




BP AND SHELL: RISING RISKS TAR SANDS UPDATE 2. JULY 2009

KEY:

-  Shell operated and majority owned tar sands asset
-  BP joint venture with Husky
-  Pipeline



SHIFTING SANDS: HOW A CHANGING ECONOMY COULD BURY THE TAR SANDS INDUSTRY

The map of Alberta in July 2009 remains littered with deferred tar sands projects. The fall in oil prices following the \$147 peak in July 2008 has undermined their viability – these projects need strong oil prices to generate a profit. The International Energy Agency (IEA) has shown that of the two million barrels a day (mb/d) of non-OPEC oil production capacity that has been deferred or cancelled since the oil price fell, a full 1.7 mb/d – 85% – derives from Canadian tar sands projects.¹

Shell has passed the halfway mark with the construction of the first phase of the Jackpine Mine and the associated upgrader expansion at Scotford. The construction of this expansion was well underway when the market crashed. However, the subsequent phases of the Athabasca Oil Sands Project (AOSP) with a potential additional mining capacity of up to 520,000 b/d remain deferred 'until market conditions and economics improve.'²



The same conditions have deferred development of Shell's huge resources of deeper Canadian bitumen that require *in situ* methods of production. These resources, located at Peace River, Cold Lake and Grosmont, have been estimated to contain at least 55 billion barrels of 'oil in place'³, and may constitute Shell's single biggest oil resource.

Meanwhile, BP and its joint venture partner Husky Oil have deferred the final investment decision on the Sunrise SAGD⁴ project by a year to the first half of 2010.⁵ While the project may benefit from falling costs in Alberta, the go-ahead still hinges on the companies' expectations for oil prices in the medium to long term.

STRUCTURAL CHANGE AHEAD

This second update to our *Rising Risks* report⁶ builds on earlier work examining the structural macro-economic threats to tar sands production. It draws together fresh insights into the medium and long term oil market from diverse sources including the IEA, OPEC, BP, Cambridge Energy Research Associates, Douglas Westwood, Arthur D. Little Management Consultants, Ernst & Young, Risk Metrics and others.

The resulting analysis is unsettling for the tar sands industry. It suggests that the international oil companies (IOCs) face significant challenges to their current business plans for oil production. While risk is nothing new to the oil industry, the kind of structural change being signalled today is unprecedented. Significantly, the implications are particularly salient not only for tar sands projects but also for other 'frontier' oil projects championed by the IOCs. Ultra-deepwater and offshore arctic resources face a similar challenge as, like tar sands oil, they also represent the 'marginal barrel'.^{7, 8}

While risk is nothing new to the oil industry, the kind of structural change being signalled today is unprecedented.

The main factors constituting this threat to the IOCs are:

⊗ As former Shell CEO Jeroen van der Veer has said several times recently, the era of 'easy oil' is over.⁹ Persistent resource nationalism and depletion of conventional resources in Europe and North America has left the IOCs with difficult-to-access oil to divide between them. This means that the bulk of the oil that is left for them to exploit is to be found in the tar sands and in ultra-deepwater and other marginal resources such as the Arctic. This is reflected in the breakdown of their total resources, a longer term analysis of their reserves than those they disclose as 'proven' or 'probable' (see figs 2 and 3 on page 11).

⊗ All of these resources are very expensive to produce, require long lead-in times to bring on stream and in many cases have controversial environmental and social impacts that will cost more to ameliorate. The expense of bringing much of this oil to market means that the sustained oil price needed to do so is dangerously close to a 'break point' price beyond which oil demand is constrained via changes in consumer behaviour and reduced economic growth.

⊗ While the oil price may at times rise above that ceiling, the consequence is demand destruction and price deterioration. We are still in the midst of a particularly aggressive cycle of this phenomenon.

⊗ The difference between the recovery periods following previous oil shocks and the current one is that a significant proportion of today's oil demand decline is permanent. In other words, this recession has triggered demand destruction as well as demand suppression.

⊗ This demand destruction is driven by the disintegration of market barriers to significant improvements in efficiency, and transportation technology diversity, which are in turn driven by both consumer sentiment and government policy aimed at addressing energy security, limiting exposure to oil price volatility and addressing climate change.

⊗ As a result, oil demand in the US and OECD has peaked.

⊗ While demand in non-OECD countries still has significant growth potential, it is unlikely to grow at the rates that were being predicted before the recession, and may also peak within the coming decade. Therefore a global peak in oil demand may be within sight. The implications of this for the high cost production that IOCs increasingly face are extremely serious.

⊗ The issue of the steep decline in traditional oil supplies that some refer to as 'peak oil' may at times create 'supply squeezes' when supply declines at a greater rate than demand and prices will spike. But each supply squeeze will create further permanent demand destruction. When a demand peak is reached, the most expensive-to-extract oil will face a serious threat as OPEC producers move to monetise their reserves in a significantly different market paradigm.



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THE ELUSIVE 'SUSTAINABLE' OIL PRICE

In December 2008, we commissioned Marc Brammer of Innovest (now RiskMetrics) to analyse the implications for the tar sands industry of an idea first proposed by Cambridge Energy Research Associates (CERA) in 2006.¹⁰ CERA discussed a 'break point' price for oil of between \$100 and \$120 per barrel. When oil rises above this price range, not only do alternative technologies become significantly more competitive but economic growth is constrained and thus oil consumption curtailed. This scenario played out dramatically in 2008 as in the first quarter of that year, months before the Lehman Brothers crash, the US economy went into recession as oil approached \$100 a barrel.¹¹

Marc Brammer posited that the break-even point for new tar sands projects was close to the ceiling at which oil prices could be sustained by the economy. At between \$65 and \$90, the oft-quoted range for break-even, the room for long term profitability appears slender. He also pointed out that those break-even levels do not currently include costs that such projects are likely to see added in the near future:

'Should additional costs be considered such as the inevitable remediation costs, carbon costs and the potential inflationary costs for materials and labour that would be imposed by the very oil prices required for profitability, it does not appear that these projects are economically viable.'

This theory has been vividly illustrated by events of the past year. The oil price rally above \$100 lasted barely nine months. It was followed by a severe recession during which prices fell dramatically and most planned tar sands projects were deferred.

With the global economy in a fragile state and oil prices rallying amid rumours of 'green shoots' in June 2009, discussion increasingly focused on whether the economy can withstand further price increases. UK Prime Minister Gordon Brown asked Treasury and Department of Business ministers to draft plans to cope with rising oil prices in June following an oil price rally that took prices beyond \$70 a barrel.¹²

A report from energy business analysts Douglas Westwood gave a much more detailed analysis of the effect on the US economy of high oil prices, and set a lower threshold than CERA for the 'break point' effect.¹³ The report suggested that since the oil shock of 1973, 'when oil consumption breached 4% of GDP, the US has suffered a recession, and indeed, the current US recession began within two months of oil hitting the 4% threshold, that is, when oil reached \$80/bbl'¹⁴ (in 2008 dollars). The paper posited \$80 per barrel as the 'recession threshold'.

But while there is an obvious concern about the negative effect on economic growth of high oil prices, it would appear that there is another factor for oil producers to be concerned about.

At the launch of BP's *Statistical Review of World Energy* in early June 2009, BP's chief executive Tony Hayward said that as the oil price went over \$90 consumers 'began to change their behaviour' and that there was significant 'elasticity of demand above \$100 a barrel'. He suggested that the 'right range' for the oil price would be between \$60-90 a barrel, as below that level suppliers 'shut in investment and stop doing activity'.¹⁵

If Hayward and Douglas Westwood are accurate in their assessment, it would appear that oil demand is curtailed by constrained economic growth and consumer behaviour at oil prices between \$80-90/bbl. That leaves tar sands producers even less of a margin than that suggested by CERA in 2006.

