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THE CHANGING GEOPOLITICS OF ENERGY

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Abstract. The paper discusses the changes in the global energy balance and the resulting geopolitics, which have in the recent years emerged as a result of the interplay of factors such as the rapidly increasing world's energy consumption and the shift of the source of consumption eastwards to China and India. The apparent shortage of oil is exemplified by the "peak oil" theory, signalling a global struggle for oil and the need for new oil production, despite the apparent investor's insecurity to commit under the current geopolitical and economic conditions. Against the backdrop of these disconcerting factors, the authors considered the emergence of shale gas, as a new and abundant energy source that may redirect the energy geopolitics towards more comfortable outcomes.

Key words: Geopolitics, energy, OPEC, peak oil, shale gas

Introduction

Energy supply has long played a prominent role in world's international affairs. The forces of globalisation, market liberalisation and technology have created a global economic engine that is now engaging massive populations in the developing world, especially in Asia.

As the globalised markets of today have been very much energised by the affordable and available transportation fuels, oil and natural gas are expected to dominate the world geopolitics in the years to come. In addition, with the economic rise of China and India, the world's energy balance has undergone substantial changes over the last few decades, in terms of both demand increase and its "shift eastwards" – changes that will without doubt further enhance the role of energy in international politics, moving the energy security up the political agenda and intensifying the campaign for the remaining resources.

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The global struggle over energy, especially the control over the flow of oil and gas from the Caspian region to the markets in Europe and United States, is only expected to intensify.

While there appears to be an urgent need to invest in new oil resources, especially in the OPEC region, the current economic and geopolitical climate combined with environmentalist's decarbonisation desires and the corresponding agendas makes the potential investors reluctant to engage in energy projects.

In the last few years, however, amidst the turbulent and worrying manifestations of the global energy reality, there came the shale gas shock – a new, abundant, uniformly distributed, inexpensive, clean and reliable energy resource emerged that is destined to transform the world's energy prospects.

This study examines these changes and how they affect the global energy balance and the underlying geopolitics.

Geographical shift of consumption

In spite of the fact that there is no imminent shortage of world energy supply, the sharp increase in consumption is often quoted as a major concern from both the geopolitical and environmental viewpoints. World's energy consumption is currently around 500 exajoules/year, or on average 55 kWh per person per day. By 2035 the worldwide requirement for primary energy is expected to rise by 49% relative to 2007 (DOE EIA, 2010, page 1).

However, it is the shift in the source of consumption, and particularly of the oil consumption, that made substantial changes to the world energy balance, which can naturally be followed by a shift in the geopolitical and economic power from West to East. This process may be gradual, but its potential consequences are profound. The economic crisis in the West, if it continues, can only accelerate the trend, and it may turn out that the year 2008 was the turning point.

As shown in Figure 1, the energy consumption of the OECD countries is expected to rise only marginally by 2035. The main increase will occur in the developing nations of Asia, and especially in China. The non-OECD nations account for 84% of growth in energy use between 1990 and 2035 (DOE EIA 2011, Figure 50). While China's share of the global energy consumption was only 8% in 1990, compared to US's 24%, China is expected to equal US in 2015 at about 18% of world's energy, and to dominate in 2035 at 24%, compared to

USA's expected 16% share. Both countries will undoubtedly rate their energy security as a national interest of the highest priority[2].

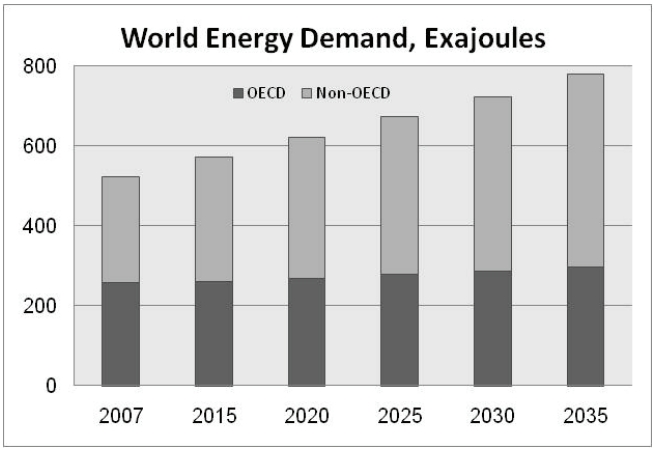

Figure 1 World energy demand projection (DOE EIA, 2010)

As regards its oil consumption, China emerged from being a net oil exporter in the early 1990s to become the world's third-largest net importer by 2006. Its oil consumption growth accounted for about a third of the world's oil consumption growth in 2009 (EIA, 2010).

China consumed 8.3 million barrels per day (Mbpd) in 2009, while producing only 4 Mbpd. Its import in 2009 was 4.3 Mbpd, compared to US's 9.6 Mbpd (EIA, 2010).

Chinese oil demand will have reached 9.6 Mbpd in 2011, and its imports will rise to 5.6 Mbpd. At this growth rate Chinese oil imports may reach that of the US by year 2016.

