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Abstract

Mexico is a highly centralized federation. The states and municipalities are highly dependent on federal transfers and so equally at risk to the country's fiscal dependence on oil. Although Mexico has become more truly federal since multiparty competition has become vibrant and several states are in opposition hands, the states remain very minor actors in relation to oil and gas. However, as the political system has democratized, states have had an increasing say regarding oil and gas activities, particularly when these involve social or environmental damage or costs. This institutional framework has implications on Pemex (a major contributor to public budget), whose development is hindered in all stages of production. In this paper we discuss measures to promote Pemex' development in the context of Mexico's federal system, such as: (i) the Government must find additional and more diverse sources of public revenue (ii); Pemex itself must derive greater wealth from its investment in petroleum projects (iii); Pemex must also be able to allocate more of its investment to exploration in order to replenish its depleted sources (iv); political manipulation in the estimation of the oil revenues should be eliminated brought greater certainty, transparency, and accountability for federalism in Mexico, and (v), a clear mechanism to distribute the oil proceeds is crucial. The new fiscal scheme must make clear how Pemex pays rights and taxes, based on rules set by the National System of Fiscal Coordination.

Resumen

México es una federación altamente centralizada. Los estados y municipios son altamente dependientes de las transferencias federales y, por lo tanto, enfrentan el mismo riesgo de la dependencia fiscal del país en el petróleo. Aunque México se ha vuelto más auténticamente federal, puesto que la competencia multipartidista se ha tornado vibrante, y varios estados están en manos de la oposición, siguen siendo los actores de menor importancia en relación con el petróleo y el gas. Sin embargo, como el sistema político se ha democratizado, los estados han tenido una participación creciente respecto a las actividades de gas y, en especial, cuando éstas implican daños sociales o costos ambientales. Este marco institucional tiene implicaciones sobre Pemex (un contribuyente muy importante al presupuesto público), cuyo desarrollo se ve obstaculizado en todas las etapas de producción. En este trabajo se discuten medidas para promover el desarrollo de Pemex en el contexto del sistema federal de México, tales como: (i) el Gobierno debe encontrar fuentes adicionales y más diversas de

ingreso público (ii); el propio Pemex debe derivar una mayor riqueza a partir de sus inversiones en proyectos petroleros (iii); Pemex también debe ser capaz de asignar más de su inversión en la exploración con el fin de reponer sus fuentes agotadas (iv); la manipulación política en la estimación de los ingresos del petróleo debe de ser eliminada para aportar una mayor certidumbre, transparencia y rendición de cuentas al federalismo en México, y (v), un mecanismo claro para distribuir los ingresos del petróleo es crucial. El nuevo régimen fiscal debe dejar bien claro cómo Pemex paga los derechos e impuestos, con base en las reglas establecidas por el Sistema Nacional de Coordinación Fiscal.

Introduction

Since its nationalization in 1938, the oil and gas sector has played a crucial role in Mexico's economic development. Oil revenue has been a very important source of federal income in funding the industrial development during the 1970s and 1980s, and in facilitating the buildup of international reserves, which now stands at historic levels. The national oil company *Petróleos Mexicanos* (Pemex) has been the source of approximately one third of the total federal resources in the last 20 years, often bankrolling the State during the last three decades. In addition to supporting the national economy, Pemex has recently also provided additional resources to state and local governments. Notwithstanding Pemex's important role, fiscal, institutional, legal, and organizational constraints, which are the outcome of the historical evolution of the sector, have prevented Pemex from taking advantage of its strong position in the market, both in Mexico and in North America.

Mexico remains a highly centralized federation and the Mexican constitution gives absolute control of the petroleum sector to the federal government, with pivotal decisions regarding pricing and investment usually being taken by the Ministry of Budget and Finance. During the last decade, this institutional arrangement has brought about important changes in the petroleum sector, and in the manner in which resources are allocated among Pemex, stabilization and other funds, and the federal, state and local governments. The new arrangement is not without fault, having drawn criticisms from various stakeholders. The producing states receive almost nothing from the sharing of petroleum revenues, most of which come from the offshore in any case.

Finally, in the last 10 years, issues related to pollution, accountability, and transparency have gained prominence and found their place on the government's agenda. Pollution from the activities of the petroleum industry has been a particular concern of local and state governments in producing areas. While the federal government has set new rules for accountability, applying mainly to Pemex, state and local governments have been slow to put planning and accountability mechanisms in place, particularly for their share of surplus oil revenues.

Historical and regional context of the petroleum industry

The current salience of the oil and gas sector in Mexico can be best understood by an examination of its origins. Private oil companies, such as London Oil Trust and Mexican Oil Corporation, had been carrying out exploration activities in Mexico since the 1870s. The development of the oil sector started in the 1890s under the presidency of Porfirio Díaz, when the

first oil wells were drilled and oil was discovered. However, it was not until the 1900s that the oil industry got going in earnest, and the first oil law was promulgated by the federal government on 24th of December, 1901. It provided for the granting of petroleum exploration concessions to private oil companies (mainly foreign ones), the exemption from import tariffs for refinery equipment, and the elimination of taxes on capital investment. These provisions played a significant role in establishing the framework for investment in the sector, with companies such as S. Pearson & Son Limited (later known as El Aguila Company), Huasteca Petroleum Company and the Compañía Transcontinental de Petróleo, becoming important players in the industry. This market architecture, characterized by the concessionary system, remained largely unaltered during the rest of the administration of President Diaz, thereby allowing companies to explore and extract oil from the continental shelf, lakes, and lagoons.

The settled pattern in the industry was disrupted after 1910, when President Diaz left office. The following tumultuous decade was the period of the upheavals of the 'Mexican Revolution', during which many changes occurred in the architecture of the Mexican oil market, with each subsequent president promoting his own policy. For example, Francisco I. Madero (1911-1913) introduced, although for a few months only, the first tax on oil companies which was fixed at 20 cents per ton of crude oil. This tax was eliminated when Madero's government was ousted. In 1914, the government of Venustiano Carranza imposed a new tax on all existing companies - all of which had Anglo-American ownership, and were specialized in production (80 firms) and exports (17 firms). Owing to the turmoil in the political arena caused by the revolution, these companies could not meet the government's expectations in terms of investment and growth. In spite of the difficulties during this period, Mexico became the second largest oil producer in the world.

The year 1917 marked a critical point in the development of the petroleum sector, when the State took control of oil resources under Article 27 of the Mexican Constitution. A new tax on oil production, targeted at exporting companies, was among the first measures introduced by the federal government. From then on, the federal government undertook several measures and implemented different tax regimes that applied to all companies producing oil (Silva, 1973). A new tax on oil production, targeted to exporting companies, was among the first measures introduced by the federal government. At the end of the turmoil, the well designed property regime established under the new constitution, and the concessionary regime were instrumental in underpinning the growth in the petroleum sector until the early 1930s. This market architecture generated substantial resources for the federal government and served as a foundation for the consolidation of the peace process and Mexico's economy.

By the mid 1930s, the increasing power of the federal government along with the new fiscal regime created some tensions between the Mexican government and the oil companies. This conflict intensified in 1937 when the government of Lázaro Cárdenas, in an effort to prevent a strike in the industry, tried to act as a mediator between the oil labor union, *Sindicato de Trabajadores Petroleros de la República Mexicana* (created in 1935) and the oil companies. The dispute rapidly evolved into a national crisis and gave rise to a social movement that eventually led to the nationalization of the oil industry in 1938. Pemex was created as a result of this dispute on 7th of June, 1938. The international business community, pushed by the countries whose assets were nationalized, reacted immediately by blocking the entry of Mexican products, mainly oil, in foreign markets. However, the start of the Second World War quickly diverted the attention of foreign governments, particularly the United States, away from this issue (Gutiérrez, 1998).

The constitutional amendment (*Article 27*) and the nationalization of the petroleum industry crystallized the new market architecture, which has remained basically unchanged since 1938. Under it, certain key policy principles were affirmed: price controls were imposed to subsidize the transport and the industrial sectors (there were policies to provide fuel oil to the electricity sector at prices below international ones (Carreon, et.al. (2007) and diesel at subsidized prices for the transport sector), incentives were introduced to encourage the development of local technical capacity in petroleum exploration and refining, and oil workers were given important welfare concessions (which still prevail in the labor contract with Pemex). At the same time, exploration, extraction, the construction of refineries, and the development of distribution networks were expected to occur under tight public budget constraints (Wionczek, 1983). Insufficient financial resources, organizational problems, as well as union conflicts considerably hampered the development of the nationalized industry. The situation deteriorated in 1944 when Pemex was asked to compensate expropriated oil companies on behalf of the federal government. The growing demand for oil, linked to the Second World War, gave a breathing space to the petroleum industry in Mexico, and underpinned its growth.

The 1950s to the 1970s were difficult for the industry, to the point that oil exports ended by 1966. The low-price policy for domestic consumers (electricity sector, transport sector, and residential consumers)[1] and the unfavorable financial structure the federal government imposed on Pemex

[1] The pricing policy for gasoline has always been an issue given the importance of oil revenue. When the international price of oil is "high", gasoline consumers receive a subsidy (most of the time, because in these cases the price of gasoline increases to cover the cost of refining). Under these circumstances, the internal price is below the international price of gasoline, inducing a deficit that is covered by the excess oil revenue. On the other hand, when the international oil price is "low", the price of gasoline increases to provide the income required for the federal government. In these cases, the internal price is above the international price of gasoline.

had seriously deleterious consequences for the industry. In fact, oil production dropped so low, relative to domestic demand that Mexico started importing oil in 1971. The situation improved in 1972 when exploration carried out in the southeast led to the discovery of many important oilfields (mainly Cantarell). By 1974, Mexico's production and exports had increased substantially, marking the beginning of an important decade during which the country did not experience an economic crisis. The unusually high oil revenues were used to support large public expenditure programs, which were intended to maintain high growth rates during a period of worldwide recession. However, by mid 1981, the international price of oil started to fall as consumers in the big importing countries reacted to the two oil price shocks with savings and substitution policies that favored natural gas and other alternative energy sources. Facing falling revenues, the federal government imposed drastic austerity measures (Wionczek, 1983) and placed more stringent restrictions on Pemex's investments.

Oil prices dropped dramatically by the mid-1980s and did not recover for twenty years. During this long period, the federal government, which was fiscally very constrained, tried to limit the decline in payments from Pemex, which meant that Pemex in turn was severely limited in its ability to invest or even to maintain key facilities. The high oil prices of recent years have generated considerable receipts for the federal government and eased Pemex's cash constraint, but the legacy of underinvestment in the sector has been severely felt as production has not kept up with demand and imports growth, raising costs for industry. In addition, oil production costs have increased as the main oil fields are depleted and new fields prove more expensive.

