Mexico's Deepwater Auctions

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January 9, 2017

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On December 5, 2016, the Mexican government auctioned eleven deep- and ultra-deepwater blocks in the Gulf of Mexico, five of them close to the US maritime border in the Perdido Foldbelt and another six in the Salina Basin, offshore Southern Veracruz and Tabasco. These large blocks are considered by some to be part of the jewels of the Mexican oil crown and the last to be offered to bidders in the first round of auctions. The seven winning operators in this bidding round (known as Round 1.4) are all credible, highly experienced oil majors and large international exploration and production companies. Competition for specific blocks was limited: in five cases only one bid was received, and in three cases there were two bids tendered. Two blocks did not receive any offers. However, Block 5 of the Salina Basin received 4 bids.

Pemex and the government viewed the process and its results as a major success. However, this critical commentary strives to balance what has been achieved to date by opening of the Mexican upstream to private investment, particularly the deep water Round 1.4, with some of the limits and shortcomings of its execution. The 2013 energy reform marks a major discontinuity: the beginning of a new industrial structure that ends a long established state monopoly. The entry of new domestic and international investors will fundamentally change

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the Mexican oil and gas industry, slowing down the decline of legacy assets and eventually recovering output level. Competition should force Pemex to improve the performance of its upstream activities and enhance productivity and operational efficiency. Achieving these mid- and longer term objectives will be preceded by what already appears to be a difficult to plan and manage transition.

A naïve optimism with respect to production and reserve replacement, as well as the short- and mid-term impact of upstream reform, prevailed from 2013 to 2015. This view was expressed in annual government targets and mid-term projections of production and government revenues.[1] It was not until 2016 that the authorities assumed a more realistic perspective, as both internal and external economic conditions and oil industry trends deteriorated. For a time over-optimistic assumptions were used in selling the energy reform to the public. With some exceptions, many in government began to believe in their own projections. More recently government officials have begun to recognize that the upstream auctions will have little effect on production and fiscal revenues during this decade. The compounding impact of low prices and falling oil production on public finance and particularly on the financial position of Pemex has forced the oil industry to limit debt and drastically cut expenditures. The mid-term consequences of these constraints should not be underestimated.

The timing and sequencing of the Round 1 auctions has been severely affected by global oil industry conditions. This commentary and others published by the author argue that a more rigorous selection of assets and a slower paced calendar could have offered better results under

[1] SHCP, Criterios Generales de Política Económica, 2013, 2014, 2015 y 2016. .http://finanzaspublicas.hacienda.gob.mx/es/Finanzas_Publicas/Paquete_Economico_y_Presupuesto

these circumstances. It would have given more time for the Mexican government and the upstream regulator to develop and strengthen their capacity to manage the reform process more effectively. The institutional stress under which policy makers operated allowed little time to evaluate and more fully understand the results of each auction and pose alternative contractual options in the following ones. The argument that they had no other options is mistaken. The overall process could have benefitted from different solutions at critical points along the way. A more paused schedule would have had a limited impact, given the long gestation period of offshore exploratory projects. It would also have allowed the global oil industry to begin its recovery from what has been a taxing crisis.

Pemex Farmout

Of the 11 blocks on offer in December 2016, the Trion block was of particular interest, due in part to its location near successful fields, some of which are already under production. Trion is about 110 miles from the Mexican coast, 20 miles from the US border, and less than 40 miles from the Great White field in US waters and Shell's Perdido production platform. It is only about 15 miles from three other Pemex fields –Maximino, Exploratus and Supremus– where successful wells have been drilled. The Trion auction was also important because it marks the first field offered as a Pemex farmout, testing what will be a new form of upstream joint ventures with the Mexican national oil company. The new Pemex operating partner is BHP Billiton, which received a 60 percent stake in Trion while Pemex retains a 40 percent interest. According to Pemex estimates, gross technically recoverable resources are 485 million barrels of oil equivalent (Mboe), in water depths that range between 6,800 to 8,400 feet. These are prospective resources and not 3P reserves as announced. The official 3P reserve estimate on

December 31, 2015 was 267 Mboe. Pemex expects first production in 2023 that will plateau at 120,000 b/d beginning in 2025. The underlying assumption may be that 12 production wells will be drilled, each producing 10,000 b/d.

