

**INSTITUTO TECNOLÓGICO Y DE ESTUDIOS
SUPERIORES DE MONTERREY**

CAMPUS MONTERREY

**ESCUELA DE GRADUADOS EN ADMINISTRACIÓN PÚBLICA
Y POLÍTICA PÚBLICA**



PEMEX AND THE CHALLENGE OF ENERGY MODERNIZATION:

**AN ANALYSIS OF STRATEGIES FOR REFORMING
THE OIL INDUSTRY IN MEXICO**

THESIS

Master in Public Administration and Public Policy

by

RICARDO FALCÓN BAUTISTA

**May 2006
Monterrey, Nuevo León**

*To my parents,
Ricardo and Laura,
for the love and support
they have always endowed me with.*

*To my brothers,
Ronni, Muriel, and Mariano,
for being my best friends.*

*To Yesica,
for her companionship
and her relentless devotion to
understand my thoughts and actions.*

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THESIS

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for the Degree of

Master in Public Administration and Public Policy

Approved by the Thesis Supervisory Committee

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Abstract

Today, Mexico is struggling for the implementation of structural reforms that could provide for stable economic development. One of the federal government's major tasks is the modernization of the energy sector in order to provide the country with adequate and sustainable sources of energy, particularly regarding petroleum and its derivative products. The public debate on the restructuring process of the domestic oil industry is inextricably related to the state's responsibility of procuring a solid budgetary income while simultaneously ensuring suitable fiscal proceeds without having to depend so much on oil revenues derived from Pemex, the state-owned oil company of Mexico.

How can the Mexican government simultaneously address the structural issues of Pemex while confronting the challenge of energy modernization? This research project analyzes the main structural issues that affect Pemex's current performance in order to understand why energy modernization has not been fully accomplished in Mexico. I argue that Pemex has become a stagnate state oil company because (a) its legal framework does not reflect the current needs of the Mexican oil industry, (b) its political context has not allowed for the implementation of innovative oil reforms, and because (c) its economic situation is faltering due to decapitalization, indebtedness, and high-risk massive investment in the *upstream* level.

This information allows for another major task: to find out what set of policy strategies the government should focus on in order to ensure both the viability of its oil industry and the modernization of the energy sector as a whole. Thus, the primary objective of this project goes beyond a simple depiction of the problem. Using historical research and document-based case study methodology, I explain the legal, political, and economic factors that have led Pemex to stagnation, and explore what alternatives can be undertaken to improve the state oil company's situation in order to pave the way towards energy modernization in Mexico.

Key concepts: stagnation of Pemex, legal framework, political context, economic situation, state ownership, fiscal reform, transparency, accountability, oil reserve recovery program.

List of Acronyms

AOIS	Agreement on the Oil Income Scheme
API	American Petroleum Institute
ARE	<i>Aprovechamiento sobre Rendimientos Excedentes</i> (Tax on Excess Yields)
ASF	<i>Auditoría Superior de la Federación</i> (Federal Auditing Bureau)
BMV	<i>Bolsa Mexicana de Valores</i> (Mexican Stock Exchange)
BTUs	British Thermal Units
CIA	U.S. Central Intelligence Agency
CNC	<i>Confederación Nacional Campesina</i> (National Confederation of Peasants)
COFIPE	<i>Código Federal de Instituciones y Procedimientos Electorales</i> (Federal Code of Electoral Institutions and Procedures)
CPEUM	<i>Constitución Política de los Estados Unidos Mexicanos</i> (Political Constitution of the Mexican United States)
CRE	<i>Comisión Reguladora de Energía</i> (Energy Regulatory Commission)
CROM	<i>Confederación Regional de Obreros Mexicanos</i> (Regional Confederation of Mexican Workers)
CSMs	<i>Contratos de Servicios Múltiples</i> (Multiple Services Contracts)
CTM	<i>Confederación de Trabajadores Mexicanos</i> (Confederation of Mexican Workers)
DOE	U.S. Department of Energy
DOF	<i>Diario Oficial de la Federación</i> (Official Journal of the Federation)
EIA	U.S. Energy Information Administration
FEIP	<i>Fondo de Estabilización de Ingresos Petroleros</i> (Oil Revenue Stabilization Fund)
FRL	Federal Revenue Law of 1997
IEA	International Energy Agency
IEPS	<i>Impuesto Especial sobre Producción y Servicios</i> (Special Tax on Production and Services)
IFE	<i>Instituto Federal Electoral</i> (Federal Electoral Institute)
IMF	International Monetary Fund
IMP	<i>Instituto Mexicano del Petróleo</i> (Mexican Institute of Petroleum)
INEGI	<i>Instituto Nacional de Estadística, Geografía e Informática</i> (National Institute of Statistics, Geography, and Informatics)
ISI	Import-substitution industrialization
IVA	<i>Impuesto al Valor Agregado</i> (Value Added Tax)
JCA	<i>Junta de Conciliación y Arbitraje</i> (Conciliation and Arbitrage Committee)
LIT	Law of Industries of Transformation of 1941
NAFA	North American Framework Agreement
NAFIN	<i>Nacional Financiera</i> (National Financing Institution)
NAFTA	North American Free Trade Agreement

OER	Oil Extraction Rights
OPEC	Organization of Petroleum Exporting Countries
ORRP	Oil Reserve Recovery Program
PAN	<i>Partido Acción Nacional</i> (National Action Party)
PECE	<i>Pacto para la Estabilidad, la Competitividad y el Empleo</i> (Pact for Stability, Competitivity, and Employment)
Pemex	<i>Petróleos Mexicanos</i>
PEP	<i>Pemex Exploración y Producción</i> (Pemex Exploration and Production)
PGD	<i>Plan Global de Desarrollo</i> (Global Plan for Development)
PGPB	<i>Pemex Gas y Petroquímica Básica</i> (Pemex Gas and Basic Petrochemicals)
PGR	<i>Procuraduría General de la República</i> (Prosecuting Attorney of the Republic)
Pidiregas	<i>Proyectos de Inversión Directa en Infraestructura Productiva de Largo Plazo con Impacto Diferido en el Registro del Gasto Público</i> (Long-term Productive Infrastructure Projects with Deferred Impact in the Recording of Public Expenditure)
PIRE	<i>Programa Inmediato de Reordenación Económica</i> (Immediate Program for Economic Reordering)
PMI	<i>Petróleos Mexicanos Internacional / PMI Comercio Internacional</i>
PND	<i>Plan Nacional de Desarrollo 2001–2006</i> (National Plan for Development 2001–2006)
PPQ	<i>Pemex Petroquímica</i> (Pemex Petrochemical Unit)
PR	<i>Pemex Refinación</i> (Pemex Refining Unit)
PRD	<i>Partido de la Revolución Democrática</i> (Party of Democratic Revolution)
PRI	<i>Partido Revolucionario Institucional</i> (Institutional Revolutionary Party)
PRM	<i>Partido de la Revolución Mexicana</i> (Party of the Mexican Revolution)
PROSENER	<i>Programa Sectorial de Energía 2001–2006</i> (Energy Sectorial Program 2001–2006)
PSE	<i>Pacto de Solidaridad Económica</i> (Economic Solidarity Pact)
R&D	Research and development
SAT	<i>Servicio de Administración Tributaria</i> (Tax Administration Bureau)
SENER	<i>Secretaría de Energía</i> (Secretary of Energy)
SHCP	<i>Secretaría de Hacienda y Crédito Público</i> (Ministry of Finance and Public Credit)
STPRM	<i>Sindicato de Trabajadores Petroleros de la República Mexicana</i> (Oil Workers' Union of the Mexican Republic)
USLC	U.S. Library of Congress
WEC	World Energy Council

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1. Introduction

Mexico's oil reserves will deplete in year 2016 if production continues at the current intensity level. Even though the country ranks ninth in the world for proved oil reserves and fifth for total oil production (U.S. Department of Energy [DOE], 2005; U.S. Energy Information Administration [EIA], 2004), data reveal that exhaustion is imminent. Between 1995 and 2005, crude oil total reserves plunged from 44.1 billion to 33.3 billion barrels, thus representing a nominal decrease of 10.8 billion barrels within a ten-year-long period (Secretaría de Energía [SENER], 2005). For the last five years, proved oil and gas reserves have decreased in 50%, falling from 32.6 billion barrels of crude oil equivalent in 2001 to 16.5 billion barrels in 2005 (Rodríguez, 13-V-2006). Depletion would not be so disconcerting for the national panorama if the federal government depended less on oil revenues to achieve economic policy objectives. The reality, however, is that for the last three decades Mexico's public financing structure has followed the course of petrolization.

This phenomenon has been particularly noticeable during the Fox administration. Between 2000 and 2005, the proportion of oil revenues within the federal government's total budgetary income rose from 27.53% to 37.27% (Secretaría de Hacienda y Crédito Público [SHCP], 2006). Concurrently, crude oil total production increased from 3.01 million to 3.33 million barrels per day during the same period, with a record output of 3.38 million daily barrels daily in 2004 (Pemex Statistical Yearbook [PMXSY], 2005). Growing international oil prices have become central for the Mexican government to promote a policy of intensive oil exploitation in search of enlarging exports, and consequently oil-related fiscal proceeds. As a result, higher energy revenues have led to some fiscal consolidation in Mexico for the last three years (International Monetary Fund [IMF], 2006), but for how long can this trend continue?

Today, Mexico is facing the challenge of energy modernization, which refers to the reforming process that countries have to cope with in order to provide for adequate and sustainable sources of energy. The development of the domestic oil sector seems to be deterred by factors that go beyond the central problem itself. To begin with, Petróleos

Mexicanos (Pemex), the state-owned oil company, has confronted diverse structural issues related to the legal, political, and economic aspects.

Pemex is the foremost state-owned corporation in Mexico and the ninth largest integrated oil company in the world (Petroleum Intelligence Weekly [PIW], XII-2004). Although it was not dismantled during the economic liberalization process of the 1980s and 1990s, the state oil company has experienced significant changes since then (Barkin, 2003). The 1938 expropriation of the oil industry of Mexico and the subsequent creation of Pemex have been symbols of “sovereignty and national identity” to important sectors of the Mexican society (Shields, 2003:7). However, the spirit of “authentic nationalistic revolution” (Tanennbaum, as cited in Krauze, 2000:24) that emerged from these episodes is currently at stake by serious threats to Mexico’s energy capabilities.

Pemex has remained the third largest crude oil producer in the world for the last four years and has maintained its position as one of the top ten petroleum companies within the global oil market (PMXSY, 2005). Even so, Pemex is being overwhelmed by matters such as (a) state over-regulation on oil operations, (b) a lack of financial autonomy, (c) limited project-management capabilities, and (d) an enormous fiscal compulsion that the federal government imposes over oil-related activities to sustain the public budgetary income (Shields, 2003).¹ These factors have provoked the unavailability of capital for research and development in the domestic oil sector, and consequently the continuous exhaustion of national oil reserves. This project analyzes the structural issues of Pemex both to identify their influence over the Mexican oil industry’s performance and to put forth a set of oil policy recommendations with the hope of contributing to the definition of Mexico’s path towards energy modernization.

1.1. Social problem and research questions

Pemex is currently being affected by structural issues related to legal, political, and economic aspects. The problem is that the Mexican government has not developed adequate policy strategies for reforming the national oil industry in order to face the

¹ According to the U.S. Energy Information Administration (2004:3), in 2003 the Mexican government relied on Pemex for about one-third of its budget, with Pemex and its subsidiaries turning over an estimated 60% of their annual revenues to the government. An additional 8% of Pemex revenues were used to cover pension liabilities.

challenge of energy modernization. Oil policy strategies should deal with matters such as: (a) the need for consensus among interest groups and governmental institutions to design innovative oil-policy alternatives; (b) the need for political concurrence between the legislative and the executive branches of the government to implement structural reforms; (c) a revision of the oil sector's legal framework regarding Mexico's subsoil exploitation regime; and (d) transparency and accountability of Pemex's financial and fiscal assessment.

Considering the social problem to be analyzed in this project, the central research question is, "How can the Mexican government simultaneously address the structural issues of Pemex while confronting the challenge of energy modernization?" Three sub-questions complement this main inquiry. First, what are the structural issues that Pemex is currently facing? Second, how do the structural issues of Pemex affect the performance of the Mexican oil industry? Third, what set of policy strategies can be implemented to reform Pemex in order to meet the challenge of energy modernization?

1.2. Thesis argument

The argument of this thesis is that Pemex has become a stagnate state oil company because: (a) its legal framework does not reflect the current needs of the Mexican oil industry, (b) its political context has not allowed for the implementation of innovative oil reforms, and because (c) its economic situation is faltering due to decapitalization, indebtedness, and high-risk massive investment in the *upstream* level.

1.3. General and specific objectives

This research project analyzes the main structural issues that affect Pemex's current performance. The intention is to reveal to what extent Pemex's structural issues are factors that explain why energy modernization has not been fully accomplished in Mexico. This information allows for another major task: to find out what set of policy strategies the government should focus on in order to ensure both the viability of its oil industry and the modernization of the energy sector as a whole. Thus, the primary objective goes beyond a simple depiction of the problem. This project explores what

alternatives can be undertaken to improve Pemex's productivity so as to pave the way towards energy modernization in Mexico. The specific objectives are:

1. To describe the Mexican oil industry through the depiction of its core issues, its historical background, and its institutional features on both the international and the national realms.
2. To explain the legal, political, and economic structural issues that Pemex is currently facing in order to deduce their level of causality over the stagnation of the Mexican oil sector.
3. To provide a set of recommendations for undertaking policy strategies that could solve Pemex's structural issues, looking towards the reformation of the Mexican oil industry in the face of the challenge of energy modernization.

1.4. Contributions of this project

This project contributes in several ways to the study of the Mexican oil policy in both the academic and the public policy-making areas. First, it offers a comprehensive outlook of the main factors that affect the functioning of Pemex, and consequently the performance of the Mexican oil industry. Second, it provides a systemic analysis of the structural issues of Pemex that have been typically studied separately by other scholars. Third, it puts forth a set of recommendations for oil policy-makers to address Mexico's upcoming energy modernization challenges.

1.5. Justification

Why is it important to identify the crucial problems of Pemex, and why is such knowledge significant to Mexico? To find satisfactory answers, this research project is justified by the following ideas. Pemex has been historically the most influential public enterprise on the economic and political context of contemporary Mexico. This fact elucidates the developmental objectives that the Mexican modern state has pursued in the course of its process of consolidation. The Mexican government has pledged its ideological, institutional, and procedural principles through the definition of the national oil policy. Therefore, the analysis of the national oil policy allows for an understanding of

the Mexican oil industry's functioning, and consequently for a better comprehension of Pemex's structural issues. To address Pemex's main issues is to head toward Mexico's energy modernization via transformational oil-policy strategies. This research project examines the structural issues of Pemex in order to explore for feasible solutions that could contribute to that major task.

1.6. Scope and limitations of the project

This project addresses different perspectives of the Mexican oil industry, and yet, it keeps a fundamental scope that is the comprehensive understanding of the current situation of Pemex and its future implications for Mexico's economic development. This thesis is mainly historical research, based on documental evidence for explaining the relation that exists between several critical factors that affect Pemex. Thus, this study focuses on legal, political, and economic structural issues regarding the general topic, and only considers other aspects so long as they are significant for the thesis argument.

This is not an exhaustive analysis of Pemex's financial and operative issues, nor is it an extensive reformulation of the Mexican energy policy in the oil sector. Instead, this study offers a series of recommendations to define a concrete, feasible oil policy in the short term. For that reason, this project does not offer an in-depth assessment on Pemex's financial and operative standards, or any theoretical model for restructuring the Mexican oil industry. Rather, it focuses on a more general analysis of the causes that have led Pemex to its current circumstances, and the possible alternatives that could be undertaken to improve the performance of the Mexican oil industry.

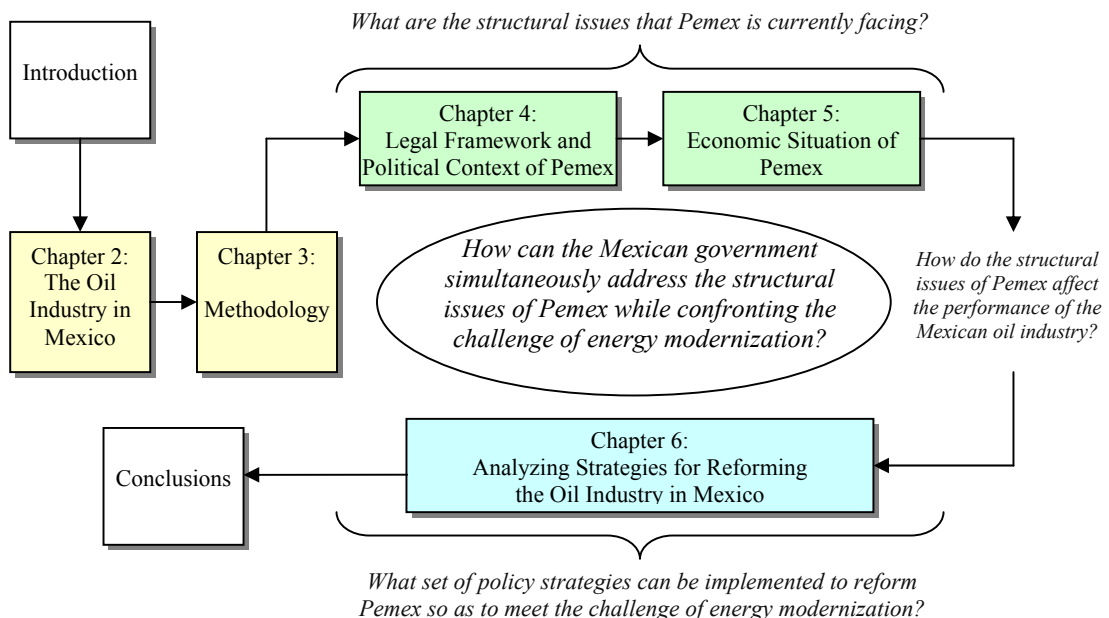
1.7. Organization of thesis

The remainder of this thesis is organized as follows: chapters 2 and 3 provide the background of the case study and the theoretical approach, and the last three chapters focus on the analysis of Pemex's current state of affairs. Specifically, Chapter 2 contains an overview of the contemporary Mexican oil industry, its historical background, and the institutional framework of the Mexican oil policy. Chapter 3 describes both the conceptual framework upon which the concept of public policy analysis stands and

methodology. In addition, Chapter 3 discusses some ideas related to the importance of analyzing the Mexican oil policy from a systemic approach. It also describes the way in which public policy analysis is applied in the Pemex case study.

Chapters 4, 5, and 6 are the analytical sections of this research project. Chapter 4 is an explanatory analysis of Pemex’s legal and political issues that are classified in two conceptual categories: legal framework and political context. Chapter 5 discusses the economic situation of Pemex. I address these aspects to find out to what extent the structural characters of the Mexican modern state have influenced the performance of the national oil industry and vice versa.

Chapter 6 consists of an exploratory analysis of strategies for reforming the oil industry in Mexico. This chapter intends to be an experimental energy policy planning in which the conventional steps of public policy analysis will be the main guidelines for making recommendations. Finally, I offer some conclusions that will focus on the main accomplishments of this research project, including a synthesis of the thesis argument and a number of reflections about the future challenges entailed in Mexico’s course towards energy modernization. The structure of this thesis is illustrated as follows:



2. The Oil Industry in Mexico

This chapter describes the Mexican oil industry. The first section portrays the main characteristics of the contemporary Mexican oil panorama. The second section analyzes the modern history of the Mexican oil industry from 1934 to 2000. The third section discusses the major trends and challenges that the domestic oil sector has faced during the Fox administration. The last part of this chapter evaluates the national oil policy to illustrate the institutional framework that encloses the oil industry in Mexico.

2.1. Contemporary oil panorama of Mexico

Mexico is one of the largest emerging markets in the world. Its population is estimated at 106.2 million, with an average annual growth of 1.17% (U.S. Central Intelligence Agency [CIA], 2005). If this growth rate remains constant, the population will double to 212.4 million by 2064. Therefore, real GDP must grow at the same rate simply to maintain a constant average standard of living. A closer examination of the data reveals that Mexico's economic growth, however, has not been stable. From 1965 to 1979, real GDP per capita annually increased by 3.7% due to high rates of capital formation, intensifying commercial energy consumption, and technological progress embodied in new capital stocks. Conversely, from 1979 to 2000, macroeconomic productivity stagnated because of financial disturbances, including sharp peso devaluations and rising energy prices. It was not until 2000 when productivity rates did recover to the level of 1979 (Moroney & Dieck-Assad, 2005).

There is a close link between productivity and standards of living. The acute economic contrasts between both periods (1965–1979 and 1979–2000) confirm that a long-term decline in productivity necessarily leads to a corresponding decay in the standards of living (Moroney & Dieck-Assad, 2005). By 2001, Mexico's real GDP per capita stood at 8,770 international dollars (adjusted for purchasing power parity) in comparison to the U.S. real GDP per capita of 34,870 dollars – almost the quadruple than that of Mexico. Poverty, income inequality, and unemployment are some of the numerous challenges that Mexico has faced for the last two decades.

What does energy has to do in this situation? Energy plays a crucial role in Mexico as oil is intimately related to development. Oil has been of the highest priority to Mexico both because its petroliferous reserves are considerably large and because oil exports are the principal source of foreign exchange (Moroney & Dieck-Assad, 2005) (see Appendix A). In fact, the country produces more energy than it consumes, and relies almost completely on fossil fuels for commercial energy (2005).

With an estimated 14.8 billion barrels of total proved oil reserves at the end of 2004 – from a world total of 1,188.6 billion barrels –, Mexico ranks ninth in the world for proved oil reserves (U.S. Department of Energy [DOE], 2005). Most analysts agree that Mexico has the third-largest proven conventional crude oil reserves in the Western Hemisphere after Venezuela and the United States (U.S. Energy Information Administration [EIA], 2004). Around 56% of Mexican oil reserves are located in the Gulf of Mexico (particularly in the state of Campeche), 24% in the Chicantepec region (the state of Veracruz), and 15% in the states of Chiapas and Tabasco (Economist Intelligence Unit [EIU], 2002).

Mexico is also the fifth largest oil producer in the world (see Table 2a) (BP Statistical Review of World Energy [BPSRWE], 2005; EIA, 2004). In 2004, Mexico's total oil production stood for 3.83 million barrels per day – equivalent to 190.7 million metric tons. This figure accounted for a 4.9% of total oil production worldwide, with a positive change of 1% over the 2003 figure and an *R/P ratio* equal to 10.6 (BPSRWE, 2005).² About 75% of Mexico's oil output comes from the Bay of Campeche, situated in the Gulf of Mexico along the Yucatán Peninsula. The most productive oil field in Campeche is Cantarell, which is located about sixty miles offshore.³

² The *reserve-to-production* (R/P) ratio represents the length of time that the remaining reserves of a country would last if production were to continue at a given level (BP Statistical Review of World Energy [BPSRWE], 2005). Data reveal that Mexico's oil reserves will last no longer than 11 years at the current production level.

³ From 1979 to date, Cantarell has become one of the largest oil complexes ever discovered, with an estimated 35 billion barrels of oil originally in place (Moroney & Dieck-Assad, 2005). Today, this oil field produces approximately 1.9 million barrels per day, comparable to about half of the country's total oil output. The four major subfields that compose the Cantarell complex are Akal, Nohoch, Chac, and Kutz.

Table 2a. Top World Oil Producers, 2004*

Rank	Country (OPEC members in italics)	Total Oil Production** (million barrels per day)
1	<i>Saudi arabia</i>	10.37
2	Russia	9.27
3	United states	8.69
4	<i>Iran</i>	4.09
5	Mexico	3.83
6	China	3.62
7	Norway	3.18
8	Canada	3.14
9	<i>Venezuela</i>	2.86
10	<i>United arab emirates</i>	2.76
11	<i>Kuwait</i>	2.51
12	<i>Nigeria</i>	2.51
13	United kingdom	2.08
14	Iraq	2.03

* Table includes all countries with total oil production exceeding 2 million barrels per day in 2004
**Total oil production includes crude oil, natural gas liquids, condensate, refinery gain, and other liquids

Source: EIA (2005).

Crude oil (including lease condensates) is the dominant fossil fuel produced in Mexico. In 2001, it accounted for 76% of the total fossil fuels produced nationally. Accordingly, crude oil production increased from 4.26 quadrillion *British Thermal Units* (BTUs) in 1980 to approximately 6.93 quadrillion BTUs in 2001 (see Appendix B).⁴ Mexico generates three types of crude oil. The first is heavy Maya that has a 22-API density and accounts for approximately 52% of total oil production.⁵ The second is light, low-sulfur Isthmus that has 34 API degrees and represents about 28% of the output. The third is extra-light Olmeca that has 39 API degrees and accounts for about 20% of production. (Secretaría de Energía [SENER], 2005; DOE, 2005; EIU, 2002).

Fossil fuels are important to Mexico domestically because they provide for almost all of the country's energy consumption. Fossil fuels, including petroleum and its products, dry natural gas, and coal, represent an average 93.5% of the total energy consumed between 1980 and 2001. Specifically, petroleum and its products stood for 69% of the total primary energy in 1980 and 63% in 2001, thus representing a standard of 66% within a two-decade period (see Appendix C). In 2003, the country consumed 2.02

⁴ One BTU is the amount of heat required to raise the temperature of one pound (0.45 kilograms) of water one degree Fahrenheit at an initial temperature of 39.2 degrees Fahrenheit (4 degrees Celsius).

⁵ Crude oil quality can be classified in terms of density according to a standardized scale that is known as the *API density*. The API scale is validated internationally by the American Petroleum Institute (SENER, 2005).

million oil bpd (EIA, 2004). Energy consumption by 2010 is estimated to increase to 9.0 quadrillion BTUs at an average annual growth rate of 2.8% (DOE, 2005).

The difference between fossil fuel production and consumption is the portion available for exports. As indicated before, oil exports are the single most important source of Mexico's foreign exchange (Moroney & Dieck-Assad, 2005:9) (see Appendix A). In 2001, Mexico produced 6.93 quadrillion BTUs of oil and consumed 3.77 quadrillion BTUs, thus exporting 3.16 quadrillion BTUs of its oil, equal to 46% of total output. With total oil exports of 1.80 million bpd in 2004, Mexico is the world's ninth oil net exporter (see Table 2b).⁶

Table 2b. Top World Oil Net Exporters, 2004*

Rank	Country (OPEC members in italics)	Net Oil Exports (million barrels per day)
1	<i>Saudi Arabia</i>	8.73
2	Russia	6.67
3	Norway	2.91
4	<i>Iran</i>	2.55
5	<i>Venezuela</i>	2.36
6	<i>United Arab Emirates</i>	2.33
7	<i>Kuwait</i>	2.20
8	<i>Nigeria</i>	2.19
9	Mexico	1.80
10	<i>Algeria</i>	1.68
11	<i>Iraq</i>	1.48
12	<i>Libya</i>	1.34
13	Kazakhstan	1.06
14	Qatar	1.02

*Table includes all countries with net exports exceeding 1 million barrels per day in 2004.

Source: EIA (2005).

Mexico is the second largest supplier of crude oil to the United States, after Saudi Arabia. In the first semester of 2002, Mexico exported 1.446 million barrels per day to the United States, which is approximately 16% of U.S. total crude oil imports. Other oil export markets for Mexico are Spain, Netherlands Antilles, India, Central America and the Caribbean, Canada, Great Britain, Portugal, Japan, Israel, and Holland (DOE, 2005; Shields, 2003). As of 2004, Mexico exported a total average of 1.851 million barrels per

⁶ An oil net exporter is a country whose value of oil exports exceeds its value of oil imports.

day to the world. From this figure, 88.2% correspond to exports within America, 9.5% to Europe, and the remaining 2.3% to Asia and other regions of the world (SENER, 2005).⁷

Mexico is richly endowed with natural resources, particularly oil and gas. However, the current economic and demographic growth levels will cause energy demand to surpass the country's ability to generate additional supply. Data reveal that Mexico's oil remaining reserves will last no longer than 11 years at the current production level (BPSRWE, 2005). According to the IEA World Energy Investment Outlook (2003), Mexican oil production is projected to peak at 4.1 million barrels per day around 2010, and to remain flat during the following decade. After 2020, production is predicted to drop precipitously, reaching 2.7 million barrels per day in 2030 (IEA, 2003). The most crucial uncertainties about the development of the Mexican petroliferous sector are related to legal, political, and economic issues. To understand these factors it is important to analyze the historical background of the contemporary Mexican oil industry.

2.2. Modern history of the Mexican oil industry

The modern history of Mexico has been shaped by the trajectory of its oil industry. As suggested by Meyer, the history of the development of the national oil industry is essentially a history of political economy (as cited in De la Vega, 1996). This section confirms such idea through four parts, whereby each one corresponds to a specific period. The first part (1934–1940) corresponds to the *sexenio*⁸ during which Lázaro Cárdenas nationalized the oil industry of Mexico. This episode began the autonomy of the Mexican state from the foreign companies that had controlled the national oil business for decades. The oil expropriation and the subsequent creation of Pemex symbolized the spirit of Mexican revolutionary institutionalism. From then on, the history of the Mexican oil industry has been the history of Pemex. Thus, the origin of Pemex can be regarded as a historical landmark for analyzing the situation of the domestic oil sector.

The second part of this section describes the thirty-year phase (1940–1970) throughout which Mexico encouraged both a *stabilizing development* and a political

⁷ Author's own calculation from data of Secretaría de Energía. (2005). *Exports volume of crude oil* (Publication Code Excrumex251104.xls). Mexico, D.F.: SENER. Retrieved November 1, 2005 from http://www.energia.gob.mx/wb2/Sener/Sene_308_estadisticas_de_hidr

⁸ *Sexenio* is the concept by which the presidential six-year term is commonly known in Mexico.

consolidation of the official institutions by means of corporatism and co-optation. In this period, Pemex underwent a shift from a precarious, newly expropriated oil corporation to a consolidated petroliferous industry. The third part (1970–1982) corresponds to the stage of *petrolization* of the Mexican economy that ensued after the significant oil discoveries made in the bay of Campeche. In this phase, Mexico was affected by the crisis of the *import-substitution* developmental model that prevailed during the 1940–1970 period.

The fourth and last part of this section corresponds to the 1982–2000 period that encompassed both the incipient neoliberal attempts to renovate the state apparatus and the mature process of economic liberalization in Mexico. This period extends from the early *sexenio* of Miguel de la Madrid Hurtado (1982–1988) to the late term of Ernesto Zedillo Ponce de León (1994–2000). Pemex faced crucial challenges during this phase, especially because of structural issues related to the legal, political, and economic aspects. Altogether, this section consists of a historical background for explaining some of the main problems that affect the functioning of the Mexican oil industry.

2.2.1. The Cardenista nationalization: 1934–1940

The *sexenio* of General Lázaro Cárdenas is considered the milestone of Mexico's post-revolutionary history (Delgado, 1996). Between 1934 and 1940, Cárdenas committed to institutionalize the ideals of the Mexican Revolution by forging a power structure that would remain essentially intact for the next six decades. To do so, he stamped a mark of nationalism on his government by invoking the provisions of the *Mexican Constitution of 1917*.⁹ The 1934–1940 *sexenio* was also characterized by political consensus between a conciliatory Cárdenas and the nationalist sectors of the Mexican society, including the federal army, peasants, and workers (1996).

There are significant events that marked the rise of *Cardenismo* (Brown, 1993; Yergin, 1991; Medina, 1995; Arellano, 2000). In 1936, labor was reorganized into the *Confederación de Trabajadores Mexicanos* (CTM) under the leadership of Vicente Lombardo Toledano and Fidel Velázquez (Aguilar & Meyer, 1993). With the creation of the CTM, Cárdenas planned to wrest influence from the *Confederación Regional de Obreros*

⁹ Drafted during the Constituent Congress meeting in Querétaro under Venustiano Carranza's guidance, the Constitution of 1917 became the most important product of the Mexican Revolution.

Mexicanos (CROM).¹⁰ That same year, the national petroleum union was created under the name of *Sindicato de Trabajadores Petroleros de la República Mexicana* (STPRM). This union joined the CTM to systematically fortify the labor structure of Mexico.

In March 1938, the official party of Mexico was reorganized and renamed as *Partido de la Revolución Mexicana* (PRM). The objective of Cárdenas was to amplify the membership of the official party by incorporating the labor, agrarian, military, and popular sectors to a massive political apparatus.¹¹ This goal gained momentum in August 1938, when the *Confederación Nacional Campesina* (CNC) was created so as to confirm that the social basis of the Mexican political system was changing.

The *Cardenista* era of reformism reached its climax on March 18, 1938, when Cárdenas expropriated the Mexican oil industry from all foreign operations in response to the oil companies' denial to satisfy the labor demands that had existed since 1936 (Brown, 1993; U.S. Library of Congress [USLC], 2005). This episode is crucial for understanding the modern history of the Mexican oil industry because it established a clear-cut border between the foreign-managed, oil exploitation system that prevailed before 1938 and the state-owned, industrial scheme that emerged with the nationalization of Mexico's oil assets. The oil expropriation had a precedent in 1934, when "Petróleos de México" (Petromex) was formed with state majority capital to compete with the foreign companies and reduce the influence they had over the domestic oil market (Castillo, 2003). Even though "Petromex" did not become the foremost competitor, it confirmed the government's opposition to the foreign-owned companies that for many decades controlled the domestic oil sector.

Cárdenas was eager to support radicalism against foreign oil companies by means of a mass-based, nationalist labor policy. In July 1936, leaders of the newly born STPRM

¹⁰ The CROM (or Regional Confederation of Mexican Workers) was formed in 1918 in line with the labor provisions of constitutional Article 123. This union began a labor-politicization era that would eventually allow for the establishment of strong political coalitions between interest groups and the Mexican government. While the CTM concentrated the vast majority of labor associations, the CROM became gradually relegated.

¹¹ Notwithstanding the eclectic composition of the official party, numerous factions were not included because of their conservative position. Eventually, those groups found a niche in political associations such as the Partido Revolucionario Anti-comunista (PRAC, or Anti-communist Revolutionary Party), established in 1937; the Partido Acción Nacional (PAN, or National Action Party), founded in 1939 by Manuel Gómez Morín; and the Partido Revolucionario de Unificación Nacional (PRUN, or Revolutionary Party of National Unification), founded in 1940 by Juan Andrew Almazán's adherents (Delgado, 1996).

agreed to demand that the oil companies sign a *collective contract*,¹² and threatened to go on strike if their claim was rejected. After six months of unfruitful negotiations, the strike began in May 28, 1937, when the national oil union received CTM support to paralyze the industry. Despite the resulting oil-supplies shortage, numerous segments of the population approved the course of action of the STPRM (Delgado, 1996).

Considering how important the petroleum industry was to the Mexican economy, Cárdenas called for consensus among the divergent factions. Finally, after almost forty days of intense debates, the oil workers agreed to lift the strike on July 9, 1937. Shortly thereafter, a commission of experts, the *Junta de Conciliación y Arbitraje* (JCA), acted in accordance with the Mexican labor legislation by investigating if the oil companies were financially capable of affording the workers' demands (Delgado, 1996). The JCA concluded that neither the petroliferous regions nor the oil workers were experiencing optimum conditions. Moreover, there was evidence that demonstrated that the foreign-owned oil companies had implemented tax-evasive strategies to increase their revenues. Thus, the next step for the Mexican government was to penalize them.

Notwithstanding the JCA's sentence, oil companies remained unyielding to the workers' demands, assuming that Cárdenas could not support the oil union if a boycott was launched. The government, however, maintained its position in agreement with the JCA. On December 29, 1937, the Supreme Court of Justice denied legal protection to the foreign oil companies. The companies' representatives met with Cárdenas between March 3 and 7, 1938, looking for a suitable solution, but the meetings were not fruitful and tensions rose. In light of such an impasse, CTM leaders declared they felt ready to assume the responsibility of running the oil industry as a gesture of connivance to Cárdenas (Delgado, 1996).

A few days later, an exogenous factor seemed to create even better conditions for the Mexican government to overcome the challenge. On March 13, 1938, Adolph Hitler proclaimed the *Anschluss* (annexation) of Austria to the Third Reich, a day after the German Army occupied Vienna. The connection between the German occupation of Austria and the oil dispute in Mexico was quite clear: Cárdenas assumed that the

¹² Based on the principles of equity and mutual consensus, a *collective contract* is a written agreement that both employers and employees set, after concluding a bargaining process, in accordance with specific laws and regulations to address issues such as remuneration, working hours, labor insurance, occupational safety, and health (Commission for Labor Cooperation [CLP], 2000).

impending international conflict would be problematic enough as to impede any U.S./British incursion into Mexico in response to the decision of expropriating the oil industry (Delgado, 1996). Actually, Cárdenas was not far from correct. Both the external and internal factors that shaped the context at that moment were set in such a particular way that no other strategy than nationalization could have been expected.

On March 18, 1938, President Cárdenas publicly pronounced the application of the *Oil Industry Expropriation Decree*. This document declared that all foreign oil operations and properties would become part of the Mexican state patrimony (Zenteno, 1997; Griswold, 1995).¹³ The government instituted the National Cooperation Fund to manage the indemnity payments that the foreign companies were going to receive as the expropriation decree stipulated. On March 23, a demonstration was organized in Mexico City to show support of the decision that Cárdenas made on behalf the oil workforce. Then, on June 7, *Petróleos Mexicanos* (Pemex) was created to administer and operate the newly nationalized oil industry of Mexico (Pemex, 2005; Instituto Mexicano del Petróleo [IMP], 2005).

A few days after the oil expropriation, technical and financial difficulties sprouted everywhere. While some refineries were completely paralyzed, many others were operating at just half their capacity. There was simply not enough technology or advanced equipment available to immediately reactivate the petroleum industry.¹⁴ Cárdenas had no choice but to maintain the oil-occupancy level and to carry out the workers' demands. Notwithstanding

¹³ Expropriated foreign-owned assets included machinery, physical installations, buildings, pipelines, refineries, storage tanks, communication channels, and all real estate properties. The foreign oil companies affected by this measure were: (1) Compañía Mexicana de Petróleo El Águila; (2) Compañía de San Cristóbal; (3) Compañía Naviera San Ricardo; (4) Huasteca Petroleum Company; (5) Sinclair Piers Company; (6) California Standard Oil Co.; (7) Compañía Petrolera El Águila; (8) Compañía de Gas y Combustible Imperio; (9) Consolidated Oil Co.; (10) Compañía de Vapores San Antonio; (11) Sabalo Transportation Co.; (12) Clarita; and (13) Cacaillao. The British-Dutch assets of "El Águila" represented about 70.5% of the oil industry in Mexico, whereas American corporations controlled a 29.5% (Pazos, 1989). The indemnities stipulated by the 1938 Oil Expropriation Decree were not paid immediately due to the government's economic insolvency. The compensation to American oil companies initiated in 1940 and finalized until 1953, while the reimbursement to British oil corporations started in 1948 and finished in 1962 (1989).

¹⁴ Barbosa (as cited in Palacios, 2002:25) explains that "although the government had gone directly into the oil business in 1934 with the creation of a company named Petromex (later to be named Pemex), it did not have the capacity or expertise to manage the nationalized oil industry [as promptly as needed]." In fact, production decreased continuously over the ten years following the oil expropriation – the total production decrease reached almost 20% between 1937 and 1944 –, partly due to the suspension of all exploratory activities. Because of this situation, "production was 'carried out without any technical consideration or knowledge of the size and distribution of Mexico's oil reserves,' which resulted in an unnecessary exhaustion of existing wells (*Ibidem*)."

the obstacles of that moment, the nationalist spirit prevailed among the sociopolitical blocs as the main stimulus for renovating the oil industry (Pemex, 2005).

On November 9, 1940, a substantial reform to constitutional Article 27 was published in the *Official Journal of the Federation* (DOF).¹⁵ Compared with the former version, the renewed Article 27 suppressed the concessions regime and sanctioned instead the exclusivity of the state for exploiting the hydrocarbon resources of Mexico. This change asserted the absolute exclusion of any private-led exploitation of national hydrocarbons. Among other arguments, the Congress contended that there was no reason to keep supporting private interests because it was presumed that they could potentially become opposite to those of Mexico (Arellano, 2000; Zenteno, 1997). The origin of Pemex represented the end of an era of profound political antagonisms in Mexico, but it also symbolized the beginning of a new stage of crucial economic challenges.

2.2.2. Economic reactivation: 1940–1970

As of 1940, the Mexican state pursued economic and political strategies for ensuring national stability. From 1940 to 1970, the state-oriented model for economic growth encompassed the following aspects: (1) social assistance, (2) moderated inflation rates, (3) controlled balance of payments, (4) low taxation levels, and (5) accelerated *import-substitution* industrialization (ISI), with annual real gross national product (GNP) growth rates averaging over 6% (Aguilar & Meyer, 1993; Medina, 1995). In these years, Mexico transformed a part of its predominantly agricultural economy into a dynamic industrial one and became self-sufficient in the production of many goods (Babb, 2001:79), including basic oil products. For this reason, this stage is known either as the *stabilizing development* period or as the *Mexican miracle* (Teichman, 1995; Medina, 1995; Hamnett, 1999; Babb, 2001; Aguilar & Meyer, 1993; Anda, 2005; Jenkins, 2000).

¹⁵ The *Official Journal of the Federation* (DOF, by its acronym in Spanish) is the Mexican government's certified publication by which all laws, decrees, regulations, accords, dispositions, orders, and acts are divulged within the national territory in order to endow them with juridical validity. According to the law, it is an indispensable requisite for the Mexican government to publish any official act through the DOF to validate law enforcement. For a more detailed reading, see Chapter I of the *Ley del Diario Oficial de la Federación y Gacetas Gubernamentales* (1986). *Diario Oficial de la Federación*, 9-XII-1986. Congreso de los Estados Unidos Mexicanos. Retrieved January 5, 2006, from www.cddhcu.gob.mx/leyinfo/pdf/75.pdf. See also Article 4 of the *Ley Federal de Procedimiento Administrativo* (1994). *Diario Oficial de la Federación*, 4-VIII-1994; reform and amendment 24-XII-1996; reform 30-V-2000. Retrieved January 5, 2006, from <http://www.energia.gob.mx/work/resources/LocalContent/4063/1/Leyprocedadmvo.pdf>

The stabilizing development phase comprised five *sexenios*. The term of Manuel Ávila Camacho (1940–1946) was characterized by a rekindled political conservatism and a strategic foreign policy within the context of World War II. The presidency of Miguel Alemán (1946–1952) represented the consolidation of the official party’s power and a reaffirmation of the Mexico-U.S. relations. The administration of Adolfo Ruiz Cortines (1952–1958) was driven by a widespread anti-corruption campaign and the expansion of social assistance programs. The period of Adolfo López Mateos (1958–1964) was distinguished by a confirmation of the mass-based politics and a reemphasized institutional nationalism. Finally, the *sexenio* of Gustavo Díaz Ordaz (1964–1970) brought to light the flaws of the nationalist consensus project, especially following the 1968 “Massacre of Tlatelolco” that made the authoritarian aspects of the Mexican government impossible to ignore (Hamnett, 1999; USLC, 2005).¹⁶

During this time, Pemex evolved from an incipient oil-manufacturing sector to a consolidated, vertically integrated industry due to strategic management efforts (Morales, 1992). A first step was the 1941 *Law of Industries of Transformation* (LIT) that granted considerable tax exemptions to Mexican enterprises that were deemed vital for economic expansion. Next, the Bank of Mexico and the National Financing Institution (NAFIN, created in 1934) underwent restructuring to promote selective financing of both developmental industries and infrastructure projects. Known as “the greenhouse industry,” the protected industries allowed a steady incorporation of Mexico into international markets, especially

¹⁶ On October 2, 1968 (two years before President Gustavo Díaz Ordaz’s retirement), the summer Olympic Games to be celebrated in Mexico were preceded by a violent incident known as the “Massacre of Tlatelolco.” A crowd of about 5,000 convened in the Plaza of the Three Cultures in Mexico City – mostly students and discontented sectors of the society – to protest against an authoritarian government that seized political power by suppressing the voices of criticism. While in the gathering, “armed military units and tanks arrived on the scene and surrounded the demonstrators, while military helicopters hovered menacingly overhead.” Shortly thereafter, shots rang out. The panicked crowd “suddenly surged toward the military cordon, which reacted by shooting and bayoneting indiscriminately into the crowd (USLC, 2005).” The massacre, however, was not enough of a reason to suspend the Olympics. Díaz Ordaz “claimed to have saved the country from civil war and an international conspiracy to undermine its institutions, though it remained unclear which foreign country sought to destabilize [Mexico] and why (Hamnett, 1999:272).” It also seems he considered the Olympic Games as an opportunity to portray Mexico abroad as a developed, modern country. Thus, the Olympics proceeded on schedule. Nevertheless, the Tlatelolco episode “had a profound and lasting negative effect on the PRI’s public image. The authoritarian aspects of the Mexican political system had been starkly brought to the surface (USLC, 2005).”

that of North America (Werner, 2001).¹⁷ Such progress would not have been possible without the low-cost-energy policy that the Mexican state maintained in the oil and electricity sectors.

The provisions of the 1941 LIT signaled that petroleum had become a priority for Mexico's development. During the Ávila Camacho term, some attempts were done to retrieve foreign investments that resulted in the approval of a semi-retroactive modification of the 1941 *Regulatory Law to Article 27 concerning Petroleum Affairs* to allow the Mexican government to grant contracts for drilling and extracting petroleum (Zenteno, 1997). The concessions scheme was in fact tinged by the "contracts" model to assert the discretionary attribution that the executive branch had over the management of national subsoil resources, but foreign participation was not completely banned.

Mexico passed through a critical stage during World War II that impelled a more participative role of the state in the global order. In 1942, an official agreement was signed between the Mexico and the U.S. to stimulate the bilateral exchange of raw materials and commodities. The treaty granted Mexico unconditional *most-favored-nation* status. At least in theory, this measure established that the oil import barriers would be eliminated in the United States, due to their need to fuel the resistance against the "Berlin-Rome-Tokyo Axis" formed by Nazi Germany, Fascist Italy, and Imperialist Japan. However, the U.S. government could not sustain the stipulated supply quotas and so the Mexican government opted to begin economic protectionism of the national industry as of 1943 (Delgado, 1996).

Three years later, the political scenario of Mexico experienced significant changes. By 1946, the PRM included new groups of Mexican society. Representatives of businesses and industries approached the power structure to constitute a *de facto* liaison with the government. Signaling the end of the Revolution's transitional phase, the official party was renamed as the *Partido Revolucionario Institucional* (PRI). This event marked the beginning of a new era in which civilian politicians were the new rulers of the national political system. Their main goal was to balance the social pact between capital and labor (Hodges & Gandy, 2002). Thus, the military assumed a low profile under the corporatist-bureaucratic machinery of an industrializing, capitalist state (Aguilar & Meyer, 1993).

¹⁷ The Mexican industrial structure "underwent a relatively fast transition from simple manufacturing – as defined by its organization, technology, and distribution channels – to more complex manufacturing, which also meant the shift from perishable goods to intermediate, nonperishable, and capital goods (Werner, 2001:300)."

