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## Oil, Gas & Energy Law Intelligence

### Mexico's E&P Reform - An Opportunity Missed for Petroleum Conservation? by D. Auty and C. Canales

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# Mexico's E&P Reform – An Opportunity Missed for Petroleum Conservation?

David Auty and Carlos Canales\*

## I. Introduction

Mexico's constitutional energy reform was published in the Mexican Federal Gazette (*Diario Oficial de la Federación*) on December 20th, 2014 (the "Energy Reform"). It provides new legal frameworks and market structures for the petroleum and electricity sector, including 9 (nine) new laws and amendments to 12 (twelve) existing laws<sup>1</sup>. The Energy Reform is designed to provide a valuable opportunity to revitalize Mexico's energy sector and boost its economy. Immediate drivers for its implementation have been **(i)** the impressive fall in crude oil production (in decline since 2004 and high volume of 'cost oil') and exports regarding the recent expansion of oil and gas in the North American region, **(ii)** a dramatic natural gas supply crisis caused by the increase of imports that has been insufficient to meet demand due to midstream constraints, and **(iii)** uncompetitive electricity costs and prices that limit manufacturing growth.<sup>2</sup>

Although oil and gas *in situ* will not be privatized, upstream, midstream and downstream operations will gradually open to private investment. Competition will take place in the electricity, natural gas, refined products and retail markets. Overall the Energy Reform is directed to:

- Redesign and create new market structures for the energy sector
- Provide greater independence and oversight authority to regulators
- Manage competition in the electricity market and oversight of transmission, transportation and distribution grids by system operators
- Provide new governance structures, authorities and processes for the national utility CFE (Comisión Federal de Electricidad) and the national oil company Pemex (Petroleos Mexicanos)<sup>3</sup>

The first steps of a historical change for the Mexican energy sector have been taken. Once the regulatory authorities approve the outstanding body of guidelines, directives, resolutions and norms that will further structure the energy sector; the piecemeal construction of a new regulatory framework will begin. Although the speed of the process thus far has been notable, policy must stand up over the long term, and be bolstered by democratic discussions that ensure public support, environmental protection and good governance. To this titanic

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<sup>1</sup> For a list of the implementing legislation refer to  
<<http://www.presidencia.gob.mx/reformaenergetica/#!leyes-secundarias>>

<sup>2</sup> See, for example, Adrian Lajous, 'Mexican Energy Reform' (June 2014) Center on Global Energy Policy, available at  
<[http://energypolicy.columbia.edu/sites/default/files/energy/CGEP\\_Adrian%20Lajous\\_Mexican%20Energy%20Reform\\_Final.pdf](http://energypolicy.columbia.edu/sites/default/files/energy/CGEP_Adrian%20Lajous_Mexican%20Energy%20Reform_Final.pdf)>

<sup>3</sup> *ibid*

challenge, the incorporation of sustainable development goals<sup>4</sup> such as efficiency, assessment and protection of the environment, public participation and governance play a fundamental role for its long-term success.

Oil and gas sustainability, has gradually been introduced in petroleum laws worldwide. Fueled by the concept of petroleum conservation, institutions such as the World Energy Council have defined sustainability as “energy produced and used in ways that support human development over the long term, in all its social, economic and environmental dimensions.”<sup>5</sup> Today it is unquestionable the economic, social, and environmental impacts that oil and gas development has to the public interest. What follows is a summary of the oil and gas sustainability measures adopted by the Energy Reform limited to upstream activities under the new Hydrocarbons law. The overall objective is to highlight the importance of sustainability measures for the further implementation of secondary legislation and its overall impact to the Energy Reform.

## II. Defining Petroleum Conservation

Oil and gas sustainability is often referred to as the overarching concept of petroleum conservation. Although the term petroleum conservation has no generally accepted definition, its relation to the sustainable development of hydrocarbons is unquestionable. Onuosa defines petroleum conservation as “... developing petroleum in a manner that minimizes the depletion rate of reserves and maximizes the life of present and future generations.”<sup>6</sup> Its origins can be traced to the first major oil rush during the early 1930s in the United States which lead to a plethora of drilling rigs in a race to extract oil as quickly as possible.<sup>7</sup> In 1935 US Congress ratified the Interstate Compact to Conserve Oil and Gas. This compact coupled with comprehensive state petroleum conservation acts comprises one of first legal regimes establishing basic principles of petroleum conservation. Article II of the Interstate Compact states its purpose as to “conserve oil and gas by the prevention of physical waste thereof from any cause.”<sup>8</sup> The principle goals of comprehensive state conservation acts are to prevent waste—underground, surface and economic—and to protect correlative rights—to give every resource owner a fair opportunity to capture a fair share of hydrocarbon resources without waste.

