

The Shale Revolution: Its Impact and Implications for India

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Production of shale oil and gas had begun in North America around 2007; however, its full impact began to be felt only around 2011. Its advent has been likened to that of the sighting of a 'Black Swan', an event that is rare, unusual and unexpected, and which is transformational of the ways in which the world lives and believes.¹ Understandably, therefore, it has come to be described as a 'revolution'.² Nearly every one concurs that the shale revolution is to here stay. This essay examines two major issues associated with the shale revolution which bear scholarly significance:

- (i) its meaning in terms of global energy security, and the structural change that this revolution is bringing about in the global balance of power, the prospects of economic development, and climate change negotiations; and
- (ii) its impact and implications for India's energy security, besides whatever else it may hold in terms of geo-political and economic opportunities.

One Hundred Years of Gas

There is no gainsaying that shale oil and gas is transforming North America in some very meaningful ways. Its full impact, which would only be understood in hindsight, will be known only around 2030. However, scores of influential geo-political and economic analyses are pointing out the way shale revolution is beginning to rebalance the global political order in favour of the USA. A caveat needs to be added here: the shale revolution of USA cannot be replicated elsewhere for technological and organisational reasons, except in the case of Canada. In other words, other countries may have shale resources, but they will not be able to follow the US lead without its technological and organisational assistance.³

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The shale revolution has also gravely dented the 'declinist' thesis regarding the USA. 'The Age of Gas could make the United States the world's leading geopolitical power into the new century'.⁴ In his State of the Union Address 2012, President Barrack Obama promised the 'supply of natural gas that can last America nearly 100 years'; two years later, delivering the 5th Union Address, he reminded that the 'energy strategy I announced a few years ago is working, and today, America is closer to energy independence than we have been in decades'. 'The shadow of the crisis has passed', as America has risen from recession for reasons, among others, 'a booming energy production'. At his sixth address, Obama declared that the USA has 'grown more self reliant on its own energy reserves'.⁵

There might be some exaggeration in all this; but the shale revolution is not a 'hoax'; and neither, a 'Ponzi scheme disguised as an energy revolution'.⁶ Of course, projections and forecasts differ widely, and making policy recommendations remains somewhat hazardous. The shale revolution still being in its initial stage, 'its policy implications are poorly understood and the future trajectories of that production growth are highly uncertain'.⁷ With all scepticism taken into account, the shale revolution is here to stay well into the 2030s and, as production rises, its impact on global and regional supply and prices are being felt strongly.

The shift is paradigmatic: the arrival of non-conventional hydrocarbons is changing the assumptions upon which states and markets have worked their energy relations for the past half a century.⁸ Two assumptions have shaped national energy security policies since the 1970s:

- (i) oil is a key strategic resource, and guaranteed access to it at affordable prices needs to be ensured; and
- (ii) that the energy apocalypse is not far away. The final count-down in depletion and exhaustion of oil has begun. In the not-so-distant future, more oil might be available in the global market but at an unaffordable price, especially by the developing countries.

Working on these assumptions, all countries – especially the big and rich consumers – define their energy security, and then compete to guarantee access to energy resources at an affordable price. This is particularly so with the developed and powerful countries: being major consumers, they factor in energy security in their national security policies and defence scenarios. Producers of oil liberally use it as a political tool to gain concessions and influence; even transit countries leverage it to their advantage. In short, oil is all about geo-politics – an arena for high-level inter-state interactions and

parleys. It is not a commodity tradable in the market place. States themselves remain actively involved in matters of national energy security; and all have created a plethora of ministries, arrangements, and state-owned oil companies, etc.

The shale revolution has also upset the assumptions of state centrality regarding oil, and thereby raised questions about the way international relations have worked thus far. Developments witnessed since the advent of the shale revolution portend new directions: there is a continuous increase and diversification in the sources and types of energy. These trends are moving towards a more equitable and market based relationship between producers and consumers. They are also imposing a downward pressure on prices. Moreover, there is a rapid rise of gas in the global energy matrix, but without displacing oil as the primary source of energy. Some of these changes are coinciding with others: like the rise of 'new' energy; technologies of efficiency; alternatives and renewables; a culture of energy saving; and climate conservation, etc.