Pemex estimates total investment over the life of this project at $11 billion. However, in the initial exploratory phase (4 years), BHP Billiton has committed to spend at least $570 million. If BHP Billiton decides to continue with the project, this company has committed to invest in Trion a total of $2 billion, which would include a Pemex carry of $790 million, as consideration for the work it performed and the discoveries it made prior to the joint venture, as well as the corresponding partnership obligation of $1.2 billion. These funds will preclude Pemex from having to make any disbursements on the project over the next four years. The government will receive an 11.5 percent royalty on gross revenues when first production is achieved, plus income tax when profits are realized. The level of the government take reflects, among other things, the expected high cost of ultra-deep water projects.

As noted, Trion also represents a major step forward in the exploration and development of other Pemex fields through farmout mechanisms. An aggressive farmout program was proposed in its most recent business plan, with 6 specific blocks to be auctioned in 2017, as well as a number of unidentified onshore fields. For 2018, a significant number of blocks have also been put forward. This farmout program should be carefully coordinated with the government's upstream auctions to avoid crowding out other investors. Pemex favors this form of privatization as it injects cash to a company constrained by a lack of liquidity, reduces short-term capital requirements and allows for greater investment in reserve replacement and

production capacity. It also offers a unique learning process that will help Pemex develop other fields in a more effective manner, with state of the art technology and best industry practices. The state oil company must also learn to be a constructive upstream partner that contributes solutions to complex issues that will necessarily arise in these joint ventures. In the past, the behavior of Pemex in the few joint ventures in which it participated tended to fluctuate from that of a totally passive partner, to one that raised minor formal issues, to one that at times intervened consequentially. Such an erratic track record in its limited past joint ventures created concerns among potential future partners.

The Fourth Auction of Round 1

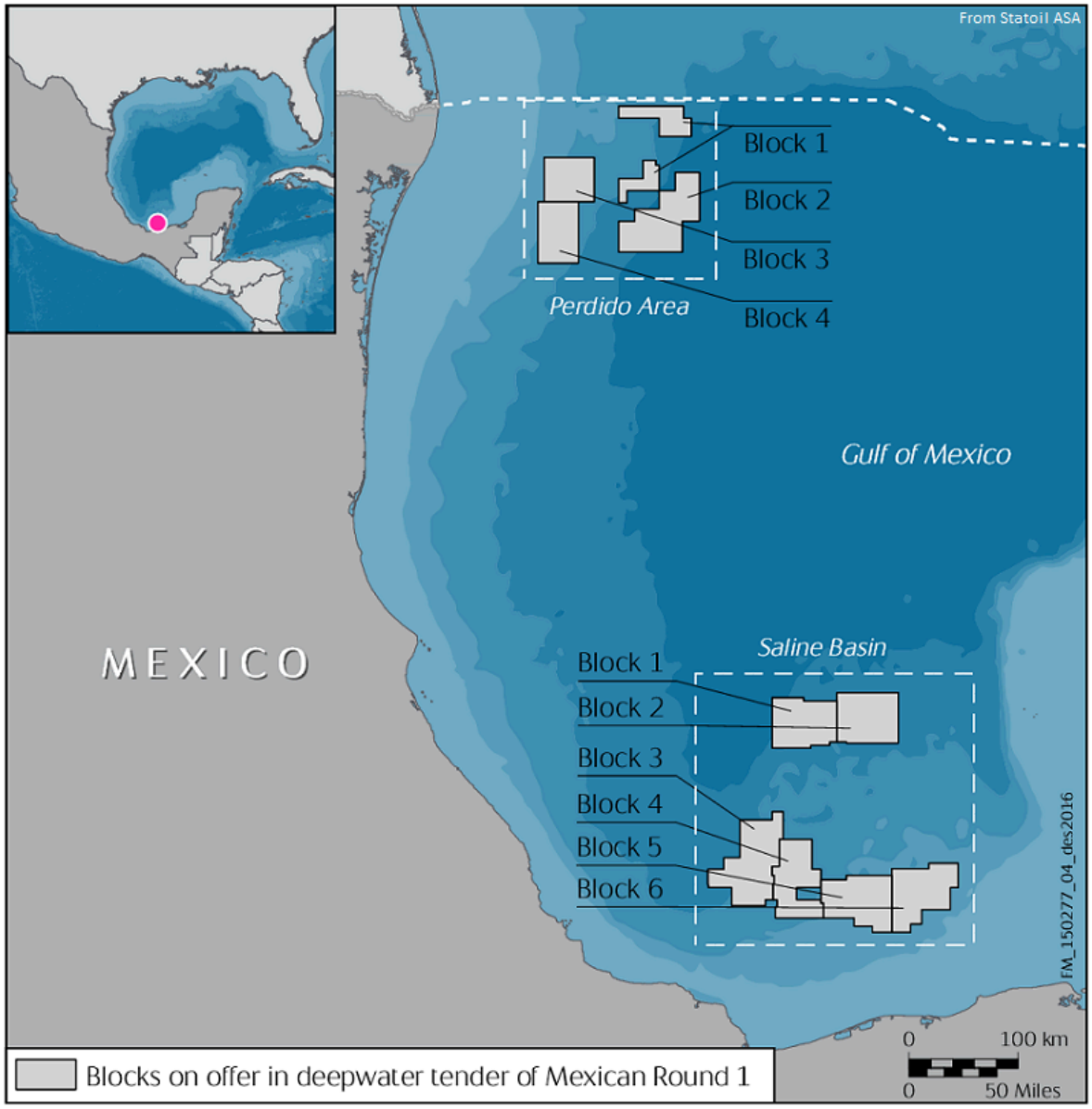
In addition to Trion, the Mexican government awarded 8 offshore exploration and production licenses in the December 2016 auction, four in the Perdido Foldbelt and four other in the Salina Basin in the Gulf of Mexico. These are a result of the auction of 10 exploratory blocks. As mentioned, two fields did not receive any bids. Two of the winning bidders acquired two blocks each. Six operators were selected from a number of consortia and one individual firm. The 12 winning companies were allocated 7,265 square miles of mostly ultra-deep, generously sized tracts, more than half in the less explored Salina Basin. According to Pemex, fields awarded comprise 1.8 billion barrels of oil equivalent of P_{90} prospective resources and the median estimate is 8.4 billion barrels of oil equivalent (see Table 1).

