



Mexican Council on
Foreign Relations

WORKING PAPER **Mexico**
and the Energy Revolution

ENERGY WORKING GROUP

Message from the President

“Mexico and the Energy Revolution” is the result of the dialogue and analysis completed by the Energy Working Group of the Mexican Council on International Affairs (COMEXI). Top level experts, specialists and connoisseurs on the subject discussed and presented a proposal with respect to a key issue on the current global stage: the changing energy landscape.

The COMEXI Working Groups are an initiative the Council recently created to encourage public debate and reflection on issues regarding Mexico and the world. The Working Groups aim to provide a unique opportunity to strengthen our analytical vocation with our multidisciplinary vision, aside from the personal opinions of the Council members. The groups reflect on the diverse views and experiences that nourish our membership; hence, the reflection arising therefrom expresses the position of their members and not the association's opinion as a whole or the COMEXI's position as an institution.

I hope this document helps spark a national debate based on the talent, experience and extensive knowledge this group of experts has on the subject, and contributes to an informed and systematic dialogue on the global energy landscape and its implications for Mexico.

Dr. Jaime Zabłudovsky

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Preface

In 2013, the Mexican Council on International Affairs (COMEXI) created an Energy Working Group with some of its distinguished members. The group presented a series of reflections on the global energy revolution and its geopolitical, economic and social development relevant to Mexico.

This report was prepared with the consensus of the members of the Working Group to the extent possible, and the sense of the majority in other cases. The members of the Working Group support the conclusions and policy recommendations expressed herein, and agree that this report is based on the consensus of the group or its majority, although not all members agree with each of the conclusions or recommendations.

The report does not represent the point of view of COMEXI nor of any of the institutions the Working Group members now belong to or have belonged to in the past.

The Working Group's material can be found at
<http://gruposdetrabajo.consejomexicano.org/energia>

Introduction

In 1956, American geologist M. King Hubbert presented a theory arguing that oil production had reached its peak, and would begin to fall hopelessly by the seventies. This well-known Peak Oil theory, determined, until recently, how we imagined the world at the end of the hydrocarbon era caused by depletion. Global price shocks in the seventies and the latest depletion of the Cantarell supergiant field, seemed to provide powerful and irrefutable evidence of irreparable future oil shortages, accompanied by a complex pricing environment during the transition to a new energy model.

In fact, just five years ago, during the 2008 discussion on the energy reform, former President Felipe Calderón presented the motives supporting the proposed reform, assuming that the “technological changes the world has experienced in recent years have served to supplement fossil fuels with a variety of renewable energy sources that will gradually replace those.” However, five short years later, this transition is now expected to last longer because of the profound change that has taken place.

The global energy situation changed in that short period and with it the world map. North America, particularly the United States and Canada, are leading a deep energy revolution that is providing access to the world of hydrocarbons that were not considered economically or technically recoverable in the past. Many of these resources are proposing an accelerated transformation of industrial processes based on natural gas, which leads to a significant reduction in greenhouse gas emissions and provides a few years to continue to develop renewable sources to replace hydrocarbons in due time. The old American dream of energy self-sufficiency may be possible, as well as a revival of its manufacturing capacity, and a profound transformation of the power and influence of all countries on the global energy diagram. That, which used to be a fact, is no longer true for anyone.

The U.S. oil production, which declined from 9.6 million barrels a day in 1970 to 4.95 in 2008, is now on the road to a strong recovery, already reaching 7 million¹¹ and projected to reach 10 million barrels by 2020. With natural gas, oil, coal, nuclear energy, biomass and renewable energies, the U.S. meets 80% of demand with domestic production and with the lowest price in the world in some cases, such as gas.

However, this revolution is not only an economic, technological or logistical challenge, but rather defies the imagination as seen in the eastern Mediterranean countries, Russia, Qatar, Kazakhstan, Canada, Brazil and Colombia among many other countries. This revolution is forcing the world to rethink the future, to explore the paradigms of the past, many derived from the vision of scarcity raised by Hubbert, to evaluate the relationship between today's decisions and the effects they produce on tomorrow. It is forcing them to ask whom they want to be and how they plan to achieve their goals because the energy to do so is now available.

This does not mean disallowing our past. We all know what happened on March 18th, 1938. Mexico expropriated the oil industry, and created a model of exploration and production which then took 95 barrels a day to market, and reached a peak of 1.5 million barrels before the Cantarell discovery.

¹ The U.S. Energy Information Administration, EIA, “Crude Oil Production” http://www.eia.gov/dnav/pet/pet_crd_crpdn_adc_mbbldpd_a.htm, March 2013.

Mexico built its post-revolution country during that period. It designed the image to answer the question posed as 'who are we?' It implemented a business model that systematically closed the country to achieving industrialization on its own.