The foremost impact of the shale revolution is being felt within USA as the North American energy revolution continues unabated. The USA is being described as the new 'energy super power'. In 2013, US oil production had surpassed that of Saudi Arabia; and by taking into account the oil production of Canada and Mexico, North America is being described as 'Saudi America'.⁹ The USA accounted for 10 per cent of world oil production in 2013–14, with production reaching 8.5 mbd; and it could touch 9.6 mbd in 2016.¹⁰ In 2013, Texas singly produced more crude oil than either Venezuela or Kuwait. In the previous decade, imported crude met 60 per cent of US needs; now it accounts for about 30 per cent only. By the end of the present decade, the International Energy Agency (IEA) expects North America to be producing 20 per cent of world's oil supply, and to have become a 'titan of unprecedented proportions' in the oil products market. With revamped and expanded refining capacity and a robust downstream sector, the USA is also emerging as the most competitive source of refined petroleum products. This trend is not confined to oil and petroleum products; the USA is also predicted to become a net natural gas exporter by 2016, with shipments reaching 3.4 billion cubic feet per day by 2025. Within a short span of time, shale gas is accounting for 44 per cent of total US natural gas production. The gas play of Marcellus, with production at 12 billion cubic feet per day, is greater than the export capacity of the two largest LNG exporters, namely Qatar and Australia.¹¹

Oil is a price sensitive commodity, and moves freely around the globe in search of the top suitor. This is not true for natural gas; developing even a

regional market is a difficult task. As a result, there is a huge price differential. US gas is currently priced at one third of European and one-fifth of Asian prices. An interesting debate has broken out within the USA between energy exporters and the manufacturing industry. Major US gas exporters are looking for new lucrative markets, while the industry is foreseeing the dawn of an American 'manufacturing renaissance'. Exporters are insisting that the US change its forty years-old hydrocarbon laws which ban the export of crude oil and liquefied natural gas (LNG) to the non-free trading partners of the USA. The argument is that it would help the USA offset its huge trade deficit. Indicative of the things to come is the rising US export of shale gas to the hydrocarbon-rich Mexico – ironically, using the same pipelines that were laid to import Mexican natural gas into the USA. On the other hand, domestic manufacturers of energy intensive products, like heavy metals and chemicals, are predicting the dawn of a 'manufacturing renaissance' on the back of cheap and abundant natural gas which is once again giving American manufactures a competitive edge in the global market. And, it is said, this competitive advantage would last through the 2030s.¹²

The strong recovery of the American economy in the second half of 2014 is accounted for, among others things, by the access to cheap and abundant shale gas by households and manufacturers. Income has risen by \$1200 for an average American household; and the IMF estimates that the export of American manufactures rose by six per cent in the past couple of years. It is estimated that the shale revolution supports some two million jobs, besides shale rich states in the USA are undergoing an economic boom in these times of national slowdown.¹³

The USA has not been importing LNG for the past few years, and so saving a clear US\$ 100 billion annually on the gas import bill alone. At the average price of US\$ 100 per barrel, the USA also saved roughly another US\$ 100 billion on its oil import bill in 2013. At the same time, billions of dollars are being invested to change import terminals into liquefaction terminals for the export of LNG. The International Security Advisory Board of the Department of State estimates the USA becoming a major net exporter of petroleum products soon, though not of oil so soon. In short, the domestic impact of the shale revolution on the USA is profound – and no doubt irreversible – with strong international geo-economic implications.

Thanks to rapid technological breakthroughs in fracking, the cost of shale oil in the USA is far lower than the cost of conventional oil. Tight light oil can withstand a fall in prices and even squeeze out many oil producers. It is surmised that it would still be profitable to produce shale oil at global oil

prices below US\$ 60 per barrel. Crude prices fell by 45 per cent in the calendar year of 2014, but it has not diminished the interest of investors and innovators in the shale revolution.¹⁴ According to the *Economist*, the most 'decisive' event of 2014 was US oil production of 9 million barrels a day. It is predicted that it shall remain so in the coming years, and set global oil prices and supply.

Thus, it is not surprising that geo-political play is in. The USA is beginning to use its shale resources as effective tools of statecraft in the form of sanctions (say, against Iran); as a negotiation counter (say, in trade deals); and as an incentive for its allies (say, to develop their shale resources). These practices are getting embedded in US foreign policy tools and mechanisms.¹⁵

In brief, the shale revolution has inaugurated a new strategic ball-game. As Clifford Krauss remarks, (i) shale oil and gas resources of the USA, in conjunction with oil from the tar sands of Alberta in Canada, fossil fuels from the pre-salt layers of the Santos Basin in Brazil, and the deep-waters off Australia, have resulted in an altogether new map of US-led global geo-politics and economics. Importantly, all the three new energy powerhouses are US allies, and two of them are located in the Western Hemisphere. (ii) No less significantly, the shale revolution has made energy supply polycentric; it has made fuels and their technologies multiple and complex; and it is also altering energy routes, mix, price and relations in some very significant ways.

