Energy Security
A Challenge for Peru in the XXI Century[1]

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Editors

Introduction

The abrupt increase in the price of petroleum, from $85 per barrel in February 2007 to $137.11 per barrel in June 2008, immediately impacted the price of gasoline and the cost to consumers globally. This new oil price shock brought to the forefront the subject of energy security.

Unlike the oil price shocks that had occurred in previous decades, this latest one has struck in a global context characterized by: greater interdependence among countries; the information technology revolution; supranational armed insurgent groups; the pressures of global environmental deterioration; interconnected financial markets; extended energy infrastructure; and the emergence of new consumer energy markets. As a result, this latest oil price shock calls for a revision of the traditional conception of energy security that focuses on the disruption in energy supplies.

Throughout history, human development has been tied to one or several forms or sources of energy, and to technologies for using it, from the discovery of fire in prehistoric times, to the development of nuclear power in the present time. In short, without energy, development is not viable. All nations, rich and poor, must have sufficient and sustained quality sources of power.

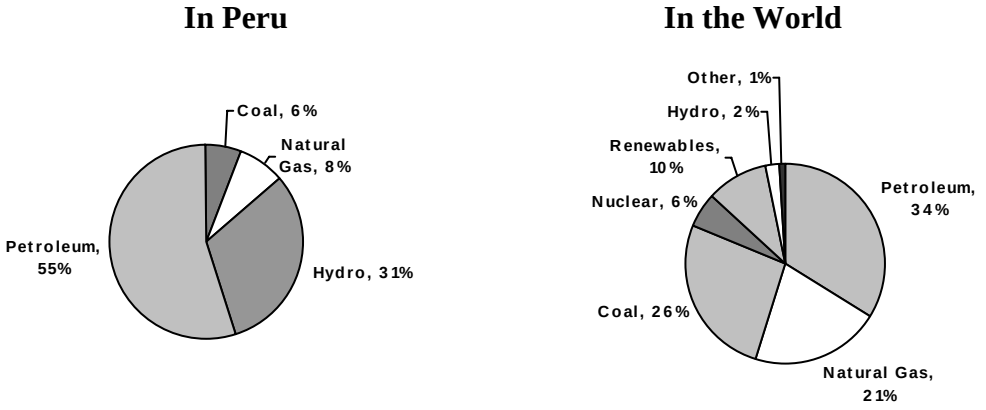
The global structure of energy demand is based mainly on fossil fuel consumption. According to projections regarding the structure of consumption, this situation will continue through 2030. This is also the case in Peru, where the demand for energy is mainly in the form of nonrenewable energy sources. (Figure 1)

From the point of view of energy security, the intensive use of coal, petroleum, and gas as primary sources of energy is not only subject to the risk of supply interruption, due to attacks or damage to physical infrastructure, but also due to geopolitical reasons. Such use also must face two factors that are likely to be a high priority in the 21st century: first, continually rising costs of natural resource exploration and extraction, putting an end to inexpensive energy; and second, the effects of carbon monoxide emissions on climate change.

The response of the international community to the risks outlined above has been varied. Some emphasize efforts toward rational energy use, improving energy efficiency. Others focus on the search for alternative sources of energy, such as nuclear power, to be developed commercially on a large scale. Still others focus on carbon sequestration to avoid its damaging effects on the atmosphere, or on liquid gas, among others. All of these

efforts require vast financial resources for research and development, which, despite global efforts, remain insufficient.

Figure 1. Structure of Energy Consumption



Source: Energy Information Administration, 2008.

The issue of energy security is not just of interest to the energy consuming countries; it is also of concern for energy producing countries, energy companies, financial centers, government agencies, industrial energy consumers, and individual consumers.

The successes and/or failures of the conceptions and of the implemented mechanisms of energy security in a country have significant repercussions in the economic sphere, on the environment, and on national security. For this reason, countries go to great lengths to: deign policies and implement mechanisms that permit them to improve energy efficiency; diversify their sources of supply; improve their energy portfolio; invest in research and development for technology innovation; improve the business environment to encourage investment in energy; develop systems for monitoring energy infrastructure; and develop foreign policies to minimize geopolitical risks, among others.

