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CHANGING ENERGY GEOPOLITICS: WHAT IS THE ROLE OF SUSTAINABILITY IN THE GLOBAL ENERGY GEOPOLITICS?

Maria Cândida Arrais de Miranda Mousinho[1]
Ednildo Andrade Torres[2]
Silvio Alexandre Beisl Vieira de Melo[3]
Nanda Kumar Janardhanan [4]

Introduction

The capacity of the State to plan and control the generation and the use of energy influences its competency to transform energy resources into wealth and power. This is so because energy routes define global political relations and energy is essential for the means of production regardless of which political and economic system they are linked to. Therefore, the understanding of the control of the geographical space[5] with important energy

1 Master's Degree in Regional Analysis from the University of Salvador. Participant in the course "International Futures" at the Diplomat Training Academy in Berlin. Fellow of the United Nations University in a project on energy and governance. Expertise in energy, environment, governance, international relations, tourism and education.E-mail: mcadmm@yahoo.com.br.

2 Postdoctoral Degree from Florida A & M University – College of Engineering, Florida State University. Coordinator of the Energy and Gas Laboratory (LEN) of the UFBA Polytechnic School (Federal University of Bahia). E-mail: ednildo@ufba.br.

3 Associate Professor at the Federal University of Bahia. Professor of the Graduate Program (Master's and Doctoral Degree) in Industrial Engineering and of the Doctorate Program in Energy and Environment. E-mail: sabvm@ufba.br.

4 Professor of the Energy Studies Programme of Jawarhalal Nehru University, expert on energy and climate policy. Member of the Teaching and Advisory Board of Strathclyde University (Scotland). Adjunct Fellow of the Institute of Chinese Studies (New Delhi). Fellow-IGES (Japan). Formerly a Fellow with MIT's 'Climate CoLab', has taught in reputable universities and worked with policy think tanks in India and abroad.

5 Geographical space is understood in this paper as more than a simple physical area of the

resources – and more precisely of the control of these resources – becomes the basis for a proper interpretation of the positioning of the countries and of their political, economic, social and environmental development.

For this reason, the understanding of geopolitics and of its representation in the energy field is essential to make evident the importance of energy in the international arena and also to interpret how countries have positioned themselves. After all, geopolitics has moved beyond the conception that linked it exclusively to physical space, and renewable energy too has emerged in the global scene. From the conventional energy geopolitics the debate has been reshaping to energy - environment the page where greater attention have been given to sustainable energy development and equitable access to energy by all sections of human civilization from across the world. The policy attention that has emerged following the climate change debate also need to be highlighted here as one of the factors that is catalysing the shift from conventional energy of politics to a new political interactions and engagement between the stakeholders of global energy market.

This paper aims to contribute to the discussion about the transition from the geopolitics based on the physical space to the geopolitics based on sustainability, in which renewable energy has consolidated an important role in the international arena: that there has been a changing debate in the energy security and energy geopolitics worldwide. The text is divided into six sections in addition to the Introduction and the Concluding Remarks. The first section makes a review of the literature on geopolitics regarding its traditional theoretical approaches. The second section addresses the relationship between conventional energy, geopolitics and energy security. The third section highlights the debate on energy security related to the accessibility and affordability energy resources. The following sections contextualize renewable energy in the geopolitics transition fomenting reflection on energy cooperation. The fifth part, before the Concluding Remarks, section brings "new geopolitics" underlined China and India in the context of competitiveness.

Theoretical perception: observing the traditional behind the new horizon

The term *geopolitics* was coined in the nineteenth century by Rudolf Kjellén, who defined it as an analysis of the State as a homesteader and a geo-

globe. Considering society and nature as dynamic, this paper sees geographical space as continuing socio-spatial relations. According to Henri Lefebvre (1991), these relations are characterized as economic, political and symbolic-cultural.

graphical space controller with life form based on political, economic and geographical elements (Kjellen 1916; Braga 2011). This term brings in its meaning the strict relationship between geography and politics and points to a set of strategies used by a State or territory in order to manage itself in a manner consistent with their goals. For this reason, Oliveira (2012) sees geopolitics as a transdisciplinary field of knowledge, which encompasses issues related to the use of natural resources, to the use and acquisition of geographical space, and to the attainment of political power.

By using the biological metaphor of the State as a territorial body, Kjellén revealed that he based his considerations about geopolitical issues on Friedrich Ratzel (Vicens-Vives 1956). The comparison with a biological organism is due to the fact that the State has the function of connecting its people to its territory through policies to achieve a certain goal, which is related to the expansion, organization or protection of the State. Hence, the comparison of the State with a biological organism in which everything is interconnected. Paul Claval (1994) notes that this the organicistic image led Ratzel to give great importance to the political idea.

Implicit to Kjellén vision is the idea of nation beyond the border limits of its territory, which implies the imperialist conception inherent to the conquest of territories. Costa (1992) emphasizes Kjellén's reductionist and expansionist view of the State, because the goal of his "new science", *i.e.*, geopolitics, was directed to the Major States, central European empires, particularly Germany, which, in Kjellén's opinion, should be transformed into "scientific academies" once the war situations were ideal for the analysis of geopolitical phenomena. Kjellén showed his wish to see Europe unified into a huge German empire. Hence, the success of his ideas in the circles of power characterized by the European fascist regime as well as in the military circles in the third world that had included the theme of geopolitics in the curriculum of its courses producing various geopolitical studies (Costa 1992). That interpretation about geopolitics brings the view of the overseas nation, the nation beyond the border limits of its territory, which refers to the imperialist view inherent to the conquest of territories.

The discussions raised by Ratzel's and Kjellén's ideas promoted the approximation of the academic, military and political worlds in the debates about geopolitics. Such discussions found echoes in two classical theories that underlie the study of this theme: the sea power theory proposed by American Navy Officer Alfred Thayer Mahan (1890) and the Heartland theory proposed by British geographer Halford Mackinder (1904). These two theories are the basis of contemporary geopolitical dialogues (Costa 1992; Braga 2011; Vesentini 2000; Oliveira 2012; Mahan 1965; Mackinder 1904).

