



## BRICS Countries: Green and Sustainable Economies

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### Abstract

*Nature offers all resources (land, labour, capital) Man extracts nature for his survival but it leads to human destruction when it is extracted for greed. The Brazil, Russia, India, China and South Africa (BRICS) consists of five countries of the world. Green Economics means growth of income and employment which reduces pollution, enhance resource efficiency and helps to prevent biodiversity that is driven by public and private investments. Green economics helps in reducing ecological scarcities, environmental risks and aims for sustainable development. The BRICS countries are working on clean, green and sustainable economies aggressively. All economies do stress on green economics. This paper highlights the issues of green economics and sustainability as an opportunity and challenging of BRICS countries. This paper assesses the growing power and capacity building to resolve impending problems. It is a known fact that some of BRICS countries are, indeed, becoming driving forces in the renewable energy and sustainability sectors. This paper also analyses the policies, rules and regulations to be taken into consideration by individual country as well as in block for green and sustainable economics. This paper argues that through green economics and sustainable development resources can be utilised efficiently and made friendly environmental.*

**Keywords:** Sustainable, Ecological, Resources, Energy etc.

### Introduction

There is shift in economic power in Brazil, Russia, India, China, and South Africa countries (BRICS). These five countries are 40% approx. of global population has been growing fast for the last decade and it is an estimated that BRICS has approximately US\$4 trillion of foreign reserves. BRICS is becoming more relevant and can also influence green and sustainable economies as its impact has been increasing for the last decade. As per UN Environment Programme (UNEP), a *green economy* when implements by a country, their intention to improve social equity of its people reducing in environment problems and ecological scarcities. Their main purpose green economy “less carbon emission, low usage of non renewable resource and provide equal opportunities to all”.

The average temperature of the entire world has been gradually increasing. Global warming is one of the factors that affect life of human beings. Now states are making policies for sustainable development that helps in green economic growth for next decade, save economic, social and the environment. The climate change problem has given the chance to government of developing countries how to increase efficient economic growth for the next 20 years which has helped in making better for the environment, society and promoting growth in sectors like energy efficiency, sustainable agriculture and off-grid renewable power Philip Schellekens<sup>1</sup>. It must provide multiple socio-economic and environment dividends which constitutes low-carbon.

OECD defines *green growth* as economic growth by reducing pollution, GHG emissions, minimizing waste, inefficient use of natural resources. Green growth emphasizes as an instrument of economic growth by investment in the environment. Now producers are producing products with lower emission of carbon and other gases which are responsible for increasing pollution. There is no denying the fact that rapid economic growth leads to increase in pollution, global warming. Natural resource management is to preserve economic growth, whereas renewable resources like air and water are shared among countries. This is a common problem and all countries are paying equal costs. Countries those have low emission but their responsibility to take action for carbon emission for example, least developed countries like small island states those have more burden or high costs of GHG emissions as there is increase in sea levels even they are responsible for low emissions gases. In the process to save and preservation of environmental resources, the cost of the developing economy could be raised.

The developed and developing countries government on policy to save environment leads to promoting ‘greener’ growth and consumption. For green technologies and their sharing governments are making efforts for sustainable consumption of resources even for production. Visions and practical experiences of sustainable development are of crucial importance and have its global significance in defining long term strategies of BRICS<sup>2</sup>. Although BRICS countries have different economic endowment but for economic development, they have

challenges to save natural resources and protect economic environment.

BRICS countries' cooperates and provides how to tackle challenge on different environment issues. Main objectives of BRICS countries are to create a green economy for sustainable development. There are many Debates and disagreements are on green economy that shows political competition among countries<sup>3</sup>. The argument on these concepts and the extent of social inclusivity versus economic growth attached to each country. This paper highlights the issues of green economics and sustainability as an opportunity and challenging of BRICS countries. This paper assesses the growing power and capacity building to resolve impending problems. It is a known fact that some of BRICS countries are, indeed, becoming driving forces in the renewable energy and sustainability sectors.

