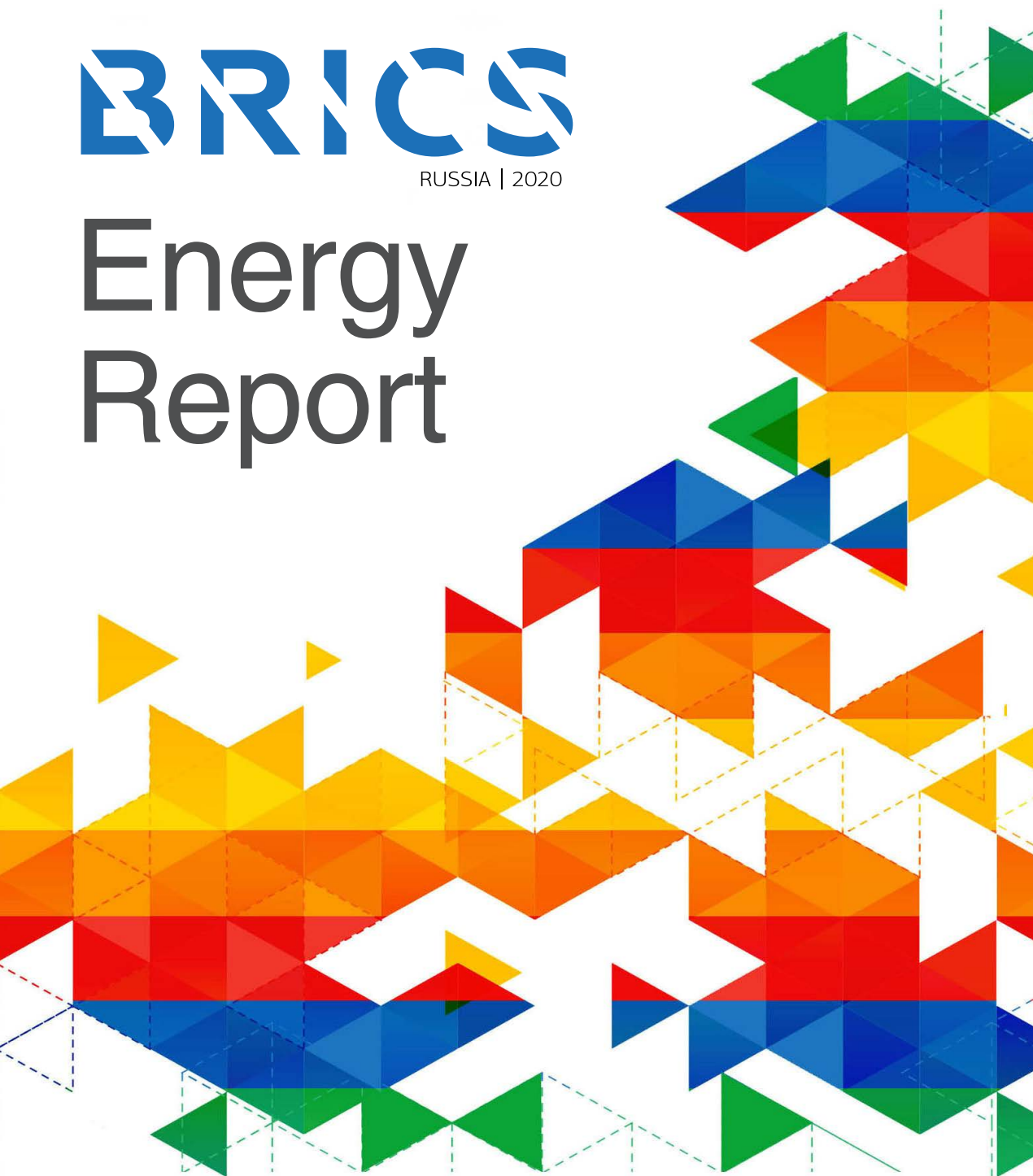


BRICS

RUSSIA | 2020

Energy Report



BRICS
ENERGY RESEARCH COOPERATION PLATFORM

ISBN 978-5-9143803-3-2

The work presents the current state and plans for energy development in the BRICS countries, as well as analyzes possible areas of cooperation within the Group. The research focuses on the synergy and complementarity between the energy systems of the five countries, while emphasizing their significant role in the global energy system. The analysis also shows the need to strengthen the role of BRICS in the global energy agenda.

The material was prepared by experts of the BRICS Energy Research Cooperation Platform based on the national information provided and with the active participation of relevant ministries of the BRICS countries. The study consists of two sections. The first section is devoted to the study of the features of the energy systems of each of the BRICS countries. The second section assesses the role and place of BRICS in the global energy sector, considers complex strategic goals that are of interest to all the countries of the Group, and assesses the prospects for energy transformation in the next 20 years.

