



Mexico downstream: oil reform

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The basic design of the Mexican oil industry's new architecture is now in place. Regulatory directives and resolutions, as well as a number of key policy decisions and new business strategies, will further define how the new structures come together. Within this context, it will be the behaviour of the incumbent monopoly, and of new players, that will determine industry dynamics. Public interest in Mexican energy reform has focused on the opening of the upstream to international industry. This is understandable given the expectation of important investment flows and the continuing decline of oil production. However, it is still too early to forecast the magnitude of capital flows associated with Round 1 upstream auctions and farmouts, or the time profile of incremental production and eventual government oil revenues. Recent government medium-term oil revenue projections to 2020 are based on questionable assumptions and unwarranted optimism, even if Round 1 is successful. On the other hand, mid and downstream investments in oil products, natural gas, and electricity could have greater short- and medium-term impacts on Mexico's energy markets and manufacturing industry, and are a central feature of energy reform.

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Changes in energy flows

The rapidly changing patterns of energy flows in North America provide a new context that offers significant opportunities, but they are also a source of stress for Mexico and require new policy initiatives and direction. After the dramatic reduction

in exportable surpluses of oil liquids that began in 2004, Mexican light crude exports have been displaced by US domestic production, while its heavy crude is beginning to be substituted by the Canadian crudes that have started to flow to the Gulf Coast. As pipeline and rail transport capacity from Canada expands, competition will intensify and Mexican crudes will be redirected to Asia. However, deep conversion refinery capacity expansion in that area will probably lag and be insufficient to process growing Venezuelan and Mexican crude flows.

More interesting for Mexico is the recent growth of gas and oil product imports, mainly from the USA, as this country continues to set production and export records. In the first half of 2014, total Mexican net gas imports were 2.7 bcf/d and oil product imports averaged 600 kb/d. Given domestic capacity constraints, these flows will continue to grow, at least up to 2018. Meeting import demand requires important investments in logistical infrastructure – natural gas and oil liquids pipelines, tank cars, storage capacity, terminals, and transmission and distribution lines. Additional power exports from South Texas utilities are planned for January 2015, based on 1999 US Presidential permits.

Dilemmas faced by policy makers

The effect of expanding upstream production on the Mexican economy is mostly through additional government revenues. The high capital intensity and the high import content of investment that characterize this sector of the oil industry imply the existence of important economic leakages that limit the multiplier effects of capital expenditures.

It is the downstream that has a more direct impact on industrial competitiveness by lowering the supply costs of oil products and natural gas. The same is true of power supply, given the fact that current electricity prices for industry are 75 per cent higher than in the USA. This note poses some of the issues and dilemmas that policy makers face as they introduce greater competition in the oil product and natural gas markets. They will have to offer pragmatic solutions to three prerequisites of competition: infrastructure investment, freeing up oil product and natural gas imports, and competitive pricing. New legislation provides a clear sense of direction and policy has been set regarding these matters. It is in the regulatory sphere and in the actual implementation of market reform where the main challenges now lie. The focus must now be on the multiple transition issues that must be resolved.

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Mid-stream

Natural gas pipeline construction is booming. Pipelines to the Mexican border from the Waha and Agua Dulce hubs in Texas are being built, interconnections between US and Mexican grids expanded. New trunk lines are being laid along the Northwest Coast and into Central Mexico from the US border. In other parts of the natural gas grid, capacity is expanding, links are being strengthened, and risk-managing redundant capacity installed. Stepwise increases in import

and transport capacity should take place at the beginning of 2015 and 2016. International gas transport companies are involved in construction programmes promoted by the Federal Power Commission (CFE) and PEMEX.

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 The excitement surrounding multiple mid-stream natural gas projects contrasts with the lack of drive regarding the much-needed expansion of the liquids logistical infrastructure. Part of the explanation for this lies in the fact that gas pipelines have been opened to private investment since 1995. However, over many years, regulatory failure and inconsistent public policies have prevented the definition of ultimate private and public sector responsibilities for capacity expansion. This resulted in the 2011–12 natural gas supply crisis, when critical alerts signalled multiple gas delivery interruptions. These disruptions triggered a strong investment response directed to the elimination of existing bottlenecks and the building of new capacity. In the case of crude oil and oil product pipelines and liquids storage capacity, institutional, managerial and capital constraints limited the allocation of investment resources. In recent years, product pipeline capacity from the Gulf to Central Mexico has doubled, but a much-needed third product line in this corridor is yet to be built. As oil products can be stored and transported by rail and trucks, supply interruptions were not made apparent and transport cost increases were absorbed by consumers and by PEMEX. Crude transport modernization and capacity expansion was also limited by the lower volume processed in domestic refineries. The propensity of a capital-constrained monopoly to

underinvest in infrastructure, both in pipelines and in tank farms, leaves a heavy burden for the liberalization of oil product markets.