Table 1

Mexico: size, prospective resource and water depth of Round 1.4 blocks

Block	Operator	Area (square miles)	Prospective resources (Mboe) P90	Prospective resources (Mboe) Median	Water depth (feet)	
Total		**7,265**	**1,752**	**8,444**		
Perdido Foldbelt		**3,173**	**797**	**3,911**		
1	Cnooc	648	109	626	3,281	10,171
2	Total	1,149	218	1,440	7,546	11,811
3	Chevron	651	334	1,304	640	5,577
4	Cnooc	725	136	541	1,969	6,562
Salina Basin		**4,093**	**955**	**4,534**		
1	Statoil	919	329	1,852	6,562	10,171
3	Statoil	1,269	373	1,669	3,280	4,921
4	Petronas	910	83	392	3,280	4,921
5	Murphy	993	170	621	3,280	4,921
Memorandum:						
Trión	BPH Billiton	1,285	181	537	6,857	8,432

Source: Sener, CNH and Pemex.



The successful operators and their partners of Round 1.4 are a diverse group, as can be seen in Table 2. They include companies based in China, France, Japan, Malaysia, Mexico, Norway, the United Kingdom and the United States. China's Cnooc was the only company that participated alone in the bids. Three companies formed the Statoil, BP and Total consortium and the Murphy partnership included four companies. The Statoil consortium and Cnooc acquired the greatest surface extension. Statoil also obtained the blocks with greater potential

as measured by median prospective resources, followed by Total, which is also part of the Statoil consortium. Individually, Total acquired the highest acreage participation by bidding both with Statoil and BP as well as with ExxonMobil. Chevron was awarded the smallest block, located in shallower waters, closer to the coast and to the Vespa field. Given its experience, Pemex's participation in this consortium might have offered a deeper understanding of this block and its adjoining area. As there were no other bidders, the group led by Chevron managed to win the block with the lowest overall bid in the round. At the other extreme, Murphy faced the strongest competition, which might help explain why it offered the highest overall bid. Only the partnerships formed by Anadarko (Atlantic Rim) and Shell, as well as Eni and Lukoil, failed to win any acreage in Round 1.4.

