Accessing Energy Security of BRICs Nations for Strategic Partnership

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Abstract— **Availability of the energy is crucial for the sustenance of any country. The energy available at a countries disposal is dependent on a lot of factors such as the geographical location, technology and resources available for the energy extraction, Government policies, international alliances, military might etc. Developed countries, already having an energy intensive lifestyle are supposedly shifting to greener ways whereas in the new emerging world the people have an aspiration to lead an energy rich materialistic lifestyle. Within this chaos, the security of the bare minimum energy needed for the survival of every individual is at stake. A small crisis due to political, environmental or military may put the population of that nation in jeopardy. Thus Energy security is essential for countries sustenance and securing energy through strategic ties with likeminded countries becomes crucial. This paper tries to highlight the energy requirement and potential of the emerging economies and also tries to identify the challenges posing them. The paper discusses the opportunity for strategic partnership, for energy, within the BRIC Nations and suggests interventions and policies to increase the collective energy security (pertaining to certain sectors) of these nations.**

I. INTRODUCTION

Energy availability is the crux for the functioning of all the activities in the world. Every activity performed by man for his survival needs energy of some sort. In the modernized world securing energy sources becomes as crucial as securing the natural resources. As of now we are heavily reliant on the non-renewable sources of energy. These non-renewable sources of energy (predominantly Crude Oil and Coal) are locked within the reach of particular nations who call the shots. This means that the current energy sources to the entire world is controlled, and has been in control by economic and military super-powers, all of which are trying to secure the energy sources for themselves. But times are changing fast and with the approaching economic power migration from the west to the east, energy security becomes important to these emerging economic contenders whom we call "New Eastern World".

In the post-colonial world we tried to make things more convenient and life more luxurious. For this capitalistic natural resource consumption, we had resorted to most interesting phenomenon of transforming one type of energy to another. E.g., to produce one unit of energy from the food, we use almost tenfold of energy to produce it in terms of production, processing, packaging, transportation etc. This habit makes us highly dependent on energy and makes our activities more energy intensive.

The world economy is at crossroads. The burgeoning population and the underlying ambition for economic development by the east have resulted in the shift of economies worldwide. A shift or a change in diction of the economic functioning of the world is approaching. These countries of the "New Eastern world" are dynamically changing and modifying their economies. This will have serious implications on a host of things. Most importantly it shall have a profound impact on the energy consumption and energy sourcing of these countries. At the national level, level of technological advancements is more or less equally distributed among all the new energy consuming nations. This means that it is safe to assume that with the passage of time, per-capita energy consumption shall be more or less equal in these countries. If we look form the perspective of development, it can be seen as progress but from the point of view of energy security this poses a huge risk due to their increased energy dependency.

With more people depending on increased energy levels, the population becomes more vulnerable. Thus emerges the question of energy security. The problem of energy security could be solved by two approaches. One is to increase the energy security by exploration of options within the country, which is a concrete measure to curb the crisis. And the other is to depend on the rest of the world for energy security. But this means that the involved countries need to have better international understanding, partnership and policies in place which shall ensure the security.

II. ENERGY SECURITY AND ITS VARIOUS MEANINGS

Energy security is an umbrella phrase. It covers many issues; it is governed by many factors and means different things to different countries. While we try to define the phrase, we should first understand the factors that affect energy security. In a seminar recently conducted by the Near East South Asia Center for strategic studies at Rome, many speakers talked about energy security expressing their views on the subject. The counties in the world can generally be divided into 1) Countries which have huge reserves of oil, which they export 2) Countries which are developed and have enough money to import oil from these oil producing countries 3)

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Countries which neither have the reserves nor the money. Based on these characteristics of the world countries, energy security is defined in different ways.

Broadly speaking, affordability, durability of supply, diversification of source, environmental acceptability, sufficiency relative to demand, relationship among nations, morality of energy consumption and energy efficiency in countries are some of the factors that needs to kept in mind while defining energy security.

