



A Failure of Leadership

How action on climate change will be overwhelmed by the energy crisis

Despite elevated international focus on climate change, policy and action to address this crisis remain inadequate. As if this task was not sufficiently challenging, the world is also facing an energy crisis, on an unprecedented scale, which is likely to hijack the political space required to address the climate crisis. Policy makers need to make a step-change in their thinking – that the cost of the development and deployment of an alternative, sustainable global energy system is an opportunity, not a burden.

The energy crisis, initially related to oil availability, is centred on a growing inability of supply to keep up with demand, and will soon be followed by annual declines in production as output peaks. This is likely to precipitate a major global economic downturn, sucking resources and finance away from efforts to build an alternative energy system.

The scale of this impending crisis is little understood amongst policy experts, let alone acknowledged by politicians. There are no effective measures being put in place to address the situation.

As energy availability declines, the world faces an escalated risk of conflict – the ultimate resource war – as powerful industrialised countries engage in an increasingly desperate struggle for essential supplies because they have no alternative. Well before reaching this stage, hard won natural resource governance reforms such as the Extractive Industry Transparency Initiative (EITI)¹, one of the keys to creating government accountability around extractive industry revenues, are likely to fall by the wayside as aggressive competition for resources builds.

This meshing together of the climate and energy crises forms a perfect storm, a threat to the survival of increasingly large populations, not to mention the habitability of the planet, over a very short time frame. Failure to act on these two issues represents perhaps the biggest abrogation of responsibility by the collective global leadership in generations.

Governments now need to publicly acknowledge the scale of the impending oil supply crisis, clearly explaining the problem and its impacts to the wider public. They must also take on board the implications of a potentially imminent and drastic reduction of available energy on the global economy, incorporating these factors into negotiations for the post-2012 framework. The nascent governance reform agenda must also be protected.

Governments must convene at the highest level and take cooperative action to build a new sustainable and low carbon energy framework and ensure that low cost technology transfer is made globally available.

Photo: Aerial view of Shell Albion mine north of Fort McMurray, Alberta, the biggest oil sands deposits in Canada ((c) Jiri Rezac / VISUM)

Oil supply and its impact on the climate crisis

The role of oil

Oil is the world's pre-eminent natural resource, providing 36.4% of the planet's primary energy today. Having enjoyed the economic benefits of a rapidly expanding access to cheap energy supply from oil for most of the 20th century, oil is now utilised across almost all sectors of the global economy.²

Oil fuels around 90% of all transportation, and is essential in petrochemical production, in particular for pharmaceutical and agro-chemicals. Around 99% of food production involves oil (and/or gas) at some stage in its production, and around 95% of all products in shops depend on oil for their delivery.² It is important to stress this point, because the ramifications of a global oil shortage go far beyond affecting private transport.

Government focus on energy is centred on two "above ground" factors

Government officials clearly recognise the world is facing an energy supply problem, in particular for oil and gas. Unfortunately, with some notable exceptions, understanding of the problem and subsequent energy security policy is only framed around two key above ground issues:

- The politics and instability of a particular oil or gas exporting country, or region;
- The need for increased investment in energy supply infrastructure.

These above ground factors are undoubtedly important in the security of energy supply, and are therefore an understandable focus of attention. Hence, the energy policy debate has precipitated policies aimed at the stabilisation of producer countries and regions and ensuring the requisite financing is available.

Over the past 20 years, global production and consumption of oil has increased considerably. In 1986 production reached 54 million barrels per day (mbpd), rising to 73.2 mbpd by 2002.³ Today, in 2007, global output stands at approximately 86 mbpd.⁴ It should not be assumed that such increases in output can be continued. The industry has under-invested over the same time period and is now suffering a dearth of drilling equipment and a lack of experienced field engineers, as its ageing work force approaches retirement age.⁵

The consequences of the drive for more oil

Unfortunately, the understandable pursuit of national energy security has in some cases resulted in negative impacts for human rights and for national and regional stability. A good example from the gas sector of the impact of instability was provided

during the winter of 2005/06, when a significant proportion of Europe's gas supply was reduced when Russia temporarily cut off gas supplies to Ukraine, over a pricing dispute.