## Literature Review

Existence literature is also highlighting the problem of climate change emission of gases rising pollution. There is also direct relation between economic development and environmental degradation. As we are exploiting more and more resources for the development more and more environmental degradation is taking place.

The Brundtland Commission helps to make popular sustainable development at international level defines sustainable development "development that meets the needs of the present generation without compromising the ability of future generations to meet their own needs"<sup>4</sup>. "Technology and social organization can be both managed and improved to make way for a new era of economic growth"<sup>5</sup>. There is growing pressure of economic growth and unsustainable growth on the environment which is distributed unequally. Dasgupta<sup>6</sup> argued that economic growth is unsustainable in underdeveloped countries as compared to the developed countries. These countries provide subsidies for their export resources and change the consumption pattern of importing countries. Consumption patterns among regions are changing with the emergence of new economies and powers such as China, India, Brazil, South Africa and Mexico. There is integration of knowledge in the global economy through trade and financial flows by growing globalization through the transfer of information, culture and technology in the world economy<sup>7</sup>.

The global environmental problems through international negotiations on solutions have frequently stalled over questions of equity<sup>8</sup>. For example, international negotiations have slowed down over the question how to divide responsibilities and burden on climate change among nations given in past and present levels of their countries emissions. Poverty is understood by deprivation of basic freedoms. It implies that effect of climate change is seen in health problems, premature mortality and low literacy. This also shows inadequate usage of resources, discrimination, health care and education<sup>9</sup>.

Gender inequality is most vital inequalities in both developed and developing countries as according to UN most of the populations under poverty line are women<sup>10</sup>. Growing economic activity requires larger inputs of energy and generates larger quantities of waste by-products. As increased extraction of natural resources, accumulation of waste and concentration of pollutants will therefore overwhelm the carrying capacity of the biosphere and result in the degradation of environmental quality and a decline in human welfare<sup>11</sup>.

The country's development path cannot fixed along with relationship between environment and economic growth, it may be negative/ positive, change sign from positive to negative as any country reaches a level of income where people demand and afford a cleaner environment<sup>12</sup>. It is argued that degradation of the resource base will put economic activity itself at risk. The economic growth must cease and the world must make a transition to a steady-state economy to save the environment and even economic activity.

**Objectives:** i. To find relationship between environment degradation and economic development. ii. To analyze environment quality improving measuring steps to be taken while growing economically. iii. To assess how to BRICS countries to clean energy and economic growth in a sustainable way. iv. To promote "green" progress in BRICS countries.

**Research Hypotheses:** i. H1: BRICS countries examine climate change and take necessary action jointly and plan to GHG emissions. ii. H2: Relationship between bilateral cooperation and multilateral negotiations of BRICS countries. iii. H3: BRICS have many problems on implementation of environment policies to make strong cooperation they need their contribution to overcome these problems. iv. H4: BRICS countries have to sustain growth for long run without pollution and its impact on growth of environment.

## Findings

**BRICS' approach to climate change:** According to World Resource Institute, 2013, China ranked 1, India 4, Russia 5, Brazil 6 and Russia 12 for global GHG emissions. In 2013, Brazil is the consumer of energy (8<sup>th</sup> largest) and producer (10<sup>th</sup> Producer) of energy in world, Brazil's GHG emissions 5% global emissions and 75% emissions occur due to burning for agriculture use and deforestation. Russia is consuming 1.5 times per unit energy of the world, 3.5 times per unit energy of developed countries. Though Russia has many potential renewable energy resources even then these renewable energy are undeveloped. India has greenhouse gas emission more than 5% of CO<sub>2</sub> emission of the world. India's GHG emissions may increase 2-1/2 times more in the year 2010-2030 according to McKinsey. Fossil fuels are also contributed for carbon emission in India. India has created 65% carbon emission from house use and power generation, and 9% from transportation.