Thus, Energy Security is the ability of any country to provide affordable, clean and sustainable energy to its population. Whereas, according the Integrated Energy Policy 2006, energy security is defined as follows-

"We are energy secure when we can supply lifeline energy to all our citizens irrespective of their ability to pay for it as well as meet their effective demand for safe and convenient energy to satisfy their various needs at competitive prices, at all times and with a prescribed confidence level considering shocks and disruptions that can be reasonably expected." (1)

III. WHAT IS BRICS &WHY BRICS?

Two of the world's largest countries in terms of population, India and China shall be the countries that should be considering energy security very seriously. These two countries represent 36.2% of the total world population (2). India is country with a very ambitious economic development agenda but faces huge problems due to non-inclusive development and lack of major crude oil reserves. China is a different story with its increasing skilled labour population and considerably high concentration of proven non-renewable reserves. India has certain advantages due to its high adoption of English language which has led to IT industry concentration and it also has a massive share of younger population. China on the other hand has the advantages of highly skilled labour and well organized small economic machineries which shall ensure its economic stability. Thus, it is evident that every country of this New Eastern World has its own challenges and opportunities. In 2001, looking at the trends of rapid growth and economic development the term BRIC was coined by a British economist. It refers to the four major rapidly growing players namely Brazil, Russia, India and China. This acronym became increasingly widespread due to their similarities in the style of economic development and growth. Also due to their shared "fate", the idea of strategic and technological cooperation and between these countries was seen with increasing importance.

Today the BRIC countries have been joined by South Africa forming BRICs. These new powerhouses have pledged to actively support each other in all possible ways to create a strong political, economic, technological partnership. The possibility of a strategic partnership in energy and sustainable development is high within these countries. These countries need to strongly consider the opportunity for sharing energy resources and foster for an overall strategic partnership for increasing each other's energy security.

IV. FOSSIL FUELS – OIL.

Fossil fuel is an important factor in deciding the energy security of the nation. The BRICs Nations have set up their state oil companies or NOC (National Oil Companies). These companies have roles to fulfill such as equitable distribution for energy security and are not profit oriented. The BRIC nations can be divided into two main categories –Producers (Russia and Brazil) and consumers (India and China) of oil. India and China are among the top five consumers of Oil in the world.

Russia has always had a large share of Oil reserves and tops the list among the BRICs Nations. Recent discoveries of oil reserves in Brazil could change the oil scenario for the country and it could become one of the largest exporters of oil within the coming decade. China is hunting for new reserves and is constantly increasing its reach within the international Oil companies. It is trying to increase its overseas assets and to include them within its supply chain. India is heavily dependent on imported oil. India strategy is to invest heavily on technology, refining and increasing the diversification of oil sources. But the Oil reserves of India are relatively low in comparison with its other BRIC counterparts. Thus, India needs to rapidly engage itself in increasing its energy security by other means. This could be through increasing the share of renewables, investing in infrastructure such as pipelines to source oil from other countries, change in policies for buying and selling of oil etc.

Renewable energy in BRICs nations
Present scenario and future trends

Brazil

Contribution of renewable energy to the total electricity generation is as high as 89%, of which 83.2% is hydro sector's contribution. In addition to the present capacity, the potential for future is also quite high (140GW). The growth story in wind sector also has been hopeful where the installed capacity has increased from a mere 22MW in 2000 to 1261 MW by 2010. Also, Brazil is situated at one of the sunniest regions of the Earth with an average solar radiation of 6000 Wh/m2 making it hotspot for solar PV development.

Russia

Unlike Brazil the major constitute of electricity generation in Russia are conventional sources with a renewable energy share of 18%, of which hydroelectricity takes the major share.

The potential of renewable energy in Russia is very high but hasn't been tapped due its technological downturn and the dominance of natural gas.

India

Country wise renewable energy share in electricity generation amounts to approximately 14%, with hydro contributing 11.9%. It already has over 17 GW of installed renewable power generating capacity, (including only small hydros) out of which the major share is of wind energy,

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V. COMPARING BRICS AND G6 NATIONS FOR OIL

Table 1: General data table on oil of BRIC countries

Country	Population (Million)	GDP (Billion dollars)	GDP annual growth	Proven oil reserves (Thousand Million dollars)	Crude oil production (Million barrels daily)	Crude oil consumption (Million barrels daily)	Crude exports (Thousand barrels daily)
Brazil	196.7	2476.70	2.7%	15.05	2.19	2.65	556.61
Russia	141.9	1857.79	4.3%	88.18	10.28	2.96	5786.3
India	1241.4	1857.77	6.9%	5.70	0.86	3.47	1.47
China	1344.1	7298.10	9.1%	14.71	4.09	9.76	30.00
USA	311.6	15094.00	1.7%	30.87	7.84	18.84	21.00

Source: World Bank; BP Statistical Review of World Energy, June 2012

Table 2: Table Explaining the Status of Oil in BRIC

Oil Reserves	BRICs nations better off than G6 Nations
Oil production	BRICs Nation better off than G6 Nations
Oil consumption	G6 nations better off than BRICs Nations
Refining capacities	G6 nations better off than BRICs Nations

Source: Deloitte-If not BRICs then what? 2011.