The volatility of international oil prices also severely affected Mexico's macro-economic stability, with economic crises in 1970, 1982, 1985, 1994-1995, and 2008-2009. These crises reflect not just volatility in international energy prices but also overspending and/or poor economic public policies. They have significantly affected the growth and consolidation of the oil industry, as Pemex has faced rising import costs for machinery and equipment that feed through into lower short-run and long-run productivity.

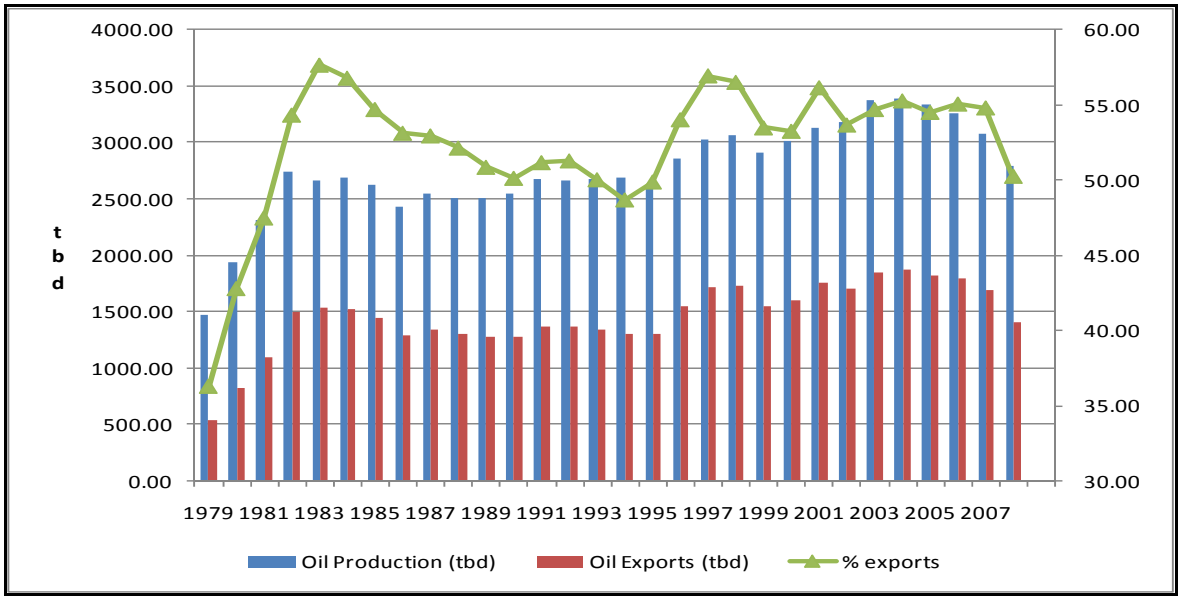
On the other hand, the natural gas sector has been neglected by Pemex compared to oil. Natural gas started being relevant in the early 1970s — 30 years after the nationalization of the industry — when Pemex began to develop a pipeline system along the gulf coast in order to export gas to the United States. This policy, oriented to the United States' natural gas market, triggered intense gas utilization in the northern part of the federation, and fostered concessions for local natural gas distribution. However, the real engine for growth in the natural gas sector was the reform of the power sector in 1992 (Carreon, *et al.*, 2007; and Carreón and Rosellón, 2002). The new market architecture allowed private investment in generation under the

self-supply, co-generation, and independent-power-production projects schemes. The resulting increase in demand encouraged the development of the natural gas sector. In addition, the Natural Gas Reform in 1995 allowed private investment in distribution, transportation, and storage. These two important reforms set the stage for the creation of a regulatory entity, the *Comisión Reguladora de Energía* (CRE) with power to regulate transportation and distribution tariffs and biddings. Pemex's residual market power in the production of natural gas is regulated by the CRE through yardstick regulation, which links the price in Ciudad Pemex in the Southeast of Mexico (where most natural gas is produced) to the Houston Ship Channel Hub in South Texas. This pricing method aims to make Pemex a competitive player in the North American market. Second to complete liberalization, this regulation has been proven to be the best alternative for CRE, although it provides poor investment incentives (Brito and Rosellón, 2002). Additionally, its proper functioning has been hindered by subsidies granted, in the last years, by the Executive in clear opposition to the regulators' objectives.

Pemex reached its oil production peak through an increase in its capacity from 1986 to 2003. Mexico's maximum production level was achieved in 2004 with 3.4 million barrels per day (mbd). However, production and exports have been falling since 2004, as shown in Figure 1, with production having declined to 2.8 mbd in 2008. In 2007, Pemex ranked third in the world as a producing company, but was ranked 13th with respect to refining capacity. In 2008, it dropped to the 6th and 15th places, respectively. The company has recently announced that it will try to keep its production above 3.0 mbd until 2012 (Lajous, 2008).

The production of oil in Mexico is concentrated in a few regions, mainly in the Gulf of Mexico, specifically in Marine Northeast, Marine Southwest, South, and North. The more productive fields are located offshore in the Marine Northeast which accounts for approximately 65.7 per cent of total crude oil production, followed by the Marine Southwest with 16.4 per cent. The South and North regions accounted for 15.1 and 2.8 per cent, respectively. Total production for 2008 is shown in Table 1.

FIGURE 1. CRUDE PRODUCTION AND EXPORTS



Source: Pemex.

TABLE 1. OFFSHORE AND ONSHORE OIL PRODUCTION AND STATE POPULATION (2008)

STATES	POPULATION		OIL PRODUCTION			
			OFFSHORE (ADJACENT TO)		ONSHORE	
	SIZE	%	TBD	%	TBD	%
Campeche	791,322	0.74	2,046.3	73.12	0	0
Chiapas	4,483,886	4.19	0	0	33.51	1.20
Puebla	5,624,104	5.25	0	0	5.92	0.21
San Luis Potosí	2,479,450	2.31	0	0	0.19	0.01
Tabasco	2,045,294	1.91	206.59	7.38	419.42	14.99
Tamaulipas	3,174,134	2.96	6.25	0.22	8.58	0.31
Veracruz	7,270,413	6.79	13.50	0.48	58.36	2.09
Total	25,868,603	24.05	2,272.64	81.21	525.99	18.79

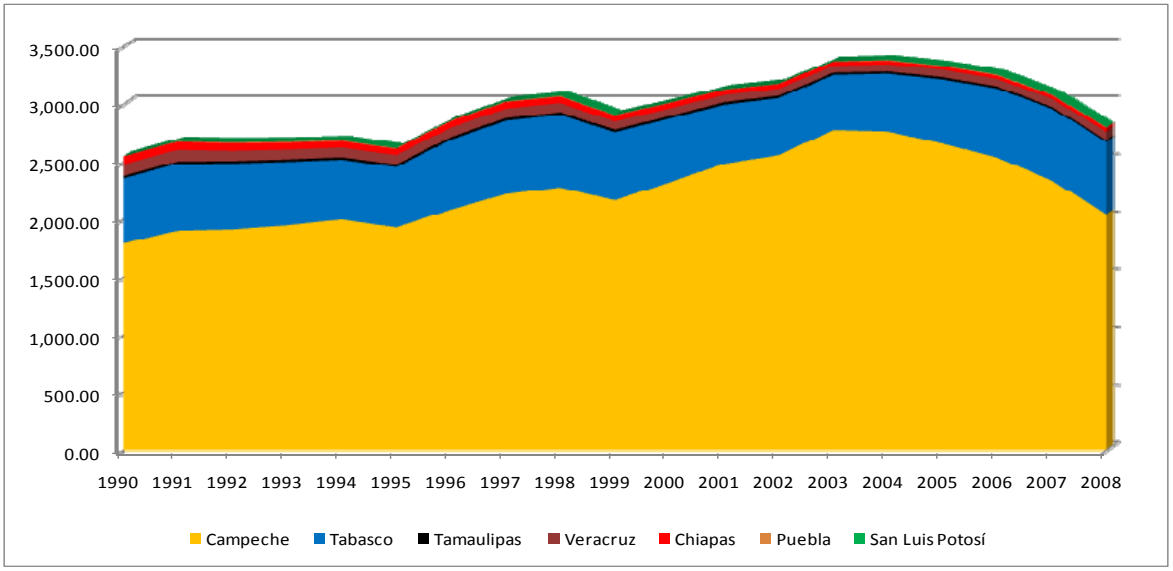
Source: Pemex and INEGI.

Cantarell, the most productive field in Campeche Bay, was randomly discovered in 1971 by a fisherman called Rudecindo Cantarell. Its production started in 1979. The period from 1979 to 1996 was characterized by Cantarell's initial development and exploitation, which drastically increased oil production in the north and south regions as well as in Chiapas. Further development and investment after 1997 allowed the field to reach its maximum production level in 2003 (2.2 mbd). The last stage, characterized by a 14 per cent decrease in annual production, started in 2005 and has contributed to Mexico's increasing dependency on fuel imports to satisfy local

demand. By 2007, Cantarell's reserves accounted for 17 per cent of total reserves (64 per cent are proven, 19 per cent are possible, and 17 per cent are probable reserves). As a consequence of Cantarell's declining production levels, Mexico now faces a deficit in local petroleum products.

Figure 2 shows the production by states, including the adjacent offshore regions, from 1990. It is evident that the largest producer, by far, is Campeche, with less than one per cent of the population, where Cantarell is located, followed by Tabasco, with less than 2 per cent of the population. These two states, with less than 3 per cent of the national population, lack the political weight to take on federal control of the petroleum sector. All derivatives from both onshore and offshore production belong to the federal state.