In the 1980s, we made the changes needed when the economic and political crises taught us that the closed model of import replacement had stretched out. The country opened up on an economic, political and social level. Macroeconomic discipline became an irrefutable consensus along with commercial freedom and political democracy. It took over 30 years to complete the political and economic transition that now clearly shows that Mexico is a democracy with an economy based on competition and foreign trade, and commitment to growth and diversification, except when it comes to energy when we talk about oil and PEMEX. Here, our model continues to reference a closed economy that no longer exists, and whose central paradigm —the global oil shortage— and the price shock that accompanied the Cantarell discovery, is rapidly fading.

This is essentially the discussion we began in 2008, and are coming back to once again in 2013. Our energy model is incompatible with the vision for national development we imagined at the end of the 20th Century and consolidated at the beginning of the 21st Century. It is also incompatible with the competition, efficiency and production capacity the world now demands, but above all, it is incompatible with the image of a Mexican land that is politically independent and economically prosperous, that travels the world and brings the world to Mexico. It is incompatible with our right to think different and make that right a reality.

President Enrique Peña Nieto's government has been

clear on the need to implement a sweeping energy reform that will put us at the forefront of the global model, and do so now. This sense of urgency has been widely shared by those who have specialized on the subject's technical, institutional and economic proportions.

The Working Group prepared this paper to present its assessment of the subject divided into four parts. It begins by describing the crossroads Mexico faces in light of the movements in world energy supply and demand. It then presents an analysis of the cost of not implementing the reforms needed to exploit the opportunities offered by the new situation and manage the risks. The third part spells out the potential impacts produced by a sweeping energy reform, both in economic and social terms, while the fourth section evaluates the results of the 2008 reform and lays out a timely proposal on the axles the reform must follow, and that could be discussed over the course of this year. The proposal is not limited to broad strokes, but also includes detailed and concrete implementations.

These proposals suggest improvements to strengthen the State's power and increase its exploration and production capacity, both through PEMEX and third parties. It also suggests specific measures to strengthen our capacity for industrial transformation, which is essential if we want to benefit from the energy revolution. Most of all, it answers the often overlooked but crucial issue of regulation, institutional development and mainly mechanisms to attract revenues and the responsible management of such income.

We firmly believe that our country will make a momentous decision in the coming months that will produce significant consequences. We are all bound to a responsible engagement in the discussion with substantiated information.

Executive Summary

COMEXI, the Mexican Council on International Affairs has recently prompted the creation of different working groups to discuss specific topics of general interest. Comprised of COMEXI members, these groups seek to provide a sound analysis and an international perspective on major national issues. It specifically created the Energy Working Group this year (2013) that conducted a series of reflections, lectures, discussions and research on the impact of the global energy revolution in Mexico.

This energy revolution is disrupting the world of energy with momentous consequences in terms of supply, demand, technological access and human resource development. This is particularly evident in North America, where our neighbors and partners are developing a new model of hydrocarbon exploration and operation that is leading to the rebirth of their manufacturing sectors and their respective relations with the world. This study also identifies the challenges and opportunities that such transformations represent for Mexico, and presents a concrete proposal for an energy reform to insert the country in world trends, maximize the value of our energy resources, and use oil revenues to overturn the social backwardness that still hinders our nation's comprehensive national development.

Some of the main findings obtained from the study are described as follows:

- Global energy demand will increase by one third between 2010 and 2035² and its center will migrate from North America, the key to the United States' development in the 20th Century, to Asia Pacific, especially China and India.
- High international oil prices and rapid technological development have allowed the United States and Canada to increase their oil production and come close to achieving energy independence, primarily based on the massive exploitation of natural gas in oil shale fields, deep water and bituminous sands, also known as non-conventional reservoirs.
- This energy revolution in North America is also a new industrial revolution. The abundance of production inputs and their competitive prices have promoted the repatriation of manufacturing, driven the growth of jobs and triggered economic growth.
- Mexico can leverage the opportunity to jump on to the new industrialization of North America — or not — and also progressively lose its natural hydrocarbon export market.
- These regional transformations represent three main challenges for Mexico. It can continue to be a relevant player in international oil markets, secure its energy independence and maximize the value of its oil.
- The Mexican energy model is the relic of a closed economic system — the replacement of imports, which no longer reflects the open and competitive nature of virtually all economies or the complexity of the national energy situation.
- This can be seen, for example, in the fact that between 2005 and 2012, PEMEX imports of natural gas grew from 480 to 1.089 billion cubic feet per day while domestic production fell 14%³ between 2009 and 2012. If we include the imports of the CFE or Federal Electricity Commission and private user imports, the figure rises to 2,100 billion cubic feet per day.⁴
- On the other hand, the purchase of oil products from abroad grew from 334,000 to 669,000 barrels per day while petrochemical exports dropped from 867 to 602 million tons⁵.

² World Energy Outlook 2012 Executive Summary, International Energy Agency,
<http://www.iea.org/publications/freepublications/publication/English.pdf>, p.1

³ IMCO, "International Competitiveness Index 2013", July 2013, p.81

⁴ EIA, "Record Mexican Natural Gas Imports,"
<http://www.eia.gov/todayinenergy/detail.cfm?id=11291>, May 16th, 2013.