A Western Hemisphere of Energy

Among others, the idea of a Western Hemispheric energy sphere looks more plausible today than ever before in the past. For more than half a century, the USA dabbled with the idea of a Western hemispheric energy policy which, in essence, meant how to secure access to the energy resources of Mexico and Venezuela in a situation of military exigency. Today, the idea is shaping into reality. The 'new energy axis runs from Alberta, Canada, down through North Dakota and South Texas, past a major new discovery off the coast of French Guyana to huge offshore oil deposits found near Brazil.'¹⁶ The energy axis holds several hundred billion barrels of conventional and unconventional oil and gas resources. There is no doubt that this will be a game changer.

The Western hemisphere accounts for:

- (i) 33 per cent of the world's proven oil reserves (Venezuela: 297, Canada: 173, USA: 25, Brazil: 13, Mexico: 13 mmbd);
- (ii) 37 per cent of world's undiscovered oil reserves (Brazil: 83, Mexico: 19, and Guyana-Suriname: 12 mmbd);

- (iii) 42 per cent of the world's shale oil reserves (USA: 58, Argentina: 27, Venezuela: 13, and Mexico: 13 mmbd);
- (iv) 10 per cent of the world's proven natural gas reserves (US A:372, Venezuela: 196, Canada: 66, and Mexico: 17 tcf (trillion cubic feet));
- (v) 8 per cent of world's undiscovered gas reserves; and
- (vi) 43 per cent of world's shale natural gas reserves.¹⁷

In terms of being technically recoverable – that is, shale oil and gas volumes that could be produced with current technology regardless of production cost – the data from the US Information Energy Administration for 2013 indicates that total technically recoverable shale oil world-wide is estimated at 345 billion barrels. Several Latin American countries are in the premier league of shale revolutionaries. Among the top 10 countries with technically recoverable shale oil resources, Argentina occupies the fourth position, with 27 billion barrels of shale oil; and, Venezuela and Mexico with 13 billion barrels each are tied at seventh and eighth position respectively. Likewise, among the top 10 countries with technically recoverable shale gas resources Argentina, with its 802 trillion cubic feet (tcf), occupies the second position; Mexico, with its 545 tcf, is at sixth; and Brazil, with 245 tcf, stands at the tenth position. It is estimated that Latin America holds roughly a total of 30 per cent of the world's recoverable shale gas.

BP has predicted that shale revolution, along with other fuels, 'will make the western hemisphere virtually self-sufficient in energy by 2030. In a development with enormous geopolitical implications, a large swath of the world, including North and South America, would see its dependence on oil imports ... disappear.'¹⁸ BP's chief economist, Christof Ruhl has further foretold that, within the present decade, North and South America together are set to overtake the Middle East as the largest source of liquid fuels, and maintain the lead well up to 2030. This means a permanent rebalancing of oil within the region, and a new global geopolitics of energy routes and relations. Simply put, more Western hemispheric oil will become available for supply to the rest of the world. Another scenario would be the emergence of a regional market in natural gas, characterized by low prices which will fuel the growth of manufacturing in Latin America, and make value addition to its exports. Yet another noteworthy change already taking place is in the area of crude refining and petroleum products. As more 'extra-heavy' crude from Venezuela, Mexico and Brazil comes on line, US import of crude from Latin America and the export of refined products – including light tight oil – to the region will go up.