FIGURE 2. OIL PRODUCTION BY STATE: 1990-2008 (THOUSAND B/D)



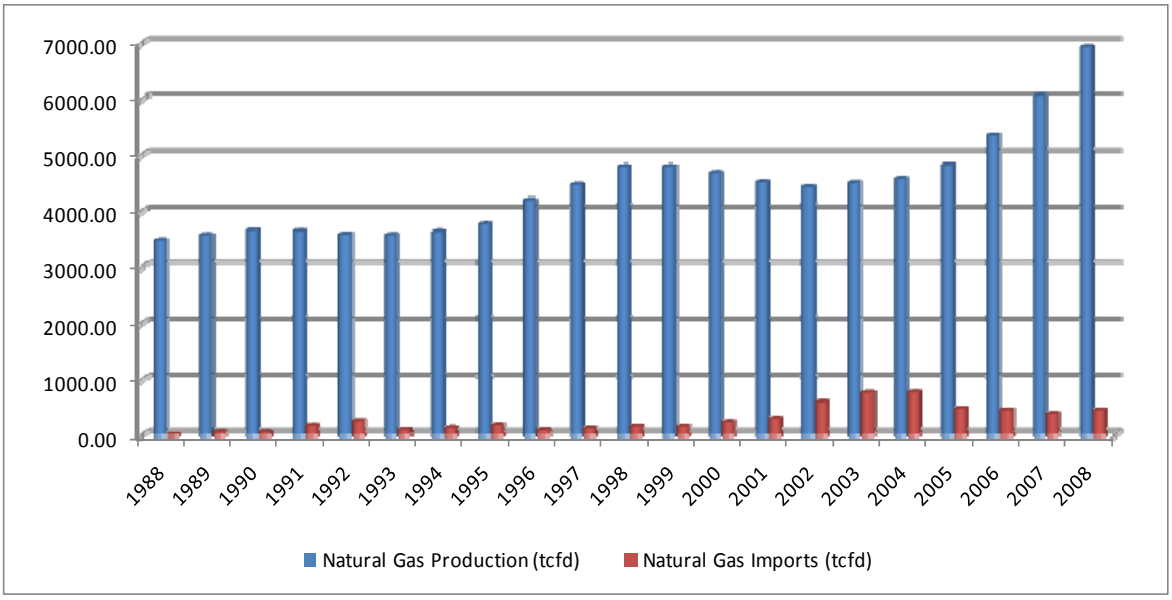
Source: Pemex.

While Mexico has remained an oil exporter, the situation is the opposite for natural gas, where, despite rising production, the country has been an importer since 2000, as shown in Figure 3. Natural gas is a fundamental input in power generation, industrial consumption, as well as for Pemex's activities, so demand has grown strongly. Since 2000, it has become increasingly important in the residential and motor vehicle sectors as well. Electricity demand has increased due to the trend to combined-cycle power generation and to environmental regulations.

The financial restrictions that Pemex has been facing during the last decade have negatively impacted reserve replacement and production, both

of which depend on investment in exploration, development, and technology. The accurate estimate of reserves is a complex issue that depends on methodology as well as geological complexity. In 2002, Mexico adopted the Securities and Exchange Commission (SEC) criteria for reserves classification. This caused a reclassification among different reserve categories (possible, probable, and proved), but did not affect the estimate of total reserves (see Figure 8.4 for total reserves for crude oil, condensates, liquids, and dry gas); proved reserves decreased while probable and possible reserves increased (SENER, 2008a). All other types of reserves follow the criteria established by the Society of Petroleum Engineers (SPE), the American Association of Petroleum Geologist (AAPG) and the World Petroleum Congresses (WPC). Data shown in Figure 4 and Table 2 do not account for the huge potential that Mexico has in the deep waters in the Gulf of Mexico, where estimates are around 50 billion barrels, according to Pemex.

FIGURE 3. PRODUCTION AND IMPORTS OF NATURAL GAS (THOUSAND CUBIC FEET PER DAY)



Source: Pemex.

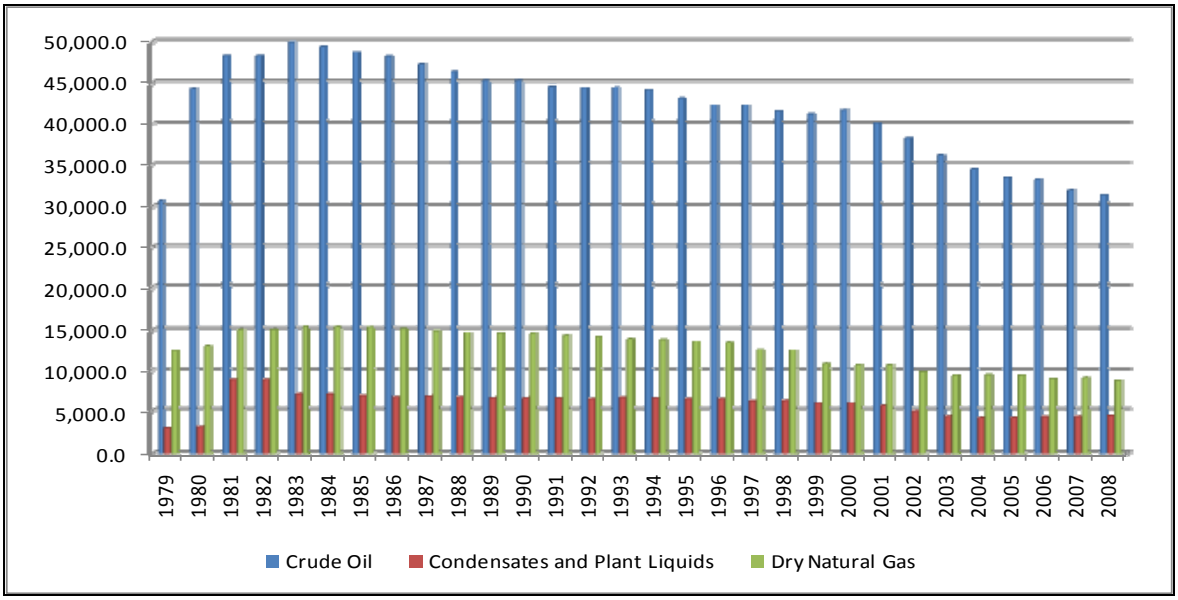
[C] Federal system and constitutional provisions

Mexico has had a federal constitution since 1917. The country is currently composed of 31 states and a Federal District; there are 2,454 municipalities. Its territory consists of 1,972,550 square kilometres and the population is 107,550,697.

Each federation establishes its own balance between the powers of the central or federal government and the autonomy of the federated states. The

constitution establishes the functions and powers of the two orders of government, but in practice these are modified over time by politics and the interaction of the different governments. Mexico's federal political system is similar to the one established in the United States in that it is presidential (with governors in the states). Thus there are checks and balances within each order of government, with an independent executive, legislature and judiciary. Mexico's system has been highly centralized, partly because of federal dominance of the public purse and its extensive legislative powers, but also because of the legacy of the many decades when the *Partido Revolucionario Institucional (PRI)* dominated all governments in a very controlled, and limited, democracy. In recent years (since 1997), the political system has pluralized, with a diffusion of power. Thus power at the centre is divided between a president of one party and a Congress in which two opposition parties have the majority. The states have governors of various partisan allegiances. The system remains very centralized, but the trend has been to greater power in the states.

FIGURE 4. RESERVES (MILLION BARRELS OF CRUDE OIL EQUIVALENT)



Source: Pemex.

TABLE 2. TOTAL RESERVES AT THE END OF 2008

TYPE	HYDROCARBONS (MILLION BARRELS OF CRUDE OIL EQUIVALENT)	CRUDE OIL (MILLION BARRELS)	NATURAL GAS (BILLION CUBIC FEET)
Proved	14,308	10,404	17,649
Probable	14,517	10,396	20,151
Possible	14,738	10,130	22,574
Total (3P)	43,563	30,930	60,374

Source: Pemex.

The oil sector is governed by the Constitution of 1917, by the treaty between Mexico and the United States regarding the delineation of the continental platform in the western region of the Gulf of Mexico, and chapter six of the North American Free Trade Agreement (NATFA) which was signed in 1992. Within Mexico, the power over the oil and gas sectors resides clearly with the federal government. It exercises its powers through Pemex, the Energy Ministry (SENER), the Budget and Finance Ministry (SHCP), the Ministry of the Economy (SE), and the CRE. The CRE has been the regulator of natural gas since 1995. The SENER establishes policies relevant to the energy sector, the SHCP has the ultimate authorization for all projects presented by Pemex and sets fuel tariffs by regulating taxes and subsidies, and the SE administers the prices of energy commodities. The combination of restrictions imposed by these institutions results in a very complex set of rules that Pemex must follow. Under this arrangement, the states have almost no authority in the sector. The only possible legal influence they have is in terms of designing the environmental policies and land use regulations. However, governors can lobby thorough their party's congressmen and the association of governors to force down the executive and the congress to get more oil revenue, as has happened in the last years. In this concession, all governors have gotten more resources coming from the excess oil revenue.

Article 27 of the Mexican Constitution establishes that the Nation has direct ownership of petroleum and all solid, liquid, or gaseous hydrocarbons, and of the national territory, as per the terms fixed by international laws. This ownership is inalienable and essential. The exploitation and use of these resources are governed by Mexican laws which grant concessions only according to strict compliance with the rules and conditions established by legal framework. No concessions or contracts are granted to entities other than the nation or national entities, which effectively means the federal government and its agents. Article 28 determines that this exclusivity must not constitute a monopoly in the case of petroleum and the various hydrocarbons, basic petrochemicals, radioactive minerals, and the generation of nuclear energy and electricity. The creation and regulation of Pemex is established in Articles 25, 28, 42, and 73 of the Constitution. This legal framework prohibits the commercial operation of international oil firms

within Mexican borders as well as the granting of concessions, risk contracts, and incentive contracts to them. As a consequence of this framework, Pemex is in charge of all activities related to the oil sector.[2] Under the actual political context in Mexico, it seems impossible to have constitutional changes to eliminate some of these restrictions. The recent history has proved since late 1990s that any reform in the energy sector that tries to modify the constitution is blocked in the Congress. Thoughts about sovereignty and nationalism are strong enough in the population that no party is willing to promote any change that could be reflected in the electorate decisions.

In sharp contrast with the Canadian Free Trade Agreement, which was incorporated into the North American Free Trade Agreement, NATFA effectively accepted Mexico's restrictive practices in recognizing that it reserves the right to strategic activities and investment in the exploration and exploitation of crude oil and natural gas, in refining or processing of crude oil and natural gas as well as in the production of artificial gas, in basic petrochemicals and their feedstock, and in pipelines. It also recognized Mexico's unfettered rights over foreign trade, transportation, storage and distribution, up to and including first hand sales of crude oil, natural and artificial gas, as well as goods covered by chapter six (those obtained from the refining or processing of crude oil and natural gas, and basic petrochemicals).

This framework has been very restrictive in relation to private participation within the Mexican petroleum sector, and there was virtually no private investment until the early 1990s. In addition to these legal restrictions, for many years the administrative rules and regulations governing Pemex seriously constrained the company's financial planning for investment in exploration, production, refining, and related activities. In 1992, new laws were passed to provide greater flexibility, freedom, and powers to Pemex as

[2] On March 1938, petroleum became, completely, property of the Mexican State under the nationalization decision by President Lázaro Cárdenas. The strategic petrochemical area has been, since then, exclusively administrated by the federal government. The roots of this change were established in the Expropriation Law (*Ley de Expropiación*) and to the amendments to the 27th Article of the Mexican Constitution.