The sea power theory was proposed by Alfred Mahan in 1840 and was based on the idea that a nation established as a naval power would rule the world. This theory is recognized as a precursor of contemporary geopolitical theories. It showed an innovative aspect: the integrated conception of all activities related to the sea, not limited to isolated trade analyses or isolated analyses of naval power. Mahan considered marine waters as a peculiar socio-political space linked to the land through internal communication ports and waterways (Costa 1992 *apud* Mahan 1965).

According to Mahan (1965), the maritime power of a State should be focused on three essential elements if it wished to become a world hegemonic power: production, which arose from the need of trade; navigation, which made trade possible; and colonies, which facilitated the logistics of navigation. Mahan emphasized some key conditions to define the maritime power of a State: its geographical position; the length of its coastline; the characteristics of its ports; and its territorial extension.

Mahan was a kind of a prophet of imperialism because, ten years after the publication of his book, the United States won the war against Spain in 1898 and extended its domination over Central America and the Caribbean, starting its maritime expansion. In 1914, the Panama Canal opened and consolidated the American expansion. In 1916, the Navy Act[6] confirmed his thesis on sea power and consolidated the United States claim as a hegemonic world power (Costa 1992).

The Heartland land power theory, proposed by Halford Mackinder in 1904, defended the idea that, for a State to become a hegemonic power, it was fundamental that it had control of the land power or, more precisely, that it rule a particular geographical area called pivot area (Mackinder 1904; 1942). According to Braga (2011), Mackinder called into question the sea power theory when he came up with the concept of pivot area, a strategy in the politics of power of the nations. The pivot area, called Heartland, was located in the Eurasian region and it was a large territorial space with natural and energy resources; Mackinder advocated the idea that geopolitics should be understood in face of the struggle between the pivot area and the areas surrounding it (Mackinder 1942; Mello 1999).

The second concept of Heartland theory was the Midland Ocean (which could be translated as 'North Atlantic'). It brings the integrated perception of sea and river basins, in which there would be three essential elements: a beach head located in France, a moat protected airfield in England and a re-

6 The *Navy Act* was a federal law sanctioned by U.S. President Woodrow Wilson in order to transform the American Navy into the best of the world in a ten-year period.

serve of agricultural and industrial resources in the United States and Canada (Mello 1999; Mackinder 1942). In this line of thought, geopolitics is based on the view that these four States are the holders of power or of the center of global decisions, which is a vertical and static view of the world order, not yet globalized.

For Aymeric Chauprade (2001), the idea of centrality in the theory proposed by Mackinder is the result of historical events. After all, technological progress, which increased the access to roads and the exploitation of energy resources, demonstrated the strategic superiority of land over sea. However, apart from the discussion about the superiority of land over sea and vice versa, Mackinder's theory sees the pivot area as a dynamic territory once society and economy provokes its transformation. On the other hand, it can also be inferred that this dynamic centrality would be related to the Heartland and to the nations that control it, which together have the decision power in the world. This gives the impression that other areas, other tangential territories, would always be subjugated to this condition, not bringing up, over time, elements that promote the balance in relation to the world power, as can be currently seen with the role played by the so-called emerging countries in the world.

According to Braga (2011), Mackinder's theory remained present in the discussions in the twentieth century and several suggestions from this theory were essential in decisions with historical impacts. For example, the union between Germany and the Soviet Union should be prevented so that the Anglo-American power could be strengthened. From that idea derived the creation of various States, such as Poland, Czechoslovakia, Hungary and Greece, all originated form dismembered territories from the Russian, German, Austrian and Turkish empires. Moreover, in the interwar period, Mackinder predicted the world bipolar order.

The Heartland land power theory remains timeless in discussions on geopolitics, since Mackinder was the pioneer of a line of geopolitical thinking important for understanding the current world. Three of his formulations are particularly relevant: (a) the world as a closed system; (b) the historical and geographical overview of the permanent struggle between the maritime powers; (c) the geostrategic concepts that resulted in the North American containment policy and in the military alliances of the United States in the present (Braga 2011; Mackinder 1942).

The two classical mainstreams theories of geopolitics have guided significant political decisions made by the major powers throughout the twentieth century. The sea power theory has contributed, for example, to the United States' becoming the world leader maritime power: it has approximately 800

military bases scattered around the world in 63 countries (Global Research 2015). The Heartland theory led the British to join Russia against Germany in the conflicts of the First and Second World Wars and led to the formation of various States in the European continent. In addition, other theoretical approaches have emerged from the discussions raised by these two theories, such as the geopolitics of airpower, the geopolitics of nuclear power, and the geopolitics of cyber power.

These theories express concern for not only the National State and its strengthening, but also for the development of strategies in which the State is the center of power and of analysis and in which the emphasis is placed upon the military power. According to Oliveira (2012), new generations of authors have updated or adapted many classical approaches both in the field of geopolitics of Heartland theory and in the field of sea power, highlighting the interdisciplinary nature of geopolitics. If, in the beginning of geopolitical studies, military officers and geographers stood out, modern studies of geopolitics have given historians, economists and political and social scientists a prominent position.

Currently, and particularly due to globalization, geopolitics has taken on a broader scope by expanding its spectrum of analysis. According to Becker (2005), geopolitics is characterized by mild interventions and even by wars, as far as the conquest of territories is concerned. In this sense, the State used to be the central figure of geopolitics since it was considered the only source of power, the only political representation. However, in the present day, geopolitics operates mainly through the power to influence the decision making of States on the use of the territory due to the fact that the conquest of territories and colonies has become very expensive (Becker 2005).