There is already a discernible geographic shift in the source of energy supplies to the USA: 45 per cent of American oil imports are from the three main regional producers – 25 per cent from Canada; 11 per cent from Mexico; and 9 per cent from Venezuela. Add to this the oil from Brazil, Colombia and Ecuador, and the percentage reaches over half of total US oil imports. To the discomfiture of both Mexico and Venezuela, their ‘extra-heavy’ crude export to the USA is facing competition from Canadian crude and, this may, in future, reduce the importance of both Mexico and Venezuela for the USA.¹⁹ This also seems indicative of a long-term trend here: comparing 2008 and 2013, US imports of crude oil and petroleum products from every other country/region – except Canada – have declined. For Latin America and Canada, the corresponding figures for 2008 and 2013 are from 3.4 mbd to 2.6 mbd, and from 2.5 mbd to 3.1 mbd, respectively.²⁰

US oil refineries are working at full capacity refining crude, manufacturing diesel, and producing other refined products, thus making oil prices low in the USA. It has also made the USA ready to export low-priced petroleum products to Latin America, Africa and Asia. With the spread of urbanisation and the rise of middle class, the demand for oil and products is rising in Latin America and, with its export of competitive fuel and products, the USA is becoming the source. The USA’s total export of petroleum products in 2008 was at 1.8 mbd which increased to 3.5 mbd in 2013; to Latin America, the corresponding figures for the two different years were at 0.8 mbd and 1.7 mbd respectively.²¹

In due course of time, the North American shale revolution shall make all major hydrocarbon producers adjust to the new situation and its challenges. Those who lack a diversified economic base, such as Venezuela, stand to lose more in terms of production, price as well as income – and, probably, some prestige too in terms of their ability to leverage oil for political gains. As and when American crude oil pipeline capacity expands into the US Gulf coast, it would also hurt Mexico. Gas producers in Latin America, such as Bolivia, shall lose; and importers, such as Chile, will gain when liquefied gas terminals expand on the US Pacific coast.

A recent study by the UN Economic Commission for Latin America and the Caribbean (ECLAC) for the Community of South American Nations (UNASUR) points out that, as Latin America supplies itself, this gives the region a ‘clear advantage in ... raising productivity and exporting fuels from a secure and stable region.’ Somewhat like as in the case of the USA, the argument being proffered is that cheap energy shall help Latin American economies gain global competitiveness. The energy revolution has other

regional geopolitical dimensions: for instance, the rising naval capability of Brazil to secure its SLOCs, and arms purchases by Venezuela. Chinese investment in building an inter-oceanic canal through Lake Managua, which could carry super-tankers across oceans, is another important development in the energy-led geostrategic scenario.

One has yet to decipher the significance of Alberta's tar sands for global energy and US leadership. Canada supplies almost 99 per cent of its oil from tar sands to the USA. This makes the building of the controversial Keystone XL pipelines, intended to take Canadian oil to US Gulf coast refineries, crucial. Indeed, at times, US government officials refer to Alberta as the 'template' of American foreign policy.²²

Indo-Pacific as the 'Ground Zero' of Growth

David Kaplan talks of the geo-politics of energy involving resources and routes; he also argues that a new world map of energy is getting drawn wherein consumers are in Asia and producers in North America. He approvingly quotes Mohan Malik to claim that the real big story is not the emergence of the USA as a super shale revolutionary but the rise of the Indo-Pacific as the 'ground zero' of growth in so far as energy consumption is concerned. Kaplan argues that, in the next 20 years, 85 per cent of growth in energy consumption will come from the Indo-Pacific. Already, one-fourth of the world's liquid hydrocarbons are consumed by China, India, Japan and South Korea. It is estimated that China will account for 40 per cent of the growing consumption until 2025, after which India will emerge as the 'biggest single source of increasing demand'. The rate of energy consumption in India will grow to 132 per cent; in China and Brazil, demand will grow by 71 per cent, and in Russia, by 21 per cent.

A similar assessment has been made by the International Security Advisory Board of the US Department of State which describes the rise in Asian demand as 'arguably the more geopolitically significant energy development'. This will probably be so, because Asian demand 'significantly alters fuel mixes and trade flows. It also challenges energy security frameworks and climate change mitigation efforts, heretofore structured mainly around the industrialised West.'²³

Data from the IEA indicates the same: China and India will see their demand for oil imports grow by 40 per cent and 55 per cent, respectively, from 2012 to 2035. The entire Indo-Pacific will become heavily dependent on oil imports from the Middle East. According to the projections of *World*

Energy Outlook 2012, Middle Eastern exports to China will surge to around 6.7 to 6.8 million barrels of oil a day by 2035; to India around 4.8 mbd, and to Japan and South Korea, again to around 4.5 mbd, but would decline to the USA to as low as .2 mbd only, and to Europe to 2.3 mbd by 2035.