Table 3: Table Ranking The Energy Security Of Bric Due To The Factors Mentioned.

	Import percentage %	Proven Oil Reserves %	Oil Consumption %	Energy security Rank -BRIC
India	75.21	4.61	18.41	4 (Low)
China	58.09	11.89	51.80	3
Brazil	17.35	12.17	14.06	2
Russia	-247.29	71.31	15.71	1 (High)

Source: Author.

There are plans to increase the wind generation upto 89 GW by 2020. The Jawaharlal Nehru National solar mission plans to have a total solar grid capacity of 20GW by 2022.

China

The renewable energy scene in china is somewhat similar to that of Russia with a total renewable energy share of 17.5% of which is mostly contributed by the hydro sector. China also has mostly failed to tap its renewable potential. Government plans to increase the total solar capacity to 1.8 GW by 2020 and the total wind capacity to 30 GW by 2020.

South Africa

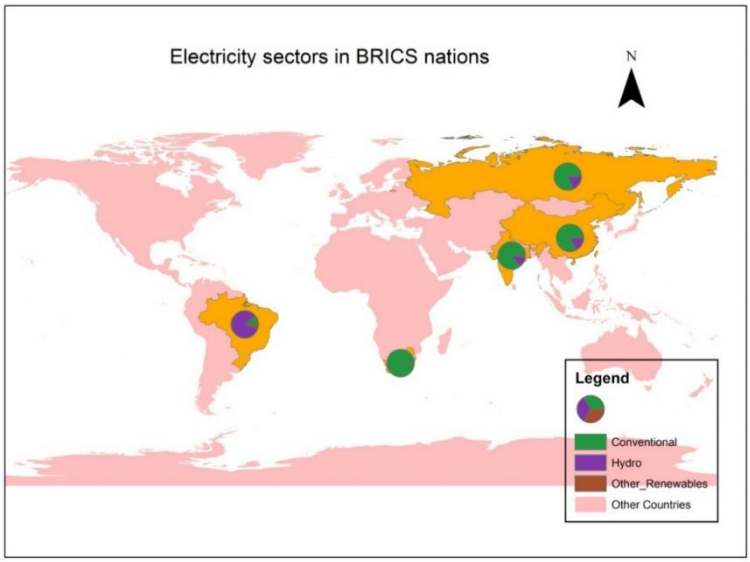
The level of implication of projects in the renewable energy sector has been below par and Government of South Africa is planning to increase its investments and thus increase the renewable energy share, which stands at a very low 1.83% of the total electricity sector.

According to a renewable energy attractiveness study done by Ernst & Young, 2012, the renewable energy indices were found out for various countries. In the charts below, we have compared these indices (solar index, wind index and regulatory infrastructure index) of the BRICS nations (data was only available for Brazil, India and China) with the indices of USA.

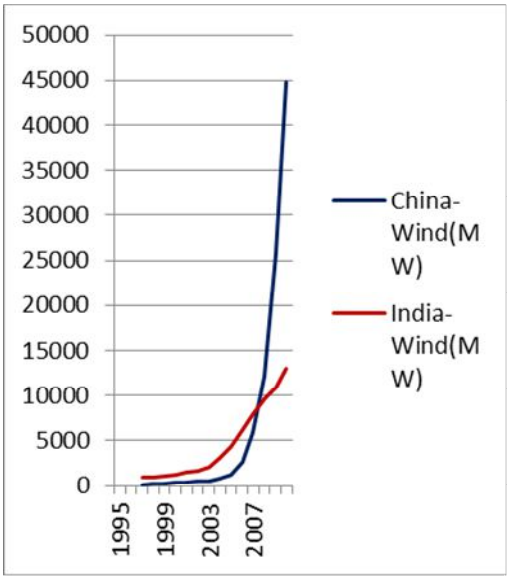
The indices were comparable to the indices of USA, some even larger which, along with the tremendous growth story are proves of the fact that if properly tapped the renewable energy sources can be considered as one of the options in solving the problem of energy security.