The importance of the State began to be relativized in the global political scene due to the emergence of other players. International organizations, regional trade blocks, non-governmental organizations, financial institutions and multinational and transnational companies have to be taken into consideration in global geopolitical analyses as they directly influence the decision-making process between States. Furthermore, some fields of knowledge have gotten such relevance in the understanding of the relationship between power and geographical space that it would not be possible to tackle geopolitics without addressing issues of sustainable development, global warming, immigration, vulnerability, resilience, financial markets and, of course, energy, a theme historically related to geopolitics, a relationship which is addressed in the next section.

Conventional energy and geopolitics: a timeless and challenging relation

Energy has always been part of the geopolitical discourse directly or indirectly since controlling energy resources involves the conquest of territories and societies, i.e., once it involves geographical space. In geopolitical classical theories, energy played a central role: Mahan stressed the importance of the consolidation of steam and petroleum when he analyzed the historical development of naval power; Mackinder stressed the value of a region rich in resources such as wood, coal and oil when he proposed his Heartland theory (Oliveira 2012; Mahan 1965; Mackinder 1949).

Energy and geopolitics have always walked conjointly and certainly there has never been a historical moment in which energy was not viewed from a strategic point of view. Not surprisingly, the concept of energy geopolitics arose, which can be defined as according to Oliveira (2012) as "analysis of the geopolitical and strategic elements that influence the exploration, infrastructure, transport and end-use of energy resources".

The issue of location is inherent to the geopolitics and, of course, to the geopolitics of energy. According to Melvin Conant and Fern Gold (1981), energy geopolitics, in addition to highlighting the importance of location factors in the relations between States (including issues of access to raw materials), considers the geographical factors and the position that countries occupy in the international scenario determinant to governmental policies. To these authors, the reserves of energy sources, the processing of these sources, the supply chain, the new discoveries of energy resources, increasing energy consumption, and research and technology are also important factors in the geopolitics of energy. This is evidenced by the fact that the primary sources of energy are transformed and transported and only after that properly used.

A central issue for the geopolitics of energy is energy security (Kalicki and Goldwyn 2005; Klare 2008; Yergin 2006). It can be defined as the situation in which a nation or region are in terms of "energy availability sufficient to maintain reasonable rates of economic growth and development, maintaining or preferably gradually improving the living conditions of the population" (Oliveira 2012).

Energy security is therefore closely related both to the structural composition of the society and to the conservation and support of the political organization of a State. The development of a State is guided by the control of energy resources, and consequently and preferably, of the technologies linked to them in the process of extraction and production of energy. That is why, for

example, the hegemonic States see the control of production, distribution and use of oil as a strategic priority.

If coal played an important role in the Industrial Revolution and in the capital accumulation process in the nineteenth century and the first decades of the twentieth century, oil became the driving force of the capitalist accumulation process in contemporary society. Not surprisingly, the discussions linked to the oil crises were responsible for calling the attention of the world to the geopolitics of energy. For Goldemberg (2014), the oil supply problem is geopolitical, because generally oil is not consumed in the countries where it is produced once half of the world production is sold.

However, the issue of energy security should not be restricted to the oil issue, although it is increasingly influenced by the discrepancy between the amount of resources and the increasing demand for energy in the coming decades. The discussions on energy security cover a range of subjects, including terrorism, growth and economic development, geopolitical instability and rivalry, and the relations countries have with one another.

Growth in developing countries is a factor that undoubtedly contributes to increasing concerns about energy security. It causes uncertainties related to the use of energy resources both for the emerging countries, which require more energy to feed its accumulation process, and for the other countries because of the higher pressure placed by a tough competition for energy resources.

According to the International Energy Agency (IEA), the center of gravity of energy demand is shifting towards emerging economies. For Russia, the objective of energy security lies in guaranteeing the control that the government has over energy resources and in controlling the main channels and the main pipelines market. For China and India, the ability to adapt to their dependence on the world markets and on self-sufficiency commitments is of great importance as far as energy security is concerned. Brazil seeks to adapt to the challenges in the international arena and to deal with an energy matrix based on hydroelectricity. Furthermore, Brazil has to deal with the possibility of becoming a world leader in the production of energy by the recent pre-salt discovery, which, according to the IEA (2013), requires a complex capital-intensive extraction process, with investment levels higher than those in the Middle East and in Russia.

After oil, coal and gas are the two most used energy sources and, thus, are also part of the discussions on geopolitics and energy security. Coal is the most used fuel in developing countries with the exception of Brazil (Sampaio and Freitas 2013). According to the IEA, although the use of this fuel tends to decrease in the OECD countries, its global demand will be 17 % higher in

2035. One third of this increase will come from countries outside the OECD, and India, Indonesia and China will account for 90 % of the growth of coal production (IEA 2013).

As for natural gas, the largest growth in its demand will come from emerging markets, especially China, where the use of gas will quadruple in 2035, and the Middle East. Gas will become the main fuel of the energy matrix of the OECD countries, supported by the new regulations in the United States. Differently from what will happen to oil, gas production will substantially increase throughout the world, except Europe. The need for gas import will increase in parts of Asia and Europe. And the greater uncertainty, outside of North America, is whether gas can be made available at attractive prices for consumers while there still are incentives for investments in the field of gas supply. This is a matter of domestic legislation in many countries emerging from non-OECD markets, including India and the Middle East and a concern in the context of international trade. Security issues of future gas supplies will be partially solved thanks to the growing number of international suppliers (IEA 2013).

The fact that coal, oil and natural gas are relatively finite resources grants the States and the energy companies important power (Freitas 2013). Moreover, the articulation of productive elements to generate resources causes tension between the nations that compete for them or need them. Geopolitics presents some challenges, such as the multiplicity of issues that have become part of its context of analysis, the emergence of other players different from the State that have become part of its analysis, the continuous increase in energy demand in the face of traditional resources that will eventually end. These challenges, as Daniel Yergin (2006) notes when referring to oil, will provoke anxiety attacks in the market, in the State and in the society. In this sense, it is not possible to address the geopolitics of energy without considering all the variables that influence its analysis. It is necessary to take into account the broader concept of energy security including the protection of the entire chain of supply of energy and infrastructure in order to increase energy security (Yergin 2006). In this context, countries need to seek strategies to help them increase energy security.