On the one hand, it was added the first part of the Regulatory Law of the 27th article of the Mexican Constitution in the Petroleum Sector (which remains nowadays): "The Nation has direct ownership of all natural resources of the continental shelf and underwater zones around islands, of minerals or substances that are in veins, layers, or masses; of beds of ore that constitute deposits naturally distinct from the components of the earth, such as minerals from which metals and alloys used in industry are derived; of beds of precious stones; of rock salt, and the salts formed directly in sea waters; the products derived from the decomposition of rocks when their exploitation requires underground work; of mineral beds, or beds of organic materials that are used as fertilizers; solid combustible materials; of petroleum and all solid, liquid or gaseous hydrocarbons, and of the space situated over the national territory, to the extent and terms fixed by international law. […] the ownership of the Nation is inalienable and essential, and the exploitation, use, or enjoyment of these resources by individuals or by associations governed by Mexican law cannot take place except by means of concessions granted by the Federal Executive according to the rules and conditions which the laws establish. […] No concessions or contracts will be granted for the extraction of petroleum or solid, liquid, or gaseous hydrocarbons, or for radioactive minerals. The Nation will carry out the exploitation of these products in the terms that the respective regulating law specifies […]".

On the other hand, the Expropriation Law established the payment specifications for the national and international enterprises that exploited petroleum in Mexican territory before 1938.

regards strategic planning. The new laws led to the creation of four subsidiaries — Pemex Exploration and Production, Pemex Refining, Pemex Gas and Basic Petrochemicals, and Pemex Petrochemicals. A new Administrative Board was established, composed of 11 members, and tasked with overseeing Pemex's activities and also entrusted with designing the financial and commercial strategies as well as the allocation of its resources for Pemex.

A major challenge for Pemex is the lack of coherent linkage between the generation of its revenues and its spending in relation to infrastructure and investment. Any business decision in Pemex (including investments, exploration, and the development of new oilfields) requires engaging with different levels of the government and institutions such as SENER, SHCP as well as the Congress. While first stage projects typically begin within a Pemex subsidiary which designs the project, the last stage involves the Mexican Congress, where it is presented for final discussion and approval. The project is only implemented once the proposal has successfully passed through all the administrative stages in between. Given such a process, it comes as no surprise that Pemex has proven to be ineffective in fostering project implementation and that its administrative structure has been incapable of dealing effectively with unforeseen changes. The hierarchical, and quite political, nature of this structure is an obstacle to the decentralization of operational and investment decisions. It is important to note that the states, through their governors, have no role in this decisions process. The only influence is indirect because when they ask for higher income transfers, there are fewer resources for Pemex. They seem to worry only about the sharing rules to distribute the oil revenue.

The patterns of administrative liability promote an increasing risk aversion and accountability evasion. All this thwarts the diffusion of technology, and administrative and industrial efficiency within Pemex. In order to reduce many of the continuing constraints on Pemex, further changes were introduced in the energy reforms of 2008 which resulted in the modification of the company's laws so that regulation by lower levels within the federal government ceased being as restrictive as it used to be.[3] Under the new architecture, four new laws were created: a) Law of Pemex, b) Law of the National Commission of Hydrocarbons, c) Renewable Energy and Energy Transition Financing Law, and d) Law for Sustainable Use of Energy. In addition, three existing law were amended: a) The Oil Act, b) Organic Law of the Federal Government, and c) Energy Regulatory Commission Law. Finally,

[3] Congress now approves the national energy strategic plans for the next 15 years. SENER will take care of fixing the platform of hydrocarbon production. Likewise, SENER is *authorized* to integrate the National Council of Energy (CNE), which plans exploration, operation, and transformation of hydrocarbons. Furthermore, according to the Law of National Hydrocarbons Commission (LCNH) a National Hydrocarbons Commission (CNH) has been created. It will be in charge of regulating and supervising exploration and extraction of hydrocarbons, including derivatives as well as refining activities, transport, and storage projects.

there were some modifications to the regulatory framework related to duties, fiscal frame and revenue.[4]

The Administration Board was modified, so that it is now composed of 15 members — 6 being officials from the federal government, 4 being external advisors, and 5 being members of the union. The option to create other subsidiaries was preserved. The energy reforms of 2008 also modified the budgetary process for Pemex and it was freed from the authorization previously required from the finance ministry, whose role was restricted to approving specific rules governing debt management and project's design and management. As long as Pemex fulfills its productivity goals, it will be able to tap into the money market.

The objective of these changes has been to allow Pemex to take risks and be free to choose whatever is best for it, thus reducing inefficiencies. In addition, the energy ministry will grant Pemex and its subsidiaries the allocation of areas for oil exploration and operation, with the joint border basins being operated in accordance with international treaties. The reforms provide that Pemex's subsidiaries and their affiliates will be able to carry out construction and service contracts with private investors, subject to the condition that the remuneration of these contracts will be paid in cash and will not grant any ownership of hydrocarbons. Production sharing contracts with private firms, which include a percentage of oil production, sales, or beneficial use, are prohibited. These continuing constraints mean that most upstream oil and gas companies, whose priority is to add to their reserves, are not attracted to working in Mexico on a service contract basis.

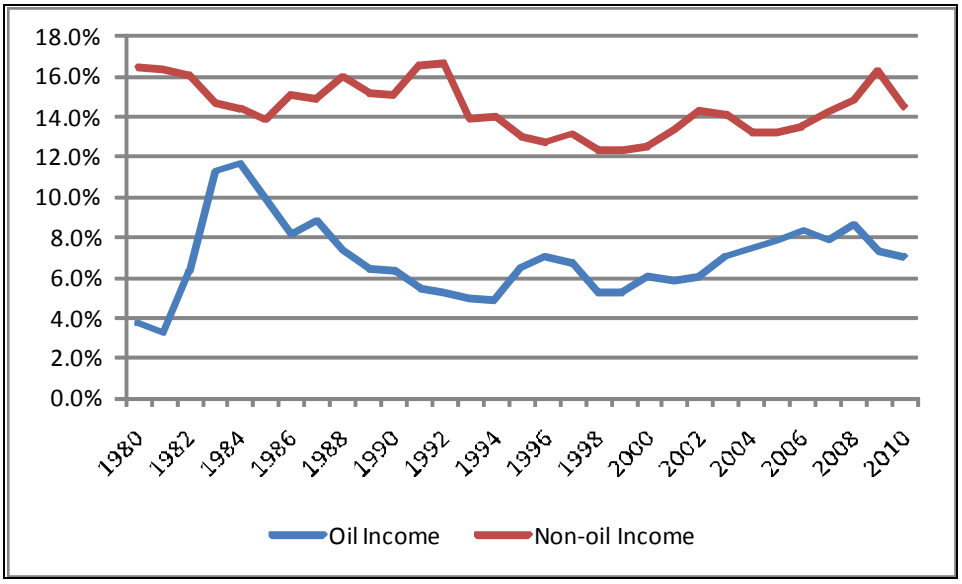
[D] Petroleum revenue arrangements in the context of the federal fiscal regime

Mexico's fiscal federalism is characterized by a huge vertical imbalance whereby states receive almost 90 per cent of their revenues from federal transfers while municipalities receive about 65 per cent in the same way. The states and municipal governments receive general transfers, specific transfers and some revenue from federal taxes administered and collected by the states. Revenues from petroleum are an important element in this architecture in that they are part of the general revenue pool which is shared with the states and municipalities. Producing states get almost no direct fiscal advantage from petroleum revenues. The federal government, for its part, has had a continuing heavy dependence on oil and gas revenues from Pemex,

[4] The Law of Public Works and Related Services (Ley de Obras Públicas y Servicios Relacionados con las Mismas), the Government Procurement Law (Ley de Adquisiciones Arrendamientos y Servicios del Sector Público), the Law on Federal Budget and Fiscal Responsibility (Ley Federal de Presupuesto y Responsabilidad Hacendaria), the Federal Duties Law (Ley Federal de Derechos), and the Federal Fiscal Revenue Law (Ley de Ingresos de la Federación) were adapted to the new legal architecture.

partly because of very weak tax collections from other sectors of the economy. Mexico's tax collections represent, on average, 10 per cent of GNP, which is very low for a middle income country. This number is explained by the importance of oil, the very complicated fiscal structure, the special regimes for some sectors, and the evasion widespread in the economy. Figure 5 shows the importance of oil income as a percentage of GDP from 1990 to 2010. Regardless of the important fluctuations, this income accounts for an average of 6.9% of GDP and 32% of total federal income in these 30 years. This heavy dependence has meant that Pemex has been starved of cash flow to invest, with serious consequences for its long-term production prospects as well as its productivity, and its safety and environmental performance. Recent reforms have made the revenue sharing arrangements more transparent and predictable, but have not adequately addressed some of the deeper issues of public finance or long-term investment in the petroleum sector. In order to alleviate the fiscal regime imposed on Pemex,[5] it is crucial to implement a fiscal reform in Mexico. It is important to find alternative fiscal sources, like the elimination of special regimes in the value added tax and the evasion in the income tax. Finally, the local states must share the responsibility for rising fiscal revenue. Under the actual system, the responsibility is almost exclusively at the federal level.

FIGURE 5. FEDERAL GOVERNMENT OIL AND NON-OIL INCOME AS A PERCENTAGE OF GDP



Source: Centro de Estudios de las Finanzas Públicas de la Cámara de Diputados.

[5] It is important to notice that Pemex is part of the federal budget. Under this current fiscal architecture, Pemex' budget must be approved by Congress and it is included under the fiscal rule (excluding its investment). This framework makes Pemex a unique energy enterprise in the world and has restricted its optimal development as it is discussed in this chapter.

The revenue regime for petroleum is essentially the tax regime for Pemex. It has been characterized by a set of taxes and duties designed by the finance ministry with the central objective of channeling resources to the federal government. Given the importance of the oil revenue paid by Pemex to the federal government, it has been very difficult to implement adjustments in the tax structure so as to give more resources to the enterprise as well as to states and municipalities. However, since 2005, we have seen a set of modifications along these lines. The tax regime for Pemex remained practically unchanged until 2005. Before then, the key components of the fiscal regime included taxes and rights based on income, sales, and productions levels, as follows:

- Taxes and rights based on income net of costs and amortization of investment.
  - A 52.3 per cent income tax (DEP).
  - A 25.5 per cent special tax on oil extraction (DEEP).
  - An additional 1.1 per cent right on oil extraction (DAEP).
- A tax on oil returns (ISRP), set at 30 per cent of net return.[6]
- An additional tax (IEPS) applied to the final sales price net of commissions, transport tariffs, production cost, and value added tax.
- A hydrocarbon right (DSH), set at 60.8 per cent of the sales value, including the IEPS.