China is trying to develop renewable resources to fulfill its power requirements for the economy growth. It is biggest user of hydroelectric power, nuclear-power plants, solar and wind energy. China may be consumer of 4.4 billion tonnes of coal in 2030(McKinsey) and its carbon emissions are expected 6.8 billion tones. Nearly 40% of carbon emission comes from power generation. The energy consumption of the China is 8 to 10 times in the world. South Africa’s carbon emission is the highest in the African continent countries. In South Africa, there is 78% emission from GHG from energy sector and 90% from carbon dioxide emission.

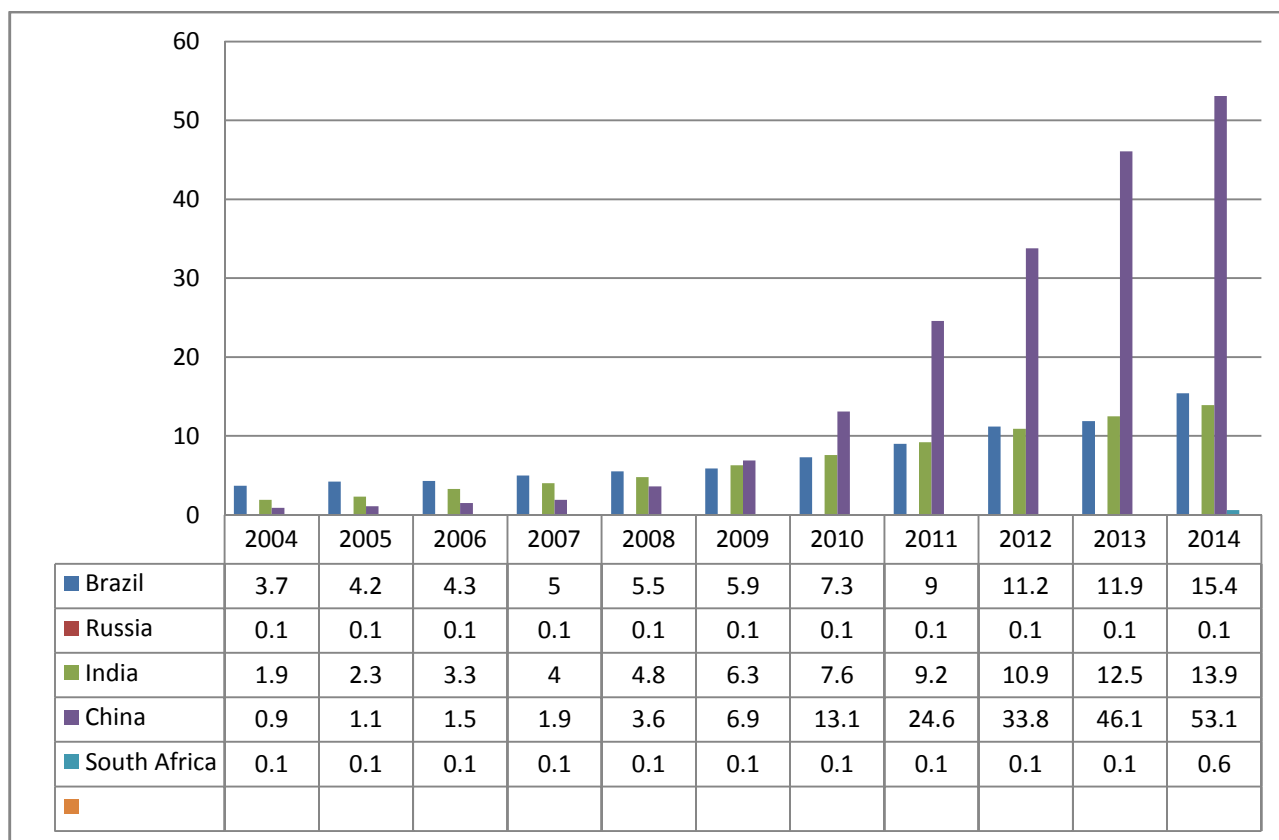
**BRICS countries renewable energy utilization:** BRICS countries’ renewable energy usage (2004-14) mn tons of oil equivalent.