China in the energy market - a different game?

The rise of China, as an influential consumer and a possible US's competitor for the remaining oil, has several important geopolitical consequences. In addition to the emerging struggle for resources and the risk of crossing the boundaries of diplomatic contests, the specific Chinese campaign for resources creates a

[2] National energy security is discussed in detail in Luft and Korin: *Energy Security Challenges for the 21st Century*, ABC CLIO, 2009

peculiar economic effect – a change in energy trading methods, which some authors describe as "market suppression", caused by special bilateral deals.

China's approach to energy markets in Africa and Central Asia often involve special, not so transparent government-to-government agreements, which is in contrast with the market-based approach to energy security, favoured by the market economies. It is feared, largely in the West, that the grants, special loans and infrastructure development projects that the Chinese government routinely offers to its resource-rich business partners distort the workings of the market (Klare, 2008).

However, some authors assert that this Chinese practice is neither exceptional nor at all harmful, arguing that if the Chinese energy sector bring more supplies onto the global market, all consumers will benefit in the long term (Victor, Yueh, 2010). These authors hope that China will appreciate that the flows of the new supplies will be more reliable if they came from countries with well functioning governments. It is believed that to enable such development in Chinese attitude towards energy markets, the investment standards should be developed that align China's interests in its energy security with the Western norms of well-functioning markets.

The response – increased awareness of energy security

The five largest energy consumers, and at the same time the economically strongest powers and actors on the world geopolitical map (US, China, EU, India, Japan), are all short of conventional energy supply. Government's concern about the energy security causes them to take energy to the top of their political agendas. The fragile government become sensitive to lobbying in favour of one option or the other. For example:

- Following Fukushima nuclear reactor explosions, Germany decided to abandon nuclear power by 2022 (Pidd & Goldenberg, 2011). The announcement came only months after Angela Merkel's government decided in autumn 2010 that their nuclear power stations should continue to operate until 2035, which overrode a decision to quit nuclear energy by 2022 made by the government of Social Democrats and Greens in 2001.
- At the same time France made a new commitment to nuclear power (Willsher, 2011)
- In the UK, the Severn Estuary tidal power project was abandoned (UK Department of Energy and Climate Change, 2010).

Some of these moves are in sharp contrast with the environmentalist's desire to switch to low-carbon energy and many governments verbal agreement to action on this, in spite of expert's warning that the switch may be a very slow process with a limited effect (Kramer and Haigh, 2009).

The supply side - world oil reserves

Although there is no imminent oil shortage on the world stage, the "peak oil" alarmists are still active. The scare mongering is assisted by the lack of transparency concerning world's oil reserves and the perception of a production "peak", followed by a decline. The so called "Hirsch report" has been quite influential in this respect (Hirsch et al., 2005).

The world's oil consumption is expected to be around 88 million barrels per day (Mbpd) in 2011, providing around 34% of the global energy demand. Of this, 23% will be consumed in the USA, 10% in China, 18% in the EU and 5% in Japan. (EIA 2011a, Table 3a)

The proven oil reserves are estimated at 1.3 trillion barrels. The distribution of the reserves is shown in Figure 2 (DOE EIA, 2010). Relatively few fields have a major influence on global crude oil supply, and their gradual decline is an area of concern.

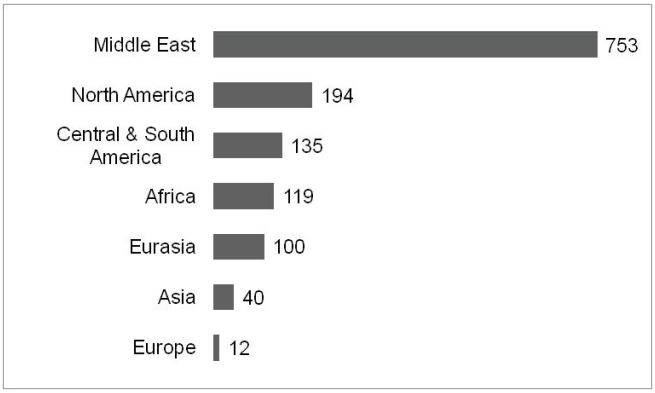

Figure 2. World oil reserves distribution, billion barrels (DOE EIA, 2010)

As the oil production in the non-OPEC countries is expected to increase only marginally between 2010 and 2030, it is the call on OPEC to provide for the new production.

The production rates expected from OPEC vary from analyst to analyst. OPEC's own predictions quote 49 in 2030 (Hamel, 2007), while DOE predicts 47 Mbpd by 2035 (DOE EIA, 2010).

Assuming a 1.5 %/year depletion[3] rate of the existing fields, the OPEC's projected shortage in 2030 will be around 16.5 Mbpd, equal to 150% of the current production of Saudi Arabia.

Propensity to Invest - Investing in the Uncertain World

There appears to be an urgent need to invest in new oil, and it is the investment, not the resource that seems to be critical. However, the political and economical instabilities set constraints on the propensity to invest, and have caused apparent investor's reluctance.

