Energy Law and Regulation in Brazil

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Editors

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Springer

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ISBN 978-3-319-73455-2 ISBN 978-3-319-73456-9 (eBook)
https://doi.org/10.1007/978-3-319-73456-9

Library of Congress Control Number: 2018935299

Printed on acid-free paper

This Springer imprint is published by the registered company Springer International Publishing AG part of Springer Nature.
The registered company address is: Gewerbestrasse 11, 6330 Cham, Switzerland

Introduction

Brazil is Latin America's largest and world's tenth largest energy producer. In 2015, Brazil's total energy production reached 279.37 Mtoe, and the country achieved 94% of energy self-sufficiency (International Energy Agency 2017).[1] In 2016, Brazil's total energy production increased to 294.72 Mtoe, whereas the total energy consumption amounted to 255.43 Mtoe. In the same year, the country reduced its total external dependency on energy to 2.1% (Empresa de Pesquisa Energética 2017a). Brazil seeks increasing energy integration with neighbor countries in Latin America and engages in importing and exporting different energy sources. In 2016, for example, Brazil's net import of energy amounted to 8.83 Mtoe, even though the country exported 35.8 Mtoe of petroleum in the same year (Empresa de Pesquisa Energética 2017a).

Brazil's energy matrix presents a distinctive balance between renewable (41.5%) and nonrenewable (58.5%) energy sources. The main energy sources contributing to the total energy production are petroleum (44.2%), natural gas (12.8%), sugarcane products (17.2%), and water (11.1%). Even though the total energy production largely depends on petroleum and natural gas, the domestic electricity supply is mostly (68.1%) based on renewable hydropower production (Empresa de Pesquisa Energética 2017a). In the last decades, the energy matrix became increasingly diversified due to the growing participation of renewable energy sources. From 2015 to 2016, for instance, the domestic wind energy supply increased by 54.9%, while the solar energy domestic generation increased by 44.7% (Empresa de Pesquisa Energética 2017b).

According to Brazil's Ministry of Mines and Energy (MME) projections, the total energy consumption is expected to reach 309–474 Mtoe by the end of the period 2005–2030 (Ministério de Minas e Energia 2007b). In this scenario, the required

[1] In 2015, the world's largest energy producers were China (2.5 thousand Mtoe), the United States (2.02 thousand Mtoe), Russia (1.33 thousand Mtoe), Saudi Arabia (648.61 Mtoe), India (554.39 Mtoe), Canada (471.33 Mtoe), Indonesia (425.86 Mtoe), Australia (381.33 Mtoe), Iran (394.18 Mtoe), and Brazil (279.37 Mtoe) (International Energy Agency 2017).

energy production would demand an average of US$32 billion in investments per year, amounting to a total investment of more than US$800 billion by the end of the period (Ministério de Minas e Energia 2007a). In the decade from 2016 to 2026, the estimated annual growth of domestic energy supply is 2.0%. The decennial energy plan forecasts that domestic supply produced from renewable energy sources will have a more intense annual grow (2.6%) in comparison with nonrenewable sources (1.5%). Furthermore, the energy sector is expected to demand US$423 billion in investments in the decade (Ministério de Minas e Energia 2017).

The Brazilian government has promoted electricity generation and transmission auctions in the last years, and two new electricity auctions for the generation of hydraulic, wind, solar, and biomass electricity are announced in late 2017 (Agência Nacional de Energia Elétrica 2017). Following the petroleum bidding rounds recently concluded, the National Council for Energy Policy (CNPE) announced new bidding rounds taking place in 2018 for onshore and offshore exploration and production of petroleum, including some offshore blocks in the pre-salt area (Agência Nacional do Petróleo, Gás Natural e Biocombustíveis 2017). The announcement by Brazilian authorities of the country's commitment to promote the energy sector illustrates the need for systematic understanding of both the legal constraints and the regulatory atmosphere with impact on several operations of production, transmission, distribution, and consumption of energy in the country.