**Effects of climate change in BRICs countries:** The world’s temperature increasing by 0.74°C and may also increase by six times more temperature at the end of 21<sup>st</sup> century. For climate change and ecosystem Global warming’s one of the important reasons. It is found as one of the main reason which is harmful for people. Climate change is a reason for economic loss to 5~30% of the world. In Brazil, there is change in weather pattern of country’s ecosystems. Even Brazil is a country rich in biodiversities and vast tropical forest has in danger because of

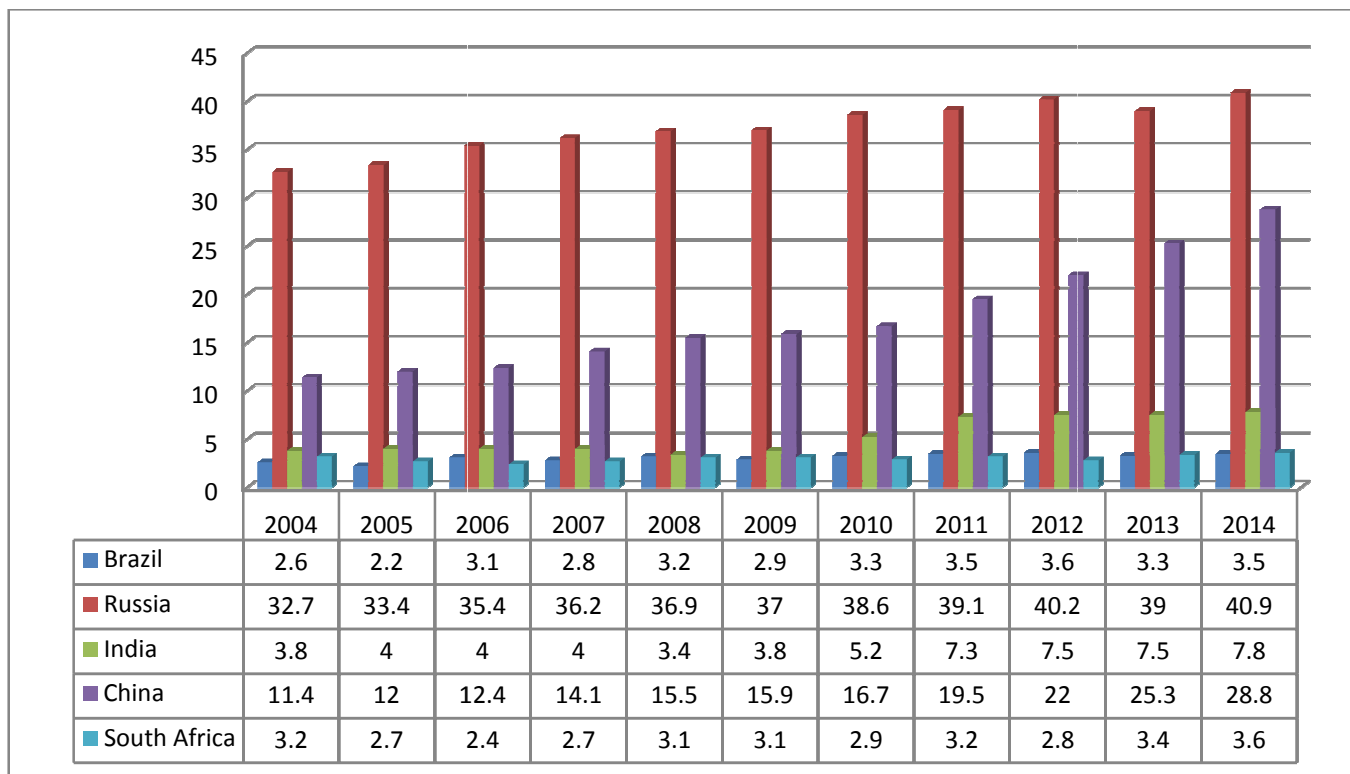
problems of weather patterns. Brazil’s biggest threat is semi-arid region of the North East converting into desertification.