Known as the *Institutionalized Revolution* era (Meyer, Sherman & Deeds, 2003), the 1946–1958 period represents the rise of Mexican corporatism during the administrations of Miguel Alemán (1946–1952) and Adolfo Ruiz Cortines (1952–1958). Both presidents pledged economic growth by a strategy of large-scale industrialization, following ISI protectionist policies. Despite that effort, the oil industry remained unstable. In this phase, Pemex faced the challenge of vertically integrating the oil industry under state control (Morales, 1992), which was no easy task because the state oil company was already facing serious difficulties operating the primary oil-manufacturing sector. This condition was confirmed in the Wolverton Report by the Oil Affairs Committee of the U.S. Chamber of Representatives in 1949 (Barbosa, 2000). As said by Morales (1992):

From the very beginning, [Pemex’s vertical integration] proved hard to establish. On the one hand, production of crude oil had to be maintained and increased; on the other, it was necessary to develop a refining industry that would be virtually wholly geared toward a constantly expanding domestic market. Furthermore, the new company had begun as a nonprofit-making institution, to provide public services according to criteria of social utility... Hence, the activities of Pemex were governed by criteria other than those followed by private companies (p.208).

As a result, the oil mystique promoted by the state’s economic nationalism was challenged. The organizational – but not the ideological – features of Pemex were readjusted. At that time, the Regulatory Law of 1941 did not forbid the participation of foreign capital in the drilling, exploration and construction of wells, a fact that later led to the signing of *risk service contracts*¹⁸ with U.S. companies. Eventually, the conditions changed with the proclamation of the *Regulatory Law to Article 27 concerning Petroleum Affairs* of 1958, which was substituted for that of 1941. With the 1958 law, the concessions of the former version were finally revoked to become state property (Teichman, 1995; Zenteno, 1997). However, during the Ruiz Cortines *sexenio* the oil industry slowed down, despite the remarkable inland and offshore discoveries that took place in the states of Tamaulipas, Veracruz, Tabasco, and Campeche.

¹⁸ A *risk service contract* is the juridical act by which either one private company or several (acting together) can undertake exploration and exploitation tasks on its/their own account and risk. Contractors receive compensation only if commercially exploitable resources are discovered and according to pre-established, contractual stipulations (Garza, 2005:49).

Shortly after Ruiz Cortines's retirement, Adolfo López Mateos confronted a complicated economic situation during the 1958–1964 *sexenio*. Yet, by 1960, commerce had regained a significant position within the gross domestic product (GDP) with 29.2%, almost eight points above the 1950 figure. Manufacturing represented 18% of GDP, while agriculture and livestock accounted for 14.2%. Mining fell dramatically to 2.2%, while oil slightly increased to 2.4% of GDP (Anda, 2005). Pemex then experienced a consolidation phase due to an extensive oil workforce and financial recuperation (Teichman, 1995).

In the 1960s, Pemex mainly focused on meeting the demands of the domestic market at subsidized prices. Import substitution continued to be a priority, and union *cacicazgo*¹⁹ became an established labor practice. However, during this phase two opposite phenomena were observed. On the one hand, natural gas production and the manufacturing of petrochemical products were stimulated. On the other hand, reserves dropped and production lagged behind consumption. This was a sign of the impending crisis during the second half of the 1960s, which resulted in increased imports of oil products. From 1971 onward, Mexico would become a net importer of crude oil (Morales, 1992).²⁰

In 1965, the *Instituto Mexicano del Petróleo* (IMP) was created to provide Pemex with a technical-support network based on a permanent research program in areas such as seismology, gravimetry, and magnetometry (Barbosa, 2000).²¹ For the next three years, numerous oilfields were discovered in the Gulf of Mexico. However, the underlying contradiction between *dynamic exploration* and *precarious reserves* continued. Why did Mexico have enormous potential of reserves, but yet not enough oil to meet the existent demands? The answer is that almost all sophisticated exploration and extraction techniques

¹⁹ *Cacicazgo* refers to *cacique*, the generic term with which the indigenous cultures of Latin America called the chiefly rulers of their communities. Throughout time, and especially since the Colonial era, the concept of *cacique* suffered a connotative transformation for it was then used to referring to the powerful landowners of Mexico (RAE, 2005). Thus, *cacicazgo* can be defined as the land-owning regime that is based in the authoritative role of powerful land proprietors or *caciques*.

²⁰ A country whose value of crude-oil imports exceeds its value of crude-oil exports is a crude-oil net importer.

²¹ *Seismology* is “the science and study of earthquakes, and their causes and effects and attendant phenomena.” *Gravimetry* is the measurement of the variation in the force of gravity from one place to another. *Magnetometry* is the measurement and comparison of strengths of magnetic fields (Oxford English Dictionary [OED], 2005). These three scientific disciplines allowed IMP researchers to acknowledge how valuable a petroliferous zone was. By measuring the movement of plate tectonics, they could know what was the possible depth and structure of a subsoil petroleum deposit. Additionally, the gravimeter allowed them to know the composition and differential density of the materials that could possible underlie the earth's surface. Finally, the magnetometer permitted researchers to know what kinds of minerals were contained in a specific reservoir – to deduce if there was enough oil within the rock formations –, by measuring the variable magnetic charges of the area (Barbosa, 2000).

(i.e. offshore methods) were unaffordable for Pemex. Given the domestic economic conditions, both the government and Pemex's managers considered it more suitable to use cheap procedures to extract conventional, easy-to-pump hydrocarbons. This oil production scheme had obvious problems that would become visible years later.

2.2.3. Petrolization and economic crises: 1970–1982

In the early 1970s, the ISI protectionist model showed signs of failure when the domestic industry's decreasing growth-rate and the declining agricultural production forced the Mexican government to import growing quantities of raw materials (Werner, 2001). It was clear that the dichotomous structure of the Mexican state was facing fundamental contradictions: while populism prompted the instrumentation of social benefits and social mobility, capitalism encouraged the control of popular masses through corporatist syndicalism and cooptation (2001).

Following his election for the 1970–1976 *sexenio*, Luis Echeverría Álvarez criticized the political and economic system of Mexico and sought to reaffirm the founding principles of the Mexican Revolution. His intention was to implement practical measures for reactivating the economy and for encouraging the government's recovery of credibility and legitimacy. As a result, the Echeverría administration promoted a "consolidation" policy in accordance with the so-called *shared development* model (Anda, 2005). This state-led, economic formula intended to both (a) reinstate the economic initiative of the Mexican state within the economic-growth process, and (b) support the small and medium domestic businesses to lower the influence of national and foreign oligopolies.

With respect to the oil industry, the *Internal Law of Petróleos Mexicanos* was passed on February 6, 1971, in order to institutionally reaffirm the constitutional precepts related to state ownership and exploitation of hydrocarbons. On August 10, 1972, the *Regulation to the 1971 Internal Law* was issued to specify Pemex's functions and attributions (Morales, 1992; Zenteno, 1997). The provisions of these norms reasserted the nationalist principles that had favored the consolidation of Pemex since its creation. Up to 1971, Pemex's opposition to crude-oil imports contributed to a reduction in the import of by-products and reduced the financial pressures on its trade balance (Morales, 1992). Thus, Pemex turned inward, devoting itself to supplying the domestic market (Yergin, 1991).

Contrary to the government's expectations, the national economy was affected by external debt, uncontrolled public deficit, credit shrinkage, and inflation. This crisis was exacerbated in 1973, when the global recession destabilized the Mexican balance of payments due to the instability of the international financial system. That same year, oil prices increased dramatically as the OPEC Arab members imposed a general oil embargo in response to the outcome of the fourth Arab-Israeli War.²² The short-term consequences of this oil shock hurt Mexico because oil production was inward-oriented and did not cover its domestic demands. Yet, given the potential of oil reserves in Tabasco, Campeche, and Chiapas – after significant deep-drilling exploration programs were completed –, Mexico was approaching an important position in the global oil market. As Yergin (1991) indicates:

In 1974, the country started, in a very small way, to sell petroleum abroad again, though the export of oil was criticized by some as running against the tenets of Mexican nationalism. While production was rising, the engineers in Pemex continued to be very cautious in their estimates of reserves through the last years of the Presidency of the radical, nationalistic Luis Echeverría Álvarez (666).

In the second half of Echeverría's administration, the government increased public investment in manufacturing and oil industries to compensate the private investment slowdown. However, due to a decline in oil production, public investment gradually augmented foreign debt from \$5,065 million dollars in 1972 (equivalent to 12% of that year's GDP) to \$25,894 million dollars in 1976. Therefore, after being elected for the 1976–1982 *sexenio*, José López Portillo inherited one of the worst economic crises ever experienced by the country. As Yergin (1991:667) says, “the Mexican economic miracle had run out of gas” due to economic stagnation and the peso-value collapse of 1976. International lenders then considered Mexico as a risk country.

To confront the crisis, President López Portillo embarked on an *accelerated-economic-growth* model by implementing the *Plan Global de Desarrollo* (PGD) that entailed three stages: two years dedicated to overcome the crisis, two years to consolidate the domestic economy, and the last two years to boost economic growth (Anda, 2005). López Portillo assumed that the large petroleum discoveries of southeastern Mexico would be a reliable, abundant source for financing development projects. In lieu of the 1974–1975

²² This confrontation was also known as the Yom Kippur War, since the Arab attack that commenced such military engagement burst during this Jewish celebration, on October 6, 1973.

concern about what volume of oil exports was needed to increase Pemex's finances (for boosting investment), the Mexican government turned to oil exports as the easiest solution to the country's liquidity crisis (Morales, 1992), after the 1976 peso devaluation.

Oil production rose steadily during the López Portillo term from 830,000 bpd in 1976 to about 2.1 million bpd in 1980, leading Mexico to become the world's fourth largest producer in 1981 (Yergin, 1991; Meyer, Sherman & Deeds, 2003). As of 1979, the Cantarell petroliferous complex – located in the Bay of Campeche, Gulf of Mexico – began operations.²³ The oil bonanza was accompanied by fiscal reforms: that same year, tax excisions were implemented along with the reorganization of tariff structures. In 1980, the *Impuesto al Valor Agregado* (IVA) replaced the *commercial-revenue tax* to collect 10% of the products' value.

By the late López Portillo term, oil was the growth factor of the Mexican economy (Teichman, 1995). Oil's proportion of GDP doubled, thus representing more than 75% of the total exports – in contrast with 1978, when it accounted only for 30% – and providing about 30% of the total federal income, compared to the 11% of 1979. In 1981 Mexico became the first country to sign a long-term sale contract to supply the U.S. strategic oil reserves. In 1982, Mexico replaced Saudi Arabia as the main supplier of U.S. oil imports. While OPEC tried to sustain global oil prices by decreasing exports in 18%, Mexico offered the cheapest oil in the market. In fact, between 1979 and 1982 the Mexican oil production augmented 70% while OPEC's dropped 40%.

Despite these positive figures, the crisis was imminent due to the extensive *petrolization* of the Mexican economy. The government used revenues from oil exports to finance major investment programs. The fragility of funding development with oil production was evident when mismanagement came about because of both excessively optimistic oil-price forecasts and subsequent indebtedness (Everhart & Duval-Hernández, 2001). Consistent with Lustig and Székely (1998), both the expectation of an intense cash flow and the overvalued exchange rate impelled an increasing fiscal deficit that provoked disequilibrium in the balance of payments.

Between 1978 and 1981, fiscal deficit grew from 6.7% to 14.1% of GDP whereas the current-account deficit augmented from \$2.7 billion to \$16.1 billion dollars. Mexico

²³ Cantarell has been one of the most productive fields of Mexico, with an estimated output of 1.9 million barrels per day in 2002 (Moroney & Dieck-Assad, 2005).

was contracting the so-called *Dutch Disease*,²⁴ one of the recurrent syndromes that would prevail in the forthcoming years. Everhart and Duval-Hernández (2001:6) explain that this phenomenon occurs when a natural resource windfall generates a sudden increase in export earnings and draws resources out of the production of traded goods.

Increased revenues resulting from a commodity boom increase the demand for goods in the economy and raise the price of non-tradables [such as social and insurance services, public administration, transport, and communications]. As the price of tradable goods [is] internationally fixed, the impact of higher wages and real exchange rate appreciation diminish the overall productivity in the sectors that produce those goods. The long-run effects in the economy are uncertain depending on the specific macroeconomic conditions of the country and the policy response of the authorities. However, in the short-run, Dutch Disease has posed quite a challenge to several developing economies (*Ibidem*).

In Mexico, negative effects were particularly visible because of deindustrialization – due to the exhaustion of the ISI model – and the rampant debt provoked by both a mismanaged economy and *petrolization*. In the next few years, the Mexican economy became excessively dependent on oil exports. Moreover, in 1981 global oil prices decreased as interest rates increased. The government did not resist this phenomenon and requested short-term foreign borrowing, which was coupled with massive capital flights. By 1982, available creditors were scarce and the Mexican government had to declare an involuntary suspension of payments. Corruption and inefficiency eroded the bureaucratic system of the state and its subsidiary enterprises. The country then faced bankruptcy.

Thus, the *debt crisis* of the 1980s began (Werner, 2001; Lustig & Székely, 1998; Krauze, 1997). In 1982, the peso was devaluated from \$22 to \$70 pesos per dollar and external debt grew from \$26 billion to \$80 billion dollars. In addition, banks sent huge amounts of capital abroad. In reaction to decapitalization, the frustrated President López Portillo nationalized the banking system before concluding his term, which angered the business elites (Hodges & Gandy, 2002). Meanwhile, oil prices continued to decline until mid-1983 and crude oil lost nearly 30% of its value (Everhart & Duval-Hernández, 2001).

²⁴ So called after the crisis suffered in the 1960s by the Dutch manufacturing sector. The *Dutch Disease* was caused by the export boom in the natural gas industry (Everhart & Duval-Hernández, 2001).

2.2.4. The neoliberal reformation process: 1982–2000

In 1982, Miguel de la Madrid Hurtado was elected as the new president of Mexico. The presidential succession of that year “turned out to be a watershed for Mexican economic policymaking, simultaneously marking the rise of technocracy, the blossoming of the debt crisis [inherited from the López Portillo administration], and the dawning of neoliberalism (Babb, 2001:171).”²⁵ De la Madrid realized it was time to embrace a *neoliberal* development model, “a model adjusted to the guidelines of the International Monetary Fund, which stressed the payment of the external debt, the reduction of direct public economic activity, and the reorientation of national production toward external markets (Werner, 2001:301).”

Known as *the adjustment years*, the 1982–1988 *sexenio* was characterized by a series of reconstructive economic programs intended to overcome the peso devaluations, the chaos of the financial markets, and the abrupt slowdown of the productive activity. The De la Madrid administration tried to control public expenditure, reorient production (in line with the internal and external demands), and search for new alternatives to foster economic growth (Everhart & Duval-Hernández, 2001; Lustig & Székely, 1998). Under the *Programa Inmediato de Reordenación Económica* (PIRE), De la Madrid fostered a series of legal reforms and economic strategies for reorganizing the Mexican state.

Concerning the legal aspect, constitutional Articles 25, 26, and 28 were amended to adapt the *state rectory* principle to the newly embraced *mixed-economy* model,²⁶ that is, an economic system in which both the government – through state-controlled companies – and private enterprise play important roles with regard to production, consumption, investment, and savings (USLC, 2005). With respect to public participation, oil and basic petrochemicals were considered strategic-development areas that the state could manage exclusively through its own organisms and enterprises. Accordingly, the oil industry was given priority: Pemex would be reorganized to become a more efficient public entity for the optimization of the oil sector, basic petrochemical manufacturing would be reinforced

²⁵ *Technocracy* is a form of government in which scientists and technical experts are in control of the developmental planning of a country. It is also described as "that society in which those who govern justify themselves by appeal to technical experts who justify themselves by appeal to scientific forms of knowledge (Cognitive Science Laboratory of Princeton University, [CSLPU] 2005)." In Mexico, the rise of technocracy occurred since the 1980s, the decade in which neoliberalism became the mainstream economic model.

²⁶ That means that certain sectors of a country's economy are left to private ownership and free market mechanisms, while others, considered strategic, are significantly owned and managed by the government.

to boost Mexican industries, and the natural gas distribution market would be liberalized (Zenteno, 1997). Shortly thereafter, concepts such as “federalism,” “democratization,” “strategic planning,” and “decentralization” fashioned the Mexican state’s *leit motif*.

Although the worst effects of the 1982 crisis appeared to be under control,²⁷ something was wrong with the structural adjustment policies implemented by the Mexican government. In the later half of 1985, inflation rose again after two years of steady declination. The cause was that the government relaxed price controls to prompt economic growth. However, when oil prices suddenly began to drop, the De la Madrid administration tried to correct the distortion with re-intensified control of the aggregate demand, although with little success because of the dramatic oil-price shrinkage of 1986. The average oil value fell from \$25 dollars per barrel in 1985 to \$11.84 dollars per barrel in 1986. Thus, Mexico experienced “a crisis within a crisis” (Medina, 1995).²⁸ De la Madrid considered this stage as an “economic earthquake” because the Mexican economy was highly dependant on oil revenues (Delgado, 1996:447).²⁹

As of October 19, 1987, the situation was no longer controllable. Capitals flight began again with new devaluation, this time reaching an exchange rate of \$2,200 pesos per dollar. In consequence, domestic prices of final goods and services increased and labor unions began to demand a revision of wage standards. The De la Madrid administration responded by signing the *Pacto de Solidaridad Económica* (PSE) with leaders of the labor, business, agricultural, and public sectors to conciliate the interests of the productive sectors toward the single economic goal of restoration (Medina, 1995).

²⁷ Two years after the De la Madrid *sexenio* began, the national economy was apparently stabilized. Inflation descended progressively from 117.2% in 1983 to 53.4% in June 1985. The exchange market was seemingly controlled as well. Yet, the peso was still devaluated. From 1984 to mid-1985, the Mexican currency value experienced a decrease of about five pesos per month vis-à-vis the dollar. Results in the balance of trade were considerably better, since by 1983 it had a surplus. In 1984, non-oil commodities were notably recuperated with regard to the U.S. market, to which approximately 9,095 million dollars were exported from Mexico (that is, a 29% rise in comparison with the 1983 figure). In addition, the government’s financial deficit decreased from 16.9% of GDP in 1982 to 9.6% in 1985 (Delgado, 1996).

²⁸ By 1986, the balance of payments was abruptly destabilized as a result of the seismic disasters occurred in Mexico City on September 19-20, 1985. Foreign tourism and exports decreased while imports swelled owing to the elevated public expenditure implicated in the reconstruction of urban infrastructure.

²⁹ Inflation reached again an overwhelming point, this time of about 132.5%. GDP dropped 4% while employment levels and real wages manifested a similar, discouraging leaning. Thus, workers lost almost half of their purchasing power. Middle and upper classes were also affected, particularly after the *Bolsa Mexicana de Valores* (BMV, or Mexican Stock Exchange) crashed. In fact, the financial destabilization was global. After the New York Stock Market crashed, the Mexican counterpart did no longer resist.

The outcome of the agreement was encouraging. Inflation rates slowed from an annual rate of 180% in February 1988 to 50% by the end of that year, while salaries gradually rose. The manufacturing sector reemerged, foreign exchange was available for importing consumer goods, and exports went up as Mexican prices became very attractive because of the moderate peso value. In addition, foreign investment grew as domestic wages went down in dollar terms and led to the proliferation of *maquiladoras*.³⁰

On December 1, 1988, Carlos Salinas de Gortari was elected as new president of Mexico, again confirming the dominance of the official party. The Salinas presidency, however, underwent a legitimacy crisis due to the suspicious circumstances surrounding the victory. Civil society and representatives of the political opposition – especially the *Partido Acción Nacional* and the *Partido de la Revolución Democrática* – protested their suspicion that Salinas’s electoral triumph was fraudulent.³¹ In light of the political crisis, Salinas sought to legitimize his *sexenio* by starting a comprehensive reformation process (Medina, 1995). The first step was to avow the continuity of the neoliberal economic model, in line with the 1989 Washington Consensus (Williamson, 2004; Babb, 2001).³² The 1989–1994

³⁰ *Maquiladoras* are assembly plants initially located in the Northern border region of Mexico. These assembly plants could import materials duty-free, reexporting products to the U.S. and paying customs only on the value added in Mexico, for example, on the difference between the price of the final goods and that of the raw materials (Needler, 1995:28).

³¹ The foundation of the *Partido de la Revolución Democrática* (PRD, or Party of Democratic Revolution) is the most significant political reaction to the electoral fraud that took place in 1988. The increasing sociopolitical unrest impelled important fissures into the official party, the PRI. The so-called *Corriente Democrática* emerged as a political alternative that eventually broke-off with the PRI to form the *Frente Democrático Nacional* (FDN, or National Democratic Front). The FDN contended in the 1988 elections, having Cuauhtémoc Cárdenas – the son of Lázaro Cárdenas – as presidential candidate in opposition to the PRI. On July 6, 1988, the oppositional tendency that voters were manifesting during elections was suddenly reverted by the official results of the electoral process, after an “unexpected” failure of the vote-computing system occurred. The suspicion of an electoral fraud led the opposition groups to a widespread protest that would practically endure for the rest of the Salinas *sexenio*. Henceforth, the PRD had become the foremost opposition party of Mexico as well as the most representative left-wing party of the national political system (Delgado, 1996).

³² The Washington Consensus is a set of policy recommendations that promote economic growth in several Latin American countries, including Mexico. It was done in 1989 by John Williamson, an economist from the Institute for International Economics of Washington, D.C. This text included the ten following policy guidelines: (1) fiscal discipline, (2) reordering public expenditure priorities, (3) tax reform, (4) liberalizing interest rates, (5) a competitive exchange rate, (6) trade liberalization, (7) liberalization of inward foreign direct investment, (8) privatization, (9) deregulation, and (10) property rights (Williamson, 2004). Beginning in 1989, the Mexican government negotiated several agreements with the IMF, the World Bank, and foreign countries. Following the U.S. Brady Plan, Mexico reached an agreement with commercial banks (Lustig & Székely, 1998). In order to entice foreign capital, the banking system of Mexico was re-privatized. Thus, enough capital was attracted that the Bank of Mexico could accumulate foreign reserves upon a relatively abundant dollar basis (1998). The debt renegotiation was seen as one of Salinas’s major accomplishments because he achieved a \$20 billion dollars excision. Although the public external debt grew from \$77.8 billion dollars in 1990 to \$85.4 billion dollars in 1994, the proportion of payments of overall GDP was reduced. In

National Development Plan emphasized that the Mexican state needed to be modernized to assure the rule of law, citizens' security, political consensus, sovereignty, and progress.

Trying to seize political power, Salinas launched an assertive anti-corruption campaign against public personalities who were previously thought to be untouchable. On January 10, 1989, the *Procuraduría General de la República* (PGR) ordered the apprehension of the STPRM leader Joaquín Hernández Galicia (alias "La Quina") on charges of illegal weapons possession, by way of a premeditated, quasi-military operation. By arresting "La Quina," Salinas sought to deal with the anticipated strike of the oil workers who opposed his intention to privatize Pemex (Teichman, 1995; Needler, 1995; Delgado, 1996).³³

The early 1990s were particularly intense for the Mexican oil industry. The oil sector's share of total export revenues dropped from 61% in 1985 to 38% in 1990, due to higher domestic demand and lower total output. Between 1987 and 1990, the volume of exports fell from 1.4 million bpd to 1.3 million bpd. Due to the oil shortage in Iraq and Kuwait provoked by the Persian Gulf War, oil prices rose briefly to more than \$35 dollars per barrel in 1990. Moreover, oil output rose steadily from 2.5 million bpd in 1989 to 2.7 million bpd in 1991. Consequently, Mexico's oil export revenues increased to \$10 billion dollars before falling back 15% the next year. The volume of oil exports again reached the 1.4 billion bpd in 1991. In 1992, it remained steady as the oil price dropped under \$15 dollars per barrel. The oil sector's share of overall GDP rose from 5% in 1985 to over 6% by 1992. That year, the country produced 3.14 million barrels per day of crude oil, accounting for 40.7% of the total production in Latin America. Mexico consumed 61 million tons of oil in 1992, when the total oil consumption reached 1.8 million bpd (Wu, 1995).

On April 22, 1992, public scrutiny turned to Guadalajara (in the state of Jalisco), where a major disaster occurred. A series of explosions of Pemex gas pipelines destroyed more than 13 kilometers of roads in an urban area of about 20 blocks in the Reforma neighborhood. Two hundred people died and other 1,800 were severely wounded, while thousands of people lost their properties. The cause of the disaster was a gas leak in the sewer system underneath the affected area, and although plenty of complaints were made

1988, total debt represented 50% of GDP while in 1994 it only accounted for 17%. Between 1989 and 1991, the fiscal system was reformed to increase the public incomes and to foster internal savings (Delgado, 1996).

³³ For an autobiographic perspective on this episode, see La Quina's testimony in Hernández, J. (2000). *Cómo Enfrenté al Régimen Priista: Memorias*. México: Editorial Océano.

to the local authorities when the leak was detected, no serious preventive measures were taken. In the aftermath of the explosions, investigations began along with the rescue tasks. Some responsibility was given to Pemex because the catastrophe could have been avoided if the gas ducts had been appropriately maintained and if Pemex did not lack of public accountability. However, Guillermo Cosío Vidaurri (governor of the state of Jalisco) and Enrique Dau Flores (major of Guadalajara city) were also pressed to resign because of their incompetence to confront the crisis (Delgado, 1996).

Salinas saw the Guadalajara disaster as a symptom of Pemex's increasing inefficiency. He decided it was time to encourage the oil industry's privatization under the scope of neoliberalism. However, due to the risk of facing political turmoil, the government opted to divide the oil company into parts instead of privatizing it all at once. In fact, this was a pragmatic decision that revealed Salinas's desire to create the appropriate conditions for the potential privatization of Pemex. It seemed politically – and even legally – less risky to gradually liberalize a segmented Pemex than completely privatize a vertically integrated, state oil company (Shields, 2003).

Thus, the 1971 *Internal Law of Petróleos Mexicanos* was substituted for the *Internal Law of Petróleos Mexicanos and Subsidiary Entities* in 1992. Accordingly, the state oil company was divided into four principal branches: (1) Pemex Exploración y Producción (PEP), (2) Pemex Refinación (PR), (3) Pemex Gas y Petroquímica Básica (PGPB), and (4) Pemex Petroquímica (PPQ) (Martínez, 2004).³⁴ The Mexican state would manage the strategic oil areas, including crude oil and its by-products as well as basic petrochemicals, through Pemex and its subsidiary organisms, following the *Regulatory Law to Article 27 concerning Petroleum Affairs* of 1958 (Beltrán, 2005).

In the early 1993, the *Pacto para la Estabilidad, la Competitividad y el Empleo* (PECE) was signed to accelerate the liberalization and deregulation processes that the former *Pacto de Solidaridad Económica* (PSE) embraced during the De la Madrid *sexenio*. The PECE was part of a privatization plan by which numerous state-owned companies (and the banking system) were left to private capital. Between 1982 and 1993, the Mexican government privatized 942 state enterprises, 228 of which were privatized

³⁴ Every unit became semiautonomous in terms of budget direction, planning, personnel, and technical operations. There is a linkage among the four subsidiaries based on formal contracts and market-based transfer prices. The corporative boards of the Pemex subsidiaries are composed by public functionaries (Beltrán, 2005).

during the Salinas *sexenio* (Delgado, 1996).³⁵ The total amount of state-owned companies declined from 1,155 in 1982 to barely 213 by May 1993. For Pemex, however, strategic functions remained under the control of the Mexican state.

Then, crude oil production and exports plunged. The decline in oil exports resulted both from increased domestic demand and from lower total outputs. During 1993, Mexico's oil exports averaged 1.3 million barrels per day. This figure represented 2% less than that of 1992 (USLC, 2005). Exports fell dramatically to \$7 billion dollars due to the steady decrease of world oil prices during 1992 and 1993. Oil provided about 30% of central government revenues at that time. Compared with the downscale tendency of 1993, the oil panorama turned out as Mexico's revenue from oil exports surpassed the \$7 billion dollars. Pemex accounted for 474 oil fields in which 74 represented over 90% of total output: 15 fields were located in the North of Mexico, 40 in the South, and 19 in the offshore zones (Mariel, 1999).

On January 1, 1994, North American Free Trade Agreement (NAFTA) came into effect. Aside from the political instability of that year,³⁶ NAFTA's effects were initially positive to Mexico in terms of exports. By August 1994, total exports to the United States increased approximately 22% in comparison with the previous year, mainly corresponding to growth of manufacturing products, and exports to Canada rose 36% during the first half of 1994. Foreign investment also increased as \$10 billion dollars

³⁵ Between 1983 and 1993, major divestitures of non-financial public enterprises took place. Divested state companies included Compañía Mexicana de Aviación, purchased by Grupo Xabre and U.S. and British investors in 1990; Fundidora Monterrey, closed down in 1986; Somex companies, acquired by Grupo Vitro in 1986; Aeroméxico, sold to the Pilots Association, Grupo M. Alemán Velasco, and Bancomer in 1988; Dina, purchased by Consorcio G. S.A. de C.V. in 1989; Cananea, acquired by Mexicana de Cananea and Belgian mining groups in 1990; Compañía Mexicana de Cobre, sold to Minera México in 1989; Conasupo plants, purchased by Unilever and other 5 companies in 1989; AHMSA, acquired by Acero Norte in 1992; Concaril, sold to the Canadian Bombardier in 1992; and Telmex, divested to Grupo Carso in 1990 – under leadership of Carlos Slim Helú and complementary participation of French capital in about 21% of shares (Teichman, 1995).

³⁶ First, the *Ejército Zapatista de Liberación Nacional* (EZLN, or Zapatista Army of National Liberation) aroused in Chiapas against the Mexican government the same day that NAFTA came into effect. Headed by the insurgent *Subcomandante Marcos*, the EZLN claimed for the vindication of the indigenous people's rights whose interests were marginalized and excluded from the official developmentalist project (Delgado, 1996). Then, on March 23, 1994, Luis Donaldo Colosio Murrieta (the PRI's presidential candidate for the 1994 elections) was assassinated in Tijuana while in political campaign. Several hypotheses around the Colosio case were formulated since then, although no satisfactory results emerged. If Colosio had lived, "he would presumably have won the presidency with a convincing majority of the vote (Needler, 1995:31)." On September 28, 1994, another crime was perpetrated against José Francisco Ruiz Massieu, a former Governor of the state of Guerrero, militant of the PRI, and virtual leader of the Chamber of Deputies. The assassinations of both Colosio and Ruiz Massieu exacerbated the political crisis of the late Salinas *sexenio* (Meyer, Sherman & Deeds, 2003).

came to Mexico between January and September (Delgado, 1996). In addition, Mexico's revenue from oil exports surpassed the \$7 billion dollars mark.

However, these optimistic figures were soon reverted by several factors. The internal-savings level turned out to be very low and the current-account deficit was financed with volatile short-term debt denominated in foreign currency (Everhart & Duval-Hernández, 2001). Thus, Mexico became highly dependant on foreign capital flows. Growth rates would have not been so low if the manufacturing structure of the country had been resistant enough to increase productivity (Werner, 2001).³⁷ The social assistance program of Salinas was overwhelmed as poverty increased because of the impending crisis (Lustig & Székely, 1998).

Prior to the end of Salinas's term, Ernesto Zedillo Ponce de León was chosen as the PRI candidate for the 1994 elections. A Yale-trained economist, Zedillo represented a pledge to continue with the technocratic and neoliberal trends that emerged in 1982 with De la Madrid (Babb, 2001; Álvarez, 1997; Adler-Lomnitz & Gil-Mendieta, 2001; Hart, 2001). After a close election, Zedillo narrowly won for the 1994–2000 *sexenio*. The first months in office were particularly complicated for the new president (Ramales, 2005).

Once again, the peso began to decline against the dollar. Between December 1994 and January 1995, the Mexican currency lost about 46% of its value and continued collapsing for the next two months while the Mexican Stock Market crashed. Businesses closed down and banks began to foreclose on properties. Inflation and interest rates began to swell up again, while employment levels dropped. Zedillo's hesitation to deal with the problem was that of an overwhelmed president in the face of an economic emergency (Meyer, Sherman & Deeds, 2003). The attempt to decentralize the public expenditure scheme under the *new federalist* institutional reforms was not enough to confront the crisis (Scott, 2004).

The crisis began when markets assumed that the real exchange rate of the peso was no longer sustainable. The government was forced to devalue and so the value of the peso floated as Mexico's federal reserves were based on dollars (Aggarwal, 2002; Kaewthep,

³⁷ The Mexican industrial sector had then a particular problem. Capital was concentrated in a small number of companies. Salinas's privatization process became selective, since only certain groups of the business sector were beneficiated. Consequently, monopolies and super-millionaires flourished – such as Carlos Slim (Carso Group), Emilio Azcárraga (Televisa), Lorenzo Zambrano and Marcelo Zambrano (Cemex Group), Alejo and Carlos Peralta (Iusacel Group), and Jerónimo Arango (Cifra Group). Conversely, there was a spread impoverishment over a high proportion of the population (Ramales, 2005; Delgado, 1996; Werner, 2001). Composed by large numbers of medium-sized, small, and micro businesses commonly known as “Pequeñas y Medianas Empresas” (PYMEs), the productive basis of Mexico lacked of quality controls and competitiveness.

1998). In response to the existing financial and liquidity crises, petroleum was designated as a guarantee to the \$51.76 billion dollar credit package granted by the IMF, of which the U.S. contributed \$20 billion dollars (Martínez, 2004:2037). To this end, the Mexican and the U.S. governments signed the North American Framework Agreement (NAFA, or “Acuerdo Marco”) in 1995. Part of this arrangement was the Agreement on the Oil Income Scheme (AOIS), which “not only compromised the country’s sovereignty by mortgaging Pemex’s total income, but also substantially debilitated the company by opening up all its strategic information to the U.S. (Ángeles, as cited in Martínez, 2004:2037; Aggarwal, 2002; Saxe-Fernández, 2002).” By 1995, the oil sector generated 10% of Mexico’s export income in comparison to 80% in 1982, when Mexico was the world’s sixth largest crude oil producer.³⁸

Following NAFA and AOIS, the Mexican government took four major actions: (1) the privatization of Pemex’s petrochemical unit, (2) the opening of the electric power sector to private investment, (3) the establishment of strategic alliances with transnational oil enterprises for exploration and exploitation, and (4) the concession of natural gas distribution, transportation, and storing to private investors (Shields, 2003; Álvarez, 1997; Martínez, 2004). Also in 1995, gas concessions were supported by a series of amendments to the *Regulatory Law to Article 27 concerning Petroleum Affairs* of 1958 (Zenteno, 1997).

These measures revealed Zedillo’s intention to significantly reform the Mexican oil industry. On the one hand, Pemex would keep control of the *upstream* area, and extraction of both crude oil and natural gas would remain under Pemex’s direction while commodities commercialization and some R&D projects could be run with private investment. On the other hand, the *downstream* area would be gradually transferred to foreign and domestic private capitals, including the production, transportation, storage, and distribution of fuels and petrochemicals (Manzo, as cited in Álvarez, 1997).

In early 1996, the government unveiled its Program for the Development and Restructuring of the Energy Sector. The program [estimated] the minimum investment required by the petroleum sector by the year 2000 to be 250 billion new pesos (at 1995 prices). The private sector [was] expected to provide 49 billion new pesos of this amount. The plan [was] intended to increase Mexico’s petroleum exports, improve its competitiveness in the international energy market, and contribute to more balanced regional development (USLC, 2005).

³⁸ In the Western Hemisphere, only the U.S. surpassed Mexico’s oil production level. Directly behind Mexico was Venezuela, which in 1992 produced about 89% of Mexico’s crude oil output (USLC, 2005).

In spite of the effort to boost Pemex's petrochemical division, the results were not as fruitful as desired. In fact, "Pemex's restructuring processes, and the trade liberalization of basic petrochemicals that has taken place since 1986, have failed to create conditions for attracting the capital and technology required to modernize the sector (Martínez, 2004:2047)." The main factors for this failure have been: (1) high unit production costs, (2) limited investment in petrochemical plants, (3) great demand for manufacturing oil derivatives, and (4) a downward trend in oil prices in the international market between early 1997 and 2001. Trying to alleviate the fiscal pressures derived from this situation, the government increased the *Impuesto al Valor Agregado* (IVA) and the *Impuesto Especial sobre Producción y Servicios* (IEPS) (Martínez, 2004; Beltrán, 2005).³⁹

As of 1997, oil prices fell persistently until December 1998. In response, Mexico increased the volume of both oil production and exports to counterbalance the devaluation of domestic oil exports. The government also continued investing in petroleum infrastructure, expecting an increase in both oil prices and demand. This hope relied on *Pidiregas*, that is, long-term infrastructure projects with deferred impact in the recording of public expenditure that entailed dualistic financial schemes: while some projects became public investment as the government repaid its debt to the private sector, other projects became private investment with a long-term supply contract (Shields, 2003; Everhart & Duval-Hernández, 2001).

By 1998, oil-producing countries faced a difficult situation due to the turbulence that East Asian economies (i.e. Thailand, South Korea, and Japan) experienced in 1997 (Stiglitz, 1998; Aggarwal, 2002; Kaewthep, 1998). In this context, the price of Mexican crude oil dropped below \$7 dollars per barrel, the lowest value in two decades. To respond to the oil depreciation, Mexico signed an agreement with Saudi Arabia and Venezuela – both OPEC members and major world oil producers – to contract the international oil supply, and other OPEC members quickly joined. However, this measure was not successful because of both the still-depressed demand for oil and some participants' lack of commitment (Francis, 2003).

Oil prices recovered in late 1999, and the government used the revenues generated by the oil windfall mainly to offset fiscal pressures. Between 1999 and 2000, around 32%

³⁹ IEPS (or Special Tax on Production and Services) is a commercial excise tax paid for gasoline, diesel, and natural gas used in vehicles (Everhart & Duval-Hernández, 2001). For a more detailed reading, see Beltrán, J. (2005). *México: Crónica de los Negros Intereses del Petróleo*. Mexico: Ed. Diez, pp.97-158.

of Mexico's federal revenue came from taxes levied on Pemex, which gave over 60 cents of every dollar to the Mexican government. By 2000, oil production totaled the 3.5 million barrels per day, of which 86% was crude oil. In the budget for 2000, some expected oil revenues were earmarked for increase expenditure on social programs, and more optimistic forecasts for future oil prices brought about an expenditure plan that became larger than the initial budgetary stipulations (Everhart & Duval-Hernández, 2001:22). The aim was to use oil extra-revenues to fund higher non-programmable expenditures (mostly interest payments), make transfers to state governments, and repay debt (2001).

In terms of politics, Zedillo wanted to place Mexico on a true democratic course. Although he was the first president in seventy years to face an opposition Congress, Zedillo “would not be judged totally successful unless he could find a way to lead his own party to defeat in the presidential election of the year 2000 (Meyer, Sherman & Deeds, 2003:681).” Nothing less climatic than the end of the PRI-led era would substantiate his pledge to political reform (2003). A new stage of political alternation and economic challenges was about to begin. On July 2, 2000, the PAN presidential candidate, Vicente Fox Quesada, was elected for the 2000–2006 *sexenio*. However, the PRI-PAN political alternation did not produce a substantial change on the Mexican economic policy. Indeed, the Fox administration's developmentalist model has been akin to the prevailing market-oriented global trends, as will be discussed in the next section.

2.3. Trends and challenges of the Mexican oil industry under the Fox administration

Even though the Mexican oil industry has undergone several transformations over the past twenty years, structural issues remain latent. Prior to the decade of the 1980s, no substantial reforms ensued regarding the petroliferous sector, except for legal and administrative adjustments that, in any case, were not meant to reallocate the control of Pemex away from centralized state interests. As of late 1982, some advancement on energy policy issues had effect under the scope of neoliberalism, which comprised macroeconomic strategies such as trade liberalization, deregulation, opening to foreign direct investment, and privatization (Tornell, 2002; Martínez, 2004). Energy liberalization gained momentum during the Salinas *sexenio* (1988–1994) after the negotiation of NAFTA, and progressed warily under the Zedillo administration (1994–

2000) due to sizeable contingencies that exposed a petrochemical sector incapable of creating appropriate conditions for enticing the capital and technology required for improvement (Palacios, 2003; Martínez, 2004).

Since the beginning of his term, President Fox has tried to push for a comprehensive energy reforming process, albeit without much progress. After a few months in office, Fox realized that the government's budgetary resources were scarce and that they were already allocated according to a complex political agenda. The array of opportunities to act independently from influential groups of the Mexican political system – i.e. political parties, unions, bureaucrats, mass media, and businesspeople – has been limited both by the national legal framework and by the influence of the traditional rules that characterized the Mexican public administration (Núñez-Luna, 2005).

The Fox energy policy-making cabinet has been often impinged by political gadgets that have led to institutional instability, as exemplified by the frequent replacements that occurred in the head of the Secretary of Energy between December 2, 2000, and September 28, 2005. Within this lapse, four appointments were made to chair the SENER: Ernesto Martens Rebolledo (2-XII-2000), Felipe Calderón Hinojosa (1-IX-2003), Fernando Elizondo Barragán (1-VI-2004), and Fernando Canales Clariond (28-IX-2005) (Alatríste, II-2006). The nature of this institutional reordering has produced political uncertainty about the government's profitability to define a clear, long-term energy plan. Fox's capabilities to persuade for embracing energy reforms have been narrowed by political opposition, not to mention the constant scrutiny that mass media has had over the executive's energy policy agenda (Merino, 4-II-2006).

Thus, the executive power has lacked of capacity to negotiate with the legislative branch for turning bills into substantial changes to the national oil sector. Neither institutional reshuffling nor political gadgets inside the state apparatus have outshined the need for updating the oil regulatory framework, which has been the primary obstacle to restructuring the Mexican oil industry. Although the rhetoric of privatization has permeated different governmental levels, the oil sector has remained closed to direct private participation. Table 2c synthesizes the major events that have taken place in the restructuring process of the Mexican oil industry under the scope of neoliberalism.

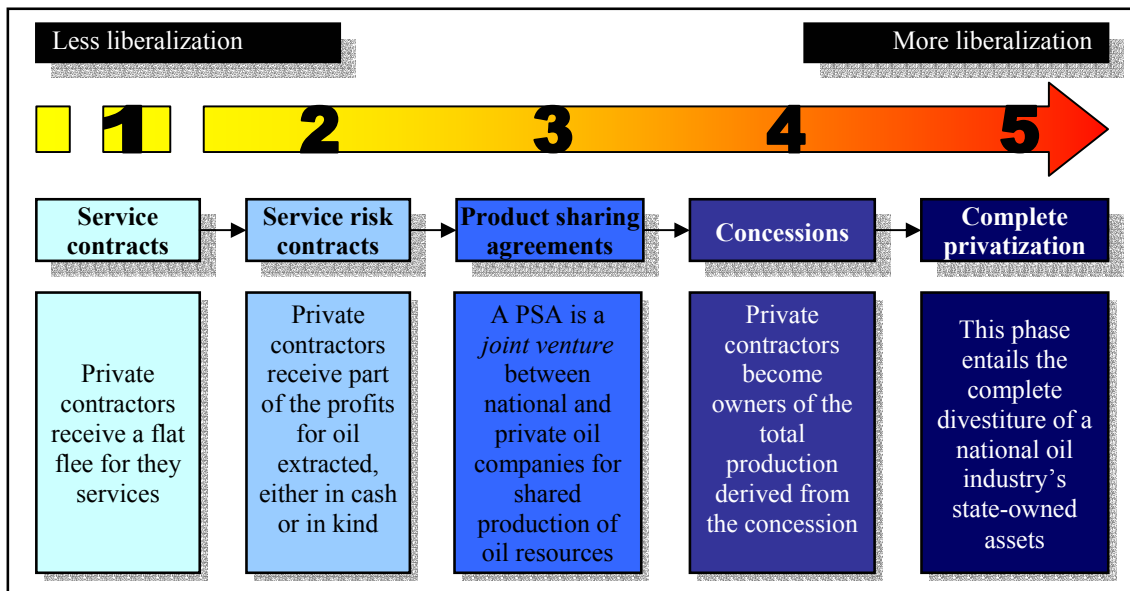
Table 2c. Chronology of Major Events Related to the Process of Liberalization of the Mexican Oil Industry, 1986–2005

Year	Event
1986	<p>1. Implementation of measures oriented towards privatizing the basic petrochemical industry</p> <ul style="list-style-type: none"> • Private companies are authorized to import basic petrochemicals that Pemex cannot supply • 36 of the 72 basic petrochemicals were reclassified as secondary by decree • A flexible pricing policy is enacted
1989	<p>2. Strengthening of the privatization phase within the labor and petrochemical areas</p> <ul style="list-style-type: none"> • Labor restructuring <ul style="list-style-type: none"> – 50% reduction in salaries – Massive lay-offs of almost 71,000 workers – Annulment of the union's participation in Pemex's activities • Partial opening of the petrochemical industry <ul style="list-style-type: none"> – Reclassification of basic petrochemicals from 34 to 19 denominations
1992	<p>3. Administrative/operative reorganization of Pemex</p> <ul style="list-style-type: none"> • Congressional approval of the <i>Internal Law of Petróleos Mexicanos and Subsidiary Entities</i> that transformed Pemex into a holding company with four subsidiaries: Pemex Exploración y Producción, Pemex Gas y Petroquímica Básica, Pemex Refinación and Pemex Petroquímica • The private sector gains access to strategic and profitable activities such as: <ul style="list-style-type: none"> – Drilling marine wells in the Sonda de Campeche – Joint-venture agreements with transnational companies for hydrocarbon refining
1993	<p>4. Further liberalization of the petrochemical industry</p> <ul style="list-style-type: none"> • Only 8 products are considered as basic petrochemicals (of 19 in 1989) • Restriction to foreign capitals in petrochemicals was lifted <p>5. Creation of the <i>Comisión Reguladora de Energía</i> (CRE, or Energy Regulatory Commission)</p>
1995	<p>6. Enactment of <i>Pidiregas</i> (long-term productive infrastructure projects)</p> <p>7. Liberalization of downstream gas operations</p> <ul style="list-style-type: none"> • Amendment to the <i>Regulatory Law to Article 27</i> to allow private participation in transportation, storage, and distribution of gas • Approval of new gas law regulating the opening of the gas sector at the downstream level <ul style="list-style-type: none"> – This included the liberalization of natural gas import and exports rights and the regulatory framework for opening the distribution system (i.e. pipelines) • CRE is empowered to regulate the gas sector
2000	<p>8. <i>Differentiated opening</i>: direct private investment is allowed not only in gas and petrochemicals but also in refining activities</p>
2003	<p>9. First licensing round to run Multiple Services Contracts for natural gas in the Burgos Basin</p>
2005	<p>10. The Senate of the Republic (upper chamber of Congress) approves unanimously the <i>New Fiscal Regime of Petróleos Mexicanos</i></p> <ul style="list-style-type: none"> • An additional amount of \$23.23 billion pesos is forecasted for year 2006

Source: Palacios (2002, 2003), Martínez (2004), Saxe-Fernández (2002), and El Financiero (9-XI-2005)

Alike other oil-exporting countries in South America – i.e. Argentina, Brazil, and Venezuela –, Mexico’s process of liberalization in the oil sector has resulted from increasing demand-and-supply pressures, although neither adjustment choices nor reform timing have been self-evident. They have rather responded to the structural conditions of Mexico as an oil-exporting country as well as to the institutional characteristics and evolution of the domestic oil industry (Palacios, 2003). This trend would not be so disconcerting if the national oil industry’s process of liberalization yielded important results regarding Pemex’s own capacity to invest in productive infrastructure projects. The fact is, however, that the course of liberalization of the domestic oil industry is still both incipient and disorganized. In other words, the Mexican oil sector’s *downstream* level is going through a relatively stable opening process while the *upstream* level is wavering between the first two out of five liberalization phases that Palacios (2003:4) identifies within the economic context of Latin American countries: (1) *service contracts*, (2) *risk service contracts*, (3) *product sharing agreements*, (4) *concessions*, and (5) *complete privatization* (see Figure 2a).