The research is intended for government officials, representatives of science and business, and can be used in education.

ACKNOWLEDGMENTS

This Report was made possible thanks to the support and advice of many individuals and organizations.

The Committee of BRICS Senior Energy Officials plays a key role in providing guidance and support at all stages of the Report's cycle. BRICS ERCP would like to thank each of its members for their time, energy and enthusiasm.

BRICS ERCP would like to acknowledge the support from the Ministry of Mines and Energy of the Federative Republic of Brazil, Ministry of Energy of the Russian Federation, Ministry of Foreign Affairs of the Russian Federation, Ministry of Power of the Government of India, Ministry of Petroleum and Natural Gas of the Government of India, Ministry of Coal of the Government of India, Ministry of New and Renewable Energy of the Government of India, Ministry of Statistics and Programme Implementation of the Government of India, National Energy Administration of the People's Republic of China, Ministry of Mineral Resources and Energy of the Republic of South Africa.

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BRICS ERCP are also grateful to (Russia) the Energy research institute of the Russian academy of science, (India) NITI Aayog of the Government of India, (China) China Electric Power Planning & Engineering Institute, China Renewable Energy Engineering Institute, (South Africa) South African National Energy Development Institute.

BRICS ERCP would like to express gratitude to Russian Chairmanship for leading the preparation of the Report and its publication. Overall guidance was provided by the Deputy Minister of Energy of the Russian Federation Anton Inyutsyn.

Special thanks to Olga Yudina, who coordinated, oversaw production of the Report and overall publication process.

We are also very grateful to Ilya Klimov for the design of the cover and the illustrations included in this Report and Danila Rozhkovets for the logo design.

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Bento Albuquerque

*Minister of Mines and Energy
of the Federative Republic of Brazil*

I would like to congratulate the Government of the Russian Federation for the masterful coordination of BRICS in 2020 and in particular of the ministers of energy meeting.

In this regard, I praise the adoption the BRICS Energy Report. This document is the result of the most commendable work of our experts and will strengthen and deepen our ties based on our common challenges and the exchange of best practices in the energy sector

As an energy superpower BRICS countries can play a pivotal role in guaranteeing not only our group's energy security but also the world's one in the future. To that extent the BRICS Energy Report is a first step in the right direction to enhance and diversify even further our already robust cooperation.



Alexander Novak

Minister of Energy of the Russian Federation

Right in front of you the very first study prepared within the BRICS Energy Research Cooperation Platform: a report on the development of the five countries' energy sectors. For the first time, our countries present to the world community the vision of BRICS role in the world energy sector.

The BRICS approach to energy cooperation is primarily based on the complementarity of the energy strategies of our countries. We have similar approaches to international cooperation, as well as common goals, including ensuring universal access to energy resources, energy security, and the fight against energy poverty.

BRICS today is about a third of the world's energy consumption and will account for more than 40% by 2040. We, as major energy powers, must work together to strengthen the role of the BRICS countries in the global discussion of energy issues, to shape and promote the view of the five countries on the global energy agenda, and to promote stability and predictability of energy markets. Such coordinated efforts will contribute to enhancing the sustainability and energy security not only of the BRICS countries but the entire world.

I am convinced that this report will commence the activities of the BRICS Energy Research Cooperation Platform aimed at obtaining substantiated data about key trends in the global energy sector and determining the BRICS contribution to ensuring energy security. BRICS ERCP researchers and experts will be able to propose consistent and independent estimates that will become an intellectual alternative to the analytical reports that are currently predominant on the market.



Raj Kumar Singh

*Minister of Power
of the Republic of India*

Energy is one of the most vital components of infrastructure for the inclusive economic growth and development of nations. The sustained growth with continuous transformation according to new challenges has been characteristic of Indian power sector.

The journey of power sector on growth trajectory has continued in India with focus on reliable, economic and quality power to all. The Government of India has been working tirelessly during such testing times during this COVID era to ensure stable, affordable, sustainable, and uninterrupted supply of power to meet demand, especially for essential services, such as healthcare.

The ensuing report presents general overview of the energy sector, energy industries and prospects of cooperation among the BRICS countries.