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<sup>4</sup> Brundtland Commission. Report of World Commission on Environment and Development: Our Common Future (March 1987) to the UNGA as Annex to Doc A/42/427. For this matter, in addition to the three basic pillars of sustainable development –economic, social and environment- there are seven principles contained in the ILA’s 2002 New Delhi Declaration of Principles of International Law that address Sustainable Development. These principles are: (1) the duty of States to ensure sustainable use of natural resources, (2) equity and the eradication of poverty, (3) common but differentiated responsibilities, (4) the precautionary approach, (5) public participation, (6) good governance, and (7) integration and interrelationship.

<sup>5</sup> World Energy Trilemma:2012 Energy Sustainability Index, World Energy Council available at <[https://www.worldenergy.org/wp-content/uploads/2013/01/PUB\\_2012\\_Energy\\_-Sustainability\\_-Index\\_VOLIII.pdf](https://www.worldenergy.org/wp-content/uploads/2013/01/PUB_2012_Energy_-Sustainability_-Index_VOLIII.pdf)>

<sup>6</sup> S Onuosa, ‘Sustainable Development of Petroleum Resources: The Rumpus and Resolution’, in Z Gao (ed), *Environmental Regulation of Oil and Gas* (Kluwer Law International 1998) 436.

<sup>7</sup> Some would argue that a similar oil rush began in recent years with the shale oil and gas revolution, particularly in the United States, which has only been curtailed by the fall in oil prices during 2015.

<sup>8</sup> Whilst the Compact did not establish any legal obligations it created the Interstate Oil and Gas Compact Commission (“IOGCC”), which acted as a forum for state representatives to discuss matters concerning petroleum conservation. The IOGCC remains active today with 30 states party to the forum. IOGCC Charter (1935) available at <<http://iogcc.publishpath.com/charter>>

Over time the definition of petroleum conservation has widened. In 1970 the Bank Of New York stated that “petroleum conservation involves three things: 1. Squeezing the oil-bearing earth for maximum production over the long haul at minimum cost. 2. Bringing the oil above ground as fast as it is needed, and no faster. 3. Protecting the rights of everybody who has an interest in any part of an oil field: not just the biggest or the fastest or the most powerful.”<sup>9</sup> This description identifies three important concepts. Firstly, that petroleum conservation concerns maximizing recoverable reserves. When a field development fails to consider the reservoirs geological properties the volume of unrecoverable reserves is greater than what they would have been under an optimal development plan contemplating all geological properties. For the producer, governments and society, this presents a resource waste and many national legal systems apply mandatory unitization provisions to prevent this. Secondly, the description identifies the need to minimize development and production costs. Lower costs should not only provide improved economic returns to the producer but could also reduce the overall supply cost, including unnecessary environmental degradation. Thirdly, the description recognizes the diverse interests associated to oil and gas production. Whilst the intent of the description is for producers of a common resource to share the benefits of development, it also raises the notion of the larger public interest. A key objective of most government is to protect its citizens’ interests to have a clean and safe environment. More and more petroleum conservation measures foresee a holistic approach to the environment, including the protection of surrounding ecosystems, such as ground waters, marine life, climate etc. whilst applying best practice on social, health, safety and environmental matters.<sup>10</sup> Although not a historical concern, modern petroleum conservation also contemplates the reduction of carbon dioxide from activities such as flaring at upstream platforms and carbon sequestration<sup>11</sup> and the promotion of energy efficiency.<sup>12</sup> Whilst oil and gas extraction operations negatively impact the environment and present occupational work hazards principles of petroleum conservation aim to minimize environmental impacts and apply best practices on health and safety.

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<sup>9</sup> The Bank of New York, ‘Petroleum Conservation - How America is Making the Most of its Oil and Gas Resources’ (1970) 3 (2) Natural Resources Law 272.

<sup>10</sup> For example Integrated Coastal Zone Management (“ICZM”) aims to establish plans to maximize the benefits of the coast by taking a holistic view of all sector activities whilst minimizing harmful impacts upon the environment. ICZM is a form of environmental best practice based upon the concept of sustainability of the coastal environment which supports petroleum conservation. It is defined as the governance process which consists of the “legal and institutional framework necessary to ensure that development and management plans for coastal zones are integrated with environmental (including social) goals and are made with the participation of those affected. J Post, C Lundin and World Bank, *Guidelines for Integrated Coastal Zone Management* (The World Bank 1996).