The impact of climate change also showed in Russia. In the year 2010, Russia has high temperature because of this large Area of forest fire. India is also world’s most affected countries to climate change (Cruz, 2007; INCCA 2010). India’s 70% people still lives in village or climate sensitive sectors (Bureau of Labour Statistics 2010). The biggest global warming effect is changes in climate weather of South Asia. From 5 decades, there is rise in temperature and 10 percent annual rainfall of the monsoons reduced which is not good for all Indian agriculture. Climate change has also effects to China’s agriculture. It has increased unstable agriculture production that damages to crops which is due to increase in temperatures in many parts of the country.

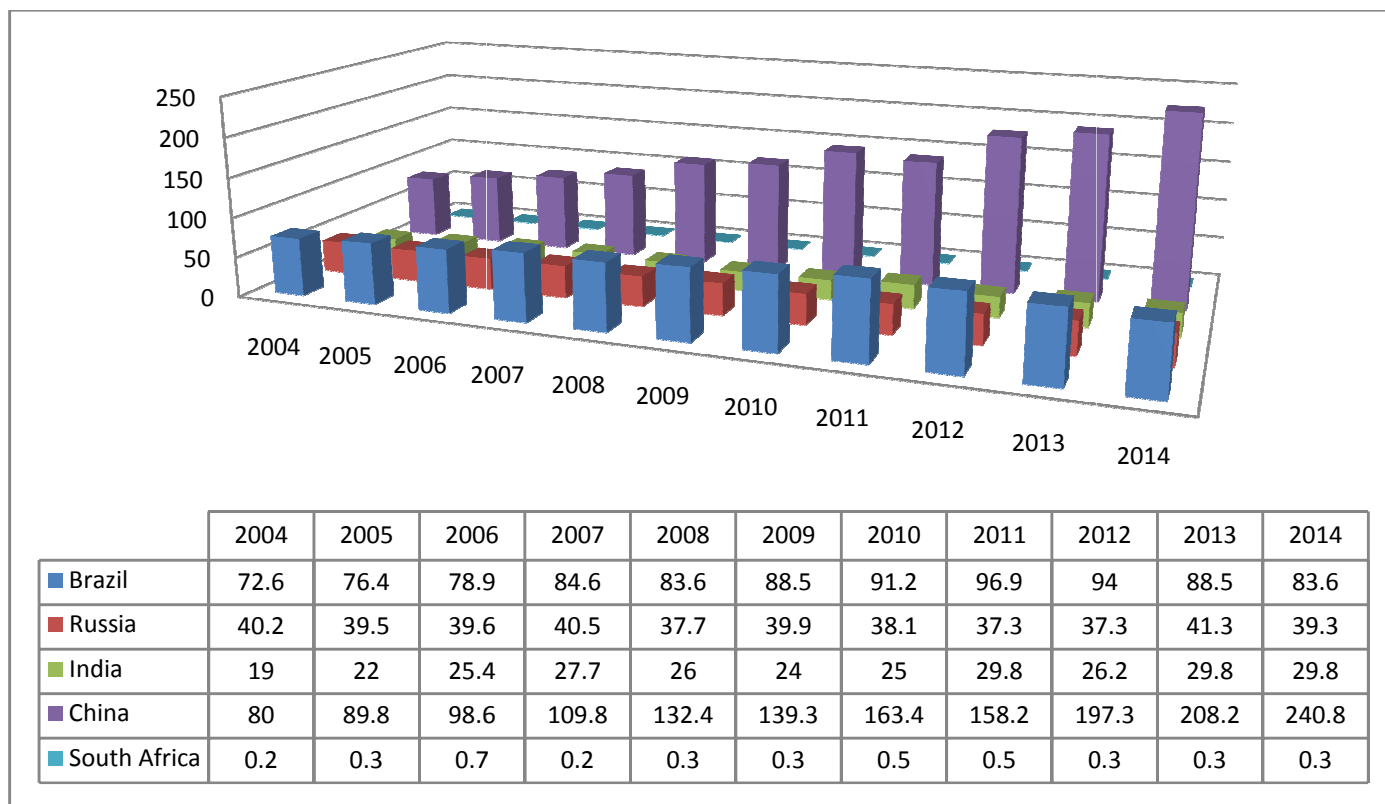
Climate change showing early-budding of crops which produces low quality of grasslands and losses. In 2012, State Council of global warming explains China is one of the country’s most vulnerable to the adverse impact of climate change. In South Africa, Global warming is one of the threats to water resources, food production, health, infrastructure and ecosystem. South Africa’s problems like poverty and inequality impacts one of the challenges for economic development and biodiversity.