The complex regulatory structure of Brazil's energy sector reflects the diversification of its energy matrix. The general ruling of the sector falls within the scope of the constitutional exclusive powers of the federal government. In this regard, the Ministry of Mines and Energy (MME) is the main executive body responsible for energy-related issues.[2] The formulation of energy policies and guidelines is nonetheless assigned to the National Council for Energy Policy (CNPE), an advisory committee to the president of the republic.[3]

The most intense regulatory activity is performed by the National Electric Energy Agency (ANEEL) and the National Agency of Petroleum, Natural Gas and Biofuels (ANP), two important regulatory agencies supervised by the Ministry of Mines and Energy (MME). The National Agency of Petroleum, Natural Gas and Biofuels is in charge of the regulation, supervision, and control of operations in the oil, gas, and biofuels industry, including the derivatives of these materials.[4] The National Electric Energy Agency, on the other hand, is in charge of the regulation and supervision of

[2]The competences and the structure of the Ministry of Mines and Energy were redefined according to Decree no. 8871 (6 October 2016).

[3]The National Council for Energy Policy (CNPE) was established under Law no. 9478 (6 August 1997) and structured according to Decree no. 3520 (21 June 2000). The council is composed of several ministers and representatives of the civil society, the academia, and the states.

[4]The National Agency of Petroleum, Natural Gas and Biofuels (ANP) was established under Law no. 9478 (6 August 1997) and structured according to Decree no. 2455 (14 January 1998). The current denomination of the agency was established according to Law no. 11097 (13 January 2005), which included references to natural gas and biofuels.

the production, transmission, distribution, and sale of electric energy.[5] Therefore, most operations relating to hydraulic, wind, and solar electricity generation, transmission, and distribution are regulated by the National Electric Energy Agency.

The institutional competences are not always quite clear. Both the National Agency of Petroleum, Natural Gas and Biofuels and the National Electric Energy Agency regulate biomass energy production, depending on whether the biomass is transformed into biofuels or converted to electricity. Nuclear energy is also submitted to shared competences: while the National Electric Energy Agency is responsible for the regulation of electricity generated from nuclear power plants, the general regulation, authorization, and supervision of the production and use of nuclear energy are assigned to the National Nuclear Energy Commission (CNEN),[6] overseen by the Ministry of Science, Technology, Innovation and Communication (MCTIC).

There are other agencies, administrative bodies, public companies, and mixed-capital companies that have different degrees of regulatory impact over the energy sector in Brazil. Moreover, many issues relating to the distribution of energy, the environmental protection, and research and development are regulated by other institutions. States and municipalities might also have supplementary legislative and executive powers in certain phases of the energy production chain. The contributions in this book are attempts to reveal the structure of the multilayered and fragmented universe of energy law and regulation in Brazil.

In the first chapter, Marilda Rosado de Sá Ribeiro discusses the evolution of the upstream sector of petroleum exploration and production in Brazil, highlighting the impact of the discovery of pre-salt reserves in the institutional competences and contractual framework of the industry. The chapter also examines current debates on unitization, arbitration, and environmental impacts related to the production of petroleum in Brazil. The second chapter deals with the downstream operations of the petroleum industry. Clarissa Brandão and Renato Barcellos present an overview of the Brazilian regulation on refining, transportation, selling, and consumption of petroleum subproducts, stressing the ongoing renewal of the National Agency of Petroleum, Natural Gas and Biofuels (ANP)'s regulatory rules on these operations.