But surely as economic growth picks up so will demand, and supply constraints caused by depletion and underinvestment will ensure high oil prices in the future? Won't people just have to pay the price for oil? It would appear that there are a number of shifts on the horizon that seriously challenge that thinking.

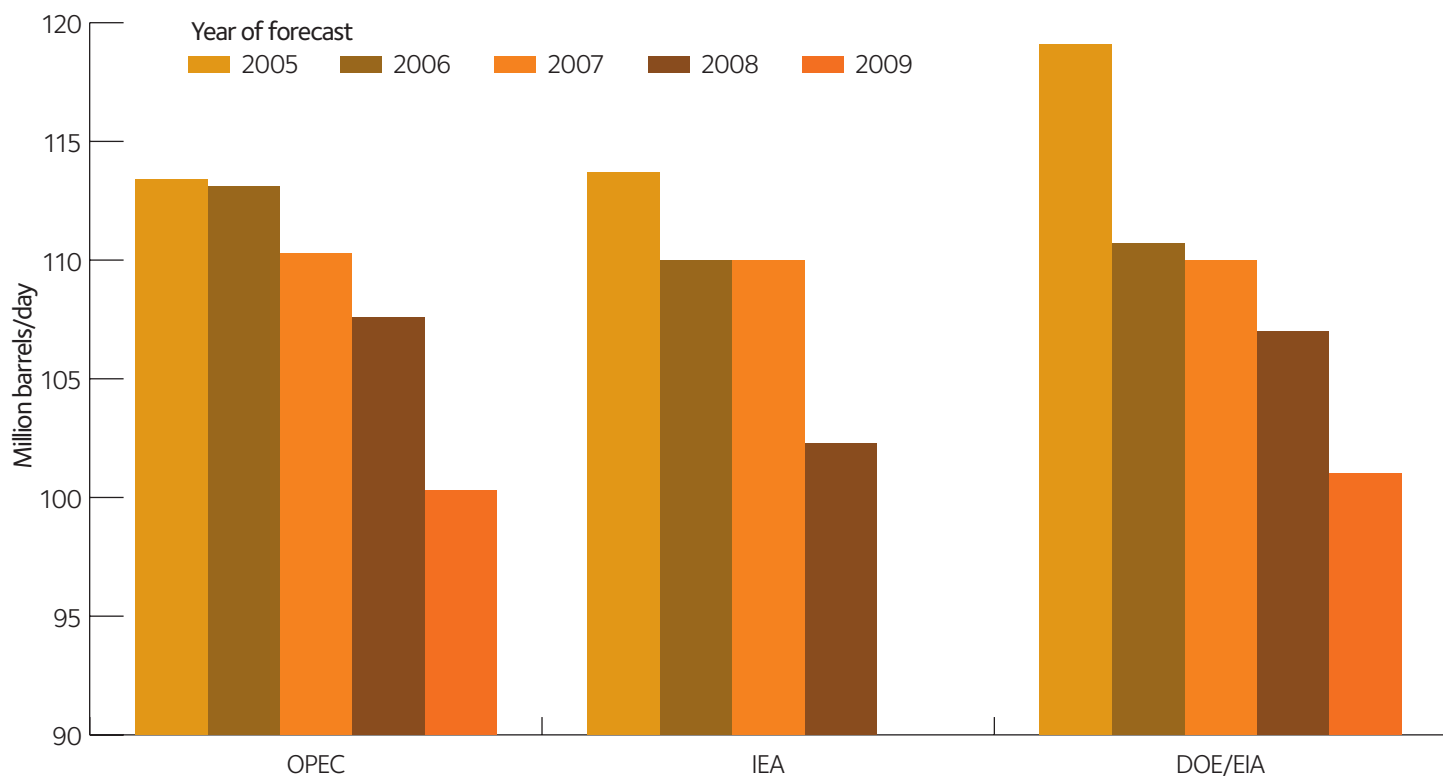


Figure 1: Changing World Oil Demand Projections for 2025.

Source: OPEC World Oil Outlook, July 2009.

THE SHIFTING SANDS OF OIL DEMAND

A little earlier in the Q&A session following the presentation of BP's 2009 *Statistical Review of World Energy*, Tony Hayward was asked whether the volatility seen in the oil market in 2008 was a signal of the much-anticipated peak in global oil supply. His answer was probably not what the questioner was expecting to hear:

*'BP is unlikely to sell more gasoline ever in the United States [...] than it sold in the first half of 2008. The energy efficiency drive that is going to come through over the next few years will mean that demand in the mature markets of the OECD will continue to decline. I think the real question is what is the projection of future demand?'*¹⁶

All of the three major energy agencies that publish global energy demand forecasts – the International Energy Agency (IEA), the Organisation of Petroleum Exporting Countries (OPEC) and the US Department of Energy's Energy Information Agency (EIA) have revised down their forecasts for oil demand dramatically in recent months. In fact, downward revisions to the long term forecast for oil demand have occurred every year since 2006, with by far the most dramatic revision coming this year (see figure 1).

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The revisions that have been made this year have slashed some 15% from the long term forecasts that were made in 2005. These revisions appear to be partly based on the impact of the current recession, which is generally expected to constrain demand over the next three to five years, depending on the trajectory of recovery. However, in the longer term, the impact of two key policy instruments adopted in the US and EU are cited as gaining in influence. These are the US Energy Independence and Security Act (EISA) and the EU Climate and Energy package. These policies, and the fact that there has been a degree of saturation in these markets, have led to the unanimous conclusion among these agencies that oil demand in the OECD has peaked.¹⁷

There also appears to be an expectation that the full impact of such policies, and the likelihood of further measures, are yet to be factored into the projections, and that further downward revisions are likely:

*'This lowering of demand expectations is a reminder that there is probably a need to continue to revise projections downwards because policies are geared to reducing demand. Indications of future oil supply needs that are based solely on reference case figures could be misleadingly skewed towards the high side. There is clearly a need to continuously review the extent to which future reference cases should include policy developments.'*¹⁸

A brief summary of the 2009 demand revisions is presented in Box 1. Beyond the figures, the debate surrounding the factors contributing to the expected decline in oil demand reaches beyond these two policy instruments and includes significant

structural responses to high oil prices. We will first look at the discussion surrounding the response in the world's most voracious consumer of oil, the US, and then move on to the debate taking place regarding the response beyond the US.

BOX 1: DRAMATIC DOWNWARD REVISIONS TO OIL DEMAND FORECASTS MADE IN 2009

The International Energy Agency (IEA) published its 2009 *Medium-Term Oil Market Report* in June. In it the agency revised down its oil demand forecast for the next five years. The revision was not the first the IEA has made in the past year. In its annual *World Energy Outlook 2008*, released in November 2008, the forecast for oil demand in 2030 was revised down by 10 mb/d.

This most recent downward revision offered significantly different forecasts for high and low growth scenarios. The high growth forecast saw a downward revision of 3.3 mb/d from previous forecasts for 2013. This results in a 1.4% increase per year in global oil demand, with demand reaching 89 mb/d by 2014.

However, the IEA warned that this was based on strong economic recovery with growth reaching 5% per year by the end of the period. In the low growth scenario, growth is restricted to 3% over the entire period, and therefore oil

demand would only grow at a mere 0.4%. In this scenario consumption in 2014 would be 4.1 mb/d less than the high growth figure at 84.9 mb/d, significantly less than it was in 2007 and the first half of 2008. In fact the current demand peak for oil was reached in November 2007 at 87.2 mb/d

OPEC released its *World Oil Outlook* in July 2009 and also revised down its demand projections for the medium and long term. In its reference case, OPEC agrees with the IEA on oil demand in 2013 at 87.9 mb/d. This is 5.7 mb/d below OPEC's 2008 forecast for that year. OPEC also discusses a 'protracted recession' scenario with similar dramatic consequences for oil demand as those forecast by the IEA.

