Oil Security and its Impact on India

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Introduction

Oil as a strategic commodity made its mark from the day it was discovered in 1859. We have now become a "Hydrocarbon Society" as Daniel Yergin claims in his book *The Prize*.[1] Climate change, with 97 per cent scientific consensus has, however, jolted the status of oil, which the world had taken for granted. Realisation has now dawned for the need to find an alternative for oil because it is the largest emitter of Greenhouse Gases (GHG). Efforts to replace oil by alternative sources have affected energy planning entailing a relook at the energy strategies of nations. Of particular significance is the consumption of energy by air and sea transportation because there is yet no alternative for aviation jet fuel, and ocean shipping, carrying 80 per cent of world trade, emits 3 per cent of global GHG. In October 2016, 194 countries, including India, signed the Paris Agreement on Climate Change and agreed to make "Nationally Determined Contributions" (NDCs).[2] Reducing the use of crude oil will make countries self-reliant by making do with domestic production. This will shake the world balance of power. The transition to a post fossil fuel age should be smooth, without affecting energy security.

The timeframe is difficult to predict but it is certain that both fossil fuels and alternative fuels will remain alongside for a considerably long

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period, with fossil fuels losing their strategic importance gradually. Alternatively, it would mean that crude oil security would not vanish overnight. Climate change has opened a new window for India to be self-reliant in energy security. It would be prudent for India to revisit its energy policy and fuel policy and adopt a new approach to its energy strategy in order to achieve energy independence. As energy security and climate change are intimately entwined, the topic should be dealt with at the highest level in the government and not by the Ministry of Environment, Forests and Climate Change.

The Strategic Importance of Oil

Throughout history, the pursuit of strategic commodities has been intimately intertwined with national strategies, and global politics and power. Centuries ago, salt enjoyed a monopoly over food preservation, which is basic to life and for living. Thus, securing access to salt shaped national strategies. Once the world found alternatives, salt lost its strategic value. Likewise, the importance of oil, discovered in 1859, kept increasing. It was being perceived as an "environment saviour" because the most malodorous environmental challenge facing the world's big cities then was not slums, sewage or soot: it was horse dung. In 1900, London's estimated 300,000 horses and New York's estimated 100,000 horses pulling carriages, omnibuses, carts and all kinds of vehicles left "swamps of manure in their wake".[3] As Daniel Yergin notes, "The cry that echoed in August 1859 through the narrow valleys of Western Pennsylvania [...] set off a great oil rush that has never ceased in the years since. And thereafter in war and peace, oil would achieve the capacity to make or break nations, and would be decisive in the great political and economic struggles of the twentieth century".[4] Although Sir Halford John Mackinder's "Heartland Theory" [5] was never proved, it certainly did influence strategic thinking. As noted, from a "Mackinderian" perspective, the strategic value of the energy sector is immense.[6]

With the advent of technology based on petroleum, energy security and crude oil security became synonymous. The competition for 'mastery over oil', thus, became critical. Transportation fuel consumption accounted for more than 60 per cent of total oil consumption in 2016.[7] The breakdown in per cent is: road 50.21, aviation 7.43, marine 3.4 and rail/domestic waterways 1.7.[8] Resultantly, oil largely controls the global transportation system, giving those who control it disproportionate power on the world stage. Oil is, thus, the very essence for mobility even today.

Oil is a unique commodity. It made the 20th century the hydrocarbon century, so much so that today, oil and its products actually pervade and surround us. Development, security and growth have become synonymous with oil. Oil has become indispensible to life. As the world started taking oil for granted, climate change sounded a warning note.

Climate Change

The main cause of the current global warming trend is human expansion of the "greenhouse effect", according to the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, 2014[9]—warming that results when the atmosphere traps heat radiating from the Earth toward space. Long-lived gases that remain semi-permanently in the atmosphere and do not respond physically or chemically to changes in temperature are described as "forcing" climate change. Humans have increased atmospheric GHG concentration by more than a third since the Industrial Revolution began. This is the most important long-lived "forcing" of climate change. Hence, there is need to reduce GHG in the atmosphere.