The timely completion, by 2017, of this vast natural gas pipeline programme is exacting but feasible. A second, more complex challenge is the establishment and operation of a new regulatory framework and the growth of regulatory institutions – in this case the downstream regulator (CRE) and the competition regulator (CFCE). Their independence must be well protected and respected, and their professional qualifications and capacities well regarded, if they are to maintain credibility – the main asset of regulators. The CRE's experience is basically limited to natural gas. It has little expertise in electricity and none in liquid hydrocarbons, with the exception of LPG. It will have to rapidly recruit and train staff to cope with a widening scope of activities and retain significant consultant manpower, both in technical and in legal matters. Due to the oil industry's de jure monopoly structure, the CFCE has only participated marginally in energy sector issues. It will now have to broaden the range of its mandate, particularly in the oil industry, where multiple competition issues will arise as markets are liberalized.

A third challenge will be the establishment and start-up of the independent system operator (Cenagas), which will be responsible for the national integrated natural gas transport and storage system. This wholly owned State entity was established by law in late August 2014 and a Managing Director has been appointed. It should begin operations in February 2015. The scope of its activities is unique. It is a hybrid that must carry out the functions of an independent system operator (ISO), but it will also be the owner and operator of existing PEMEX gas transport and storage assets. Both PEMEX and CFE

will have to transfer all of the capacity reserve contracts that they hold with third-party pipelines. Cenagas is required by statute to separate these two functions operationally and functionally, and keep separate accounts. It will transport the natural gas produced and sold by the PEMEX upstream organization and operate under open access regulations, allocating available capacity through open season procedures. Cenagas will be responsible for daily balancing of the system, developing a secondary market for transport capacity, and for planning the expansion of the natural gas grid. However, it is not an independent body. Four government members and two independent directors serve on its board. Also, requirements for independent directors limit the participation of gas industry executives, important clients, and suppliers with gas business experience.

As a matter of public policy the government decided not to privatize existing PEMEX natural gas pipelines and storage facilities. The Department of Energy (SENER) and the CRE must now design solutions for the development of liquids infrastructure that supports product market liberalization and, at the same time, attracts private investment. A delicate balance between these objectives will have to be skilfully struck, given the constraints imposed by legislation and by existing arrangements. Also, these two organizations urgently need to design the scope and structure of the system operator. The Hydrocarbon Law offers different options to the grids and storage systems currently held by the incumbent. Crude oil and oil product pipelines and storage facilities will be regulated in a different manner to those associated with natural gas.

The existing PEMEX infrastructure will require a permit from CRE to operate under the new legislation. This will most probably be granted subject to CRE



open access and tariff regulations in order to serve third parties. PEMEX would reserve capacity up to a limit set by CRE. There are clear precedents for this as three PEMEX LPG pipelines currently operate in an open access mode. It is likely that oil product pipelines will be legally structured as an integrated system and thus be operated by an independent system operator. Until the CRE declares that effective competitive market conditions prevail, first-hand sales by PEMEX will be regulated, product prices set at refinery gates, gas processing plants, and import points, and invoices will expressly disaggregate the product price from transport and storage costs. This open access, integrated system, operated by an ISO, could adopt one of three different corporate models: (i) a separate PEMEX affiliate; (ii) a wholly owned State agency, similar to Cenagas; and, (iii) a privately owned company with a significant PEMEX minority share.

In the first case, the new company would receive all PEMEX liquid product transport and storage infrastructure and would effectively manage these assets at arm's length, both functionally and operationally, keeping separate accounts with respect to PEMEX and to its responsibility as an ISO. The second option would essentially replicate the previously described Cenagas structure. The third alternative is initially more challenging but offers a cleaner long-term solution. It is closer to the model of the Spanish transport and storage company, CLH, where ownership is highly fragmented among private oil companies, financial institutions, and institutional investors. For example, Repsol only holds 10 per cent of its shares. To illustrate the possible transition to this type of structure in Mexico, one could imagine that the new company would begin by having PEMEX hold 49 per cent of the equity while a Mexican development bank, such as Nafinsa, could hold

the remaining 51 per cent. As more capital was required, Nafinsa could sell part of its equity to finance the expansion of the system; PEMEX would eventually follow suit as opportunities arose and better financial conditions could be attained. Also, part of these shares could be placed in the Mexican stock market. This option would not be subject to the institutional and financial constraints of wholly owned state agencies such as Cenagas. Trade union restrictions might also be relaxed if PEMEX holds a minority stake. Analytically, it would not be very different from the envisaged upstream farmouts, where PEMEX would not be the operator. SENER, CRE, and CFCE retain a certain degree of discretion with respect to the actual design of the companies that will be responsible for the liquids infrastructure. They will test a number of variations with respect to the basic designs described.