Figure 2a. Liberalization Phases at the Oil Sector’s *Upstream* Level



Source: Palacios (2003:4).

Following the scheme above, Mexico’s current liberalization status in the *upstream* oil sector is located in the midst of phases one and two by way of Pemex’s

Contratos de Servicios Múltiples (CSMs).⁴⁰ This fact proves contradictory because *simple service contracts* do not involve risk-management provisions as *service risk contracts* do. A combination of both service-contracting modalities is thus problematic as it distorts the extent to which risk investment can be handled by the state vis-à-vis private contractors. In addition to legal challenges, CSMs have gone through this problem due to structural flaws that reveal an opposition between what the state is supposedly protecting and what it is actually opening to private participation regarding the *upstream* level.

These and other contradictions entailed in the progressive liberalization of the Mexican oil sector have pressed the Fox administration to face possible fallbacks. On September 12, 2005, President Fox pronounced an *Energy Plan* composed by ten central strategies mainly oriented (a) to boost the development of the domestic natural gas industry; (b) to diversify the sources of natural gas imports; (c) to help embryonic enterprises to reducing the impact of high costs of energy commodities; (d) to promote the development of renewable sources of energy; and (e) to create an interdisciplinary group of experts for improving Mexico's energy-policy planning (El Universal, 12-IX-2005).

These guidelines confirm that the Fox administration is trying to find alternatives for improving the domestic energy sector, especially through the innovation of oil-related activities in the gas area. However, the government has only achieved modest reforms at the administrative level of Pemex, along with some advances in *downstream* activities, particularly in transportation, storage, and distribution of natural gas. Since the central management of the Mexican oil industry is still controlled by the state, there is public incertitude about Pemex's mid-term viability, especially because the oil industry's current degree of liberalization is not clear at the legal and institutional levels vis-à-vis the country's high degree of petrolization. As posited by Palacios (2003), "the degree of dependence on oil revenues seems to be negatively correlated with the level of opening of the oil sector (p.21)."⁴¹ To grasp the significance of this phenomenon, it is important to understand the main characters of the Mexican oil policy.

⁴⁰ Beginning in 2003, CSMs were designed to entice private capital, technology, and equipment for exploiting natural gas that Mexico needs urgently to meet the increasing demands. CSMs feature is that, instead of bidding on one task, contractors bid to a set of multiple tasks for a certain period (up to 20 years) (Pemex, 2005).

⁴¹ Palacios (2003) explains that countries that are more dependent on their oil sector for collecting fiscal and foreign revenues tend to be less open to foreign investment. This dependence is generally linked to a country's oil-exporting status. In Latin America, oil-exporting countries have been less prone to

2.4. Mexican oil policy

The *Political Constitution of the United Mexican States* of 1917 declares that subsoil resources are property of the nation. The Constitution proscribes the activity of foreign investors in strategic energy sectors. Articles 27 and 28 are very specific on this matter, especially after significant amendments were done by Congress in search of adequacy to the constantly changing circumstances. The provisions of the 1917 Constitution were given unprecedented priority in 1938, when President Cárdenas nationalized the oil industry and expropriated all foreign-owned assets. Twenty years later, the 1958 *Regulatory Law to Article 27 concerning Petroleum Affairs* gave Pemex control over *downstream* oil operations (Hufbauer & Schott, 2005).

In the 1970s, Mexico took advantage of both high oil-prices and the discovery of offshore reservoirs in the Gulf of Mexico. Production and exports dramatically increased in result, giving the government reason to prompt the *petrolization* of the nation's economy. Accordingly, extensive debt-financed investments were approved in order to boost research and development of crude oil and its products, petrochemicals, and natural gas. Employment grew significantly in those years, and Pemex consolidated its leading role over the industrial structure of the country. However, in the early 1980s the Mexican protectionist economy was exhausted both because oil prices dropped (due to a global recession) and because oil-related debt distressed the government.

By the end of the 1980s and throughout the 1990s, the Mexican oil policy was refocused on the *upstream*⁴² level while some *downstream*⁴³ operations were left to private investment. In 1995, the natural gas sector was opened to foreign capitals in both transportation and storage. Natural gas drilling projects, however, were still nationalized. Regarding oil, foreign investors are allowed to offer their services for exploration and extraction of reserves, but they cannot own any of the petroleum produced. The Mexican

liberalization than oil-importing countries. Thus, the placement of a country's oil industry in the world markets does matter to explain the level of openness to private participation (2003).

⁴² *Upstream* operations are those activities related to crude oil exploitation, production, and delivery in transportation terminals. A *terminal* is a maritime installation that receives and stores crude oil, offshore products, viaducts, and/or tankers (Parra, 2003).

⁴³ *Downstream* operations are all those activities encompassed between crude oil's shipment to the transportation terminal and final consumption. The downstream level includes crude oil transportation – via ships or pipelines –, supplying, refining, distribution, and marketing of oil derivative products (Parra, 2003).

energy policy is the least market-oriented of North America, due to factors that underlie the country's political and economic structure (Hufbauer & Schott, 2005).

Since being elected in 2000, Fox has sought to promote a comprehensive energy policy where oil continues to play a crucial role for the development of Mexico. President Fox and the state secretaries involved in energy issues have tried to embrace alternatives for developing the energy potential of the country by presenting several reform proposals to the Mexican Congress. However, the Fox administration has not satisfactorily reformed the oil sector. It is stated that:

The centerpiece of these planned reforms would be the privatization of PEMEX [sic]. Some of [Fox's] proposed changes would require amending Mexico's Constitution, necessitating a two-thirds majority vote in Congress where the [...] pro-reform National Action Party (PAN) faces stiff opposition. In the meantime, the Fox Administration is working on other ways to attract much needed foreign investment capital to finance hydrocarbons drilling, production, and [...] infrastructure improvements (DOE, 2005).

It is true that Pemex needs serious reforms, but privatization is not yet the best alternative. Before privatizing Pemex, the federal government must improve the structure of the national petroliferous sector in terms of legislation, fiscal assessment, financial accountability, economic efficiency, political consensus, environmental protection, and social equity. It would be perilous to assume that the main issues of Pemex can actually be solved by privatizing it all at once. So far, the Mexican government has endeavored to improve the energy sector through a series of policy guidelines in compliance with constitutional Articles 25 and 26.⁴⁴ In compliance with these constitutional norms, the Fox administration released the *Plan Nacional de Desarrollo 2001–2006* (PND) and the *Programa Sectorial de Energía 2001–2006* (PROSENER) in 2001.

Both PND and PROSENER address two main objectives for the energy policy. First, the Mexican government desires a *qualified-service based, price-competitive* energy supply, and to promote sustainable development criteria to foster efficient energy utilization and better use of alternative sources of energy. Second, the government looks

⁴⁴ Article 25 of the Mexican Constitution establishes that the federal state shall plan, coordinate, and guide the nation's economic activity. Additionally, the public sector shall have the exclusive power to manage the strategic areas of Mexico's productive activity. Article 26 indicates that the federal state shall organize a democratic planning system by means of a national development plan on which the government's programs shall be based (Constitución Política de los Estados Unidos Mexicanos [CPEUM], 1917).

to build a “world-class” energy sector by transforming and modernizing it in search of international quality/price competitiveness. To do so, the Fox administration focuses on (a) energy security (risk prevention) of productive operations, (b) environmental protection, (c) scientific and technological knowledge, and (d) formation of human capital (PND, 2001:300). Consistent with the PND, the current Energy Sectorial Program entails a series of guiding principles referring to the Mexican energy policy (see Table 2d).

Table 2d. Guiding Principles of the Mexican Energy Policy, 2001–2006

Guiding principles	Connotation
Energy sovereignty	State ownership is a fundamental principle for the Mexican government to manage natural resources.
Supplying capacity	An adequate development of the energy sector is desirable upon de basis of competitive price inputs.
Social commitment	Energy is considered a developmental factor for improving the living standards of Mexicans.
Modernization of the energy sector	Mexico needs to adapt to the global energy market trends in terms of efficiency and productivity.
Increasing private participation	The Mexican government intends to ensure the long-term viability of the energy sector.
Sustainable development orientation	There government concerns simultaneously about environmental protection and economic growth.
Commitment with future generations	The government intends to foster research and development to constitute an efficient network of energy commodities for the future.

Source: Adapted from PROSENER (2001).

These principles suggest that the Mexican government is pursuing ambitious policy objectives. The Fox administration is concentrating efforts on the protection of national sovereignty via state ownership of natural resources while simultaneously promoting the modernization of the energy sector by way of transformational strategies. At first glance, this course of action looks positive as it procures concordance to the state’s developmental course vis-à-vis projected economic goals. Nevertheless, the guiding principles of the Mexican energy policy may also prove contradictory as *energy sovereignty* implies legal restrictions to *increasing private participation*. That can explain why the state’s ideals on energy policy have proved insubstantial throughout the Fox *sexenio*, as will be later discussed. Goals can be also identified in the set of strategic objectives and action guidelines that the government has delineated to improve the Mexican oil sector (see Table 2e).

Table 2e. Strategic Objectives and Action Guidelines of the Mexican Oil Policy, 2001-2006

Strategic objectives	Action guidelines
1. To make Pemex a world-class oil company by prompting the transformation of its constituent oil-manufacturing stations and value chains.	<ul style="list-style-type: none"> ▪ Modify the legal framework for budgetary exercising, supervision, and assessment of Pemex. ▪ Develop policies for ensuring the efficient administration of national hydrocarbons. ▪ Promote efficiency and productivity to guarantee hydrocarbons supplying.
2. To increase oil reserves and set extraction ratios to assure both environmental protection and efficient energy use.	<ul style="list-style-type: none"> ▪ Maintain the oil-reserve levels.
3. To strengthen the refining capacity.	<ul style="list-style-type: none"> ▪ Diversify and modernize the refining sector.
4. To ensure a sufficient natural gas supply upon the basis of competitive prices.	<ul style="list-style-type: none"> ▪ Boost the natural gas domestic production. ▪ Install one or more liquefied natural gas (LNG) facilities in the country.
5. To promote structural transformations in the liquefied petroleum gas (LPG) market.	<ul style="list-style-type: none"> ▪ Revise the security norms on LPG distribution in concordance with international standards. ▪ Update the current LPG regulatory framework in order to specify distribution responsibilities and obligations.
6. To design and implement policies for strengthening the Pemex petrochemical unit.	<ul style="list-style-type: none"> ▪ Reactivate Pemex's petrochemical industry.
7. To design, implement, and evaluate the foreign oil policy of Mexico and negotiation strategies that could maximize oil-exporting revenues.	<ul style="list-style-type: none"> ▪ Set an optimal hydrocarbon export platform. ▪ Develop responsible, efficient, and diversified commercialization schemes to assure a competitive-price projection of Mexican crude oil in the global market. ▪ Use oil advantage to upgrade the strategic position of Mexico in the global market.
8. To develop a culture of excellence and continuous improvement within state companies.	<ul style="list-style-type: none"> ▪ Provide human capital with continuous capacitating programs. ▪ Optimize the use of economic, material, and financial resources within the oil sector. ▪ Respect oil workers' rights and interests.

Source: Adapted from PROSENER (2001).

The objectives and guidelines of the Mexican oil policy contain the following main points: the government (1) intends to improve Pemex's productivity by encouraging legal, administrative, and operative changes; (2) aims to increase oil reserves as well as energy sustainability; (3) wants to develop the refining capacity of the Mexican oil industry through diversification and innovation; (4) looks to enhance both natural gas and LPG marketing scenarios via investment, production, and reform strategies; (5) will try to strengthen Pemex's petrochemical unit; (6) focuses on maximizing oil-exporting revenues by using foreign policy instruments; (7) will pursue greater efficiency on Pemex in terms of technical and administrative expertise. Much like the Mexican energy policy principles, the

series of goals and guidelines for Mexican oil policy have been challenged by several issues that the Fox administration has faced during the process of energy modernization.

On September 1, 2005, President Vicente Fox presented his Fifth State of the Union Address. This official report emphasized central aspects of governmental efforts over the last five years in search of substantiating the PND and PROSENER principles and objectives (Fifth State of the Union Address [FSUA], 1-IX-2005). Accordingly, substantial investments have been made to incorporate new hydrocarbon reserves and to increase the *reserve-to-production* oil and gas ratios. The reconfiguration of the National Refining System has continued in search of increasing the installed-capacity occupation rate. The government has also promoted the improvement of the oil industry's installed capacity for processing higher volumes of sweet liquefied gas. Likewise, the Fox administration has considered strengthening the petrochemical value chains to increase competitiveness (see Appendix D).

These energy policy strategies reveal the government's concern to overcome the stagnation of Pemex's petrochemical sector, and a consequential interest in attracting private investment through differentiated opening and financing mechanisms. It is also clear that the current state oil policy works along the lines of economic neoliberalism just as the three previous administrations did. The problem is that, on the one hand, the government preserves Mexico's high dependence on oil revenues by shielding the oil industry through legal mechanisms, and on the other hand, it fosters the liberalization of oil activities by way of pragmatic procedures, as will be discussed further.

3. Public Policy Analysis: Approaches and Methods for Studying the Mexican Oil Industry

This chapter provides an analytical basis for studying of the Mexican oil industry. The first section defines the concept of public policy analysis, and justifies Easton's *input-output* systemic model as the main analytical approach for this research project. The second section explains the research methodology through which the Mexican oil industry is studied.

3.1. The concept of public policy analysis

According to Nagel and Teasley (1997), public policy analysis is “the study of the nature, causes, and effects of alternative public policy choices” that takes part in the decision-making process of public administrators (p.507). The primary objective of public policy analysis is to determine what alternative or combination of alternatives best achieve the goals of a public organization when facing a specific problem. Public policy analysis allows for an overview of the performance of a political system in which both the formal (or institutional) and the informal (or non-institutional) aspects of the political process are valuable. Interest groups, public opinion, civil society, and governmental institutions are some of the main political agents that policy analysts observe through interdisciplinary studies to understand *their reality*.

As said by Dye (1984), policy studies involve a description of the content of public policy as well as an assessment of the impact of the circumstances in which policy contents are embedded. The author also explains that policy studies entail an analysis of the effect of various institutional arrangements and political processes on public policy, and an inquiry into the consequences that public policies have over the political system as a whole (1984). The understanding of both expected and unexpected consequences suggests that social impact of public policies will always be evaluated for continuous improvement of public administration. For that reason, public policy analysis must be undertaken from a dynamic perspective in relation to the political system's functioning. Theodoulou & Cahn (1995:2) explain that public policy analysis provides a wide-ranging depiction of the political system, including its output. Although this perception may

overestimate the practical contribution of policy studies, it gives us a hint about the extent to which both political science and politics are fundamental for public administration.

Over time, there have been numerous attempts to consolidate a grounded theory of public policy analysis with different instruments from other branches of political science. The result of that effort has been the use of models as interpretive instruments for identifying *politics* and *policy* as two distinguishable – but not mutually exclusive – concepts (Parsons, 1995). The *politics-policy* dichotomy has prompted important inquiries about *what* a public policy is and *how* can it be studied. On the one hand, the term *public* “presupposes that there is a sphere or domain of life which is not private or purely individual, but held in common (1995:3).” On the other hand, a *policy* is defined as “an attempt to define and structure a rational basis for action or inaction (1995:14).” Thus, *public policy* is the materialization of the attitude that a political authority or institution has toward a specific issue of collective interest.

Theodoulou & Cahn (1995:2) identify four key criteria that illustrate what public policy is. First, public policy should distinguish between what governments intend to do and what they actually do – governmental inactivity is as important as governmental activity. Second, public policy ideally involves all levels of government and is not necessarily restricted to formal actors. Third, public policy is pervasive and is not solely limited to legislation, executive orders, rules, and/or regulations. Fourth, public policy is an intentional course of action with an accomplished end goal as its main objective. Fifth, public policy is an ongoing process that involves not only the decision to enact a law but also the subsequent actions of implementation, enforcement, and evaluation.

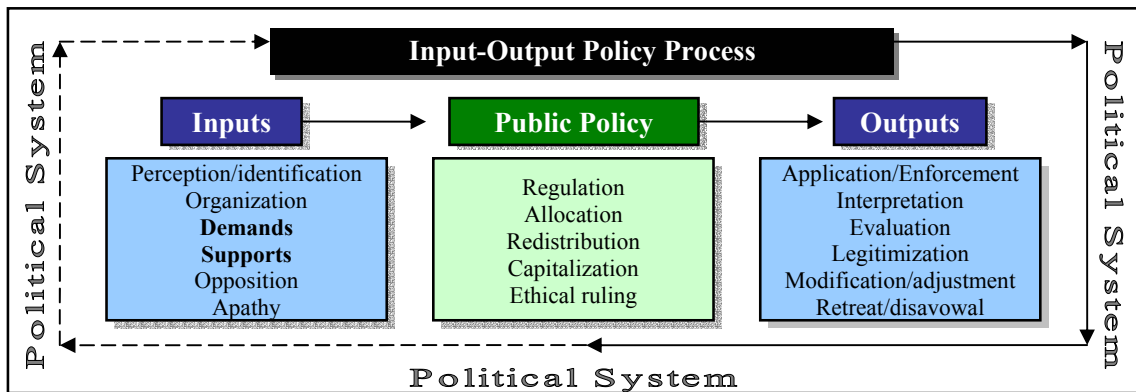
In concordance with these criteria, public policy analysis is seen as the instrument with which the *policy-making process* can be evaluated either by a policy-maker or by an external observer. Thus, policy studies are oriented toward the consolidation of *knowledgeable governance* (Parsons, 1995:6), that is, the constant acquisition of experience and knowledge about social problems towards developing better solutions for improving public administration. Numerous researchers have contributed to this particular area of political science, such as Laswell (1971), Simon (1945), Lindblom and Woodhouse (1993), and Easton (as cited in Parsons, 1995).

In agreement with these authors, it is important to acknowledge public policy analysis as a useful instrument for assessing the *expertise* of problem-solving strategies in public administration. Accordingly, diverse models can be proposed to analyze public policy. The way in which a public policy is formulated and implemented as well as the relationship that such a process has with policy makers in a specific context affect the manner in which the results and implications are interpreted. There are different theoretical approaches that have intended to explain the public policy-making process, such as systems theory, structural functionalism, the policy cycle model, group theory, elite theory, the corporatist approach, and the sub-governments model (Theodoulou & Cahn, 1995). Each of these approaches has particular attributes so that public policies can be analyzed from different angles and with different research tools.

Due to its particular characteristics, the systemic approach of Easton is useful to analyze the Mexican oil policy. The *Eastonian* systemic analysis identifies public policy as an institutional, dynamic response to the environmental influences of a political system (Easton, 1992). Easton conceives a political system as the public sphere in which diverse social demands and supports emerge and compete as *inputs* for a certain outcome. Inputs will serve as “summary variables that concentrate and mirror everything in the environment that is relevant to political stress (*Ibidem*),” and thereby as a powerful tool for analyzing the functioning of the political system. Demands and supports (or inputs) are processed in the system, giving way to decision-making agendas that continuously encourage institutions to produce concrete results by means of public policies.

A substantiation of the “authoritative allocation of social values,” public policies interact with the political environment of the system as *outputs* that generate new social demands that some groups may support and some others may not (Easton, 1992). In this context, public policies (or outputs) are the authorities’ decisions and actions that result from the system’s input and decision-making processes. In public administration, the *outputs* of the governmental apparatus stimulate the formulation of new social demands in a continuous feedback loop, thereby constituting an *input-output cycle* within the political system (see Figure 3a). Easton suggests that institutions endeavor to address social demands as a way to ensure the stability of the political system (1992).

Figure 3a. Eastonian Systemic Model for Public Policy Analysis



Source: Adapted from Parsons (1995:24).

The *Eastonian* input-output cyclic model illustrates the mechanics of the public policy-making process. As suggested before, *inputs* are the demands and supports that summarize the perceptions, interests, and needs of different social groups. Demands and groups compete in the political system, then yielding to the decision-making process that institutional authorities go through. This process leads to the definition of concrete actions in the form of public policies, and involves institutional procedures such as regulation, resource allocation, redistribution of benefits, capitalization, and/or ethical ruling. As public policies are implemented, they interact with the political environment of the system as *outputs*. Social groups interpret and evaluate these outputs to decide whether they are legitimate or not. The assessment of the authorities' decisions and actions may cause simple modifications to a public policy or even a serious retreat from certain groups of society. In due course, the interaction between outputs and the political environment generates new demands and supports in a continuous feedback process.

Following Easton's systemic approach, the Mexican political system represents the domain in which the input-output oil policy-making process occurs. The Mexican oil policy is the government's response to the *inputs* that emerge from within the domestic political system, including an extensive array of social demands, political perceptions, organized interests, institutional and non-institutional supports and oppositions, and even social apathy towards governmental action. An *Eastonian* input can be identified as either the civil society's set of demands for innovative oil-related bills, as the ideological stance

of political parties towards state ownership of hydrocarbons, or as the influence of international petroleum prices over the domestic energy market.

Energy policy makers are sensitive to these and many other *inputs* that continuously shape the Mexican oil policy. After processing inputs, the authorities' response is an oil policy whose course of implementation involves institutional mechanisms like energy regulation, allocation of subsoil resources, redistribution of anticipated oil revenues, capitalization of benefits, and promotion of principles and guidelines related to current state interests. At this intermediate stage of the input-output oil policy process, public management is partially efficient, as policy consequences are still not broadly evaluated.

In due course, the different agents of the Mexican political system – i.e. civil society, political parties, mass media, and NGOs – reflect their perceptions about the *outputs* related to the Mexican oil policy. Such outputs emerge once oil policy strategies are translated to concrete courses of action, as usually happens with law enforcement and institutional procedures. An important output ensues when the oil policy is interpreted according to the interests of the diverse agents that interact within the Mexican political system. Subsequently, evaluation occurs in official and non-official realms, leading to the struggle of oil policy legitimization, which in turn depends on the extent to which the implemented strategies can solve existing problems.

The outcome may be variable as the oil policy's degree of legitimization oscillates between simple modifications to the original policy planning and serious rejections derived from structural flaws. Thus, an *Eastonian* output can be identified either as a retroactive law to oil-related concessions, as the refusal to an oil-related reform from the oil workers' union, or even as a total alteration to a petroleum finance vehicle. Of course, outputs can be also positive as exemplified by increased oil exports, constructive taxation mechanisms, or efficient arrangements on oil resource allocation. Eventually, every output becomes a new input within a permanent feedback loop and the oil policy process starts all over again.

This scheme explains why the Mexican political system's *inputs* and *outputs* allow for a holistic assessment of the Mexican oil policy, because a system can be seen as a whole that is more than the sum of its parts. The interaction of those parts provides an analyst with hints for evaluating the system's dynamics. In this project, the *Eastonian* approach is useful for understanding both the way in which the components of the Mexican

political system interact and the way in which such interaction shapes the Mexican oil industry. For the purposes of this research project, the systemic factors that affect the Pemex will be classified as legal, political, and economic. The following section offers a detailed description of the research methodology used in this study.

3.2. Methodology

To undertake policy studies, public policy analysts use either quantitative or qualitative methods for research – or even a mixture of them – depending on the means and ends entailed in a given project. Both approaches have particular features, including strengths and weaknesses derived from their intrinsic essentials. Among several qualitative strategies for investigation, *case study research* is a useful method to achieve the goals delineated for this project. Case study research is an in-depth exploration of one particular situation (or subject) for the purpose of acquiring a comprehensive understanding of the investigated issues related to it through systematic observation of the characters involved, including background, agents, factors, and alternatives of solution (Stake, 1995; Yin, 1994, 2003; Creswell, 1994; Patton, 2002; Denzin, Lincoln & Lincoln, 2000).

The logic of case study research “is to demonstrate a causal argument about how general social forces shape and produce results in particular settings (Walton, as cited in Neuman, 2003:33).” Therefore, case study uses analytic in lieu of enumerative induction by selecting either one or a few cases to illustrate an issue and analytically study it – or them – in detail (*Ibidem*). According to Evera (as cited in McNabb, 2002), such analytical feature is substantiated throughout five main uses for case studies in both political science and public administration: (1) to create theories, (2) to test previously established theories, (3) to identify antecedent conditions, (4) to test the importance of these antecedent conditions, and (5) to explain cases of intrinsic importance. This project conforms to categories number three, four, and five, since it describes and evaluates the historical background of the Mexican oil industry to explain the main issues that affect Pemex’s performance through the application of Easton’s systemic analysis.

The proposed method of inquiry that derives from this scheme results in a two-dimensional case study. First, I provide an *explanatory analysis* (Chapters 4 and 5) of the factors that have hindered the development and reformation of Pemex by addressing both

the antecedent conditions and the current circumstances of its legal, political, and economic issues. Then, I offer an *exploratory analysis* (Chapter 6) in order to define a set of recommendations that Mexico's energy-policy makers could follow to make Pemex an efficient enterprise looking towards energy modernization.

The reason I decided to use a case study method is that it provides an in-depth understanding of the research phenomenon (Esterberg, 2002). As Yin (1994:1) mentions, "case studies are the preferred strategy when 'how' or 'why' questions are being posed, when the investigator has little control over events, and when the focus is on a contemporary phenomenon within some real-life context." The explanatory dimension of case studies can be complemented with an exploratory analysis, in which either fieldwork or data collection are undertaken before the final definition of study questions and hypotheses (Yin, 2003:6). The exploratory exercise corresponds to Chapter 6, in which a set of public policy recommendations on the Mexican oil policy are delineated.

For the case study strategy, I selected a *single-case holistic design* (SCHD) out of four types of case study designs suggested by Yin (1994). The other three types are: (a) *multiple-case holistic design*, (b) *single-case embedded design*, and (c) *multiple-case embedded design*. The SCHD is characterized by the study of a single, critical case within a single unit of analysis. Regarding this project, the case is the current situation of the Mexican oil industry, and the holistic unit of analysis is *Pemex*. The SCHD strategy was implemented by following three basic steps recommended by Patton (2002) and Creswell (1994). First, I assembled the raw case data and information collected about the unit of analysis and its determinant factors. Then, I constructed a case record by condensing the raw case data organization, classification, and interpretation. Finally, I composed a case study narrative in both ways chronologically and thematically, with the purpose to present a comprehensive portrayal of Pemex's functioning and challenges.

Given the characteristics of this project, the research technique is *historical-comparative*. Historical-comparative research (HCR) can be defined as the method that conducts case studies to examining aspects of social life in a past historical era or across different cultures. Neuman (2003) explains that researchers who use HCR may focus on one historical period or several, compare one or more cultures, or merge historical

periods and cultures. This type of research technique combines theory with data collection, and can be exploratory, descriptive, or explanatory.

Historical-comparative research is distinguished by the following aspects. First, it is usually limited and indirect because direct observation or involvement by the researcher is often impossible. Second, it leads the researcher to a retrospective interpretation of the evidence, rather than situational. Third, it encourages the researcher to be aware of longitudinal, cultural distortions. Fourth, it integrates the micro and macro levels simultaneously instead of focusing on small-scale, face-to-face interaction. Fifth, it allows shifting between a specific context and a general comparison. In other words, HCR involves the examination of specific contexts, followed by the detection of similarities and differences and the subsequent generalization of central ideas (Neuman, 2003).

3.2.1. Data collection process

As suggested before, legal, political, and economic oil-related issues were considered for the purposes of this project because they provided valuable hints to find alternatives for the reformation of the Mexican oil industry. In order to categorize those issues, data collection was based on the three following criteria: (a) the quantitative and/or qualitative significance of data related to the domestic oil sector; (b) the validity of such data as explanatory factors of the current situation of Pemex; and (c) the extent to which the information collected was useful for designing feasible oil-policy recommendations.

The process of data collection was based on documentation and archival records as the main sources of evidence. The reason is that such data sources are considerably stable, as they can be reviewed repeatedly; unobtrusive, as they are not created as a result of the case study; and literal, as they contain precise facts and references. Documents and archival records have also a broad coverage because they involve a long span of time, many events, and many settings, and can be even useful in quantitative terms (Yin, 1994). I gained access to documents and archives in two ways: (1) bibliographic and other printed formats, and (2) electronic sources such as internet and databases. The data collection process comprised the definition of categories and subcategories in which information was allocated according to its nature (see Table 3a).

Table 3a. Data Allocation Categories and Sub-categories of the Pemex Case Study

Structural Categories	Sub-categories	
	Quantitative data	Qualitative data
Legal framework	<ul style="list-style-type: none"> • number of constitutional norms and secondary laws related to the Mexican oil industry • number of amendments and reforms on oil-related legislation 	<ul style="list-style-type: none"> • content of constitutional norms and secondary laws related to the Mexican oil industry • underlying principles of the 1917 Constitution • relation between national sovereignty and state ownership of hydrocarbons • Mexico’s subsoil exploitation regime • legal context of constitutional reform mechanisms concerning oil affairs
Political context	<ul style="list-style-type: none"> • proportional representation of major political parties in the Mexican Congress 	<ul style="list-style-type: none"> • institutional basis for vertical integration of Pemex • domination pact vs. political segmentation • ideological composition of Congress • presidentialism vs. divided government • labor structure of the Mexican oil industry • context of Pemex’s reform attempts
Economic situation	<ul style="list-style-type: none"> • Pemex production and trade statistics • infrastructure of Pemex • oil reserve-to-production statistics • fiscal contribution of Pemex to the public budgetary income • Pemex’s financial statements • capital expenditure of Pemex 	<ul style="list-style-type: none"> • international oil-price setting mechanisms • oil-derived economic rent and petrolization • oil-related revenues • impact of Pemex’s fiscal regime on its financial situation • decapitalization and indebtedness of Pemex • high-risk investment in the upstream level

Source: Elaborated by author.

The *legal framework* encompasses those laws, decrees, norms, and regulations that are applicable to Pemex and to the Mexican oil industry as a whole. Specifically, I used official documents (laws, executive *communiqués*, congressional registries, and service records) and specialized literature on Mexican legislation (books, dissertations, presented papers, and scholarly journals) to obtain data on the number and content of constitutional norms and secondary laws related to the Mexican oil sector and their corresponding reform mechanisms. Data collection on the legal framework of Pemex allowed for an overview of the underlying principles of the Constitution of 1917, particularly regarding national sovereignty, state ownership on hydrocarbons, and Mexico’s subsoil exploitation regime.

The *political context* includes both the historical background of the Mexican oil industry and the power-allocation setting that has shaped the administrative structure of Pemex. I collected data on the factors that have constituted the institutional basis for the vertical integration of Pemex. Such factors were synthesized by the concept of “pact of

domination,” which was measured up to the political segmentation that characterizes the current political system of Mexico, and which has obstructed oil-reforming consensus. I used formal studies – i.e. books, scholarly journals, specialized magazines, dissertations, working papers, and statistics – and newspaper articles to obtain this information.

The *economic situation* comprises the series of statistical and financial indicators that determine Pemex’s degree of productivity. I used both official and non-official sources to collect information on Pemex’s operative, fiscal, and financial statistics that contributed quantitatively and qualitatively to the understanding of the research problem. Official sources consisted of administrative documents (presidential proposals and progress reports), service and organizational records, and energy policy studies, presentations, and statistics. Non-official sources encompassed formal studies and evaluations on the Mexican oil industry – books, dissertations, scholarly journals, specialized magazines, working papers, NGO documents, and survey data – as well as newspaper clippings and other mass media articles.

The conceptual framework of this project was structured from a systemic scope. Sub-categories embedded in the legal, political, and economic sections derive from the assessment of the principles and guidelines of the Mexican oil policy. Major oil policy issues were instrumented as scrutiny targets after being classified in specific categories and sub-categories by using the *data coding* method. Data coding consists of three main phases: (1) location of relevant data related to the research phenomenon, (2) collection of relevant data, and (3) analysis of the information for structuring a conceptual framework (Coffey and Atkinson, as cited in Esterberg, 2002). Coding is both a mechanical data reduction and an analytical categorization of data into themes.

In this project, I followed two steps for data coding. First, I used *axial coding* that consists of analyzing data upon the basis of an organized set of initial codes or preliminary concepts (Neuman, 2003). Accordingly, initial coded themes were given priority vis-à-vis the data, moving toward the organization of ideas and identification of the axis of key concepts in analysis.⁴⁵ Then, I used *selective coding* that involves a

⁴⁵ *Axial coding* differs from *open coding* in certain ways. During open coding, a researcher focuses on the actual data and assigns code labels for themes, but it is not peremptory to make connections among preliminary themes or concepts (Neuman, 2003:444). Although a researcher begins coding with a list of concepts, he generates most coding themes while reading data notes and thus *open coding* confirms its flexibility. As Miles and Huberman suggest, “regardless of whether he or she begins with a list of themes, a researcher makes a list of themes *after* open coding (as cited in Neuman, 2003:443).”

careful scanning of data and previous codes, to select the elements that illustrate the axial themes and to contrast them after data collection is complete. During selective coding, major themes or concepts ultimately guide the research process (2003:445).

After concluding data collection and coding, I wrote an *analytical memo* that is a synthetic discussion of thoughts and reflections about the coded themes and the coding process itself (Esterberg, 2002). In this project, a brief analytical memo was written for each of the three structural categories that explain the *stagnation of Pemex*. These three memos constituted the methodical basis for developing central arguments in chapters 4, 5, and 6.

3.2.2. Methodological limitations

It is important to mention that the document-based, case study method of this project has visible limitations (Yin, 1994; Creswell, 1994). First, there existed protected data unavailable to public/free scrutiny in both bibliographic and internet-based sources. Therefore, valuable information for the analysis was not accessible and so a number of key aspects about the Pemex case might not be present in this research project. Second, retrievability and feedback lacked because documents and archives do not provide social interaction as people do, for instance, by way of interviews and ethnographies.

The third limitation of this document-based case study is that selectivity was biased by a non-comprehensive collection of data. Conclusions in this project might be partial because they were based on assumptions derived only from the sources available. It is important to mention that some materials were either incomplete or inaccurate so that data allocation and coding were harder to accomplish than if complementary data-gathering techniques were implemented (i.e. interviews, content analysis, participant/direct observation). In conclusion, the achievements of this project shall be enriched with future studies from different perspectives and research strategies. Such an effort will allow for a more complete vision of the current situation of the Mexican oil industry and its future challenges.

4. Legal Framework and Political Context of Pemex

This chapter offers an explanatory analysis of the legal framework and the political context of Pemex. The first section describes the role and importance of the state oil company in the national and international realms, and introduces the main issues analyzed in subsequent sections. Specifically, the second section describes the *legal framework* of Pemex and discusses its fundamental flaws. The third section analyzes the *political context* that has influenced both Pemex's functioning and the Mexican oil-policy-making process.

The argument is that the process of reformation of the Mexican oil industry has been thwarted by structural issues related to the legal framework and the political context of Pemex. The Mexican state's legal restrictions to reform the national oil sector – regarding propriety and exploitation of hydrocarbons – have led the executive power to circumvent the Constitution for the last three *sexenios* to embrace strategic oil-policy changes. Thus, the constitutional basis of the national subsoil exploitation regime has become contradictory, as confirmed by the implications that circumvention has had over the Mexican political system.

Although this phenomenon reflects the societal dynamics that made for a highly-centralized oil policy-making during the congressional PRI-led era (1929–1997), since 1997 pluralism has produced new, uncertain scenarios. The domestic oil-policy-making process has been gradually democratized as the traditional and new political forces activate the checks and balances of the Constitution. However, the multiplicity of interests regarding the organization of the national oil industry has turned oil-reforming consensus into a difficult task. The political context of Pemex has not allowed for the implementation of innovative oil reforms in search of improving the situation of the Mexican oil sector.

4.1. Pemex, the state-owned oil company

On June 7, 1938, the federal government of Mexico proclaimed the creation of Petróleos Mexicanos (Pemex).⁴⁶ Pemex is the state-owned company responsible for developing Mexico's hydrocarbon assets. In compliance with its legal and procedural

⁴⁶ As specified by Article 1 of the 1938 Decree that creates Pemex. See Decreto que crea la Institución Petróleos Mexicanos (1938). Diario Oficial de la Federación, 20-VI-1938. Congreso de los Estados Unidos Mexicanos. Retrieved December 10, 2005, from <http://www.pemex.com>

rigidity reflected how convenient *developmental-authoritarianism*⁶¹ was for bestowing a non-democratic political regime as the Mexican with social legitimacy (Olvera, 1997; Lozano, 2005). For decades, the legitimacy source of the Mexican state was not electoral competition, but the government's implementation of populist policies in exchange for loyalty from the social blocs it was benefiting. Social and economic assistance included subsidies to the price of commodities and services, agrarian allotments, compensation bonuses, free basic education, fringe labor benefits, social security, minimum wages, syndical privileges on the signing of contracts, and so forth (Randall, 1989; Lozano, 2005).

In the case of the Mexican oil industry, such benefits were entrenched in the very process of nationalization. The *Cardenista* administration conferred on influential groups and unions monopoly rights consistent with the state project of national industrialization. In this way, rent-seeking factions came forward to ensure political reliability to the centralized regime (Tornell, 2002). This course of action was possible due to the structure of the *official party*, called *Partido de la Revolución Mexicana* (PRM) in 1938, and renamed as *Partido Revolucionario Institucional* (PRI) in 1946 (Medina, 1995).

The official party integrated its political militancy into corporative clusters that encircled four major groups: (1) the workforce, represented by labor unions such as the CTM and STPRM; (2) peasants, incorporated in agrarian leagues represented by the CNC; (3) the popular sector, constituted by civil professionals, teachers, bureaucrats, and merchants; and (4) the military (Lozano, 2005). These blocs fashioned the internal

modernization (Goetz & Philip, 2000). State and society on the one side, and state and economy on the other, constituted the basic forms of public organization. Thus, the intermediate spheres of economic and political association virtually vanished in the absence of *operative legal institutions* (Olvera, 1997).

⁶¹ *Authoritarianism* refers to the regime whose main characteristic is a high degree of state power and discretion. Most often, this type of rule lacks of procedures for popular consent or for guarding individual rights – thus standing in fundamental contrast to democracy (Encyclopædia Britannica Online [EBO], 2005). A neologism, authoritarianism is closest in meaning to *dictatorship*. As explained by Calhoun (2002), during the Cold War some Western political theorists and international relations experts developed a distinction between authoritarianism and *totalitarianism*. Accordingly, “authoritarian states were held to be less severe, less intrusive, and less durable than totalitarian states, such as Hitler's Germany or Stalin's USSR (*Ibidem*).” When referring to *developmental-authoritarianism*, Olvera (1997) stresses the peculiarity of the Mexican state apparatus. That is to say, the state pursued the economic modernization of the country by seizing control of both the productive processes entailed in strategic areas and the societal mechanisms by which power was vertically distributed. According to its conceptual roots, Latin American authoritarianism is not identified as an anti-constitutional postulate, but as a *para-constitutional* one. That means that it emerged as an accidental complement of political rule (hence transitory), albeit indispensable in the early stage of new-fangled republics for the achievement of essential objectives such as national integration, territorial sovereignty, and economic restructuring (Nohlen & Fernández, 1998).

attributions, Pemex explores, produces, and commercializes crude oil and natural gas within the national territory. Additionally, it processes and distributes refined products, gas, and petrochemicals that are sold in the domestic market and abroad (Pemex Annual Report on Sustainable Development [PMXARSD], 2003). Pemex operates through four principal *subsidiary entities*: Pemex Exploración y Producción (PEP), Pemex Refinación (PR), Pemex Gas y Petroquímica Básica (PGPB), and Pemex Petroquímica (PPQ).

PEP explores and develops Mexico's crude oil and natural gas reserves, mainly located in the country's northeast and southeast regions and offshore in the Gulf of Mexico. PR produces gasoline, aviation fuel, kerosene, diesel, fuel oil, and liquefied petroleum gas, and commercializes and distributes them inside the country. PGPB is responsible for processing, transporting, distributing, and commercializing natural gas and liquefied natural gas as well as basic petrochemicals. PPQ produces and sells secondary petrochemicals, including methane and ethane derivatives, ammonia, methanol, polyethylene, and other olefins and aromatics. The Pemex Corporate unit is in charge of both central direction and strategic management for ensuring the company's general coordination (Pemex, 2005) (see Figure 4a).

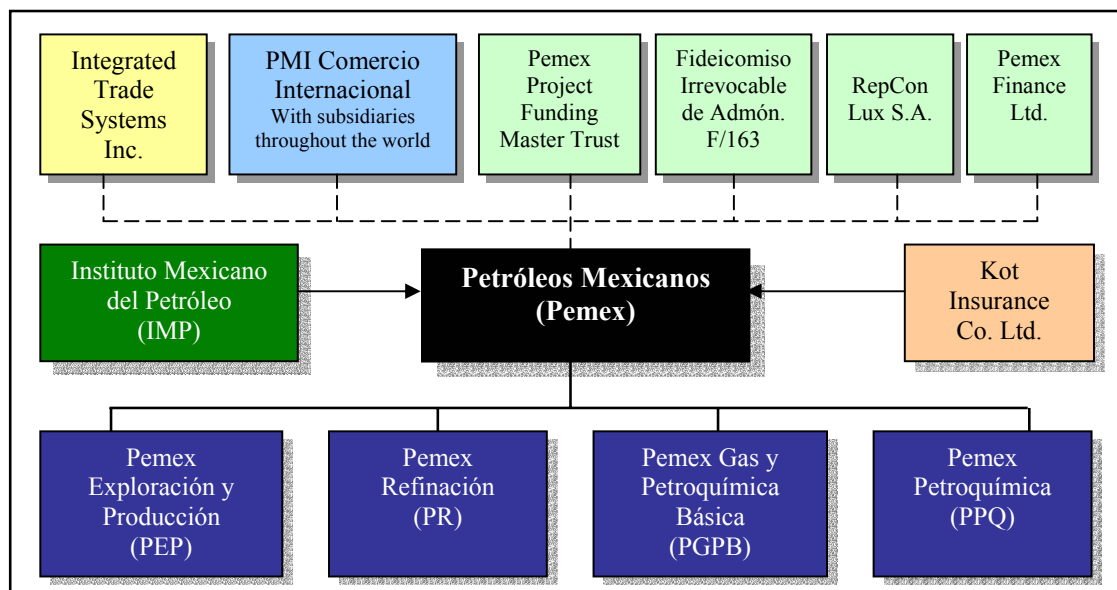
Petróleos Mexicanos also has *subsidiary companies* in charge of international operations.⁴⁷ PMI Comercio Internacional S.A. de C.V. is the company that performs trading operations for Pemex in the world markets. PMI offers risk management, insurance, transportation, and storage services as well (Pemex Statistical Yearbook [PMXSY], 2005). Integrated Trade Systems carries out commercial affairs, while the Pemex Project Funding Master Trust (a Delaware statutory trust) is responsible for obtaining funds to finance Pemex's major projects (Shields, 2003).

In 2003, the *Fideicomiso Irrevocable de Administración F/163* (a Mexican statutory trust) was constituted to finance *Pidiregas* (long-term productive infrastructure projects) in domestic currency (Pemex, 2005). Both the Fideicomiso F/163 and the Master Trust are controlled by Pemex. It is worth mentioning that RepCon Lux S.A. (a Luxembourg finance vehicle) and Pemex Finance Ltd. (a limited liability company incorporated as of 1998) are also part of the state oil corporate entity, which has also its

⁴⁷ *Subsidiary companies* are those corporations that are not *subsidiary entities* but in which Pemex has more than a 50% ownership investment (Pemex Consolidated Financial Statements [PMXCFS], 2004).

own insurance company registered as Kot Insurance Co. Ltd. In addition, the Instituto Mexicano del Petróleo (IMP) focuses on research and development activities to provide Pemex with scientific and technological support (Shields, 2003). Petróleos Mexicanos, the subsidiary entities, and the subsidiary companies are referred to as “Pemex” (Pemex Consolidated Financial Statements [PMXCFS], 2004) (see Figure 4a).

Figure 4a. Organizational Structure of Petróleos Mexicanos (Pemex)



Source: Pemex (2005) and Shields (2003:36).

Today, Petróleos Mexicanos is the third largest crude oil producer and the ninth largest integrated oil and gas company in the world (Petroleum Intelligence Weekly [PIW], XII-2004). By 2003, it remained in eighth place globally in crude oil reserves, thirteenth in refining capacity, and sixteenth in natural gas production (PMXARSD, 2003). With a total income before taxes and duties of \$459.3 billion pesos (equivalent to \$43.7 billion dollars),⁴⁸ and 137,722 employees in 2004, Pemex is also the largest company in Mexico and one of the most important in Latin America (Pemex Annual Report [PMXAR], 2004; PMXSY, 2005; PMXARSD, 2003; Ibarra, 2003; Shields, 2003;

⁴⁸ Amounts in U.S. dollars are translated at the February 10, 2006 exchange rate of \$10.50 MXN = \$1 USD.

Palacios, 2003). In 2005, *oil revenues*⁴⁹ accounted for 37.27% of the federal government's income budget, thus making Pemex the country's foremost fiscal contributor (Secretaría de Hacienda y Crédito Público [SHCP], 2006) (see Appendix E).⁵⁰

Pemex is one of the most profitable enterprises in the world (Rodríguez, 20-III-2005),⁵¹ and yet, it is currently experiencing a serious stagnation. Today, Pemex is the most indebted oil company worldwide. By October 2005, its debt reached the sum of \$1.03 trillion pesos (\$98.24 billion dollars), about 140% higher than that of 2000 (Rodríguez, 6-II-2005; Rodríguez, Zúñiga & Cardoso, 31-X-2005). Congressional legislators and the executive cannot agree how to reform a state corporation that accounts for a third of federal revenues but that has no investment capital (Shields, 2003). Pemex's lack of financial autonomy and adequate funds hamper major investments in exploration, exploitation, and infrastructure improvements. The company is also languishing in terms of productivity and operative efficiency because of legal and fiscal restraints. Since domestic and international energy markets are increasingly demanding, Pemex is facing the difficulties that any state-owned monopoly has to cope with.

Pemex is becoming immersed in a complex situation that comprises multifaceted issues. In the era of globalization, liberalization, and deregulation, the state-owned company needs to be reformed to remain as a world-leading oil producer. The challenge ahead is to fulfill the growing demands of both the domestic and international energy markets without compromising the protection of the environment or the development of Mexican society. The problem is that the Mexican government has not developed adequate policy strategies for reforming the national oil industry to face the challenge of energy modernization. Those strategies should deal with matters such as: (a) the need for consensus among interest groups and governmental institutions to design innovative oil-

⁴⁹ *Oil revenues* are all tributary and non-tributary earnings generated from petroliferous activities, and encompass (a) the 15% Value Added Tax paid by Pemex, (b) *hydrocarbon rights*, (c) the *special tax on production and services* on gasoline varieties and diesel, and (d) Pemex's revenues (Quiroz, 2004).

⁵⁰ Author's own estimation from preliminary data corresponding to January-December, 2005. Secretaría de Hacienda y Crédito Público (2006). *Timely Public Finances and Public Debt Statistics: Public Sector Budgetary Revenues (Information to January-December 2005)*. Mexico: SHCP. Retrieved February 2, 2006, from http://www.shcp.sse.gob.mx/contenidos/informacion_economica/temas/estadisticas_oportunas/english/html/mensual.html

⁵¹ For instance, Pemex has one of the smallest crude oil extraction costs per barrel in the world. In 2005, Pemex's cost of extracting one barrel of crude oil was \$6.5 dollars, while Royal Dutch Shell's extraction cost was \$6.49 dollars per barrel (d/b); BP Amoco, \$7.62 d/b; Exxon Mobil, \$8.65 d/b; Texaco, \$8.74 d/b; Conoco, \$9.03 d/b; Chevron, \$9.87 d/b; and Philips, with \$12.47 d/b (Rodríguez, 20-III-2005).

