.pdf, accessed 5 May 2012, p. 51.

moment, oil is dominant in transport – road and aviation – but gas has the potential to become a major substitute road transport fuel. While such developments make the oil majors' investments in gas safer, and may remove some of the smaller competitors in shale oil, their high-risk, high-cost investments in conventional oil production look exceedingly unsafe.

Shell makes move into shale oil

Oil majors Shell and Chevron bought the majority of shale oil assets being off-loaded by distressed US producer, Chesapeake, in September. The Texan oil fields cost Shell a reported \$1.94bn, the company's biggest move into shale oil production so far.

Crooks, Ed (2012) 'Chesapeake offloads \$6.9bn in assets', *Financial Times*, 12 September.

4. Unintended consequences: coal now rivals oil

A further consequence of the US gas revolution that makes the majors' investments in both oil and gas look less safe is the suppression of global coal prices. Even in Europe, where governments are committed to reducing emissions, demand for coal has actually increased in 2012 while demand for gas has shrunk. In the UK, the increase in 2012 was 7m tonnes, approximately 28%⁴⁸. The IEA now expects coal to rival oil as the world's top energy source by 2017⁴⁹.

This is entirely due to the cost advantages in coal as the US has been exporting its production, no longer needed because of low domestic gas and oil prices. The 600% surge in US exports over the last five years has combined with increased production from Australia, Colombia and Indonesia, causing a glut. Prices reached a peak in 2008 at \$220/tonne, but in early 2012, hit a two-year low of \$85/tonne⁵⁰. In Europe the cost advantage for coal has been supported by the low price for burning carbon under the EU's carbon trading scheme, a distortion that may be removed in 2013/14⁵¹.

5. Revenue from less likely sources: volatility has unexpected advantages

However, despite the low North American oil and gas prices, the dominant world benchmark for oil – Brent – was extremely high in 2012. High prices are strongly correlated with volatility and it might be assumed that this would be potentially disastrous for physical traders since oil is often sold for delivery in several weeks' time with a price to be set in the future, typically the loading date. Price movements of several dollars per barrel are a relatively new phenomenon in the market. The super-majors have large trading arms and BP is believed to be the largest, an extraordinary 4,000 people⁵². The trading arms of the super-majors 'hedge' to reduce their exposure to price movements but the

⁴⁷ Blas, Javier (2012) 'US rush to gas depresses coal prices', *Financial Times*, 12 March.

⁴⁸ Pfeifer, Sylvia (2012) 'Cost advantage fuels demand for coal', *Financial Times*, 3 October.

⁴⁹ Blas, Javier (2012) 'IEA expects coal to rival oil by 2017', *Financial Times*, 18 December.

IEA (2012) 'Coal's share of global energy mix to continue rising, with coal closing in on oil as world's top energy source by 2017', available at www.iea.org/newsroomandevents/pressreleases/2012/december/name,34441,en.html, accessed 13.1.13.

⁵⁰ Blas, Javier (2012) 'Miners hit by coal glut as prices tumble', *Financial Times*, 18 June.

⁵¹ Pfeifer, Sylvia (2012) 'High gas prices hasten UK energy crunch', *Financial Times*, 13 March.

⁵² BP website, available at www.bp.com – About BP – What we do – Moving oil and gas – Global Energy trading, accessed 15.1.13.

question is whether their activities are adding to those of big hedge funds and financial institutions that contribute to price inflation and great unpredictability (See **'High and Volatile Oil Prices: A Study of 2012'**).

In 2010 when volatility was greatly down, BP reported a *drop* in profitability of its trading division⁵³. It appears that hedging against price volatility has been transformed into derivative trading for profit. According to the BP Treasury webpage, 'Volatility is what drives trading on almost any market. It can bring both risk and opportunity. The ability to assess the risks, take proportionate action to mitigate them, and be able to spot and take advantage of opportunities, when they arise, is central to effective, efficient and successful financial management.' Although the much smaller 200-strong Treasury team is apparently separate to the physical traders, it appears that similar derivative-trading skills are required across both departments. The Treasury is responsible for approximately \$1 trillion throughput per year which includes the generation of income for the company's pensions and insurance requirements⁵⁴.