A credible analysis of the underlying reasons for the invasion of Iraq centres around oil, to remove barriers to increasing Iraqi oil output, which would have been impossible to engineer under a sanctioned Iraq led by Saddam Hussein.⁶ Iraq, probably more than any other Middle Eastern country could add major new volumes of oil to the market, following significant investment.

Competition for new oil reserves between the industrialised economies of Europe and America and the world's rapidly expanding economies, such as China and India, often results in a blind eye being turned to the excesses of some of the world's most despotic regimes such as Angola, Congo Brazzaville, Equatorial Guinea and Sudan.

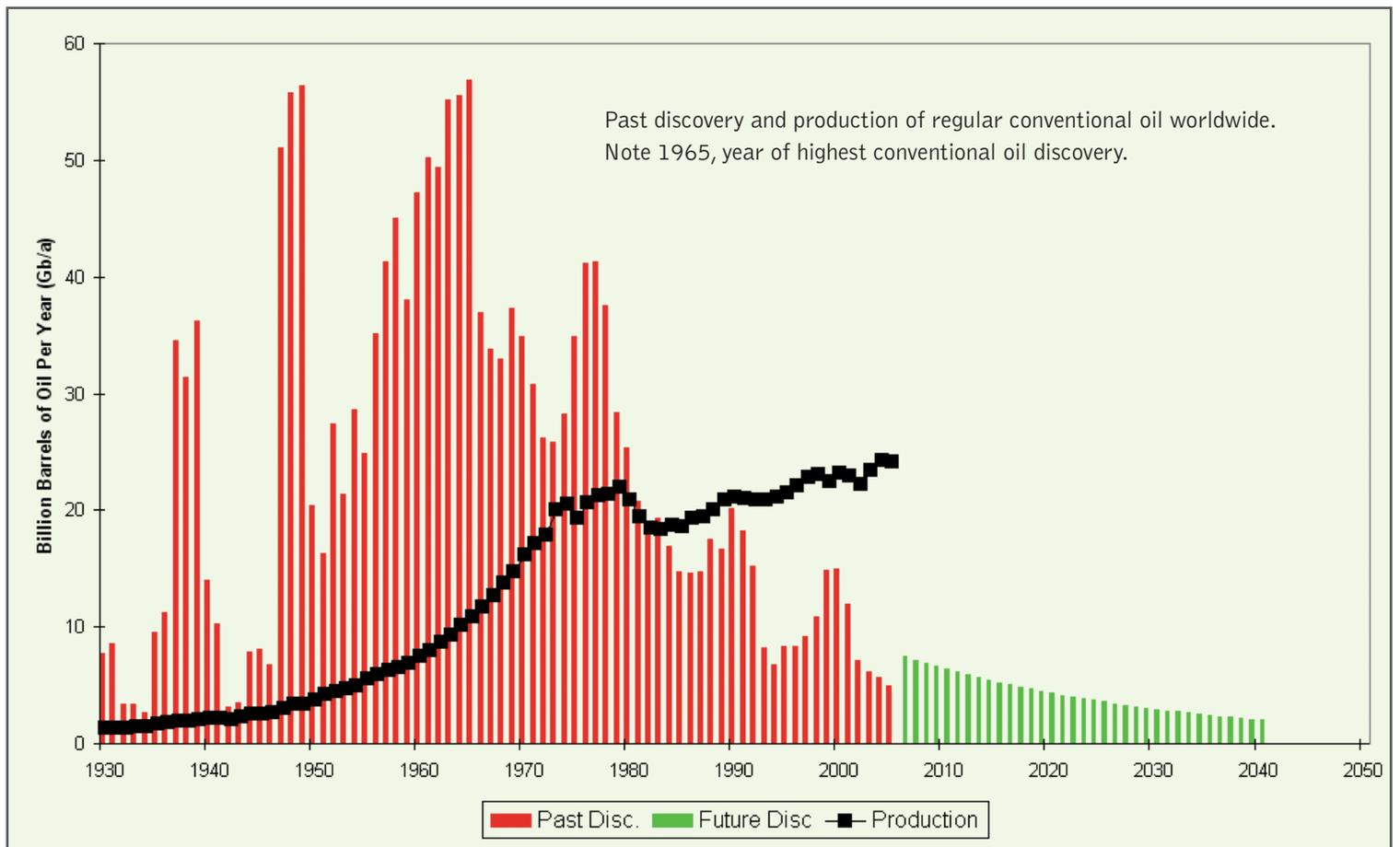
Governments need to consider a third key factor – the finite limit of resources