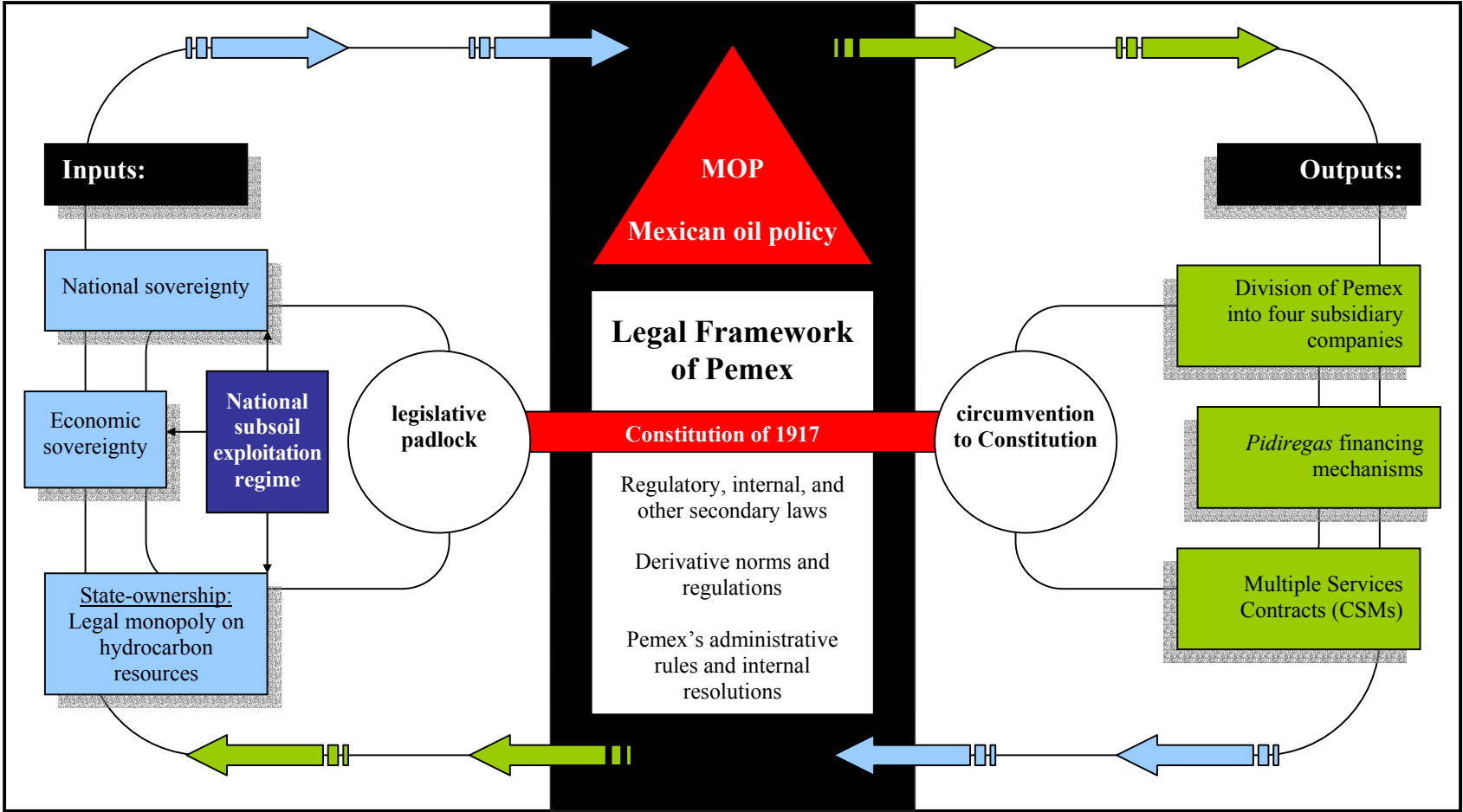
policy alternatives; (b) the necessity of political concurrence between the legislative and the executive branches of the government to implement structural reforms; (c) a revision of the oil sector's legal framework regarding Mexico's subsoil property and exploitation regimes; (d) transparency and accountability of Pemex's financial and fiscal assessments; and (e) an evaluation of both the environmental impact and the social implications derived from the state's macro-economic measures related to the oil industry's structural planning.

The remainder of this chapter analyzes the legal and political issues that explain the stagnation of Pemex. It is important to reiterate that this is not an exhaustive study of every issue related to the state oil company. Therefore, I only evaluate the most critical topics of each of the categories mentioned above. The interrelation of key topics will be illustrated in the following sections as a sign of theoretical linkage among the concepts that elucidate the social problem analyzed in this project.

4.2. The national subsoil exploitation regime: sovereignty versus circumvention

This section analyzes the legal framework Pemex that comprises those laws, decrees, norms, and regulations that are applicable to the state oil company and to the Mexican oil industry as a whole. The three main themes discussed are: (1) the legal basis of the national subsoil exploitation regime, (2) the principle of national sovereignty, and (3) the relation between the *legislative padlock* of the Constitution and circumvention. I argue that the constitutional groundwork of the Mexican state's exclusive property on hydrocarbons has been both constructive and restrictive. On the one hand, it pledged economic growth and political stability to the post-revolutionary Mexico. On the other hand, it has blocked opportunities to restructure the domestic oil industry by means of transparent methods. Representatives of the executive power have implemented pragmatic, oil-policy reforms by circumventing the Constitution at the expense of affecting the functionality of Pemex's legal framework. Such reforms include (a) the partition of Pemex into four subsidiary entities in 1992, during the Salinas *sexenio*; (b) the enactment of *Pidiregas* during the Zedillo administration; and (c) the implementation of *Contratos de Servicios Múltiples* (CSMs) as of 2003, under the Fox presidency. The conceptual map for the *Eastonian* systemic analysis of the legal framework of *Petróleos Mexicanos* is sketched in Diagram 4a.

Diagram 4a. Conceptual Map for the Systemic Analysis of the Legal Framework of Pemex



Source: Elaborated by author

4.2.1. Legal basis of Mexico's subsoil exploitation regime

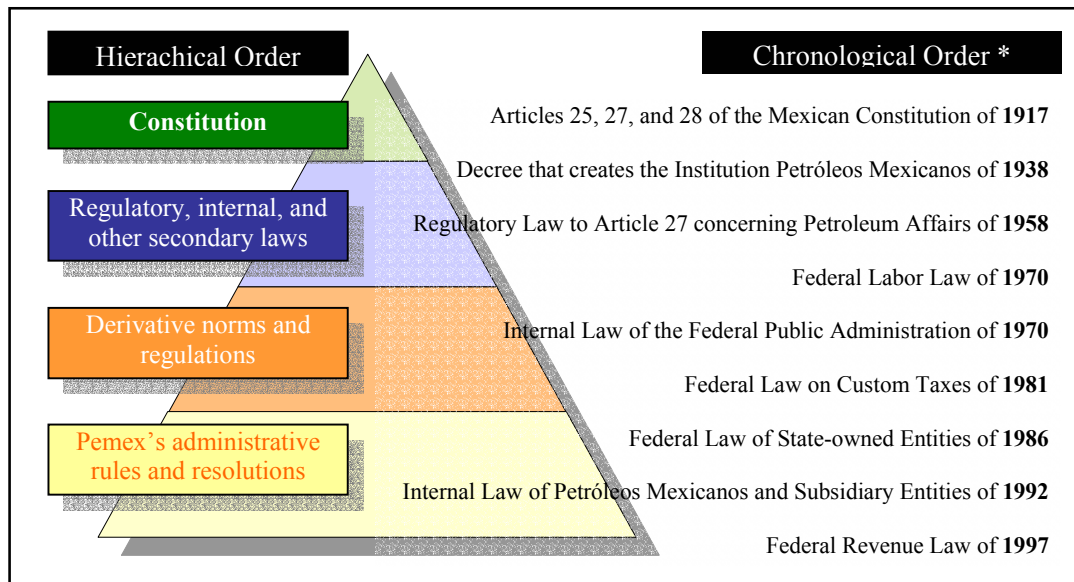
Article 27 of the *Mexican Constitution of 1917* establishes that “the Nation” has an original right of property over petroleum and every solid, liquid, or gaseous hydrocarbon within the boundaries of the national territory. Additionally, Article 25 indicates that the public sector shall have the exclusive power to manage the strategic areas established as such by Article 28, including mail services, telegraphs, nuclear energy, oil and all hydrocarbons, and basic petrochemicals. For that purpose, the federal government shall always keep the property and full control over the agencies created therein. Accordingly, Article 28 specifies that the Mexican state shall provide for agencies and corporations deemed to be necessary in order to administer efficiently the strategic areas within its domain. Likewise, it states that the public sector shall act either alone or jointly with both the private and the social sectors in organizing those development areas considered as national priority, such as satellite communications and railways (*Constitución Política de los Estados Unidos Mexicanos [CPEUM], 1917*).

To grant the feasibility of the *national subsoil exploitation regime* described above, the Mexican state operates through its oil and gas company. Article 3 of the 1938 *Decree that creates the Institution Petróleos Mexicanos* defines Pemex as a decentralized entity of the federal government that possesses its own patrimony as well as its own juridical personality. Consistent with the Mexican law, Pemex has the responsibility to exert central management and the strategic direction of all the activities encompassed in the oil industry of Mexico. Detailed in Articles 3 and 4 of the 1958 *Regulatory Law to Article 27 concerning Petroleum Affairs*, such activities include the exploration, exploitation, refining, storage, distribution, and commercialization of hydrocarbons (Venegas-Martínez, 2001).

Other secondary laws and regulations are also applicable to Pemex. Some of the most important are the *Federal Labor Law* of 1970, the *Internal Law of the Federal Public Administration* of 1976, the *Federal Law on Custom Taxes* of 1981, the *Federal Law of State-owned Entities* of 1986, the *Internal Law of Petróleos Mexicanos and Subsidiary Entities* of 1992, and the *Federal Revenue Law* of 1997. The Mexican Constitution of 1917 rests on top of all these laws and their corresponding regulations. At the bottom of this hierarchical structure, there are internal rules and resolutions that Pemex puts into effect for

administrative purposes. The constitutional articles and the secondary laws, decrees, norms, and regulations named above comprise the legal framework of Pemex (see Figure 4b).

Figure 4b. Legal Framework of Petróleos Mexicanos (Pemex)



*The chronological order corresponds to the year each law was issued for the first time in the DOF.

Source: Pemex (2005) and Ibarra (2003).

Given that the Mexican law proclaims Pemex as the only entity that can explore for, exploit, transport, and process crude oil within the national territory, the domestic oil sector is officially set as a *legal monopoly*.⁵² Private participation in the Mexican oil sector is limited mainly to the transportation, storage, and distribution of natural gas and to the exploitation of secondary petrochemicals (Martínez, 2004; Palacios, 2003). This scheme of property reveals an asymmetry between those activities that are open to private investment and those that are reserved to the Mexican state by means of its oil company (Rosenzweig & Gutiérrez, 2005).

⁵² A *legal monopoly* exists when a law, a license, or a patent restricts competition in the form of a barrier to entry. A barrier to entry is either a natural or a legal impediment that protects an enterprise from potential competitors within a specific market (Parkin, 1998:335). Although a state monopoly, Pemex is not possessor of the subsoil resources of Mexico. That means the exploitation of hydrocarbons is a prerogative of Pemex, but the legitimate proprietary is the Mexican state to which the public oil company pays taxes under a special fiscal regime. This difference reveals that the property of subsoil assets is not defined by the type of exploitation, which can be either monopolistic or competitive, but by the fiscal regime and the assortment of rights and royalties related to such activity (Quiroz, 2004).

4.2.2. *The principle of national sovereignty*

Pemex's prerogative to develop Mexico's hydrocarbon assets is legally protected by the Constitution of 1917 (De la Vega, 1996). The Constitution has based its legitimacy upon the principle of *national sovereignty* (Carreón, Jiménez & Rosellón, 2005; Núñez-Luna, 2005; Garza, 2005),⁵³ to which Pemex has been strongly associated since the time of its creation. To grasp the significance of such ideological link, it is essential to reflect on the historical circumstances that prevailed during the configuration of the contemporary Mexican state. As said by Carreón, Jiménez, and Rosellón (2005:112):

The Mexican modern nation was built around the idea of sovereignty as a key element to keep the country united against external forces. To understand the importance of that concept it is necessary to recall that Mexico lost half of its territory in the 19th century to the United States. [Since then,] Mexican leaders have used the discourse of nationalism and sovereignty as persuasive and unifying elements to protect Mexico's borders and maintain the country's independence.

Although the territorial sovereignty of the country is no longer in danger, several decades of indoctrination have persisted through the institutions of the Mexican political system (Carreón, Jiménez & Rosellón, 2005). Even when international circumstances have changed, the Mexican government remains hermetic on issues related to the property and exploitation of subsoil resources. Privatization and foreign private investment in the oil sector are still perceived by certain groups – i.e. the national oil union, left-wing parties, and non-officialist media – either as politically risky or as legally objectionable (2005).

⁵³ A conjunction of both *nationalism* and *sovereignty*, the concept of *national sovereignty* represents the pledge of integrity that the Constitution of 1917 manifested toward the Mexican modern state. On the one hand, *nationalism* is defined as an ideological manifestation of loyalty and devotion to the nation-state above all else. This sentiment is normally based on the premise that population groups are bound together through territorial, cultural, historic, linguistic, and/or ethnic common values. As maintained by Scott and Marshall (2005), nationalism “also entails certain assumptions about the will to self-determination, the existence and indeed desirability of diversity, the superiority of the sovereign state over other forms of rule, and the centrality of national loyalty to political power as a basic form of legitimation.” On the other hand, *sovereignty* is defined as “the claim to be the ultimate political authority, subject to no higher power as regards the making and enforcing of political decisions (Buzan, 2003).” This term can be seen either from an internal perspective or from an external one. From an internal point of view, sovereignty is synonym of *supremacy*, which is defined as the unrestricted power that an authoritative entity has to provide for and enforce its own juridical order within its own sphere of influence. From an external scope, sovereignty is “the claim by a state to full self-government” within the international system (*Ibidem*). In theory, the external aspect of sovereignty entails juridical equality (equal rights, equal capacities) of all nations, thus epitomizing the principles of *independence* and *self-determination* (Garza, 2005).

In addition to the juridical and the political, there is a more practical connotation of sovereignty that emerged from the power relations historically established by nation-states, referred to as *economic sovereignty*. This term refers to the unlimited right of every nation-state to the self-determination of its economic system/regime (Garza, 2005). This definition suggests that a country shall be free to exploit the natural resources that are inherent to its territorial demarcation. In the case of Mexico, such statement became essential for configuring the nation's developmental project through legal means epitomized in the *Magna Carta* of 1917. The principle of economic sovereignty served as a juridical instrument to assert the state's exclusive property on hydrocarbons (2005).

It is worth noting that the constitutional character of Mexico's subsoil exploitation regime involved social precepts along with a mixed economy planning. The reason is that Mexican constitutionalists looked after the country's economic independence in terms of both social utility and national benefit. To succeed, the state required to be legally protected against exogenous agents from the international realm. Thus, the endurance of the country depended on the extent to which national sovereignty was substantiated. Outwardly, Mexico's sovereignty was emphasized through the reaffirmation of its independence. Internally, the Mexican state avowed its sovereignty through the principle of supremacy, that is to say, by invoking its unrestricted capacity to enforce law within its territorial domain. The ultimate purpose was to evolve from a pre-revolutionary, semi-colonialist economy to a post-constitutionalist, productive structure. The method consisted of prompting any legal means necessary to ensure that transformation.

An important outcome can be illustrated with the reorganization of property that resulted from the enforcement of Article 27. This article, and the 1917 Constitution itself, challenged the founding precepts of the former Constitution of 1857: legislators of the 1917 Constituent Congress replaced the ideals of American classic liberalism with a more social-oriented character. The underlying strategy was to reform Mexico's subsoil exploitation regime by restituting the *ordinary mining regime* that the Porfirio Díaz government (1876–1911) abandoned in favor of British and American oil investors (such as H.C. Pierce and W. Pearson) (Lavín, as cited in Garza, 2005; Brown, 1993).⁵⁴

⁵⁴ Equivalent to the *subsoil exploitation regime*, the *ordinary mining regime* established that every subsoil-exploitation activity within the Mexican territory should be authorized by the state in conformity with the

The way in which state sovereignty on subsoil resources was sketched in the 1917 Constitution signaled the determination of the Mexican government to reassure both centralization and political-administrative control over the decision-making process of oil operations. This fact also entailed the possibility to implement a fiscal scheme supported by the principle of supremacy. However, public management of the oil sector was not feasible at that moment because there were neither funds nor the appropriate conditions for the state to run a national oil company. In fact, the enforcement of the principle of sovereignty was a cause of discordance between the government and the oil companies that were then operating in the country. This conflict reached a climax in 1938, when the oil industry was nationalized and Pemex was instituted as the only oil corporation in Mexico (Palacios, 2002). Pemex's foundation represented the consolidation of constitutional precepts originally incubated in the Mexican Revolution, but it also brought serious economic challenges to the federal government.

A convenient outcome in the domestic context was that, once the government solved the controversies provoked by the expropriation of foreign-owned oil assets, no significant threat to the legitimacy of the subsoil exploitation regime came about thereafter. Thus, the Mexican state asserted its sovereignty by seizing all domestic, oil-related activities via *Petróleos Mexicanos*. Pemex's official status of exclusivity to exploit hydrocarbons remained virtually intact until the late 1980s, when the Salinas administration implemented neoliberal economic reforms in the energy sector (Palacios, 2003).

concessions legal scheme. Concessionaries were obliged to respect the legal and regulatory compromises enclosed in this type of contract, including the interdiction to transfer their rights to third parties without the permission of the conceding authorities. The mining regime was part of the "Hispanic-Mexican orthodox juridical order," the legal system that Mexico inherited and adapted from Spain since the Colonial era. In that epoch, legal control on natural resources was imposed by several Royal Orders, like that of Alfonso XI (enacted in the 14th century), by which he declared that every colonial mine and its products were property of the Spanish Crown. Carlos III also enacted two Royal Orders (in 1780 and 1783, respectively) that stated that the king could authorize concessions for exploiting the Crown's minerals and other "earth's bitumens" (Arellano, 2000). Eventually, royal privileges were transferred from the Spanish Crown to the newly independent Mexican state by the celebration of the 1836 Treaty of Peace and Amity. This pact was Spain's official recognition of Mexico's sovereignty, once the War of Independence (1810-1821) came to an end with the Treaty of Cordoba that Juan de O'Donojú (viceroy of New Spain) and Agustín de Iturbide (Creole insurgent and first emperor of independent Mexico) signed in 1821 (*Ibidem*). Among the early mining laws of the Mexican state was the federal *Mining Code of 1884*, the *Mines Law of 1892*, and the *oil laws of 1901, 1905, and 1925* (this last amended in 1928) (Garza, 2005:13-20).

4.2.3. The legislative padlock of the Constitution

Why has the national oil industry remained protected by the Mexican law even when Pemex is stagnating? A powerful explanation is that the Constitution of 1917 is guarded by a *legislative padlock*. This means that the Constitution comprises complex reform procedures originally designed as such in order to preserve fundamental norms as unalterable as possible. The Constitution bestows the bicameral Congress with the power to produce or amend laws and to enact constitutional reforms. The president can send bills to Congress and he can even veto legislative bills. The Supreme Court can review the constitutionality of legislation and, if considered necessary, annul it either partially or completely. In any case, the Constitution makes congressional action a necessary condition for policy change (Lehoucq, Negretto, Aparicio, Nacif & Benton, 2005).

Thus, legislative reform measures are complicated enough as to inhibit major attempts to make profound alterations on constitutional norms. Article 135 specifies that the Constitution can be amended or reformed only if a *qualified majority* in Congress approves it, that is, two-thirds out of the attending members at the respective session (Nava & Yáñez, 2003). Such amendments and reforms shall be valid when ratified by a simple majority of State Legislatures (local congresses) (Rodríguez-Padilla, 2001). Either the Congress or the Permanent Commission shall compute the State Legislatures' votes and declare the approval of the corresponding modifications (CPEUM, 1917; Miller, 27-VI-2005). Alterations to secondary laws are comparatively less difficult, since they only require the consent of a simple majority in Congress (Bailey, 27-VI-2005). For that reason, representatives of the executive power have seen less problematic to propose amendments to secondary oil-related laws rather than pursuing deep changes to the Constitution. Implications, however, have proved conflicting.

The rationale of constitutional reform mechanisms is contradictory to the current circumstances of the domestic oil sector. The Constitution's status of "inalienable" was a cornerstone for the institutionalization of the subsoil exploitation regime in those areas considered as strategic by the Mexican state (De la Vega, 1996). This explains why Pemex became the foremost state monopoly of the country throughout the second half of the twentieth century. However, legal obstructions to amend constitutional norms have become factors of legislative paralysis concerning structural energy reforms to the

detriment of Pemex. Even when it was crucial to safeguard oil through legal means during the post-revolutionary era in quest of political stability and economic growth, today the *legislative padlock* is an obstacle for updating the Constitution and consequently for reforming the Mexican oil industry.

Although there have been important constitutional reforms concerning the oil area, critical flaws continue to be unattended by the government. The best example is Article 27 that reveals some of the Constitution's main discrepancies because it keeps reflecting the idea of a defensive, inward-looking state that pursues national integrity at all costs. This image countervails the multilateral approach that Mexico has promoted through its foreign trade policy since the mid-1980s, a policy that has actually contributed to the gradual reorganization of the oil sector under the scope of neoliberalism. This can be exemplified with the asymmetrical scheme of property that characterizes the oil sector: while the *upstream* level has strictly remained under state control, the *downstream* level has been progressively liberalized since the Zedillo *sexenio* (Rosenzweig & Gutiérrez, 2005; Martínez, 2004). The legal standing for Mexico's subsoil exploitation regime is thus confusing because it does not clarify to what extent the principle of national sovereignty is compatible with new privatization schemes in the oil area. Theory and practice result inconsistent and potentially harmful to the authenticity of the legal framework of Pemex.

Can we say then that the Constitution is the main obstacle to the reformation of Pemex? Not exactly. The concern should not be if whether the Constitution is obsolete for restructuring the Mexican oil industry, but rather to what extent the inconsistencies of the Constitution are seized as an opportunity to embark on pragmatic, oil-related reforms. Considering the nationalist legal framework as a great impediment to liberalize the oil sector, Núñez-Luna argues that representatives of the executive branch have followed a trend of *circumventing the Constitution* (2005).⁵⁵ Specifically, presidents of the last three

⁵⁵ According to the Oxford English Dictionary (2005), *to circumvent* is "to get the better of by craft or fraud; to overreach, outwit, cheat, 'get round', 'take in'." Circumventing is also evading or finding a way around a difficulty, an obstacle, an issue, and etcetera (*Ibidem*). In the case of the Mexican legislation, circumventing the Constitution does not necessarily mean an illegal exercise, given that constitutional norms have been as adaptable as either congressional representatives or the executive have required in the way of circumstantial interpretations, amendments, and reforms. As suggested by Olvera (1997), the revolutionary legitimacy of the Mexican state was "the political foundation of a *neopatrimonial* regime where legality was by-passed or ignored (p.4, my italics)." That tradition remained practically intact until the present time. Then, it can be deduced that the gaps of the Constitution were the factors that made

sexenios have implemented pragmatic oil-related reforms seeking to evade legal controversies by taking advantage of the Constitution's gaps, rather than promoting real amendments through clear and transparent rules (2005). In most cases, this maneuver has consisted of adjustments to secondary oil-related laws with the purpose to make them more flexible. Consequences have not been always constructive, though. Although circumvention has not necessarily led to law infringement, it has had repercussions on the extent to which constitutional norms could credibly be enforced by the state authority.

The first example of circumvention is the partition of Pemex into four semi-autonomous divisions during the Salinas *sexenio* (Martínez, 2004). Salinas decided to avoid legal challenges and so, instead of proposing a constitutional reform to liberalize the oil industry, he prompted Pemex's restructuring in 1992 looking towards welcoming private investment in the petrochemical area. Since the Constitution reserves the production of petrochemicals to Pemex, two categories were created through statutory law, namely, "basic" and "secondary" petrochemicals. Foreign investment was allowed only in the second category, but the number of basic petrochemicals was reduced from fifty substances to eight, thus attracting the private sector by circumventing, but without violating the Constitution (Núñez-Luna, 2005). Yet, the way in which Pemex was divided provoked political divergences. Armando Leal Santa Ana, director of Pemex Petroquímica during the Zedillo administration and head of Pemex Refinación during the first two years of the Fox *sexenio*, declared that Pemex's division was a mistake because it worked against the tendencies of the world oil industry, which is moving towards the consolidation of companies and not towards the disintegration of *value chains*⁵⁶ (Saldaña, 18-X-2000).

Another case in point is the enactment of a financing mechanism called *Proyectos de Inversión Directa en Infraestructura con Registro Diferido en el Gasto (Pidiregas)* during the Zedillo administration (1994–2000). *Pidiregas* emerged as a response to the declining public revenues and the loss of access to international financing provoked by the

outwitting a common practice within the Mexican political system. Corporatism, presidentialism, and clientelism are but some of many forms of political organization that have entailed law circumvention.

⁵⁶ A *value chain* is the sequence of activities by which a good or service is produced, distributed, and marketed. Each step of the chain may consist of the activities of one company or several, and creates different amounts of value for the consumer (Smullen & Nicholas, 2005). The underlying principle of this concept is that "a company should examine its costs and performance at each stage and decide, among other things, whether it is best to carry out a particular stage in house or externally (*Ibidem*)."⁵⁶ A value chain can provide the basis for strategic analysis in search for competitive advantage.

economic crisis of 1994–1995 (Núñez-Luna, 2005; Shields, 2003). Subsequent to a number of amendments to the budget laws, this legal instrument was created to attract private investment via the long-term financing of Pemex's strategic projects. The reimbursement of privately financed public infrastructure would be defrayed by Pemex with earnings derived from projects themselves as soon as being completed and operational (Quiroz, 2004). Then, the projects' cost would be registered as public account liabilities, thus becoming contingent debt to be rewarded in the long term. In this way, the state assumed the projects' absolute risk at the expense of accumulating elevated debt rates (Shields, 2003).

Pidiregas has generated a debate on the role of the public and private sectors regarding the development of subsoil resources. The mainstream approach suggests that the last two neoliberal administrations have pursued the objective of privatizing the oil sector as quickly as possible, but that before constitutional padlocks and political opposition, they have opted to ban Pemex from current-account budgetary funds for investing in infrastructure projects. Conversely, some opinions are supportive of *Pidiregas* under the argument that they stimulate Pemex's improvement through private participation without the necessity to privatizing it (Shields, 2003). Yet, whether *Pidiregas* has been an alternative to Pemex's lack of capital, it is not convenient for the state to keep indebting itself through this mechanism just because there are no clearer means to counterbalance legal restrictions on property and exploitation of hydrocarbons.

A final example of circumvention is the implementation of a new scheme called *Contratos de Servicios Múltiples* (CSMs) in 2003 by the current Fox administration. CSMs were designed to attract private capital, technology, and equipment for exploiting natural gas that Mexico needs urgently to meet the increasing demands. CSMs feature is that, instead of bidding on one task, contractors bid to a set of multiple tasks for a certain period (up to 20 years) (Pemex, 2005). However, there is strong political opposition to these contracts based on legal arguments. When President Fox announced the CSMs prototype in 2001, the Senate questioned the legality of these contracts and forced the government to revise their rationale as to curtail their significance. Accordingly, CSMs were seen by congressional representatives as an attempt to introduce *risk service contracts*, which are prohibited by the Constitution (Núñez-Luna, 2005).

Pemex functionalities defended their position by arguing that CSMs are destined only to cover exploration of proven reserves, thus implying that they are allowed by the statute that authorizes the celebration of services contracts with other entities (Núñez-Luna, 2005). Some analysts (Garza, 2005; Lajous, 2004) argue that, since CSMs are neither *risk service contracts* nor *concessions*,⁵⁷ they are permissible because their configuration does not contravene constitutional principles. As Lajous (2004) explains:

The multiple services contracts [CSMs] recently awarded by Pemex are qualitatively and quantitatively different [to other types of contracts also managed by the state oil company]. Their scope comprises the complete cycle of activities of exploration and production, and the operative obligation passes unequivocally to the contractor. Pemex keeps the functions of control and supervision that correspond to the owner's representative, which in this case is the Nation [sic], and the contractor assumes the operation within the framework of a master program annually updated. The contractor is in charge of producing gas and condensates under Pemex's account and orders, and has to convey them in the transference points previously accorded (p.13, my translation).

After evaluating the CSMs, critics – largely left-wing members of Congress – have disputed that such contracts have no juridical standing and that their implementation allows private companies to substitute *Pemex Exploración y Producción* (PEP) in activities that are reserved to the state. They have alleged violations to constitutional Articles 25, 27, and 28 by saying that CSMs defy the state's exclusivity over strategic areas declared as such by Article 28, including hydrocarbons and basic petrochemicals (Shields, 2003). While political divergences continue and opposition legislators announce their intention to mount a *constitutional controversy* before the Supreme Court, Pemex has awarded CSMs to foreign companies like Repsol-YPF, Petrobras, and Lewis Energy Group (Núñez-Luna, 2005).

Therefore, either constitutionally contravening or not, circumvention reveals that the legal framework of Pemex has been overwhelmed by political disagreement on how the Mexican oil industry should be reformed. Significant constitutional reforms in oil matters appear to be difficult in the short term, whereas adjustments to secondary oil-

⁵⁷ According to Garza (2005:48), a *concession* is the juridical act by which the state awards a third party the exclusive right to explore for subsoil resources within a geographical area and during a determined period. If discovered, resources can be exploited so long as the concessionaries comply with technical, financial, and economic obligations. A *risk service contract* is the juridical act by which either one private company or several (acting together) can undertake exploration and exploitation tasks on its or their own account and risk. Contractors receive compensation only if commercially exploitable resources are discovered and according to pre-established, contractual stipulations (2005:49).

related laws are used increasingly as transient palliatives. Eventually, it will be impractical to make secondary laws more flexible than they are today, and so congressional representatives will be pushed to revise the Constitution in order to design innovative options for improving the domestic oil industry. Changes should be arranged promptly in order to prevent risks such as the exhaustion of Mexico's oil reserves, the increase in crude oil production costs, or the destabilization of the public financing policy. Energy policy decision-makers and influential groups of the Mexican political system – i.e. political parties, the national oil union, mass media, and NGOs – should promote a new series of reforms or at least discuss formally the character of constitutional principles regarding state property on hydrocarbons (Quiroz, 2004).

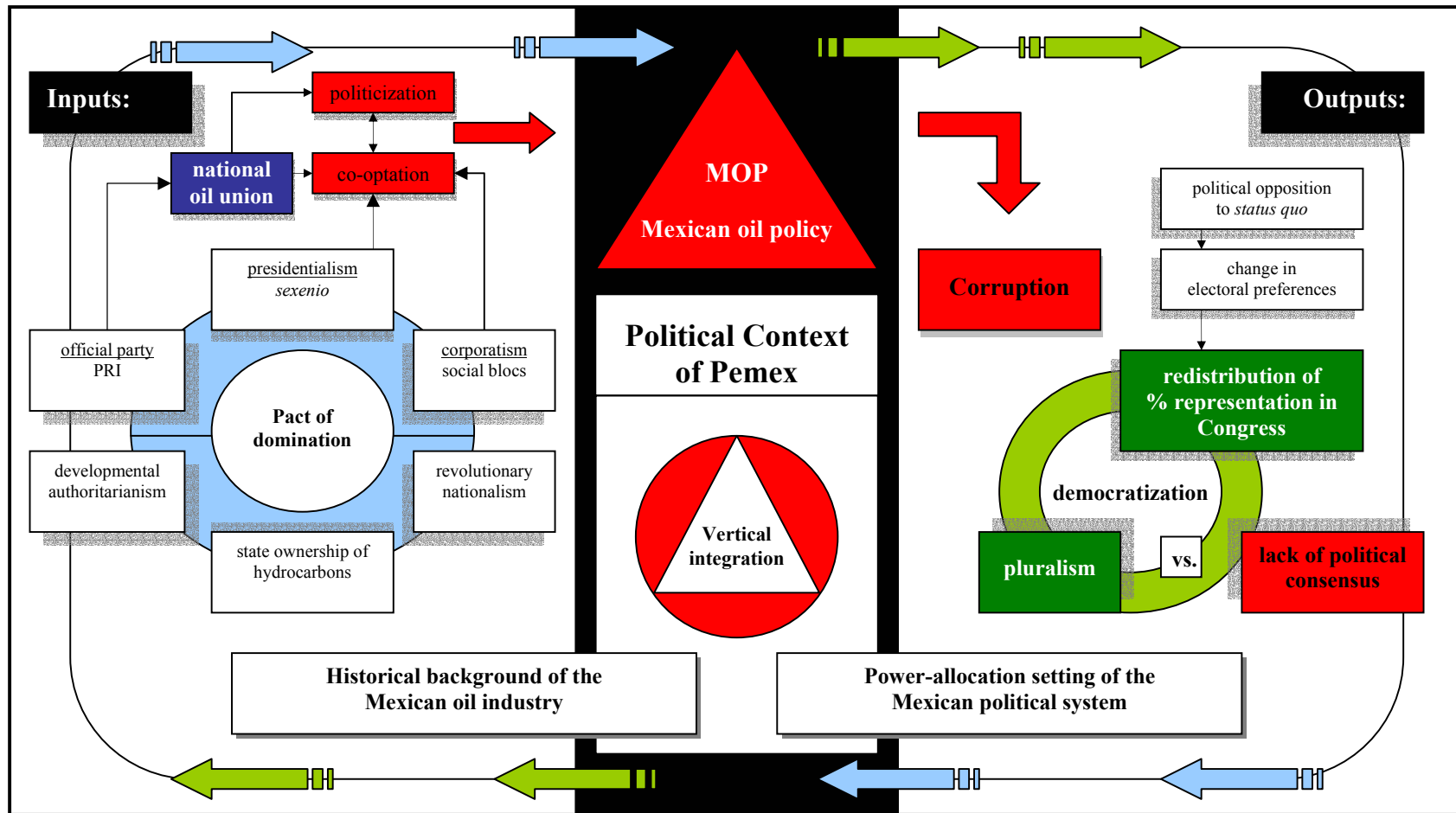
The legal framework of Pemex has not been sufficiently reformed to provide for institutional mechanisms in search of improvement. It is compulsory to rework it or at least to clarify the extent to which public investment in the oil sector can be complemented with new modalities of private participation (Quiroz, 2004). In this way, emerging policy strategies could stop provoking legal and political plights as both *Pidiregas* and CSMs have done. Transparent oil policy reforms must substitute concealment and politicization to avoid undermining the constitutional basis of Pemex's operative structure. Rhetorical and populist claims of lost sovereignty and state autonomy against privatization should contribute to the public debate on energy modernization instead of just motivating ideological confrontation (Carreón, Jiménez & Rosellón, 2005). Up to now, oil-reforming consensus seems hard to establish both because the political landscape is fragmented and because the Congress is ideologically divided. The next section will focus on these matters by analyzing the political context of Pemex.

4.3. The politics of vertical integration and the quest for political consensus

In the course of almost seven decades, the identity of Pemex has been shaped by the *political context* to which it is embedded. This context includes both the historical background of the Mexican oil industry and the power-allocation setting that has characterized the administrative structure of Pemex. Two major themes comprise the political context to be analyzed in this segment: the first one corresponds to the institutional basis of Pemex's vertical integration, and the second one refers to the lack of consensus that has prevailed in Mexico's current political scenario. This section scrutinizes the historical aspects that constituted Pemex's process of vertical integration as well as the political factors that have reshaped such operative structure with unclear results on the state-owned company's performance.

I argue that Pemex's improvement is at stake because agents of the current political context have not set efficient mechanisms to reform the national oil industry. Today, the Mexican oil sector remains one of the most rigid at their status quo levels along the lines of the legal framework that defines Pemex's operative scheme. Yet, underneath the official stance that delineates both state oil property and the national subsoil exploitation regime, there are historical and political factors that enlighten the nature of the domestic oil industry's constitutional canon. Those factors reveal the innermost mechanisms of Mexico's modern state apparatus. The conceptual map for the systemic analysis of the political context of Pemex is illustrated in Diagram 4b.

Diagram 4b. Conceptual Map for the Systemic Analysis of the Political Context of Pemex



Source: Elaborated by author

4.3.1. Institutional basis for the vertical integration of Pemex: the pact of domination

The establishment of Pemex coincided with the early development of the Mexican contemporary state (Núñez-Luna, 2005). Prior to the nationalization of the oil industry, constitutional provisions on state ownership over subsoil resources had not been fully accomplished. The oil expropriation of 1938 and the subsequent creation of Pemex materialized the underlying principles of the Constitution of 1917 concerning the reorganization of national oil property. The *Cardenista* era of reformism (1934–1940) represented the commencement of state-led institutionalization (Córdova, 1972).

This shift gained momentum with Pemex’s early process of *vertical integration*,⁵⁸ that is, the progressive centralization of every stage of production related to oil. Structural verticality assured Pemex’s control over the entire industry of petroleum because it plunged preferential schemes of production, transportation, and distribution of oil products within the domestic market. In this way, constitutional restrictions to private participation in the strategic oil area were corroborated and competition was discouraged. Regarding the managerial performance of Pemex, structural verticality also synthesized the multiple facets of the Mexican political system, including its structural flaws.

Pemex’s vertical configuration rested upon a paradoxical background. While the liberal legacy of the Mexican political culture was rejected in practice by *revolutionary nationalism*,⁵⁹ the formal democratic principles of liberalism were institutionalized at the constitutional level. As expressed by Olvera (1997), “the contradiction between the simultaneous formal legalization of democracy and the *de facto* institution of authoritarian rule defines the very essence of politics in Mexico (p.4).”⁶⁰ The tenet of institutional

⁵⁸ *Vertical integration* is the combination in one company of two or more stages of production normally operated by separate companies. According to Black (2002), “vertical integration may involve forward integration, for example an oil company running filling stations; or backward integration, for example an army running its own ordnance factories.” He adds that vertical integration “can be beneficial for firms if it assists in co-ordination over the quality and reliability of intermediate goods which one independent firm would have sold to the other (*Ibidem*).” However, it may also inhibit entry to and competition in an industry.

⁵⁹ *Revolutionary nationalism* comprises four mainstream postulates: (1) distrust toward great powers of the international realm (especially to the U.S.) in line with anti-imperialist ideas; (2) nationalization as an instrument to prescribe property of soil and subsoil resources, and as a way to entice capital; (3) state intervention in both economy and politics; and (4) Mexican identity as the source of intense political participation (Aguayo & Bagley, as cited in Lozano, 2005:75).

⁶⁰ Consistent with this particular structuring, two major historical projects were initiated in the aftermath of the Mexican Revolution: (1) a state-led program of social and political collusion, and (2) a nationalist developmental program through which the government assumed the baton of the country’s economic

mechanisms of the ruling party's bargaining network, thus enabling the practice of *corporatism*,⁶² "a usually formal arrangement whereby decisions of state agencies are made in consultation with interest groups, which in turn guarantee the cooperation of their membership in implementing policy (Calhoun, 2002)."

Pemex's road to vertical integration was marked by corporatism, but economic solidness was still far off. The reorganization of the newly nationalized oil industry proved more daunting than expected. The years immediately following the expropriation were disruptive to Pemex, not only because of the government's lack of a final settlement with the affected foreign oil companies, but also because of the difficulties that sprouted as the oil industry was being restructured. Along with the foreign oil companies' departure, key technical expertise left too. The absence of well-trained personnel, technology, and basic knowledge contributed to Pemex's lack of productivity.

The link between the state and the oil union grew within this context. The change in oil-assets ownership "meant more bargaining power for the labor unions vis-à-vis the government, whose lack of technical expertise in the industry made it difficult to refuse labor demands (Palacios, 2002:25)." As a result, the oil union gained significant participation in Pemex's profit through a series of policies. First, the state oil company became increasingly overmanned as the number of workers practically doubled every decade after the oil expropriation. Second, there was a stiff control of recruitment, which created a market for distributing jobs in favor of unionized oil workers (Pazos, 1989). Third, the Mexican oil union seized control over Pemex's contracts. According to Sepúlveda (as cited in Palacios, 2002), about 50% of the Mexican oil industry's contracts were handled by the STPRM.⁶³ The better Pemex's employment conditions were,⁶⁴ the

⁶² *Corporatist* interests may be either economic or socially/politically based. Corporatism is significantly different to *liberalism* and *pluralism* in that it assigns interests to groups rather than simply to individuals. According to Calhoun (2002), corporatism also departs from parliamentary systems that organize representation based on territory or population.

⁶³ The traffic of influences and benefits was reciprocal between state functionaries and leaders of the national oil union. STPRM chiefs used their power to expand the advantages of unionized workers. As mentioned above, a recurring strategy was the selling of Pemex's vacancies as if they were marketable commodities. This procedure impelled labor discrimination for the sake of the politically aligned vis-à-vis the technically proficient. Pemex's jobs were desirable both because salaries were sensibly higher than the average minimum wages and because oil workers could obtain stipulated premiums and benefits. Pemex workers could also form cooperatives that gained lucrative contracts for services provided to the oil company (Randall, 1989).

⁶⁴ Currently, the formal regime ruling Pemex's employment conditions derives from three sources: the Constitution of 1917, the Federal Labor Law of 1970, and the union contract. Article 123 of the

more selective political interests were in supporting unionized workers to the benefit of both the state apparatus and the ruling party.⁶⁵ Clearly, beyond the economic challenges, Pemex's advancement was being hampered by the *politicization* of its functioning.

In fact, politicization has been an observable trend throughout the entire history of Pemex. Inherent to the vertical structure of the state oil company, the conjunction of revolutionary nationalism, developmental-authoritarianism, official-party dynamics, and corporatism constituted the *pact of domination*. According to Brachet-Márquez (2001:54), this concept encloses two elements that appear to be contradictory but that actually keep a symbiotic relationship. On the one hand, "pact" implies negotiation, conflict resolution, and institutionalism. On the other hand, "domination" connotes inequality, antagonism, and coercion. The juxtaposition of both terms suggests that socially active groups of the corporatist regime acknowledged their subordination to the state apparatus, albeit not at any price. There was simultaneity between (a) the state's control over social blocs and (b) the institutional and extra-institutional means that social blocs counted on to modify the conditions of their subordination (2001).

In this way, social and political interaction reinforced the prevalence of a systemic oil policy-making process. The pact of domination assured the endurance of an institutionally-sanctioned and coactively-implemented set of rules that specified "who gets what" within the context of corporatism (Brachet-Márquez, 2001). Pemex symbolized an institutional consolidation that corporative groups allegorized by concepts such as "social pact," "historical pact," "corporatist agreement," and "accorded democracy" (2001).

Thus, between the 1940s and the late 1970s, the principle of petroleum state-ownership relied on a system of indoctrination that pledged both economic growth and

Constitution sets forth the social rights of workers. These include labor contracts, the maximum number of hours worked during day and night shifts, work by minors and women, provision for pregnant or nursing women, minimum wages, profit sharing, overtime pay, workers' housing, training of workers, responsibility for industrial safety and health, strikes and arbitration, social security, and the formation of cooperatives, among others. The constitutional provisions on labor are made explicit by federal labor-related laws and the regulations that implement them. In addition, labor law provisions are incorporated in the collective contract between union members and Pemex. In some cases, benefits provided under the contract are more extensive than those required by the federal labor law (Randall, 1989:107).

⁶⁵ For example, while in 1938 the oil industry was operated by 17,600 workers, two years later the number increased to 21,940, that is, almost 25% more employees in the oil sector (Pazos, 1989). This enlargement did not mean an increase in productivity, though. In 1927, Mexico's annual production was 64 million oil barrels with 12,500 workers recruited in the oil industry. In contrast, by 1947 the production of the already-nationalized oil industry decreased to 57 million oil barrels per annum (about 11% less), even though the number of workers had boosted to 18,822 – that is, 130% more than 20 years before (1989).

social equilibrium within a noncompetitive political structure. In due course, however, the regime's high level of centralization led to the rupture between legality and legitimacy (Olvera, 1997). From *political patronage*⁶⁶ between presidents, cabinet members, and corporatist leaders, the governmental machinery switched to secrecy and clientelism. This process became the axis of public political action, thus hatching implicitly a network of *corruption*.⁶⁷ As expressed by Weyland (1998):

One of the most widely held explanations of corruption points to state intervention in the economy. By giving bureaucrats and politicians discretion over the allocation of vast resources, state interventionism creates enormous opportunities for the extraction of bribes... Entrepreneurs often bribe bureaucrats in order to gain unfair advantages in the allocation of public resources and in regulatory decisions. Since their profits depend on the favorable decisions of public officials, these entrepreneurs are susceptible to blackmail (p.2).

That was precisely the case of Mexico, especially during the oil boom of the late 1970s under the López Portillo administration (1976–1982). The state-led *petrolization* of the Mexican economy led to an uncontrolled expansion of public investment that incited bureaucrats and politicians to embezzle more and bigger bribes than ever before (Weyland, 1998). The facility with which state officers were able to build clientele was enhanced by the wide discretion they had in the dispensing of funds for contracts and purchases (Teichman, 1995). Through such connections, the government made allies of the firms with which Pemex was doing business. Pemex functionaries used to purchase disproportionate amounts of materials in order to get larger commissions on inventory expenses. In addition, the use of tankers was favored over cheaper oil-transportation means (i.e. pipelines) since they were owned by influential politicians (Pazos, 1989).

Pemex's autonomy as a public corporation motivated ambitions for political leadership. Bureaucratic imperatives and the quest for career advancement were additional factors that stimulated clientelism between bureaucrats, the private sector, and the oil union. Chief officers, labor leaders, and owners of private companies became important

⁶⁶ *Political patronage* occurs when "public decision makers use their legal margin of discretion to confer favors on their friends and followers without receiving material benefits in return (Weyland, 1998:2)."

⁶⁷ According to Weyland (1998), *corruption* is the provision of material benefits to politicians and public officials in exchange for illicit influence over their administrative decisions. As the author says, "the corruptor uses private benefits to induce a public decision maker to bend or break formal rules of procedure in order to confer on the corruptor special favors in the adjudication of rights or the allocation of resources (*Ibidem*)."

sources of pressure for the expansion of Pemex. Simultaneously, Pemex became a foremost channel of co-optation. Directors of Pemex hinged largely on their personal relationship with the president and the powerful support that came from oil workers and private oil contractors. This process led to elite cohesion via the so-called *camarillas*, a network of vertical and horizontal patron-client ties based on strong institutional and interpersonal loyalties that mitigated divisions within the state machinery (Teichman, 1995).

How could such a system remain practically unscathed for several decades? There is a factor that propelled political unification to the advantage of both governmental and corporatist interests, and is conceptualized as *presidentialism*.⁶⁸ In Mexico, the rise of presidentialism represented an intermediate stage between constitutionalism and authoritarianism as well as between popular sovereignty and oligarchy (Nohlen & Fernández, 1998). That means that the personality of the president usually exceeded the institutional aspects of the office. Lujambio (2000) suggests that this characteristic is consistent with the concept of *hyper-presidentialism*, which is the overriding of the executive's ordinary attributions by way of meta-constitutional powers.

Mexican presidents' sources of power included control over (a) the official party, (b) the central administration, and (c) the presidential succession.⁶⁹ These features drove them to a major concern about their political role in the national agenda-setting vis-à-vis the definition of a long-standing economic project. In fact, policy-making was much less public oriented than the regime's revolutionary rhetoric suggested. Unless a citizen belonged to one of the mainstream corporatist sectors, the state offered modest benefits in the way of public services (Lehoucq et. al., 2005). According to Goetz and Philip (2000), the paradox about this type of institutionalization is that presidential power was in many ways highly arbitrary and personalist, while policy was fairly rational and intelligible.