Zhang Jianhua

Administrator of National Energy Administration of China

The BRICS has always been an essential platform for major emerging markets and developing countries to strengthen collaboration and safeguard common interests. With joint efforts of the top leaders from the five member states, the BRICS spirit of openness, inclusiveness, and win-win cooperation has been upheld by all members to strengthen unity and address challenges together. Pragmatic cooperation have been achieved in various fields, especially in this year, facing crucial changes in the international landscape, BRICS countries have pulled and supported each other to overcome all the difficulties, made all-out efforts to overcome the impact of the COVID-19 pandemic and thus fully promoted economic recovery and set a model for building a new type of major-power relationship around the world. As President Xi Jinping illustrated at the Plenary Session of the BRICS Brasilia Summit in 2019, “Faced with profound changes rarely seen in a century, major emerging markets and developing countries like us must grasp the trend of the times. We must respond to the call of our people, and shoulder our responsibilities. We must remain true to our unwavering commitment to development and strengthen solidarity and cooperation for the well-being of our people and for the development of our world.”

Energy cooperation is an indispensable part of pragmatic cooperation in the economic field of BRICS countries. Among the five countries, there are both energy producers and energy consumers. Each country has its own advantages in resource endowment and technological innovation. Strengthening energy cooperation and seeking ways to energy development and transition will not only help to jointly fight against external risks and climate change, but also have a positive impact on the global energy transition and sustainable development.

According to the consensus reached at the Forth Meeting of BRICS Energy Ministers, with the active initiative by Rotating Presidency of Russia, the BRICS countries have overcome many difficulties and completed the BRICS Energy Report and BRICS Energy Technology Report – the first two cooperative reports under the ERCP framework. I hope that there will be more fruits under the ERCP framework in the future. China is always looking forward to working with all parties to promote energy technology for BRICS and wide around the world with more extensive and mutually beneficial cooperation, so as to lay a solid foundation for the sustainable development of mankind.



Samson Gwede Mantashe

*Minister of Mineral Resources and Energy
of the Republic of South Africa*

The South African government remains committed to decrease greenhouse gas emissions, restructure its electricity sector and improve prospects for lower electricity prices by gradually and responsibly reducing the share of coal in total electricity production through the uptake of renewable energy, gas, hydro and other complementary technologies. Our recently approved Integrated Resource Plan for the period up to 2030 guides our efforts, and calls for an energy mix that would contribute to both our energy security and stability objectives, as well as our commitments under the Paris Climate Agreement.

South Africa therefore welcomes and supports the BRICS Energy Report, as an innovative and futuristic tool to advance our own just transitions towards affordable, reliable, accessible and secure energy for all, while advancing sustainable development, job creation, skills development and economic growth. This Report could be of use not only to BRICS members, but also foster strengthened partnerships and mutually beneficial energy trade between BRICS and all regions in the world.

South Africa wish to acknowledges the effort of the BRICS 2020 Chairship under the Russian Federation for its efforts in forging all BRICS countries into a common programme, drawing on the strengths of the collective, but also allowing for space that will further nurture national actions towards a shared goal.

We have collectively, under your leadership, enhanced the international energy dialogue and presented our countries, collectively and individually, with diverse and innovative options that can drive regional and global energy market growth and stability, access and development. We look forward to working together as BRICS over the next coming years as we continue on this progressive and all-embracing path in global energy governance.

INTRODUCTION

The development of energy cooperation within the framework of BRICS has been on the agenda of the leaders of the BRICS countries since the initial summit, which was held in 2009 in Yekaterinburg (Russia).

The first meeting of BRICS energy Ministers was held in Moscow (Russia) in 2015. The Moscow Ministerial meeting marked the beginning of institutionalization of energy cooperation within the BRICS framework and was the first practical step in implementing the BRICS Strategy for Economic Partnership in the energy sector.

The key result of the meeting was the signing of a Memorandum of understanding on energy conservation and energy efficiency between the BRICS ministries and departments responsible for energy and energy efficiency, which provides for active cooperation in improving the energy efficiency of national economies.

The Memorandum also provided for exploring the possibility of further institutionalization of energy cooperation within the framework of BRICS.

The BRICS countries differ significantly in the degree of energy self-sufficiency, the structure of the fuel and energy balance, the level of development of energy infrastructure and the organization models of domestic energy markets.

At the same time, given the high volatility of world energy prices, the rapid development of new energy technologies, the development of new sources of hydrocarbons and significant progress in energy efficiency, in other words, in the context of the global transformation of the global energy system, the need to strengthen the role of BRICS in reforming the international energy architecture becomes obvious.

In the joint statements the leaders of the BRICS countries have repeatedly emphasized that energy derived from fossil fuels will continue to play a leading role in the energy balance for the foreseeable future, and that fossil fuels remain one of the most important sources of energy and the basis for the energy security of the BRICS countries. At the same time, the BRICS countries consistently advocate ensuring universal access to energy resources. Recognizing that shifts in the energy sector are unique for each country, depending on its national conditions, the Association will strive to expand the use of

clean and renewable energy sources and improve the efficiency of the use of fossil fuels. Traditionally, great importance is given to the development of nuclear energy as a clean, affordable and reliable source of energy.

