

# BRICS

## ENERGY REPORT

### 2021



BRICS  
ENERGY RESEARCH COOPERATION PLATFORM

Imprint

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September 2021

# I CONTENTS

Foreword	v
Acknowledgement	vii
1. Introduction	1
2. Overview of energy sector development and related sustainability commitments	3
2.1 Brazil	3
2.1.1 General overview of energy sector	3
2.1.2. Assessing demand and supply of key energy sources	10
2.1.3 Commitment towards NDC & selected SDGs	13
2.1.4 Recent initiatives and emerging challenges in energy transition	14
2.2 Russia	15
2.2.1. General overview of energy sector	15
2.2.2. Commitment towards NDC & selected SDGs	17
2.2.3. Recent initiatives and emerging challenges in energy transition	18
2.3 India	21
2.3.1 General overview of energy sector	21
2.3.2 Assessing demand and supply of key energy sources	28
2.3.3 Commitment towards NDC & selected SDGs	30
2.3.4 Recent initiatives and emerging challenges in energy transition	33
2.4 China	36
2.4.1. General overview of energy sector	36
2.4.2 Assessing demand and supply of key energy sources	37
2.4.3 Commitment towards NDC & selected SDGs	37
2.4.4 Recent initiatives and emerging challenges in energy transition	38
2.5 South African Republic	38
2.5.1. General overview of energy sector	38
2.5.2 Assessing demand and supply of key energy sources	43
2.5.3 Commitment towards NDC & selected SDGs	43

<b>3. BRICS energy as the basis for sustainable global development</b>	<b>45</b>
3.1 Comparative analysis of BRICS energy sector and sustainable development	45
3.2 Impact and consequences of COVID-19 on BRICS countries' energy sector and mitigation strategies	47
<b>5. Conclusion</b>	<b>53</b>

# I FOREWORD

The BRICS Energy Report is the study prepared by experts of the BRICS Energy Research Cooperation Platform. This work presents the past trends as well as current state of energy consumption and production of the five member states. It also presents the recent developments in the energy sector of the BRICS countries and the impact of COVID19 pandemic. The steps taken to manage the impact of the pandemic are also a part of this report.

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 three sections. The first section is dedicated to the introduction to the energy sector of the five BRICS countries. The second section provides a general overview of the energy sector of the member countries, demand and supply assessment of the key energy sources, commitment towards NDCs and the recent initiatives in the sector. The third section shows a comparative analysis of the BRICS energy sector along with the impact and consequences of COVID-19 on BRICS countries' energy sector.

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

# I ACKNOWLEDGEMENT

The BRICS Energy Report – 2021 is the outcome of the collaborative efforts of the committee of the BRICS Senior Energy Officials. BRICS ERCP acknowledged the support provided by the officials from the Ministry of Mines and Energy of the Federative Republic of Brazil; Ministry of Energy of the Russian Federation; Bureau of Energy Efficiency, Ministry of Power of the Government of India; National Energy Administration of the People's Republic of China; and Ministry of Mineral Resources and Energy of the Republic of South Africa.

The Indian Chairship extends its profound thanks to following ERCP experts: Paulo Cesar Magalhães Domingues from Ministry of Mines and Energy of Brazil; Konstantin Grebennik, Anna Gerasimova, Alexey Davidenko from Ministry of Energy of Russian Federation; Abhay Bhakre, Arijit Sengupta, Siddarth Dhar, Sumit Mudgal from Bureau of Energy Efficiency, Ministry of Power Government of India; and all energy officials from National Energy Administration of China and Department of Mineral Resources and Energy of South Africa.

BRICS ERCP would like to express gratitude to India Chairship for leading the preparation of the Report and its publication. Overall guidance was provided by the Director General, Bureau of Energy Efficiency, Ministry of Power of Government of India.

Special thanks to Souvik Bhattacharjya, Balaji Raparathi, Yatharth Sharma and Mani Juneja from The Energy and Resources Institute for coordinating, overseeing the production and publication of the Report.



**Bento Albuquerque**

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

I would like to congratulate the Government of India for the leadership and coordination of BRICS in 2021.

Brazil welcomes the adoption of the updated BRICS Energy Report, which is a valuable tool to understand the landscape in which we operate, especially as we overcome the impacts of the COVID-19 pandemic.

We look forward to continuing engagement in order to advance the vast potential of cooperation within the BRICS.



**N. Shulginov**

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*Minister of Energy of the Russian Federation*

The Russian Federation supports international efforts aimed at providing general access to cheap, reliable, sustainable and modern sources of energy, development of technologies, promotion of rational environmental management. In the last few years, BRICS countries have managed to achieve substantial progress in stated directions. The “BRICS Energy Report 2021”, prepared by the experts of the BRICS Energy Research Cooperation Platform, clearly demonstrates the new vectors of energy policy of the BRICS countries.