**Figure-1**  
 BRICS countries’ renewable energy usage (2004-14) mn tons of oil equivalents<sup>13</sup>



**Figure-2**  
**BRICS countries Nuclear power utilization (2004-14) mn tonnes of oil equivalent<sup>13</sup>**



**Figure-3**  
**BRICS countries hydropower utilization (2004- 14) mn tons of oil equivalent<sup>13</sup>**

## BRICS' Action on emission

**BRICS's countries Local efforts: Brazil** took the necessary steps in 2010, to advance its climate change commitments made at the COP-15 (Copenhagen). It detailed official emissions reduction commitment of 36.1% to 38.9% by 2020. Brazil has had success of slowing deforestation through a policy over the last decade and produced positive results. According to Environmental Defense Fund (January 2013), Brazil reduced deforestation about 76% from last 20 years. Now Brazil's goal to reducing greenhouse gas emissions by 38.9% could be reached by 2016. Brazil has adopted targets for its industrial 5%, transportation 2%, and mining sectors emissions reductions by 2020.

There are national policies to change climate action in Brazil's cities. Brazil faces the challenge of meeting low-carbon energy sources for growing energy demand. To protect forests and meeting increasing energy demand is one of the Brazil's climate policies. Brazil's has 10Year Energy Expansion Plan 69 GW of installed generation capacity from 2011 - 2020. Brazil has also diversified portfolio of resources for generation expansion like hydropower, biomass cogeneration and wind power. The International Energy Agency (IEA) projects for next 10 years, installed new capacity in Brazil will be provided through hydropower and natural gas and only to a lesser extent by biomass and wind<sup>14</sup>.

It is opportunities to explore clean energy developments will be of great importance over the next decade. Russia, since 2009, stepped up the intensity of actions on climate issues. Russia announced to reduce greenhouse gas emissions by 10%-15% by 2020 and 50% in 2050. In 2009, Russian President Dmitry Medvedev approved the "Climate Doctrine of the Russian Federation" which helps to deal on climate change problems and enhance international climate cooperation. On Russian "Climate Doctrine, "It will implement short-term and long-term climate policy which may participate in the international community to address the problem of climate change and also strengthen Russia's scientific and technological strength, and provide a scientific basis for addressing climate issues.

Specific content includes as improvements in energy efficiency in all economic sectors, the development of renewable and alternative energy sources which reduce the adverse effects of the market economy through the implementation of financial and tax policies and to protect forests and reservoirs, and strengthen a forestation and reforestation. In September 2013, the Russian President signed on target reduces of GHG emissions by 2020; they must not exceed 75% of the total emissions of 1990. Russia will start clean energy program for "green technology. By 2020, India targets to reduce 20-25% GHG emission and follows renewable energy efficiency techniques.

India started the largest coal-fired power plants, coal mining, and infrastructure due to India's reliance on imported energy sources and increasing demand for energy, it will concern about energy security. India has started National Action Policy on Climate Change in 2008 to produce 15% of the country's electricity with renewable energy sources by 2020. In 2010, India launched the JNNSM (Jawaharlal Nehru National Solar Mission) produces 4,000-10,000 MW energy and 20,000 MW energy in 2017 and 2022. India is going to improve industrial energy efficiency has spawned another new policy. To achieve and Trade scheme assigns mandatory energy efficiency targets for 478 energy-intensive enterprises across eight sectors that account for around 80% of India's industrial energy use in 2012 (British High Commission New Delhi 2012).