Other oil majors are less explicit about the 'opportunities' available in volatile markets. Shell has a team of 500 based in a 'Business Service Centre' in Glasgow, plus five other 'service centres' which support 'delivery of the global Finance functional plan'⁵⁵. ExxonMobil, in its end-of-2011 report, declared a one per cent increase in oil and gas production but 'unprecedented cash generation supported a 6-percent increase in our dividend'. Income from 'Corporate and Financing' was reported as \$2,221 billion, compared to \$34,439 billion from upstream and \$4,459 billion from downstream assets⁵⁶.

Although it may be considered normal and correct that oil majors seek to exploit volatility in order to finance their operations, the fact that they have led resistance to the G20's calls for transparency in reporting trades appears highly relevant, particularly given their asymmetries of information⁵⁷ (See **'High and Volatile Oil Prices: A Study of 2012'**).

6. Conclusion

This document does not claim to be exhaustive in its attempt to gauge the impact of high and volatile prices on the super-majors. However, by looking at news reports over 2012, certain trends are clear and questions regarding the long-term viability of the super-majors are raised.

First, high prices have stimulated resource nationalism and the drive to seek alternative supplies. The majors have become limited to areas that require high technology expertise and high levels of capital. These are also areas of high risk. With the aim of replacing reserves and improving Return on Capital Employed, and flush with cash as the super cycle took off, the super-majors have focused strongly on the Arctic and deep water.

⁵³ Pfeifer, Sylvia and Blas, Javier (2010) 'BP plans for trading arm shake-up', *Financial Times*, 7 October.

⁵⁴ BP website, available at www.bp.com – Press – BP Treasury, accessed 15.1.13.

⁵⁵ Shell website, available at www.shell.co.uk/gbr/aboutshell/shell-businesses/sssc.html, accessed 15.1.13.

⁵⁶ ExxonMobil website, available at www.exxonmobil.com, accessed 15.1.13.

⁵⁷ Braithwaite, Tom (2012) 'Reporting agencies should accept oversight', *Financial Times*, 9 July.

Tett, Gillian (2012) 'Oil markets should heed Libor lessons', *Financial Times*, 12 April.

Second, in a further bid to improve their two main 'health indicators' they have concentrated on conventional gas production and the infrastructure required for LNG, assuming first that the primary market would be the US and now focusing hopes on Asia. Continued high global prices for oil and gas, while at the same time both commodities reaching rock bottom in the US, has made the investment picture very complex. The majors have now bought in to the shale revolution, to the point that they are no longer 'oil majors' but generally have equal assets in gas. However, lack of infrastructure and a near-absence of export licences is keeping key US prices low, preventing the development of a global market, stimulating the growth of coal consumption *and* hitting the bottom line of *all* gas producing companies in North America. Hopes that the Asian gas price will remain high enough to justify investments have been dented by Chinese reluctance to embrace gas power generation, indicating that it may be waiting to unlock their own vast resources which would wipe out the super-majors' primary market. Even without Chinese gas supplies coming on-stream, there is the possibility that increased supplies from Indonesia and Australia may cause a gas glut in Asia, puncturing the super-majors' ability to make a profit on their investments.

WTI expected to fall to \$50 over next two years

The US Association of Oil Pipe Lines reported 500,000 barrels/day (b/d) new capacity in 2012. However, crude production rose by 780,000 b/d, and is expected to increase by a further 890,000 in 2013, indicating that bottlenecks will continue. WTI is expected to drop to \$50 over the next two years, below the cost of supply for tar sands and shale oil.

In January 2013 pipelines were described as mired in conflict as 'customers jockey over space and operators seek higher fees'. Pipeline operators are seeking to charge market-based rates but have so far been prevented by the Federal Energy Regulatory Commission which considers pipelines to be utilities and allows only modest increases. If increases are allowed, costs for producers and refiners may increase.

Meyer, Gregory (2013) 'Disputes rage along US oil pipelines', *Financial Times*, 8 January.

it is clear that trading on volatility has become a significant source of income although the full extent is unclear. The question arises, given the majors' blocking of investigations into the Price Reporting Agencies (See '**High and Volatile Oil Prices: A Study of 2012**'), of whether oil majors are involved in market manipulation, to what extent information asymmetries operate in their favour when derivative trading, and even whether there is any concerted effort to keep prices generally inflated. It is clear and right that the oil majors hedge their currency exposures, given that they operate all around the world. However, how much broader is their speculative trading in the name of income generation? Are they, as with many units within banks, operating effectively as hedge funds within a larger corporation? Statements on the BP website indicate that this is so and something that investors should be aware of. It is noteworthy that in January 2013 another commodity giant, the Indonesian coal mining company, Bumi Resources, part of London-listed Bumi Plc, reported a loss of \$422m in derivatives trading in the first nine months of 2012, bringing a net loss to the company⁵⁸

⁵⁸ Thomas, Helen (2013) 'Bumi Resources hit by derivatives losses', *Financial Times*, 3 January.