Under this scheme, Pemex had to satisfy the tax rule that the DHS must equal the sum of DEP, DEEP, DAEP, ISRP, and IEPS. If the rule was not satisfied (in monetary terms) for any reason, the federal government had the right to adjust the DEP and DEEP rates as needed. This regime was complemented with the following taxes:

- 15 per cent value added tax (IVA) on the value of petroleum product sold
- A 39.2 per cent tax on surplus return (ARE), calculated on the difference between the current oil price and the fiscal price (see Figure 8.7 below).[7]
- An additional right (DA) due to the reduction in the oil production platform.

[6] Net return was defined as income minus admissible costs. Admissible cots included expenses, costs, investment, research, and development.

[7] The reference price is the fiscal price used to estimate the federal oil income. It is determined annually in the federal income law (it is discussed with detail in next sections).

In 2005, the tax regime was reformed.[8] Although cumbersome, the new regime was an improvement as more taxes were based on net earnings rather than on gross sales. Additional changes occurred in 2006 and 2007, generally easing the fiscal burden.[9]

The last change to the fiscal regime for Pemex was implemented in 2008.[10] Figure 6 shows the amounts paid by Pemex due to rights, taxes, and duties. It can be seen that Pemex's payments have risen substantially over the decade. These increases primarily reflect higher prices and, to a lesser extent, production volumes. The fiscal changes were designed to increase the company's ability to invest and to provide incentives for additional production. In fact, while its payments to government were rising, its own net take also raised because of higher prices and the new taxation regime and above-budget price revenue sharing arrangements, especially since 2005. Prior to 2005, Pemex received no share of oil revenues above the budgeted price, but, as we discuss below, the regime was reformed in 2005 to give it 50 per cent of such revenues (see Table 3).

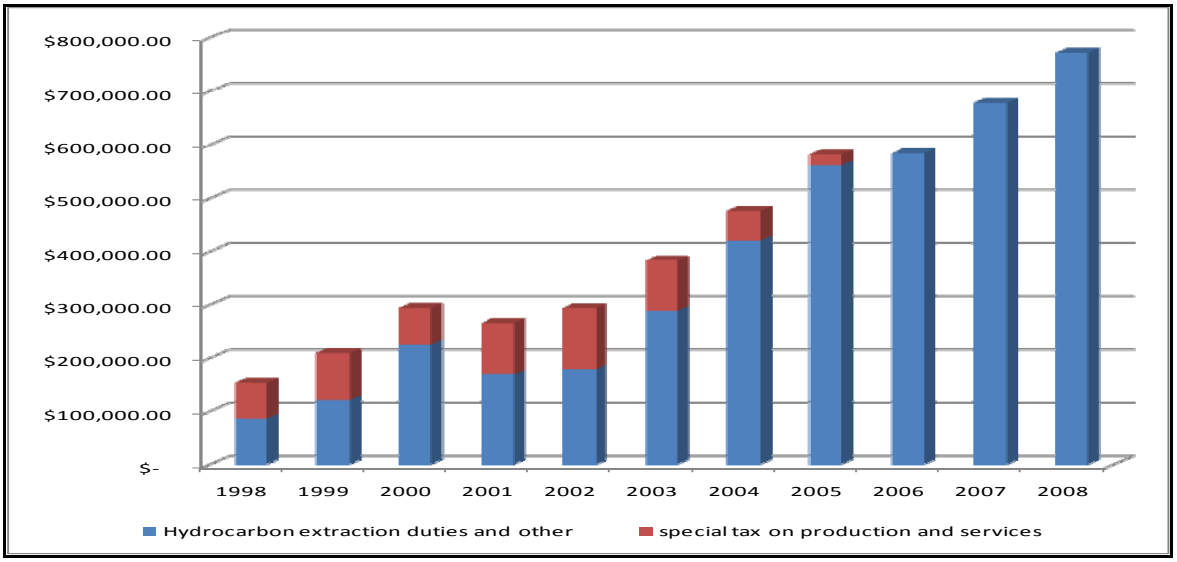
Even though it looks very complicated, the fiscal regime imposed in 2008 is simpler than the previous ones. It has some advantages. First, it is based mainly on net income. Second, it taxes differently the oil coming from different oilfields. Third, it allows the states to get a share from the oil revenue. Fourth, Pemex is getting more resources for investment, both in technology and in exploration (in fact, this was the main goal driving these amendments). Finally, it was possible to start building a stabilization fund, which was absent before these last changes.

[8] DEP, DEEP, DAEP, and DSH were eliminated, while ISRP, IEPS, ARE, and IVA remained. New taxes were added, in particular a contribution to the fund for technological and scientific research (DFCIT), a tax on 'fiscal oil' (DFP), a contribution to the Mexican Stabilization Fund (DSHFE), a special tax based on the difference between the current and the fiscal oil price (DEEXP), and an ordinary tax on hydrocarbons (DOH).

[9] The additional right (DA) was eliminated by the end of 2007; the tax on surplus return (AR) disappeared in 2006. The DEEXP, DSHFE, and DFP remained unchanged, and the ordinary tax on hydrocarbons (DOH) was reduced, while its proportion of the shared federal tax collection increased. Finally, the technology levy (DFCIT) rate increased.

[10] It included three new rights, while the DEEXP, DSHFE and DFP remained unchanged. Some additional modifications were made in relation to the DOH and DFCIT: the ordinary tax on hydrocarbons (DOH) was increased and the technology levy (DFCIT) was reduced. New taxes were created based on the oilfield's location in order to give incentives to Pemex to diversify its production from new fields. Among the new taxes created was a tax based on the average price of crude oil for export (DEH), a new tax *limited to* fields located in the Paleocanal of Chicontepec and based on the price of crude oil and natural gas for export (DEHPCH), and a new tax *limited to deep water* fields based on the average crude oil export price (DEHAP). It also promoted the creation of the single right (DU) charged with 20 percent of the production wells abandoned or in the process of abandonment.

FIGURE 6. RIGHTS, TAXES, AND DUTIES PAID BY PEMEX (MILLION PESOS)



Source: Pemex.

Finally, Table 4 summarizes the relevant regulatory authorities before and after 2008. Some restrictions were simplified, or completely eliminated, though in some other cases, additional agencies are playing important roles in the regulatory framework under which Pemex must operate. Under this new market architecture, Pemex would take decisions based on the market signals rather than on the needs of the federal government. It is expected Pemex' performance will improve in the near future due to more flexibility in the decision making process and the higher resources it is getting for investment.

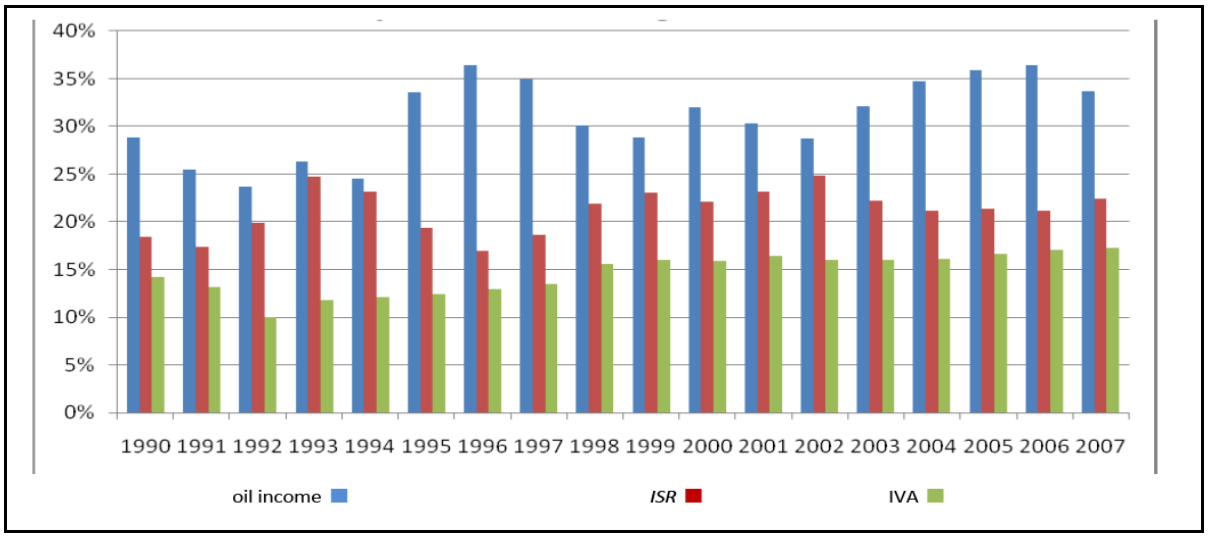
Regarding the fiscal relationship among the federal, state and local governments, the National System of Fiscal Coordination (SNCF) defines the functions of the federal government in relation to revenues. The federal government collects taxes, such as income tax, value added tax, as well as other taxes on some products and services. The system gives virtually no role in tax collection to state governments, with the exception of payroll tax, property tax, and other minor taxes. Figure 8.7 shows the total tax collection from Pemex, income tax and value added tax as a percentage of total government fiscal revenue; typically these three sources account for over 70 per cent of all federal revenues.

TABLE 4. REGULATORY SCHEMES

	BEFORE 2008	AFTER REFORM OF 2008
Budget planning	Pemex	Pemex
Budget approval	SHCP	SHCP/Congress*
Project planning	Pemex	Pemex
Project approval	SHCP / SENER / Congress	Pemex
Contracting with third parties	Not allowed	Pemex
Contacting approval	Not allowed	Pemex
Debt approval	SHCP / SENER / Congress	Pemex/SHCP**
Monitoring	Board (11 members)	Board (15 members)
Price fixing	SHCP / CRE	SE / CRE
Regulatory Agencies	CRE / SENER	CRE / SENER / CNH

* SHCP receives budget proposals but Congress makes the final approval. ** According to debt rules.