What is likely to change in the future is that oil shall bring the Middle East closer to Asian consumers, and to the partners of the USA. As China and India gain in strength in working out import arrangements with Middle Eastern suppliers, both might also be required to take greater interest and responsibility for regional stability and security. The definition of energy security shall undergo modifications as exporters will seek stability in demand and price. As oil declines as a political tool, demand-supply will be determined more by harmonious relations among states as well as by the workings of the market. Benefits of such a structural shift will go beyond the purely economic for India and China, as both will be seen projecting their 'soft power' in the Middle East.

The rise of gas in the energy matrix may also mean closer relations between Middle Eastern producers and Asian consumers, and a different geopolitics and positions in climate change negotiations by countries and the regions. As the energy mix changes in the Indo-Pacific, there may be a renewed interest in pipelines going from the Gulf towards Asia, or from Central Asia towards East and South Asia. Moreover, securing sea lanes will assume a new urgency as major consumers go into high drive to secure their seaborne assets spread across vast oceans. A cooperative security arrangement might become an imperative in the Indo-Pacific. In a special report, the *Economist* has stated that with the USA becoming the world's biggest producer of oil and LNG, the Pacific region is in for a new round of economic interdependence and geopolitics, worked upon by US gas exports.²⁴ With the Middle East and Russia already shifting towards the Indo-Pacific, one is witnessing all energy routes leading towards the Indo-Pacific. In brief, the Indo-Pacific would become 'world's energy interstate'.

Europe, Russia and North East Asia are all ageing, and it is more than likely that they will not grow in importance in the energy market. If we modify the term 'Indo-Pacific' and replace it with 'Indian Ocean World', one finds that it is the Indian Ocean World alone which will grow in demographic and energy consumption terms. Both North America and the Indian Ocean World would, thus, become the 'new pulsating centre of commerce'. Power in Eurasia would move to a southernly latitude, while the USA will have its own power reinvigorated by an ever closer relation with Canada and Mexico. As Kaplan remarks: 'The Euro-centric world of the past millennium may finally be passing as North America and Greater Indian Ocean take center stage.'

Will India Swim with the Energy Tide?

India's energy relations with the USA are embedded in a larger strategic partnership; and deserve separate treatment. Suffice to say here that energy relations cover a very large area, including nuclear power, 'new' and alternative energies etc.; and both have an interest in reducing the linkage between economic growth, energy consumption, and the environment. In the immediate context of the shale revolution, India has shown interest in importing low-priced US LNG, besides technological cooperation in the area of oil and gas. With the rise of gas in the global and Asian energy mix, the proposed gas pipelines from Iran and Turkmenistan, otherwise virtually given up, also rebound in the Indo-US energy dialogue.

The tar sands of Alberta hold substantial promise for India. The proven oil reserves at 173 billion barrels – the third largest after Saudi Arabia and Venezuela – and marketable natural gas reserves – currently estimated at 1300 tcf – make Canada an energy giant. A 4600 kilometres-long Energy East gas pipeline from Alberta to the oil port in Saint John, New Brunswick, to be ready by 2018, shall become the shortest route for the supply of LNG from North America to the west coast of India. The cost of Canadian crude is lower – on an average by \$11 a barrel – as it reaches Saint John before it is loaded onto the super tankers. As the USA reaps its own shale revolution, and when heavily discounted Russian gas begins flowing to China under the US\$ 400 billion mega deal of 2014, Canada is looking for new Asian markets. Moreover, Canadian business estimates that Canada could be earning C\$ 50 million a day more only if Canadian oil and gas is sold outside North America. India could have the choice: go for a China-like deal with Russia, or bargain a better-termed deal with Canada! Canadian tar sands are heavily rich in bitumen which, after the extraction of oil, is used to produce varieties of petroleum products. Indian Oil Company and Reliance are reportedly serious about a deal. Some initial steps have already been taken; it looks as if oil and gas from Alberta would reach India in 2018.²⁵

As Latin America supplies itself and the whole of the Western hemisphere become oil and gas surplus, energy from the LAC region shall also flow towards the Indian Ocean World. Latin American export of crude to Asia is rising, and declining to the USA. Brazil exports 30 per cent of its crude oil to Asia. In 2013, about 45 million bpd of Brazilian crude flowed towards Asia and Pacific. Likewise, Venezuela's crude export to the USA is declining, and rising to India and China: in 2013, it was estimated at 400,000 and 200,000 bpd, respectively. India imports roughly 11 per cent of its energy needs from

the Latin America, with Venezuela emerging as the fourth largest supplier, at US\$ 14 billion crude export in 2013.