For the longer term, to 2030, OPEC sees demand rising to 106 mb/d, down from 113.3 mb/d in the previous estimate. However, in a discussion of the recent downward revisions by a range of agencies, the report points out that further downward revision may yet be necessary (see page 5).

Oil Demand Forecast Revisions M/BD	2008	2009f	2012f	2013f	2014f	2015f	2030f	Historic Demand Peak (4Q 07)
OPEC 2008		88.4	92.3	93.6		96.1	113.3	
OPEC 2009	85.6	84.2		87.9		90.2	105.6	87.2
IEA 2008	86.2	86.4	89.9	91.2		94.4	106.4	
IEA 2009 (f=High Growth)	85.8	83.2	86.8	87.9	89.0			
IEA 2009 (f=Low Growth)	85.8	83.2	84.8	84.9	84.9			

Declining US demand: destruction or suppression?

The IEA *Medium-Term Oil Market Report* takes a detailed look at the demand trend in the US, and asks whether the recent decline, which is the sharpest since 1980, is a sign of demand suppression or destruction.¹⁹ Suppression is a term used to describe a reduction in demand caused by economic contraction, and therefore suggests that demand will bounce back with economic recovery. Demand destruction implies a structural shift that permanently reduces demand.

The IEA notes that in all sectors of US oil demand, from gasoline through to jet fuel, fuel oil, heating oil and petrochemicals, there has been an ongoing downward trend in energy intensity in the economy for some time, while overall consumption started its decline more recently.

For power generation and heating, natural gas is grabbing market share, whilst airlines have been gradually streamlining operations since 2001 and petrochemicals are losing market share to the emerging economies. But it is the ground transportation sector – specifically private car use – which is undergoing the most radical change. The significance of this cannot be underestimated, as around 50% of US oil demand is accounted for by gasoline predominately used in the private car.²⁰

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The IEA notes that as gasoline prices rose through 2007–8, American drivers changed their habits:

*'US drivers eventually reacted to the price rise by cutting leisure driving, sharing non-discretionary daily commutes, switching to smaller cars, using public transport and even riding bicycles.'*²¹

So the consumer reaction to high oil prices noted by BP's Tony Hayward was significantly evident in the US. The economic crisis accentuated the demand decline as huge job losses decreased commuting, discretionary driving and general consumption. However, the IEA sees signs that an economic rebound will not necessarily be accompanied by a commensurate rebound in transportation fuel use.

The new vehicle efficiency standards announced by the Obama administration will eventually slash the current fleet's fuel intensity by half. While this will be a slow transition, the IEA calculates that some 15% of the fleet could be highly efficient vehicles by 2014, slashing gasoline demand by 1.4 mb/d. The agency places its forecast for gasoline demand growth at 0.3% to 2014 and notes that, 'this suggests that current gasoline consumption levels may well be seen in retrospect as the inflexion point – ie, the peak – of US demand.'²²

The discussion then goes on to note the increasing trend in the efficiency of oil use in the economy more generally, both within the OECD and non-OECD countries. The authors argue that the suppression argument, which basically states that demand will rebound with economic growth, overlooks the significant efficiency improvements now being made in the transportation sector and the substitution of oil with gas in the power sector. They expect that globally oil intensity will decrease on average by 2.4% per year between 2009 and 2014 compared with 2.1% between 1996 and 2008.²³

Significantly, the authors point out that there are signs that much more dramatic shifts could be on the horizon, which imply a far greater reduction in the intensity of oil use. They end their discussion of the 'destruction versus suppression' issue with the following uncharacteristic message:

*'... these efficiency assumptions could prove too timid. Indeed, rather than pondering whether demand will be 'destroyed' or 'suppressed', a more pertinent question is arguably whether the ongoing shift towards greater energy efficiency will be more pronounced than in the past. As much as we attempt to account for what, in our view, are discernible structural adjustments, technological breakthroughs or new policy initiatives could bring forward still stronger efficiency improvements even more rapidly than we currently expect. In such case, even under conditions of strong economic activity, greater efficiency advances could still result in lower oil demand growth.'*²⁴

This begs the question: how far could demand destruction go? What would be a realistic estimate given available technology? One analysis of potential US demand destruction, by leading US environmental advocacy group the Natural Resources Defense Council (NRDC), suggests that the figure could be as high as 10 mb/d by 2030, given existing technology but assuming a stronger policy environment.²⁵ This would constitute around a 50% cut in US oil demand from 2007–8 figures. Box 2 details this analysis. It also shows an estimate of the potential composition of the US car fleet in 2020.

BOX 2: POTENTIAL OIL SAVINGS IN US: 10 MB/D BY 2030

This box illustrates the potential for oil demand destruction in the US. The table is drawn from an analysis conducted by

Natural Resources Defense Council in January 2009. The notes explain some of the measures necessary.

Saving 10 Million Barrels per Day by 2030

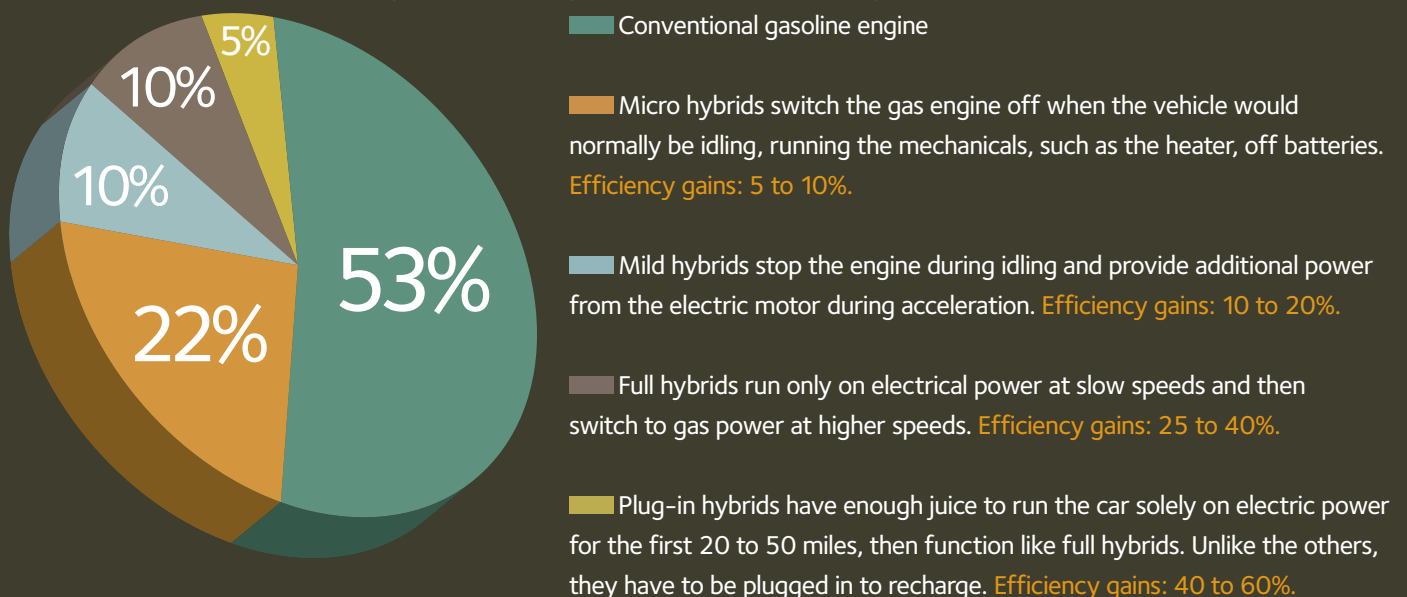
Measure	2030 Savings (Mb/d)	Notes
Cleaner, More Efficient New Cars and Light-Duty Trucks	4.3	The new CAFE standards mandate 35.5 mpg by 2016 and place the US on a pathway to reach 42 mpg by 2020 and 55 mpg by 2030.
Improved Fuel Economy of On-road Vehicle Fleet	0.2	These savings reflect proposals to establish minimum efficiency standards for replacement tires and fuel-efficient motor oil.
Improved Fuel Economy for New and On-road Heavy-duty Trucks	0.6	EISA requires establishment of minimum efficiency standards for heavy trucks. EPA also intends to set GHG performance standards for trucks.
Building Efficiency	0.2	Potential saving from improving efficiency in buildings heated by oil.
Advanced Bio-fuels	2.3	Loan guarantees are needed for leading edge bio-fuels programs.
Air Travel Improvements	0.3	\$1.3B was allocated for air transport system improvements under the American Recovery and Reinvestment Act.
Smart Growth and Transit	1.5	Improved public transport provision and 'Smart Growth' planning, which prioritises low car use. A 10% reduction in light-duty Vehicle Miles Travelled (VMT) per capita is achievable in 2030.
Plug-in Electric Cars	0.3	8% of VMT on electricity assumes approximately 16% of light-duty vehicles use electricity for about half of their VMT.
Total	9.7	