As energy policy makers focus their attention on the geopolitics and financing of energy supply, they have failed to focus on a third key factor – the finite nature of the resource base.

This is because policy makers have relied on an over-optimistic analysis of remaining oil reserves provided in the forecasts of organisations such as the OECD's International Energy Agency (IEA) and the US Department of Energy's Energy Information Administration (EIA). Reliance on inadequate data has allowed politicians to presume that sufficient global oil reserves remain potentially available to meet future global demand, with little consideration of the remaining resource base in the ground.^{7,8} For example, in October 2007, in response to a public petition asking the UK Prime Minister to acknowledge imminent oil and gas peaking, the UK Government stated, "The Government fully recognises that there is uncertainty around the issue of future global oil and gas production..." The statement, citing a 2005 IEA report, continued "The hydrocarbon resources around the world are sufficiently abundant to sustain likely growth in the global energy system for the foreseeable future."⁹

Policy makers seeking to understand potential oil availability must distinguish between the use of the terms "resources" and "reserves". Put simply, the term "resource" relates to the amount of oil in the ground, whilst an oil "reserve" relates to the volume of oil that might be expected to be extracted. The first is a product of nature; the second is a product of human economics. Regardless of how much demand there is, the limit set by the former cannot be exceeded. Frequently, both terms are confused in press reports. This has led to occasions where the large size of a resource base is presumed to imply a large potential production will be forthcoming – for example, in Canada, the enormous size of the Athabasca tar sands deposit resource has led to significant overstating of its potential reserves for production.

It is only true up to a point that oil price rises will encourage additional extraction of hard-to-reach reserves. After a certain point which varies by field, physics, chemistry and geology



become the defining limits, and the extraction process enters a phase where regardless of additional expenditure and effort, output volumes decline. Some decline rates can be extremely rapid, for example the Abaktun field in Mexico has an annual decline rate of 16%, whereas, the UK's Forties field in the North Sea has an annual decline rate of 8%.¹⁰ Thus far, nearly two thirds of the world's major oil producing countries have moved into decline.¹¹

Thus, a key assumption in most energy policy, that increased demand for oil will drive an increased supply through financing additional investment, cannot be relied upon if geophysical limits are reached. The next section provides disturbing evidence that these limits are being reached and that we may be approaching a peak output, to be followed by an irreversible decline in production.

A point of no return

Governments are relying on energy forecasts from two influential organisations, the OECD's IEA and the US EIA, which have, in turn, used data from the US Geological Survey (USGS) global field analysis from 2000. Since then, global annual oil discovery has trailed the USGS estimate by a massive 60%.^{7,12}

Data presented by Ray Leonard, Yukos' former Vice President for Exploration and New Ventures, reporting on the Hedberg conference (a meeting of international oil company senior executives in November 2006) gave an interesting insight into the industry's view of remaining resources "to be discovered" for each of the world's main producing regions. In each case, according to

Leonard, industry viewed the USGS 2000 data as significantly over-optimistic in comparison to actual discoveries.¹³