Fossil Fuels and Climate Change

A natural question that comes to mind is: why are fossil fuels being mainly targeted for reducing GHG emissions and help mitigate global

warming? Fossil fuel producers are the main emitters of GHG (mainly carbon dioxide, methane and nitrous oxide). Just 25 fossil fuel producers were responsible for half of global industrial GHG emissions from 1988 to 2015, and 100 active fossil fuel producers have been linked to 71 per cent of industrial GHG emissions since 1988.[10]

The Clash of Epistemology and of Humankind

The reference to the clash of epistemology[11] is because there are naysayers who are denying the existence of climate change and, therefore, working actively against substitution of fossil fuels (e.g. the United States). However, there is a 97 per cent consensus among scientists on global warming and climate change.[12] The effects of climate change include economic loss, changes in atmospheric concentration, and cultural loss.[13] The cultural loss pertains to mankind's "lifestyle" and "quality of life", which is adversely affected due to climate change. There is, thus, a conflict between the proponents of climate change and greenhouse gases, between fossil fuels and renewable resources, and between conservation and exploitation of nature. It is the clash of humankind, the first of its kind.

According to a major survey of opinions on climate change, climate policy and future energy options among over 4,000 people across four countries, completed in 2016, only about one-third of people in Germany, the UK, France and Norway believe that there is a strong scientific consensus on the reality of climate change. The researchers were from the European Perception of Climate Change (EPCC) project.[14] In India, the believers would be much less. As we shall see, international pressure is emerging towards substituting fossil fuels by renewable resources to control global warming.

Effect of Renewable Energy on Energy Strategies

Climate change has entailed development of alternative sources of

renewable energy out of both compulsion and necessity and the need to reduce GHG emissions by burning fossil fuels. On April 01, 2016, 175 parties (174 states and the European Union) signed the Paris Agreement which obligates the signatories to present their national plans to reduce emissions to limit global temperature rise to below 2°C (3.6F) and reduce carbon emissions by almost 60 per cent by 2050. By now, 194 countries have ratified the Paris Agreement. India adopted the United Nations Framework Convention on Climate Change (UNFCCC) at the Conference of Parties (COP-21) in 2015 and made commitments under the NDCs on October 02, 2016. This single act on the part of the 194 countries has affected the basic concept of energy security and, in turn, energy strategy and further national strategies because of the international consensus to substitute oil with alternative sources of energy.

India attaches importance to substituting fossil fuels by alternative sources of energy. This is apparent from the visit of the UN Secretary General Antonio Guterres to India from October 01, 2018 to attend a series of events with a focus on renewable energy. Furthermore, from October 03-05, 2018, India organised the first assembly of the International Solar Alliance, the Second Renewable Energy Ministerial Meeting of the Indian Ocean Rim Association of States (IORA) and the Second Global Reinvest meet and expo.[15]

Air and Sea Transportation

It would be prudent to discuss aviation and marine transportation in a little detail because there is no alternative yet to petroleum in jet aviation and ocean shipping, which moves more than 80 per cent of world trade. Further, both air and sea power are the pillars of security for a nation.

Alternatives have been considered, including nuclear power, hydrogen, and compressed or liquefied natural gas, but not one has proved feasible for aviation. Ethanol and biodiesel blending components are also not suitable for jet aviation.[16] However, research is in progress on Sustainable

Alternative Jet Fuels (SAJF) to characterise a family of drop-in fuels that are intended to lower the net life-cycle carbon emissions of aviation.

Ocean shipping services transport more than 80 per cent of world trade by volume and account for 3 per cent of global greenhouse gas emissions. Oil shipping accounts for nearly a third of global maritime trade.[17] One giant cargo ship emits nearly as much pollution as 50 million cars.[18] Further, world maritime shipping absorbs about 3.4per cent of global oil output. The fuels most commonly considered today are Liquefied Natural Gas (LNG), electricity, biodiesel and methanol, and for the future, are Liquefied Petroleum Gas (LPG), ethanol, Dimethyl Ether (DME), biogas, synthetic fuels, hydrogen, and nuclear fuel.[19] Restrictions on emissions specifically comprise Sulphur Oxide (SO), Volatile Organic Compounds (VOC), Nitrous Oxide (NO) and Ozone Depleting Substances (ODS). Currently, SO is to be reduced to 0.1 per cent from 1 per cent by 2020. However, actual implementation has not commenced, mainly because of the high costs.