India's 12th Five Year Plan (2012 to 2017) contains a target that 50% to 60% of coal plants use by SC technology. In 12<sup>th</sup> five year plan Chinese government has strategies on climate change and adopted measures as adjusting industrial structure, saving energy, increasing energy efficiency, optimizing energy structure, controlling the emission of greenhouse gas induced by non-energy activity, and increasing carbon sinks. The Chinese government issued policy for the year 2014-2015 for Energy Conservation and Low Carbon emission helps to reduce GHG by 4% and 3.5%t for 2014 and 2015. China also issued policy on Climate Change for the year 2014-2020 to guide principles, goals, roadmap, targets, and directions for climate change. China pledges reduction of GHG emissions by 2030 and increase use of non-renewable resources which consume energy 20 percent. China's renewable energy plays an important role in the country's energy development. South Africa commits to achieve a 34% carbon emission by 2020 at the UN climate change conference held in Durban, and 42% carbon emission by 2025.

The Brazil has agreed on National Climate Change Response White Paper on Climate Change that shows their interest for climate change transition for low-carbon economy and society. The Renewable Energy policies and imposed of carbon emission taxes have started to follow. A new National Development Plan 2030 of South Africa has started to reframe climate change as an economic development. Even government officials at national, provincial, and domestic level are now planning climate change strategies and plans. Individually all BRICS countries are taking important measuring steps to deal with climate change. Joint cooperation can bring faster and good results.

## BRICS countries' Bilateral and joint cooperation

BRICS countries bilateral cooperation is an important step to climate change, and got results. In 2005 India and china has signed and cooperate on climate change problems to save environment. For years from 2004 to 2007, China and India have several consultations on climate change.

In 2009, these countries signed a Memorandum of Agreement (MoA) on dealing with climate change. These countries have established Joint Group exchange problem programmes and their solutions on global climate policies and implementation of cooperative projects. In the year 2010, there was partnership between China- Brazil to start policies to overcome problems of climate change. These countries signed the Joint Action Plan from 2010 to 2014 where Center for Climate Change and Energy Technology Innovation was set up at Tsinghua University. China - Russia has established relationship on economic, social and political issues.

On the 16<sup>th</sup> BRICS countries meeting on global warming, these five countries come together for cooperation on climate change fight through joint resolutions for example: BRICS issued a joint statement which contains the resolutions at this meeting. These countries strengthen their clean energy cooperation by starting new energy strategies in the field of non-renewable and renewable energy resources. For example, BRICS countries establish R&D center to encourage cooperation between their universities. BRICS countries also establish cooperation between government, industrialist and financial agencies to develop and implementation of energy programmes. Many steps are taken to resolve the issue but facing many challenges and barriers.

**Barriers:** There are barriers to overcome BRICS' efforts to green economy by cooperation. These barriers include: i. First barriers of BRICS countries to face competition for non-renewable fossil fuels in the global market; ii. BRICS has to take strong legal regulatory framework to make use of renewable energy resources. iii. These countries required friendly technology support for climate change. iv. These BRICS countries must have infrastructure for the development of green energy. v. These countries have inadequate of green financing. vi. These countries have inappropriate lack of appropriate information of renewable energy resources and human resources.

## Conclusion

The BRICS countries have ideas for economic development which replace scarcity of resources by using of renewable resources. Progress of renewable energy sector in green industry of BRICS related to progress in the energy sector of economic development. The relationship of BRICS countries depends on collaboration of energy i.e. clean and green energy. These countries strengthen their green energy resources cooperation by starting new energy cooperation in the field of non-renewable and renewable energy resources. For example, BRICS countries establish R&D center to encourage cooperation between their universities. BRICS countries can also establish cooperation between government authorities, experts, industrialist and financial institutions to develop and implementation of energy programmes. The negotiation process of Kyoto Protocol and the Bali Roadmap has target actions and measures for parties by

2020. The BRICS countries should also take more forceful solutions; need practical cooperation, cooperation by developing mutual trust on important matters for climate change. Bilateral meeting arises points which need attention in front of U.N. Climate Change Conference.

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