While most of the oil reserves are in regions that are politically unstable (Figure 2), it is prohibitively expensive to invest in oil fields in stable locations. According to OPEC, the expansion of non-OPEC capacity is on average 2-3 times more costly than for OPEC, with this gap widening over time, as costs in non-OPEC regions gradually rise faster than in OPEC. The highest-cost region is the OECD, which also experiences the highest production decline rates (Hamel, 2007).

Another investor's dilemma is that the producing countries may question if the demand is certain to justify the large investments. The environmentalists discourage new oil investment, and in particular the "climate change" activists doubt future fossil fuel usage, albeit without offering a clear alternative.

Finally, the intrinsic instability in energy pricing, due to the currently prevailing speculative mechanisms of oil pricing makes planning and deciding about energy investments increasingly more difficult.

For a couple of decades, until about 2004, the price of oil had been basically determined by OPEC, through an administered system of fixed prices. Since early 1980s, large producers moved to a "benchmark" pricing system, trading in crude futures. This brought in new players from the financial sector, including large hedge fund speculators and index investors. As the price of oil has become

[3] Note that the assumed depletion rate of 1.5% is conservative – a more detailed analysis of the depletion patterns is to be found in (Höök et al., 2009)

commodities, the main drivers of price have increasingly included financial market indicators, such as equities and exchange rates.

Shale gas revolution

The breakthrough in natural gas supply in North America is one of the most important changes in the global energy image. Several old and new technologies combined to enable shale gas extraction: hydraulic "fracking" of rock to open pores and allow extraction, improved horizontal drilling, improved seismic exploration, and, most importantly, gas extraction from deep shale by using "slick" (low viscosity) water and send mixture to fracture the rock combined with horizontal drilling to expand the reach of the well (Ridley, 2011).

Oil and gas companies have more than doubled the discovered shale gas resource base in North America in the past three years and they have scaled-up production dramatically. Total potential resources are now thought large enough to meet current consumption levels for about a century. In an unprecedented move, the Royal Dutch Shell declared to have become a "gas company" (Lestak, 2011).

As shale gas is uniformly distributed, other countries are now encouraged to search for new gas resources themselves. The global unconventional gas resource base must still be proven, but with the EIA estimating a potential recovery worldwide at 185 trillion cubic meter (tcm) (EIA, 2011), it will clearly be a game-changer.

To put this shale gas resource estimate in some perspective, world proven reserves of natural gas as of January 1, 2010 are about 187 tcm, and world technically recoverable gas resources are about 450 tcm (excluding shale gas). Thus, adding the identified shale gas resources to other gas resources increases total world technically recoverable gas resources by over 40 percent to 635 tcm.

The largest addition comes from the USA – the estimates vary from 24 tcm (EIA, 2011), to 31 tcm (IHS CERA, 2010). In Europe, Poland is currently quoted as richest in shale gas reserves, followed closely by France. The estimates for Poland vary from 1.3 tmc (Wood Mackenzie[4]) to 5 tmc (EIA). As a reference, Poland's natural gas consumption is 14 billion m^3/year, and EU demand is about 550 billion m^3/year.

[4] The original publication is obscure, but see:
http://business.timesonline.co.uk/tol/business/industry_sectors/natural_resources/article7087585

The success of shale gas projects that are already in the US underway will give governments, investors and consumers the confidence to commit to natural gas in the long term. It is not difficult to take these forecasts one step further and foresee that natural gas may gradually replace coal as the power generation fuel, and also replace oil as land transportation fuel via gas-to-liquid (GTL) partial oxidation, followed by the Fischer Tropsch process[5].

Conclusion

Two opposing movements dominate the world energy outlook: (1) fear of shortage of energy, especially shortage of oil, and the geopolitical contest for the remaining resources; (2) a dramatic increase in the availability of unconventional natural gas as world's primary energy resource for centuries to come.

How these two forces will be reconciled remains to be seen. However, the world's energy problems are relieved by shale gas revolution to an extent unimaginable only several years ago. A switch from coal to gas and from oil to gas appears imminent, in a word in which the choice of fuel for electricity production seems to be gas, and the future of transportation the electric car.

The optimism in world's energy affairs has been desperately out of fashion over the last twenty or so years, although there has never been a clear and a scientific rationale behind such sentiments and beliefs. The shale gas solution to world's energy problems will certainly encounter formidable opposition from oil, coal, nuclear, renewable and other energy industries, politicians, the green movement, the global warmists and other environmental pressure groups. Not to be ignored is the desire to dominate the world geopolitics by the energy producing countries, who will not welcome shale gas as a competitor.

In the EU, it will be the political will and the strength of individual governments to make a U-turn, abandon the expensive and mostly futile renewable energy initiatives and start with shale gas exploitation. The priority that EU places on energy security may be sufficient to overcome the opposition.

[5] In 1923 German scientists Franz Fischer and Hans Tropsch discovered that synthesis gas can be converted into heavier hydrocarbons suitable for use as synthetic fuels.

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