The IEA's latest World Energy Outlook of November 2007, raises concern about the prospect of an energy "crunch" around 2015. But, its Chief Economist, Dr Fatih Birol, continues to insist that there is no lack of resource base, rather that these potential problems could be overcome if the correct policies and investment streams are deployed, leading to the ability to increase production of global oil output from today's 86 million bpd to around 116 million bpd by 2030.^{7,14,15}

The US EIA's International Energy Outlook of May 2007 report forecasts "liquids" consumption reaching 118 million bpd by 2030. The report suggests that demand can be met by a combination of "conventional" oil production, together with unconventional liquids, which include tar (bitumen) sands, oil shale, biofuels, coal to liquids and gas to liquids production.^{8,16} There are major problems associated with the realisation of unconventional liquids production, and policy makers should not consider these forecasted production volumes to be a foregone conclusion.

For example, the use of Canadian tar sands to make a synthetic crude oil, or syncrude, is often cited as a major additional unconventional source of oil. Emphasis is placed on the size of the resource base. Size is not everything because, despite the resource base, it looks unlikely that Canadian tar sands production will ever expand much beyond 3 mbpd, slightly more than the current output of Nigeria, because of several limiting factors.¹⁷ Extraction and conversion utilises huge quantities of steam, requiring water, a resource which is also limited in that location. Significant quantities of natural gas are needed to heat the water, but gas supplies are severely limited, indeed Canada's National Energy

Board issued a statement of 10th October 2007, which noted an anticipated gas output reduction of between 7-15%, between the year 2007 and 2009.¹⁸ The process is also environmentally very damaging, and as the extraction area moves outwards from its current 12% bitumen content location, the quality drops towards 8%, which is likely to impact on the viability of the process.¹⁷

The other alternatives also have problems. For example oil shale, which also has a large resource base, could provide a source of liquid fuels, but its production process is very energy intensive and the extraction process is also environmentally damaging. The recent political focus on biofuels has precipitated an investment drive, but with major negative environmental and human rights consequences, including increased forest clearance¹⁹ and rises in the cost of some staple foods. This is because, for example, increasing quantities of corn are being used to manufacture ethanol, pushing the price of corn up.²⁰

Towards peak oil?

This is a very misunderstood term. It does NOT mean oil is running out. Peak oil is the point where further expansion of oil production becomes impossible, because new production flows are fully offset by production declines, or depletion. This is an entirely natural process, very familiar to the oil industry as oil field after oil field reaches maturity, with production volumes dropping off, regardless of expanded investment. Eventually, the costs do not justify the minimal volumes being returned and fields are abandoned.^{2,11}

Oil depletion can also be viewed on a more national, and then global basis. Countries typically experience an increase in net production with each new field, until the point where there are no



Offshore Oil Rig (Foto: Kim Steele / Photodisk)

new upcoming fields to replace those in decline. At this point the country has peaked, and outputs go into continuous decline. This has already occurred in many countries. The world will have reached a peak at the point when new projects coming on-stream fail to off-set the annual decline from older fields supplying the international market. It follows that at this point, world production will gradually go into decline. The following facts illustrate the lack of sustainability around current presumptions of future oil discovery and supply, and should alarm policy makers:²

- The largest volume of oil discovered in a single year took place in 1965, global discoveries have declined annually since then.
- By 1981 oil consumption had exceeded the volume of discovery, and has continued every year since.
- By 2006, the volume of oil consumed was approximately three times the volume discovered each year.
- By 2006, of the 65 largest oil producing countries, 54 had passed their peak production, and were in decline.
- By 2006, 120 of the world's largest fields provided 50% of total world oil production.

When might we reach a global oil peak?

Trying to pinpoint the precise date of peak oil is difficult, but it is likely to be sooner than many policy makers realise. Whatever the date, the important point is that a decline in oil supply will have major economic and social consequences. Policy makers need to take the potential impacts into account when considering the post-2012 framework to address climate change, otherwise they may find that the consequences of peaking oil supply are likely to overwhelm their efforts.