In the Ministerial declaration adopted in 2019 in Brazil BRICS Ministers noted that BRICS countries have energy strategies that have proven to be complementary, opening up opportunities for enhanced intra-BRICS energy cooperation to foster domestic and global energy security and stimulate economic growth. Cooperation on energy holds common interest and represents a win-win situation for BRICS countries.

Having accumulated extensive experience in discussing energy issues in a five-party format, the countries decided in 2018 to create the BRICS Energy Research Cooperation Platform. In 2019, the Ministers of energy approved the Terms of Reference for the BRICS Energy Research Cooperation Platform (BRICS ERCP).

The BRICS ERCP will promote sustainable energy development through cooperation in energy research, technology, policy and innovation, and develop a broad dialogue on energy issues to ensure universal access to affordable, reliable, sustainable energy supply, strengthen the energy security of the BRICS countries, and ensure greater support for BRICS in global discussions on energy issues.

At the initial stage the priority areas for the BRICS Energy Research Cooperation Platform were identified, which included technological cooperation, digitalization, renewable energy sources, bioenergy, coal, natural gas, including LNG, sustainable transport, energy efficiency, smart grids, as well as studies on energy sectors development in the BRICS countries.

Based on the selected priorities, the topic for the first research of the BRICS ERCP was selected — an Overview of the energy sector of the BRICS countries. This document was prepared by the participants of the BRICS ERCP, based on national statistics of the BRICS countries. It provides a consolidated vision of the future of energy for the BRICS member countries, based on their national documents and joint statements on energy issues presented as the result of BRICS summits and meetings of BRICS Energy Ministers and contains independent and unaffiliated assessments of the prospects for energy development of the BRICS countries and their role in the global energy sector.



CHAPTER 1

ENERGY SECTORS OF THE BRICS COUNTRIES

BRAZIL

RUSSIA

INDIA

CHINA

SOUTH AFRICA

[1.1]

BRAZIL

1.1.1_GENERAL OVERVIEW

ENERGY PRODUCTION

In 2018, Brazil produced 306.8 million toe of primary energy, including 14 million toe of non-used energy and natural gas reinjection (in 2019: 327 and 17 million toe, respectively). For the first time in its history, Brazil had a surplus of energy: 1.5% of the total demand (in 2019: 5% surplus). In oil, production exceeded consumption by 52.5%, being the key source for the Brazilian surplus (in 2019: 64%). Concerning the other sources, in 2018, there were deficits: 10.8% in oil products, 28.4% in natural gas, 84.3% in mineral coal and 5.5% in electricity.

Oil represented 43.7% of primary production and bioenergy, 29.5%.

By 2029, energy production is expected to grow at 5.5% per year, and should reach 520 million net toe, excluding 31 million toe of unused energy and reinjection. This production will exceed the Total Primary Energy Supply (TPES) by 140 million toe and will provide an energy surplus of over 35%.

Energy expansion accumulated investments up 2029 are estimated at 610 billion dollars, 78% in oil and gas, 19% in power energy and 3% in biofuels. This amount should represent 12% of Brazilian total investments in the period.

ENERGY CONSUMPTION

The TPES for 2018 was 288.7 million toe (in 2019: expected increase of 1.5%), equivalent to 1.37 toe per capita and 2% of world energy. Renewable sources accounted for 45.2% – this indicator is three times higher than the world average, 14%. The indicator for renewables comprises 31% of bio-energy, 12.6% of hydraulics, 1.4% of wind and 0.1% of solar. In non-renewable sources, oil accounted for 34.5%, natural gas with 12.4%, mineral coal with 5.8% and others with 2%.

Until 2029, total energy demand should grow 2.54% per year, reaching 380 million toe, and equivalent to 1.7 toe per capita.

IMPORT AND EXPORT

In 1979 Brazil had its largest net energy deficit: 45.9% of TPES. Oil had a deficit of 90% and oil products had a surplus of 8%. This year, the sum of imports and exports represented 50.8% of TPES.

In 2018, Brazil had an energy surplus for the first time, with exports surpassing imports. The sum of these two indicators accounted for 48.5% of the TPES.

Unlike 1979, in 2018, Brazil imported 9.6 million toe of oil and exported 55.7 million toe, and in oil products, it had a net deficit of 222 thousand bep per day. In other sources, there were also deficits, such as 10.6 billion m³ in natural gas; 22.8 million t in mineral coal; and 35 TWh in electricity.

ENERGY MIX EVOLUTION

The 1970s were characterized by a strong economic growth (more than 8% per year in GDP growth) and high urbanization, with consequences for the energy matrix structure, whose renewable sources fell from a 57.6% share (1970) to 45.3% (1980). In this period,