Source: Clean Energy: the Solution to Volatile Gas Prices, Natural Resources Defense Council, Energy Facts Series, January 2009. Available at: <http://www.nrdc.org/energy/gaspricesolutions.pdf> with additions to the notes derived from personal communication with author.

RISE OF THE ELECTRIC VEHICLE: WHAT THE US FLEET WILL LOOK LIKE IN 2020

The chart below is a recent analysis of the potential conversion of the US car fleet to hybrid vehicles. The estimate draws from recent data published by IHS Global Insight,

Deutsche Bank and Argonne National Laboratory. It suggests that substantial efficiency gains can be gained in a relatively short space of time.



Sources: IHS Global Insight, Deutsche Bank; Argonne National Laboratory. By Rich Clabaugh. Reproduced with permission from the July 2, 2009 issue of The Christian Science Monitor (www.CSMonitor.com). ©2009 The Christian Science Monitor.

While some of the measures discussed in the NRDC analysis are yet to be legislated for, the biggest portion of those savings – over 4 mb/d – comes from improved vehicle efficiency standards that are mostly already law. It is the long-awaited move to regulate vehicle efficiency in the US, initially made by the Bush Administration and significantly improved upon by President Obama, together with the massive financial support written into the fiscal stimulus package for further development of efficiency technologies, that has led a number of analysts to speculate that a major structural shift could be on its way. This potentially reaches beyond the borders of the US.

US peak or global peak?

What does a significant long term decline in US and OECD oil demand mean for the global oil market? Will demand in the emerging economies dwarf the decline with their inexorable growth?

The IEA report suggests that in the medium-term at least that depends on economic growth. The IEA presents high and low economic growth scenarios in its forecast for oil demand reflecting the uncertainty surrounding the duration and depth of the current recession (see box 1). The high growth scenario certainly foresees demand in non-OECD countries growing to overtake the decline in the OECD. But in the low growth scenario, non-OECD demand would be sluggish and barely make up for the decline in the OECD.

As we noted above, the long term forecasts are also coming down and these are not primarily driven by the impact of the current recession. It is the emerging confluence of a set of increasingly urgent policy drivers that are pushing policymakers towards addressing long term oil demand that led the leading management consultancy firm Arthur D. Little to publish a report called, *The beginning of the end for oil?* in February 2009.²⁶ It was written by the Director for Global Energy, Peter Hughes.

The report questioned the general consensus that the future of oil demand and price is an inexorable upward curve. It proposed that a set of mutually reinforcing policy drivers have the potential to significantly constrain future demand growth.

The author acknowledged that demand will rise with the return to economic growth, but then contended that the arrival of a ‘tipping point’ after which demand will recede is potentially within sight as a result of three powerful policy incentives. These incentives are cited as:

- ☒ The political undesirability of oil price volatility
- ☒ Security of supply
- ☒ Climate change

The three drivers are individually seen as major forces for change that will affect oil demand but the real power lies in ‘their strong alignment in terms of the required policy responses that multiplies their power to bring about major change.’²⁷ The arrival of a president in the world’s leading oil-consuming country who is focused on creating a new greener economy is cited as reinforcing the seismic shift taking place in the oil market.

The author points to the deal brokered in the US for that country’s ailing car manufactures which hinged on their committing to developing new technology, improving efficiency and dedicating capacity to public transport as evidence that the technologies are within reach and that the policy drivers in question are at work.

The reports by the IEA and OPEC confirm that this is occurring in the OECD countries. But the author argues that these drivers, particularly the first two, are also increasingly driving policy in the world’s second-largest oil consumer – China.

Arthur D. Little highlight that China clearly recognises the threat posed to its economic growth by its growing dependence on imported oil, and has already devoted significant resources towards developing technology to ease the pressure in the future. It further suggests that it is not implausible that China could be a source of major breakthroughs in this area.

The report met with a muted response, perhaps unsurprising given the enormous implications of a demand peak for the international oil industry – the main audience of the report.

However, not only have the recent demand forecast revisions lent weight to the theory by indicating that in the medium-term, demand growth is on a knife edge, but recent policy announcements in China have also lent support to the author's contention that China maintains both the incentive and the ability to curb its oil demand – albeit within a growth trajectory.

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CHINA: AN EMERGING EFFICIENCY LEADER

With OECD demand in decline, China's share of global primary energy growth in 2008 grew to 75%, while its oil demand grew 3.3 % in the face of a global decline of 0.6%.²⁸ It is clear that China now plays a pivotal role in the global oil demand trajectory. In short, its demand growth could outweigh declines elsewhere, whereas a more restrained rate of post-recession demand growth could signal a demand peak.

A major indicator of China's concern over its oil demand came in May 2009 when government officials drafted new standards to achieve significant improvement in vehicle fuel efficiency by 2015.²⁹ Commentators cited the multi-faceted nature of China's interests in achieving this, which included energy security, urban pollution and climate change as well as the desire to increase China's competitiveness in the vehicle export market.³⁰

This is impressive, as new vehicles in China are already achieving an efficiency level roughly equivalent to the level the US has recently mandated for 2016 under new tighter CAFE standards. This is approximately 56% higher than today's US standard. Under the proposed changes, cars sold in China will be 18% more efficient than this by 2015 by achieving 42.2 miles per gallon on average.³¹

Another indicator of the Chinese government's willingness to act on fuel consumption came in June 2009, when the government unexpectedly raised pump prices to the highest level ever. Chinese consumers are paying approximately 12.5% more than their American counterparts following the 9 and 10% respective rise in petrol and diesel prices, the third rise since March this year.³²

These latest measures follow sales tax changes implemented last year that clearly demonstrate the government's thinking. Fuel-efficient family cars with engine sizes of 1.6 litres and under now pay sales tax at 1%, compared with up to 40% for bigger cars including mini vans and sports utility vehicles.³³

The government's desire to support fuel-efficient vehicle manufacturing in China has been widely noted by international companies. Following the Shanghai Auto Show in April 2009, where nearly 1000 cars featuring fuel-efficient technology were displayed, Ford's vice president for Asia, John Parker, told the *New York Times* that the company was preparing to transfer its efficiency technology to its Chinese joint venture and that he believed that the Chinese government's emphasis on efficiency was 'for keeps'.³⁴

GM's regional executive Nick Reilly also told the paper that China was poised to be the leader in alternative-fuel vehicles.

'There's no question that the government and the companies here are spending huge amounts in this area, so there's no doubt they are going to be important players, [...] If you look at where batteries are making the fastest progress, it's China, it's Korea, it's where the government is heavily behind it.'