Taking into account the size of the BRICS economies and, above all, the scale of the energy sectors, we believe that our energy cooperation can become one of the additional factors in ensuring global sustainable development.

I welcome the publication of the “BRICS Energy Report 2021” and convinced that joint energy studies of BRICS countries are an important tool for energy dialogue. They allow us to express a common point of view on the issues of the development of energy complexes and global energy markets, as well as to define directions for the implementation of future joint projects.

I commend the Indian Chairmanship for preparing a broad energy agenda covering all key areas of modern energy and holding the corresponding BRICS events in 2021 at the highest level.





**Raj Kumar Singh**

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*Minister of Power, Government of India*

BRICS platform has been quite effective in strengthening collaboration and safeguarding common interests of the five major economies. BRICS cooperation on Energy is an important agenda of the member countries.

Energy is the key driver for the economic development of the Nation. The energy sector is witnessing major transitional effects due to the commitments to reduce greenhouse gas emissions under the Paris Agreement. Therefore, restructuring the power sector, phasing out of old and inefficient coal-based power production and large-scale uptake of renewable energy is essential to achieve such goals.

India intends to introduce this year's BRICS Energy Report that provides an update to the energy sectors of the BRICS member countries. The report also highlights the impact of COVID19 pandemic and the steps taken by each member country to minimize the adverse impact. I am confident that this report will strengthen the BRICS Energy Research Cooperation Platform (ERCP) and enhance BRICS contribution in ensuring energy security.



**ZHANG Jianhua**

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*Administrator of the National Energy Administration of China*

This year marks the 15th anniversary of the establishment of BRICS. In the 15 years, we have witnessed the continued improvement of our cooperation mechanism, expansion of collaboration areas, and enhanced global influence, which shows unique charm in maintaining and practicing multilateralism. Facing a pandemic and major changes both unseen in a century, BRICS countries maintained the momentum of cooperation while boosting domestic economic recovery, lending important impetus to the efforts by the five countries and beyond to combat the coronavirus and rebuild the economy.

To accelerate the implementation of the 2030 Agenda, economic recovery through green and low-carbon development represents a compelling consensus shared by the international community. More than 100 countries around the world have pledged to reach carbon neutrality, who are actively promoting energy transition. As Chinese President Xi Jinping pointed out in his remarks at the 12th BRICS Summit, all of us are indeed passengers in the same boat. When the wind is strong and the tides are high, we must be even more focused on our direction. We must keep pace and work as a team to break the waves and navigate steadily toward a brighter future. BRICS countries have respective strengths in energy resource endowments and technical innovation. Facing the common opportunities and challenges of development and transition, BRICS countries hold broad cooperation perspectives in enhancing energy security and low-carbon energy transition. In this context, we BRICS countries should secure new prospects amidst changes. We should work together to enhance all-round cooperation in energy field, explore the future course for green recovery and energy transition, and contribute BRICS' share to tackling common challenges brought by climate change.

This year, at the Indian Presidency's active initiative, BRICS countries overcame difficulties and jointly completed BRICS Energy Report 2021 and BRICS Energy Technology Report 2021 as the ERCP outcomes for this year. The reports update the latest development in energy fields and the progress combating Covid-19, which are of great importance. China is willing to stand with all other countries, actively practice green development philosophy, and contribute to promoting intra-BRICS practical cooperation in energy.



**Samson Gwede Mantashe**

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

Energy plays a key role in the development of every country and for the African continent access to modern energy service is linked to the achievement of the Sustainable Development Goals (SDGs). Sub-Saharan Africa is rich in energy resources, yet only 290 million of the 950 million people have access to electricity.

Electricity consumption per capita in the region is less than that needed to power a 50 watts light bulb continually. Efforts to promote electrification are gaining momentum but are outpaced by population growth. This severe shortage of essential electricity infrastructure is undermining efforts to achieve more rapid social and economic development.

South Africa joins its BRICS member countries in a continued effort to call for universal access to safe, affordable and reliable, and modern sources of energy within the global energy governance system.

Universal access to energy features highly on the energy sectoral cooperation of BRICS and South Africa commends the Indian Presidency for having elevated this even higher. The BRICS Energy Report 2021 highlight our common and shared goal of (i) expanding access to ensure energy security of the population to improve living standards and ensuring social stability; as well as (ii) creating cleaner, low-carbon energy systems to reduce the negative impact on the climate and environment, among others.

This is to be achieved through a jointly agreed programme of action among BRICS member states, which include the following; namely; (i) Smart energy infrastructure development;(ii) Development of renewable and low-carbon energy (based on natural gas, renewable energy; and sources, including nuclear energy and hydrogen sources); and (iii) improving the efficiency of development, processing, and supply of fossil energy resources.