<sup>11</sup> Since 2006 the New Mexico Energy, Minerals, and Natural Resources Department’s Oil Conservation Division has sought ways to reduce carbon emissions in oil and gas operations including the use of carbon sequestration technologies. In 2013 the division approved an enhanced oil recovery process from Occidental Permian Limited Partnership to inject of water, CO<sub>2</sub> and produced gases into the South Hobbs Grayburg-San Andres Pressure Maintenance Project after taking a holistic review of matters including the impact on fresh water sources in the area. See Holland & Hart, ‘Carbon Sequestration Update on National and Western State Activities’ (November 2007) available at <<https://www.hollandhart.com/files/CarbonSequestration.pdf>> accessed 20 November 2015; Minutes Of The Meeting Of The Oil Conservation Commission Held On May 9-10 2013, New Mexico Oil Compact Division (“OCD”) available at <<http://www.emnrd.state.nm.us/OCD/documents/May9ComMin.pdf>> accessed 20 November 2015

<sup>12</sup> Whilst energy efficiency is often linked to the use of energy by the end user it also applies to upstream oil and gas activities where the choice of equipment used affects the energy used in producing the oil and gas, for example the energy efficiency of motors and pumps used on a platform.

For economic growth, petroleum conservation provides significant benefits to governments, individuals and oil and gas companies. Maximizing petroleum production increases government rent, which it can invest for the benefit of its citizens.<sup>13</sup> For oil and gas companies the principle of cost minimization reduces capital costs and increases profit. This principle considers a holistic shared view of infrastructure rather than a project based view and contemplates notions of third party access and the expansion of existing infrastructure. To avoid underground waste, the principle also considers the exploitation of oil and gas deposits in the most efficient manner by taking into account early in development the geological features of the reservoirs. Finally, the reputation of oil and gas companies benefit from the application of best practice on health, safety and environmental matters (“HSE”). A recent definition of petroleum conservation is found under Article 4 of the Oil And Gas Conservation Act of Alberta, which refers: “(a) to effect the conservation of, and to prevent the waste of, the oil and gas resources of Alberta; (b) to secure the observance of safe and efficient practices in the locating, spacing, drilling, equipping, constructing, completing, reworking, testing, operating, maintenance, repair, suspension and abandonment of wells and facilities and in operations for the production of oil and gas or the storage or disposal of substances; (c) to provide for the economic, orderly and efficient development in the public interest of the oil and gas resources of Alberta; (d) to afford each owner the opportunity of obtaining the owner’s share of the production of oil or gas from any pool; (e) to provide for the recording and the timely and useful dissemination of information regarding the oil and gas resources of Alberta; (f) to control pollution above, at or below the surface in the drilling of wells and in operations for the production of oil and gas and in other operations over which the Regulator has jurisdiction.”<sup>14</sup>

Although petroleum conservation relates to the three basic pillars of sustainable development –economic, environmental and social, clarity on the precise legal substance of the concept is still debated. As with the term sustainable development, petroleum conservation poses many facets and consequently, consensus on the delicate balance between economic development, environmental assessment and protection and social equality and respect for the public interest, including human rights, has become an ongoing challenge for petroleum laws.<sup>15</sup>

### **III. Why petroleum conservation is important for Mexico**

Mexico has been an important petroleum producer since the early twentieth century and is the ninth largest producer in the world. Its production peaked in 2004 at 3.9 million b/d but a lack of investment in both exploration and enhanced oil recovery has resulted in declining production from its maturing fields and production fell to 2.3 million b/d in 2015. With the need for vast sums of investment to prevent further decline the Mexican government chose to bring in foreign investment. The historic legal framework that provided regulations to oversee Pemex has been altered to allow the participation of private enterprise requiring a new set of regulations. The history and situation of the Mexican oil and gas sector provides

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<sup>13</sup> This is restricted by the fact that election cycles typically mean that Governments think in the short term and they may be more concerned with the rapid production of cash rather than maximizing long-term revenues. T Reynolds, ‘Delimitation, Exploitation, and Allocation of Transboundary oil & Gas Deposits Between Nation-States’ (1995) 1 ILSA Journal International & Comparative Law 135.

<sup>14</sup> Alberta Oil and Gas Conservation Act, Alberta Regulation 151/1971, with amendments up to and including Regulation 114/2015 (current as of 29 March 2014) (Alberta Oil and Gas Conservation Act).