According to Oliveira (2012), there are three strategies that the States should adopt regarding energy security. The first is energy self-sufficiency, because the need to import energy is a fact, particularly between the major world powers. This strategy can be implemented through the diversification of energy sources. Thus, problems with a particular source, such as shortage effects, could be avoided. It is important to note that the diversification of the matrix cannot reduce the risk of high dependence on a single type of generation and

distribution system of power or of a single mode of transport, for example.

Yergin (2006) understands that the diversification of energy sources will remain as the main starting point of energy security, but not the single point. Therefore, without proper and integrated strategic planning in the sector, diversification of energy sources would not be an effective instrument for energy security. In this sense, the technologies in renewable energy in general play an important role.

The second strategy the State can put into practice in order to increase its energy security is the increase in the security of external energy supply. It can be achieved through diversification of external suppliers through trade agreements, political and diplomatic influence, market mechanisms or the militarization of the control of energy resources abroad (Oliveira 2012; Abraham 2004). The dependence on a single or on a few energy suppliers causes vulnerabilities, such as energy uninterrupted uncertainty, and it can link energy supply to political or commercial situations between the supplier country and the receiver, which are not necessarily inherent to the energy sector. Besides the diversification of suppliers, possible solutions are the investment in energy efficiency and the increase of domestic production of energy that can be done through the adoption of renewable sources.

The last strategy is regional integration, which refers to the integration of infrastructure and supply chains of energy in a region or a continent usually permeating regional integration processes (Stanislaw 2004; Oliveira 2012). Regional energy integration began to be seen with more attention due to the globalization process, which has required from the States actions that increase their competitiveness in the international arena. Regional energy integration can focus on increasing the competitiveness of the countries that are signatories of agreements involving energy through the participation of institutions and multilateral agreements that would give the countries access to energy resources, and the regulation would be carried out through contracts (NIIR 2014). Still regarding the perspective of competitiveness, integration can be carried out by a group of countries led by a hegemonic country or a satellite-region (NIIR 2014). Thus, integration has a broader meaning than simply integrating the infrastructure and production chains of a particular region or continent: it aims to link and expand global production systems and systems related to the financial sector and to society, which goes beyond pre-established geographical boundaries.

Yergin (2006) summarizes four principles (or strategies) that countries must follow to maintain energy security, given the geopolitical context. The first one is the diversification of energy sources, which helps to reduce disruption impacts of a source and provides alternative sources. The second

principle is integration, whose best example is oil: there is only one market, a complex system and the security lies in the stability of that market, which is already integrated. The third principle is resilience, which guarantees a margin of safety against crisis because of the country's capacity to replace the production, adoption of strategic reserves, adequate storage capacity along the supply chain, storage of critical parts of the production, and distribution of electricity. The last principle is information because, in times of crisis, false information and rumors contribute to intensify the crisis.

As important as these four principles are the two critical dimensions that should be part of the energy security concept: the recognition of the globalization of the security system (which can be achieved especially engaging India and China) and the fact that the entire chain of energy supply must be protected (Yergin 2006). Although Yergin does not go into the details of how to protect the whole chain, considering the globalized system, it is implied that information should be managed at the global level only to sustain the system, since each State and each institution act following the rules of the market of information and strategic disinformation in order to protect itself.

Geopolitics undergoes a remarkable change. A transition imposed by the international situation marked by global warming, by a crisis of natural resources seen as energy sources, by the pressures of global economy, and population growth. This change relates to the fact that the location of energy resources, although it is still relevant, begin to share space with other technologies of energy generation. In other words, the location becomes no longer the only limiting factor to generate energy.

According to Freitas (2014), the geopolitics of energy moves from the structured energy resources of power (fossil fuels) to a geopolitics that is still being structured and encompasses renewable energy or low carbon energy.

Changing energy debate

Throughout human history, the foundations of civilizations have rested heavily on their energy supplies (Willrich 1975). Energy plays an important role in the economic development of any country. Securing energy supply is a national priority for fuel import dependent countries. In the international arena, energy as a security concern was more of an after-effect of the 1973 Arab oil embargo. The supply shortages and the quadrupling of oil price have had long lasting impacts on the global economic scenario. The western countries which were largely dependent on imported supply from the Persian Gulf realised that critical policy measures need to be taken to ensure the supply security.

Conventionally, the debate of energy security has evolved in two different streams. First energy security as a policy target is applicable both to an energy producing economy as well as an energy import dependent economy. For energy producer, the term energy security is more about finding continuous demand for the energy it produced and supplied and best possible price it can get in return from energy market. However for the energy consuming country or those dependent on energy import, energy security is more about ensuring the supply of adequate energy to support the domestic economic activities. Despite these differences, energy security as a concept is more frequently associated with the search for energy import dependent countries' search for fuel supply rather than the search for a the market stability for a producer.

Energy Security is differently defined by various institutions and scholars. It is defined as state in which a country can ensure 'the uninterrupted availability of energy sources at an affordable price. Lack of energy security is thus linked to the negative economic and social impacts of either physical unavailability of energy, or prices that are not competitive or are overly volatile' (IEA 2014a). The IEA also sees energy security as a combination of three determining factors 'Affordable/Competitive Supply', 'Reliable/Uninterrupted Supply', and 'Accessible/Available Supply' (IEA 2014a).