Both common and contract carriers will expand oil product infrastructure and they will be coordinated by the ISO. Their interconnection and optimization will not be easy tasks. The requirements of storage capacity expansion should not be underestimated as the market is liberalized. Low current levels of oil product inventories pose serious risks and increase transport costs. Growing product imports will also require the development of strategic stocks. Special attention must be given to smaller isolated systems that are more prone to monopolistic practices. These issues will immediately arise in the two extreme ends of the PEMEX grid, the Yucatán and Baja California peninsulas.

The Hydrocarbon Law treats crude oil transport and storage in essentially the same way as oil product infrastructure. However, although it refers to pipelines that gather oil and natural gas from producing fields, it does not establish a clear borderline between gathering and transport pipelines. There is only a

passing and awkward reference in the Law to the flow of hydrocarbons within upstream contractual areas, which it excludes from transport systems. The lack of a legal definition poses site-specific problems to new upstream entrants, who will like to know where and under what conditions they can gain access to PEMEX pipelines and storage facilities. Both the upstream and the downstream regulators will have to decide on these matters. In any case, whatever is defined as 'transport' should form an integrated open access system that could be part of both the oil products and natural gas infrastructure or managed separately. Bidders in the Round 1 upstream auction will surely seek clarification.

Competitive markets

The introduction of competition in final product markets has a precisely defined calendar that is included in the Hydrocarbon Law. Starting from a long-established closed commercial monopoly in oil products and partially opened natural gas imports, the transition to competitive markets is being facilitated by domestic price levels that are now close to US Gulf Coast market prices and by a high and growing share of imports in domestic supply. A tight calendar varies by product but the most important changes should have been implemented by early 2018.

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In the case of automotive fuels – gasoline and diesel – domestic prices have been subject to monthly increases in 2013 and 2014, while in some instances US Gulf prices have adjusted downward. The combined effect of these

trends is close to effectively eliminating implicit subsidies that in 2012 were above US\$15 billion, the equivalent of 1.3 percentage points of GDP. In 2015 and 2016 the government will set maximum selling prices that will reflect both expected domestic inflation and external market conditions. More important is the decision to transit from a system of uniform national prices to one that gradually reflects transport and distribution costs. As of 1 January 2018 market prices should prevail. PEMEX will continue to be the sole importer of gasoline and diesel until the end of 2016. Import permits to qualified shippers will be granted at the beginning of 2017, when new PEMEX supply contracts will have to allow sales by shippers and service stations that are not part of its current franchise. The restrictions on foreign investment in service stations have now been lifted and the authorities hope to attract private companies to the distribution sector. Multiple problems are bound to arise during this transition. However, the government retains powers to intervene if serious disruptions ensue. There are three issues that must be dealt with: consumer reaction to geographically differentiated pricing, as well as to unplanned price fluctuations and price volatility, and the control of black markets associated with organized crime. The orderly enforcement of ultra-low sulphur diesel and gasoline specifications will have to be adopted by PEMEX in order to meet import competition. PEMEX refineries are lagging in this area, particularly with respect to diesel.

The planned pace of adjustment in LPG markets will be even faster. Mexico's residential LPG market is one of the largest in the world, given the relatively low household penetration of natural gas and electricity. At the end of 2015 import permits will be granted to qualified shippers, but government-set maximum retail prices will prevail

until the end of 2016. The current interplay of private Mexican distributors, PEMEX, and consumers is swamped with complex long-unresolved issues and it is not clear at present how they will unravel. Investments by new international players will be allowed, hopefully introducing additional competitors. The government has committed itself to the establishment of focused price subsidies to the poor, both in the countryside and in low-income urban areas, to compensate for rising prices. It understands that LPG is the fuel of choice of Mexican homes, both for cooking and water heating. However, it has yet to design and propose a specific mechanism for the allocation of the new subsidies.

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'MEXICO'S RESIDENTIAL LPG MARKET IS ONE OF THE LARGEST IN THE WORLD ...'

Natural gas is better placed for further market liberalization. Gas prices have been set monthly on terms related to South Texas pipeline price quotations. These are net-backed to the McAllen/Reynosa border and from there to the large gas processing plants in south-east Mexico – specifically to Ciudad PEMEX, Tabasco – from where they are net-forwarded to all consumption points on the integrated natural gas grid. Some isolated systems, which only connect to US pipelines, have prices that are directly related to price references on the other side of the border. In the last instance practically all natural gas prices in Mexico are linked to Henry Hub spot prices. Regulated prices of first-hand sales in Reynosa and in Ciudad PEMEX have tended to be slightly below Henry Hub prices. Transport tariffs are regulated on a rate-of-return basis and the integrated grid is open access, although capacity constrained.