He went on to comment on China's incentives:

*'I think there's a very good chance China will lead [in alternative energy vehicles], because they've got the need, they've got the size of market, they've got the resources.'*³⁵

These trends in car manufacture have significant implications for the global market given that China overtook the US as the biggest car manufacturer globally in the first quarter of this year.³⁶

So while huge growth in car ownership is expected in China, each car is significantly less thirsty than its US counterpart, and will continue to improve in efficiency. Additionally, Chinese consumers are no longer protected from oil prices by national subsidies. Meanwhile there is strong evidence to suggest that the government sees tremendous opportunities for the country to lead the market in producing increasingly efficient vehicles.

So what if a global peak in demand was to occur, perhaps around 2020 or maybe a little later? Where would that leave Shell, BP and the other IOCs? Have they the right strategies in place to cope with such a structural shift? What will be the impact on tar sands projects? Many of the tar sands investments they are currently considering whether to proceed with are now unlikely to come on stream before 2020, and they will require years to pay back capital and produce returns.

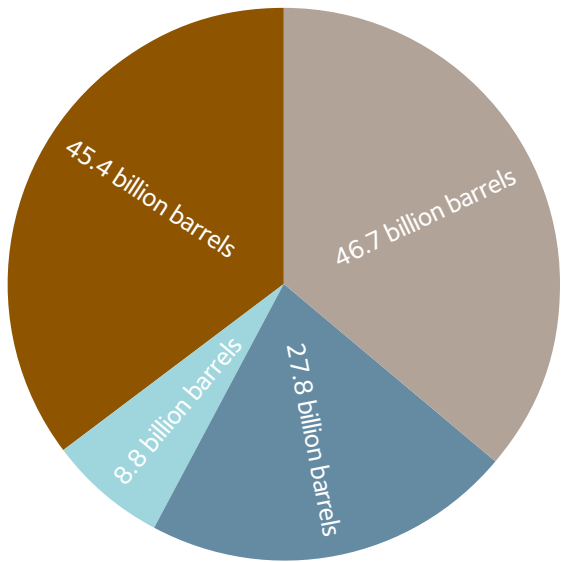


Figure 2: Breakdown of top 4 IOCs' Total Oil Resources.

Sources: Annual Reports or Strategy Presentations of Chevron, Exxon, BP and Shell

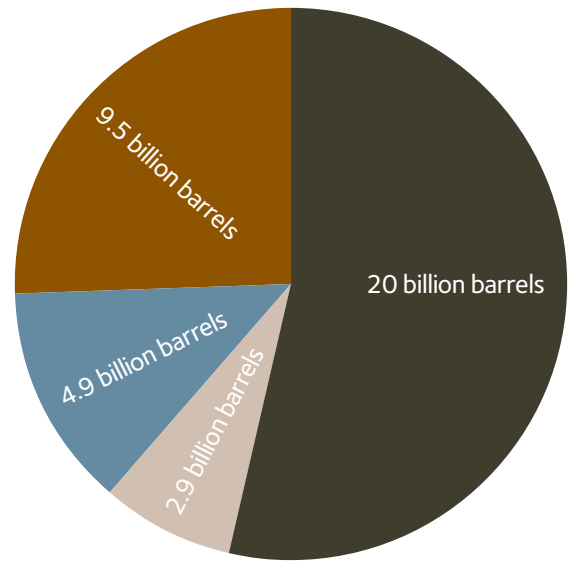


Figure 3: Shell's Total Oil Resources.

Source: Shell Strategy Investor Presentation, March 2009

IOC FUTURE OIL PRODUCTION: AN INCREASINGLY MARGINAL BARREL

Oil is becoming more expensive to produce. The old workhorse oil fields are being depleted and losing pressure. Technology and engineering are enabling companies to squeeze more oil from wells using various innovative techniques, but these generally require more energy and resources and therefore more money. The IOCs continue to be shut out or limited in their access to much of the easier-to-produce oil that does remain.

In November 2008 the Canadian Energy Research Institute, a government and industry-funded body, calculated that for a 10% return on investment, oil prices between US\$64 and \$80 would be needed over a 30 year period for future tar sands projects. The lower figure relates to SAGD projects while the higher figure relates to integrated mining projects.³⁷ These estimates do not take into account the threat of additional costs deriving from carbon regulation, whether in the form of taxes, emissions credits or the addition of carbon capture and storage infrastructure.

Deepwater projects, whether off the coast of Angola, Brazil or elsewhere, require a similar price range.³⁸ The new frontiers in the Arctic, deep in the Chukchi and Beaufort Seas, are unlikely to provide a cheaper barrel. Other even more marginal resources, such as oil shale, may require much higher prices as they clearly require even greater quantities of energy to extract than tar sands.

The future of oil production for the IOCs is based on their significant development of state-of-the-art technology and engineering prowess to access these marginal resources. This is clearly demonstrated by the IOCs' domination of deepwater technology led by BP and Shell³⁹, their presence in the Canadian tar sands and their recent acquisitions in the new oil frontier, the offshore Arctic.⁴⁰

For Shell the issue is particularly salient, as over 30% of the company's total resources are concentrated in the Canadian tar sands, while over 7% are classified as deepwater. Figures 2 and 3 show the future dependence on these resources of the top four IOCs and of Shell's exposure in particular.

Costs will vary among these projects according to the accessibility, quality and size of the resource, as well as the dynamics in the labour and equipment markets in the region and time space that they will be developed in. Currently, the most expensive oil being proposed for short to medium term development is tar sands oil. That is why 85% of non-OPEC oil project cancellations since October 2008 are tar sands projects.⁴¹ However, one thing unites all of these potential resources: compared to oil that can be produced by National Oil Companies (NOCs) in general, this oil will be at the high end of the cost spectrum.

It is perhaps worth noting that in their recent reports, both the IEA and OPEC forecast medium-term average oil prices (to 2014) at \$70 in nominal terms. This may translate to around \$61 in 2008 dollars.⁴²

So with an increasing proportion of IOC reserves concentrated in oil fields that will need upwards of \$60 a barrel to make a profit, and evidence that high oil prices can only be sustained for short periods due to the impact on demand, are oil company executives showing concern about these risks? According to at least one survey, they are beginning to.

INCREASING RISK: ABOVE AND BELOW THE RADAR

In April 2009 Ernst and Young produced its annual analysis of business risk in the oil and gas sector.⁴³ The report's assessment was drawn from interviews with senior executives and analysts in the sector as well as the company's own experts. It showed that individuals in the sector were starting to express awareness of the threats we have highlighted here.

Price volatility entered the list of the top ten risks faced by the sector. It was the first time the issue had made it onto the list, and it came in ranked at number three. Topping the list were long term contenders: access to reserves and uncertain energy policy.

Marcela Donadio, the company's Oil and Gas Americas Leader, commenting on the price volatility issue, said that:

*'Companies that invest in long term oil projects with a high marginal cost of production, such as deepwater drilling as well as oil sands, are likely to be the most vulnerable.'*⁴⁴

The report also listed three 'below the radar' risks that were identified by its interviewees as potentially emerging in coming years. Interestingly, price volatility was in this list last year. This year under 'new operational challenges,' the risks associated with operating in the harsh environment of the Arctic were cited.

Additionally, 'competition from new technologies' was listed, quoting one analyst as having told the report's authors that:

'the industry will change fundamentally over the next few decades. New technologies will be very much a part of this. [...] The risk is not participating in the discovery and development of the new energy future.' Another interviewee on this subject thought that, 'oil in our lifetime may be relegated to petrochemicals.'⁴⁵

From these comments, it would appear that there are already concerns among senior analysts and executives in the oil and gas sector that IOCs are not only vulnerable in their dependence on high cost resources, but in the course of pursuing these risky projects they may be missing the opportunity to benefit from the real prize of the future energy market: the development of alternatives to oil.