The debate on energy security is also about the accessibility and affordability of different types of energy resources. Though the world has already witnessed a drastic shift in usage of energy resources over the past few centuries from wood fuel to coal and then to petroleum and nuclear and to cleaner renewable energy sources, the distribution of energy resources across the different regions and their technically feasible exploitation are notably different. Today, in many countries the conventional fuels constitute majority of their energy mix while non-conventional energy sources (such as gas hydrates, shale gas, all other sources that are categorised as alternative sources including various renewable energy sources and advanced nuclear reactors generation III or generation IV or small and medium rectors) constitute only a relatively smaller share. While the conventional energy sources are predominantly emission intensive, the non-conventional energy resources are largely low carbon sources or rely on technologies that are responsible for lower emission of greenhouse gas in comparison to the conventional sources [Fossil fuels (Petroleum or Coal) or Conventional Biomass burning (Wood)].

As the global temperature rise by 2020 in comparison with the pre-industrialisation period to be kept below 20C (UNFCCC 2015), drastic policy measures promoting non-conventional sources are required. The global climate debate has made way for a shift in the energy consumption pattern

among the countries across the world. Promoting non-conventional energy sources through channelling more investment in proven alternative or renewable energy technologies and helping non-conventional energy market to grow has gained policy priority in both developing and developed economies.

However the developing economies and emerging economies, which are focusing on their economic growth face serious challenges as they try to curb their dependence on conventional fuels. To meet emission reduction target and strengthen the alternative energy sector many of the developing economies will need large scale technology financial support from foreign countries that have advanced technologies. While countries like India and China among the developing block in Asia have made significant foray into the alternative energy sector, many of their counterparts in the region still lag far behind with regard to clean energy development. Being two economies in the region with growing share of alternative sources in the energy mix, India and China are well equipped to play critical role in strengthening the alternative energy sector in the other developing economies.

Contours of Energy Debate

It is impossible not to see that there is an energy crisis going on when one observes the growth of global energy consumption, the emergence of developing countries, the energy requirements of a population of more than seven billion people, and the climate change. In fact, this crisis is related to the unsustainable way energy has been used for over a century. Changing the way energy is used can contribute to the redefinition of the world geopolitics, considering that the promotion of alternative sources of energy can promote investment and affect the investments already made, which are responsible for moving the wheels of the global economy. Furthermore, in this context, it can be asked whether the share of renewables can meet the challenges that the geopolitics of energy has faced because of the secular use of fossil fuels.

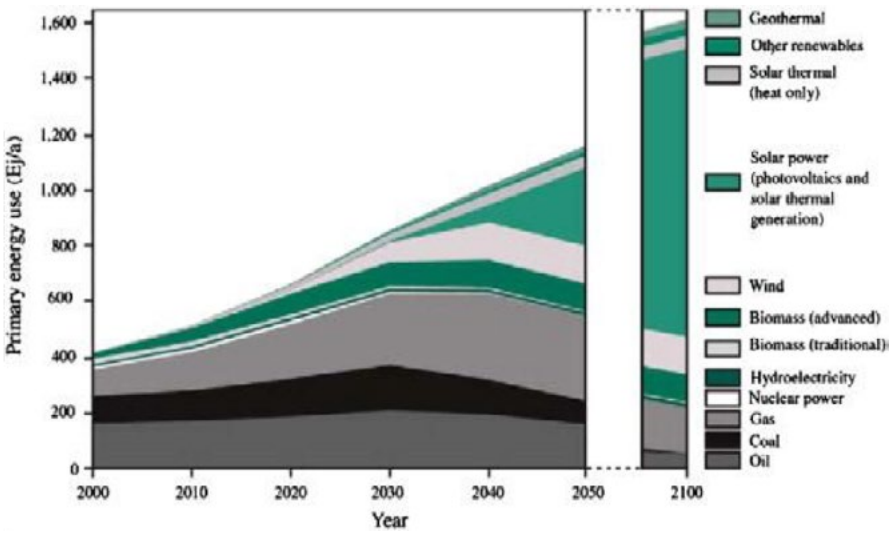
Renewable energy has been systematically established in the world. The growth of renewable energy sources has been driven by several factors such as improved cost-competitiveness of renewable technologies, energy security, environmental issues, improvement of the access to funding and policy initiatives (currently more than 146 countries have adopted policies in the renewable energy area against 15 in 2005) and the growing demand in developing economies (REN 2016). This growth is undoubtedly a stimulus to the creation and promotion of new markets.

2015 was the year in which there was the greatest addition of glob-

al capacity in renewable energy in the world. Investments reached a record level even with the decline of the prices of fossil fuels and the weakening of the European economy. For the sixth consecutive year, renewable energy surpassed fossil fuels in relation to net investments in energy capacity additions. Global investments in renewable energy including biofuels and hydroelectric power generation with less than 50 MW were 286 billion dollars in 2015, representing an increase of 4.5% in relation to the previous year. When the investments in large hydroelectric plants are taken into account, the total of investments rises to 328 billion dollars. In 2014, developed countries increased their investments by 3% while in developing countries the increase was 36%. In 2015, for the first time, investments in renewable energy in developing countries surpassed developed countries (REN, 2015; 2016).

According to the International Energy Agency, renewable energy will account for almost half of the increase in total electricity generation in 2040, the use of biofuels will increase more than three times and the use of renewable energy for heat production will grow more than twice. The electricity sector is the one which will help the most to decrease the percentage of fossil fuels in the world (IEA, 2014b). Figure 1 illustrates the development of renewable energy in a century.

Figure 1. Renewables Energy: Evolution in one century.



Source: Toklu 2013.

The current use of renewable energy is far from being a threat to conventional energy. This can be illustrated by the global subsidies to renewable

energy technologies, which reached US$135 billion in contrast with fossil fuel subsidies, which were US$490 billion (REN 2016).