⁵ SENER, Energy Information System, "Foreign trade of natural gas" and "oil import volume"
<http://sie.energia.gob.mx/bdiController.do?action=cuadro&subAction=aplyption>

- Looking forward into the future is even more disturbing. Gasoline consumption between 2011 and 2026 will grow on average 3.7% per year (55.5% at the end of the period), the number of cars will increase from 25 to 63 million, and the number of cities will grow from 384 to 489.⁶ All of this growth requires energy.
- Today we are unable to meet our national energy demand, primarily natural gas and refined products, and if we do not drastically change our trade balance and platform production, we will become increasingly dependent on the outside and less competitive globally.
- Not only that, but the shortcomings found in the current schema are also reflected in an increasingly expensive exploration and production model. PEMEX has quadrupled its budget in the last 12 years⁷ and the country calls for much larger investments to meet its needs. At the same time, we experienced significant debt —US \$140 billion including labor liabilities— a set of regressive subsidies for more than 1.5% of GDP.
- Furthermore, the 25% decline in production recorded from the peak in 2004 (from 3.4 to 2.5 mbd), led to a 32% reduction in exports (from 1.9 to 1.3 mbd), representing a cumulative loss of income in this period totaling over US \$100 billion dollars, at reported export prices.
- The nature of our current deposits has also transformed to become more complex and therefore, more expensive than in the past. After the rapid depletion of our supergiant field Cantarell, our reality is now difficult oil and its technological exploitation curves are strongly marked in areas we do not dominate or know well.
- The challenge is particularly tricky to the extent that Mexico faces the impending retirement of a large number of skilled human resources in the coming years. This is a global phenomenon, and, given the long time it takes to replace this staff, a couple of decades of knowledge and experience raise a new dimension of competition between nations and companies to attract, develop and retain specialized technical staff.
- Even with the difficulty faced in the exploitation and declining profit margins in unconventional reservoirs, Mexico has a huge potential for economically viable resources waiting to be exploited.
- According to 2013 estimates by the U.S. Energy Information Administration, Mexico has the sixth largest technologically recoverable shale gas reserves (545 trillion cubic feet) worldwide.⁸
- In order for Mexico to properly exploit these opportunities — reverse national shortage trends and the inefficient investment in the sector—, we need to change the energy model, and create a new one that allows us to achieve the following objectives:
 - Significantly increase oil and gas production (multiplying execution capacity, effective management and attracting investment),
 - Improve our ability to transform it into electricity, fuel and petrochemical products,
 - Aim for the energy efficiency standards future growth will require, and
 - Shore up the State's governance, industry regulations, and the responsible management of resources and profits obtained from such based on technical efficiency, transparency and intergenerational justice criteria

⁶ SENER, "Prospects for Oil between 2012 and 2026," http://www.sener.gob.mx/res/PE_and_DT/pub/2012/PP_2012_2026.pdf, 2012, p.137 and 140

⁷ PEMEX, Financial Reports and Report F20, <http://www.ri.pemex.com/index.cfm>, several years.

⁸ EIA; Technically Recoverable Shale Oil and Shale Gas Resources: An Assessment of 137 Shale Formations in 41 Countries Outside the United States, <http://www.eia.gov/analysis/studies/worldshalegas/pdf/fullreport.pdf>, June 2013.

- Five short years ago we embarked on an energy reform that, while it helped break the belief that hydrocarbons were not subject to a national debate, it produced decidedly limited practical effects. Overall, it was unable to produce reform conditions conducive to innovation, cost reduction and the exploitation of underperforming deposits.
- At that time, in 2008, the political complexity of the issue overrode technical and economic sense. As a result, today we do not have the same tools as other countries. While the State in Mexico absorbs the full risk of not transforming PEMEX into a real business and not permitting mechanisms for private participation other than service contracts, other nations transfer this risk and cost to public or private companies, without affecting their power over the resources.
- In the current discussion, we must understand that the nation's ownership of its oil and gas is consistent with allowing for competition in the sector and that we can establish a balance between state control of oil and the optimization of its value.
- From the analysis described above, we believe that an effective energy reform must be grounded on at least three fundamental principles:
 - a) Openness to competition, with the concurrence of the state enterprise,
 - b) Strengthen the state enterprise to be able to compete under the industry's new organization, and
 - c) Reinforce the State's governance and its regulatory instruments.
- Such reform should include a constitutional review to ensure legal certainty, and a number of reforms to secondary laws that collectively provide a legal framework for easy tracking and implementation purposes.
- Without a reform to create the conditions for a competitive energy market and maximize oil revenues, Mexico will only be an observer and not a player in the energy revolution. It will progressively weaken its position as an oil country, diminish its energy independence and miss out on the opportunity to use the nation's wealth to actually change the lives of Mexicans.