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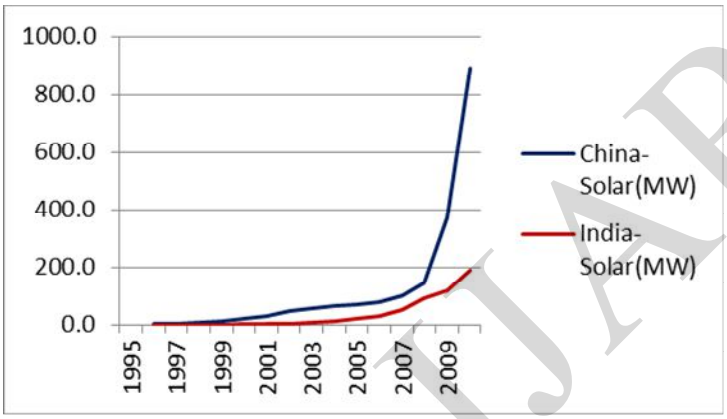
VI. RISKS IN RENEWABLE ENERGY GENERATION AND ITS MITIGATION



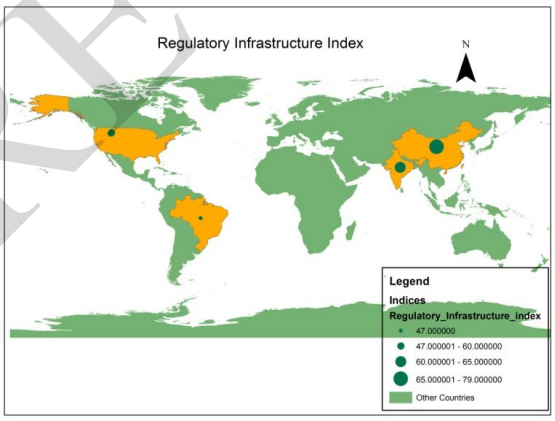
Electricity sectors in BRICS nations
The figure shows the share of electricity of various sectors. Below the graph shows the growth in solar and the wind sector in India and China from 1997 to 2010.
Source: Author



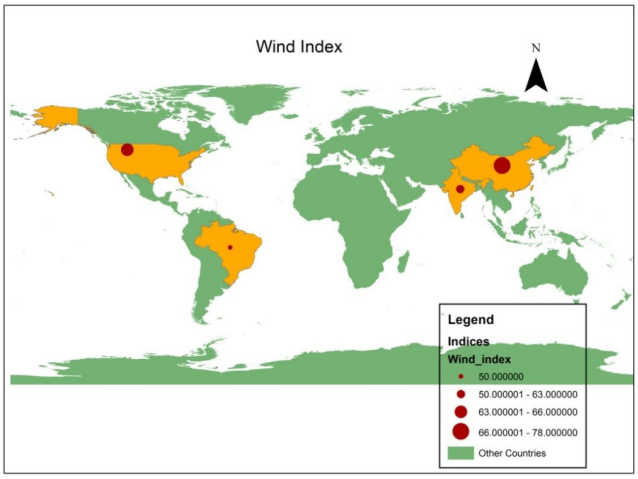
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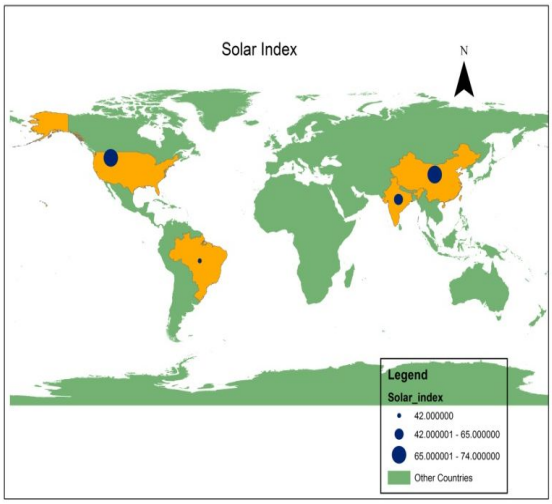
Source: Author



Regulatory Infrastructure Index and wind index (Investment attractiveness and potential index), BRICS and USA
Source: Author



Regulatory Infrastructure Index and wind index (Investment attractiveness and potential index), BRICS and USA
Source: Author



Solar index (Investment attractiveness and potential index), BRICS and USA
Source: Author.