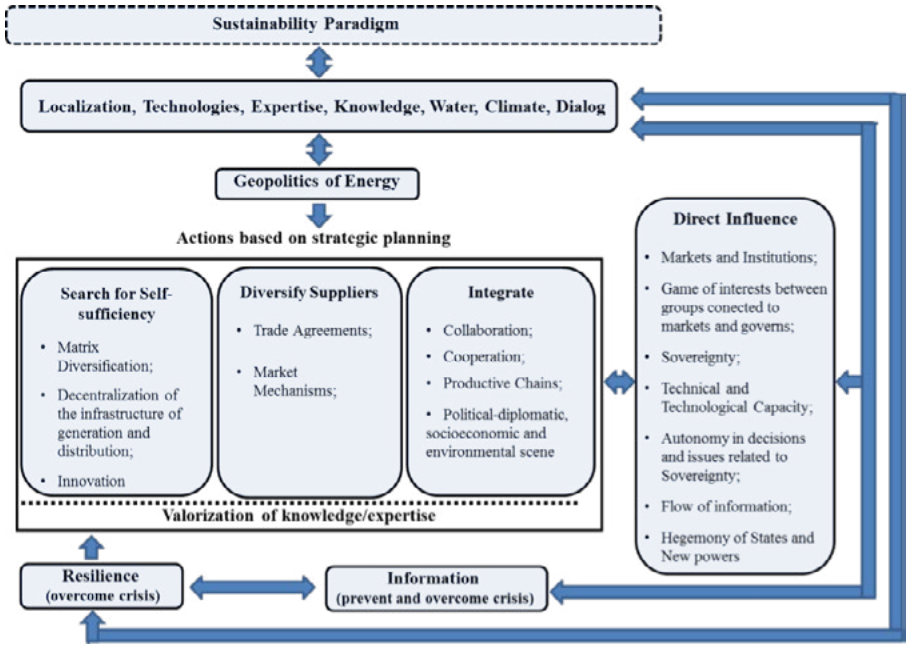
Indeed, subsidies can be seen as a barrier that hinder the development of renewable energy in the world. Another barrier regarding the implementation of renewable energy is its intermittent nature. Therefore, public policies are essential to boost the processes of change. Market, technological and technical training barriers need to be removed. Production costs for the diversification of energy sources by renewable sources can only be effectively transformed through public policies that help to promote investments in the sector.

The geopolitics of energy wanders amid significant changes and becomes more complex as it becomes more diverse, covering new issues and challenges. It moves in the direction of an unstable situation in terms of availability and use of energy resources, which is related to how each of the nations of the globe understands energy security. This reinforces the importance of a closer study of the way the States behave before the challenges in the energy area and of their relations with other countries.

The insertion of renewable energy in a context dominated by traditional sources of energy provokes a reflection on how the challenges related to geopolitics will be dealt with. The intensification of the use of renewable energy, along with the use of traditional energy, is a fact and the study of forms of dialogue is certainly one of the most coherent strategies for the access to energy resources through, for example, knowledge and technology exchange. The empowerment of countries where there is more availability of renewable energy is a source of discussion in the scenario of geopolitics of energy.

The sustainability paradigm influences the international scene and is directly and indirectly related to the geopolitics of energy through elements linked not only to location, but also to new renewable energy technologies, knowledge and expertise, natural resources and the dialogue between countries, which must be based on the maintenance of balance in the global energy chain. In this context, the actions which aim to seek energy self-sufficiency, to diversify energy suppliers and to integrate through collaboration and strategic agreements in the energy area are added to the value of knowledge that is certainly the focal point of energy geopolitics, especially to energy cooperation. In all countries there are some forms of renewable energy to be exploited. Resilience and information are fundamental in this process and has a direct relationship with markets, institutions and issues linked to the sovereignty of the States or the maintenance of hegemony linked to energy security supply (see figure 2).

Figure 2. Geopolitics of Energy and the new context.



Energy interdependence and the increasing scale of energy trade require ongoing cooperation to ensure the security of the entire supply chain. Cross-border behaviors are becoming increasingly relevant to the global energy trade. In an interdependent world, energy security will depend largely on how countries manage their relationships with each other, either bilaterally or multilaterally. And that requires looking at the reality of a more complex and integrated global energy system, and at the relations between the countries that participate in it (Yergin 2006).

In spite of the obvious interdependence between countries, the capitalism economic crises, such as the 2008 financial crisis, which shook the neoliberal structures jeopardizing the ideas of minimum State and free market, brought up protectionist actions and policies. The crisis of the European Union and the timid repercussion of Mercosur have weakened the idea of socio-political and economic integration within the unit in which it was designed. However, when it comes to energy, the focus is on maintenance of its balance, which implies the search for cooperation especially due to unequal conditions of availability of natural resources between countries, which can be balanced by exchanges of technical knowledge, of products with added value and of technologies.

Thus, and according to the IEA (2013), it is essential to understand the

dynamics that sustain energy markets so that political decision makers reconcile their economic, energy and environmental objectives. Those countries that get ready for global energy developments will have the greatest advantages, while those who do not will be at risk of making wrong political decisions and bad investments.

Knowing the dynamics of the relations between countries is essential due to their complexity and the transition from a geopolitics based on geographical location to the geopolitics of energy, which is based on the sustainability paradigm linked to the expertise related to technology, to the integration of markets and to the form of dialogue between the countries.

New Geopolitics: underlining China and India in the competitiveness scenario

Energy geopolitics should be discussed beyond the conventional framework where in countries compete different geopolitical settings. This is relevant especially in the context of renewable energy, where economic and technological prowess of a nation matters more than political and military capabilities which used to equip a country to play efficiently.

Unlike petroleum sector where countries competed for acquiring overseas energy equity stakes or exploration contracts, the alternative energy sector provides opportunities for a technology supplier and investor to spread its influence in the consumer countries in the process of energy transition.