FIGURE 7. REVENUES FROM PEMEX, INCOME (ISR) AND VALUE ADDED TAXES (IVA) AS A PERCENTAGE OF TOTAL FEDERAL REVENUES

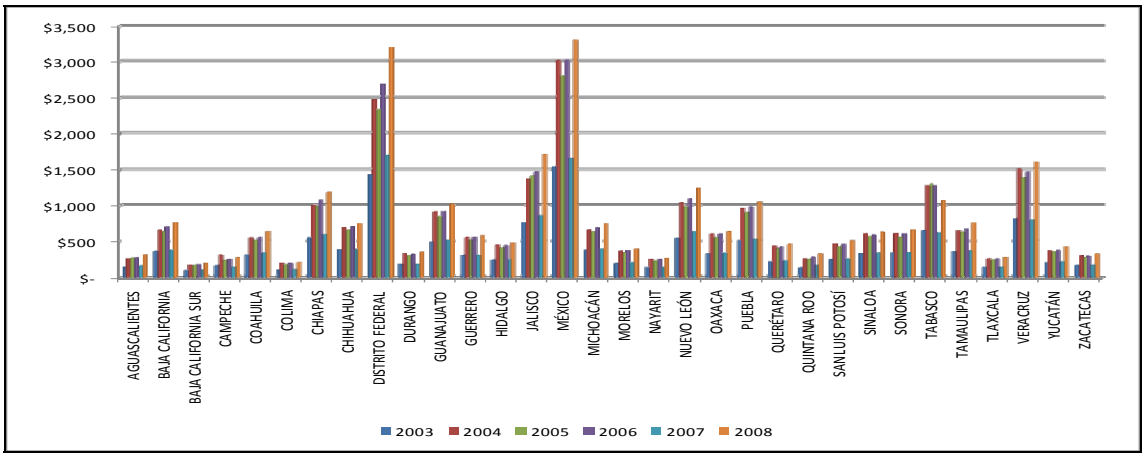


Source: INEGI (2008).

The state governments receive three types of revenue transfer from the federal government: general transfers (*participaciones*), specific transfers (*aportaciones*), and some small transfers related to federal taxes, administered and collected by the states. General transfers are made from the *Recaudacion Federal Participable* (RFP), which is composed of federal taxes (mainly value added and income tax) and oil revenues. The transfers are allocated to the constituent unit governments using a formula which gives 45.17 per cent weight to population size, 45.17 per cent to local fiscal revenue generation capacity, and 9.66 per cent in inverse relation to the per-capita transfers resulting from the two first components.

Municipalities, for their part, must receive at least 20 per cent of state revenues. For the municipalities, these resources account for almost 65 per cent of their total budgets. However, states are not bound to a particular formula for sharing revenue with municipalities and are free to choose their own sharing criteria. In practice, not all states use formulas, or establish transparent sharing mechanisms. It is important to highlight that municipalities have a higher tax capacity than the states due to their power to collect local taxes. Nonetheless, only a few metropolitan areas (such as the Federal District with property taxes) have been able to fully exploit this potential. Most municipalities fare poorly in this regard, and are hampered by the strong regional heterogeneity in administrative practices and resources allocated to execute local tax collection (Sobarzo, 2004). Figure 8 shows the total resources transferred by the federal government to each state.

FIGURE 8. ALLOCATION OF GENERAL REVENUES TO THE LOCAL STATES (MILLION PESOS)



Source: SHCP.

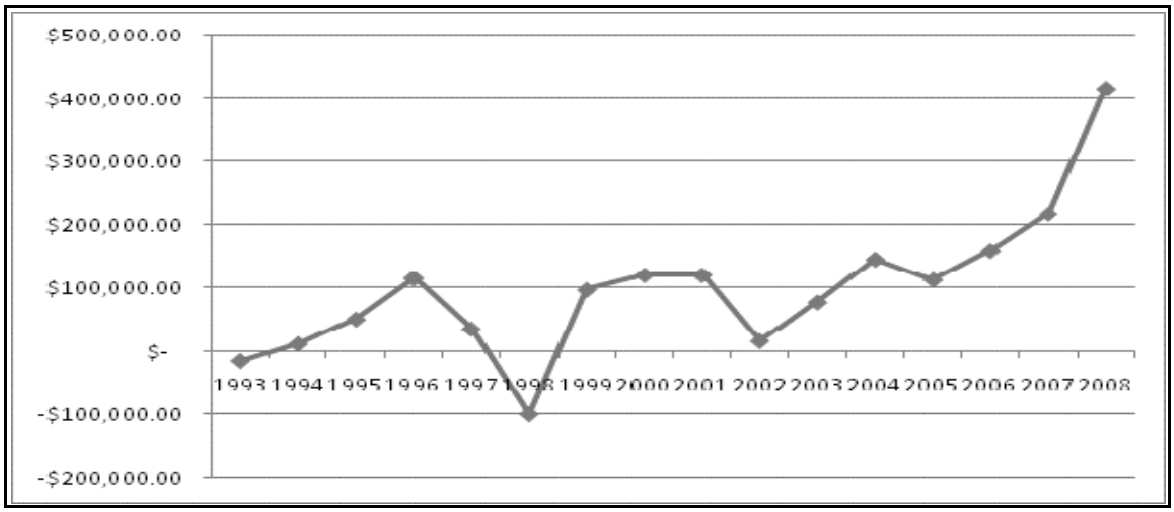
These resources include revenues from taxes, duties, and special taxes paid by Pemex. The Distrito Federal and the Estado de Mexico have the biggest shares since they have the largest populations and generate most of the taxes collected by the federal government. For similar reasons, the smallest states (Colima, Nayarit, and Tlaxcala) get the fewest resources. The trend since 2003 has been for the states to receive substantially greater resources —roughly doubling in nominal terms from 2003 to 2008—, but the year-to-year fluctuations have been substantial, notably with a pronounced drop in 2007. The increase is mainly explained by the higher oil income received by the country, while the drop in 2007 was due to the decrease in oil production and lower exports because of the global economic-financial crisis.

In addition to these allocations from general revenues, the states also receive a share of the excess oil revenue, based on the difference between

the market price and the fiscal oil price. Figure 9 shows how these resources have grew dramatically from 2005 to 2008.

Oil revenue estimation and the management of the Mexican Stabilization Fund are calculated according to the *Ley Federal de Presupuesto y Responsabilidad Hacendaria (Law on Federal Budget and Fiscal Responsibility, LFPRH)*. The budget price used by the Congress is initially estimated based on the averages of market values using historic prices for the Mexican Oil Basket and future prices from the NYMEX. These projected revenues are then added to other tax revenues to get the projected total federal income. The excess oil revenue is determined based on the difference between the price set by Congress in the budget and the actual market price. These so-called oil excess revenues are distributed among the local states, the federal government, the stabilization funds, and Pemex, according to the LFPRH.

FIGURE 9. EXCESS OIL REVENUE (MILLIONS OF 2008 PESOS)



Source: Own calculations computed from Pemex's data.

A long-standing issue in Mexico was how to allocate the surplus revenues that may result from the oil price being higher than budgeted. Table 3 summarizes the distribution of petroleum revenue above the budgeted price among the different levels of government, as well as Pemex since 2000. From 2000 to 2005, Pemex received none of these revenues, but since 2005 its share has increased to 50 per cent. This has allowed the company some much needed breathing space for additional investment. The Stabilization Fund's share, which was originally 40 per cent, has progressively fallen to 25 per cent. By the end of 2008, the fund had accumulated about $5 billion US.

TABLE 3. RULES FOR SHARING OIL REVENUES ABOVE THE BUDGETED PRICE

2000	2001 — 2	2003 — 4	2005 — 6
40% Stabilization Fund	33% Stabilization Fund	25% Stabilization Fund	25% Stabilization Fund
60% public debt repayment	33% Public sector balance	25% Public sector balance	25% Public sector balance
	34% Infrastructure: water and exploration projects	50% Investment in infrastructure in states	50% Pemex investment

Under the changes implemented in 2008, it is more transparent how the excess oil revenues are distributed among all the recipients. First, a revenue target is set. Second, the first tranche is allocated to compensate for any increase in non-programmable expenditure.[11] Thirdly, if the revenues are high enough to achieve the first target, the second tranche is allocated according to the next rule: 25 per cent goes to the states' Revenue Stabilization Fund, 25 per cent goes to the Pemex's Infrastructure Stabilization Fund, 40 per cent to the Stabilization Fund, and 10 per cent to infrastructure and equipment investment projects of the states. These last resources will go to them in accordance with the most recent public budget for that particular local state.

If the next threshold of oil surplus funds is achieved, this third tranche is allocated in four equal amounts to the federal budget for investment projects giving preference to those that address needs of the federal entities, to the states and municipalities for investment projects and programs, to Pemex for investment, and to the support fund for restructuring the pension system.

This mechanism has eliminated the political manipulation in the estimation of the oil revenue and in their allocation, and most importantly has made these processes very transparent so that it is easy to find the final allocation of oil proceeds. Moreover, the LFPRH has allowed sharing the excess oil revenue among federal and state stabilization funds, Pemex investment, and the current budgets of the states and municipalities. As well, from 2006 to 2008, the Stabilization Funds have accumulated substantial resources. However, even though these changes have improved transparency they still present two important problems. On the one hand, they have not eliminated the volatility related to the excess revenue. Pemex' investment plans still, in part, depend on the yearly difference between the budgeted price and the actual price of oil. This volatility and unpredictable pattern restricts long-term planning in the enterprise. By the same token, the state and

[11] The non- programmable expenditure accounts for expenditure regarding the *Participaciones,* to cover the financial cost, resulting from changes in the interest rate or the exchange rate, to repay debt from past years, and to allocate resources to the natural disaster fund when there is need for additional resources. By the time this chapter was finished, this first tranche was temporarily eliminated.

municipalities face the same uncertainty about their final resources. On the other hand, there is a need for improvement in the accountability and rules related to the final use of the resources allocated to the states and municipalities. This is discussed further below. Finally, this intricate architecture of earmarking revenue gives rise to many issues that will need to be solved in the future: budget rigidity, hysteresis effects, inefficient allocation of resources, incentives for waste, and potential underfunding of crucial productive projects.

[E] Macro-economic challenges

Mexico faces various macroeconomic challenges, which are very closely related. Firstly, there is the need to reduce Mexico's excessive dependence on oil revenue, and to develop alternate sources of public revenues.

At present, oil revenue constitutes around one-third of total federal income, and this strong dependence has generated some important distortions that are difficult to eliminate. It has created a climate of relaxed controls on tax evasion, which has been around 25-30 per cent for both income and value added taxes during the last 10 years. A new fiscal framework will require a broader tax base and more effective collection, so that the federal government can eliminate its high dependence on oil income. Such heavy reliance has had negative effects, because expenditure programs have fluctuated with the price of oil, even though there is a stabilization fund. Such pro-cyclical fluctuations have clearly negative impacts on the national economy. The experience in Mexico has proven the need for a different macroeconomic management of the oil income. The creation of the stabilization funds and the hedging policies that the federal government is implementing would lessen the size of such fluctuations. The goal must be to have a stabilization fund (or some other macroeconomic policy) in order to smooth federal spending as much as possible.