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CONCLUSION

In this update, we have highlighted the increasingly recognised contention that high oil prices have a short shelf life. The recovery period following the current recession is likely to show that oil demand has been affected not only by recession-induced suppression but also by policy and consumer-driven destruction.

We have discussed the growing consensus among the energy agencies that policy and technology are likely to further reduce the forecasts for oil demand on top of the significant downward revisions that have already been made.

We have also highlighted the growing reliance of the IOCs on marginal resources, which require high oil prices over sustained periods to be profitable. For the medium-term it is looking increasingly likely that many of these will remain shelved as forecasts for oil prices over the next five years look unlikely to support them. The question is whether in the long term this will change.

Shell is a company which is currently significantly dependent on that long term gamble paying off. BP, with only one upstream tar sands investment, may appear to have a more diverse upstream portfolio but its investments in reconfiguring its significant US refining capacity to process tar sands crude which is yet to come on stream appear vulnerable too.

If the growth in global demand for oil remains sluggish beyond economic recovery, or if future periods of rising oil prices are followed by increasing rates of demand destruction, what does the future hold for IOC oil production? Will the producers bringing the highest costing oil to the market be squeezed out? When could that realistically start to happen?

When an oil company talks about acquiring new resources in the Arctic, or its plans for developing tar sands projects with their complex infrastructure requirements and extended construction periods, it is with a view to a market environment far beyond 2020 that investors will need to judge viability. Can oil companies and investors be sure enough of the conditions within that timeframe? Both costs and oil prices are bound to shift to varying degrees over the period. But will the relationship between the two ever diverge significantly enough for long enough to make it a risk worth taking? Do the structural shifts taking place suggest that there may be investments to be made in the energy sector with far less risk attached in the long term?

INTERVIEW



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1. What do you think investors should be most concerned about when considering an oil company's long term strategy?

In the long term any oil company that believes it can continue to externalise environmental costs, especially carbon, to society at large will have significant difficulty. Carbon caps are going to be a reality and at the moment carbon capture and storage does not look cost effective or even technologically feasible at the scale necessary. Since the industry recognises that too-high prices are limiting factors on macroeconomic conditions, it is clear that the ability to pass these costs on to the customer will be limited by the same dynamics that keep general prices in check.

2. Do you think oil companies have the right strategies in place today to cope with future oil price volatility?

The short answer is no. The industry was never set up to deal with the present market conditions. In the past the industry could always depend upon sizable expansions in cheap reserves. Now, significant new finds are more expensive and that doesn't even begin to address the new environment wherein externalities will have to be priced back into the resource cost.

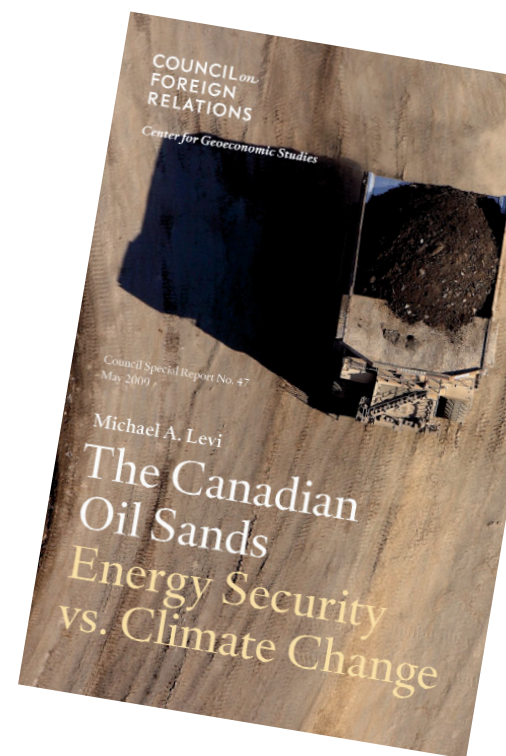
3. What would a realistic investment strategy look like for an oil company that was aiming to reduce its exposure to oil price volatility?

Moving capital into VC clean tech and renewables is a good start. Trying to monetise energy efficiency is also a good start. In general oil companies need to start seeing themselves as energy service companies as opposed to drillers and refiners of a specific commodity.

4. What do you think the key things are for investors concerned about these issues to push for when engaging with oil companies?

Getting them to be open and transparent about the challenges at stake as outlined in 2 and 3 would be a good start.

TAR SANDS AND ENERGY SECURITY: A SPURIOUS CONNECTION



Supporters of the tar sands industry continually cite energy security as the prime reason that US consumers should overlook the environmental impacts of tar sands production and be grateful that such a vast oil resource exists next door. According to this argument Canada – a politically stable, free trade-friendly neighbour – is a secure source of oil that can help to reduce US dependence on unstable and unsavoury regimes propped up by burgeoning oil revenues.

The argument appears to be unassailable on the surface, but a recent report by the centre-right Council on Foreign Relations, which actually set out to argue for the energy security benefits of tar sands oil over climate change concerns, appears to struggle to make its argument.⁴⁶

A WEAK CASE FOR TAR SANDS

Breaking down the energy security argument into six dimensions, the author fails to discern a strong role for tar sands production in any of them. The phrases 'modest', 'weak', 'limited' and 'little advantage' pepper the section of the report that analyses the energy security benefits of tar sands oil for the US economy. In fact, the author repeatedly asserts that demand reduction would have a far greater effect on US energy security than the tar sands trade could ever have.

The author, the Council's senior fellow for energy and the environment, sets out the following dimensions to energy security, which are often cited as the negative security and economic consequences of oil consumption in the US:

1. Oil revenues empower exporting states whose interests often conflict with US interests.
2. US economic growth is damaged by oil price volatility.
3. US economic growth is damaged by wealth transfers to some oil producing states.
4. Barriers to well-functioning oil markets, including but not restricted to price manipulation by OPEC or national governments, raise oil prices and hence hurt the US economy.
5. The US is potentially vulnerable to supply disruptions resulting from states' decisions to withhold oil supplies from world markets or from damage to oil supply chains by non-state actors or natural disasters.
6. Dependence on oil from unstable regions may necessitate military expenditures to ameliorate risk.

All these dimensions are undermined by the fact that, with oil traded as a global commodity, the small size of the tar sands' share of global trade renders its influence on the market minimal.⁴⁷

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Key to this is the fact that, with its high capital intensity, complex infrastructural requirements (new bitumen capacity requires corresponding upgrading or specialised refining capacity as well as dedicated pipeline volume) and consequent long project lead-in times, it is very difficult to create spare capacity to address supply shortages and relieve pressure on markets.

OIL AS A WEAPON?

In contrast, many OPEC countries, especially Saudi Arabia, maintain significant spare capacity or the potential to bring incremental new capacity on-stream at relatively short notice. Their ability to do this, and to constrain production to maintain prices, means that they remain the 'swing' producers in the market and this is not significantly challenged by tar sands production at today's levels or at the higher levels being proposed for the long term.

This can be demonstrated by the fact that despite the recession Saudi Arabia is on schedule to bring onstream the largest single incremental capacity increase in history in 2009, when it starts up the Khurais field with a 1.2 mb/d capacity.⁴⁸ This single development is roughly equivalent to Canada's entire tar sands production capacity today. Saudi Arabia's total installed capacity will consequently rise to 12.5 mb/d – over ten times that of the Canadian tar sands.

Another argument that appears weak is the idea that Canadian oil delivered to the US market channels funds away from potential adversaries. The way OPEC works means that as non-OPEC production increases, the cartel has the choice to either maintain its production levels, allowing prices to drop, or cut its production and maintain prices. The former spreads the loss between all members, whereas the latter primarily affects the members with the largest spare capacity – predominately Saudi Arabia. Either way, the effect on any one producer is marginal and is not significant enough to prevent any adversary pursuing an agenda it is intent on.