The rationale of such a contrast is not coincidental, though. During the congressional PRI-led era (1929–1997), political cooperation among a few actors along with a centralized policy-making process allowed for inter-temporal linkage between *sexenios*. This sort of arrangement produced stable, adaptable, and coordinated policies

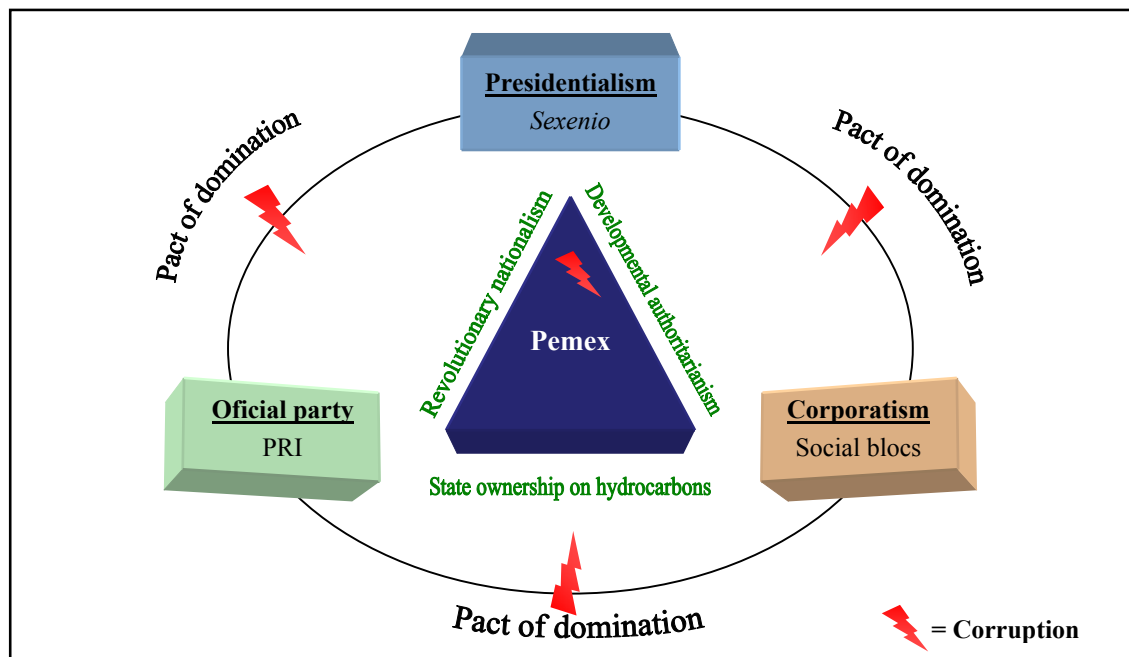
⁶⁸ A *presidential* government is the form of political organization in which an elected official is empowered as both chief of state and chief political executive, whereby the president is constitutionally independent of the legislature (Merriam-Webster's Collegiate Dictionary [MWCD], 2005).

⁶⁹ In fact, the political calendar has been an institution itself: the presidential term is six years (*sexenio*) and re-election is forbidden according to Article 83 of the 1917 Constitution (CPEUM, 1917).

(Spiller, Stein & Tommasi, 2003), although not necessarily efficient. Even though inter-*sexenio* crises were persistent – especially as of the 1970s, when the stabilizing development began to falter –, presidentialism proved to be adaptable enough as to implement economic and political reforms when the regime’s survival was at stake.

For the most part, Mexican presidents of the PRI-led stage were able to have their bills approved in Congress so long as they refrained from proposals that meant reallocating power away from the corporatist pillars of the system (Casar, as cited in Lehoucq et. al., 2005). Whenever there was significant opposition, it usually came from inside the establishment itself and partisans addressed it according to the PRI’s internal rules of negotiation. That explains why the foundational structure of the national oil industry did not experience significant modifications for several years. Corporatism, official-party dynamics, and presidentialism became the core institutional factors that laid the groundwork for Pemex’s vertical integration – including intrinsic distortions such as corruption –, especially between 1936 and 1992 (see Figure 4c).

Figure 4c. Institutional Basis for the Vertical Integration of Pemex, 1938–1992



Source: Elaborated by author.

4.3.2. Democratization, pluralism, and the struggle for oil reforming consensus







Pemex's vertical integration represents the tenet of Mexican presidentialism. The national oil policy became a receptacle of state interests that were hinged by the pact of domination. Nevertheless, Mexico's oil-management structure had critical flaws. Over time, presidents' propensity to avoid coping with thorny issues produced endogenous fissures into the state apparatus. An ambivalent set of policy procedures revealed the progressive abatement of a regime in which secrecy and centralization entailed ever-increasing transaction costs (Spiller, Stein & Tommasi, 2003). While structural reforms fostered an internationally open economy since the mid-1980s in line with neoliberal strategies, efforts to denationalize hydrocarbon resources and deregulate labor markets faced opposition from legislators beholden to corporatist interests originally empowered by presidentialism. From the mid-1990s, oil and fiscal policies became all the more inflexible at their foundational levels in the face of potential changes.

The reason behind such phenomenon is that the Mexican political system elapsed gradually from a unified, corporatist establishment to a competitive, political scenario. This transformation entailed a new order of political arrangements and dissensions that affected the conventional running of Pemex. Hence, a *first major phase* can be distinguished with respect to the government's oil policy-making process. This phase corresponds to the heyday of the PRI that goes from 1929 to 1997, when the ruling party's congressional preponderance sustained the executive's capacity to enact effective, though sporadic alterations to the legal status of Pemex.⁷⁰ The official party's absolute majority in both chambers of Congress was a crucial asset for the PRI-led presidency (Carreón, Jiménez & Rosellón, 2005). However, acute centralization, pervasive secrecy, and disproportionate bureaucratization produced a lack of governmental efficiency.

⁷⁰ For instance, between 1940 and 1946, some attempts were done to retrieve foreign investments following the oil expropriation, looking towards lessening its negative consequences over the Mexican oil industry. The outcome was the approval of a semi-retroactive modification of the 1941 *Regulatory Law to Article 27 concerning Petroleum Affairs* to allow the Mexican government granting contracts for drilling and extracting petroleum (Zenteno, 1997). Eventually, these conditions changed when the *Regulatory Law to Article 27 concerning Petroleum Affairs* of 1958 substituted that of 1941. With the 1958 law, concessions were revoked to become state property again (Teichman, 1995; Zenteno, 1997). Then, in 1971, the *Internal Law of Petróleos Mexicanos* was passed to institutionally reaffirm constitutional precepts on state ownership of hydrocarbons. In 1972, the *Regulation to the 1971 Internal Law* was issued to specify and delimit Pemex's functions and attributions (Morales, 1992; Zenteno, 1997). The provisions of these norms reasserted the nationalist principles that gradually favored the consolidation of the state oil company.

The economic crisis of 1994–1995 was a snapping point to the oil policy making-process. Politically, this crisis induced a radical change in electoral preferences that resulted in an unusual composition of Congress following the midterm elections of 1997 (Lujambio, 2000; Negretto, 2004; Carreón, Jiménez & Rosellón, 2005). After several decades of control, the PRI lost its absolute majority in Congress (see Table 4a).⁷¹ The redistribution of proportional representation in Congress revealed that political opposition to the status quo was maturing in conjunction with *democratization*.⁷²

Table 4a. Percentage of Deputies and Senators within the Mexican Congress, 1955-2003

Legislature/ Year	Chamber of Deputies (%)				Chamber of Senators (%)			
				Others				Others
43 / 1955	98.3	1.3	-	.4	100	0	-	0
44 / 1958	98.6	1	-	.2	100	0	-	0
45 / 1961	99	.8	-	.2	100	0	-	0
46 / 1964	83	10	-	7	100	0	-	0
47 / 1967	83	9	-	8	100	0	-	0
48 / 1970	84	9	-	7	100	0	-	0
49 / 1973	82	11	-	7	100	0	-	0
50 / 1976	82	8	-	10	100	0	-	0
51 / 1979	74	11	-	15	100	0	-	0
52 / 1982	75	13	-	12	100	0	-	0
53 / 1985	72	10	-	18	100	0	-	0
54 / 1988	52	20	0	38	94	0	6	0
55 / 1991	54	18	8	10	95	2	3	0
56 / 1994	60	24	14	2	74	20	6	0
57 / 1997	48	24	25	3	60	26	12	2
58 / 2000	42	42	10	6	47	36	12	5
59 / 2003	45	31	19	5	47	36	12	5

Source: Medina (1995), Lujambio (2000), and Carreón, Jiménez & Rosellón (2005).

⁷¹ The Mexican Congress is composed by the Chamber of Deputies and the Chamber of Senators. The lower house is composed by 500 deputies and the upper house has a total number of 128 senators. The chamber of deputies is totally renewed every three years and the senate every six so that there are two concurrent and one mid term election per presidential term. *Neither deputies nor senators can be reelected*. The formula to elect deputies is a “mixed-member” majority system in which 300 seats are allocated to parties in single-member districts by plurality rule, and 200 seats are allocated to parties in multi-member districts by popular representation in closed lists. Three senators per state are elected by limited vote, in which two seats are allocated to the party with most votes and the third seat to the second most voted party. Popular representation in a single national district is used to elect 32 additional senators (Negretto, 2004:6).

⁷² As of the 1970s, a state-led process of preemptive, political liberalization took place in Mexico in response to the crisis of authoritarianism that reached a climax with the 1968 “Massacre of Tlatelolco.” Political renovation initiated with the electoral reforms of 1978 and 1986. In 1988, presidential elections manifested a historical faltering of the PRI’s sympathetic-voting. Then, a gradual transition occurred with the electoral reforms of 1990, 1993, 1994, and 1996. Following the political crisis that prevailed for the most part of the Salinas *sexenio* (1988-1994) and the beginning of Zedillo’s term (1994-2000), democratization gained momentum again when Vicente Fox (a PAN member) was elected for the 2000-2006 *sexenio*. Fox’s triumph represented *alternation* in the presidential power structure as the PAN became the first non-PRI party in Mexico since 1929 (Lozano, 2005).

Thus, a *second major phase* began in 1997. Since then, *pluralism* has substituted the hierarchic and centralized governance that characterized the PRI's hegemony. Political reorganization within the federal government, decentralization – since the mid-1980s –, and the ascension of an increasingly assertive judiciary power have emasculated the concealment of the single-party oil-policy-making process (Lehoucq et. al., 2005). The path to democratization that commenced in the late 1970s was thus reinforced by means of a rekindled pluralism, but it also entailed major challenges. As expressed by Weyland (1998), “the dispersal of power that a transition from authoritarian to democratic rule entails extends the range of actors who need to consent to decisions over public-resource allocation (p.3).” Accordingly, political actors that can demand illicit payoffs and “veto players” that can use their influence to extract bribes increase along with democratization. Weyland makes clear that democratization may also enhance overall accountability and thus prevent power holders from misusing their influence for illicit enrichment (1998).

In the case of Mexico, *corruption* was not merely used by politicians and public officials to accumulate private wealth during the oil bonanza, but also to collect funds for political purposes such as electoral campaigns. The most recent example is the so-called “Pemexgate.” This incident consisted of a millionaire sum of money that Pemex functionaries transferred illicitly to the PRI via the national oil union, in contribution to the financing of Francisco Labastida Ochoa's political campaign en route to the presidential elections of 2000 (El Universal, 30-IX-2002). The funds that the PRI received in secrecy from the STPRM reached the amount of \$640 million pesos (approximately \$61 million dollars), of which evidence could only confirm \$500 million pesos as incriminating. The entire maneuver was considered illegal because it violated both the Constitution and the *Código Federal de Instituciones y Procedimientos Electorales* (COFIPE). After an extensive investigation led by the PGR, the *Consejo General del Instituto Federal Electoral* (IFE) resolved to apply a \$1 billion peso penalization to the PRI in 2003 (Instituto Federal Electoral [IFE], 14-III-2003).⁷³

⁷³ For a more detailed reading, see the full-length resolution on the “Pemexgate” case in Consejo General del Instituto Federal Electoral (14-III-2003). *Resolución respecto de la queja presentada por el Partido de la Revolución Democrática sobre el origen y aplicación del financiamiento del Partido Revolucionario Institucional, por hechos que considera constituyen infracciones al Código Federal de Instituciones y Procedimientos Electorales* (Extraordinary Session CG45/2003, Expedient No. Q-CFRPAP 01/02 PRD VS

The implications of this episode unveiled crucial issues within the political context surrounding Pemex. Tensions emerged between the national oil union and the PAN-led government, principally because the STPRM alignment with the PRI was not as luscious as it was formerly, when the PRI controlled the presidency. Following the public disclosure of the “Pemexgate,” the PGR initiated impeachment against Rogelio Montemayor (former director general of Pemex) and Carlos Romero Deschamps (leader of the STPRM) under the charges of peculate and public service mismanagement.

Seizing the opportunity, the oil union workers announced their intention to go on strike on July 31, 2002, in demand for a 15% wage increase. Although the strike was adjourned several times as of July 31, 2003, public anxiety persisted because a potential paralysis of Pemex would have had overwhelming effects on both the national and international oil markets. After a hard process of negotiation, the strike was finally avoided on September 29, 2003, as Pemex and the STPRM signed an agreement by which oil workers received a 5.5% wage augment as well as an increase of 1.8% in fringe benefits (Cruz, Velasco & Zárate, 30-IX-2002). Fox pronounced that the end of this conflict did not mean the end of the prosecution of those functionaries implicated in the “Pemexgate” case.

Romero Deschamps’ accusation revealed that the national oil union’s traditional role as one of the government’s closest collaborators was at critical point.⁷⁴ Since the oil union is not aligned with the PAN-led government, public concern persists before the possibility of a STPRM strike on Pemex, mainly because the Mexican law does not contemplate requisition over the oil industry workforce. In the meantime, PRI-PAN alternation in the presidency and the “Pemexgate” effect have led the Mexican civil society to claim for both Pemex accountability and labor unions’ democratization in search of transparency (Shields, 2003).

The quest for union democratization is still not foreseeable, though. The STPRM has maintained its political unity around the figure of their regional and national leaders.

PRI) [Electronic version]. Mexico, D.F.: Instituto Federal Electoral. Retrieved January 7, 2006, from <http://www.ife.org.mx/documentos/TRANSP/docs/consejo-general/resoluciones/ind0303.htm#20031403>

⁷⁴ This quarrel actually commenced during the Salinas *sexenio*, when the national oil union leader, Joaquín Hernández Galicia (alias “La Quina”) was arrested. More than a simple display of law enforcement from Salinas, La Quina’s apprehension was a powerful message of political confrontation with the national oil union. Actually, it was under the Salinas administration when the first great limitations to the oil workforce ensued. The government cut off significant benefits that the oil, unionized workers used to enjoy under the auspices of corporatism. Salaries were reduced in as much as 50%, there were massive lay-offs of oil workers, and the union’s participation in Pemex’s financial activities were cancelled (Palacios, 2003).

Such unity is still essential for the PRI, especially in those regions where petroliferous activities are crucial for development, such as Veracruz, Tabasco, and Campeche. Consequently, Pemex vacancies have continued on sale at the expense of losing technical expertise (Shields, 2003). Even though dissenting groups have emerged tangentially to the oil union,⁷⁵ the STPRM's typical recruitment procedures have endured. In 2004, Pemex employees amounted for 137,722 (PMXSY, 2005), with a visible enlargement in administrative posts, which are not only the best remunerated in the oil company, but also the best paid in Mexico's public administration (Shields, 2003).

Consistent with these facts, Pemex is one of the world's largest oil companies in terms of workforce (Shields, 2003) (see Table 4b). The problem is that the large amount of workers does not reflect increasing rates of productivity. Even though crude oil production increased 17% between 1991 and 2001, petroleum reservoirs keep slimming down, crude oil refining capacity is stagnating, imports of fuel and chemicals for manufacturing are boosting, and the petrochemical unit is collapsing. So far, Pemex's technical and bureaucratic over-employment has had a growing negative impact over oil projects' profitability, not to mention the additional 55,000 retirement pensions to be covered and the misallocation of jobs along the oil value chain (2003).

Table 4b. World Largest Oil Companies by Workforce (Selected Countries), 2005

Rank	Company	Country	Number of employees
1	PetroChina	China	417,229
2	Pemex	Mexico	137,722
3	Lukoil	Russia	130,000
4	NIOC	Iran	120,000
5	Royal Dutch/Shell	Netherlands/UK	114,000
6	Total	France	111,401
7	BP	United Kingdom	103,700
8	Exxon Mobil	United States	85,900
9	Saudi Aramco	Saudi Arabia	54,000
10	Petrobras	Brazil	48,798

Source: Ranked by author with data from Energy Business Review Online (2006).

⁷⁵ Including Unión Nacional de Trabajadores de Confianza de la Industria Petrolera (UNTCIP), Frente Nacional Petrolero, Movimiento Petrolero Independiente, Coalición Nacional Democrática Petrolera, Alianza Democrática Nacional Petrolera, Grupo Unificador Democrático, and Coordinadora Nacional Democrática (Shields, 2003).

Public scandals like the “Pemexgate” and oil labor conflicts have not been the only cause of political dissonance within the current domestic context. Difficulties to develop productive negotiations for reforming Pemex have transformed the executive into a reactive branch of government while Congress has become the essential lawmaking nucleus. Yet, congressional representatives have had tribulations as well. Policy expertise of legislators is undermined by non-consecutive reelection whereas term limits shorten time horizons of deputies and senators for political bargaining. In the absence of the incentives given by incumbency, non-reelected legislators have lost their electoral connection with voters (Nava & Yáñez, 2003).⁷⁶ Likewise, lobbying capabilities have been curtailed to the detriment of political-negotiation forums.

Without the support of partisan majorities, the Fox administration has faced a *lack of political consensus* to pass legislative changes for the implementation of structural energy reforms. So far, most of the executive’s energy-policy bills had not provided clear electoral benefits to opposition parties or concrete advantages to the population. That is particularly the case with oil-related reforms whose collective benefits are uncertain and remote but whose immediate effects are unpopular or affect influential organized interests (Negretto, 2004), including those of the national oil union and opposition parties. The inadequate definition of property rights over the effects of reforms reveal why political parties cannot agree to amend constitutional norms in order to permit private investment in the national oil industry. As explained by Lehoucq et. al. (2005):

Political bargains are more difficult to effect because it is hard to translate future economic payoffs into present value political compensation. A hypothetical contract, where reforms are agreed upon in exchange for some political and economical compensation, requires credible commitments, and equally important, they need to be enforceable. In private bargains, it is easy to rely on explicit contracts and third party enforcement. But in matters of public policy, such explicit contracts are rare, and the likely enforcer, the electorate, faces collective action problems and remains ambivalent about further structural reforms. While, for example, approximately half of the electorate expresses support for private sector involvement in the energy sector, another majority does not want to limit national sovereignty and therefore “privatize” PEMEX [sic] (pp. 49-50).

⁷⁶ Since 1934, the legislature has been integrated by non-reelected representatives. Initially, the crucial effect of this prohibition was the strengthening of the official party. Combined with other constitutional factors, non-consecutive reelection contributed to the emergence and consolidation of *presidentialism*. During the last decades, however, non-consecutive reelection has affected the performance of deputies in committees because there is no chance to set a long-standing platform for legislative cooperation (Nava & Yáñez, 2003).

Whether the privatization of Pemex is likely or not in the mid term, recent transformations within the Mexican state reveal an uncertain future. It is true that throughout the changing political patterns, a *moderate multiparty system* has been consolidating (Negretto, 2004). Highly competitive elections as well as highly disciplined three-party governance – PRI, PAN, and PRD – have reshaped the oil policy decision-making process. Nevertheless, the coherence of the Mexican oil policy is declining while traditional and novel political forces activate the checks and balances of the Constitution. Intensified claims for accountability between the three branches of government have reaffirmed the separation of federal powers, thus contributing indirectly to the fragmentation of the Mexican political system. Mature and emergent parties as well as interest groups and mass media can also obstruct efforts to reform the oil sector.

Given that the Mexican political system is currently composed by multiple agents, the lack of consensus can keep distorting the implementation of much-needed modifications to the fiscal and labor areas that have ultimate implications over petroleum affairs. That allows for realizing that the political panorama of Mexico will manifest growing transaction costs in the negotiation of structural reforms to the oil sector if the outcome of the 2006 presidential elections is not constructive enough for ensuring essential energy reforms. Unless partisan identities and policy alternatives become clearer, the federal government, political parties, interest groups, and citizens will hardly commit to restructure the oil industry of Mexico.

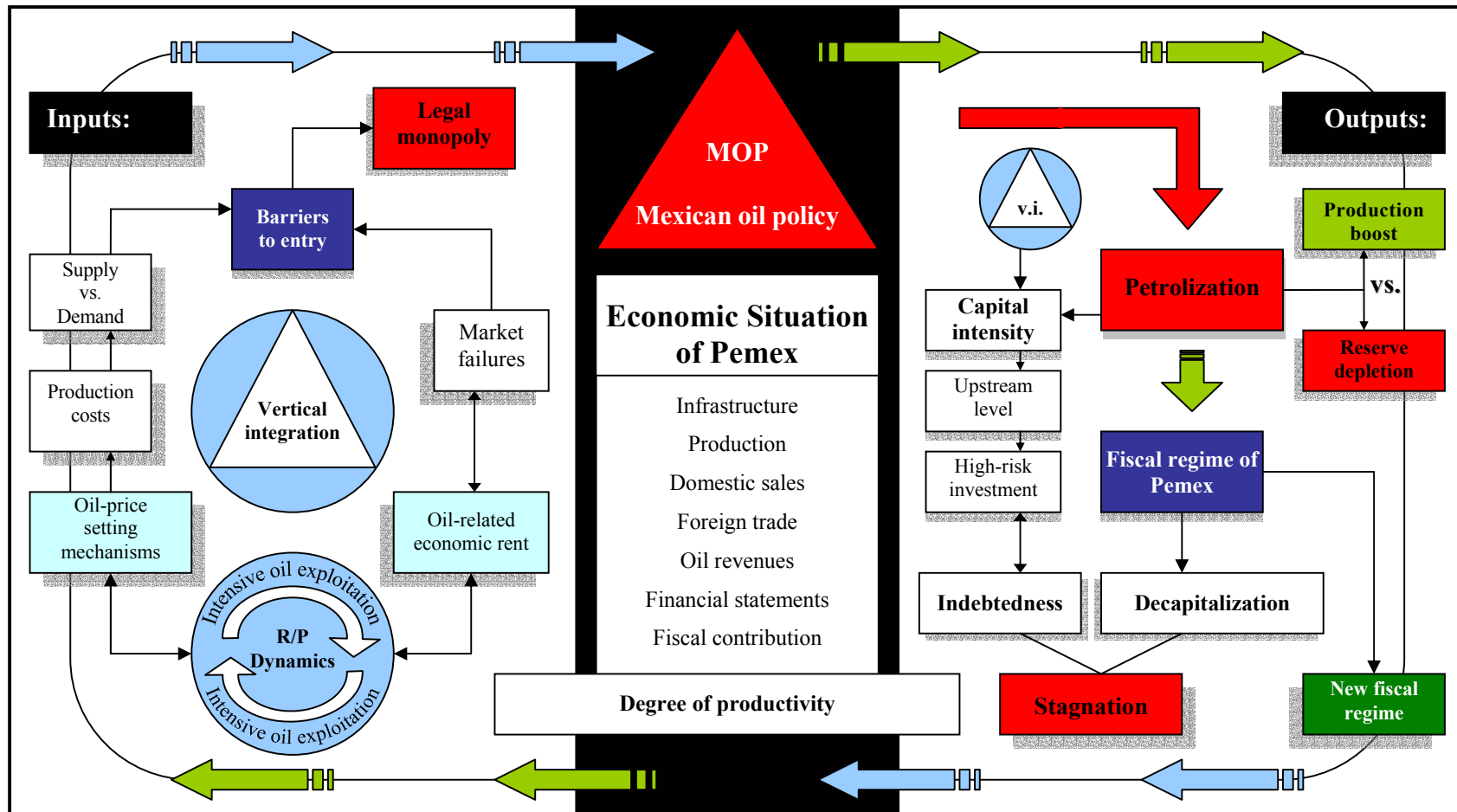
This scenario turns more complex as economic factors are taken into account. As Meyer maintains (as cited in De la Vega, 1996), the history of the Mexican oil industry is essentially a history of political economy. In Mexico, oil and politics are as inseparable as oil and economy. Therefore, changes in the nature of state power have determined the functioning of the Mexican oil industry and vice versa. The following chapter focuses on the economic situation of *Petróleos Mexicanos*.

5. The Economic Situation of Pemex

This chapter offers an analysis of the economic situation of Pemex that indicates the state oil company's degree of productivity. In the first section, I present Pemex's key figures, including statistics related to oil production, sales, and infrastructure. The next three sections discuss the structural economic issues entailed in the operative guidelines that the Mexican oil policy has delineated for the exploitation of national hydrocarbon resources. Specifically, I focus on the following: (1) the economic rationale for the intensive oil-exploitation system that the oil company is currently executing; (2) the relation between state-ownership of hydrocarbons, petrolization, and Pemex's fiscal regime; and (3) the connection between decapitalization, indebtedness, and high-risk investment in the *upstream* oil sector.

The central argument of this chapter is that the Mexican government is currently promoting an oil policy whose procedural guidelines affect the economic situation of Pemex. By way of intensive oil exploitation, the state oil company has boosted domestic production in compliance with the government's fiscal and budgetary-income objectives. The problem is that Mexico's oil reserves are exhausting, and there are no clear alternatives to develop much-needed recovery prospects. In addition, Pemex's tax burden is producing decapitalization while massive, high-risk investment is enlarging the level of indebtedness. The conceptual map for the *Eastonian* systemic analysis of the economic situation of Pemex is illustrated in Diagram 5a.

Diagram 5a. Conceptual Map for the Systemic Analysis of the Economic Situation of Pemex



Source: Elaborated by author

5.1. Pemex essential statistics

As mentioned before, Pemex is the most important corporation of Mexico and the ninth-largest integrated oil company worldwide (PIW, XII-2004). In 2003, Pemex was ranked as the third crude oil producing company in the world (PMXSY, 2005) (see Appendix F). At the end of 2004, Pemex's total income before taxes and duties reached \$459.3 billion pesos (\$43.7 billion dollars), thus increasing 29% as compared with year 2003 (PMXAR, 2004). Pemex is Mexico's foremost source of foreign currency (Almeida, 1994). In 2005, its total sales surpassed the \$735.8 billion pesos (\$70 billion dollars), of which \$332.7 billion pesos (\$31.7 billion dollars) represented total exports of crude oil, petroleum by-products, petrochemicals, and natural gas (Rodríguez, 31-I-2006; Hernández, 1-II-2006).

These figures are noteworthy because they reveal that in 2005 Pemex achieved the largest surplus in the history of its trade balance, which allowed for a positive annual balance of \$234.7 billion pesos (\$22.3 billion dollars) in cash flow. This additional revenue was \$47.3 billion pesos (\$4.5 billion dollars) larger than that of 2004, thus representing a 25% increase with respect to the preceding year (Hernández, 1-II-2006). Accordingly, Pemex exported an average volume of 1.817 million crude oil barrels per day in its three basic quality-denominations – Olmeca, Istmo, and Maya – to countries in the American, European, and Asian continents via PMI Comercio Internacional.

This amount represented a total income of \$297.3 billion pesos (\$28.3 billion dollars), that is, \$74.1 billion pesos (\$7.5 billion dollars) larger than the total value of exports in 2004 – a surplus equivalent to a 33% increase. Specifically, Pemex commercialized abroad an average of 81,000 Istmo oil barrels per day that accounted for a total income of \$16.5 billion pesos (\$1.6 billion dollars). Heavy Maya oil exports totaled the sum of \$235.7 billion pesos (\$22.5 billion dollars), corresponding to an average volume of 1 million barrels per day (84% of total exports). Extra-light Olmeca crude oil reached a volume of 216,000 barrels per day with a total value of \$44.5 billion pesos (\$4.2 billion dollars). At the end of 2005, average international market prices of Mexican crude oil were \$53.11 dollars per Istmo oil barrel, \$40.53 dollars per Maya oil barrel, and \$53.91 dollars per Olmeca oil barrel (Cabildo, 23-I-2006). Table 5a shows Pemex's total production figures from the end of year 2000 to December 31, 2004 and their respective distribution in both the domestic and foreign markets.

Table 5a. Pemex Total Production, Domestic Sales, and Foreign Trade Statistics, 2000–2004

	2000	2001	2002	2003	2004
Production (thousand barrels daily)					
Liquid hydrocarbons	3,450	3,560	3,585	3,789	3,824
Natural gas (Mcf = million cubic feet daily)	4,679	4,511	4,423	4,498	4,573
Crude oil processing	1,227	1,252	1,245	1,286	1,303
Oil products	1,450	1,473	1,481	1,555	1,586
Petrochemicals (Mt = million tons)	11,501	10,377	9,880	10,298	10,731
Total	22,307	21,173	20,614	21,426	22,017
Domestic sales (DS)					
Volume (thousands barrels daily)					
Oil products	1,728	1,711	1,658	1,684	1,718
Dry natural gas (Mcf)	2,061	1,993	2,425	2,621	2,756
Petrochemicals	3,453	3,434	3,213	3,144	3,531
Total	7,242	7,138	7,296	7,449	8,005
Value (million U.S. dollars)					
Oil products	17,619	16,300	15,354	21,221	28,211
Dry natural gas	2,628	2,754	2,887	34,126	6,590
Petrochemicals	1,074	896	782	1,168	1,810
Total	21,321	19,950	19,023	56,515	36,611
Foreign trade (FT)					
Volume (thousand barrels daily)					
Net exports of liquid hydrocarbons	1,352	1,524	1,617	1,821	1,789
Crude oil exports	1,604	1,756	1,705	1,844	1,870
Total	2,956	3,280	3,322	3,665	3,659
Value (million U.S. dollars)					
Net exports of liquid hydrocarbons	-3,257	-3,092	-2,017	-2,233	-3,421
Crude oil exports	14,553	11,928	13,392	16,676	21,233
Total	11,296	8,836	11,375	14,443	17,812
Total volume (DS+FT) in thousand bpd	10,198	10,418	10,618	11,114	11,664
Total value (DS+FT) in million U.S. dollars	32,617	28,786	30,398	70,958	54,423

Source: Pemex Statistical Yearbook (2005).

During year 2005, the performance of Pemex in both the national and international oil markets was accompanied by significant achievements in terms of production cost ratios, export portfolios, and productive infrastructure projects (Hernández, 1-II-2006).⁷⁷ At first glance, Pemex's economic situation looks stable. However, the net value of exports reveals that Pemex is spending more than it earns from foreign trade, irrespective of the crude oil exporting bonanza that has prevailed for the last five years. If Pemex is a world-leading integrated oil and gas company, then how can we explain the disequilibrium that exists between crude oil and liquid hydrocarbon producing capabilities? The next section illustrates the economic rationale for Pemex's system of intensive crude oil exploitation.

⁷⁷ The current infrastructure of Pemex is shown in Appendix G.

5.2. Economic rationale for Pemex's oil-exploitation system

I have argued in this paper that Mexico will run out of oil in the year 2016 if intensive oil exploitation continues without the support of reserve recovery programs. As of January 1, 2005, the aggregation of remaining *total reserves* registered by Pemex amounted to 46.914 billion barrels of *oil equivalent*,⁷⁸ of which 37.6% are proved reserves, 33.8% are probable reserves, and 28.6% are possible reserves. The regional distribution of total reserves reveals that 44.3% are located in the Northern Region of Mexico, 31.5% in the Northeastern Offshore Region, 14.6% in the Southern Region, and 9.6% in the Southwestern Offshore Region. Total reserves' distribution by fluids shows that crude oil accounted for 71% of overall share, whereas dry gas represented 19.9%, plant liquids 7.3%, and condensates 1.8%. This means that most of the country's hydrocarbon reservoirs are oil fields so that natural gas produced is mostly associated to petroleum, thereby explaining why oil is a crucial asset for Mexico.

Also since early 2005, total crude oil reserves were calculated at 33.31 billion barrels, with heavy Maya oil accounting for 52.2% of the whole proportion, light Istmo oil for 37.4%, and extra-light Olmeca oil for 10.4%. From these figures, the remaining proved hydrocarbon reserves reached the amount of 17.65 billion barrels of oil equivalent.⁷⁹ Regarding regional distribution, 49.9% of proved oil reserves are located in the Northeastern Offshore Region of Mexico, 28.9% in the Southern Region, 11.3% in the Northern Region, and 9.9% in the Southwestern Offshore Region. In terms of composition, crude oil accounts for 73% of total proved reserves, while dry gas represents 16.1%, plant liquids 7.9%, and condensates 2.9% (Pemex, 2005). Table 5b shows the share of oil and gas total reserves from early 2000 to the beginning of 2005.

⁷⁸ Also known as 3P, *total reserves* comprise the sum of proved, probable, and possible reserves. *Proved reserves* refer to the volume of hydrocarbons (or associated substances) evaluated at atmospheric conditions, which by analysis of geological and engineering data may be estimated with reasonable certainty to be commercially recoverable from a given date forward, from known reservoirs and under current economic conditions, operating methods, and government regulations. Such volume consists of both the developed and undeveloped proved reserves. *Probable reserves* are non-proved reserves where the analysis of geological and engineering data suggests that they are more likely to be commercially recoverable than not. *Possible reserves* represent the volume of hydrocarbons where the analysis of geological and engineering data suggests that they are less likely to be commercially recoverable than probable reserves. Thus, 1P corresponds to the total of existing proved reserves, 2P is the total of proved plus probable reserves, and 3P is the total of proved, probable, and possible reserves (Pemex, 2005). *Oil equivalent* is the way of representing the total hydrocarbon inventory. This concept includes crude oil, condensate, plant liquids, and dry gas equivalent to liquid (Pemex, 2005).

⁷⁹ It is worth noting that, since year 2003, Mexico's proved oil reserves have been evaluated in accordance with the definition made by the Securities and Exchange Commission (SEC) of the United States.

Table 5b. Mexico's Oil and Gas Total Reserves, 2000–2005*

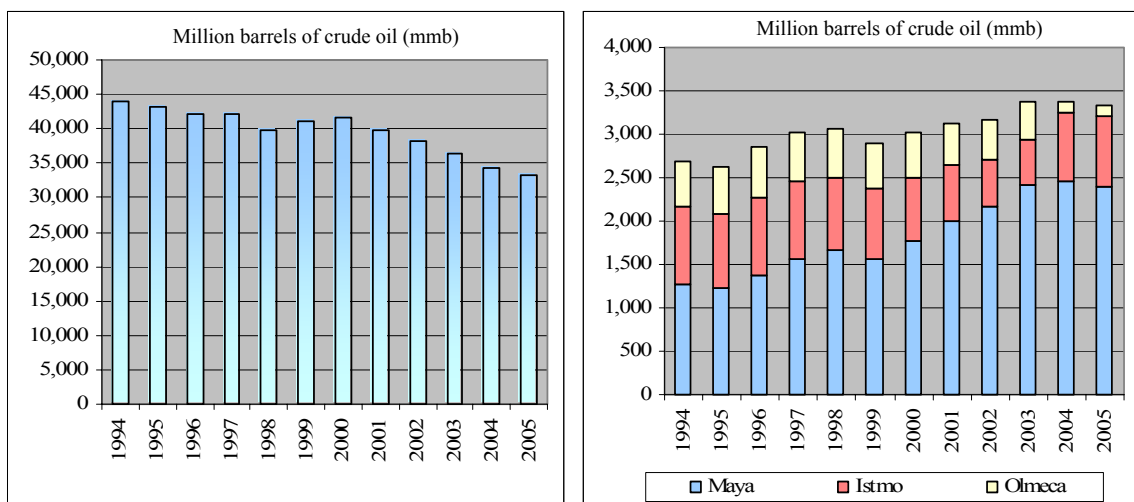
Oil and gas total reserves (million barrels of crude oil equivalent)						
	2000	2001	2002	2003	2004	2005
Proved	34,103.8	32,614.4	30,837.5	20,077.3	18,895.2	17,649.8
Probable	12,140.8	12,196.2	11,862.5	16,965	16,005.1	15,836.1
Possible	11,959.5	11,343.4	10,251	12,990	13,140.7	13,428.2
Total	58,204.1	56,154	52,951	50,032.2	48,041	46,914.1

*Beginning of year figures

Source: Pemex Statistical Yearbook (2005).

These numbers reveal that Mexico's total reserves of oil and gas are depleting. In principle, reserve exhaustion is understandable as hydrocarbons are scarce and finite resources. However, the conditions that determine how long it takes oil reserves to deplete are not exclusively geological or technical. Oil exploitation and its operative and administrative factors are crucial indicators of the extent to which petroliferous reserves can endure, given specific circumstances related to politics and economics in a country. In the case of Mexico, Pemex has carried out a strategy of *intensive exploitation* of hydrocarbon resources as confirmed by Figure 5a, which weighs the total reserves' declining tendency against the total production's growing trend from 1994 to 2005.

Figure 5a. Mexico's Crude Oil Total Reserves vs. Crude Oil Total Production, 1994–2005*



* Since year 2003, Pemex's evaluation of proved oil reserves corresponds to the definition made by the U.S. Securities and Exchange Commission (SEC).

Source: Elaborated by author with data from the Secretaría de Energía (2005).

Why is Pemex's total production increasing despite of the continual reduction of oil and gas total reserves? A crucial explanation resides in the economic rationale that characterizes the reserve-to-production dynamics of the Mexican oil industry. Such rationale encompasses two central aspects: *international oil-pricing mechanisms* and the *oil economic rent*. The former refers to the economic and political rules that affect the way in which oil prices are set internationally, with implications for Mexico's oil producing scheme. The latter corresponds to the income that surpasses a supplier's transfer earnings that represent the minimum payment an asset-proprietor needs to keep a factor of production in its current use, whether it is land, labor, capital, or their possible combinations (Parkin, 1998).

To understand the significance of the first aspect, it is important to evaluate the functioning of private and public oil companies from a microeconomic perspective. To begin with, economic theory suggests that oil prices should always converge towards the lowest marginal cost.⁸⁰ That is, prices should move towards the minimum cost resulting from the increase of total oil production in one additional barrel (Parkin, 1998). Since oil is a limited good, prices should be estimated from a long-term scale, taking into consideration the cost of alternative sources of energy. From a dynamic perspective, it would be logical that oil prices rose gradually as a reflection of marginal costs that increase while cheapest hydrocarbon assets diminish.⁸¹ Thus, oil prices should eventually increase until reaching the cost level of substitutes (i.e. hydrogen) in proportion to the progressive augment of low-quality prospects, with eventual price corrections based on either technical improvements or new discoveries (Noreng, 2003).

Rational economic behavior suggests that low-cost, high-quality oil reservoirs are preferred over high-cost, low-quality ones. Consequently, marginal costs should gradually increase as low quality reservoirs replace their ever-depleting counterpart. Within an ideal oil market, valuable information from either type of reservoir should be accessible to economic agents under the principle of perfect competition. Private investors would then be free to decide how to use their capital for developing projects,

⁸⁰ *Marginal cost* is defined as the increment of total cost resulted from the augment of production in one additional unit. The marginal cost (Mc) is calculated by dividing the change in total cost (TC) by the change in total production (TP), and is expressed by the formula $Mc = \Delta TC \div \Delta TP$ (Parkin, 1998:257-258).

⁸¹ That explains why oil reservoirs are more than a quantitative indicator of a country's petroliferous wealth. Reservoirs differ in quality, which is determined by accessibility, size, and costs implicated in oil exploitation.

without worrying about market constraints such as *barriers to entry* (Parkin, 1998).⁸² In this way, the best oil reservoirs available would be exploited both competitively and efficiently so that prices would reflect production costs with accuracy.

The reality is, however, that competitive oil markets do not exist. Information is usually imperfect and asymmetrical so that private investors' options are restricted in detriment of their opportunity costs.⁸³ Given that petroleum assets manifest a low *price-elasticity of demand*⁸⁴ in the short term, private and public oil suppliers are frequently able to influence the oil market conditions, and therefore to affect oil prices (Parkin, 1998). This means that, as oil supply is concentrated in a small number of purveyors, they find powerful incentives for pulling oil-supply back in order to collect a greater profit. Since oil demand is comparatively inelastic, little changes in the volume offered may have an enormous impact over the price of hydrocarbons. That is exactly the way in which the Organization of Petroleum Exporting Countries (OPEC) has influenced the international oil markets. Since 1960, the OPEC was created to get the greater possible benefit from its members' oil companies through fiscal duties and legislative modifications to the traditional individual-concessions regime. OPEC members have cooperated in several occasions to maintain a monopolist scheme by restricting competition in crude oil production, with clear impact on the international oil pricing standards.⁸⁵ For the last thirty years, OPEC has focused on three ways to influence the global oil market: (1) output

⁸² *Barriers to entry* refer to the natural and artificial obstacles to the access of new firms (potential competitors) into a market, and can take various forms. Barriers can be technical, legal, or even produced by strong branding of a specific product (Parkin, 1998:335). Pemex is a *legal monopoly* that is protected by legal barriers to entry consistent with the Constitution of 1917.

⁸³ The concept of *opportunity cost* suggests that the decision to produce or consume a good involves a cost in the face of scarcity. When scarce goods are confronted to ever-increasing needs, people are pushed to select between different alternatives. To illustrate this, imagine that an oil investor has to select one out of three investment options: project A, project B, and project C. Suppose that the investor goes for project A. The opportunity cost of project A is not the money invested on it, but the second best alternative rejected, say, project B. Thus, the opportunity cost of an action is the next best alternative forgone (Parkin, 1998:10).

⁸⁴ *Price elasticity of demand* (PED) measures the responsiveness of the quantity demanded for a good to a given change in the price of that good. This information is important to a firm as it helps to predict how much the demand for a product will change if price is modified, thus providing hints of the extent to which total revenues might be affected by price fluctuations. The price elasticity of demand is calculated with the percentage of change in the quantity demanded for a good ($\Delta\%QD$) divided by the percentage of change in the price of that good ($\Delta\%P$). The corresponding formula is $\eta_d = \Delta\%QD \div \Delta\%P$ (Parkin, 1998:110).

⁸⁵ OPEC was initially represented by Iran, Iraq, Kuwait, Saudi Arabia, and Venezuela. Then, the following countries joined: Qatar (1961), Indonesia (1962), Libya (1962), United Arab Emirates (1967), Algeria (1969), Nigeria (1971), Ecuador (from 1973 to 1992) and Gabon (from 1975 to 1995) (Parra, 2003).

controls, (2) state-led enticing of oil revenues, and (3) gradual consolidation of national oil-producing facilities, previously owned by foreign companies (García-Verdugo, 2000).

Mexico is not an OPEC member and is not likely to be. As a non-OPEC member, Mexico has a relative flexibility to adjust its oil-commercializing strategies to the international market conditions as well as the capacity to act either tangentially or in conjunction with OPEC members from a pragmatic scope. This is possible because Mexico is one of the main non-OPEC oil-exporting countries in the world. Consequently, the country has not been affected by the financial sanctions that the U.S. or the European Union have imposed over OPEC oil marketing in critical circumstances, especially during the aftermath of the 1973 Arab oil embargo (Almeida, 1994).

Motivations to constrain oil supply coincide with the stiff barriers to enter the petroleum industry worldwide. Obstacles are usually related to geological, financial, and technological aspects, not to mention that oil exploration requires access to prospective areas along with risk capital, broad expertise, legal provisions, and even luck. The result is that, in general, only a few companies operate in petroliferous zones. Depending on their number and level of cohesion, these firms can function collectively either as monopolies or as oligopolies (Noreng, 2003). In Mexico, entry barriers are sanctioned by the Constitution so that Pemex is constituted as a legal monopoly.

Economic rationality suggests that oil-assets proprietors choose in principle a reserve-exhaustion rate after evaluating (a) price forecasts, (b) financial markets' anticipated returns, and (c) production-cost predictions. The basic rule is that unexploited oil reserves can be profitable so long as they are valued according to a rate over the financial markets' *rate of return*.⁸⁶ Thus, if oil prices are expected to grow at a lower rate than that of financial markets, it becomes reasonable to extract oil reserves as fast as possible in order to transfer the oil-assets value from subsoil to stock markets. On the contrary, if oil prices are estimated to increase over the financial markets' projected return, it is more logical to delay the extraction of petroleum until market conditions get better. As technical progress reduces oil production costs, future extraction is relatively less expensive, thus representing a qualitative upgrading along with a positive revaluation

⁸⁶ The *rate of return* is the profit earned expressed as a percentage of the assets owed (Parkin, 1998).

of unexploited petroleum. In any case, since oil exploitation is a dynamic process, the volume of reservoirs decrease continuously so that prices move up (Noreng, 2003).

Within a perfectly competitive oil market, the average rate of return over long-term investment should adjust to the stock markets after being corrected by risk estimations so that investors would be indifferent to the equilibrium of their oil and financial-instrument assets. In practice, however, preferences can diverge. Some investors may show a major propensity than others to deplete rapidly the oil reserves available. In the real oil markets, neither marginal costs nor prices are stable and therefore the fluctuations are not linear (Noreng, 2003). That explains why in Mexico, where petroleum exploitation is intensive, oil markets' unsteadiness may prove ambiguous. On the one hand, sudden price increases can be positive in the short term as they represent unexpected revenues derived from investment returns that go beyond the normal rates. On the other hand, abrupt oil-price reductions can distort budgetary income controls, especially because the oil industry's fixed costs generally surpass variable costs (2003).⁸⁷

One of the main causes of the oil market's instability is that petroliferous regions throughout the world move across dissimilar phases of development. Mature oil regions usually produce at lower costs than the marginal ones. As a result, these areas comprise a considerable array of options to face a low-price market. Either public or private, firms located in this type of region can decide whether to produce at low-cost rates or assume the risk of waiting for future increments in oil prices.⁸⁸ Quite the opposite, in oil regions where costly marginal basins – typically offshore – have to be exploited because of the impending

⁸⁷ The economic characteristic of oil supplying is that, in general, *fixed costs* surpass *variable costs*. While fixed costs are independent of the production level, variable costs change as production does (Parkin, 1998). The typical structure of a petroliferous project consists of a small expense for exploration, a large amount for capital-goods investment, and a limited sum for each additional unit extracted (represented by marginal costs). This scheme reveals an investment plan in which almost all costs ensue at the beginning of a project, that is, between the exploration and machinery-installation phases. During the early phase of operations, costs are sensibly smaller, and tend to augment as reservoirs deplete. That means that both the exploration and machinery-installation stages represent "sunken" costs – whether amortized or not – at the moment operations and earnings commence (Noreng, 2003). It is worth noting that during the operative phase, marginal costs are far lower than total costs. Therefore, operative reservoirs' supply is competitive so long as prices remain above the marginal costs. Low oil prices compromise the investment in additional capacity with higher total costs. Likewise, prices needed to justify investment in additional capacity shall entail fringe benefits as long as they are amortized – this concept refers to the payment of the *loan principal*, that is, the original amount of a loan contracted by a country. Once "sunken" costs are amortized, projects are less exposed to risks derived from price fluctuations (2003).