6.1 The future of the super-majors

This paper is not predicting the end of the oil age. Since the oil industry has failed to 'grasp the nettle' and develop into energy companies with a serious leadership role in renewables, and governments have fallen short on demand management (most notably the US), it is likely that fossil fuels will continue to supply over 80% of the world's energy needs in 2035.

This paper has focused instead on the fact that increases in supply are dependent on unconventional and high-cost/high-risk reserves. The development of such reserves by the majors depends firstly on price, and secondly on their ability to compete against increasingly aggressive and well-funded rivals. Trends in both areas do not look promising for the super-majors.

Analysts expect WTI to continue downwards, possibly for another two years, and probably down to \$50/b. For the same reasons, the North American gas market is likely to stay depressed. This makes investments in tar sand oil, shale oil and shale gas in North America unprofitable in the short term. With their deep pockets, it seems likely that the oil majors will be able to ride out the market dislocation and possibly acquire more bargains from distressed smaller companies. However, while such acquisitions may bolster their reserve replacement rates, they will not provide good ROCE. Any rise in WTI and North American gas will be dependent on improved infrastructure and export licences, both of which the US government has been slow to expedite. A turnaround in 2014/15 is far from guaranteed.

Conversely, Brent is expected to stay above \$100 as supply from the North Sea and the Middle East stagnates and tensions with Iran continue. Although their profits may be dented, the super-majors are likely to remain cash-rich and their size and status gives them the ability to raise money easily on the bond market. However, too much cash harms their ROCE figure and they need to invest⁵⁹. It seems that they have limited options:

CEO of Total refers to 'peak capacity'

In December, Total's CEO Christophe de Margerie publically stated that the company would not be seeking acquisitions but would be selling some assets and boosting returns for investors. He stated that he expects the world to reach 'peak capacity' at 98m b/d and remain on that plateau for some years. The figure is not related to quantity, but the capacity to develop resources.

Carnegy, Hugh (2012) 'Total chief not looking for acquisitions', *Financial Times*, 11 December.

Shell raises \$2.5bn in 3 part bond issuance

Shell joined other blue-chip corporations in raising money on the bond market in 2012. Such issuance enables companies to 'lock in' low interest rates and raise funds without increasing the number of shareholders to whom they are accountable. The proceeds are to be used for 'general corporate purposes'.

Shell website, available at [http://www.4-traders.com/ROYAL-DUTCH-SHELLA-6273/news/ROYAL-DUTCH-SHELLA-Shell-Completes-\\$2-5-Billion-Three-Part-U-S-Bond-Deal-14460112/](http://www.4-traders.com/ROYAL-DUTCH-SHELLA-6273/news/ROYAL-DUTCH-SHELLA-Shell-Completes-$2-5-Billion-Three-Part-U-S-Bond-Deal-14460112/), accessed 15.1.13.

⁵⁹ Stevenson, Alexandra (2012) 'European corporate buybacks hit lows', *Financial Times*, 1 November.

- Continue to invest in expensive, high-risk unconventional, Arctic and deep water projects and pray that their deep pockets and technological expertise will not only out-strip competition but will deliver the goods without an expensive environmental catastrophe.
- Compete more effectively in areas of conventional production. Their track record is poor here and resource nationalism continues to operate against them.
- Buy up distressed competitors. Such competitors exist mainly in the US where prices are low and predicted to fall in the short-term. Shale assets are difficult to assess with accuracy.
- Greater collaboration to share costs and risks. Sharing the burden also means sharing the profits.
- Buy back shares, or possibly another round of mega-mergers, which both allow effective divestment from the sector.

BP considering massive buy back

BP, the super-major considered most likely to be the subject of a merger/acquisition, was reported to be considering a £3.7 billion share buyback in late 2012.

O'Connell, Dominic and Forston, Danny (2012) 'BP plots \$4bn buyback to repel raiders', Sunday Times, 18 November.