A number of former oil industry geologists, executives and scientists have produced credible forecasts of potential global peak oil dates, with subsequent decline rates.

To provide just a few:

- Dr Colin Campbell predicts an oil supply peak between 2010 and 2011, at an output of around 89 mbpd, with an annual 2% decline after that.
- Jean Laharrere predicts the peak coming in 2018, at an output of just above 90 mbpd, followed by an annual 2% decline.
- Chris Skrebowski, Editor of *Petroleum Review*, suggests a peak arriving somewhere around 2011, on the basis of his ongoing analysis of upcoming oil projects of the next 5-6 years, about as far ahead as it is possible to gain objective insight. He estimates a maximum output of around 93-95 mbpd, with a subsequent annual decline rate of 2.5-3%. The analysis includes all production down to an anticipated 40,000 bpd output, taking into account project slippage and depletion rates, juxtaposing these new incremental flows against projected demand. This analysis is especially relevant for policy makers because it gives an indication of what the oil sector can actually deliver.^{2,10,21}

In October 2007, in the context of rapidly rising oil prices, additional oil industry professionals have started to add their voices of concern. Perhaps the most significant of these comments came from Dr Sadad al-Huseini, former head of

exploration and production at Saudi Aramco, the Saudi State oil company responsible for the entire production of Saudi Arabia. Noting that oil production has barely increased, despite soaring prices and huge investment, he stated: "It's telling us something. We should be listening to what the numbers are telling us, not what the politicians say...It's not about economics alone, you can increase prices, but you will not necessarily drive production up." He added: "Reserves are confused and in fact inflated. Many of the so-called reserves are in fact resources. They're not delineated, they're not accessible, they're not available for production". Dr al-Huseini contends that a quarter of the world's stated oil reserves – some 300 billion barrels – are over-stated.²²

Other senior oil company executives have started to add their voices of concern. At the same conference as Dr al-Huseini, Total's CEO Christophe de Margerie stated that he saw predictions of oil output rising to 100 mbpd as "optimistic".²³ Clarifying his comments, de Margerie said that any prediction of reaching 100 mbpd had to assume increased production coming from Iraq, Venezuela, and Nigeria amongst other locations. "Today," he said, "we know those developments are not underway."²⁴

On November 8th, ConocoPhillips CEO, Jim Mulva reportedly stated: "Oil and gas production fell at all of the largest publicly traded oil companies in the third quarter, as ageing oil fields, declining access and soaring costs for drilling services took their toll on output. I don't think we're going to see the supply go over 100 million barrels a day. Where is it all going to come from?"²⁵

From peak to plateau to decline

Once a global maximum of oil production is reached, most commentators suggest that oil supply will then plateau for a limited period of time before the decline phase begins. During the plateau phase, the global economy will likely be exposed to alternating price spikes when increased demand cannot be catered for, followed by periods where incremental supply increases will lead to price reductions, giving the brief impression that normality is returning. Once past the plateau, the rate of decline of global oil supply will determine the global economic impact. The ultimate decline rate is probably more important than the timing of the oil production peak itself. This is because, instead of year-on incremental increases in the world's available energy from oil, as the global economy has become accustomed to, a post-peak world will have to face up to the impacts of an inexorable decline in available energy supplies, cutting across all sectors of the economy.¹⁰

Although Mr. Skrebowski's analysis suggests that projects coming on-stream will probably just keep up with demand until approximately 2011^{2,10,21}, policy makers need to understand that it looks increasingly unlikely that exploration will uncover any undiscovered "North Seas" sized oil fields, if they exist, in time to avoid a production ceiling. Once the plateau period ends, the decline rate is likely to be approximately 2-3% annually. To put such a decline into context, taking for example the 3% decline rate, global oil output will drop to approximately 58 mbpd by 2020, instead of the IEA's projected 105 mbpd.^{10,15,17}

What can the past tell us about the impact of an oil peak?