India-Latin America relations are essentially energy driven. Nearly half of the two-way annual trade of around US\$ 45 billion is accounted for by crude imports to India. Eight major Indian firms are part of the 12 joint ventures in all the leading oil and gas producing countries. Indian oil firms have their presence through the entire petroleum value chains in the region, demonstrating India's technological prowess, and its transfers of know-how gained through working in JVs. A substantial portion of the estimated Indian investment of US\$ 12 billion is in the energy sector. Reliance's import of an average 300,000 barrels a day of crude oil from Latin America was about a quarter of its total crude imports during 2012-13, exceeding the crude it imported from Saudi Arabia. Essar, another major private oil player, reportedly aims to buy 35 to 40 per cent of its crude oil needs from Latin America – the same as it does from the Middle East.

Varied analyses continue to base India's future energy needs and mix, assuming 8 to 9 per cent annual economic growth rate till 2030. To achieve it, the Integrated Energy Policy estimates that India's primary energy supply needs will rise 4 to 5 times over the 2003–04 levels. This means that the primary energy supply must grow 5 to 8 per cent every year.²⁶

India's energy mix reads somewhat as follows: coal at 53 per cent; oil and natural gas at 29 and 9.8 per cent, respectively; renewable at 6 per cent; and nuclear at one per cent. In 2030, the energy mix will be: coal 46 per cent; oil and gas 26 per cent and 9 per cent respectively; renewable 17 per cent; and nuclear 2 per cent (4 to 6 per cent in the best case scenario). That means some marginal fall in oil from the present one-third ratio; continued import to meet half of its need for natural gas and a third of its coal; and the two shall still account for 55 per cent of the energy mix by 2030. In sum, more than 80 per cent of India's energy mix shall depend on imports; and the bulk of its electricity will continue to be produced from coal till 2030. India holds only about half a per cent of global proven oil reserves; as for the proven and indicated reserves of natural gas, it is only 0.6 per cent of the world's total proven gas reserves. The current reserve to production ratio for oil is approximately 18 years, and for natural gas about 26.9 years. No matter what the expansion in domestic sources and change in energy mix, India's dependence on imported oil is forecast to rise up to 90 per cent by 2030 – from roughly 75 per cent in recent years.

The shale revolution is about to unleash a new energy tide in the Indo-Pacific. It is bringing about a structural shift in global energy demand and

supply, price and mix, trade routes, and the relationships between producers and consumers. The unfolding geo-politics and economics open up some very different and new possibilities in terms of inter-state relations, power hierarchies, economic development (including access to 'new' and alternative energy and technologies), and climate change and mitigation. Will India take the plunge and go with the flow?

Notes

- ¹ Nassim Nicholas Taleb, 'The Black Swan: The Impact of the Highly Improbable', *New York Times* (New York), 22 April 2007. Black Swan is an event which is an outlier with extreme impact which cannot be prospectively predicted but is retrospectively dissected at great length by social scientists. Social scientists tend to act as if Black Swan does not exist. For over a century, they have operated under the false belief that tools of empirical research could measure and predict the uncertain, which they certainly do not.
- ² Production of shale oil and gas involves two new technologies: horizontal drilling which allows wells to penetrate deep into shale rock formations, and hydraulic fracturing, or 'fracking' which injects fracturing fluids at high pressure causing the shale rock to crack. The fracture fluid continues further, extending the crack into the rock formation and release oil and gas into the wellbore. Because of different techniques, shale oil and gas is also called unconventional hydrocarbons.
- ³ Robert D. Blackwill and Meghan L. O'Sullivan, 'America's Energy Edge: The Geopolitical Consequences of Shale Revolution', *Foreign Affairs*, March–April 2014.
- ⁴ Robert D. Kaplan, 'The Geopolitics of Energy', www.forbes.com/sites/straffor/2014/04/04/the-geopolitics-of-energy, 4 April 2014.
- ⁵ <http://www.whitehouse.gov/the-press-office/2014/01/28/president-barack-obamas-state-union-address>.
- ⁶ F. William Engdahl, 'Washington's Shale Boom Going Bust', www.journal-neo.org/2014/05/12/washington-s-shale-boom-going-bust, 12 May 2014. See also his, 'The Fracked-up USA Shale Gas Bubble', www.globalresearch.ca/the-fracked-up-shale-gas-bubble/5326504, 31 August 2014.
- ⁷ International Security Advisory Board, US Department of State, *Report on Energy Geopolitics: Challenges and Opportunities*, Washington, D.C., www.state.gov/documents/organisation/229409.pdf, 2 July 2014.
- ⁸ Velichka Milina, 'Energy Security: A Paradigm Shift', *The Quarterly Journal*, Vol. 12, Issue 4, 2013, pp.75–97, www.connection-journal.org/article/energy-security-paradigm-shift.
- ⁹ Clifford Kraus, 'Saudi' America', *New York Times*, 21 April 2014.
- ¹⁰ Clifford Kraus, 'A New American Oil Bonanza', *New York Times*, 28 August 2014.