⁸⁸ Examples of mature oil regions exist in the U.S. and in the Middle East, especially in S. Arabia and Iran.

shrinkage of large reservoirs, marginal costs are higher.⁸⁹ Therefore, when prices decrease, firms located in such areas experience difficulties (Noreng, 2003; Palacio & Debrott, 2003).⁹⁰

This phenomenon is imminent for Mexico mainly because Pemex's scheme of intensive oil production has not been supported with long-term planning for the recovery of reserves (Barbosa, 2000). The Cantarell oil-field complex, one of the largest ever discovered in Mexico, has probably peaked at an output level of 2.1 million barrels per day. Pemex managers are thus concerned of the length of this field's plateau and the eventual declining rates of production. Although Cantarell's heavy-crude-oil production plateau may be prolonged by the Ku-Maloob-Zap field complex, light-crude-oil production has been decreasing for nine consecutive years, which means that exploitation has exceeded the existing reserve recovery ratios (Lajous, 27-VI-2005). This trend is disquieting if we consider that the international oil-market conditions are hardly predictable, especially now that prices are high and the margin between demand and supply is short (Rodríguez, 21-IV-2006).⁹¹

When oil markets are rigid and prices are high, owners of petroleum assets have to choose between two main alternatives. The first choice is to boost production, if technically feasible, so as to make the most of the situation, and the second choice is to restrain supply in order to prolong the useful life of reserves. This option may often be a strategy to maximize profits when production quotas are more than compensated by elevated oil prices. That is possible because when the oil supply is held back, the corresponding production ratios are fixed to anticipated revenues. The practical consequence is that the oil price-cost relation is constantly distorted by powerful market decisions so that the short-term *price-elasticity of supply*⁹² is low. This means that a decrease of oil prices does not necessarily

⁸⁹ Examples of marginal oil reservoirs are located in Russia and the North Sea region.

⁹⁰ In recent years, the world's total oil production has decreased while marginal costs have soared, in part because the largest petroliferous reservoirs are depleting. Historically, the oil-price rising propensity has usually gone together with political events that have produced significant transformations to the economic performance of the oil industry worldwide. Some of the most significant events that provoked dramatic oil-price increments are: (a) the 1956 Suez Canal closing in the context of the British-French-Israeli conflict against Egypt; (b) the 1967 Suez Canal closing that followed the Six Day War between Egypt and Israel; (c) the 1973 Arab oil embargo that ensued after the Yon Kippur War between Egypt and Israel; (d) the 1979 Iran revolution; (e) the 1980 Iraq war on Iran; (f) the 1990 Persian Gulf crisis; (g) the 2000 shortage of oil products in North America; and (h) the 2003 U.S.-U.K. war on Iraq.

⁹¹ During 2006, the international demand for crude oil will reach the amount of 85 million barrels per day so that the supply surplus will be less than 1 million barrels daily (Rodríguez, 21-IV-2006).

⁹² *Price elasticity of supply* (PES) behaves in an analogous way to the price elasticity of demand. PES measures the responsiveness of the quantity supplied to a given change in the price of a product. When the quantity supplied is sensitive to changes in price, PES is elastic. On the contrary, when a change in price

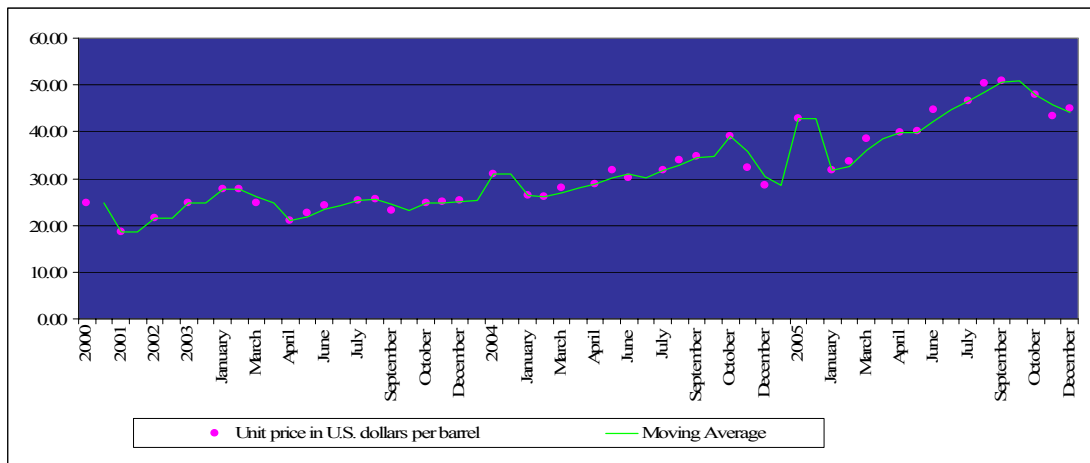
provoke a contraction of current supply. Likewise, the increase of oil prices does not necessarily lead to an augmentation of supply. Hence, at least in the short term, oil prices and volumes are mutually independent in the world markets (Noreng, 2003).

Clearly, the Mexican government has followed the first choice, that is, a trend of boosting oil production with the intention to increase oil revenues derived from exports. Accordingly, Pemex's production levels have soared. The problem is that only an undersized proportion of public income has been designated to exploration programs that could eventually substitute the already-depleting reserves (Barbosa, 2000). Consequently, reserve exhaustion complicates the panorama of an industry that normally requires six to ten years for exploring, discovering, and developing new oil fields (Garza, C., 20-VI-2005). As long as oil reserves keep dropping while production keeps increasing, the stability of Pemex, and subsequently the macroeconomic situation of Mexico are at stake. In such an intensive oil producing country like Mexico, inadequate oil-reserve bases can provoke growing tribulations for maintaining the current production levels. Such insufficiency could lead to a diminution of crude oil exports. Over time, this would have a negative impact on the vast fiscal proceeds that the government collects from Pemex.

The second aspect related to the economic rationale that characterizes the reserve-to-production dynamics of the Mexican oil industry involves the oil economic rent. For the last few years, the positive tendency of spot crude oil prices has been a reason for the Mexican government to promote the intensive exploitation of hydrocarbons (see Figure 5b), seeking to translate the oil economic rent into export returns that become part of current-account budgetary expenses. Since the Mexican government relies heavily on taxes derived from oil production and consumption, elevated prices are convenient for expanding the budgetary income base. Nevertheless, high dependence on oil revenues makes Mexico's macroeconomic health vulnerable to external, unmanageable factors. Domestically, the repercussions are that low-cost, high-quality oil reservoirs are exhausting, the recovery of reserves has not been sufficient, and Pemex lacks of own capital for investing in new exploration and exploitation projects.

has little impact on the quantity supplied by a firm, PES is inelastic. The magnitude of supply elasticity depends on (a) technological conditions that determine production, and (b) the time elapsed from the point in which price changed. Price elasticity of supply is calculated with the percentage of change in the quantity supplied ($\Delta\%QS$) divided by the percentage of change in the price of a good ($\Delta\%P$). The corresponding formula is $\eta_s = \Delta\%QS \div \Delta\%P$ (Parkin, 1998:123).

Figure 5b. Average Realized Price of Pemex Crude Oil Exports (USD/barrel), 2000–2005



Source: Elaborated by author with data from Pemex (2005).

The concept of *economic rent* is essential to understand the rationale for the intensive oil exploitation strategy that Pemex carries out. This term refers to the income received by the owner of a production factor that surpasses the *transfer earnings*, which represent the minimum payment needed to keep a factor of production in its current regime of exploitation, instead of attracting the same product by means of an alternative source or a diverse use. The total income of a production factor is constituted both by its economic rent and by its transfer earnings (Parkin, 1998; Hirshleifer, as cited in Noreng, 2003).

Hydrocarbon resources allow for a large economic rent. Petroleum's intrinsic value leads to a price that is usually superior to the total costs of the oil industry's production factors, including those of exploration, extraction, and exploitation. Thus, proprietors of subsoil resources find in petroleum a powerful asset given its high rate of return. The oil industry represents an extraordinary potential of profitability as its functioning is based in the exploitation of a finite, highly demanded resource. Actually, petroleum is valuable even before being extracted because of its high energetic content and its versatility. Both the size and the irregular distribution of petroliferous reservoirs throughout the world are perhaps more significant than oil scarcity itself. According to Dam (2001), the economic rent is essentially a function of an oil reservoir's size. While large reservoirs are extremely valuable because of their facility to generate economic rent, small ones are less important as their reimbursement capacity is reduced. For the most part, reservoirs involve costs that reach anticipated returns. Wide-ranging economic

rent predictions entail exceptional high risks to the oil industry, but they also procure extraordinary return potentialities (Dam, 2001; Palacio & Debrott, 2003).

Consistent with the concept of economic rent, oil profits usually surpass the corresponding costs in order that pecuniary benefits are substantial. The neoclassical definition of the term *cost* suggests a reasonable return over capital in such a way that, when the payment of production factors exceeds the expenditures implicated in manufacturing, revenues are lucrative enough as to attract new investors to the industry (Palacio & Debrott, 2003). Yet, an exceeding payment may also imply either that resources are scarce or that the market is imperfect because of entry barriers – sometimes it can even be both. That explains why there is more than one single level of return in the oil business. Since price-setting mechanisms usually indicate suppliers' intention to keep a part of a product's intrinsic value, success in seizing a proportion of the economic rent depends on the market's degree of competition. Given that oil markets are not competitive, the economic rent remains shielded by stiff barriers to entry. For that reason, the economic rent of oil production factors is closely related to *market failures*.⁹³ In agreement with Adelman (as cited in Noreng, 2003), oil-derived economic rent is a result of imperfect competition.

While some market imperfections are provoked by occasional distortions that can be corrected in time,⁹⁴ some others are not. The crucial factor resides in the barriers to enter the oil market. Either public or private, dominant oil enterprises have been capable enough to impose their conditions and strategic interests over potential competitors. Consequently, both the oil market features and the petroliferous economic rent have led the majority of corporative structures to remain vertically integrated. As said before, vertical integration is the combination in one company of two or more stages of production normally operated by separate companies. According to Black (2002), vertical integration “can be beneficial for firms if it assists in co-ordination over the quality and reliability of intermediate goods which one independent firm would have sold to the other.” However, this type of structure may also inhibit market efficiency.

⁹³ *Market failures* ensue when the workings of price mechanisms are imperfect and result in an inefficient (or unfair) allocation of resources in detriment of social welfare. There are six principal reasons for market failure: (1) the imperfect flow of information; (2) transaction costs; (3) the nonexistence of markets for some goods; (4) market power; (5) externalities; and (6) public goods (Stokey & Zeckhauser, 1978).

⁹⁴ For the last years, some of the main eventualities that affected the world oil market include the Prestige oil tanker's spill in the Atlantic Ocean (near to the northwestern coast of Spain) in 2002; the U.S.-led war on Iraq in 2003; and the devastation that Hurricane Katrina provoked in the Eastern Gulf of Mexico in 2005.

Even though it experienced important transformations since the mid-1980s, Pemex has preserved some of the main vertical-integration features under the logic of state ownership. The Mexican oil industry's verticality has acted as a "natural hedge" across the diverse constituent stages of production, refining, and commercialization of hydrocarbons. Likewise, operative verticality has secured the oil supply chain in compliance with the petroleum sector's legal barriers to entry, which have disallowed the relation with outside suppliers. By means of vertical integration, oil production has been linked to the sales of derivative products in a seamless, unified system of information and control. In this way, the domestic oil market decisions have been controlled by the Mexican government with the purpose to achieve tax objectives (Drollas, 6-XI-2003).

This section addressed the economic rationale for Pemex's oil-exploitation system by explaining two central ideas. First, international oil-pricing mechanisms are not only driven by geological and/or technical factors, but also by political and economic aspects that private and public oil-asset owners internalize and translate into powerful market decisions, with variable impact on Mexico's oil-producing criteria. If the international oil market conditions are predominantly unstable and unpredictable, it is because at least in the short term, price fluctuations are independent from supplying controls and vice versa. One of the main reasons of this phenomenon is that oil markets are not competitive, since private and public oil suppliers are normally capable of influencing price standards through output controls endorsed by economic and legal barriers to entry. Second, oil allows for a large economic rent so that private and public suppliers find powerful incentives to shield the oil market. Spare revenues derived from the oil economic rent can be rendered as capital potentialities that permit major companies to maintain the status quo through vertical-integration schemes. For oil-managing governments such as the Mexican example, the oil economic rent is also crucial for the consolidation of public finances through the state ownership of hydrocarbons. However, the tenet of state-ownership can be compromised by the negative effects of petrolization.

5.3. State-ownership and petrolization: prolegomena of a confiscatory fiscal regime

As posited by Noreng (2003), the fundamental reason of the state's direct participation in the oil industry has been the protection of national interests that, supposedly, neither market forces nor private entities could defend as efficiently as the public sector.

National interests have been defined in part as economical in correspondence to the oil-exporting countries' intention to control a significant proportion of the oil economic rent. Political motives for state-ownership have been equally important to oil-exporting countries in the way of discretionary powers over production quotas. National oil companies have had a considerable capacity both to rationalize and to reduce costs internationally. They also have a key role as transferors of state, oil-supplying decisions to price and market realities.

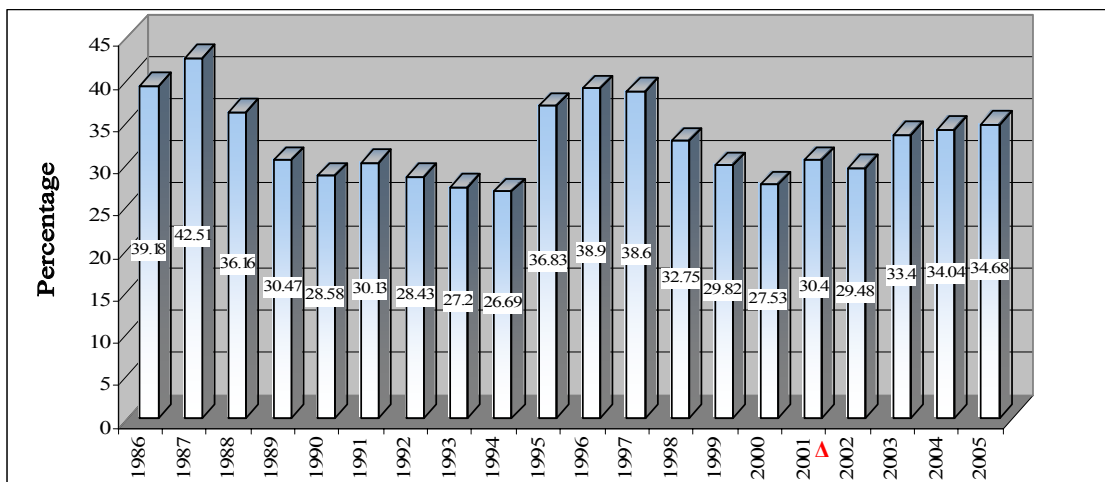
For that reason, the total privatization of national oil companies within oil-exporting countries is still a thorny issue as it implies the undermining of state-ownership. If public oil companies were meant to be divested, oil-managing governments would have also to decline their ambitions to control the hydrocarbon markets at the expense of losing capacity to obtain a large economic rent. This reveals why the total privatization of Pemex is not likely in the short term, at least from the perspective of political economy. Before promoting the complete divestiture of Pemex, the Mexican government would have to find an alternative source of income for sustaining its budgetary expenses. To be realistic, there is currently no other way for the government to keep functioning the way it does but taking advantage of the oil economic rent. The implication, however, is that the economic policy of Mexico is in the balance because of *petrolization*, which I define as the structural dependency that a hydrocarbon-producing country has on oil revenues and taxes derived from domestic sales and exports to achieve public financing policy objectives. In agreement with Blararu (2002):

The first effect of petrolization is the Dutch disease effect whereby concentration on the oil sector comes at the expense of other sectors [i.e. agriculture and industry], which consequently suffer declines in production. The cheapness of imports further exacerbates this problem as no incentives are found to sustain domestic production in these sectors. Of further significance in the macro-economic realm is the government's reliance on oil revenues and taxes from the oil industry for its revenue base. This has two significant effects: firstly, the state fails to develop a culture of taxation similar to other countries. Secondly, a rentier mentality [that is, the institutional setting of a petro-state that encourages the political allocation of the oil economic rent] develops along with an institutional base that serves to perpetuate the state's reliance on oil. This creates [barriers to change that] later impede the structural readjustment needed as a response to declining state revenues from oil exports.

The contemporary Mexican state has been particularly reliant on oil revenues, although with variable results. Following the 1982 debt-crisis that marked the transition

from the presidential term of López Portillo to that of De la Madrid, the international oil-price collapse of 1985–1986 led the Mexican government to revise its policy of petrolization. The result was that Pemex’s contribution to the government’s budgetary income experienced a declining tendency from the second half of the De la Madrid *sexenio* to the end of the Salinas administration. During this de-petrolization interlude, oil revenues decreased from 36.16% of total budgetary income in 1988 to 26.69% in 1994, thus representing an average of 29.67% within a six-year period. However, such an encouraging trend was not durable. Between 1994 and 1995, another inter-sexenio crisis ensued. By 1995, President Zedillo had to mortgage Pemex’s revenues in return for a \$20 billion dollar financial rescue from the U.S. government. At the same time, Zedillo urged Pemex to boost production and exports with the intention to overcome the crisis. The reawaken oil dependency, however, was out of control and, in 1998 another crash of the international oil prices forced the government to consider the re-petrolization of the economy. Seeking to compensate the low oil prices manifested by the international market until the late 1999, the government increased the domestic price of gasoline so as to maintain an average 33.54% of public expenditure for the whole Zedillo *sexenio*. Figure 5c shows the proportion that oil revenues have had in the public budgetary income from 1986 to 2005.

Figure 5c. Proportion of Oil Revenues within the Mexican Government’s Total Budgetary Income, 1986–2005*



* Oil revenues include: (a) special taxes on Pemex, (b) taxes on gasolines, and (c) Pemex’s net Value Added Tax.

▲ Figures from 2001 onward correspond to new accounting criteria that are not comparable to those of previous years. Even so, the ultimate impact of oil revenues on the budgetary income is still analogous to that of past administrations.

Source: INEGI (2006) for 1986–2001 and 2005 data, and Quiroz (2004) for the 2000–2004 period.

As the Fox administration approaches its end, evaluations of the Mexican oil policy confirm a rekindled propensity towards the petrolization of public finances (Shields, 2003). Particularly since 2001 both the executive and the legislative powers have concentrated efforts on making the most of a juncture characterized by high oil prices in order to justify the increasing allocation of budgetary resources on developmental programs. Preliminary data reveal that during the Fox *sexenio*, Pemex's average contribution to the public finances accounted for a third of total share (SHCP, 2006).

Although this proportion is not as elevated as those corresponding to the former administrations, petrolization is still a latent problem. In fact, the government does not seem to be interested in counteracting the oil-dependency trend. In the upcoming years, that could provoke tribulations either if oil prices crash again or if the Cantarell reservoir depletion forces the retraction of export volumes (Shields, 2003).⁹⁵ Those perils may be exacerbated if the *Fondo de Estabilización de Ingresos Petroleros* (FEIP) keeps being managed without transparency by the SHCP (the Ministry of Finance and Public Credit) (Quiroz, 2004).⁹⁶ It can be deduced then that the extent to which public finances are petrolized is not determined by the average annual crude oil prices, but by the insufficiency of non-petroliferous revenues. If the Mexican economy is seriously intended to be de-petrolized, the federal government should promote developmental policies that heightened non-oil revenues without affecting economic growth altogether.

⁹⁵ Cantarell is one of the most productive oil fields in Mexico, and it is located in Campeche, about sixty miles offshore. From 1979 to date, Cantarell has become one of the largest oil-bearing complexes ever discovered, with an estimated 35 billion barrels of oil originally in place (Moroney & Dieck-Assad, 2005:6). Today, this oil field produces approximately 1.9 million barrels daily, that is, half of the country's total oil output. The four major subfields that constitute the Cantarell field are Akal, Nohoch, Chac, and Kutz.

⁹⁶ The FEIP (or Oil Revenues Stabilization Fund) was originally created by Congress during the Zedillo *sexenio* with the objective to soften abrupt changes in oil prices. This mechanism consists of the government's collection of exceeding revenues derived from oil exports in order to use them for fiscal priorities whenever oil prices fall down. The problem is that the FEIP has been used discretionally by the *Secretaría de Hacienda y Crédito Público* (SHCP), with no tangible benefits on the economic situation of Mexico (Rodríguez, 8-X-2005; Quiroz, 2004). During the Fox *sexenio*, the FEIP has also augmented in \$3.1 billion pesos (almost \$300 million dollars) even when the oil surplus was initially calculated to surpass the \$26 billion-dollar mark (about \$300 billion pesos). Official reports reveal that, by mid-2005, the FEIP accumulated a total of 12.23 billion pesos, that is, 33% more than the initial amount set in late 2000 during the Zedillo administration (that is, 9.13 billion pesos). The weakness of the FEIP has been caused by uncontrolled expenses destined to contract coverage in the *oil futures* markets so as to ensure that production quotas will be fixed to specific prices (Rodríguez, 8-X-2005). For a more detailed reading on the FEIP, see Quiroz, J. (2004). *Recursos Naturales e Ingresos Fiscales en México: Retos presupuestarios y sector energético*. [Electronic version] Paper prepared for delivery at "Monitoreo de los Ingresos Petroleros", Open Society Institute – Fundar, Centro de Análisis e Investigación. México: Mono Comunicación.

So far, the question is if Pemex is really meant to be a productive oil company or if it is just an instrument of the Mexican government's public financing policy. In practice, the fiscal regime of Pemex has been largely confiscatory so as to compensate the inadequate, complementary sources of the federal taxation system. Between 1980 and 2002, Pemex contributed \$2.835 trillion pesos (\$270 billion dollars) to the budget of the government, which in turn provided the oil company with less than a quarter of such quantity for much-needed investment and operating expenses (Shields, 2003). The consequence is that public finances have improved gradually at the cost of Pemex's economic stagnation.

In compliance with its fiscal regime, Pemex gives almost all of its income to the Mexican government. Although the 1997 *Federal Revenue Law* (FRL) specifies that Pemex is exempt from payment of income taxes and asset taxes, there are specific duties applied to the company's *downstream* oil activities. The *hydrocarbon rights* scheme indicates that Pemex and its subsidiaries are liable for 60.8% of the total value of hydrocarbons and petrochemicals sold to third parties, in addition to a special production and service tax. Following the hydrocarbon rights system, Pemex can credit against the tax paid for *oil extraction rights* (OER), special OER, additional OER, and the *oil yield tax* (World Energy Council [WEC], 2005).⁹⁷

If the average exporting price of the Mexican crude oil surpasses the budgetary estimation established by the FRL during fiscal exercise, the federal government receives the totality of prospective surplus. This maneuver is done via the *Aprovechamiento sobre Rendimientos Excedentes* (ARE), whose payment is equivalent to 39.2% of revenues

⁹⁷ According to the *special production and service tax*, Pemex and its subsidiaries make daily advance payments of this tax on the sale of diesel and petroleum through Pemex refineries. Payments are a minimum of \$97,690 pesos against the special production and service tax for the month for which the advance payments were made. Minimum payments are modified in accordance with variations in the price of diesel and petroleum. The SHCP applies a factor equivalent to a percentage increase or decrease in the price of diesel and oil to the minimum daily payment, which is due by the third day following modification of the minimum payment. Through *custom taxes*, Pemex and its subsidiaries are required to calculate their customs duties and pay them to the Treasury Department. These taxes suggest that there are no restrictions on exports. However, importers must be authorized and listed on the General Register of Importers. There is no requirement to apply for an Official Mexican Norm under the NAFTA. In fact, there are no minimum or maximum export or import prices under NAFTA. Imports are subject to a customs duty (harmonized code) of 10%, customs duty (under NAFTA) 6%, and a Value Added Tax (IVA) of 15%. Both the special production and service tax and the IVA are payable on imports of gasoline and diesel. There are also *export duties* that establish that Pemex is also liable for exports tax on crude oil, natural gas, and oil products. Finally, the *tax on excess yields* implies that Pemex and its subsidiaries are required to pay a rate of 39.2 % on excess yield accrued on total export volumes, should the monthly-accrued weighted average of a barrel of Mexican crude oil exceed the \$14.50 dollars mark (World Energy Council [WEC], 2005).

exceeding the initial budgetary estimations.⁹⁸ Thus, Pemex pays to the government a hundred percent of each dollar earned over the budgetary assessment – that is, ¢60.8 dollar cents under the hydrocarbon rights scheme and ¢39.2 dollar cents under the ARE mechanism – in addition to the series of federal and local duties it owes annually.

Seeking to lessen Pemex's tax burden, on November 8, 2005, the Congress approved the oil company's new fiscal regime by amending the 1981 *Federal Law on Custom Taxes* (Salazar, 9-XI-2005; El Universal, 9-XI-2005). As set by its new fiscal regime, Pemex will not have to continue giving a \$23.23 billion pesos (\$2.21 billion dollars) annual contribution to the government as it is now allowed to deduct up to \$6.5 dollars per oil barrel and \$2.7 dollars per each 1000 ft³ of natural gas produced. In addition, a significant part of Pemex's ordinary oil extraction rights will go to the FEIP, another fraction will be destined to fiscal assessment by the *Auditoría Superior de la Federación* (ASF), and the rest will be used for research and development projects by the *Instituto Mexicano del Petróleo* (IMP) (El Financiero, 9-XI-2005; El Economista, 9-XI-2005).

Even though these changes are encouraging, they are simply not enough. As claimed by the current Director General of Pemex, Luis Ramirez Corzo, there are still pending transformations such as endowing the state oil company with greater decision-making autonomy and letting it adopt a new corporative government scheme (as cited in Notimex, 9-XI-2005).⁹⁹ This kind of renovation could be possible if the remnants of corporatist management were definitively eradicated. The situation would improve if the government's fiscal assessment on Pemex was fair enough to support budgetary expenses and, at the same time, to pave the way toward the modernization of the oil industry. For now, however, federal taxes on *Petróleos Mexicanos* remain excessive. Instead of just accruing Pemex's utility – as normally occurs with the major oil companies throughout the world –, the government absorbs practically all petroliferous revenues so that total taxes and duties frequently surpass the whole income of the public oil corporation.

⁹⁸ In 2002, for example, the Mexican Congress estimated a price of \$14.50 dollars per oil barrel for budgetary purposes. Eventually, that year's real average price of crude oil exports reached a final \$21.58 dollars mark so that Pemex had to pay the \$6.08 additional dollars per each oil barrel.

⁹⁹ Several proposals have been made for the restructuring of Pemex's executive council with the intention to make it more representative of civil society in opposition to the remnants of presidentialism. Today, six members of the council are public officers appointed by the president, and the remaining five members are STPRM representatives. The Secretary of Energy is who presides over the council (Shields, 2003:59).

5.4. The perils of decapitalization, indebtedness, and high-risk investment

The negative effect that the state fiscal assortment has had over the Mexican oil industry is palpable when Pemex's income before taxes and duties is compared with its net income (see Table 5c). Clearly, the public oil company has experienced a declining economic situation that, for the last five years, has coincided with the rekindled policies of intensive oil exploitation and petrolization of the Fox administration. This confiscatory taxation system has not only been the cause of Pemex's operative inefficiency, but also the root of its incapacity to invest in developmental projects, its distorted planning schemes, and its decapitalization (Shields, 2003).

Table 5c. Summary of Pemex's Financial Statements, 2000–2004

	2000	2001	2002	2003	2004
Income statements (million U.S. dollars)					
Total sales	48,920	48,711	46,685	55,663	68,673
Domestic sales	30,597	33,236	30,475	34,464	39,860
Export sales	18,323	15,475	16,210	21,199	28,813
Costs and operating expenses	20,125	22,634	19,870	22,950	28,264
Income before taxes and duties	28,631	25,235	25,513	30,241	40,774
Hydrocarbon extraction duties and other	23,423	18,405	17,367	25,664	37,251
Special tax on production and services	7,267	10,413	11,102	8,373	4,856
Cumulative effect due to the adoption of a new accounting standard	-	-146	-	179	-929
Net income (loss)	-2,059	-3,729	-2,957	-3,617	-2,263
Balance as of December 31, 2004 (million U.S. dollars)					
Assets	58,865	60,913	67,625	75,247	84,114
Liabilities	43,131	47,474	57,860	71,165	81,154
Short term	10,005	7,870	11,032	12,185	12,471
Long term	33,127	39,604	46,828	58,980	68,683
Equity	15,734	13,439	9,764	-7,511	-8,788
Total equity and liabilities	58,865	60,913	67,625	63,654	72,366

Source: Pemex Statistical Yearbook (2005).

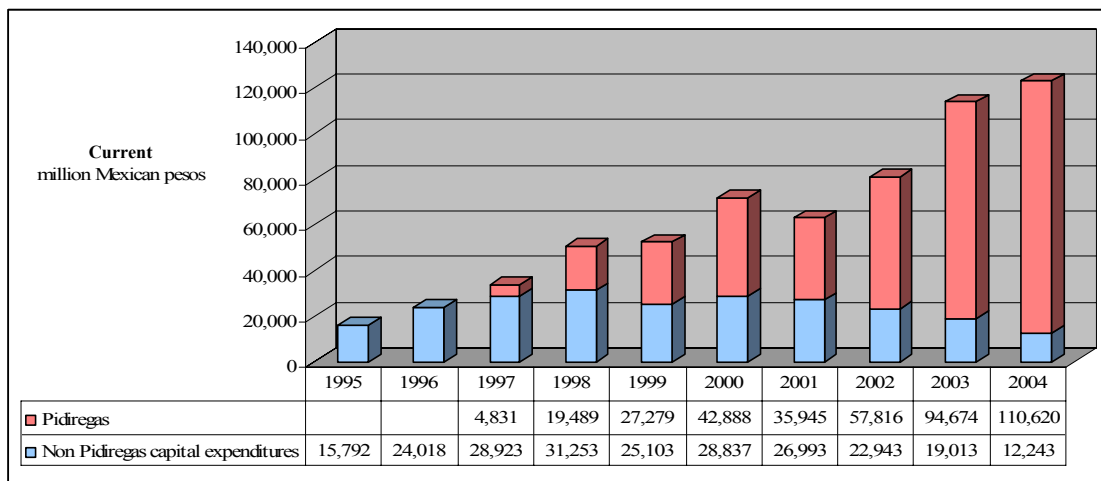
Besides the fact that Pemex has experienced net losses in five consecutive years, the financial balance of the company has illustrated serious difficulties (Lajous, 27-VI-2005). Between 2000 and 2004, liabilities rose from \$43.13 billion dollars to \$81.15 billion dollars, thus representing a nominal increase of \$38.02 billion dollars. This amount stood for a 63% variation with respect to a total average of \$60.16 billion dollars in terms of debt. The problem is that the major part of liabilities has been concentrated in the long-term category. From 2000

to 2004, long-term obligations experienced a 72% change with respect to the average (\$49.44 billion dollars) vis-à-vis the 23% change of short-term average debt (\$10.71 billion dollars).

Usually, long-term liabilities may be helpful to cash-flow forecasts so long as the capital invested are reflected in the corresponding projects' rate of return. For the last five years, Pemex projects' degree of profitability has remained stable, given that Mexico's hydrocarbon assets have tended to surpass the financial markets' stipulated returns. However, Pemex's urgency to attract liquidity – in order to keep boosting production by way of infrastructure development – is directly proportional to its lack of capital. The result is thus alarming because Pemex moves toward decapitalization and indebtedness in a market context that does not guarantee that oil prices will be always high. Moreover, long-term liabilities will become ever more distressing to Pemex as both inflationary and interest rates augment.

Without adequate capital for investment, Pemex is stagnating. At first glance, that could be understood as a sign of diminished capacity to develop infrastructure projects. How can we explain then that Pemex's capital expenditure has increased dramatically for the last ten years? According to Almeida (1994), the Mexican oil industry is decidedly capital intensive in correspondence to its accelerated-production schemes. Figure 5d demonstrates that fact (see also Appendix H).

Figure 5d. Capital Expenditure of Petróleos Mexicanos (Pemex), 1995–2004



Source: Elaborated by author with data from Pemex Statistical Yearbook (2005).

These numbers illustrate that Pemex's capital expenditure has been radically enlarged. The problem is that investment funds do not belong to the state oil company. Commencing in

1997, during the Zedillo administration, Pemex's major oil ventures have been financed through *Pidiregas*, that is, long-term productive infrastructure projects with deferred impact in the recording of expenditure.¹⁰⁰ Through this mechanism, the Mexican government has obtained private funds for developing strategic areas of the oil industry in the absence of appropriate public resources and legal opportunities. It is important to recall that foreign direct investment in oil exploitation is prohibited by the Mexican Constitution (Shields, 2003).

Prior to the implementation of *Pidiregas*, Pemex infrastructure projects depended on the government's annual budgetary allocation. A series of amendments to the budget legislation enabled *Pidiregas* as a mechanism to attract private capital by offering long-term financing of strategic projects without subjecting them to budgetary cuts or delays (Núñez-Luna, 2005). *Pidiregas* is an important means to raise funds for much-needed investment since it diversifies Pemex's financing sources (see Appendix I). Nevertheless, this method has also repercussions. As Núñez-Luna (2005) explains:

The main feature of the *Pidiregas* mechanism is the deferral of liability through account recording procedures. Under the law, in any given year, only the expenses accrued during the current and the next year is recorded as a liability by the state-owned enterprise providing the public service; i.e. CFE or PEMEX [sic]. The remaining portion of debt is treated as a contingent liability (p.23).

Thus, *Pidiregas* creates long-lasting liabilities to the government via Pemex. Since the amortization¹⁰¹ of this legal instrument depends on Pemex's capacity to maintain its revenue ratios, there is an impending danger to accumulate uncontrollable levels of debt whenever the anticipated returns are not fulfilled by the *Pidiregas*-financed projects. While in 2003 the total cost of the 33 projects that Pemex developed through *Pidiregas* amounted for \$789 billion pesos (\$75.14 billion dollars), the total payment of resulting amortizations and interests will reach \$1.58 trillion pesos (\$150 billion dollars) for the next thirteen years. The most critical point will occur in 2010, when Pemex will have to

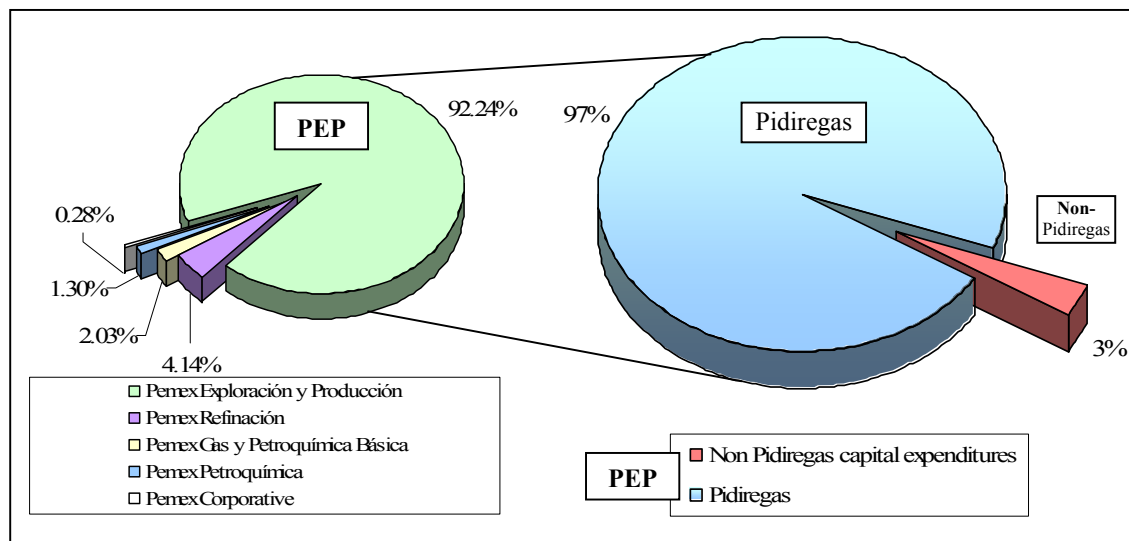
¹⁰⁰ *Pidiregas* emerged in response to the declining public revenues and the loss of access to international financing provoked by the economic crisis of 1994-1995 (Núñez-Luna, 2005; Shields, 2003). *Pidiregas* are designed to allow indirect, private participation in oil ventures through the long-term financing of Pemex's strategic projects. Under this financial instrument, the reimbursement of privately financed public infrastructure is defrayed by Pemex with the revenues derived from the projects, once these are operational (Quiroz, 2004). From thereon, the projects' cost is registered as public-account liabilities, thus becoming a contingent debt to be rewarded in the long term (Shields, 2003).

¹⁰¹ *Amortization* is the payment of the original amount of a loan contracted by a country, better known as the *loan principal* (Samuelson, Nordhaus, Dieck & Salazar, 1998:216).

pay back \$117.4 billion pesos (\$11.2 billion dollars), that is, an equivalent to 1.5% of Mexico's GDP in 2005 (Garduño & Mendez, 11-V-2005; Rodríguez, 8-I-2006).

This explains why Pemex is the most indebted oil company in the world. In 2005, its total liabilities amounted for \$1.03 trillion pesos (\$98.24 billion dollars), about 140% higher than total obligations at the beginning of the Fox *sexenio* (Rodríguez, 6-II-2005; Rodríguez, Zúñiga & Cardoso, 31-X-2005). Even so, in 2004, Pemex's capital expenditure was the highest of the last decade. From a total of \$122.86 billion pesos (\$11.7 billion dollars), 92.24% was destined to Pemex Exploración y Producción (PEP), the most capital intensive¹⁰² of all the Pemex subsidiary entities. This proportion represented a total of \$113.33 billion pesos (\$10.8 billion dollars), and consisted in 97% of *Pidiregas* capital expenditures and 3% of non-*Pidiregas* capital expenditure (see Figure 5e).

Figure 5e. Proportion of Pemex's Capital Expenditure by Subsidiary Entities with Emphasis on Pemex Exploración y Producción (PEP), 2004



Source: Elaborated by author with data from Pemex Statistical Yearbook (2005).

As illustrated above, PEP is by far the main subsidiary entity of Pemex. This information concurs with Noreng's (2003) observations. Accordingly, the majority of oil-exporting countries focus on the petroleum industry's *upstream* level, which comprises

¹⁰² *Capital intensity* is a measure of the relative use of capital, compared to other factors such as labor, in a production process. Capital intensity is often measured by the ratio of capital to labor, or by the share of capital in factor payments (Deardorff, 2006).

exploration, extraction, and production activities.¹⁰³ As a rule, the economic guidelines of these countries hinge on national oil companies (NOCs), and the reason is simple: NOCs are a vital source of fiscal proceeds (Palacios, 2003). Therefore, to have control over the production capacity of a NOC is to have the key for granting spare revenues to the budget.

The fact, however, is that the *upstream* level is more exposed to risk than its counterpart, the *downstream* level (Lajous, 27-VI-2005). To be precise, *upstream* exploration activities are the most hazardous of the oil industry. Due to technical and geological uncertainties, there is a high risk to drill a great number of dry wells before discovering commercially-exploitable oil deposits. Normally, risk is reduced when oil corporations undertake exploration projects by means of diversification (*portfolio effect*). The oil-well development stage is comparatively less hazardous than exploration, since it comes only after marketable oil deposits are identified. However, there is a permanent oil-reserve risk that is linked to subsoil variables such as the reserve-to-production ratio and the elapsed, technical conditions of operation. Thus, the reserve risk is inversely proportional to the reservoir's size. That is, large oil reservoirs entail minor risks in comparison with small ones (Noreng, 2003:228-229). For that reason, an oil company whose exploration projects are concentrated in a single petroliferous region is at disadvantage against an oil company whose exploration projects are diversified throughout the world. Pemex fits in the former category, which means that besides being affected by oil-price volatility, fiscal burden, decapitalization, and indebtedness, it is also impinged by the effect of massive, high-risk investments in the *upstream* sector.

In this chapter I analyzed the economic situation of Pemex. I argued that the challenge of energy modernization for the state oil company hinges on three main factors: (1) the economic rationale for oil exploitation, (2) petrolization of the Mexican economy, and (3) the relation between decapitalization, indebtedness, and high-risk investment in the *upstream* level. I illustrated that Pemex's current economic rationale for intensive oil exploitation is problematic because, even when it procures spare oil revenues to the Mexican state through the legal monopolization of subsoil resources, it does not offer clear alternatives to diversify the public revenue base. As a result, both state-ownership

¹⁰³ The counterpart of the *upstream* is the *downstream* level, which comprises transportation, refining, and distribution activities (Noreng, 2003:211).

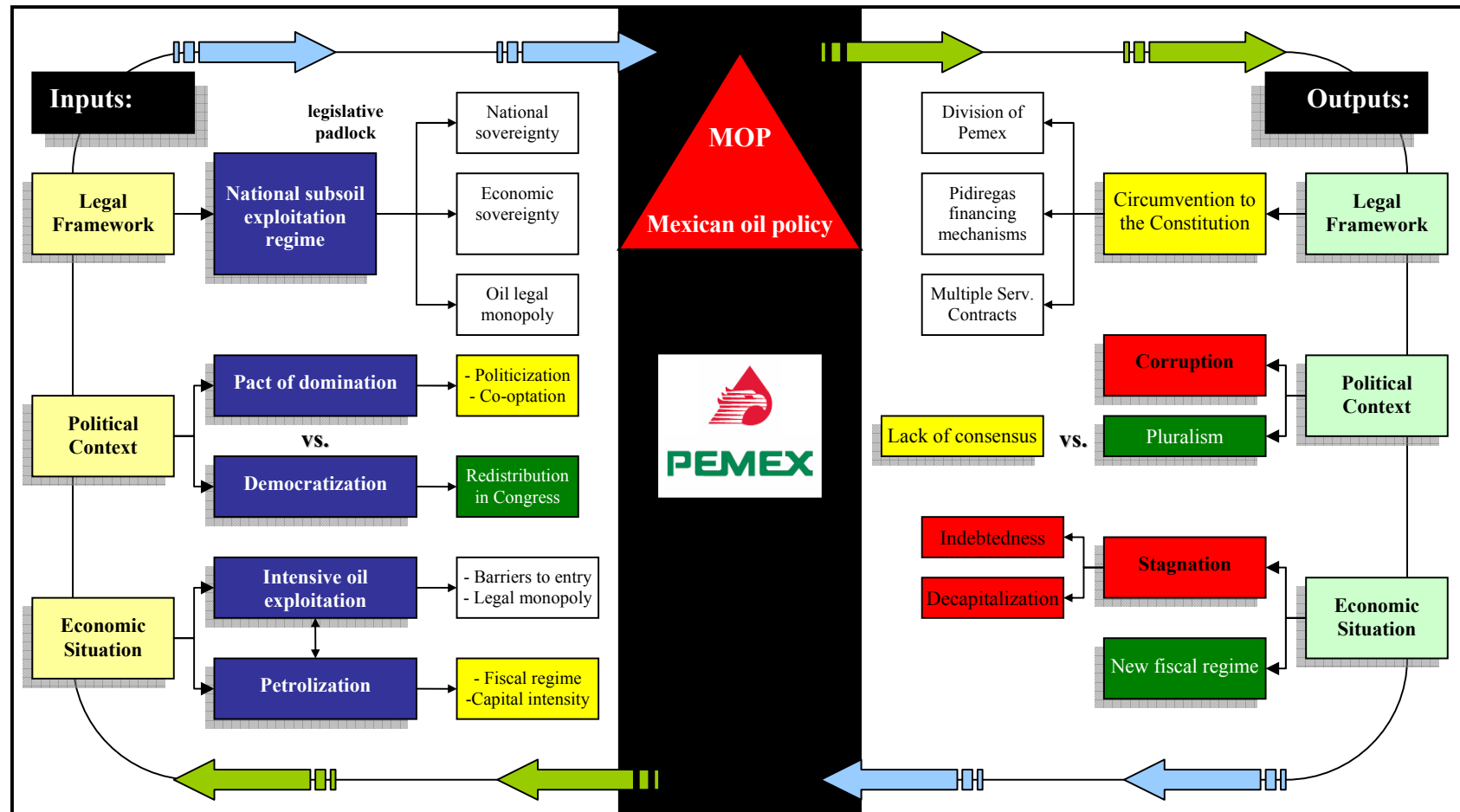
and petrolization have become obstacles to the reformation of the Mexican oil industry, especially because Pemex's tax burden hampers self-financed investment capabilities.

The state oil company is thus stagnating, as confirmed by the net income losses of the last five years. Between 2000 and 2004, the average net income loss of Pemex was equivalent to \$2.93 billion dollars. The government has tried to deal with Pemex's decapitalization by increasing capital expenditures under the *Pidiregas* scheme. While in 1997 *Pidiregas* total investment on Pemex infrastructure projects stood for \$4.83 billion pesos, in 2004 it reached the amount of \$110.62 billion pesos, that is, twenty-three times greater than the former figure. Despite the enlargement of *Pidiregas* investments, results have been counterproductive both because Pemex has become highly indebted and because actual *Pidiregas* investment-projects have not contributed to the diversification of the domestic oil value chain due to an excessive concentration on the high-risk, *upstream* level. Based on my analysis, in the next chapter I put forth a series of recommendations that Mexican oil-policy makers could follow in order to meet the challenge of energy modernization.

Chapter 6. Analyzing Strategies for Reforming the Oil Industry in Mexico

This chapter offers an exploratory analysis of strategies for reforming the oil industry in Mexico. The first section examines an array of alternatives that could contribute to the designing of an integral reform to the federal fiscal system. A comprehensive fiscal reform could help the Mexican government to lessen its dependence on oil revenues so that the public budgetary-income base would become less vulnerable to challenges derived from the possible depletion of national oil reserves. The second section puts forth a set of ideas for making Pemex a transparent and accountable state-owned company. A responsible dissemination of information related to Pemex's operations could allow for a better understanding of the Mexican oil industry's main issues, and thereby for a more efficient oil policy-making in Mexico. The third section proposes the implementation of what I call an Oil Reserve Recovery Program (ORRP) so as to balance Mexico's reserve-to-production ratio. By developing an ORRP, the federal government could elongate the useful life of domestic oil reserves, and Mexico would not run out of oil by year 2016. These three central proposals represent an effort to address the legal, political, and economic structural issues of Pemex synthesized in Diagram 6a.

Diagram 6a. Comprehensive Conceptual Map for the Systemic Analysis of Pemex's Current Issues



Source: Elaborated by author

6.1. Designing an integral fiscal reform

Pemex is an essential source of federal fiscal revenue. The total sum of special taxes on Pemex, taxes on gasolines, and Pemex's net value added tax represented 28.58% of the Mexican government's budgetary income in 1990, 36.83% in 1995, 27.53% in 2000, and 37.27% in 2005 (Instituto Nacional de Estadística Geografía e Informática [INEGI], 2006). These figures reveal a rekindled propensity towards the petrolization of public finances since the beginning of the Fox administration. The strategy of expanding Pemex's oil production quotas and exports has permitted the Mexican government to take advantage of growing oil prices in the international spot markets at the level of public financing policy objectives.

Although elevated energy revenues have recently made for some financial consolidation in Mexico, the fiscal windfall from higher world oil prices has been affected by the long-standing policy of smoothing the domestic price of gasoline (International Monetary Fund [IMF], 2006:42). Looking ahead, "the recently approved fiscal responsibility law calls for an ongoing balanced budget and establishes a rule for allocating unbudgeted oil revenues (*Ibidem*).” The new fiscal regime of Pemex has also gave momentum to the pace of growth that the national oil industry needs, for it forecasts an additional amount of \$23.23 billion pesos for year 2006 that the state-owned company could use to invest in R&D programs (El Financiero, 9-XI-2005).