The risk of major supply disruptions is significantly curtailed already by strategic petroleum reserves, the efficacy of which is demonstrated by the fact that the 'oil weapon' has not been used against the US by a major supplier for over 35 years. Even if it were, tar sands production is not much help as it takes years to bring on new capacity to plug the gap in supply. Most disputes are likely to be resolved long before new tar sands production can be brought on stream.

The current account deficit is obviously not helped by importing more Canadian oil, as it is still foreign oil. The author highlights what appears to be a slight benefit in that US dollars sent to Canada are more likely to come back through cross-border trade. But this does not stand up to scrutiny given that Saudi Arabia remains among the US's top customers for weapons systems and defence equipment.⁴⁹

Finally, the idea that military deployment to protect oil supplies in the Middle East can be reduced by importing more Canadian oil is dismissed by the author as insignificant in the face of the more pressing military objectives the US has in Afghanistan and Iraq. While those that believe that oil played a role in the Iraq debacle would question his analysis, the main point remains that some extra barrels from Canada do not diminish this as a priority for the US military. With 16-17 million barrels of oil passing through the Straights of Hormuz every day, the Persian Gulf will remain a military focus for many years to come, and no feasible amount of tar sands production is likely to change that.

The entire energy security issue is only significantly relieved by one factor: demand reduction. The author discusses this, but is sceptical about whether it can be adequately achieved and therefore concludes that tar sands production does maintain a modest role in maintaining US energy security.

We have discussed in our main article how demand reduction appears to be poised to play a much greater role than has previously been expected. The US can potentially cut demand by over 4 mb/d simply by bringing vehicle efficiency standards up to current European levels, and it has already started along this path. Given the great potential of efficiency and technology diversity in the transportation sector, the expectation that an increase in tar sands production will relieve US energy security pressures appears to be weak at best.

SHELL'S RESERVES: MORE CARBON PER BARREL THAN ITS PEERS

While tar sands production accounts for only about 2% of Shell's oil and gas production today, analysis of its total resources reveals the extent to which the company is staking its future on the resource. In a comparison with its top three competitors released at the company's 2009 AGM, Shell has been exposed as the most carbon-intensive based on its total resource base. Shell's estimated carbon intensity per barrel of oil equivalent is set to rise by 85%.

The analysis of Shell's resources reveals that nearly 35% are categorised as 'Heavy Oil and Enhanced Oil Recovery' about 88% of which, or around 30% of the total, is in fact Canadian tar sands. While the daily production capacity estimates for

mining are higher than for in situ projects, Shell's reserves of energy intensive *in situ* bitumen are in fact much greater. Shell has invested very heavily in the long term production of bitumen that will take huge quantities of energy to lift. No other oil company has staked its future on this resource to the same extent.

Investors have been concerned about this for some time. HSBC Global Research, in a September 2008 analysis that compared carbon risk across the European oil and gas sector concluded that the company's, 'above average exposure to carbon intensive projects leaves Shell more vulnerable to carbon pricing than its peers'.⁵⁰

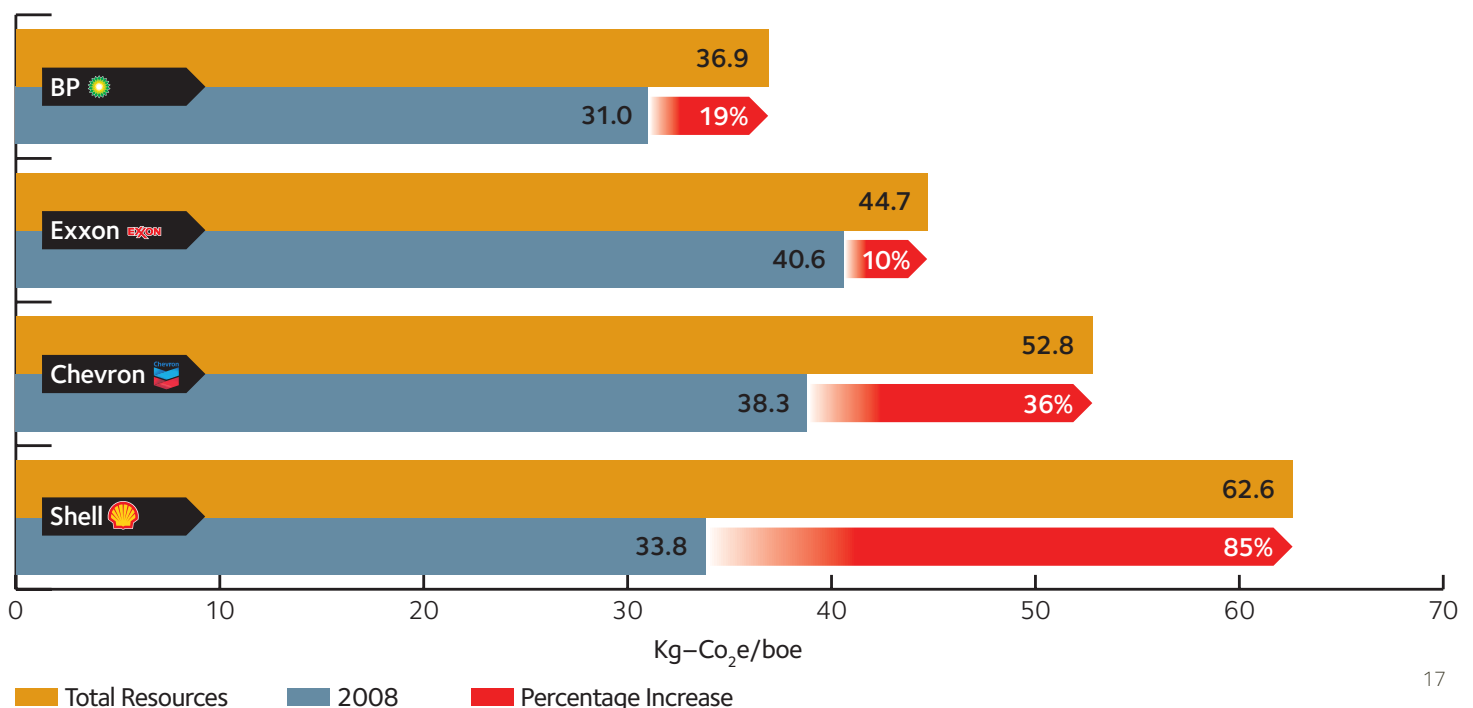
This analysis conducted by us, in collaboration with Friends of the Earth, included US giants Exxon and Chevron to see whether HSBC's conclusion would be undermined by the inclusion of these American heavyweights. It wasn't.

The full briefing is available here <http://priceofoil.org/wp-content/uploads/2009/05/shelliefinal.pdf>

The briefing was also included in a more comprehensive report on Shell and its climate crimes, Shell's Big Dirty Secret, released 29 June. This report furnishes more detail on Shell's investments in tar sands production as well as its history of gas flaring in Nigeria, its u-turn on renewables and its efforts to water down European and US climate regulation. http://www.foeeurope.org/corporates/Extractives/shellbigdirtysecret_June09.pdf

Figure 4: Carbon intensity of oil and gas production by company.

Source: Irresponsible Energy: Shell: The World's Most Carbon Intensive Oil Company. Available at: <http://priceofoil.org/wpcontent/uploads/2009/05/shelliefinal.pdf>



TAR SANDS NEWS ON THE WEB

Tar Sands Myths: Canada's leading energy and environment watchdog, the Pembina Institute busts 23 industry myths about the environmental impact of tar sands production.

<http://www.oilsandswatch.org/oilsandsmyths>

Pembina has also filed a legal case against Shell for renegeing on written agreements made in 2003 and 2006 to reduce emissions at its tar sands operations.