A large and growing share of the supply of natural gas, automotive fuels, and LPG is provided by imports, which will soon compete with domestically

produced supplies. The natural gas supply structure is particularly interesting. In the first half of 2014, net imports contributed 55 per cent of total third-party sales, after deducting PEMEX's own use. In the medium term, this share should continue to expand rapidly. In these circumstances, imports will easily displace domestic production that is not priced competitively. In order to compete, PEMEX will also have to meet certain product specifications. Currently, the nitrogen content of dry gas in south-east Mexico is high and subject to significant variations; this affects costumers' operations. PEMEX will have to solve this problem in order to sell its marketed production without deep price discounts.

The share of imported gasoline and gasoline components reached 54 per cent in 2011. Since then it has slightly contracted due to the on stream entry of the reconfigured Minatitlan refinery and to a fall in domestic demand due to higher prices and slow economic growth. There is no clear evidence as yet that more efficient new vehicles are having a perceptible effect on pool efficiency, given the growth of legal and illegal sales of used automobiles imported from the USA. In the first half of 2014, the import share of gasoline was down to 48 per cent, but it is expected to grow, especially if gasoline demand recovers due to higher rates of economic growth. Only after the three refineries that are to be reconfigured have come back on stream in 2018 and 2019, will the share of imports temporarily fall. Given current and expected refining conditions in the US Gulf Coast, expanding capacity in Mexico does not appear to make economic sense. The market share of domestically produced diesel is bound to fall more rapidly as its demand tends to increase at a higher pace than that of gasoline. A strong economic recovery would thus further accelerate diesel sales and import demand. In the first



half of 2014, diesel imports accounted for 31 per cent of total domestic sales.

The growing product surplus in the USA, driven by the rapid expansion of oil production and falling domestic demand, has a logistically attractive outlet in Mexico. Product can easily flow from the Corpus Christi refineries to northern Mexico and from other Gulf Coast refineries to central Mexico, via Tuxpan, as well as to the Yucatan Peninsula. Imports could be structured under long-term contractual arrangements. The introduction to competition in Mexican product markets might offer further interesting opportunities for US refiners. For Mexico the advantages are obvious: it can place heavy crude with these refiners and buy products at attractive delivered prices in Mexico.

Demand for LPG in Mexico has been stagnant, with a slight downward trend. As the relative price of LPG compared to natural gas and gasoline has narrowed it has been losing market share both in residential and automotive consumption. With

full price adjustment to competitive levels, further substitution by natural gas, gasoline, and diesel will reduce the demand for LPG. The speed at which natural gas will displace LPG will also depend on the rate of expansion of local distribution pipeline grids, which will have to overcome opposition by municipal authorities. LPG will increasingly concentrate in geographically isolated markets and rural communities. Given the extension of Mexico's territory, both imports and exports might grow, but net imports will tend to fall. Imports today represent 29 per cent of domestic sales.

Conclusion

Mexico's economic structure is more diversified than that of other oil producing and exporting developing countries. The oil industry contributes only 7 per cent of GDP and manufactured exports represent 81 per cent of total merchandise exports. It is in the realm of public finance where it is more dependent on oil. In the first eight months of 2014, government oil revenues were 28 per cent of total tax

revenues. Nevertheless, the size of Mexico's oil product and natural gas markets are significant. In 2013, domestic sales of natural gas reached 7 bcf/d and the corresponding volume of oil products was above 1.8 mb/d. The introduction of competition in these markets, and subjecting PEMEX downstream activities to a harder budget constraint, should provide strong incentives to improve performance. Its refining and marketing assets are poorly managed. In 2013, losses were close to US\$10 billion, due to operational, hardware configuration, and infrastructure problems, as well as policy issues. Global refining benchmarking exercises show that, in terms of operational efficiency, PEMEX's refineries remain at the lower limit of the fourth quartile. Clearly, this situation is not sustainable. Natural gas markets are under-supplied in spite of ample North American surpluses, due to pipeline capacity constraints. Market liberalization and ample low-priced supplies of oil products and natural gas in the US Gulf Coast offer attractive opportunities that Mexico must now seize.



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Annual Subscription (four issues) £90.00

Oxford Energy Forum. ISSN 0959-7727. Published by Oxford Institute for Energy Studies, Registered Charity 286084.

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