There are some pointers from the past that might provide some insight into the potential impact of a global oil supply peak. In 1973, the Arab oil boycott, resulting from the Arab-Israeli war, led to a temporary 4% drop in global oil supplies, and a resultant US GDP decline of 3%. In 1979, US GDP lost another 3% as the world experienced a second oil shock with a 5% loss of production following the fall of the Shah of Iran.¹⁰ In both cases, despite the short length of supply restriction, the impact on the global economy was a recession.

Energy expert Robert Hirsch has analysed these past oil shocks, providing potentially useful insight into the implications of a global oil supply peak.¹⁰ Although Hirsch stresses the difficulty in providing precision, his studies indicate a approximate percentage change parity between oil supply and global GDP. In other words, for each 1% drop in global oil supply, we should roughly expect a corresponding 1% drop in global GDP. Even if his assessment is rough, the inescapable conclusion is clear – a relentless year-on reduction in energy supply from oil, with the world's economy configured with its dependence on oil, will result in a relentless decline in the world's economy.

Hirsch comes to another, perhaps more disturbing conclusion. He proposes that at the point of a global peak, oil production states might decide to withhold large volumes of oil from the international market, preferring instead to retain remaining supplies for their domestic needs.¹⁰ This argument is compelling, especially given the increasing domestic energy demands of key Middle Eastern and other oil producing states,²⁶ as their populations have expanded. Such an outcome could precipitate a significantly larger economic decline than might be expected from a predictable annual oil output decline of 2-3%, and must surely escalate the potential for conflict over remaining supplies.

Conclusion

Policy makers must understand that the looming energy crisis means that the current energy provision strategy is unsustainable, both in terms of delivery and in its consequences for worsening the climate crisis, and significantly increasing the risk of conflict. These circumstances threaten to hijack the political space required to develop an adequate response to the climate crisis.

Very often discussion around climate change solutions is framed negatively around the cost of mitigation. Instead policy makers need to make a step-change in their thinking - that the cost of the development and deployment of an alternative, sustainable global energy system is an opportunity, not a burden. There is little choice in this matter.

In the words of UN Secretary General Ban Ki-moon, during his November 2007 visit to Antarctica, "This is an emergency and for emergency situations, we need emergency action".²⁷