<http://www.oilsandswatch.org/media-release/1808>

Ethical Consumer Magazine launches Tar Sands Campaign.

<http://www.ethicalconsumer.org/Oilsandsboycott.aspx>

H2Oil – documentary on tar sands and water issues.

Watch the trailer here.

<http://h2oil.com/home/>

The Co-operative's Toxic Fuels Campaign

<http://www.co-operativecampaigns.co.uk/toxicfuels/>

REFERENCES (CLICK ENDNOTE TO RETURN TO MAIN TEXT)

- 1 International Energy Agency, June 2009. *Medium-Term Oil Market Report – 2009 Edition*. p.48.
- 2 *Shell Annual Review 2008*, p8. Note: the AOSP is 60% owned by Shell.
- 3 Shell 2nd Quarter 2006 unaudited results.
http://www.shell.com/static/investor/downloads/financial_information/quarterly_results/2006/q2/q2_2006_qra.pdf 'Oil in place' is a term used to describe the estimated total oil in a reservoir and is usually a much larger figure than estimates of how much oil can actually be produced. However, Shell has not disclosed to our knowledge more precise figures on how much oil it expects to produce from these assets.
- 4 Steam Assisted Gravity Drainage
- 5 BP pulls back on Sunrise project; Husky Co-Venture', Claudia Cattaneo, *National Post*, 4 February 2009
- 6 Available at: <http://www.greenpeace.org.uk/files/pdfs/climate/RisingRisks.pdf>
- 7 *International Energy Agency Medium-Term Oil Market Report*, June 2009. P.48
- 8 In this context the IEA has apparently used the term 'marginal barrel' to mean production which is at the high end of the cost spectrum. The report said, 'Together with ultra-deepwater crude, the oil sands have come to be a by-word for the "marginal barrel" of non-OPEC supply – which is precisely why expansion projects were hit so hard when oil prices fell sharply.' Ibid
- 9 For one example see, *Wanted! Oil & Gas*, speech by Jeroen van der Veer at the London Business School, 18 October 2007. http://www-static.shell.com/static/media/downloads/speeches/jeroen_stockton_18102007.pdf
- 10 *Dawn of a New Age: Global Energy Scenarios for Strategic Decision Making-The Energy Future to 2030*; Cambridge Energy Research Associates 2006 Multi-client Study. Cited in *Macro-Economic Limits to Oil Price and 'non-conventional' Oil*. Innovest Strategic Value Advisors. February 2009. Available by request from tarsands@uk.greenpeace.org
- 11 James Hamilton, *Causes and Consequences of the Oil Shock of 2007-8*. 'Brookings Papers on Economic Activity'. Available at: http://www.brookings.edu/economics/bpea/~media/Files/Programs/ES/BPEA/2009_spring_bpea_papers/2009_spring_bpea_hamilton.pdf
- 12 'Brown demands emergency plan to stop oil wrecking recovery', Heather Stewart and Larry Elliott, *The Observer*, 21 June 2009.
- 13 Douglas Westwood Energy Business Analysts, 22 June 2009. *Oil: What price can America afford?* Available at: http://www.dw-1.com/files/files/438-06-09_-_Research_Note_-_Oil_-_What_Price_can_America_Afford_-_DWL_website_version.pdf
- 14 Ibid. p.2.
- 15 Tony Hayward, in response to questions at the launch of the *BP Statistical Review of World Energy*. 10 June 2009. View the webcast or download the audio file at: <http://www.bp.com/iframe.do?categoryId=9024230&contentId=7044938>
- 16 Ibid
- 17 Organisation of Petroleum Exporting Countries, *World Oil Outlook*, July 2009, and International Energy Agency, *Medium-Term Oil Market Report – 2009 Edition*, June 2009.
- 18 OPEC, *World Oil Outlook*, July 2009. p.74.
- 19 International Energy Agency, June 2009. *Medium-Term Oil Market Report – 2009 Edition*. pp.24–30.
- 20 Ibid. p.26.
- 21 p.26.
- 22 p.26.
- 23 p.30.
- 24 p.30.
- 25 *Clean Energy: the Solution to Volatile Gas Prices*, Natural Resources Defense Council, Energy Facts Series, January 2009. Available at: <http://www.nrdc.org/energy/gaspricesolutions.pdf>
- 26 *The Beginning of the End for Oil? Peak Oil: A Demand-side Phenomenon?* Arthur D Little, February 2009. Available from http://www.adl.com/reports.html?&no_cache=1&view=356 following free registration.
- 27 Ibid. p.3
- 28 *BP Statistical Review of World Energy 2009*. Available at: <http://www.bp.com/productlanding.do?categoryId=6929&contentId=7044622>
- 29 'Seeking to curb oil imports, China drafts tough new standards for cars', Keith Bradsher, *New York Times*, 29 May 2009.
- 30 Ibid
- 31 The *New York Times* quoted a Chinese official as estimating that current Chinese average fuel economy of new vehicles is 35.8 miles per gallon (mpg). The US Environmental Protection Agency puts the US Manufacturing Year 2007 average at 20.2 mpg. This is a 56% difference. The Obama administration's target for 2016 is 35.5mpg.
- 32 'China lifts fuel prices to record levels', *Financial Times*, 29 June 2009. <http://www.ft.com/cms/s/0/d57fe7e0-651a-11de-a13f-00144feabdc0.html>
- 33 Ibid
- 34 *China becomes a trendsetter for automakers*, Keith Bradsher, *New York Times*, 21 April 2009.
- 35 Ibid.
- 36 Op cit 34
- 37 'Industry News – All Is Not Well In Alberta', *BMI Industry Insights – Oil & Gas, Americas*, 14 May 2009,
- 38 Tony Hayward, in response to questions at the launch of the *BP Statistical Review of World Energy*. 10 June 2009. View the webcast or download the audio file at: <http://www.bp.com/iframe.do?categoryId=9024230&contentId=7044938>
- 39 See Shell's Strategy Presentation March 2009. Slide 26 shows Shell then BP as the leading companies in deepwater production globally. Available at: http://www-static.shell.com/static/investor/downloads/news_and_library/2009_strategy_webcast_analysts.pdf
- 40 In 2008, Shell bought up 275 blocks in the Chukchi Sea off the coast of Alaska, while BP secured 6000km² in the Beaufort Sea off of Canada.
- 41 *Medium-Term Oil Market Report – 2009 Edition*, International Energy Agency, June 2009. p.48.
- 42 IEA report p.7. OPEC report p.49.
- 43 *The 2009 Ernst & Young Business Risk Report: Oil and Gas*, Ernst & Young 2009. Available at: [http://www.ey.com/Publication/vwLUAssets/2009_Business_risk_report_-_Oil_and_gas/\\$FILE/EY_2009_Business_risk_report_Oil_and_gas.pdf](http://www.ey.com/Publication/vwLUAssets/2009_Business_risk_report_-_Oil_and_gas/$FILE/EY_2009_Business_risk_report_Oil_and_gas.pdf)
- 44 Ibid. p.12.
- 45 Op.Cit 43. pp. 23–24
- 46 *The Canadian Oil Sands: Energy Security VS. Climate Change.*, Michael A. Levi, Council on Foreign Relations, 2009. Available at: http://www.cfr.org/publication/19345/canadian_oil_sands.html?breadcrumb=%2Fpublication%2Fby_type%2Fspecial_report
- 47 It is currently around 1.5 per cent, (based on global production of 85 Mb/d and tar sands production at 1.3 Mb/d)
- 48 International Energy Agency, *Medium-Term Oil Market Report – 2009 Edition*. P.58.
- 49 See for example: http://www.armscontrol.org/factsheets/ProposedUSSales_2008
- 50 Paul Spedding, Nick Robins & Kirtan Mehta, September 2008. *Oil & Carbon: Counting the Cost*. HSBC Global Research.



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