The participation of Pemex in this auction, both in its winning bid with Chevron and its own losing bid for Block 1 in Perdido, raises a number of issues, given that Pemex will joint venture extensively through the announced farmout program. Its motivation and that of the government are unclear, as are the advantages of having Pemex come up with the necessary funds in the initial exploration period. There is also the question of competing for new blocks and thus further stretching its limited resources, given its own extensive holdings in Mexico. This policy should be reviewed before bids are placed in subsequent auctions.

Even more surprising was the absence of Shell in the Perdido Foldbelt bids. Shell had been considered a natural partner in this region as it operates the nearby field complex connected to the Perdido platform across the border and has the capacity to evacuate crude from its production facilities to the US Gulf Coast from its production facilities. Its partners there –BP

and Chevron– participated successfully in the bidding process. There are a number of possible explanations for Shell's absence from the bidding. One might relate to corporate strategy at this juncture, after taking over the BG Group and due to its need to reduce debt. A second explanation could be that the oil major is reserving itself for other blocks that Pemex might farmout and that are directly below its own operation across the border. A third possibility is that Shell simply did not find the tendered blocks of economic interest. Given the company's deep experience in the area, if this explanation prooves to be correct it should be a serious source of concern for the Mexican government.

Table 2

Mexico: Round 1.4 winning firms and consortia

Blocks	
Perdido Foldbelt	
1 & 4	CNOOC (100%)
2	Total (50%), ExxonMobil (50%)
3	Chevron (33.3%), Inpex (33.3%), Pemex (33.3%)
Trión	BHP Billinton (60%), Pemex (40%)
Salina Basin	
1 & 3	Statoil (33.3%), BP (33.3%), Total (33.3%)
4	Petronas (50%), Sierra Oil and Gas (50%)
5	Murphy (30%); Ophir (23.3%), Petronas (23.3%), Sierra Oil and Gas* (23.3%)

Note: Operator is underlined.
*Sierra Oil and Gas is owned by Riverstone (42.9%), EnCap (42.9%) and BlackRock (14.2%).

One measure of success of these exploration license auctions for the Mexican government would be the number of wells that the winner commits to drill in the initial four-year exploration period. The operators pledged to drill at least eight wells in total. Two operators – Cnooc and Total– offered to drill two wells each, while Chevron with Pemex and Inpex, as well as Petronas/Sierra have not yet decided to drill. Thus, a very small number of rigs will be required for these programs. In a sense, the awards represent for now a relatively low cost option for future frontier exploration.

In setting up the bidding terms, the government decided to cap at two the number of wells that the bidder is allowed to commit in the minimum work program. This decision suggests the government preferred to receive a higher royalty than an additional well in the initial exploration period. This preference is also difficult to understand in a frontier area where very little drilling, if any, has taken place. In these circumstances it is also surprising that the government would be willing to exchange drilling in the first four years of the life of the project for royalties in a more distant future if and when they arise.

After qualifying to bid, only two elements were considered in awarding the license: the additional proposed investment equivalent to the drilling of at least one exploratory well in the initial exploration period and the additional royalty offered above the base rate of 7.5 percent fixed by the government in the bid invitation. The winner was the operator that offered the highest weighted value of these two factors, according to a pre-established formula. The pattern of resulting bids is clear. In the less explored Salina Basin additional royalties were higher and the minimum drilling program lower than in the Perdido Foldbelt. The highest bid

was in the contested Block 5 in the Salina Basin, which had the highest royalty but established a commitment to drill only one well. The second highest was in Perdido with two wells but a significantly lower royalty. Clearly the formula overweighs royalties. The lowest bid contained the lowest royalty and no well commitment. These results appear in Table 3. Cnooc, which has been keen to enter the Mexican waters, made the strongest bids in Perdido. Total and ExxonMobil, offered two wells, representing the other strong bid in terms of its minimum work commitment. The average total royalty of the winning bids was 21.8 percent, a relatively low number when compared with other countries and only a fraction of the royalties currently paid by Pemex in its legacy fields. The variation with respect to the mean was wide, fluctuating from a low of 14.9 to a high of 34.4 percent. However, it is difficult to evaluate the results of the auctions, as the Mexican license is an awkward hybrid construct that includes elements and mechanisms that are usually considered in production sharing agreements.