Transition of Crude Oil to an Ordinary Commodity

The intention, therefore, clearly is to substitute fossil fuels completely: first oil and then natural gas. The more realistic scenario would be that oil would continue to be used, especially for jet aviation and defence purposes for a considerable period, but countries led by oil importers, would individually attain various stages of substitution in the transition of crude oil into an ordinary commodity by replacing the use of crude oil by renewable and other sources of energy, depending on the advancements in technology. Technology is the key to the transition as it has been in all walks of life, including for external and internal defence and security purposes.

Analogy with Media

The analogy of the print vis-à-vis electronic media would be apt in this

regard. Johannes Gutenberg invented the printing press some time between 1440 and 1450 and it revolutionised book printing. Not unlike Gutenberg's press, the internet has led the Information Age like a locomotive. "[…] Just as printed books nearly eradicated illiteracy, the internet is a portal to a seemingly endless supply of information in digital format."[20] According to Audit Bureau of Circulation data, print publications in India increased average daily circulation of 23.7 million copies from 2006 to 2016. In developed economies such as America, Germany, France, Japan, Australia and Britain, paid print circulation showed yearly drops of up to 12 per cent in some cases.[21] However, as the internet makes strides in rural India, the print media is likely to decline.

Importantly, the print media is no longer the sole repository for opinion making; not even in India because of both the digital news and social media on the internet. A similar situation is likely to arise for crude oil i.e. it will not be eradicated completely but it will no longer be the main driver for energy and certainly not strategically. It is essential to remember that petroleum would still remain in circulation as an ordinary commodity and would still be used, especially for security and defence needs, proving the adage, "The Stone Age did not end for lack of stones".

Timeframe for Transition

Even a guesstimate to predict timeframes to reach the stage when crude oil will lose its tag as a strategic commodity may well turn out to be wild conjecture. This is because there are far too many imponderables such as when unconventional oil will peak or when a crude oil price shock will take place or when oil demand will reach its peak due to the reduction in the use of fossil fuels as a mitigation measure against climate change or a combination of the above factors. Some of these factors are conflicting.

Global demand for crude is likely to "plateau" during the late 2030s, mostly because of the rise of electric cars and trucks, according to British Petroleum's annual outlook published in February 2018.[22] The prediction

is more evidence of a dramatic shift in the appetite for oil.

Importantly, 'technology' may well be the deciding factor if there is a technological breakthrough in finding a replacement for crude oil *per se*. Another critical factor in determining the timeframe is the pressure of public opinion, both international and domestic, because public opinion and pressure can even drive technology, especially in democracies.

In this perspective, it becomes imperative to understand the effect of the above scenario on the national strategies. That is, would it provide an impetus for India to chart an independent course in determining its national strategies in line with its national interest? As witnessed, during times of crisis, none of the Middle Eastern countries stood by India. Once dependence on oil reduces substantially, India would no longer need to play second fiddle to any country, given its oil dependency. This call for deliberations on whether the new geopolitical scenario would change power equations and the current oil importers would emerge as a powerful block. Furthermore, would there be any need for India to worry about Afghanistan and the land route to the Middle East and Central Asia? These relevant queries reflect that there will be a major upheaval in the balance of power.

Crude Oil Security still Relevant

India has drawn up plans to increase renewable power capacity such as solar, wind and other renewable sources to substitute oil. Out of a total of 1, 302, 904 GWh electricity generated as in June 2018, the share of renewable sources was 227, 973 GWh[23]- which equates to 17.5 per cent of the total power.