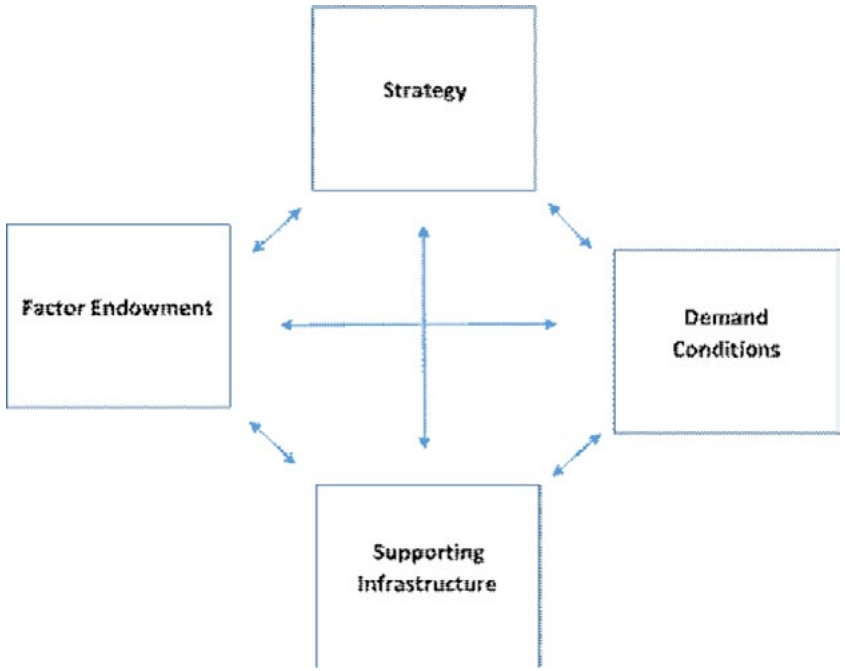
The Pacific Asian region will continue to witness India and China reaching out to the countries in this region to spread their influence. The efforts of India and China in the alternative energy sector may witness more diverse initiatives from both the countries in the coming years. To understand and demonstrate the possible trajectory of the Sino-Indian geopolitics vis-a-vis energy sector in the Pacific Asian region I use the National Competitive Advantage (NCA) theory by Michael Porter (Porter 1990). The NCA theory begins its analysis from the question "why do some nations fail while others succeed in international competition?"

> Michael Porter argues that 'Competitive advantage is created and sustained through a highly localized process. Differences in national values, culture, economic structures, institutions, and histories all contribute to competitive success. There are striking differences in the patterns of competitiveness in every country; no nation can or will be competitive in every, or even most industries. Ultimately, nations succeed in particular industries

> because their home environment is the most forward-looking, dynamic, and challenging' (Porter 1990).

The particular reason behind taking NCA theory for examining the India-China energy interaction in the Pacific Asia is that this approach is suited to examine the 'geo-economic' advantage one country has over the other. The approach to use NCA theory consists of analysis on the basis of multiple factors, namely 'Factor Endowment', 'Strategy', 'Demand Conditions' and 'Supporting Infrastructure' (See figure below).

Figure 3: India and China – National Competitive Advantage



Source: Adapted from Michael Porter's National Competitive Advantage theory, 1990

Factor endowment describes the 'nation's position in factors of production, such as skilled labour or infrastructure, necessary to compete in a given industry' (Porter 1990). In terms of alternative energy industry production activities China has notable edge over India. Often it is noted that India's manufacturing climate has still not caught up with the speed at which China has been moving ahead. Experts opine that unlike China, 'India hasn't come close to matching China's investments in the roads, ports, and power networks that companies want. Lousy infrastructure essentially eats up any advantage the country may have on the labour front' (Einhorn 2014).

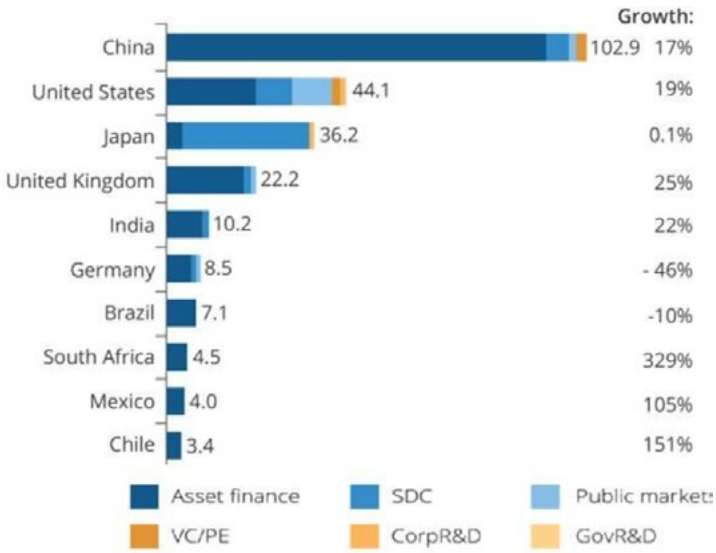
On the other hand Chinese industrial manufacturing has witnessed significant growth over the past few decades (See Figure 4). Even in the alternative energy front, China has made commendable foray. With USS$81 billion excluding R&D in 2014, China attracted more than double the renewable energy investment of its nearest competitor, the US. The country also made huge progress in the solar, wind and biomass technologies. Apart from policy support and economic incentives, the most important aspect is the cheap labour in China which makes economy of scale difficult to compete. The hourly labour cost in India for manufacturing averages 92¢, compared with $3.52 in China, according to Boston Consulting Group (Einhorn 2014). According to REN21 report, Brazil, China and India are among the top five countries on annual investments and net capacity addition in terms of renewable energy. China ranks first on renewable power capacity in the world (REN 2017).

Regarding demand conditions, Porter argues that 'nations gain competitive advantage in industries where the home demand gives their companies a clearer or earlier picture of emerging buyer needs, and where demanding buyers pressure companies to innovate faster and achieve more sophisticated competitive advantages than their foreign rivals' (Porter 1990). The growth of domestic alternative energy sector in China in comparison to India indicates that there is a significant progress in the development of alternative energy sector. The formation of domestic Renewable Energy Law and several other policy initiatives has promoted alternative energy sector a remarkable growth. However, India despite having the advantage of early starter has less renewable energy generation than China currently. As the domestic demand contributes more innovation and technological sophistication the industry would gain more attention in the international trade. Here Chinese companies has gained an undeniable advantage.