<sup>15</sup> On the challenges to the delineation of the concept of sustainable development; see, for example, N Schrijver, *The Evolution of Sustainable Development in International Law: Inception, Meaning and Status* (Pocket Books of Hague Academy of International Law, Martinus Nijhoff Publishers 2008) 220.

specific reasons to incorporate petroleum conservation measures within this new framework, which will now be identified.

### *Capacity in existing infrastructure*

Approximately three quarters of Mexican production is offshore in the Bay of Campeche where there is an extensive infrastructure of platforms, gathering pipelines and pipelines connecting major fields with domestic refineries and export terminals. As production from this maturing region is in decline there exists a growing spare capacity in the system which could be utilized to reduce investments costs and improve investment attractiveness whilst also minimizing environmental impacts of new investments. Similar reasoning was applied when the UK and Norway agreed a bilateral treaty for developing cross border reserves whilst sharing existing infrastructure and facilities.<sup>16</sup>

In the first two stages of Round 1 of the license rounds 19 shallow water blocks were put out to bid in the Campeche Basin and more are expected in later license rounds. The potential for infrastructure in these blocks to connect into existing infrastructure is paramount for their economic attractiveness, especially in the present low price oil environment. For the deep water license round these factors are especially important with some of the blocks located in Cuenca Salina in the South of Campeche Bay and in *Cinturon Plegado Perdido* in the bay along the US maritime border. Whilst a large amount of activity has occurred on the US side of the border the Mexican side is practically a virgin territory for oil activities with no infrastructure currently existing. It is hence important that the US and Mexican authorities cooperate in this area to incorporate joint conservation measures.

### *Mexican fields are mature and require EOR*

The worldwide average oil recovery rate grew from 20% in 1980 to approximately 35% in 2015.<sup>17</sup> Enhanced Oil Recovery (“EOR”) technologies have played a large role in this by increasing the field life of mature fields.<sup>18</sup> In Mexico recovery rates are some of the lowest in the world with Pemex predicting an average final recovery rate of 28%<sup>19</sup> whilst for some fields the expectation is in single digits (see Figure 1 and Figure 2). With 40-70% of Mexican

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<sup>16</sup> Framework Agreement between the United Kingdom and Norway concerning Cross-Boundary Petroleum Cooperation along with the supplemented Joint Guidelines for Development of Trans-boundary Oil and Gas Fields. Executed in Oslo, 4 April 2005. Available on the UK Department of Energy and Climate Change website, at <[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/15574/nor-guide.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/15574/nor-guide.pdf)>

<sup>17</sup> Maximize recovery Highlights, Eni webpage, available at <[http://www.eni.com/en\\_IT/innovation-technology/technological-answers/maximize-recovery/maximize-recovery.shtml](http://www.eni.com/en_IT/innovation-technology/technological-answers/maximize-recovery/maximize-recovery.shtml)> accessed 24 February 2016

<sup>18</sup> In most cases primary recovery (i.e., natural depletion of reservoir pressure) has a recovery factor under 20%. Secondary recovery which relies on either natural or artificial water or gas injection has an incremental recovery ranges from 15 to 25%. Globally, the overall recovery factors for combined primary and secondary recovery range between 35 and 45%. For further see P Zitha and others, ‘Increasing Hydrocarbon Recovery Factors’ (2011) SPE Technology Updates, available at <<http://www.spe.org/industry/increasing-hydrocarbon-recovery-factors.php>> accessed 10 November 2015

<sup>19</sup> Factores de Recuperación de Aceite y Gas en México, Comisión Nacional de Hidrocarburos (4 de Junio de 2010) available at <[www.cnh.gob.mx/\\_docs/DOCUMENTOTECNICO1FINAL.pdf](http://www.cnh.gob.mx/_docs/DOCUMENTOTECNICO1FINAL.pdf)>

oil production coming from mature fields,<sup>20</sup> increased focus on field development plans and on investment in EOR is paramount.