On the other hand, the share of fossil fuels (oil products and natural gas) in the energy balance[24] for India is still large and increasing. The total Primary Energy Consumption (PEC) for 2016-17 was 540.932 million tonnes oil equivalent (Mtoe). Of which, the share of oil products and natural gas was 235.185 Mtoe, that is, 43.5 per cent. The corresponding

figures for 2015-16 were 519.285 Mtoe and 214.081 Mtoe respectively, that is, 41.2 per cent. Consumption of energy by source is even more revealing to show that dependence on oil is increasing with a marginal increase in the share of natural gas and a marginal decrease in coal, as outlined in Table 1 below.

Table 1: Source-wise Consumption of Energy

Sl. No.	Source	% March 2017	% March 2016
1	Coal	43	45
2	Crude Petroleum	35	34
3	Natural Gas	7	6
4	Electricity *	13	13
5	Lignite	2	2

Source: Ministry of Statistics and Programme Implementation.[25]

Energy Independence

In the current scenario, 'energy security' or 'energy independence' includes 'oil security' or 'oil independence'. Further, 'oil security' is not only about having secure access to oil anymore; it is about how well countries around the world would face the transition of oil from being a strategic commodity to just an ordinary commodity without letting their strategic stance being affected or strength weakened. In other words, alternatives have to be found for oil ensuring that energy independence or energy security is not affected during the transition. Mitigation measures for climate change have given an opportunity to India to attain true energy independence by being self-reliant and not remaining dependent on imports.

The reality is that the US, China, India and other oil importers are engaged in the biggest transfer of wealth in history[26] to the oil exporting countries, thus, providing funds to support countries that may not have their best interests at heart. Hence, India should make do with its own production of oil and develop alternate sources of energy to honour its

global commitment to reduce emissions intensity by 33-35 percent by 2030. This will need intensive research by a committed scientific cadre. India has the talent for this.

Additionally, India should embark on a wide public outreach to ensure social consensus on climate change. The Indian politician does not seem convinced of climate change although more than 97 per cent scientists globally have endorsed it.[27] Unlike the scientific consensus, there is no social consensus in this regard. This is reflected in almost every stance that the elected representatives adopt, such as not encouraging public transport or not preserving rivers, hills and trees. Man-made disasters like in Kerala have become routine in India. These actions send a wrong signal to the public.

Strategic Petroleum Reserves

India requires Strategic Petroleum Reserves (SPRs) to ensure adequate stocks of petroleum during an emergency. SPRs also acts as a hedge against price rise if stocks are adequate. Stoppage of imports in an emergency is a very likely scenario in view of India's experience in both 1965 and 1971 when some members of the Organisation of Petroleum Exporting Countries (OPEC) actively assisted Pakistan and oil imports had stopped.

In Phase I, Indian Strategic Petroleum Reserves Limited constructed underground rock caverns for storage of 5.33 million tonnes (MT) of crude oil: at Visakhapatnam 1.33 MT, at Mangaluru 1.5 MT and at Padur 2.5 MT for 10 days supply of crude oil. The government has approved in June 2018 additional capacity of 6.5 MT SPR facilities at Chandikhol (4 MT) in Odisha, and at Padur (2.5 MT) in Karnataka for an additional 12 days.[28] We are hopeful that proper planning has gone into establishing the quantum of reserves with adequate inputs from the defence Services.

India's Energy Policy

The Draft National Energy Policy (last version as on June 27, 2017)[29] by

NITI Aayog, aims to chart the way forward to meet the government's bold plans in the energy domain: all the census villages are planned to be electrified by 2018, universal electrification is to be achieved with 24x7 electricity by 2022, the share of natural gas in the primary energy basket is to be increased from the current 6.2 per cent to 15 per cent by 2030 and oil imports are to be reduced by 10 per cent from the 2014-15 levels by 2022. Our NDCs, as per the Paris Agreement, are reduction of emissions intensity by 33 per cent – 35 per cent by 2030 over 2005, achieving a 175 GW renewable energy capacity by 2022 from the current 59.555 GW (India's installed capacity as on June 30, 2018, is 71.325 GW), and share of non-fossil fuel based capacity in the electricity mix aimed at above 40 per cent by 2030.