Related and supporting industries that are internationally competitive will provide unquestionable advantage in the promotion of industry abroad. China has far more higher number of major solar and wind energy companies that are in the alternative energy sector. This is one of the critical advantage China has over India. As China's oil industries gained significance in the international energy market, the alternative energy companies too are playing major role in the overseas market. Some of the biggest and most successful renewable energy companies are from China, especially in the solar panel producing segment. Trina Solar (TSL), Yingli Green Energy (YGE), and JinkoSolar (JKS) are the top players in the solar panel producing companies. It is also noted that the Chinese companies have made significant progress in investing in the renewable and alternative energy sector (See Figure 5). It is the world leader in domestic investment in renewable energy and associ-

ated low-emissions-energy sectors. China invested US$103bn in this sector in 2015, up 17% year on year, according to Bloomberg New Energy Finance (BNEF)—two and half times the amount undertaken by the U.S (Buckley and Nicholas 2017).

Figure 4: New Investment in Renewable Energy by Country and Asset Class, 2015 and Growth on 2014 (US$ billion)



Source: Buckley and Nicholas (2017).

National circumstances and context create strong tendencies in how companies are created, organized, and managed, as well as what the nature of domestic rivalry will be (Porter 1990). Chinese companies being active in the international arena face frequent rivalry and completion in the energy market. However the energy companies have been successful in getting a notable share of the market (Daojinong 2006). The Anti-monopolistic law in China which ensures fare competition with in the country among companies, in turn helps the entire energy sector to grow. This also strengthens the renewable energy players and help them perform better in the international market.

Apart from the above mentioned reasons, one critical advantage China enjoys in the region is its sheer size of economy. Its military might and the regional supremacy and its continuous efforts to enhance its influence in the region also strengthens its image as better business partner. Unlike India, China pursues a clear expansionist strategy in the region (Swaine 2000; Andrews-Speed 2014) which is equally challenging as well as providing opportu-

nities to the smaller countries in the region. In contrast, India's relations with the ASEAN economies work more on a cooperative framework. While India's relation with the South Asian countries face many difficulties, China is able to present itself as an alternative power which can offer financial support and business opportunities. Taking into account the factors mentioned above it is likely that India will have to face tougher competition from China in the alternative energy front in the Pacific Asian region.

Final Considerations

Energy has always been part of the geopolitical discourse because controlling energy resources is closely related to the conquest of territories and societies, i.e., to geographical space. In the classical theories of geopolitics, the central role of energy was highlighted: Mahan, when analyzing the historical development of naval power, stressed the importance of the consolidation of steam and of oil; and Mackinder, when he proposed the Heartland theory, stressed the value of a fortress region rich in resources such as wood, coal and oil.

The comparison made by Kjellén and Ratzel about the State and the biological organism can be interpreted, in postmodernity, as the importance of interconnectivity between the States given the energy interdependence between them. The line between military power and symbolic power would therefore be more tenuous, because facts like climate change show the interdependence between nations. The insertion of renewable energy does not end the interdependence between States since some countries have a lot of knowledge and few natural resources and others have access to markets or even know-how for the design and development policies.

The multiplicity of issues that geopolitics have dealt with, especially from the second half of the twentieth century onwards, has contributed to the emergence of a new paradigm founded on sustainability and helped broaden the range of geopolitical analysis. It is worth noting that geopolitical arrangements involve national States as well as a chain of political institutions, companies and other organizations that contribute to generate impacts on the lives of people. This has made the States lose a little of their power because of the rise of other players.

In the geopolitical context of energy, countries which are able to take advantages of their own characteristics and to interpret the global scenario in favor of themselves will emerge as a high competitive. India and China are experiencing ever-increasing energy demand, and particularly China, has been positioning itself in the global market more intensively, both in the pri-

vate and technological sectors, and in the development of policies to support renewable energy. This undoubtedly boosts the influence of this country on the global scenario - connecting investors, workers and researchers around the renewable energy market.

The quest for energy security requires more than the search for energy self-sufficiency (the utopia of countries before the hegemonic system): it requires the integration of policies, infrastructure, marketing arrangements and knowledge. Renewable energy, the result of the need generated by climate change and the depletion of fossil fuels, has given geopolitics not the solution for historical disputes, but rather challenges that pervade the power of resilience of the States.

Geopolitics creates the need to analyze the priorities of the local economy, whether regional or national, and the availability of existing resources or of energy alternatives in the face of the challenges presented. Local interests lead to global interests or actions that seek a balance between local interests and global collectives. The sustainability paradigm introduced new challenges in the geopolitics of energy, and dialogue and the synchronism of actions began to contribute decisively to the strategic strengthening of the States, so that they can take privileged positions in the global scenario. Energy cooperation and geopolitics could walk together.

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ABSTRACT

The act of dominating energy resources undoubtedly permeates the conquest of territories and their respective societies. Energy and geopolitics have always walked conjointly in the process of economic and social development in which societies have been based over the time. The multiplicity of issues that geopolitics gathered helped broaden the spectrum of analysis of geopolitical turning it more complex. This paper has the main objective to contribute for a discussion about the transition from the geopolitics based on the physical space to the geopolitics based on sustainability in which renewable energy has consolidated in the international scenario. The final considerations highlight the quest for energy security requires more than the quest for energy self-sufficiency itself. In addition, the sustainable paradigm introduced in the geopolitics of energy new challenges as the insertion of renewable energy in a context dominated by traditional sources of energy that provokes a reflection on how the challenges related to geopolitics will be dealt with. In that way, China and India appears as a global players. The choice of cooperative dialogues appears as an essential element in the balance of the energy system.

KEYWORDS

Geopolitics, Renewable Energy, Transition, Competitiveness, Energy Cooperation.

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