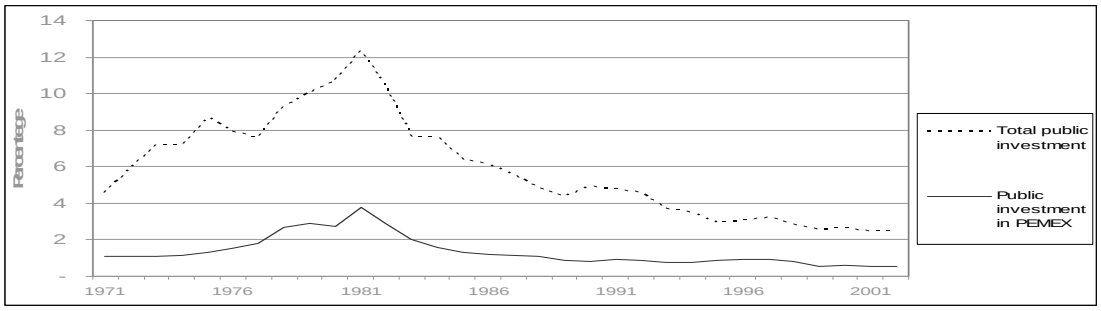
The second is the need to cut back on the constitutional restrictions which have limited private investment in the petroleum sector, which is crucial for Pemex to substantially increase its investments in exploration and development. Pemex requires enormous investments to buy/develop the technology needed to get into the deep and ultra deep waters, where it is expected to find new oilfields. Without these resources (coming from private investors given the lack of public funding), Pemex would concentrate only on the actual oilfields and will not be able to take advantage of the huge potential it has.

In 1981, the federal government invested 3.8 per cent of the GDP in the oil sector, which was a record. However, Figure 10 shows that between 1981 and 2002, public investment in Pemex declined at an annual rate of 9 per cent, even though federal tax income considerably increased, notably during the

periods 1973-85 and 1991-2004. The decline in investment in Pemex reflected a broader decline in public investment; Pemex got only one-fourth of total public investment.

In 1994, after the Mexico's crisis in the currency and debt markets, the federal government sought to stimulate private investment in the oil sector. To this end, in 1995 the Mexican Congress approved an amendment to Article 30 of the Public Budget Law (*Ley de Presupuesto, Contabilidad y Gasto Público Federal*) as well as to Article 18 of the Public Debt Law (*Ley General de Deuda Pública*) which allowed private investment in the oil industry. The most important change was the design of the Pidiregas (*Proyectos de Infraestructura Productiva de Impacto Difererido en el Registro del Gasto*) scheme in 1997. The goal of this innovative scheme was to attract long-term investment to the energy sector through long-term public debt (*Centro de Estudios de las Finanzas Públicas*, 2007a). As the public budget was relaxed under this mechanism, Pemex's investment financed through Pidiregas increased rapidly from 2003 to 2008. However, by the end of 2008, it was clear that the repayments of the Pidiregas were not sustainable as a consequence of its wide and arbitrary use.

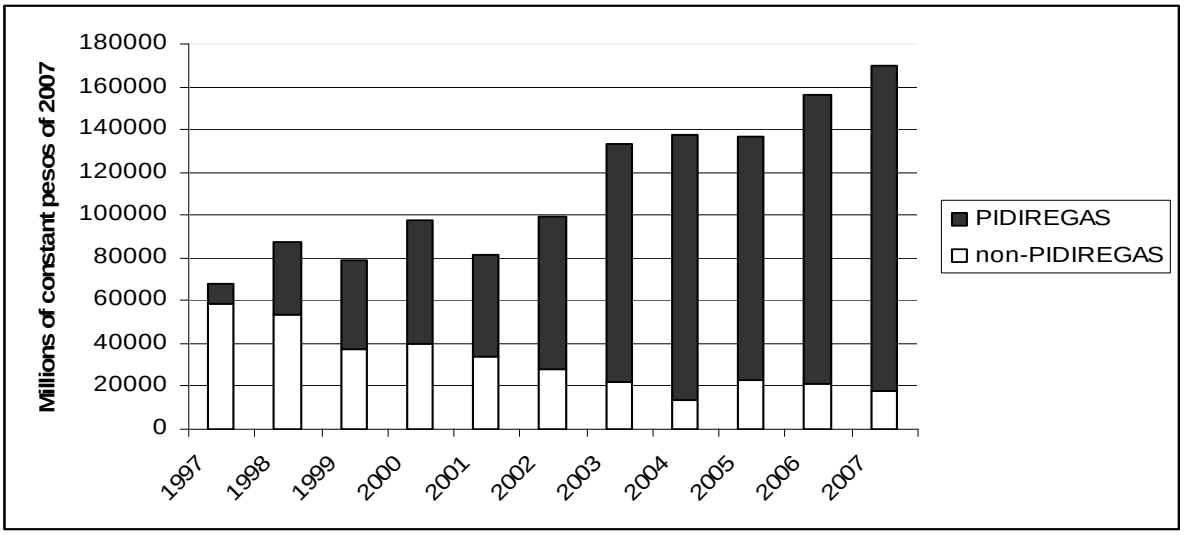
FIGURE 10. PUBLIC INVESTMENT IN PEMEX AS A PROPORTION OF GDP



Source: INEGI.

Figure 11 shows how Pemex's total investments grew dramatically from 2003 because of Pidiregas funds, even while other sources of investment declined. As a result, long-term liabilities increased by 5.7% in 2005 and 2006. The combination of new taxes and the investment incurred trough Pidiregas produced a negative net income for Pemex in almost each year from 2002 to 2006. In 2007, the situation changed somewhat, as long-term liabilities decreased 4%, short-term liabilities increased by 64%, and Pemex's total equity increased by 6.4%.

FIGURE 11. PIDIREGAS AND NON-PIDIREGAS INVESTMENT IN PEMEX



Source: Pemex.

Pemex's central medium-term challenge is to maintain its current production levels and to better manage and deal with the reduction in its oil reserves. In the longer-term it must find and develop important new fields, especially in the offshore. Pemex will need to acquire the technology to go offshore and enough resources to finance these tasks, which are the two crucial issues that must be solved in the very short run. The company's approach includes the more efficient use of energy, a reduction in crude oil exports in line with reserves depletion, and technological upgrading in production, operations, exploration and development. Its goal is to keep oil production around 3.1 mbd until 2012. This will require improved reservoir management at Cantarell, development of the Ku-Maloob-Zaap, Burgos and Chicontepec fields, and of the Southeast basin.

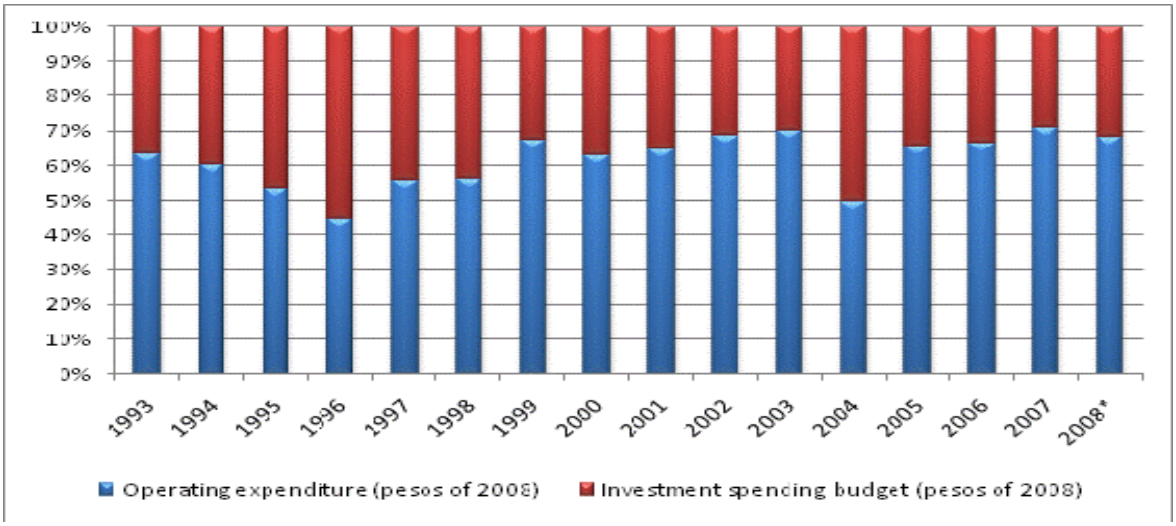
The Ministry of Energy has developed two investment scenarios: the first sees investment decreasing substantially, while the second implies further legal changes that would substantially increase private investment in production and exploration during 2007-12. With the reform approved in 2008, the Ministry has planned a substantial program of investment, allocating 62.6 per cent to production, 20.8 per cent to exploration, and 16.6 per cent to future developments, from the average investments programmed during 2008-17, according to the first scenario. It has also considered continuing with the medium and long term strategies. Additionally, the development of projects in deep waters will represent 17.9 per cent of the total investment that is planned for 2017.[12]

[12] It is important to stress that in order to develop the deep waters projects it is needed additional resources (mainly from foreign investors) and new technology (since Pemex does not have it). Under the current market

Pemex is a classic case of a national oil company that has been taxed too heavily, so that it has seriously under-invested, thus undermining long-term production and reserves. The tax requirements that have to be met by Pemex are very exacting and it is hard to find similar restrictions in other parts of the world, and this remains true, despite recent changes. Although Pemex has received significant resources, they have gone largely to fund extraction and operating costs, with investment in exploration being minimal. Figure 8.12 shows the evolution of investment for the main components. Pemex is further handicapped by how the Finance Ministry deals with its budget. Its final budget is invariably less than Pemex seeks because the Ministry must balance so many other demands from other public entities.

While this explains Pemex's under-investment, it is becoming urgent that it allocate greater resources for exploration given that at the end of 2008 its reserves were projected to account for only 10 more years of production. To be globally competitive, Pemex must replenish reserves in order to have a long-run horizon; doing so would make it easier to obtain cheaper financing in the money market. This will require Pemex having greater resources, which means either that the other claimants must have less or Pemex must find new sources of revenues as is proposed in the second scenario above. The alternative adopted in most countries —of opening the sector to foreign investment— does not seem to be a realistic prospect given the current constitutional provisions and political resistance to such an opening under the current market architecture.

FIGURE 12. INVESTMENT FOR PEMEX



Source: Pemex.

architecture, including the changes implemented in 2008, it would be very complicated to realize these ambitious goals.