For South Africa and the African continent the aforementioned direction of BRICS member countries of energy cooperation as stipulated in the BRICS Energy Report 2021 resonates with similar targets set in our country's National Development Plan 2030, as well as the African Union Agenda 2063.

# I 1. INTRODUCTION

BRICS countries have an imperative role to play in the global energy agenda in line with their share in the world's energy production and consumption. Hence, numerous mechanisms have been established in BRICS to further deepen cooperation in the field of energy. Since the first BRIC Summit in Yekaterinburg, Russia in 2009, BRICS countries have expressed the need for co-operation in the field of energy and energy efficiency. In the Delhi Declaration 2012, the leaders mentioned the need for multilateral energy co-operation within BRICS framework.

In 2015, in accordance with the strategy for BRICS Economic Partnership adopted at the BRICS Ufa Summit, the first BRICS Energy Ministerial was held, marking the institutionalization of energy co-operation within BRICS. In order to pursue energy co-operation through joint research and technology projects, tech transfer, conferences, lectures and seminars and exchange of best experience and practices, a Memorandum of Understanding in Energy Saving and Energy Efficiency was signed, which resulted in the creation of the Working Group on Energy Savings and Energy Efficiency, in 2015. The working group met for the first time under India's Chairship at Vizag in 2016, issuing a joint statement on charting an Action Plan for the Working Group on Energy Savings and Energy Efficiency.

In the Xiamen Declaration of 2017, BRICS leaders encouraged continued dialogue on the establishment of a BRICS Energy Research Co-operation Platform (BRICS ERCP). This led to the establishment of BRICS ERCP Platform, which was agreed upon and acknowledged in the Johannesburg Summit Declaration in 2018. Meetings of BRICS ERCP commenced in 2019 under a committee of senior officials under the Brazilian Chairship, during which the terms of reference of BRICS ERCP were adopted.

BRICS Energy Cooperation is not just about challenging the prevalent system but reforming it as well with the objective of achieving sustainability in energy consumption. Energy consumption is linked with the climate change issues and, in this regard, BRICS has emerged as a thought leader in providing potential and pragmatic solutions. With a quarter of world's GDP and about one-third of the world energy consumption, policies adopted by BRICS countries will have a substantial impact on influencing climate change policies in the international arena.

BRICS ERCP is now a global platform for promoting energy based sustainable development, sharing of advanced energy technologies, expansion of cooperation on educational programs, as well as exchange of statistical data and plans on the development of national energy systems and information on best practices and regulatory frameworks in the energy sector. The platform also aims at creating synergies in BRICS energy co-operation across various platforms—Academic Forum, BRICS Science, Technology and Innovative Initiative, Program of Economic Co-operation and New Development Bank.

# I 2. OVERVIEW OF ENERGY SECTOR DEVELOPMENT AND RELATED SUSTAINABILITY COMMITMENTS

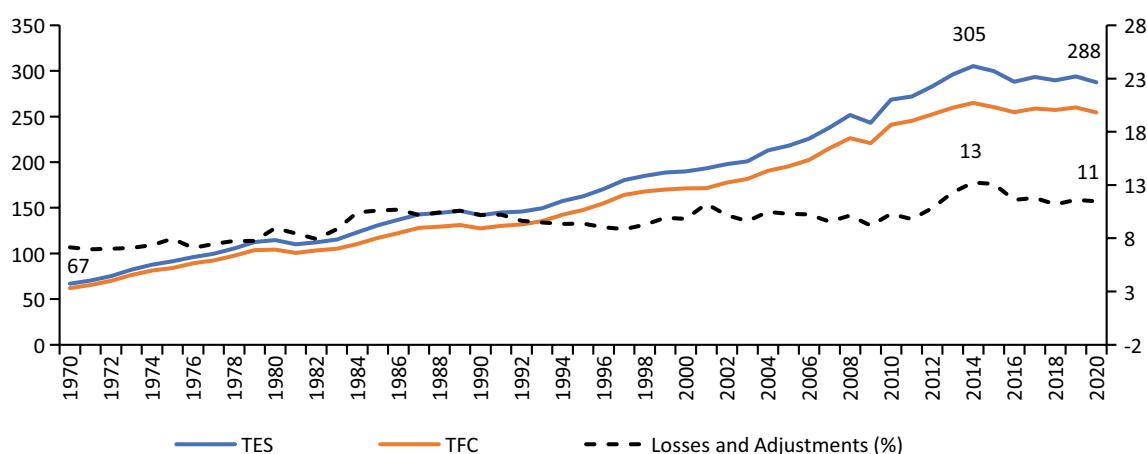
## 2.1 Brazil

### 2.1.1 General overview of energy sector

#### i. Energy Consumption

In 2020, Brazil's Total Energy Supply represented more than four times the value of 1970, showing growth of 3.0% per annum in the period (2% in the world). This is due to strong industrial growth mainly in the first two decades, accompanied by the expansion of household consumption throughout the period. In the last two decades there has been a greater expansion of electricity consumption and demand for transport fuels.