Table 3

Mexico: bidding elements considered in Round 2.1 auctions

		Royalty (%)		Number of wells	Weighted bid offer
		Additional	Total		
Overall Average		**14.3**	**21.8**	**8**	**597**
Perdido Foldbelt		**11.1**	**18.6**	**5**	**255**
1	Cnooc	17.0	24.5	2	100
2	Total	5.0	12.5	2	44

3	Chevron	7.4	14.9	0	30
4	Cnooc	15.0	22.5	1	81
Salina Basin		**17.5**	**25.0**	**3**	**342**
1	Statoil	10.0	17.5	1	58
3	Statoil	10.0	17.5	1	58
4	Petronas	23.0	30.5	0	92
5	Murphy	26.9	34.4	1	134

Impact of licenses

Based on a large set of complex of forward-looking assumptions, the Mexican government has expressed necessarily optimistic expectations regarding the results of Round 1.4. It estimates investment flows of more than $34 billion during the life of these projects. These are subject to eventual, if uncertain, discoveries in blocks that are yet to be drilled. Prospective resources that must be converted to reserves and finally to production, in fields that will be developed far into the future in ultra-deep frontier waters. For the time being all the Mexican government has are minimum exploratory work commitments, which in two cases do not include the drilling of an appraisal well. These commitments add up to about $475 million. The government estimates that up to 776,000 barrels of oil equivalent per day will be extracted. [2]

After initial production, the revenues that the government will capture through royalties will be slightly above 20 percent of the value of output, given the high costs of large scale and

[2] This figure is close to 60 percent of what is currently produced in deep and ultra-deep waters in the US sector of the Gulf of Mexico.

complex projects that will be needed to extract hydrocarbons from the tendered blocks. Meanwhile, its revenues will be restricted to fees and taxes, which are essentially symbolic, as no upfront signature bonus were required. The government aspires to receive royalties and income taxes equivalent to 60 percent of the profits generated by these licenses, if the price of oil is $60 per barrel and up to 66 percent if prices rise to $120 per barrel.

The exploration and eventual development of these prospective resources will have a limited direct and indirect impact on the Mexican economy. The minimum domestic content requirements are very low: 3 percent in the initial exploration period, 4 percent in the development phase and 10 percent after initial production. The requirements reflect what is a high capital and import intensive industrial activity to be deployed in deep-waters, far from existing infrastructure in Mexico, and the absence of a local petroleum supply industry capable of serving in this environment. While there has been much hype around Round 1.4, the deep and ultra-deep water areas that were auctioned can hardly claim to be the jewels of the crown of Mexico, a term that better fits the six giant and super-giant low cost fields (as well as some of their satellites) discovered and developed in the 20th century, and have marked Mexico's oil production history.[3]

There is another critical factor that must be considered in determining the ultimate impact of the bidding round. For Mexico, the timing of the Round 1 bids could not have been worse. The round was announced as oil prices were at the beginning of a collapse that started during mid-2014. Brent then was still trading above $100 dollars per barrel after three years of higher

[3] Pánuco-Ébano-Cacalilao, Poza Rica, Antonio J. Bermúdez, Abkatún-Pol-Chuc, Cantarell and Ku-Maloob-Zaap.

average prices. The first invitation to bid was published in December 2014. The longer than expected period of low prices had a serious impact on global industry conditions and upstream investment over the last two years. A further dip in capital expenses is predicted for 2017, albeit at a much lower rate. In this difficult context, the Mexican government went ahead with the Round 1 auction calendar. There were some delays to the process of creating Pemex farmouts because of basic disagreements between Pemex and the government with respect to the bidding process. It might have been prudent to defer some of the auctions until industry conditions began to improve[4], and advance at a more tempered pace in 2017 and 2018, when further bidding will be slowed down by the presidential election and a change of government.