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- ¹¹ Center for Strategic and International Studies (CSIS), *What Does North America's Energy Boom Mean for Latin America?* 23 April 2014, www.csis.com.
- ¹² Daniel Yergin, 'The Global Impact of US Shale', 8 January 2014. <http://www.project-syndicate.org>; Ben German, 'Manufacturers Go to War with Oil Industry over Gas Exports', 1 October 2013, www.thehill.com/policy/energy.../276585-oil-industry.manufacturers.lock-horns-over-gas-exports.
- ¹³ Stephen P.A. Brown and Mine K. Yuel, 'The Shale Gas and Tight Oil Boom: U.S. States' Economic Gains and Vulnerabilities', A CFR Energy Brief, October 2013, www.cfr.org/united-states/shale-gas-tight-oil-boom-us.../p31568.
- ¹⁴ Daniel Yergin, 'The Global Shakeout from Plunging Oil', *Wall Street Journal*, 30 November 2014, www.wsj.com/articles/daniel-yergin.
- ¹⁵ Among them is the Global Shale Gas Initiative (GSGI) of 2010. Its objective is to partner allies and friends in imparting 'best practices' of 'shale revolution'. Both China and India are partners in GSGI.
- ¹⁶ Daniel Yergin, 'Oil's New World Order', *Washington Post*, Washington, D.C., 28 October 2011.
- ¹⁷ David R. Mares, *Shale Gas in Latin America: Opportunities and Challenges*, Working Paper, July 2013, Washington, D.C., Inter-American Dialogue, www.thedialogue.org/page.cfm?pageID=32&pubID=3349.
- ¹⁸ Quoted in Engdah, n. 6.
- ¹⁹ Daniel Yergin, 'America's New Energy Security', *Wall Street Journal*, 12 December 2011; Angel Gonzalez, 'Making Sense of the U.S. Oil Boom', *Wall Street Journal*, 13 September 2012, www.ihs.com/custom/daniel-yergin-recent-articles See also, editorial comment, *New York Times*, 3 April 2014.
- ²⁰ US import of crude oil and petroleum products fell from 12.9 mbd in 2008 to 9.8 mbd in 2013. The decline is spread to all source regions. The corresponding fall for different regions for 2008 and 2013 reads as follows: North Africa, from 0.7 mbd to 0.2 mbd; West Africa, from 1.8 to 0.6 mbd; Persian Gulf, from 2.3 to 2 mbd; Europe, from 0.9 mbd to 0.5 mbd; and for Russia, it remains constant at 0.5 mbd.
- ²¹ Ed Morse, *Mind the Gulf: What does the North American Energy Revolution Mean for Latin America?* Citicorp, April 2014, www.nyenergyforum.org.
- ²² Martin Lukaes, 'A Worldwide Extreme Energy Boon, Modelled after Canada, is Unleashing Weapons of Mass Ecological Destruction', *Guardian* (London), 16 April 2014.
- ²³ International Security Advisory Board, US Department of State, n.7.
- ²⁴ 'North America's Energy Revolution will have a Ripple Effect around the Pacific', *Economist*, 15 November 2014. www.economist.com/...report/2163798-north-americas-energy-revolution-will-have-ripple-effect-around-pacific-oil-and.

²⁵ The inaugural India-Canada Strategic Dialogue was held in September 2013 in New Delhi, followed by the first India-Canada Ministerial Energy Dialogue in October 2013 in Ottawa, www.hciottawa.ca.

²⁶ Deloitte, *Securing Tomorrow's Energy Today: Policy and Regulations*, February 2013, www.deloitte.com/in.

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