The natural gas sector is covered in three chapters. In the third chapter of the book, Marcos Cintra, Hirdan Costa, Eduardo Guedes, and Edmilson Moutinho examine the upstream operations of natural gas exploration and production, discussing important matters such as environmental licensing and the obstacles to unconventional gas—in particular shale gas—production in Brazil. In the fourth chapter, Thiago Brito, Hirdan Costa, Raul Penazzo, and Edmilson Moutinho concentrate on the midstream operations of natural gas transportation in pipelines, discussing some controversial issues such as the tariff policy and the third-party open access to natural gas transport facilities. In the fifth chapter, Maria D'Assunção,

[5]The National Electric Energy Agency (ANEEL) was established under Law no. 9427 (26 December 1996) and structured according to Decree no. 2335 (6 October 1997).

[6]The National Nuclear Energy Commission (CNEN) was established under Law no. 4118 (27 August 1962) and restructured according to Decree no. 8886 (24 October 2016).

Hirdan Costa, and Edmilson Moutinho present the regulatory challenges of natural gas downstream operations in Brazil and the associated systemic risks, focusing on the regulation of different types of pipelines and of the free consumer as well as on natural gas transportation, purchase, and sale contracts.

The sixth chapter discusses the electricity sector in Brazil. Raphael Gomes and Renato Poltronieri explain the institutional model of the electric energy sector in Brazil, presenting the roles of the Ministry of Mines and Energy (MME), the National Electric Energy Agency (ANEEL), the National System Operator (ONS), and the Electric Energy Trading Chamber (CCEE), among other regulatory bodies. The authors also underline that the increasing litigation in the electricity sector is suggestive of the urgent need of reforming the institutional model and redefining the regulatory competences. In the seventh chapter, Wanderley Fernandes concentrates on the distribution of electricity in Brazil, analyzing core issues such as the tariff calculation and revision, the concession contracts, and the consumer protection.

In the eighth chapter, Vinicius Soares examines the shaping of the so-called New Regulatory Framework applicable to wind energy, discussing the previous attempts of the Brazilian government to regulate the sector. Further to presenting the current regulated market environment, the author underlines important matters such as the environmental licensing and the problems arising from the connection of wind energy production sites to the grid system and its transmission lines.

Solange Teles, Carolina Dutra, and Lucas Noura analyze, in the ninth chapter, the dawn of the "solar cities" in Brazil, presenting the regulatory framework for the generation of solar energy as a promising renewable energy source. In particular, the authors examine the energy compensation system for mini- and microgeneration projects and the local legal incentives for the construction and adaptation of buildings with adequate water heating systems using solar energy.

In the tenth chapter, Luizella Giardino discusses the current certification schemes for social and environmental compliance of biofuels, stressing the problem of "green protectionism" through the establishment of environmental standards that might limit market access. The author emphasizes the necessary convergence of existing programs and the development of internationally agreed principles so as to establish a sustainable and inclusive certification system for the production of biofuels.

Leonam Guimarães, Carlos Feu, and Olga Mafra analyze, in the eleventh chapter, the regulatory framework for the production of nuclear energy in Brazil, clarifying the governance of the nuclear sector. Furthermore, the authors stress the desirable rearrangement of the nuclear sector and discuss some important issues such as the control of the nuclear waste policy and the implementation of projects that facilitate the integration of existing capabilities and infrastructure.

In the twelfth chapter, Fernando Rei and José Goldemberg summarize the regulatory framework of the biomass energy production in Brazil, highlighting major current issues related to the production of ethanol from sugarcane and to the efficient use of charcoal.

In the thirteenth chapter, Welber Barral, Renata Amaral, and Thiago Elert focus on the international regulation of energy trade and on the various types of subsidies

within the energy sector, emphasizing the impact of international rules on Latin American countries and their energy integration projects.

We expect that the book contributes to provide useful updated information and to local specialists' insights into the complexities of the Brazilian energy sector. The interdisciplinary approach adopted in the book aims at a convergence that not only will offer a safer background for scholars, practitioners, and investors interested in this sector but will also indirectly enhance development and attraction of opportunities for the country.

Acknowledgments Editors would like to acknowledge the collaboration of Pedro Cini, Vitória Lombello, and Arthur Brasil to the early formatting and correction of the manuscripts.

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