Future auctions

After the awards of Trion and the Round 1.4 auctions were made, the Secretary of Energy declared that 20 to 25 farmouts will be offered to bidders before the end of 2018 and that the decision to bid the second farmout had been made by the Pemex Board. The government has announced the first three bidding cycles of Round 2. Bids for 15 blocks in shallow waters are due in March 2017 and those for Round 2.2 and 2.3 will be opened in July.[5] They cover exploration activities, but also include currently producing fields. The first one is for a 3,439 square miles. The second and third cycles are for licenses on onshore natural gas prone areas, one with a surface area of 1,956 square miles and the other encompassing 1,000 square miles. Three additional auctions are scheduled for 2017 and an as yet undefined number in 2018. For the same period, the Pemex business plan proposes to farmout mature onshore fields such as

[4] Adrián Lajous, Las joyas de la corona, *Nexos*, February, 2016. http://www.nexos.com.mx/?p=27602

[5] After this commentary was submitted for publication, the Mexican government announced on December 23 that Round 2.1 would be delayed 3 months at the request of potential bidders.

Ogarrio and Cardenas-Mora, the offshore Ayin-Batsil and Ayatsil-Tekel-Utsil fields, as well as a large number of others.

The government and Pemex intend to continue a vast bidding program, which accumulates government auctions and Pemex farmouts. This decision appears to be driven not only by economic calculus but also by political factors. The current government wants to ensure that the changes brought about by the energy reform become irreversible even when there is a change in government. Rapidly increasing the number of private players in the upstream would make it more difficult to revert what has been achieved until now. A left wing government might slow the overall reform process, but would find it extremely difficult to modify the licenses and production sharing contracts awarded by the present government. Round 1 allocated licenses and contracts to a total of 16 international companies and a large number of smaller Mexican firms. At this stage, rigorous thinking is required with respect to the overall size and sequencing of the remaining auctions. Greater priority could be given to the Pemex farmouts, after the Trion joint venture, which offers the advantage of requiring less investment from Pemex and shortening the time to first production.

Given current international oil industry conditions, the Mexican government might benefit from pacing further auctions more slowly or from making a full pause after Round 2.3. The government could wait for better times, when competition and risk appetite among international companies would be greater. This would temper the need to offer additional contractual concessions. Every bidding cycle has accommodated industry requests for further adjustments in contractual terms and conditions, with changes all moving in a single direction

to the benefit of bidders. They have been the result of highly asymmetric circumstances. Mexico was at a disadvantage in designing and negotiation of production sharing contracts, and hybrid exploration and production licenses due to its lack of experience as well as the rigidity of the bidding process due to a high political transparency requisite, and the prevalence of multiple negotiators from different government areas. All these factors contributed to weakening the Mexican negotiating team. In contrast, participating international firms have ample first hand knowledge of a wide range of geological and geophysical conditions, experience in managing exploration and development risks, as well as the estimation of exploration, development and production costs. These asymmetric relationships were further exacerbated by the self-imposed pressures to follow a tight calendar set in mid-2014 and conclude three bidding rounds before the change of government.

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As elsewhere in the world, the era of easy oil and low production costs is coming to an end in Mexico. Although there are still significant legacy fields to be fully developed, both in shallow waters and onshore, new opportunities are in more complex and higher cost oil provinces like the Perdido Foldbelt, the Salina Basin and in unconventional resource areas. Crude oil and natural gas production will continue to fall during the rest of this decade and are unlikely to recover to 2014 levels before the middle of the 2020's.[6] Unless oil prices return to above $100 per barrel, the rent per barrel captured by the state will be significantly lower than in the recent past. From a balance of trade perspective Mexico has now become a net importer of liquid

[6] In December 2016, crude oil production is estimated to have dropped to 2.05 million barrels a day from a pre-crisis average level of 2.48 million in the first half of 2014.

hydrocarbon and natural gas. Only significant production increases, a fundamental improvement in domestic refinery performance and additional investment in these refineries, will allow the country to return to its status as a net hydrocarbon exporter. Mexico must prepare itself for these fundamental challenges and more fully recognize the diminishing role that oil will play in the country's economy. New sources of government revenue will have to be found and net manufacturing exports must continue to increase. Mexico will have to simultaneously de-petrolize and de-carbonize its economy. However, opening its upstream to private investment can help make this transition more gradual, by using natural resources more fully and efficiently, and lengthening the period in which major adjustments can be made.