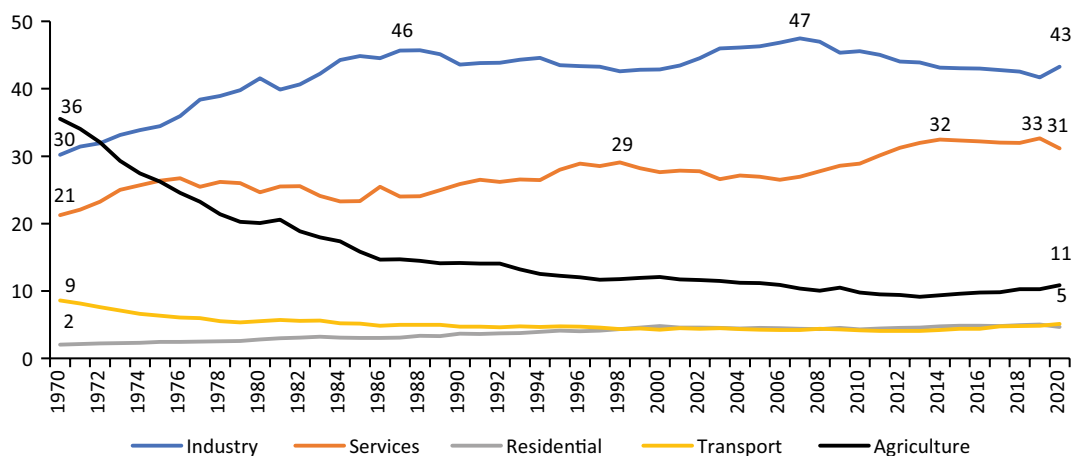
The difference between the Total Energy Supply and the Total Final Consumption (including the energy sector's own consumption), resulted from losses in the energy transformation and distribution processes. Brazil, highly reliant on electricity supply from hydropower plants, has low generation by thermoelectric plants and, as a result, has a level of losses much lower than the world average. Worldwide, the percentage of total losses in relation to supply is more than twice the Brazilian indicator.



**Figure 1:** Total Energy Supply (TES) and Total Final Consumption (TFC) in Brazil

Source: SIE Brazil

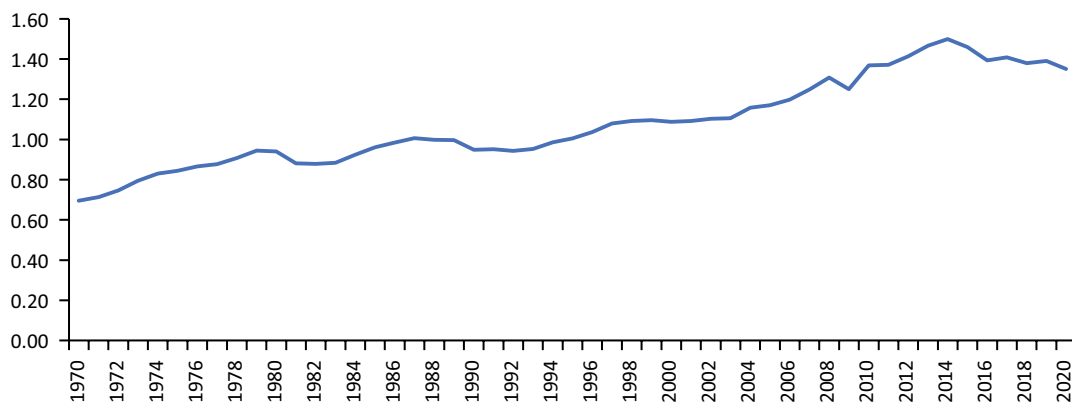
Energy consumption in the industrial sector (including consumption in the energy sector) has a greater share in almost the entire period. In the last 15 years, industrial consumption has lost its share, mainly for transport sector. The residential sector, although with high growth in the electricity consumption and cooking gas, lost its share due to the firewood replacement in cooking food, which is 5 to 10 times less efficient in use than gas. In 1970, the residential sector had the largest share of Total Final Consumption, mostly related to firewood.



**Figure 2:** Total Total Final Consumption by sector in Brazil

Source: SIE Brazil

The per capita domestic energy supply in Brazil was 1.35 toe in 2020, almost doubling the 1970 indicator, and lower than the 2014 indicator, the record. In 2020, the Brazilian indicator represented 75% of the world indicator, of 1.8 toe/inhabitant. Figure 3 shows the evolution of the Brazilian indicator, from 1970 to 2020.



**Figure 3:** Total Energy Supply Per Person in Brazil

Source: SIE Brazil