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Now we know that the BRICS nations have the potential in the renewable sector to make it big, Petko Karamotchev once called the renewable energy market in Russia, a giant to be awakened. However, the question we need to ask is how pragmatic is this alignment? Are we over estimating our prospects as an alliance? What are the risks involved if BRICS countries plan to align themselves in the renewable energy sector? And if they do align and collaborate, how can they mitigate the potential risks and work towards a common goal. In this section, we have tried to find out the potential risks and have suggested certain measures using which the risks can minimized.

To sustain their impressive economic growth both China and India are building huge hydroelectric dams on Brahmaputra or Tsang Po, as it is known in China. India happens to be on the downstream and China's tapping would directly affect India's capacity. Also, projects in Brazil have been delayed due to liquidity crunch; the local capital market has become weak whereas the Russian oil dependent market is very vulnerable to the fluctuations. Indian states are also debt ridden and may not be in a position to sponsor all the upcoming projects on its own. Land acquisitions still remain a major problem in India. South Africa faces an acute shortage of skilled workforces across sectors and widespread illiteracy if we consider economist intelligence unit's analysis of risks of doing business in world countries then it rates the BRIC countries poorly, far below USA and OECD nations.

The Geopolitical issues have to be solved through repetitive discussions and coming to a solution which adheres to the issues and concerns of all parties involved. However, the need of the hour seems to be to take care of the financial issues, which along with the global economic crisis are a major cause of concern. BRICS nations are keen to capitalize on renewable energy, World Bank's clean technology fund was planning to invest US$85mn in renewable energy and co-generation projects in South Africa[]. The nations can look for innovative ways to finance these projects. PPP models are common in all the five nations [] and its extension with some minor modifications can prove to be a useful tool for project implementation in BRICS nations.

BRICS nations can come together and implement projects making cross-country joint ventures. This will cater to both financing and technology transfer between countries. China is one of the highest manufacturers of solar PVs in the world; even the technology in Russia is quite advanced. Signing beneficial deals with other BRICS nations will serve the common good of alignment.

VII. KEY SUGGESTIONS FOR IMPROVING STRATEGIC PARTNERSHIP

Mathew Hulbert once wrote its energy that will make or break the BRICs. The future of this alliance is dependent on how they will play out their energy interests. All five nations have different interests when it comes to energy and catering to everyone's interest becomes crucial. The key suggestions in the energy sector focuses on fostering a favorable environment for energy trade within the BRICs nations. The following key recommendations are formulated in a view to promote strategic partnership in energy between the BRICs nations in order to increase the collective Energy security of BRICs

- Common integrated energy policy: The BRICs nations could consider having a common policy for the trading and transfer of energy into its counterparts through MOUs and joint ventures. It could also formulate a plan for the development of these policies over a period of time. The integrated plan shall also ensure proper policies are in place regulating the energy supply within the BRICs nations during the time of crisis
- Technology transfer: Technology is an important sector which shall play a vital role among the BRICs. The transfer of essential technologies pertaining to the renewable energy sector and newer technologies for cleaner and efficient production and consumption is required between the BRICs. This technology transfer shall ensure that there is uniform distribution of scientific knowledge and technological knowhow among the BRICs, which is essential to overcome energy security issues.
- Curbing cross border issues: Three of the five BRICs players share a large extent of border with their BRICs counterparts. Historically there have been conflicts between these nations for natural resources. But with a comprehensive strategic plan in place these countries should solve the issues and work towards harnessing the untapped potential for trans-border energy transfer. This could reduce energy transmission issues, increase efficiency and add to the existing energy potential of the place. One example of such an issue is the Indo-China debate on the use of Brahmaputra river water. Such issues should be dealt strategically which shall lead to a more stable energy scenario within the BRICs
- Market stabilization and market flexibility: The goods produced within the BRICs nations could be exchanged at a more stabilized and flexible market where one supports the other for mutual benefit.
- Economic cooperation for energy security: Economic cooperation is highly essential. The well off countries, Russia and china could help the others by actively investing in the relatively struggling counties, India and Brazil especially in the energy sector.
- Strategic partnership in storage and transportation: Strategic Planning of storage and transportation of energy sources based on the usage and proximity of users, could greatly add to the energy security.
- United strong political will and military cohesion for energy security: Ultimately if there a good unity and a strong political and military cohesion between the BRICs, then this shall lead to the BRICs safeguarding

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their rights of the member countries against external threats. This ensures security in protecting the energy and natural resources of the country

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