Of course, this is not enough. The Mexican state still depends largely on oil revenues for achieving economic policy goals. According to the IMF (2006), the Fox administration has taken advantage of unexpected revenues derived from high oil prices only for balancing the budgetary income base in terms of current-account expenditures. The problem is that strategic administration of fiscal surpluses has not been implemented for improving the Mexican oil industry's infrastructure and finances. Pemex recovers only a small fraction of its fiscal contribution by way of public investment by the federal government. For instance, in 2000 the state company recovered as federal public investment only 10.7% of the taxes it paid (Secretaría de Hacienda y Crédito Público [SHCP], 2006). Clearly, the fiscal assessment on oil operations has relied on highly confiscatory standards that have ultimately led Pemex to economic deterioration, especially because its taxes are not levied in proportion to its financial performance. As clarified by Moroney and Dieck-Assad:

Taxes levied on a private firm's profits or net income are linked to the firm's financial performance. During unprofitable years, taxes are zero. In some instances, tax credits based on negative net income can be carried forward to reduce taxes incurred in profitable years. Taxes based on a firm's total sales are fundamentally different because they are not linked to financial performance. These taxes must be paid each year, regardless of the firm's net income or loss. [Pemex] taxes are based on its total sales, not its net income (2005:34).

Moroney and Dieck-Assad (2005) affirm that Pemex taxes represent an extremely high percentage of sales. Consistent with them, the tax burden of Pemex in a given year t is the percentage of its sales paid as taxes to the federal government, and it can be calculated as Pemex Tax Burden $_t$ = [Taxes and duties paid $_t$ / Total sales $_t$] x 100. For example, total sales in 2004 amounted to \$68.67 billion pesos, and taxes and duties were equal to \$42.12 billion pesos. Thus, Pemex tax burden in 2004 stood for 163%.¹⁰⁴ This striking result is comparable to that of previous years. To be specific, since 2000 the taxes and duties paid by the state oil company have surpassed its income before taxes, duties, and the adoption of a new financial standard (2005).

That explains why Pemex has experienced net income losses for the last five years (see Table 5c, p.108), not to mention the additional debt and interest payments that the public company has incurred through *Pidiregas*. According to the Ministry of Finance (as cited in Rodríguez, 7-V-2006), Pemex obligations between 2008 and 2012 will reach the amount of \$15.55 billion dollars, while the amortization of contingent liabilities derived from *Pidiregas* will elapse until 2022, when about \$2.34 billion dollars will have to be defrayed. As stated by the ASF (the Federal Auditing Bureau), the profitability of *Pidiregas* projects has been impinged by construction delays, inflated investment costs, operative contingencies, and legal controversies (as cited in Rodríguez, 9-IV-2006).

In summary, Pemex is financially unstable for three reasons. First, its federal budgetary allocations have been cut because of fiscal austerity. Between 1997 and 2004, *Pidiregas* proportion of Pemex's capital expenditure increased from 14% to 90% of the total (see Figure 5d, p.109). Second, the loans enabled by *Pidiregas* proved to be overwhelming, since they increased Pemex's long-term debt to levels that threaten the state oil company's economic solvency. Third, Pemex taxes have represented about

¹⁰⁴ Pemex Tax Burden $_t$ = [68.67 billion pesos / 42.12 billion pesos] x 100 = 1.63 x 100 = 163%.

60% of its total sales every year since 1989 (Moroney & Dieck-Assad, 2005). Such elevated rates are simply unsustainable, since they constrain Pemex's financial and budgetary capabilities to allocate funds for strategic R&D programs.

Thus, the Mexican government is immersing in a serious predicament. There is evidence demonstrating that the public sector could scarcely afford to sustain its fiscal revenue base by cutting Pemex tax rates. Without oil revenues, the government's fiscal deficit would be equivalent to 9.8% of GDP (about \$63 billion dollars) instead of the official 0.2% that the government has estimated (González, 20-IV-2006). This reveals that the federal fiscal system needs to depend less on hydrocarbon resources for short-term consolidation, but how could the course of petrolization be reversed by Mexican energy-policy makers?

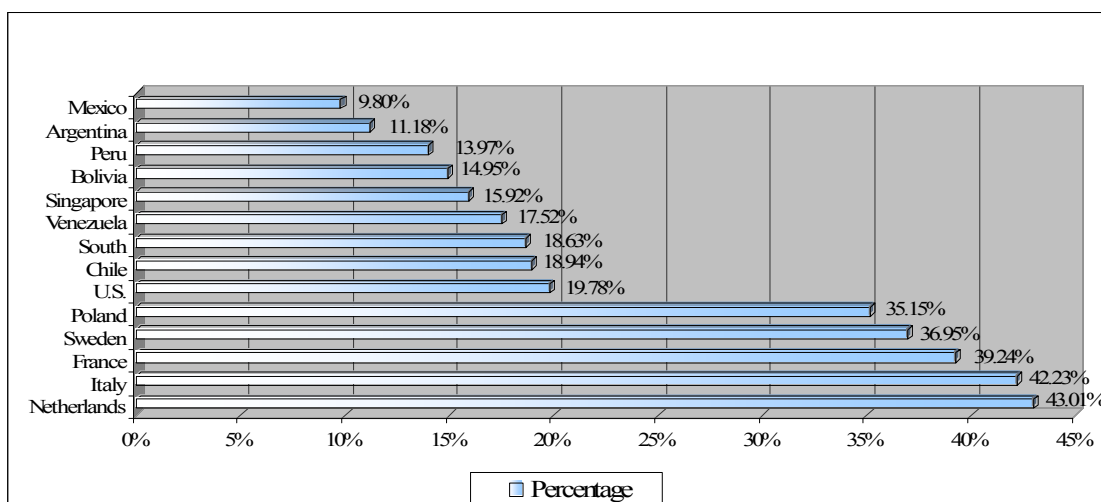
Suppose that the government were to increase [Pemex] budgets by reducing the company's taxes. Conventional thinking is that the government would then have to face three politically unpopular alternatives. First, it could increase taxes elsewhere in the economy through a so-called national fiscal reform to compensate for the reduction in [Pemex] tax revenue. Second, it could cut spending on other projects that are vital to Mexico's social agenda. Finally, it could maintain spending on social programs by increasing its budget deficit. An increasing deficit could be financed in either of two ways: by increasing the growth rate of the money supply (which could be inflationary) or by selling bonds on the open market (Moroney & Dieck-Assad, 2005:27).

The Fox administration has strived to minimize deficits and search for a balanced budget, which means that public spending is not likely to be financed under flexible criteria. Curtails to budgetary expenses in social programs are neither viable for the current PAN-led government, as they could entail serious political challenges on the road to presidential elections of July 2006. In the same way, it would be politically difficult for the government to compensate an eventual reduction of Pemex taxes with higher revenues derived from the single enlargement of the fiscal income base. What are the alternatives then?

One of the federal government's major ambitions has been the successful implementation of an integral fiscal reform. Certainly, to embark on a comprehensive reformation to the fiscal system is not an easy task. The tax administration system of Mexico is predominantly inefficient and disorganized. Bergman (2001) points out that 50%

of the state' taxation potential is lost because of evasion, elusion,¹⁰⁵ fraud, and other sorts of fiscal outwitting. During the Fox administration, the amount of proceeds that could not become part of the public income base because of elusion and judiciary difficulties surpassed the \$516.4 billion pesos mark at the end of this year's first trimester (Zúñiga, 9-V-2006). It is important to mention that industrialized countries usually accrue more than 40% of their corresponding GDP in taxes, except for the U.S., where fiscal proceeds account for an average 20% of GDP. Emerging markets as Chile, South Korea, and Singapore collect fiscal revenues in about 18% of GDP. In contrast, Mexico's fiscal proceeds barely reach a 10% of GDP (World Bank, 2003). This means that Mexico is one of the countries that collect the least amount of taxes in the world (see Figure 6a).

Figure 6a. Fiscal Accrument as Proportion of GDP (Selected Countries), 2003



Source: Hernández (2003).

There are two main reasons that explain why fiscal accrument is limited in Mexico. First, the country has a complex taxation system that comprises numerous special schemes that entail fiscal-law structural flaws. This facilitates fiscal evasion and makes tax administration a difficult task for the *Servicio de Administración Tributaria* (SAT). Second, the tax-revenue administration system is inefficient. The result is that there are not enough

¹⁰⁵ Tax *evasion* is the transgression of fiscal norms that taxpayers perform when they refuse to comply with their obligations. Tax *elusion* is the circumvention or skillful interpretation of fiscal norms that occur when taxpayers attempt to diminish the rate of their duties. This is typical of high-rate taxpayers that outwit fiscal norms to reduce the payment of what the SHCP considers officially as assessable (Bergman, 2001).

public resources to implement as much social and economic programs as needed in the country. According to Hernández (2003), it is imperative to revoke this trend by embarking on both an institutional reform and the transformation of popular perceptions regarding the Mexican state's public financing policy. Principally, it is important to develop an integral fiscal reform taking into consideration both fiscal revenues and public financing. Regarding fiscal revenues, it is necessary to progressively enlarge the tax accrument basis to make oil revenues less determinant for the macroeconomic health of the country. Simultaneously, the government needs to apply strict controls on public expenditure looking towards ensuring a fair reallocation of income (2003). Table 6a shows several public-policy options that could allow for a more efficient fiscal system in Mexico.

Table 6a. Public Policy Options to Design an Integral Fiscal Reform

Public Policy Option	Pros	Cons
1. The SHCP could enlarge the fiscal accrument base by integrating tax-evasive sectors such as informal businesses via smooth-taxation programs.	Non-oil revenues would increase and future fiscal controls and reforms on the tax reallocation system could become less challenging in terms of politics and legislation.	Informal-commerce groups could influence this policy strategy through their own political agenda. Corruption and secrecy would be difficult to avoid.
2. The executive power could propose a bill to reduce the value added tax (IVA) rates in order to stimulate fiscal contribution.	Non-oil revenues would increase significantly along with political support to the government from oppositional groups.	This strategy would not guarantee the Mexican fiscal system's efficiency. Non-oil revenues could be even smaller and the government would have to embark on even more intensive oil exploitation strategies.
3. Tax excises should be revised by Congress to make assessments more accurate and transparent.	The taxation of non-basic products would be more efficient, and incentives for tax evasion could be comprehensively reduced.	Congressional opposition and lack of consensus could turn this fiscal policy subject into a political issue, especially following 2006 elections.
4. Corruption and tax-evasive practices should be penalized through stricter sanctions by the Supreme Court of Justice.	The government would ensure transparency and accountability in the fiscal system.	Corruption would be hard to eradicate if tax evasion is propelled by influential business sectors.
5. The relative-regression effect of the IVA should be reduced to make tax payments less confiscatory for low-income sectors of the Mexican society.	Fiscal contribution would be more reflective of the different socioeconomic sectors' purchasing power. This could also entail political support to the government from popular, social sectors.	Tax accrument could become vulnerable both to political agendas and to legal challenges regarding such a profound transformation.

Source: Elaborated by author with data from Cotis (2003) and Hernández (2003).

It is highly recommendable for the Mexican government to follow these options in an integral fashion. By following any option separately, advances in the fiscal system of Mexico would be modest, and perhaps compromising due to the evasion and elusion

problems that the *Secretaría de Hacienda y Crédito Público* (SHCP) has confronted during the last few years. By striving for an integral fiscal reform, the government could strengthen the federal tax system's non-oil revenue base so that Mexico's public financing policy would depend less on oil revenues. A comprehensive reformation to the fiscal system would also make the country less vulnerable to implications derived from the possible depletion of national oil reserves. Likewise, diversified tax revenues could allow the government to allocate larger federal funds on Pemex investment projects to diminish the dependency on *Pidiregas* as well as to neutralize the negative effects produced by this financial instrument. Beyond doubt, the economic situation of Pemex cannot improve if there is not first a substantial reform to the fiscal system of Mexico. The enhancement of Pemex finances must be promoted through transparent and accountable mechanisms for the adequate dissemination of oil-related operations.

6.2. Searching for Pemex's transparency and accountability

In this project, I have argued that corruption is one of the main issues that impinge on the organizational level of Pemex. The lack of transparency and accountability is a problem that affects the decision-making process involved in the state oil company's operations. It is true that, during the congressional PRI-led era (1929–1997), Mexico's oil-policy making process allowed for stable policy strategies that contributed to the institutional consolidation of Pemex's bureaucratic and managerial strata. However, the state-led centralization of oil operations also produced negative effects in the Mexican political system. The Mexican oil policy became restrictive to democratic reforming procedures due to the highly centralized management of Pemex. This has turned petroleum affairs into conflictive themes that have hindered the success of non-orthodox oil-policy reform strategies.

The absence of transparent means to disseminate information about the current situation of Pemex has contributed to a general lack of knowledge about the challenges the Mexican oil industry is facing today, and the way they could be addressed by both the federal government and civil society. Moreover, oil policy analysis is usually biased by the incongruities that Pemex's financial and operative statements manifest. As a result, confrontational political discourses have prevailed over substantial and effective proposals for the restructuring of Pemex in the Mexican political system. The

functioning of the state-owned oil company has been chiefly overwhelmed by administrative inefficiency, secrecy, and corruption (Shields, 2003).

The best example of Pemex's lack of transparency and accountability is the so-called "Pemexgate." This case consisted of a millionaire fund transference that Pemex functionaries made illicitly to the PRI via the *Sindicato de Trabajadores Petroleros de la República Mexicana* (STPRM), in contribution to the financing of Francisco Labastida Ochoa's political campaign en route to the presidential elections of 2000 (El Universal, 30-IX-2002). The funds that the PRI received in secrecy from the STPRM reached the amount of \$640 million pesos (approximately \$61 million dollars), of which evidence could only confirm \$500 million pesos as incriminating. This maneuver was considered illegal because it violated both the Mexican Constitution and the *Código Federal de Instituciones y Procedimientos Electorales* (COFIPE). After an extensive investigation led by the PGR, the *Consejo General del Instituto Federal Electoral* (IFE) resolved to apply a \$1 billion peso penalization to the PRI in 2003 (Instituto Federal Electoral [IFE], 14-III-2003). The consequences of this case disclosed structural flaws within the political and administrative realms underlying the corporate government of Pemex.

Another case in point occurred in April 2006, when the *Auditoría Superior de la Federación* (ASF) divulged that, in 2004 Pemex did not report liabilities to the public-account official registry, of which \$25.94 billion dollars derived from foreign financing, and \$4.51 billion dollars came from *Pidiregas* projects. According to the ASF, Pemex's business plans lack of strategic organization and evaluation controls, and the configuration of the company's managerial councils are not efficient due to several factors. First, counselors' interests are that of the ministry they represent and not that of Pemex. Second, the Pemex Administration Council decision-making capabilities are highly influenced by the role of the national oil union so that counselors are not independent. Third, there is asymmetrical information between directors of Pemex's subsidiary entities and counselors so that the Administration Council is constrained on its actions. Fourth, the Council members cannot assess the extent to which the oil industry's strategic objectives are accomplished, since even when they have knowledge of Pemex's situation through the periodical reports presented by the director general, they lack of

indicators to measure the efficiency of Pemex’s workings (Rodríguez, 9-IV-2006). Table 6b presents a set of public policy options that could be followed to confront this situation.

Table 6b. Public Policy Options to Ensure Pemex’s Transparency and Accountability

Public Policy Option	Pros	Cons
1. To develop better institutional mechanisms for making operative and financial indicators of Pemex more accessible to civil society.	Citizens would be included in oil-policy planning and reforming.	The government’s discretionary capabilities on the oil sector could be reduced because of an intense scrutiny that could eventually over-politicize Pemex’s issues.
2. To empower the Secretary of Energy with broader disciplinary attributions for prompting the continuous appraisal of Pemex’s administrative procedures.	Pemex’s accountability would be enforced by a permanent system of inspection	Pemex’s decision-making capabilities could become even more restricted
3. To strengthen federal penalizations regarding bureaucratic corruption in order to dissuade bribery and fraud from Pemex, the oil union, and/or political parties – especially during electoral processes.	Mismanagement of oil revenues and political influences could be counteracted	Disciplinary trade-offs could be insufficient for fighting dishonesty in those situations that supposed huge benefits to corruptors in and around Pemex.

Source: Elaborated by author with data from Shields (2003).

It is necessary to develop a plan for promoting better mechanisms to make Pemex a more transparent corporation. The empowerment of the *Secretaría de Energía* (SENER) is also recommended for ensuring that Pemex will be adequately accountable. Finally, the government must render stricter mechanisms for the penalization of bureaucratic corruption, in order to discourage oil-profits’ mismanagement. The Mexican government must embrace the three options mentioned above. Although each policy option entails sizeable disadvantages, the results of implementing all of them could allow for a “political surplus” that would not be possible if these alternatives were applied separately. The main achievements derived from this course of action would be: (a) the confrontation to the generalized unawareness about Pemex’s state of affairs to the benefit of a democratic oil-policy planning, and (b) the dissuasion of corrupt practices from the administrative and operative spheres of Pemex and the organisms and agencies related to it.

6.3. Replenishing Mexico's oil reserves

In the course of almost seven decades, the economic situation of Pemex has reflected the financial situation of the Mexican state. Pemex's vertical integration made for the state-led centralization of oil-related activities. After being divided into four subsidiary entities in 1992, Pemex experienced a dual process of development. On the one hand, *operative verticality* faltered because of the subsidiaries asymmetric expansion. On the other hand, *administrative verticality* remained vigorous in line with state-led economic principles (Rosenzweig & Gutiérrez, 2005). Since the beginning of the Fox administration, the structural economic issues of Pemex have revealed a contradictory reserve-to-production dynamics. Production rates have boosted while oil reserves have gradually plunged (see Figure 5a, p.93). This phenomenon comes from the economic rationale of the Mexican oil policy. Accordingly, the government has pursued financing policy objectives by making the most of the international oil panorama, which is currently characterized by high-oil prices. This course of action is akin to the essence of state-ownership of hydrocarbons: oil economic rent provides for vast tax revenues.

Mexico's oil economic rent has been procured by the legal monopolization of hydrocarbons. As a result, the country's economy has become highly petrolized. Mexico's degree of petrolization has prevailed through the fiscal regime of Pemex, which entails a confiscatory taxation over oil operations. Irrespective of recent reforms to Pemex's fiscal regime, several issues are still pending, especially decapitalization and indebtedness. The former refers to Pemex's loss of own capitals for implementing strategic investment because of overwhelming fiscal assessment. The latter corresponds to the enormous liabilities that Pemex owes because of deficit-based, financing schemes such as Pidiregas.

By contracting long-term liabilities, Pemex has developed infrastructure projects that have not been completely fruitful once their corresponding amortization is taken into account. In addition, the state oil company is stagnating because of a lack of specialization. The reason is that Pemex's capital expenditure is oriented to massive, high-risk investments on the *upstream* level. Therefore, the economic situation of Pemex needs to be improved and Mexico's impending exhaustion of reserves counteracted. Up to now, the financial crisis of Pemex has caused a drilling depression, one of the main reasons for the exhaustion of reserves. As said by Moroney and Dieck-Assad (2005:29):

The magnitude of the drilling depression can be illustrated in two [...] ways. First, according to official records, [Pemex] drilled 450 kilometers (281 miles) in exploratory wells in 1970, but only 160 kilometers (100 miles) in 2000. A second measure of the depression is revealed by the sharp decline in real (inflation-adjusted) drilling investment. Measured in terms of 2001 U.S. dollars, [Pemex] investment decreased from \$13.3 billion [dollars] in 1981 to \$5.2 billion [dollars] in 2000. Thus, measured in real economic terms, [Pemex] drilling in 2000 amounted to only 39 percent of that in 1981. [Pemex] experienced a twenty-year drilling depression caused by a combination of tighter federal budgets and rising drilling costs. Even during the years of recovery, 1996–2000, [Pemex] drilled an average of 184 wells per year. This drilling rate is only 44 percent as high as the 419 wells per year in 1980 and 1981. Since a *continuous program of successful drilling* is the only way to replenish reserves, the major reason for a twenty-year decline in reserves is clear.

Pemex has performed an intensive crude-oil exploitation strategy in line with the Mexican government's oil policy. The primary goal of the government has been to take advantage of the oil-price rising trend that has characterized the international market since 2001, in order to expand the budgetary income by means of vast oil revenues. The problem is that Mexico's R/P ratio indicates that proved oil reserves will last no longer than eleven years from now if production persisted at the same intensity levels (BPSRWE, 2005). Simply put, if Pemex continued over-exploiting available reserves without exploring for and extracting from new ones, crude oil production could not be viable anymore. The ultimate effect is that the oil-derived budgetary income would decrease dramatically because of production shortages. The petrolization of Mexico's economy would then experience serious difficulties derived from Pemex's own tribulations.

If Pemex is so profitable under the current economic rationale, it begs the question of why Mexico should not keep producing at the current intensity levels while oil prices are high. I argue that this is not recommendable because Mexico is not prepared to transform its energy-supplying system as efficiently as required. Along with the country's high reliance on petroleum for industrial and transporting activities, the electricity sector is also fueled with hydrocarbon resources. As indicated by Núñez-Luna (2005:25):

There are historical reasons for the government's preference for oil as main fuel for electricity generation. In a country with abundant oil reserves like Mexico, oil-fired power plants have been the most affordable option. Particularly during the period of import-substitution industrialization, policies were pursued to make the sector self-sufficient and therefore imports of fuels and technology were disfavored. As for coal, the majority of the country's coal reserves, located in

Coahuila, are of low quality due to their high ash content and have thus been a more expensive option than oil for purposes of electricity production [...]. Today, oil-fired power plants still account for almost 50% of Mexican electricity generation, compared to 11% gas-fired and 10% coal-fired plants.

This explains why Mexico's path towards energy modernization depends on how reserves are developed in the short and middle terms. To date, the only super-giant oil field discovered in Mexico has been Cantarell. This field has probably peaked at an output level of 2.1 million barrels per day. Pemex managers are thus concerned of the length of Cantarell's plateau and the eventual declining rates of production. Although Pemex's heavy-crude-oil production plateau may be prolonged by the Ku-Maloob-Zap field complex, light-crude-oil production has been decreasing for nine consecutive years, which means that exploitation has exceeded the reserve recovery ratios (Lajous, 27-VI-2005). Table 6c presents a series of public policy options that could be considered to confront this situation.

Table 6c. Public Policy Options to Equilibrate Mexico's Reserve-to-Production Dynamics

Public Policy Option	Pros	Cons
1. To keep exploiting at current levels to make the most of the current oil windfall that has benefited the government's public financing.	The government could ensure growing revenues in the present so as to prepare future recovery projects when oil prices decreased.	In eleven years from now, Pemex's production could collapse with uncertain consequences to the country.
2. To reduce immediately the current exploiting intensity while simultaneously augmenting reserve recovery ratios.	Oil fields' production plateau could be prolonged.	The government's oil revenues would manifest a considerable diminution as a reflection of Pemex's retracted production.
3. To develop what I call an <i>oil reserve recovery program</i> (ORRP), which consists of reallocating funds derived from oil surpluses on state-led drilling-investment projects	Production could continue at its current intensity level, and oil reserves could start being recovered in order to balance the reserve-to-production dynamics of Pemex. The negative effects of <i>Pidiregas</i> could be reduced.	Sizeable funds destined to the ORRP could have a negative impact on public projects to which the government has already allocated revenues.

Source: Elaborated by author with data from Shields (2003).

Considering these options, it is urgent to balance the reserve-to-production dynamics of Pemex. Accordingly, the government should design and implement what I call an Oil Reserve Recovery Program (ORRP) by reallocating funds that are presently deriving from prominent oil revenues in proportion to the international oil market trends. The justification is that although reserves' gradual depletion is understandable, it is up to

an oil-producing country how to balance oil recovery vis-à-vis oil production. Pemex's intensive oil exploitation is a potential threat to the mid-term viability of crude oil production, and subsequently to the Mexican economic policy, which depends heavily on oil revenues. The international oil price bonanza should be handled as competently as possible by the government. Exploitation must not keep going on at the current intensity levels unless oil-reserve recovery ratios increase to a sustainable level. If the government embarked on an ORRP, it could prevent insidious oil shortages.

In this chapter, I analyzed strategies for reforming the Mexican oil industry. My proposal consisted on three central courses of action that could contribute to the successful restructuring of Pemex. First, the federal government needs to strive for the implementation of an integral fiscal reform so as to make public finances less dependant on oil revenues derived from (a) special taxes on Pemex, (b) taxes on gasolines, and (c) Pemex's net value added tax. Second, the oil-policy reforming process must be driven through transparent and accountable institutional mechanisms at the Pemex organizational level. This could permit the government to counteract secrecy and corruption so that the Mexican oil-policy making process could become more efficient and democratic. Third, oil-reserve recovery ratios must increase through the implementation of what I call an Oil Reserve Recovery Program (ORRP). The ORRP should consist of a better reallocation of surpluses derived from Pemex domestic and foreign sales to intensify investment on drilling projects. It is important to mention that investment projects should gradually tend to reorganize Pemex's capital-expenditure scheme in order to reduce the negative effects that *Pidiregas* has had on the federal government's public finances. The ultimate purpose is to improve the situation of Pemex while simultaneously facing the challenge of energy modernization.

Conclusions

Today, Mexico is struggling for the implementation of structural reforms that could provide for stable economic development. One of the federal government's major tasks is the modernization of the energy sector in order to provide the country with adequate and sustainable sources of energy, particularly regarding petroleum and its derivative products. The public debate on the restructuring process of the domestic oil industry is inextricably related to the state's responsibility of procuring a solid budgetary income while simultaneously ensuring suitable fiscal proceeds without having to depend so much on oil revenues. For the last two decades, Mexico's high dependence on petroleum has been reflected in the proportion of oil revenues in the federal government's budgetary income, with an average 33% representation of the total.

For that reason, oil can be viewed alternately as a motor for development and as a cause of distortions in domestic economics and politics (Randall, 1989). Pemex has epitomized the intrinsic mechanisms of the Mexican state, including structural flaws that have led to uncertainties on the country's oil panorama. Pemex is a major source of public revenues and foreign exchange to the country. Mexico's abundance of hydrocarbons has thus been rationalized through government spending, which is based on receipts from taxes on oil and its derivative products. This course of action would not entail serious challenges if Pemex's improvements advanced in parallel with its operative targets. The reality, however, is that the Mexican government has not had enough incentives to embark on profound transformations concerning the public-financed development of productive infrastructure projects, the reorganization of Pemex's corporative government, the restructuring of oil-related taxation, or the long-term planning for debt service repayment.

Pemex has been always a focus of the debate on the Mexican oil policy. The *leitmotif* of the domestic oil policy is that the national petroleum industry is used to helping Mexico achieve its long-term goals oriented to increasing the level of economic activity. These goals have relied on political objectives that pertain in essence to constitutional principles supportive of state-ownership of hydrocarbons. Yet, the impact of oil revenues on the Mexican economy is not something inherent to petroleum itself. It

is rather the result of state policies regarding how much to produce, how to organize the labor force and technology, who to sell the oil and under what terms, how to tax oil revenues, and how to spend the resulting income (Randall, 1989). Pemex's financial and industrial development has been driven by over-regulation, price controls, limited management, and heavy taxation (Martínez, 2004), all of which have discouraged strategic investment in the exploration for new petroliferous reserves.

Seeking to confront this situation, the Mexican government has carried out an oil policy that, in any case, has been rather ambivalent. On the one hand, the domestic oil policy guidelines have portrayed the tenet of nationalism by way of a protective subsoil exploitation regime that has complied with the Mexican state's foundational principles. The oil industry has thus remained rigid at its status quo level in respect of propriety and exploitation of hydrocarbon resources. On the other hand, significant transformations have occurred in the oil area under the scope of neoliberalism through a diversified privatization of *downstream* assets, particularly in the petrochemical and natural gas sectors.

Mexico's oil policy objectives and outcomes have thus frequently proved contradictory. Despite the government's attempts to put substantial energy reforms into practice, the national oil industry is stagnating because of structural issues that affect Pemex. The crucial issues of *Petróleos Mexicanos* are encompassed in the legal framework that underlies its organizational scheme, in the political context to which it is embedded, and in the economic situation that paces its performance. The analysis of these three aspects has constituted the explanatory groundwork for this project's research question: How can the Mexican government simultaneously address the structural issues of Pemex while confronting the challenge of energy modernization?

After evaluating the constitutional norms, laws, decrees, and regulations that delineate its functioning, the conclusion is that Pemex's legal framework has been both constructive and restrictive, and consequently contradictory. Consistent with the principles of national and economic sovereignty, state ownership of hydrocarbons has endured together with the legal monopolization of Mexico's petroleum assets. The national subsoil exploitation regime has thus remained unaltered for the most part under the influence of the Constitution, which represents the immanent restrictions that the state has towards deep reforms on the propriety and exploitation of national subsoil resources.

The Constitution's interpretive gaps and flaws have been rationalized by representatives of the executive power in the way of law circumvention, which has not necessarily entailed law infringement (Núñez-Luna, 2005), but it has led to serious political challenges that have made for a lack of consensus on the way in which the Mexican oil industry should be restructured. By circumventing the Constitution, the executive has prompted urgent oil-related reforms such as (a) the division of Pemex into four subsidiary entities under the Salinas presidency, (b) the enactment of *Pidiregas* as of the Zedillo *sexenio*, and (c) the implementation of *Multiple Services Contracts* (CSMs) under the Fox administration. These policy strategies have been driven by political pragmatism, which has become an alternative to the limitations of the legal framework of Pemex.

To counteract this trend, the Mexican government needs to update the legal framework of Pemex. A first major step could be the implementation of an integral fiscal reform. Although elevated energy revenues have recently made for some financial consolidation in Mexico, the fiscal windfall from higher world oil prices has been affected by the long-standing policy of smoothing the domestic gasoline price (IMF, 2006). Looking ahead, "the recently approved fiscal responsibility law calls for an ongoing balanced budget and establishes a rule for allocating unbudgeted oil revenues (*Ibidem*)."

The new fiscal regime of Pemex has also gave momentum to the pace of growth that the national oil industry needs, for it forecasts an additional amount of \$23.23 billion pesos for 2006 that the public company could use for research and development programs. Even though, this is not enough. It is important to embark on a comprehensive reform to the fiscal policy of Mexico, especially to propel the diversification of the public income basis in order to reduce the dependence on oil revenues.

The study of both the historical background of the Mexican oil industry and the power-allocation setting that has characterized the administrative configuration of Pemex, also leads to important conclusions of the political context that surrounds the state oil company. Pemex's identity has been shaped by the political circumstances that have fashioned the course of consolidation of the Mexican modern state. Throughout two major phases, the organizational scheme of Pemex has epitomized not only the intrinsic mechanisms of the national governmental apparatus, but also its structural flaws.

During the first phase (1929–1997), the Mexican oil policy was run under the rules set by the pact of domination, whose constituent elements were corporatism, official-party dynamics, and presidentialism. In this PRI-led era, the managerial verticality of Pemex relied on the principles of developmental authoritarianism, revolutionary nationalism, and state ownership of hydrocarbons. Eventually, the secrecy and centralization derived from the domination pact produced disruptions to the state apparatus that affected Mexico's oil policy-making process. The politicization, co-optation, and corruption that lurked around oil-related activities provoked an increasing social unrest that stimulated significant transformations into the Mexican political system, as can be confirmed by the revamped congressional representation that initiated the second phase of Pemex's political context (1997 to present time). This stage has been characterized by political divergence, since pluralism and democratization have been constantly challenged by a lack of consensus on the process of reformation of the oil sector, not to mention the non-transparent practices that are latent within and around the STPRM stratum.

It is clear that the managerial scheme of Pemex needs to be adapted to the current political context of Mexico. To this end, it is necessary to develop a plan for promoting better mechanisms of transparency and accountability with respect to Pemex's functioning. Corruption could be diminished if the running of Pemex remained permanently subjected to public scrutiny, and the structure of the oil company's corporative government could be reorganized towards administrative efficiency.

The assessment of the economic situation of Pemex has been equally useful for this project. Pemex's level of profitability is unquestionable. Its production capacity as well as its marketing portfolio has expanded for the last five years as Mexico's crude oil exporting indicators demonstrate. This operative enlargement has contributed significantly to the government's relative financial stability, given that increasing oil revenues have rendered escalating fiscal proceeds. Both the international oil-pricing mechanisms and the oil economic rent have shaped the economic rationale that supports the intensive oil-exploitation strategy that Pemex is carrying out in compliance with the Mexican oil policy guidelines.

However, oil-price unpredictability represents a danger to the current reserve-to-production dynamics of Pemex. Petroliferous reservoirs have been intensively exploited with no substantial recovery prospects. The Mexican government is upholding this

strategy to take advantage of the current oil-price bonanza, in proportion to the important economic rent that petroleum assets entail. The problem is that production keeps boosting as rich oil reservoirs deplete. Therefore, Mexico will run out of oil in eleven years from now if oil production continues at the current intensity level without developing new reserves, but Pemex has no stimulus for improving its current situation. This can be confirmed by an assessment to the taxing system that the government applies over the state oil company's operations. Pemex pays to the government a hundred percent of each dollar earned over the budgetary assessment – that is, ¢60.8 dollar cents under the hydrocarbon rights scheme and ¢39.2 dollar cents under the ARE mechanism – plus the series of federal and local duties it owes annually (World Energy Council, 2005).

In addition, the Mexican oil industry is excessively concentrated in the *upstream* level. That would not be so problematic if Pemex diversified its activities along the oil industry's value chain, and if massive investments were financed through other mechanisms but *Pidiregas*, which generates long-standing liabilities to the public sector. While in 2003 the total cost of the 33 projects that Pemex developed through *Pidiregas* amounted for \$789 billion pesos (\$75.14 billion dollars), the total payment of resulting amortizations and interests will ascend to \$1.58 trillion pesos (\$150 billion dollars) for the next thirteen years. The most critical point will ensue in 2010, when Pemex will have to pay back \$117.4 billion pesos (\$11.2 billion dollars), that is, an equivalent to 1.5% of Mexico's GDP in 2005 (Garduño & Mendez, 11-V-2005; Rodríguez, 8-I-2006). Even when oil revenues have projected positive figures on Mexico's fiscal proceeds for the last five years, the future is uncertain. The state oil company is currently being distressed by decapitalization, indebtedness, and a lack of specialization on low-risk areas such as the petrochemical. Together, these factors explain the economic stagnation of Pemex.

Therefore, the economic situation of Pemex needs to be improved. It is urgent to increase the value of Mexico's hydrocarbon assets. Petroliferous reserves must be enlarged consistently upon a long-term basis by means of an Oil Reserve Recovery Program (ORRP). In this way, the oil production and refining capacities of Pemex could credibly lead to operative efficiency and market competitiveness. Likewise, by redistributing infrastructure investments along high-risk and low-risk oil activities, the Mexican government could become less vulnerable to international oil-price fluctuations.

All these major changes will be attainable only if the administrative and operative schemes of Pemex are reformed in proportion to the modernization of the Mexican energy sector. As long as the structural issues of Pemex are addressed efficiently by the federal government, the Mexican oil policy will meet the need for improving the situation of the national petroleum industry. This project contributed to such matter by offering a comprehensive appraisal of the structural issues of Pemex. However, the task of contributing to the reformation of the Mexican oil industry requires further efforts, especially regarding new-fangled proposals and prospective oil policy scenarios.

What is the future of Pemex? Is the Mexican oil industry likely to be restructured by public means or is it necessary to appeal to private intervention? Simply put, is Pemex on the way to privatization? Palacios (2003) affirms that Mexico's important question is not *if* the liberalization of the oil sector should be undertaken, but *when* and *how* to do it. This subject has been largely discussed inside and outside the country. In the context of the upcoming presidential elections, the mainstream political discourse rejects the privatization of Pemex as a feasible strategy for modernizing the oil industry of Mexico. Candidates of the foremost political parties (i.e. PRI, PAN, and PRD) have stood against privatization, but they seem not to discard the possibility to keep divesting Pemex assets through differentiated opening schemes.

The fact is that neither the official nor the oppositional stances from leading political factions have clarified to what extent the current process of reformation of Pemex is pointing towards energy liberalization. The developmental trends of the state economic policy are seemingly prone to policy strategies that involve a *de facto* liberalization of key areas that constitute the national oil industry, including non-associated gas and secondary petrochemicals. As a result, the existing Mexican oil policy is contradictory rather than productive in terms of applicability. Unless this predicament is addressed by Mexico's energy-policy decision makers, Pemex will keep faltering because of legal, political, and economic structural constraints that thwart Mexico's course towards energy modernization.

Then, what can we say about the future oil panorama of Mexico? What kind of problems will the country face in terms of petroleum affairs? The current oil scenario portrays several uncertainties for the coming years. The most polemical topic is perhaps the potential privatization of Pemex, and the implications that this course of action could have

on Mexico's economic development. As suggested before, Pemex's divestiture will not be a feasible strategy unless the Mexican government finds another way to obtain spare revenues as substantially as it does from oil-related activities. To confront this problem, this project proposed the implementation of an integral fiscal reform, but it would be unworkable to consider it as the only way to address Pemex's major challenges. So far, liberalizing strategies have been disproportionately implemented, thus provoking operative asymmetries between the upstream and the downstream oil industry levels. It depends on Mexican public administrators and energy policy analysts how the assessment of this phenomenon will allow for innovative and constructive oil policy paradigms.

In the meantime, the Mexican state ownership on hydrocarbons will remain as a major issue. The economic viability of the Mexican oil industry will depend on the extent to which law and politics are used as instruments for the advancement of *Petróleos Mexicanos*. Accordingly, the federal government will have to be aware of striking eventualities, such as oil price downfalls and supply curtails derived from both oil reserve exhaustion and tensions between pro-liberalization and anti-liberalization discourses within the Mexican political system. Likewise, the government will have to cope with the effects of political disagreement in Congress, since oil policy alternatives are ultimately reliant on legislative processes. Oil reforming consensus will be achievable so long as the influential groups of the Mexican political system coalesce in a long-term, national developmentalist project. Pemex will then be a leading promoter of energy modernization for the sake of the Mexican society.

Appendices

Appendix A
Mexico's Trade Balance, 2005–2006
(Millions of Dollars)

Concept	Annual	Jan-Feb		Variation	Variation
	2005	2005	2006	Relative	Relative
		(A)	(B)	2005	(B/A)
Total exports	213,711	29,550	38,040	13.68	28.73
Maquila	96,756	13,545	16,357	11.28	20.76
Other	116,955	16,004	21,683	15.74	35.48
Oil	31,895	4,014	6,383	34.77	59.01
Crude oil 1/	28,334	3,576	5,848	33.29	63.53
Other	3,561	438	535	47.85	22.12
Non oil	181,816	25,536	31,658	10.64	23.97
Agriculture and livestock	6,127	1,113	1,691	7.80	51.95
Extractive	1,168	170	162	29.63	-4.91
Manufactures	174,521	24,253	29,805	10.63	22.89
Maquila	96,756	13,545	16,357	11.28	20.76
Other	77,765	10,707	13,448	9.84	25.59
Total imports	221,270	31,256	37,101	12.43	18.70
Maquila	75,129	10,378	12,609	10.90	21.51
Other	146,141	20,879	24,492	13.23	17.30
Consumer goods	31,513	4,110	5,168	24.02	25.74
Intermediate goods	163,542	23,467	27,587	9.90	17.55
Maquila	75,129	10,378	12,609	10.90	21.51
Other	88,412	13,090	14,977	9.07	14.42
Capital goods	26,216	3,679	4,347	16.01	18.15
Trade balance	-7,559	-1,707	939	-14.22	-155.02
Maquila	21,627	3,168	3,748	12.59	18.31
Other	-29,186	-4,874	-2,809	4.16	-42.38
Excluding oil exports	-39,454	-5,721	-5,444	21.48	-4.84

Source: Banco de México, 2006

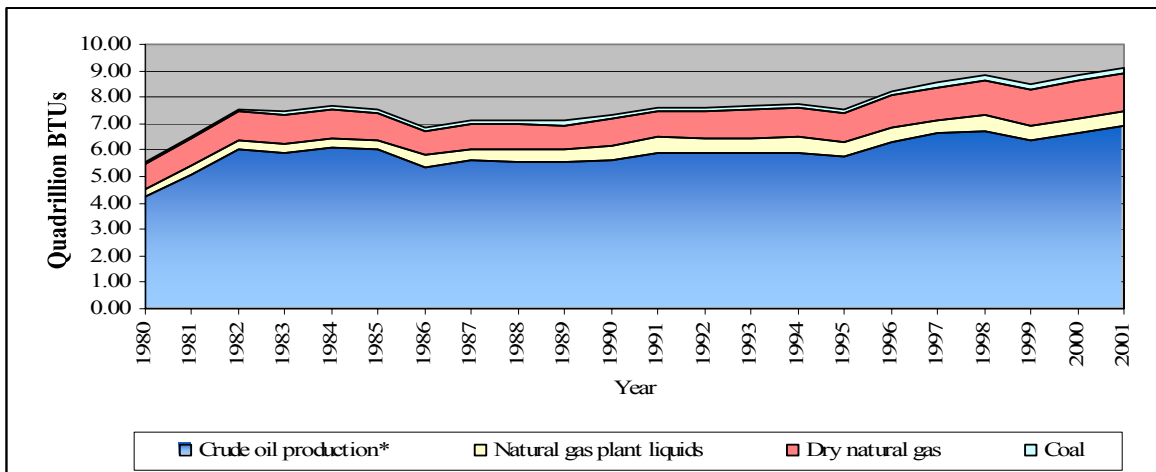
Appendix B

Fossil Fuel Production in Mexico, 1980–2001 (Quadrillion BTUs)

Year	Crude oil production*	Natural gas plant liquids	Dry natural gas	Coal	Total
1980	4.26	0.26	0.95	0.08	5.54
1981	5.07	0.32	1.02	0.08	6.49
1982	6.03	0.34	1.10	0.09	7.56
1983	5.90	0.35	1.08	0.12	7.45
1984	6.12	0.34	1.06	0.13	7.65
1985	6.02	0.36	1.05	0.13	7.56
1986	5.34	0.47	0.93	0.14	6.88
1987	5.59	0.45	0.94	0.17	7.15
1988	5.53	0.49	0.95	0.15	7.12
1989	5.53	0.51	0.91	0.16	7.11
1990	5.60	0.57	1.00	0.17	7.34
1991	5.88	0.60	1.00	0.15	7.64
1992	5.87	0.60	0.98	0.14	7.59
1993	5.86	0.61	1.05	0.15	7.68
1994	5.89	0.61	1.08	0.16	7.74
1995	5.74	0.59	1.06	0.16	7.56
1996	6.28	0.56	1.21	0.18	8.23
1997	6.63	0.51	1.25	0.20	8.59
1998	6.74	0.56	1.34	0.21	8.85
1999	6.37	0.58	1.36	0.19	8.51
2000	6.63	0.58	1.39	0.21	8.81
2001	6.93	0.57	1.38	0.22	9.09

* Including lease condensate

Source: Moroney & Dieck-Assad, 2005:7

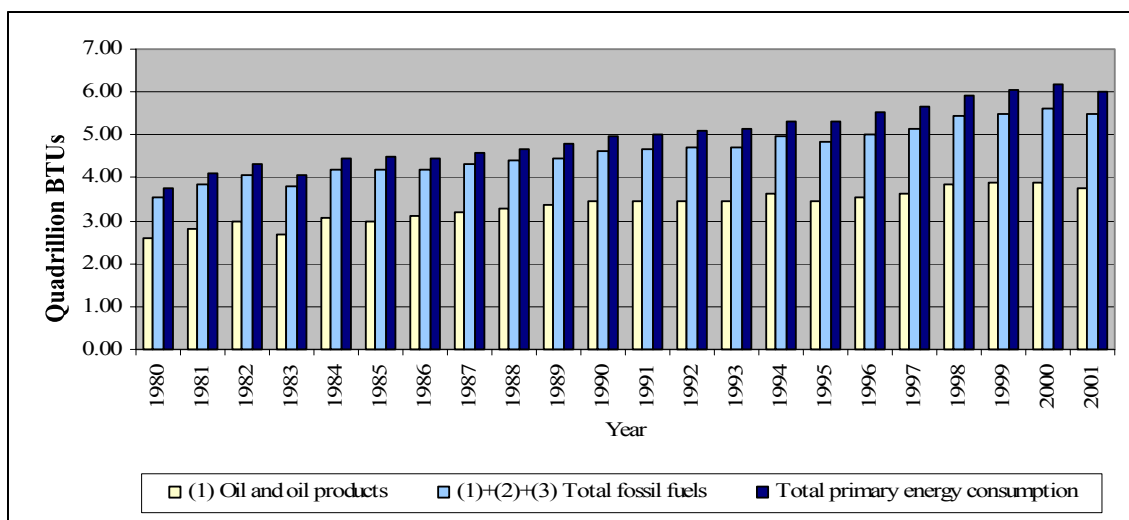


Appendix C

Fossil Fuel and Total Primary Energy Consumption in Mexico, 1980–2001 (Quadrillion BTUs)

Year	(1) Oil and oil products	(2) Dry natural gas	(3) Coal	(1)+(2)+(3) Total fossil fuels	Total primary energy consumption
1980	2.59	0.84	0.11	3.54	3.74
1981	2.83	0.91	0.10	3.84	4.11
1982	2.96	0.99	0.12	4.07	4.33
1983	2.70	0.99	0.13	3.82	4.06
1984	3.07	1.00	0.13	4.20	4.47
1985	2.98	1.04	0.16	4.17	4.48
1986	3.12	0.92	0.15	4.19	4.46
1987	3.20	0.94	0.17	4.30	4.57
1988	3.27	0.95	0.16	4.39	4.68
1989	3.36	0.92	0.17	4.46	4.80
1990	3.44	1.02	0.17	4.62	4.98
1991	3.45	1.06	0.16	4.66	5.02
1992	3.47	1.06	0.18	4.71	5.12
1993	3.44	1.08	0.18	4.71	5.13
1994	3.62	1.14	0.19	4.95	5.30
1995	3.47	1.16	0.21	4.84	5.31
1996	3.56	1.23	0.24	5.03	5.55
1997	3.63	1.26	0.26	5.15	5.65
1998	3.83	1.36	0.27	5.46	5.93
1999	3.91	1.34	0.25	5.50	6.06
2000	3.90	1.46	0.27	5.63	6.19
2001	3.77	1.45	0.27	5.49	6.00

Source: Moroney & Dieck-Assad, 2005:7



Appendix D

Excerpt from President Fox's Fifth State of the Union Address September 1, 2005

Current Situation of the Mexican Oil Industry

Industria Petrolera

La estrategia de Petróleos Mexicanos para satisfacer la demanda de gas natural, productos petrolíferos y petroquímicos de manera eficiente, confiable, oportuna y a un mínimo costo, se sustenta en la promoción de montos mayores de inversión para incorporar nuevas reservas de hidrocarburos y aumentar la tasa de restitución de reservas ^{2/} con respecto a la producción anual de crudo y gas natural; continuar la reconfiguración del Sistema Nacional de Refinación; contar con la capacidad instalada necesaria para procesar un volumen creciente de gas húmedo dulce; y fortalecer las cadenas de producción de petroquímicos que sean competitivas.