In Peru, energy security was a national concern in the 1980s and 1990s, due to blackouts that were produced by explosions at electrical towers by terrorist groups, which repeatedly left large sections of the country without power. However, at the close of first decade of the 21st century, despite the country's natural sources of hydro power and natural gas, Peru is currently experiencing an energy and gas supply crisis that has negative implications for economic growth and general welfare. This situation suggests the need for a re-thinking of approach and practice to energy security in the country. These aspects are discussed throughout this book.

This book aims to initiate a discussion around the theme of energy security in Peru in a comprehensive way. Peru is in a unique position, in terms of power resources, geographic locations, and human resources, to achieve high levels of energy security that will ensure economic development and societal prosperity.

The book is oriented toward stimulating answers to questions related to energy security in the country, such as the following:

- What are the potential risks for Peru of the present energy portfolio?
- What is the capacity in Peru for refinement and other infrastructure to cover the growing demand for petroleum-based products?
- Should the Peruvian government encourage the development of natural gas, and can the government ensure that environmental impacts will be mitigated?
- What is the significance for Peruvian consumers of the growing use of natural gas for electricity generation?
- What are the costs and benefits of developing infrastructure that supports the international commercialization of liquefied natural gas in Peru?
- How efficient is the role of the Peruvian regulatory authority to assure the benefits a competitive market in the provision of electricity?
- Should clear and measurable objectives for the development of sources alternative and renewable energy be established?
- What is the role of government and the private sector in developing existing alternative and renewable energy resources in Peru?
- What are the costs and benefits of a Peruvian national effort to improve energy efficiency?
- Do economic, regulatory, or other barriers exist in Peru that prevent the option of energy efficient technologies from satisfying the needs of the consumer?
- What should be the efforts of the state, the private sector, and universities in developing, in joint form, technology innovation programs in the area of energy in Peru?
- How can energy infrastructure protection mechanisms be improved in Peru?
- What measures should be adopted to improve the national business climate for encouraging investment in the energy sector in Peru?

This book is divided into four chapters, which cover different perspectives on specific aspects related to energy security in Peru. The multidisciplinary approach that the subject matter requires has allowed us to organize a group of authors who represent different perspectives and who, on the basis of their academic and/or practitioner experience in different areas of knowledge and economic activity, present a authoritative version of the topic.

In Chapter I, The Question of Energy Security, the issue of energy security in a global context is addressed. In order to accomplish this objective, the form in which the conception of energy security has evolved is examined. An analytical framework for understanding the subject and formulating concrete actions is presented. Finally, emerging trends that give form to the contemporary context of energy security, such as the emergence of new actors and institutions including national petroleum companies, sovereign wealth funds, the problems of sustainable development, and the relationship between energy security and competitiveness are examined.

In Chapter II, Energy Efficiency, the relationship between energy and climate change, which is observed through the river basins of the Andean glaciers that have begun to disappear, is addressed. Considering that 70% of electricity in the Andean countries comes from hydroelectric power, and recognizing that the hydroelectric potential of the Peru, which includes the Amazon region, is on the order of 60.000 MW, the chapter calls attention to the importance of its sources and the need for a geopolitical approach and more active involvement of the Peruvian state. The chapter examines how to avoid future energy crises in the context of energy market integration in the region.

In Chapter III, Diversification of the Energy Supply, the components of the Peruvian energy portfolio are analyzed in view of energy security. The current and future situation of renewable and non-renewable energy resources, mainly hydroelectric, wind, solar, biomass, and nuclear energy, is examined. In addition, the chapter covers the efforts undertaken to promote renewable energy.

In Chapter IV, Immediate Challenges, some of the main short-term problems are highlighted, emphasizing the role of science, technology, and innovation, as well as advances in the implementation and use of national technology. In addition, climate change, which has strategic importance for Peruvian energy security, is analyzed through an examination of the Mantaro river basin. The analysis is conducted through simulation models. The chapter concludes with a discussion of competitiveness with respect to infrastructure and technology and innovation capacity that jeopardizes the sustainable development of the country. It introduces the concept of responsible competitiveness that is linked to the protection of the environment and corporate social responsibility; the process of paradigm shift in the global economy; and the principles of energy security that must be respected.

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