Need for a New NEP

There is no mention in the draft National Energy Policy (NEP) of a national plan for India in terms of the Indian commitment to the Paris Agreement of October 2016. It is essential to have a long-term framework about energy development to include diversifying the energy portfolio, improving energy efficiency, and preparing for changing energy needs due to the obligation to reduce GHG emissions. This would translate into time-bound plans for the substitution of crude oil by renewable resources and other suitable products so that domestic production of oil and natural gas is adequate for critical requirements in an emergency.

National Fuel Policy

The national fuel policy, which evolves from the NEP, should aim at ensuring adequate, secure and affordable fuel supplies to support economic and social development and guarantee strategic and defence needs. It should ensure that transportation fuel contains a minimum volume of renewable fuel. Additionally, it should clearly demarcate the use of each fuel and specify the purpose for which the fuel concerned should be used in the long term, especially with regard to the use of fossil fuels.

New Approach to Energy Strategy

Just as the energy policy of a nation defines its energy strategy, an energy strategy defines the parameters of its energy security. An energy strategy is all-pervasive: it includes economics and politics that concern the citizens, it has external defence implications, and its strategic impact on the internal security of the nation is also immense. It can change the ethos of a people because it influences the very quality of their life. Hence, there is close interweaving of the energy strategy with the foreign and domestic policies.

In the total security and defence strategies of a nation, energy strategy plays a vital role. In fact, ecologically sustainable secure access to energy is a prerequisite for ensuring sound internal and external security. Further, with the advent of climate change, domestic energy policies are not internal concerns alone but are being influenced by global and international pressures to reduce emissions.

There is now even more need for India to change its approach towards an energy strategy. India should quit the old thinking that a national energy strategy is confined to exploiting the country's resource riches; or that a national energy strategy is about promoting specific actions, such as undertaking enhanced oil recovery using the latest technology; or expanding development of renewable energy sources or improving energy efficiency.

India's energy strategy should be a long-term (25 years) one, with an adaptive framework to be prepared at the national level based on which dialogue with stakeholders is essential to decide on energy options and the manner in which the goals set in the NDCs of the Paris Agreement may be achieved. The Government of India should prepare an adaptive framework to make the nation aware of the commitments under the NDCs or the Paris Agreement. Currently, the people at large are unaware of the NDCs. The government should integrate the states and union territories in energy planning centrally under NITI Aayog to finalise 'energy strategy'.

Conclusion

The timeframe for transition away from the fossil age is difficult to predict because of a number of conflicting factors but it is certain that both fossil fuels and alternative fuels will remain in use concurrently for a considerable period, with fossil fuels losing their strategic importance gradually. Looked at another way, it would mean that crude oil security will not vanish overnight and will continue to be an integral part of the energy security of the nation. Mitigation measures that India is to undertake to combat climate change have given a new opportunity to India to attain energy independence for which India should immediately revisit its energy related policies. Considering the strategic repercussions on energy security due to climate change, India should deal with matters pertaining to energy security in the fluid international situation at the highest level in the government. Additionally, as energy security is intimately entwined with climate change, we do not consider the Ministry of Environment, Forests and Climate change as the appropriate ministry to deal with this topic.

Notes

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5. See, Matt Rosenberg, "What Is Mackinder's Heartland Theory?", September 10, 2018, at https://www.thoughtco.com/what-is-mackinders-heartland-theory-4068393
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8. Ibid.
9. IPCC (Intergovernmental Panel on Climate Change), "Fifth Assessment Report (AR5)", at http://www.ipcc.ch/report/ar5/

10. Cited at https://www.cdp.net/en/articles/media/new-report-shows-just-100-companies-are-source-of-over-70-of-emissions
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15. See, 2nd GLOBAL RE-INVEST, at https://re-invest.in/.
16. See, "Sustainable Alternative Jet Fuels", at https://www.nap.edu/read/23490/chapter/8#74.
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