[F] Environmental and social issues

Environmental issues —whether climate change or local impacts— have moved well up the public agenda in Mexico. In Mexico's oil sector, the federal government has started to implement policies to prevent and repair the damage done to the environment and has established legal responsibilities for Pemex for environmental care. The reform implemented in 2008 asks Pemex to include prevention and repair actions regarding environmental damages; ecosystem conservation and restoration; and limits for oil reserve zones. During the last 10 years, concerns regarding pollution generated by Pemex activities have increased significantly. This has forced Pemex to reduce its emission of particles, its pollution of rivers, and also to look into the sulphur content in its gasoline. It has made important undertakings related to respecting and improving the environment, adopting more environmentally sensitive technologies, maintaining environmental certifications, offering products that fulfill international environmental standards, incorporating a special section on environmental preservation in its programs and projects, and participating in activities that enhance environmental care.[13] Such promises signed by Pemex accord with the National Plan of Development[14] and are based on three critical goals: to capture operating opportunities, to assure investment sustainability, and to demonstrate social environmental responsibility.

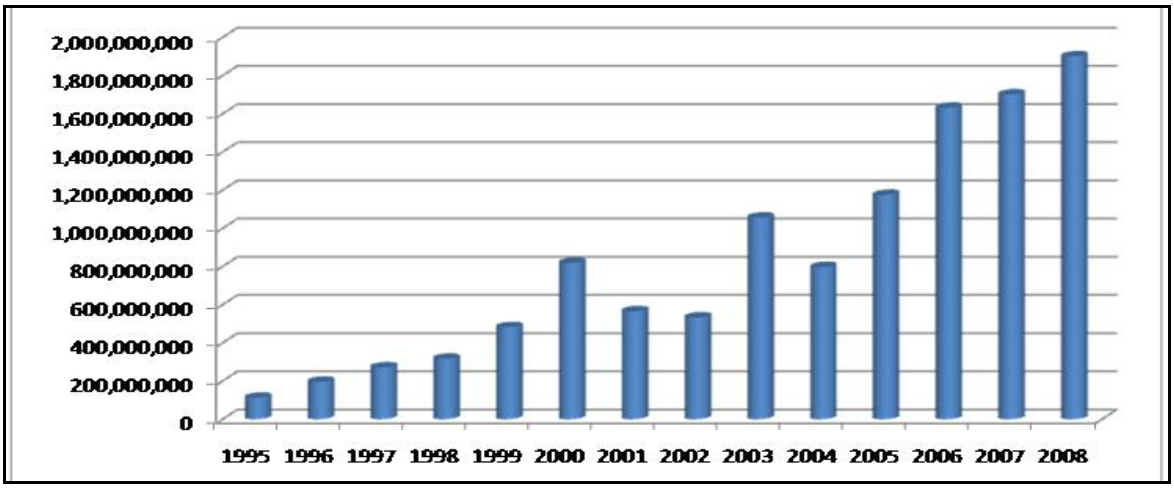
Pemex has thus designed projects to optimize its production by minimizing environmental impact. These projects fall into four main groups: air, climate change, fresh water, and environmental liabilities. For air and climate change, key goals are to reduce emissions of sulphur oxide and carbon dioxide, respectively, on both of which Pemex has made good progress. The company's water consumption has declined significantly and it increasingly uses recycled water. Finally, Pemex is committed to reversing environmental deterioration caused by its activities. However, Pemex's track record with respect to the management of hazardous waste has been dismal and its waste generation rose significantly in the last decade. Pemex will invest more than 11 billion dollars in environmental care from 2007 to 2011, of which more than 10 billion will go to the reduction of emissions of CO2 and SO2. Local governments have played an increasingly important role since 2000 in encouraging Pemex to comply with environmental regulations. Local pressure has forced it to negotiate with local authorities to compensate for environmental damage by making direct transfers and undertaking activities to alleviate these kinds of problems. As a result, Pemex has transferred

[13] Obtained from Pemex y el Medio Ambiente: PetroQuiMex.

[14] This plan establishes the national strategies and objectives. The *National Plan of Development* has five main areas: security and rule of law, competitive economy, equal opportunities, ecological sustainability and effective democracy.

increasingly large resources, based on certain sharing rules, depending on the importance of the state or municipality and any agreement in existence among them, as shown in Figure 8.13. These sharing rules are designed according to the environmental damages caused for Pemex to the local region, the pressure that could exercise the local government, and the guidelines set out in National Plan of Development.

FIGURE 13. TRANSFERS FROM PEMEX TO THE CONSTITUENT UNITS REGARDING ENVIRONMENTAL POLICIES (PESOS)



Source: Pemex.

[G] Transparency and accountability

Mexico and its institutions and public enterprises have a long and a rather negative reputation regarding transparency and accountability. This applies perfectly to Pemex, where numerous cases of corruption have been attributed to the labor union, senior management, and its suppliers. However, the company is part of a larger system that is seeing important changes and so it too has had to make modifications to its transparency requirements. Following the National Plan of Development 2007-12, the *Secretaría de la Función Pública* published in 2008 the structure, bases, and guidelines for the National Accountability, Transparency and Anticorruption Program for the period 2008-12. Based on this, Pemex participated in this public initiative from a three-way perspective.

First, Pemex incorporated the new transparency requirements into its objectives. Currently, its aim is to be a well-known public enterprise in the national and international markets, based on its excellence in operating systems, transparency, accountability, and high quality products. This target highlights the interest of Pemex in achieving efficiency and transparency. Second, in order to prevent irregular behavior and promote transparency in

operations, Pemex has created a code of conduct which requires workers to report any acts of corruption. Pemex has undertaken to adopt rules for greater certainty and transparency in its commercial processes with its suppliers and buyers. Finally, the company publishes extensive information on issues from its organizational structure to its budget on its web page.

Third, Pemex honors the commitments undertaken with international organizations. For example, Mexico has been active in anticorruption conferences organized by the OECD where Pemex has suggested mechanisms for preventing corruption, including approaches to reviewing potential partners in projects, employee education on rules, legal audits and internal controls, and the use of tenders. Pemex must also comply with the standards and information requirements set by the Mexican Stock Exchange and the US Securities Exchange Commission. The company's data are posted on its web site. The Federal Office for Public Information (IFAI) has made it possible for anyone to have access to information about Pemex and its operations, thereby increasing public awareness. To help realize all of these strategies, the federal government has allocated important resources. Preliminary results from the *Comisión Intersecretarial para la Transparencia y el Combate a la Corrupción* are encouraging. It is expected that important milestones in combating corruption and promoting transparency will be achieved by the end of 2012.

An important issue regarding transparency and accountability is related to the final use that the states and municipalities make of their share of excess oil revenues received during a year. The public perception is that the excess revenue is mainly wasted in activities and projects that are unproductive due to poor accountability. The root of the problem lies in the nature of the rules and the time-frame that regulate these transfers. Since these transfers are based on the difference between budgeted and the average real oil price, they are mainly known in the second half of the fiscal year, so that they are transferred by the third or fourth quarter and must be spent by the end of the year or, at best, before the end of the first quarter of the following year. This requirement has led to some poor spending and the practice conveys the image that the states have poor planning, inefficient spending, and poor accountability.

Finally, according to the Law of Pemex, issued in 2008, Pemex has to provide information according to the following schemes: a) send to the Congress an annual report that must include the performance of Pemex and its subsidiaries, its main ongoing projects, and its results and financial statements; b) send to the Congress a quarterly report about operation and performance; and c) send to SHCP a report about the use of debt, project profitability, financial conditions, execution time line, disbursements and business profile. As well, an auditor has to be appointed by the President and present an annual report about Pemex's performance and financial situation.

Conclusions

Mexico presents an interesting case of an 'Oil State', which is not based on an 'Oil Economy'. Oil has provided the Mexican State its financial base since its Federation, and it has been the main federal source of income, more important than revenues from income tax or the value added tax. Mexico is a highly centralized federation, in which the states and municipalities are highly dependent on federal transfers based on revenue sharing and so they are equally at risk to the country's fiscal dependence on oil.

Oil has supported Mexico's industrial development and allowed the State to obtain foreign financing at record levels. Pemex is a vital resource for the government - it supports public spending, provides a sense of certainty to the economy, and lately, provides extra resources to state and local governments. However the lack of transparency and accountability on the part of the local governments has brought about abuse of this important aspect of the economy.

Mexico has a deep, constitutionalized commitment to developing its oil sector solely through its national oil company. However, for decades, fiscal, institutional, legal, and organizational constraints have prevented Pemex from pursuing optimal strategies for reinvesting its resources or subcontracting with other firms with advanced technologies. The current market architecture in the hydrocarbon sector hinders the development of Pemex in all stages of production. For many years, there has not been a coherent public strategy to foster investment in this state monopoly. The federal government expects that the changes introduced in 2008, under which Pemex will face fewer budgetary and planning restrictions, will allow the company to strengthen its current position and improve its future prospects. Under these newly implemented changes, Mexico must address important challenges immediately. It must address its very weak performance in raising public revenues from non-petroleum sources to replace the oil income that has supported the federal budget in the past; this would permit it to escape its oil dependency and leave more adequate resources with Pemex for its investments. Pemex itself must derive greater wealth from its investment in petroleum projects, which implies it must operate in a more commercial manner. It must also allocate more of its investment to exploration in order to replenish its depleted reserves and secure its future viability.

In the last decade, Mexico has put in place a clear mechanism to distribute the oil proceeds. This new fiscal scheme makes clear how Pemex pays rights and taxes and it is based on rules set by the National System of Fiscal Coordination. It has eliminated the political manipulation in the estimation of the oil revenue and brought greater certainty, transparency, and accountability for federalism in Mexico. Legislation now governs budget

procedures and fiscal responsibility, the sharing of excess oil revenue among the federal, state and municipal government, Pemex, and several stabilization funds. An extremely positive outcome of these new rules is that by the end of 2008, the Mexican Stabilization Fund accounted for around 5 billion US dollars. However, the volatility issues related to the excess oil revenue must be solved in order to reach better macroeconomic outcomes.

While Mexico has become more truly federal since multiparty competition has become vibrant and several states are in opposition hands, the states remain very minor actors in relation to oil and gas. The country's oil and gas resources are concentrated onshore and offshore in a few very small states, with little political weight. Beyond that, the constitution and national political culture clearly make petroleum a national resource. Thus the petroleum producing states receive virtually no fiscal advantage from the resources developed from their territory. Nevertheless, they are getting some transfers via the environmental compensation and, in the last years, they got small transfers based on the right on oil extraction. However, as the political system has democratized, they have had an increasing say regarding oil and gas activities, particularly when these involve social or environmental damage or costs. Increasingly, they are compensated financially by Pemex for environmental damage it may have caused.

The sharing of excess oil revenues with the states and municipalities has given rise to some important issues regarding their accountability and transparency for the use of these transfers. It seems that local authorities, such as governors and presidents of the municipalities, are wasting these scarce resources. This problem reflects unreasonable rules requiring these transfers to spend the funds in too short a time-frame. New rules need to clarify accountabilities as well as to institute appropriate planning frameworks and time-frames.

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