Programa de Inversiones

- En los últimos cinco años Petróleos Mexicanos realizó inversiones por un monto cercano a los 574.3 mil millones de pesos, lo que significó una **inversión promedio anual** de casi 114.9 mil millones de pesos, con lo cual se logró:
 - Descubrir 112 campos nuevos, elevar el número de pozos en operación y campos en explotación para obtener máximos históricos en la producción de crudo; revertir la tendencia descendente en la producción de gas natural y aumentar la producción de gas no asociado al crudo; e incrementar la tasa de restitución de reservas.
- En el Presupuesto de Egresos de la Federación de 2005 se autorizó a Petróleos Mexicanos una **inversión total** de 147 669.4 millones de pesos, de la cual 22 732 millones corresponden a inversión presupuestaria y 124 937.4 millones a inversión financiada en proyectos PIDIREGAS. Lo anterior no incluye los recursos derivados del reembolso del Aprovechamiento para Obras de Infraestructura en materia de exploración, gas, refinación y petroquímica (AOI) correspondientes al ejercicio de 2004; esta cantidad por 32 637.5 millones de pesos se ejercerá en 2005 a través del Fondo AOI.
- La **inversión presupuestaria** ejercida en el primer semestre de 2005 ascendió a 15 524.8 millones de pesos, 8.5 por ciento mayor, en términos reales, a la del mismo periodo de 2004, y representó un avance de 68.3 por ciento del monto original previsto para todo el año. El 97.5 por ciento de los recursos se destinaron al pago de los intereses capitalizables del registro PIDIREGAS, principalmente los correspondientes a los proyectos Cantarell, Burgos y Estratégico de Gas y a la reconfiguración de las refinerías de Cadereyta, Madero, Tula y Salamanca.
- A través de la inversión financiada en **proyectos PIDIREGAS**, en el primer semestre de 2005 se ejercieron recursos por 50 714.8 millones de pesos, cifra 2.7 por ciento mayor a la

^{2/} La tasa de restitución de las reservas es resultado de dividir la reserva descubierta en un periodo determinado entre la producción del mismo periodo sin considerar desarrollos, delimitaciones y revisiones.

registrada durante enero-junio de 2004. Los principales proyectos apoyados fueron: Cantarell, Programa Estratégico de Gas, Ku-Maloob-Zaap y Burgos, que absorbieron el 73 por ciento de la inversión. A otros proyectos integrales de exploración y desarrollo se destinó 24.8 por ciento, y el resto se canalizó a los trabajos para la reconfiguración de la refinería de Minatitlán y a la construcción de las plantas criogénicas modulares tres y cuatro del Centro Procesador de Gas Burgos.

- Al 30 de junio de 2005, los principales resultados del Programa de Contratos de Servicios Múltiples (CSM) son: 51 pozos perforados y 42 terminados, que corresponden a los contratos de Reynosa-Monterrey, Cuervito, Misión y Fronterizo; 754 kilómetros cuadrados de sismología tridimensional en Reynosa-Monterrey, y seis reparaciones mayores. De abril de 2004, fecha en la que arrancaron estos contratos, a junio de 2005, la producción nacional de gas natural aumentó en 345 millones de pies cúbicos diarios, de los cuales los CSM contribuyeron con 12 por ciento sin distraer recursos de otros proyectos.

INVERSIÓN FÍSICA PRESUPUESTARIA Y FINANCIADA EN LA INDUSTRIA PETROLERA, 2000-2005

(Millones de pesos de 2005 en flujo de efectivo)

Concepto	Datos anuales						Enero-junio		
	Observado					Meta	2004	2005 p/	Variación real % anual
	2000	2001	2002	2003	2004	2005			
TOTAL	90 933.9	96 672.3	98 021.4	128 179.6	160 478.9	147 669.4	63 673.7	66 239.6	4.0
Presupuestaria ^{1/}	42 437.4	40 189.7	39 192.0	40 441.0	46 367.3	22 732.0	14 311.8	15 524.8	8.5
Exploración y Producción	26 285.6	27 345.2	26 715.5	25 373.2	33 354.4	17 732.1	9 420.2	13 431.8	42.6
Refinación	9 319.1	8 370.7	8 514.6	10 278.4	8 789.7	4 070.1	3 017.1	1 786.7	-40.8
Gas y Petroquímica Básica	5 037.8	3 015.8	2 230.1	2 554.3	2 204.3	406.8	1 045.8	199.5	-80.9
Petroquímica	1 213.0	989.0	1 215.2	1 629.4	1 662.4	0.0	702.9	2.0	-99.7
Corporativo	581.8	469.0	516.5	605.8	356.5	522.9	125.7	104.8	-16.6
Financiada ^{2/}	48 496.5	56 482.6	58 829.4	87 738.6	114 111.6	124 937.4	49 361.9	50 714.8	2.7
Exploración y Producción	34 817.8	44 775.6	58 497.8	85 608.8	113 096.1	116 068.6	48 941.3	49 606.0	1.4
Refinación	13 678.7	11 707.0	247.2	936.3	460.0	7 078.8	45.8	517.2	1 029.3
Gas y Petroquímica Básica	-	-	84.4	1 193.5	555.4	1 524.5	374.8	591.6	57.8
Petroquímica	-	-	-	-	-	265.5	-	-	-

1/ De 2000 a 2004, la inversión presupuestaria se calculó de acuerdo al Índice de Precios Implícito del PIB, 2005=100. La suma de los parciales puede no coincidir con el total, debido al redondeo de las cifras.

2/ La inversión financiada o proyectos de infraestructura productiva a largo plazo son obras cuya ejecución se encomienda a empresas de los sectores privado y social, previa licitación pública. Dichas empresas llevan a cabo las inversiones respectivas por cuenta y orden de Petróleos Mexicanos y cubren el costo de los proyectos durante el periodo de su construcción. Incluye inversión financiada condicionada.

p/ Cifras preliminares.

FUENTE: Para inversión presupuestaria, Petróleos Mexicanos. Para inversión financiada, Secretaría de Hacienda y Crédito Público.

- De enero a junio de 2005, la inversión proveniente del Fondo AOI fue de 5 607.2 millones de pesos, de los cuales 2 325 se ejercieron en Pemex Exploración y Producción, 1 854.1 en Pemex Refinación, 821.7 en Pemex Gas y Petroquímica Básica y 606.4 en Pemex Petroquímica.

Exploración de Petróleo Crudo y Gas Natural

Las actividades de exploración se orientaron, principalmente, al cumplimiento de la estrategia de incorporar reservas de gas y de crudo ligero a corto y largo plazos.

- Con el propósito de evaluar el **potencial petrolero del Golfo de México**, se conformó un equipo de trabajo multidisciplinario para definir los principales sistemas petroleros que están funcionando en ese sitio, sus focos de generación, rutas de migración, riesgos y áreas más atractivas. La evaluación de este recurso a nivel de cuenca finalizará al término de 2005.
- Adicionalmente se elaboró un plan nacional para la **evaluación de oportunidades geológicas**, el cual se implantará durante el bienio 2005-2006. El primer pozo exploratorio en aguas territoriales del Golfo de México, el pozo Nab 1, en tirante de agua de 681 metros, fue perforado entre el 27 de abril y el 5 de noviembre de 2004; resultando productor de aceite pesado de 10.9 API con un volumen *in situ* de 200 millones de barriles de petróleo crudo equivalente.
- Como parte del programa para incrementar el ritmo de **reposición de reservas de hidrocarburos**, al cierre de 2004 se incorporaron 916.2 millones de barriles de petróleo crudo equivalente en su categoría 3P (probadas, probables y posibles), volumen que significó una tasa de restitución de las reservas de 57 por ciento con base en la producción del año. De las nuevas reservas, 240.8 millones de barriles son probadas, 222.1 millones son probables y 453.3 millones de barriles son posibles; y están constituidas por yacimientos de aceite y gas no asociado.
- Al 1° de enero de 2005, las reservas totales de hidrocarburos (3P), es decir, la suma de las probadas, probables y posibles, se ubicaron en 46 914 millones de barriles de petróleo crudo equivalente, de los cuales 71 por ciento corresponde a aceite crudo, 1.8 por ciento a condensados, 7.3 por ciento a líquidos de planta y 19.9 por ciento a gas seco.
 - La reserva 3P remanente de aceite crudo está constituida por 52 por ciento de pesado, 38 por ciento de ligero y 10 por ciento de aceite superligero. Para la reserva de gas natural en su categoría 3P, 77 por ciento es gas asociado y 23 por ciento no asociado.
- La asignación presupuestaria para exploración y desarrollo de campos ha permitido, desde 2001, incrementar paulatinamente esta actividad hacia áreas frontera que aún cuando son de mayor incertidumbre y riesgo presentan mayores expectativas de reservas. Con base en los avances de los trabajos de exploración realizados entre enero y agosto de 2005 se alcanzaron los resultados siguientes:
 - Se terminaron 57 **pozos de exploración**, lo que significó una disminución de 12 pozos con relación al mismo periodo del año previo y un avance de 55.3 por ciento respecto a la meta anual programada de 103 para 2005. Del total de pozos de exploración terminados, la mayor parte se ubicó en la región norte, principalmente en Reynosa. La disminución observada se debió, principalmente, al incremento de intervalos a probar y por la mayor profundidad objetivo en tres pozos.
 - Se terminaron 446 **pozos de desarrollo**, cantidad que representa 64.9 por ciento de la meta anual comprometida, y un incremento de 3.2 por ciento en comparación a lo realizado en igual lapso de 2004. Al cierre de junio de 2005, se tenían 5 580 pozos en operación en todo el sistema, 294 más que en diciembre de 2004.

Producción de Petróleo Crudo y Gas Natural

- De enero a agosto de 2005, la **producción promedio de petróleo crudo** fue de 3 370.8 miles de barriles diarios, menor en 0.6 por ciento al promedio obtenido en el mismo lapso del año previo, debido a los trabajos de mantenimiento realizados en el complejo *Ku-Maloob-Zaap*, por la declinación natural de la producción en *Abkatún-Pol-Chuc* y por diferimiento de la producción por condiciones climáticas adversas.
 - Por tipo de crudo, la producción de crudo superligero, el de mayor valor, se incrementó 2.3 por ciento y el ligero creció 1 por ciento con respecto al periodo enero-agosto de 2004, mientras que la producción de crudo pesado se redujo 1.3 por ciento.

PRODUCCIÓN DE PETRÓLEO CRUDO Y GAS NATURAL, 2000-2005^{1/}

Concepto	Datos anuales					Enero-agosto			Variación %
	Observado					Meta	2004	2005 p/	
	2000	2001	2002	2003	2004	2005			
Total Petróleo Crudo (Mbd)	3 012.0	3 127.0	3 177.1	3 370.9	3 382.9	3 440.6	3 391.0	3 370.8	-0.6
Tipo									
Pesado	1 774.3	1 997.0	2 173.7	2 425.4	2 458.0	2 390.6	2 463.3	2 432.0	-1.3
Ligero	733.1	658.7	846.6	810.7	789.6	875.8	795.1	802.9	1.0
Superligero	504.6	471.4	156.9	134.8	135.3	174.2	132.7	135.8	2.3
Región									
Regiones marinas	2 384.9	2 539.8	2 603.8	2 813.9	2 829.0	2 814.5	2 837.4	2 793.1	-1.6
Región Sur	549.6	508.7	498.4	483.3	472.7	515.9	473.2	492.1	4.0
Región Norte	77.5	78.5	74.9	73.6	81.2	110.2	80.5	85.5	6.2
Total Gas Natural (MMpcd)	4 679.4	4 510.7	4 423.5	4 498.4	4 572.9	4 857.8	4 564.5	4 815.2	5.5
Tipo									
Asociado	3 380.2	3 239.0	3 118.1	3 119.2	3 009.6	2 955.3	3 028.9	2 963.4	-2.2
No asociado	1 299.2	1 271.7	1 305.4	1 379.2	1 563.3	1 902.5	1 535.6	1 851.8	20.6
Región									
Regiones marinas	1 556.9	1 529.7	1 451.8	1 521.8	1 550.0	1 574.3	1 552.1	1 590.7	2.5
Región Sur	1 856.9	1 743.2	1 703.8	1 630.0	1 495.2	1 386.5	1 513.0	1 403.8	-7.2
Región Norte	1 265.6	1 237.7	1 267.9	1 346.6	1 527.7	1 897.0	1 499.4	1 820.7	21.4

1/ La suma de los parciales puede no coincidir con el total, debido al redondeo de las cifras.

p/ Cifras preliminares.

FUENTE: Petróleos Mexicanos.

- Cabe destacar que la producción de petróleo crudo se ha mantenido por encima de 3 200 miles de barriles diarios todos los meses a partir de diciembre de 2002, con más de diez meses arriba de 3 400 miles de barriles diarios de producción promedio mensual.
- La **producción de gas natural** fue de 4 815.2 millones de pies cúbicos diarios de enero a agosto de 2005, superior en 5.5 por ciento a la del mismo periodo de 2004. Este comportamiento reafirma la tendencia creciente que se mantiene en los dos últimos años; en junio de 2005 se obtuvo la producción promedio más alta del lustro al alcanzar 4 910.4 millones de pies cúbicos diarios y se estima que la de agosto será ligeramente mayor a los cinco mil millones de pies cúbicos diarios.
 - De **gas no asociado** se obtuvieron 1 851.8 millones de pies cúbicos diarios, 20.6 por ciento más que en el periodo previo equivalente, lo que representó 38.5 por ciento de la producción nacional de gas natural frente a 33.6 por ciento en el mismo lapso del año anterior y a 27.8 por ciento en 2000. El incremento de la producción de gas no asociado ayudó a compensar la declinación del gas asociado, y se dio principalmente en la producción de la región norte.

- La región norte ha mostrado un crecimiento constante en la producción de gas no asociado, alcanzando máximos históricos. El 30 de abril de 2005 se alcanzó uno de ellos, con un volumen de 1 820 millones de pies cúbicos diarios.
- La producción de **gas asociado** fue de 2 963.4 millones de pies cúbicos diarios, con una reducción de 2.2 por ciento con respecto al periodo previo, como reflejo del comportamiento de la producción de petróleo crudo.

Infraestructura y producción de petrolíferos, gas licuado y petroquímicos

Petróleos Mexicanos tiene la misión de satisfacer la demanda de petrolíferos y petroquímicos del país, para lo cual realiza la mejora continua de sus procesos, tanto en refinerías como en lo que respecta a la separación y fraccionamiento de líquidos del gas, e incrementa la integración de sus procesos petroquímicos con objeto de elaborar productos de alta calidad a precios competitivos.

- Las inversiones realizadas en el **Sistema Nacional de Refinación** y en los complejos procesadores de gas permitieron:
 - Continuar la reconfiguración de la refinería de Minatitlán, iniciada en 2004 y que se prevé concluir en 2008.
 - Incrementar el volumen y proporción de crudo pesado procesado en las refinerías. En 2002 el porcentaje procesado de crudo pesado fue de 27.7; en 2003, de 33 por ciento; en 2004, de 38 por ciento; y de enero a agosto de 2005 se alcanzó 41 por ciento.
 - Iniciar la construcción de las plantas criogénicas modulares 3 y 4, que tendrán una capacidad de 200 millones de pies cúbicos diarios cada una, con lo que el Complejo Procesador de Gas Burgos alcanzará 800 millones de pies cúbicos diarios de capacidad total en 2006; ello permitirá recuperar los hidrocarburos líquidos contenidos en el gas húmedo dulce proveniente de la Cuenca de Burgos.
 - Continuar con el fortalecimiento de la cadena del etileno y de aromáticos, en especial en Morelos, Cangrejera y Pajaritos.
 - Incrementar la tasa de ocupación de la capacidad instalada del Sistema Nacional de Refinación. En 2004 alcanzó 84.5 por ciento de la capacidad de destilación primaria, 2.4 puntos porcentuales más de los obtenidos en 2003. Para 2005 se estima que este índice alcance el 84.9 por ciento.
- El **volumen procesado de crudo** en el Sistema Nacional de Refinación, durante enero-agosto de 2005, fue de 1 304.8 miles de barriles diarios, con una disminución de 1.9 por ciento con relación al mismo periodo anterior. Este resultado se debió principalmente a problemas en el oleoducto Nuevo Teapa-Poza Rica, que afectaron el proceso en Cadereyta, y por altos contenidos de sal en el crudo enviado a Minatitlán, que no se compensaron con los incrementos obtenidos en Madero y Tula.
- La **producción de petrolíferos** durante los primeros ocho meses de 2005 promedió 1 577.2 miles de barriles diarios, cantidad 2.4 por ciento menor a la obtenida en el lapso enero-agosto de 2004.
- La **producción de petroquímicos** alcanzó 9 640.4 miles de toneladas, 3.1 por ciento más que la del periodo enero-agosto de 2004; la de petroquímicos básicos fue ligeramente superior (0.4 por ciento), y la de petroquímicos desregulados muestra un crecimiento de 5.6 por ciento, como resultado principalmente de la cadena del etano, que registró un aumento de 16.4 por ciento, situación que compensó la reducción en la producción de la cadena del metano, sobre todo del amoniaco.

PRODUCCIÓN DE PETROLÍFEROS Y PETROQUÍMICOS, 2000-2005

Concepto	Datos anuales					Enero-agosto ^{5/}			
	Observado					Meta ^{5/} 2005	2004	2005 p/	Variación %
	2000	2001	2002	2003	2004				
Petrolíferos (Mbd)	1 450.8	1 474.5	1 483.0	1 557.5	1 588.9	1 475.6	1 615.3	1 577.2	-2.4
Gas licuado ^{1/}	228.5	233.3	236.1	245.9	252.9	241.3	254.9	253.1	-0.7
Gasolinas ^{2/}	393.1	390.4	398.6	445.7	467.6	425.3	475.4	464.9	-2.2
- Pemex Magna	346.0	349.4	359.4	396.5	418.5	351.3	424.5	409.9	-3.4
- Pemex Premium	17.9	17.3	21.8	37.6	43.8	68.7	45.5	48.5	6.6
- Otras gasolinas ^{3/}	29.2	23.7	17.4	11.6	5.3	5.3	5.4	6.5	20.4
Diesel	265.4	281.6	266.9	307.8	324.7	303.9	328.4	319.7	-2.6
- Pemex Diesel	254.5	266.6	246.7	290.8	319.6	303.9	323.6	312.1	-3.6
Combustóleo	422.9	436.3	450.1	397.1	368.7	348.1	376.1	354.2	-5.8
Otros petrolíferos	140.9	132.9	131.3	161.0	175.0	157.0	180.5	185.3	2.7
Petroquímicos (Mt)	14 797.9	13 862.5	13 146.7	13 663.0	14 229.5	15 397.2	9 346.2	9 640.4	3.1
- Básicos ^{4/}	6 786.5	6 676.4	6 067.6	6 244.6	6 583.3	6 744.0	4 390.8	4 409.8	0.4
- Desregulados	8 011.4	7 186.1	7 079.1	7 418.4	7 646.2	8 653.2	4 955.4	5 230.6	5.6

1/ Excluye la mezcla de butanos de Pemex Refinación, ya que en la consolidación de la producción total de gas licuado se duplicarían.

2/ Excluye las gasolinas naturales, pues se consideran como naftas y forman parte de los petroquímicos básicos.

3/ Incluye la producción de gas nafta de Pemex Petroquímica por considerarse un petrolífero y no un petroquímico desregulado.

4/ Incluye gasolinas naturales.

5/ Las gasolinas naturales (NAFTAS) no son un producto terminado, sino un petroquímico básico, por lo que en este cuadro se suman a los mismos. Por otra parte, debe excluirse la mezcla de butanos de Pemex Refinación en la producción de gas licuado. Por lo anterior, las metas especificadas para 2005 difieren de lo establecido en el PEF.

p/ Cifras preliminares.

FUENTE: Petróleos Mexicanos.

- Desde que se reformó el marco legal en 1995 para permitir la participación de particulares en las actividades de almacenamiento, transporte y distribución de gas natural, la Comisión Reguladora de Energía (CRE) ha otorgado 21 **permisos de distribución de gas natural**. El desarrollo y expansión de los sistemas de distribución de gas natural por ductos ha representado una inversión acumulada de 1 438 millones de dólares.
 - Al 31 de julio se tienen 1.75 millones de **usuarios** conectados a la red nacional de gas natural, cifra 21.5 por ciento mayor a la reportada en septiembre de 2004.
- Para **transporte de gas natural**, del 1 de enero al 31 de julio de 2005 se otorgaron cinco permisos nuevos para transporte de hasta 5.2 millones de metros cúbicos diarios de gas natural bajo la modalidad de usos propios, que representaron inversiones por 3.3 millones de dólares para la construcción de 14.5 kilómetros de ductos. Al 31 de julio de 2005, el universo total de permisos vigentes otorgados por la CRE es de 129, de los cuales 19 corresponden a la modalidad de acceso abierto ^{106/} y 110 de usos propios.
 - A partir de las modificaciones del marco legal que regula el almacenamiento, transporte y distribución de gas natural y hasta julio de 2005, se han construido 2 273 kilómetros de ductos de transporte por inversionistas responsables de su operación. Estos ductos representan 20.1 por ciento de la infraestructura de transporte de gas natural en el país.

^{106/} Acceso abierto se refiere a la obligación de prestar el servicio a cualquier solicitante que reúna las características establecidas por el permisionario en sus Condiciones Generales para la Prestación del Servicio, sujeto a que exista capacidad disponible en el sistema de que se trate y que la interconexión necesaria sea económicamente viable.

Comercio exterior de hidrocarburos

- En 2004 el mercado petrolero internacional enfrentó circunstancias que ocasionaron una alta volatilidad en los **precios del petróleo**, ubicándose en niveles que no se tenían desde la década de los ochenta. En octubre de 2004 se alcanzó el precio más alto, 53.24 dólares por barril para el *West Texas Intermediate* (WTI) y 38.93 dólares por barril para el promedio de la mezcla mexicana. Sin embargo, entre octubre y diciembre su precio disminuyó para ubicarse al cierre del año en 43.20 dólares por barril el WTI y en 28.56 dólares la mezcla mexicana.
 - Los factores que determinaron este comportamiento fueron de tipo político y social; conflictos bélicos en algunas regiones productoras, especialmente en Medio Oriente; conflictos corporativos y laborales vinculados con la industria petrolera en Rusia y Noruega; así como de tipo económico debido al alto crecimiento de China e India y el elevado consumo de crudo registrado en el Reino Unido, Canadá y Estados Unidos de América.
- Durante los primeros ocho meses de 2005 la tendencia de los precios del crudo fue creciente. En enero el WTI se cotizó en 46.83 dólares por barril, en julio en 58.68 dólares y en agosto rebasó los 60 dólares; en tanto que la mezcla mexicana pasó de 31.69 dólares a 46.36 dólares por barril en julio. En agosto la mezcla mexicana rebasó los 50 dólares por barril.
- Entre enero y agosto de 2005 el precio promedio de la mezcla de crudo mexicano registró un nivel de 38.04 dólares por barril, 28.4 por ciento más que en igual periodo del año anterior.
 - En ese lapso, el volumen exportado de petróleo crudo se ubicó en 1 825.6 miles de barriles diarios, 0.3 por ciento menor con respecto al mismo periodo anterior.
- Por **exportaciones de petróleo crudo** ingresaron a México 16 874.7 millones de dólares, valor 27.6 por ciento mayor al obtenido en el periodo enero-agosto de 2004. Si se descuentan las importaciones realizadas, la **balanza comercial de hidrocarburos** generó un ingreso neto de divisas para el país por un monto acumulado de 13 984.2 millones de dólares, el más alto para un lapso similar desde 1985.

BALANZA COMERCIAL DE HIDROCARBUROS, 2000-2005

Concepto	Datos anuales						Enero-agosto		
	Observado					Meta	2004	2005 p/	Variación %
	2000	2001	2002	2003	2004	2005			
<u>Millones de dólares</u>									
Saldo	11 294.4	8 836.1	11 374.8	14 444.1	17 829.9	13 801.6	11 636.9	13 984.2	20.2
Exportaciones ^{1/}	15 966.3	12 944.6	14 691.2	18 437.9	23 397.1	19 884.9	14 639.6	18 883.9	29.0
Petróleo crudo	14 552.9	11 927.7	13 392.2	16 676.3	21 233.4	18 761.2	13 221.9	16 874.7	27.6
Gas natural	48.8	47.8	4.0	0.0	0.0	0.0	0.0	3.6	n.a.
Condensados	0.0	0.0	0.0	1.6	17.8	0.0	15.0	20.0	33.3
Petrolíferos	1 118.9	856.2	1 182.1	1 612.4	1 929.2	888.0	1 254.8	1 767.4	40.9
Petroquímicos	245.7	112.9	112.9	147.6	216.7	235.7	147.9	218.2	47.5
Importaciones	4 671.9	4 108.5	3 316.4	3 993.8	5 567.2	6 083.3	3 002.7	4 899.7	63.2
Gas natural	366.5	423.8	775.4	1 526.2	1 715.1	1 720.8	1 087.6	969.5	-10.9
Petrolíferos	4 233.4	3 656.1	2 495.1	2 423.3	3 793.7	4 104.6	1 883.4	3 853.3	104.6
Petroquímicos	72.0	28.6	45.9	44.3	58.4	257.9	31.6	76.9	143.4
<u>Miles de barriles diarios</u>									
Exportaciones									
Petróleo crudo	1 603.7	1 755.7	1 705.1	1 843.9	1 870.3	1 903.7	1 830.5	1 825.6	-0.3
Gas natural (MMpcd)	23.6	24.9	4.4	0.0	0.0	0.0	0.0	2.1	n.a.

Condensados	0.0	0.0	0.0	0.2	1.5	0.0	1.9	1.9	0.0
Petrolíferos	111.5	103.7	155.9	177.0	151.4	75.4	156.6	185.4	18.4
Petroquímicos (Mt)	1 116.2	780.4	831.7	812.9	914.3	786.9	633.1	585.9	-7.5
Importaciones									
Gas natural (MMpcd)	231.4	292.2	592.5	756.9	765.6	809.6	738.6	609.5	-17.5
Petrolíferos	363.2	335.3	243.6	199.9	234.3	321.9	184.6	295.6	60.1
Petroquímicos (Mt)	317.3	128.1	197.4	94.7	103.9	483.6	60.0	132.1	120.2

1/ La suma de los parciales puede no coincidir con el total debido al redondeo de las cifras.

n. a. No aplicable

p/ Cifras preliminares.

FUENTE: Petróleos Mexicanos.

- El volumen de las **importaciones de gas natural** registró una disminución de 17.5 por ciento debido al aumento de la producción nacional y un consumo interno similar al de enero-agosto de 2004, en donde la demanda de los sectores eléctricos y el correspondiente a las distribuidoras se incrementó, pero se contrajo la del sector industrial. En términos de valor, las importaciones de este hidrocarburo ascendieron a 969.5 millones de dólares, es decir, 10.9 por ciento menos que en los primeros ocho meses de 2004.
- De enero a agosto de 2005, **la balanza comercial de petrolíferos** mostró un déficit de 2 085.9 millones de dólares, 231.8 por ciento mayor al saldo negativo registrado en el mismo periodo de 2004. Este comportamiento se atribuye tanto al aumento en el precio de importación de los productos, como a un mayor volumen importado. Uno de los factores que explica en mayor medida este comportamiento es la importación de gasolinas y sus componentes, que a partir del segundo semestre de 2004 registraron un crecimiento importante debido a que de noviembre de 2004 a febrero de 2005 no se envió crudo a maquila a *Deer Park* por haberse finiquitado el contrato respectivo, que reinició en marzo de 2005.
- Por su parte, **la balanza comercial de productos petroquímicos** presentó un superávit de 141.3 millones de dólares, 21.5 por ciento mayor al monto reportado en el periodo enero-agosto de 2004; esta situación se presentó por los mejores precios promedio por tonelada vendida en el mercado exterior de algunos productos, principalmente polietileno y etileno.
- El volumen de las **importaciones de Pemex como proporción de la producción**, en el periodo enero-agosto de 2005 respecto a igual periodo anterior, se incrementó en gasolinas, diesel, combustóleo y petroquímicos debido a un menor proceso de crudo, reducción del envío de crudo a maquila y las compras al mercado externo de cloruro de vinilo por los trabajos de ampliación de la capacidad instalada de este producto en Petróleos Mexicanos. En el caso del gas licuado, la proporción disminuyó como consecuencia de la contracción de la demanda interna; y la del gas natural por una mayor producción nacional.

Comercio interior de hidrocarburos

- Durante los primeros ocho meses de 2005, Petróleos Mexicanos estima un ingreso por ventas en la República Mexicana de 294 426.7 millones de pesos, 22.4 por ciento más de lo reportado en el mismo periodo del año previo. Este comportamiento se explica por:
 - **La demanda nacional de gas natural** seco por 2 764.7 millones de pies cúbicos diarios continuó su tendencia a la alza, con un crecimiento de 0.6 por ciento. Los sectores más dinámicos en el consumo de este combustible fueron el eléctrico y el correspondiente a las distribuidoras, ya que el industrial mostró una contracción en su demanda. Los ingresos obtenidos por la venta de gas natural seco fueron de 47 394.7 millones de pesos.
 - Por concepto de la **comercialización de productos petrolíferos**, Petróleos Mexicanos obtuvo ingresos por 231 958.3 millones de pesos, 25.8 por ciento más que en el periodo enero-agosto de

2004. El volumen total de ventas de productos petrolíferos fue de 1 760.7 miles de barriles diarios, 3.4 por ciento mayor al obtenido en igual lapso del año previo.

- Las **ventas de gasolinas** para uso automotor generaron ingresos 23.8 por ciento superiores, con respecto a igual lapso de 2004. En términos volumétricos se comercializaron 33.1 miles de barriles diarios más de gasolina Pemex Magna, que representaron ingresos adicionales por 18 788.9 millones de pesos, en tanto que de la Pemex Premium las ventas fueron 0.5 miles de barriles diarios más, con un incremento en los ingresos de 2 732.4 millones de pesos.
- Las **ventas de Pemex Diesel** reportaron en los primeros ocho meses de 2005, un importe total de 43 032.6 millones de pesos y las de diesel desulfurado y marino de 5 201 y 2 137.9 millones de pesos, ingresos superiores en 38.6, 26.5 y 33.2 por ciento, respectivamente, con relación a los obtenidos en enero-agosto de 2004. El volumen total de diesel comercializado ascendió a 315 miles de barriles diarios, 5.7 por ciento más que en el mismo periodo previo.
- Las **ventas de turbosina** aportaron ingresos por 9 985.7 millones de pesos, en tanto que las de gas licuado lo hicieron en 31 007.3 millones, montos superiores en 48.4 y 14.7 por ciento, con relación a los primeros ocho meses de 2004. El volumen vendido de turbosina fue de 61.5 miles de barriles diarios, 5.1 por ciento más que en enero-agosto de 2004. En el caso del gas licuado se registró una contracción de la demanda de 4.9 por ciento.

VOLUMEN DE VENTAS INTERNAS DE GAS NATURAL, PETROLÍFEROS Y PETROQUÍMICOS, 2000-2005

Concepto	Datos anuales						Enero-agosto		
	Observado					Meta ^{3/}	2004	2005 ^{p/}	Variación %
	2000	2001	2002	2003	2004	2005			
Gas natural (MMpcd)	2 060.8	1 993.3	2 425.1	2 621.4	2 756.3	2 905.2	2 748.5	2 764.7	0.6
Petrolíferos (Mbd)	1 728.1	1 711.6	1 658.5	1 684.5	1 718.0	1 764.6	1 703.3	1 760.7	3.4
Gas licuado	329.7	324.7	331.9	326.9	327.6	341.3	324.1	308.3	-4.9
Gasolinas	532.7	551.9	566.6	601.7	637.1	651.3	627.1	660.9	5.4
- Pemex Magna	472.3	476.5	476.5	500.2	525.5	524.6	515.5	548.6	6.4
- Pemex Premium	58.9	73.9	88.5	100.1	110.4	124.7	110.4	110.9	0.5
- Otras ^{1/}	1.5	1.5	1.6	1.4	1.2	2.0	1.2	1.4	16.7
Turbosina	55.5	55.3	53.3	54.2	57.8	58.5	58.5	61.5	5.1
Diesel	284.7	275.8	270.7	294.7	302.7	306.1	297.9	315.0	5.7
Combustóleo	492.4	474.9	406.2	354.6	332.5	337.0	333.7	346.1	3.7
Otros ^{2/}	33.1	29.0	29.8	52.4	60.3	70.4	62.0	68.9	11.1
Petroquímicos (Mt)	3 505.2	3 490.7	3 318.8	3 159.6	3 550.2	4 161.4	2 344.1	2 570.8	9.7
Básicos	265.6	222.1	235.4	294.6	355.8	294.1	230.4	264.0	14.6
Desregulados	3 239.6	3 268.6	3 083.4	2 865.0	3 194.4	3 867.3	2 113.7	2 306.8	9.1

1/ Incluye gasavión 100-130, gasolina incolora, gasnafta y gasolvente.

2/ Incluye querosenos, gasóleo industrial, asfaltos, lubricantes, parafinas y coque.

3/ Las metas especificadas para 2005 difieren de lo establecido en el PEF, debido a lo siguiente: en el PEF se incluyen 30 Mt de gas nafta como petroquímico debido a que lo produce Pemex Petroquímica; sin embargo, es un petrolífero que equivale a 0.7 Mbd. Por lo anterior, se le restan a los petroquímicos los 30 Mt de gas nafta y se convierten en 0.7 Mbd, los cuales se adicionan a petrolíferos.

p/ Cifras preliminares.

FUENTE: Petróleos Mexicanos.

- Por la **venta de combustóleo** en el país, Petróleos Mexicanos tuvo ingresos por 24 650.9 millones de pesos. El volumen comercializado fue de 346.1 miles de barriles diarios, 3.7 por ciento más que en igual periodo anterior. Por la comercialización de otros productos petrolíferos, como gasóleo industrial, asfaltos, parafinas, solventes, grasas y lubricantes, se generaron ingresos por 3 799.1 millones de pesos.

- La **demanda de petroquímicos** continuó su tendencia de recuperación durante enero-agosto de 2005. En este lapso las ventas ascendieron a 2 570.8 miles de toneladas, 9.7 por ciento más con respecto a enero-agosto de 2004. Con este volumen de ventas, Petróleos Mexicanos obtuvo ingresos por 15 073.7 millones de pesos, 30.1 por ciento más que en el mismo periodo anterior.

Seguridad industrial en las instalaciones petroleras

El compromiso de Petróleos Mexicanos en materia de seguridad industrial consiste en ser una empresa segura, que alcance niveles similares e incluso mejores que las empresas líderes del mundo. Los programas que la empresa aplica permitieron lograr en años pasados reducciones muy importantes en los valores registrados de los índices de seguridad. No obstante, a finales de 2004 y en el primer semestre de 2005 se observaron los siguientes resultados:

- El índice de frecuencia de accidentes de Petróleos Mexicanos fue de 1.26 accidentes por millón de horas-hombre trabajadas, 15.1 por ciento mayor respecto de igual periodo anterior.
- El índice de gravedad se ubicó en 122 días perdidos por millón de horas trabajadas, 13 por ciento mayor a lo registrado entre enero y junio de 2004.
- Para 2005 Petróleos Mexicanos cuenta con un presupuesto para mantenimiento de 53 200 millones de pesos, 5.8 por ciento mayor al autorizado el año previo.
- La empresa puso en marcha un Programa Emergente para el Fortalecimiento de la Seguridad, Salud y Protección Ambiental que incorpora las mejores prácticas preventivas y correctivas en la materia, así como procedimientos, disciplina operativa y seguridad de los procesos, denominado Sistema Pemex-SSPA. Éste se aplicará de inmediato con énfasis en la operación y mantenimiento de la infraestructura de transporte por ducto, en donde se invertirán más de 3.5 miles de millones de pesos, principalmente en aquellos con niveles críticos de seguridad.

Source: Presidencia de la República Mexicana, 2005.

Appendix E

Mexican Public Sector Budgetary Revenues, 2005

(Millions of pesos)						
Concept	December			January-december		
	2004	2005 ^{p./}	Real % growth	2004	2005 ^{p./}	Real % growth
Total	182,711.1	195,722.7	3.7	1,771,314.2	1,948,173.0	5.8
Oil related	63,812.0	82,574.0	25.2	637,360.2	726,103.5	9.6
Pemex	24,955.1	22,423.9	-13.0	190,772.0	185,578.4	-6.5
Federal Government	38,857.0	60,150.1	49.8	446,588.2	540,525.1	16.4
Rights and Royalties on oil related products	37,176.4	60,584.7	57.7	393,253.8	525,531.6	28.5
Excise taxes	1,680.6	-434.7	n.s.	53,334.4	14,993.4	-73.0
Non-oil related	118,899.1	113,148.7	-7.9	1,133,953.9	1,222,069.5	3.6
Federal Government	85,731.5	82,233.7	-7.2	823,622.9	872,662.6	1.9
Tax	62,009.1	69,129.7	7.9	716,785.2	793,216.7	6.4
Income tax	27,453.4	31,960.2	12.7	345,217.6	384,496.7	7.1
VAT	27,064.0	30,225.4	8.1	285,022.7	318,659.4	7.5
Excise taxes	2,804.9	2,767.4	-4.5	31,910.6	34,442.2	3.8
Import taxes	3,143.4	2,587.3	-20.3	29,521.0	26,823.3	-12.6
Others ^{1/}	1,543.3	1,589.4	-0.3	25,113.3	28,795.1	10.3
Non-tax	23,722.5	13,103.9	-46.5	106,837.6	79,445.9	-28.5
Rights	826.7	860.6	0.8	16,591.4	20,171.1	16.9
Fees	22,374.1	11,773.9	-49.1	84,809.8	51,312.2	-41.8
Others	521.6	469.4	-12.9	5,436.4	7,962.6	40.8
PEDBC ^{2/}	33,167.6	30,915.1	-9.8	310,331.1	349,406.9	8.3
Memorandum items:						
Total tax related	63,689.6	68,695.1	4.4	770,119.7	808,210.1	0.9
Total non-tax related	119,021.5	127,027.6	3.3	1,001,194.5	1,139,962.8	9.5

Notes: Partial sums may differ due to the rounding of figures.
p./ Preliminary figures.
n.s.: not significant.
1_/ Includes new vehicle, vehicle ownership, export, taxes non-included in the precedent fractions and accessories.
2 / Public entities under direct budgetary control. Excludes Federal Government transfers to the ISSSTE.

Source: Secretaría de Hacienda y Crédito Público, 2005.

Appendix F

Top World Petroleum Companies by Crude Oil Production Rank, 2003*

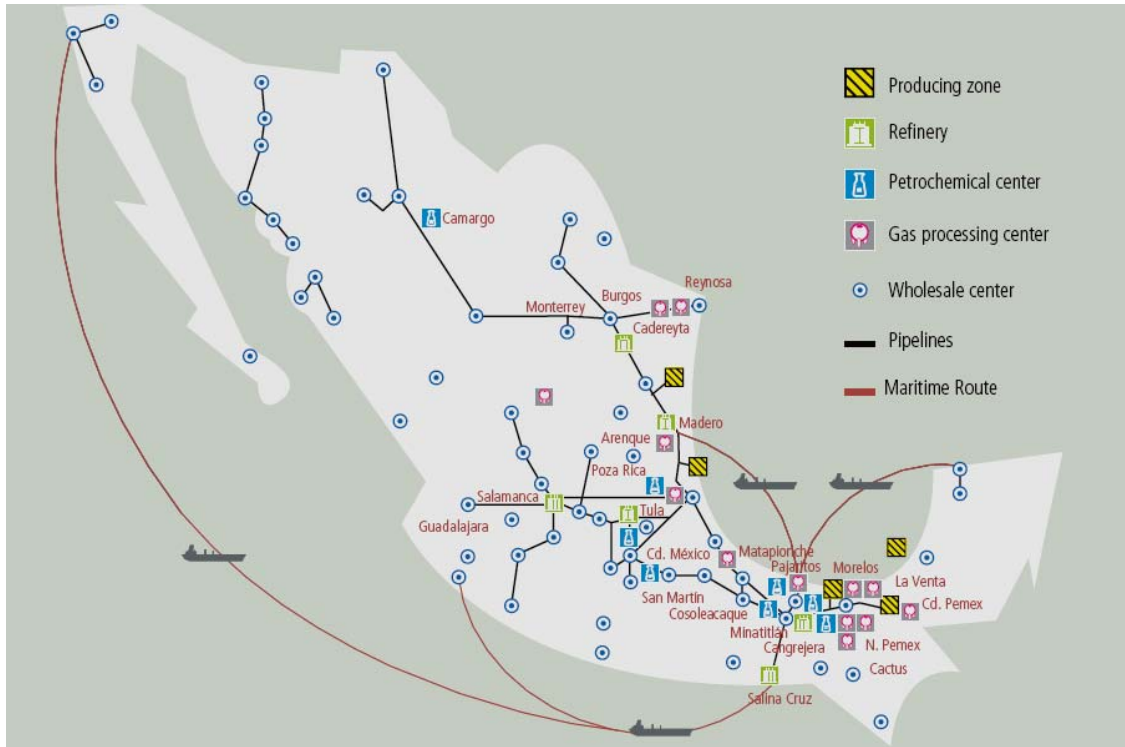
Rank	Company	Country	Thousand barrels daily
1	Saudi Aramco	Saudi Arabia	9,045
2	NIOC	Iran	3,852
3	Pemex	Mexico	3,789
4	Exxon Mobil	United States	2,516
5	PDVSA	Venezuela	2,500
6	Royal Dutch/Shell	Netherlands/UK	2,334
7	KPC	Kuwait	2,170
8	NNPC	Nigeria	2,166
9	BP	United Kingdom	2,121
10	PetroChina	China	2,120
11	Chevron Texaco	United States	1,808
12	Sonatrach	Algeria	1,729
13	Petrobras	Brazil	1,701
14	Total	France	1,661
15	Lukoil	Russia	1,622

**Includes natural gas liquids*

Source: Pemex Statistical Yearbook, 2005

Appendix G

Infraestructure of Petróleos Mexicanos (Pemex)



Producing fields	355	Condensate sweetening plants	6
Producing wells	5,286	Sulfur recovery plants	13
Offshore platforms	185	Refineries	6
Natural gas processing centers	12	Petrochemical centers	8
Gas sweetening plants	20	Petrochemical plants	37
Cryogenic plants	17	Terminals of LPG distribution	17
Absorption plants	2	Wholesale centers of petroleum products	77
NGL fractionating plants	8		

Source: Pemex Statistical Yearbook, 2005

Appendix H

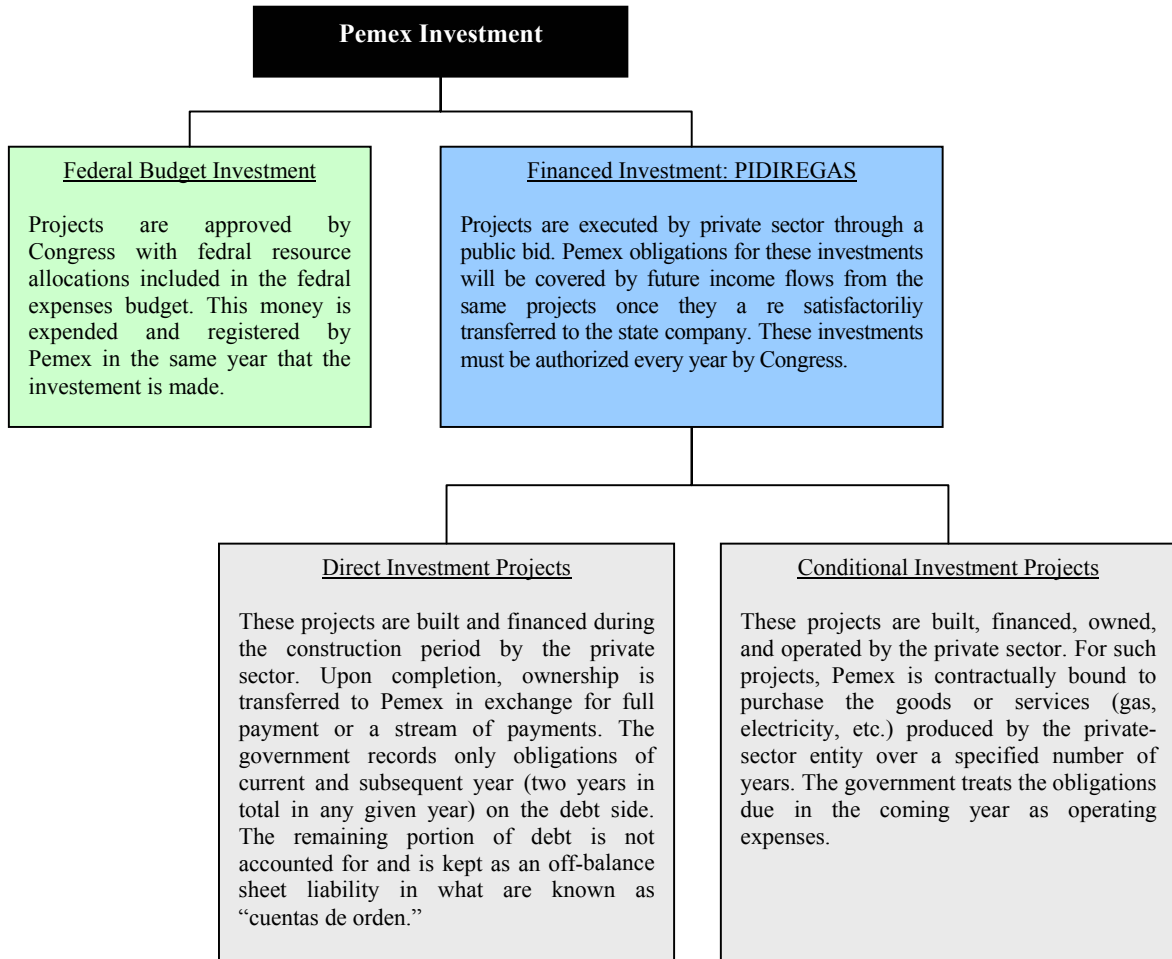
Pemex Capital Expenditure by Subsidiary Entities, 1995–2004

Year	million Mexican Pesos										million dollars
	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2004
Total	15,792	24,018	33,754	50,742	52,382	71,725	62,938	80,759	113,687	122,863	10,907
Non Pidiregas capital expenditures (capex)	15,792	24,018	28,923	31,253	25,103	28,837	26,993	22,943	19,013	12,243	1,087
Pidiregas	-	-	4,831	19,489	27,279	42,888	35,945	57,816	94,674	110,620	9,820
Pemex Exploración y Producción	9,656	16,748	24,216	37,663	41,080	44,654	53,446	63,000	88,380	113,332	10,061
Non Pidiregas capex	9,656	16,748	19,385	19,064	14,454	17,418	17,501	13,443	8,945	3,694	328
Pidiregas	-	-	4,831	18,599	26,626	27,236	35,945	49,557	79,435	109,638	9,733
Pemex Refinación	4,850	5,035	5,506	7,162	6,608	22,026	5,501	14,077	19,878	5,092	452
Non Pidiregas capex	4,850	5,035	5,506	7,162	6,608	6,374	5,501	5,893	5,744	4,647	412
Pidiregas	-	-	-	-	-	15,652	-	8,184	14,134	445	40
Pemex Gas y Petroquímica Básica	738	1,088	3,021	4,224	3,430	3,620	2,567	1,796	3,253	2,498	222
Non Pidiregas capex	738	1,088	3,021	3,334	2,777	3,620	2,567	1,721	2,148	1,961	174
Pidiregas	-	-	-	890	653	-	-	75	1,105	537	48
Pemex Petroquímica	397	365	724	1,431	945	996	1,058	1,454	1,627	1,598	142
Non Pidiregas capex	397	365	724	1,431	945	996	1,058	1,454	1,627	1,598	142
Pidiregas	-	-	-	-	-	-	-	-	-	-	-
Pemex Corporativo	151	782	287	262	319	429	366	432	549	343	30
Non Pidiregas capex	151	782	287	262	319	429	366	432	549	343	30
Pidiregas	-	-	-	-	-	-	-	-	-	-	-

Source: Pemex Statistical Yearbook, 2005

Appendix I

Pemex Financing Strategy Since 1997



Source: Moroney and Dieck-Assad, 2005

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