Notes

- 1 The Extractive Industry Transparency Initiative – EITI, see <http://www.eitransparency.org>
- 2 “So What is peak oil?”, Oil Depletion Conference, Energy Institute, London, presentation by Chris Skrebowski, November 2006.
- 3 Is the glass half full, or half empty, presentation by Matthew Simmons, ASPO Workshop; 26th May 2003
- 4 Oil Market Report; 11th October 2007, at: <http://omrpublic.iea.org/>
- 5 Personal communication Chris Skrebowski & with current oil industry executives; 2007
- 6 For a discussion around this theme, see 1st chapter, “The Last Oil Shock, A survival guide to the imminent extinction of petroleum man”, David Strahan; John Murray publishers; 2007
- 7 IEA reviews reliance on USGS resource estimates, commentary & podcast of interview with Dr Fatih Birol by David Strahan; 31st October 2007, at: <http://www.davidstrahan.com/blog/?p=69>
- 8 Preparing for life after oil, Michael T Klare, The nation; 8th November 2007, available at: <http://www.alternet.org/story/66625/>
- 9 UK Government response to peak oil petition – submitted via: [petitions.pm.gov.uk](http://www.odac-info.org) – 3rd October 2007, obtained via <http://www.odac-info.org>
- 10 From: World oil shortage scenarios for mitigation planning, Presentation by Robert Hirsch to ASPO-USA; 17-20 October 2007. Found at: <http://www.odac-info.org>
- 11 Peak oil primer & links; November 2007. Found at <http://www.energybulletin.net/primer.php>
- 12 An Evaluation of the USGS World Petroleum Assessment 2000 – supporting data, Open File report 2007-1021, at: <http://pubs.usgs.gov/of/2007/1021/>
- 13 See slide 4 from presentation of Ray Leonard to ASPO-6 conference, Cork; September 2007 – at: http://www.aspo-ireland.org/contentfiles/ASPO6/1-1_ASPO6_RLeonard.pdf
- 14 “Supply crunch” is not peak oil – IEA; 7th November 2007, at: <http://www.davidstrahan.com/blog/?p=73#more-73>
- 15 IEA: World Energy Outlook 2007; 7th November 2007; at: <http://www.iea.org>
- 16 Chapter 3: Petroleum and other liquid fuels, EIA – International Energy Outlook 2007, at: <http://www.eia.doe.gov/oiaf/ieo/pdf/oil-pdf>
- 17 David Strahan interview with Chris Skrebowski; 24th October 2007, at: <http://www.davidstrahan.com/blog/?p=65>
- 18 “Short term decrease see for Canadian natural gas deliverability, news release of National Energy Board, Canada; 10th October 2007, at: <http://www.neb-one.gc.ca>
- 19 Numerous references – for example: “Biofuels boom Spurring deforestation”, Stephen Leahy, IPS; 21st March 2007, at: <http://ipsnews.net/news.asp?idnews=37035>
- 20 Biofuels, corn prices and food security in Mexico, by Sitna Quiroz; 27th March 2007, at: http://lac.civiblog.org/blog/_archives/2007/3/27/2838904.html
- 21 “New Capacity fails to boost 2006 production – delays or depletion?” Chris Skrebowski, in Petroleum Review; February 2007, available at: http://www.odac-info.org/bulletin/documents/MegaProjects_Feb2007.pdf
- 22 Comments by Saddad Al-Huseini, at the 28th Oil and Money Conference, London; 30-31 October 2007, quoted in “Oil reserves over-inflated by 300 bn barrels – al-Huseini”, 30th October 2007, at: <http://www.davidstrahan.com/blog/?p=68>
- 23 Total Chief sceptical about future oil supplies; 31st October 2007, at: <http://blogs.ft.com/energyfilter/>
- 24 Total boss on why oil production will never top 100 mb/d; 2nd November 2007, at: <http://www.davidstrahan.com/blog/?p=71>
- 25 Big oil begins its confession, Brian Hicks; 9th November 2007, from: Wealth Daily, independent investment analysis and commentary, via: wd-eletter@angelnexus.com
- 26 CIBC World Markets – Occasional Report #62; 10th September 2007; at: <http://research.cibcwm.com/res/EcoResearch.html>
- 27 Un Chief Makes Antarctic Visit, BBC News; 10th November 2007, at: <http://news.bbc.co.uk>

Memorandum To Have and Have Not Resource Governance in the 21st Century

At the beginning of the 21st century, the natural resource sector is facing several interrelated challenges ranging from climate change to increased competition over decreasing supplies to social and environmental impacts, human rights abuses and violent conflict. The way these challenges are managed will decide whether the sector will be a source of destabilisation, destruction, and corruption, or contribute to sustainable development of human societies, communities, and the environment. “A Failure of Leadership” examines the nexus between the impending energy crisis, initially related to a peaking of global oil supplies, and the climate crisis; raising the prospect that failing political leadership to

address both crises simultaneously will likely destroy nascent natural resource governance mechanisms, significantly escalating the risk of global conflict over remaining supplies of oil.

In 2007, the Heinrich Böll Foundation produced a Memorandum, “To Have and Have Not”, dealing with the challenges of resource governance in the 21st Century, focussing on the oil and gas, mining and forest sector. It came about during the German G8 Presidency through an international civil society networking, strategy and dialogue process. The authors of the Memorandum are key civil society activists from Brazil, Cameroon, Germany, Hong Kong, India, Liberia, Mexico, the UK and USA. It aims to strengthen civil society positions and networks on governance issues in the extractive industries and serve as a handbook and capacity building tool for policy development and action.

To download the Memorandum and other background papers and material go to our webdossier at www.boell.de/resource_governance

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