Figure 1 – Oil Field Recovery Rates in Mexico<sup>21</sup>

<b>Region</b>	<b>Area</b>	<b>Crude Recovery %</b>
Marina Suroeste	Abkatún-Pol-Chuc	37.5
Marina Noreste	Cantarell	35.2
Sur	Bellota-Jujo	24.7
Sur	Cinco Presidentes	24.4
Sur	Samaria-Luna	23.7
Sur	Muspac	22.8
Norte	Poza Rica-Altamira	19.3
Marina Noreste	Ku-Maloob-Zaap	15.7
Marina Suroeste	Litoral de Tabasco	9.7
Veracruz	Veracruz	9.0
Sur	Macuspana	7.3
Norte	Aceite Terciario del Golfo	0.1

Figure 2 – Country Final Expected Oil Field Recovery Rates<sup>22</sup>

<b>Country</b>	<b>Crude Recovery %</b>
Angola	42
Brazil	38
Canada	38
Mexico	28
Norway	50
United Kingdom	40
United States	40
Iran	42
Venezuela	22
Average	38

Pemex EOR experience is limited to mainly lab and simulation studies although there are pilot projects for both steam and carbon dioxide injection.<sup>23</sup> Worldwide there is limited EOR

<sup>20</sup> Estrategia de PEMEX para Optimización de Campos Maduros, Gustavo Hernández García (Enero 2015) available at

<[http://www.pemex.com/InformesDGP/Estrategia%20de%20PEMEX%20para%20Optimizaci3n%20de%20Campos%20Maduros%20\(3\).pdf](http://www.pemex.com/InformesDGP/Estrategia%20de%20PEMEX%20para%20Optimizaci3n%20de%20Campos%20Maduros%20(3).pdf)>

<sup>21</sup> Factores de Recuperación de Aceite y Gas en México, Comisión Nacional de Hidrocarburos (4 de Junio de 2010) available at <[www.cnh.gob.mx/\\_docs/DOCUMENTOTECNICO1FINAL.pdf](http://www.cnh.gob.mx/_docs/DOCUMENTOTECNICO1FINAL.pdf)>

<sup>22</sup> L Magne, ‘How and for How Long It is Possible to Secure a Sustainable Growth of Oil Supply’, Paper delivered at the World Petroleum Congress 2nd Regional Meeting (Doha, December 8-11, 2003) Alexander’s Gas and Oil Connections, available at

<<http://www.gasandoil.com/news/europe/ece6b4f43c323611c90a9ad71b73e663>>

experience for naturally fractured reservoirs and 92% of Mexican production comes from such reserves.<sup>24</sup> If conservation goals are to be achieved, careful and thoughtful coordination in establishing appropriate development plans will be required.

### *Opening up of new acreage*

As a result of Round 1, 169 fields will be open to private investment, of which 109 will be devoted to exploration and 60 to exploitation. New fields will cover an area of 28,500 km<sup>2</sup>. It is expected that prospects and 2P reserves for bid will account for volumes of 14,606 and 3,782 of MMbpc, respectively. Annual investments of USD\$8,525 million are expected to occur between 2015 and 2018.

In addition Pemex or other State Productive Companies may enter into joint venture agreements with the private sector. Those interested in partnering with Pemex or other State Productive Companies must submit proposals in an international bidding process before the National Hydrocarbons Commission (*Comision Nacional de Hidrocarburos*) (“NHC”). Under such arrangements Pemex or other State Productive Company may act as operator or non-operator. In cross-border reserves, Pemex and other State Productive Companies must participate with a minimum of 20% interest in any contract area.

A significant amount of fields currently under the mandate of Pemex are expected to be open for *farm-out* agreements. The vast opening of new acreage and the potential for Pemex’s farm-outs provide an opportunity to strengthen petroleum conservation measures. Efficiency to avoid underground waste will play an important role in achieving the expected economic rent. Transparency, accountability and the rule of law to assign new acreage and a system of good governance within Pemex’s joint venture and farm-out agreements offer significant governance challenges to the Mexican government. The Transparency International’s Corruption Perceptions Index<sup>25</sup> and the World Justice Project (“WJP”) Rule of Law Index 2015<sup>26</sup>, which respectively rank corruption and respect for the rule of law, each ranked Mexico 95<sup>th</sup> and 79<sup>th</sup>, whilst its neighboring state, the US, respectively is ranked 16<sup>th</sup> and 19<sup>th</sup>. Further the vast area open for new acreage may conflict with indigenous communities and restrict access to underground water resources, especially in the expected areas for non-conventional acreage in the north of Mexico.

### *History of oil spills in Mexico*

As a mature oil producing region Mexico has experienced environmental damage as a result of accidents in the oil and gas sector. One of the most famous occurred in 1979 when the Ixtoc I exploratory oil well in the Bay of Campeche suffered a blowout resulting in one of the largest oil spills in history. The blow out took 295 days to contain and whilst the size of the spill is unknown estimates range from between 500,000 to 3,500,000 tons of oil. Pemex spent

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<sup>23</sup> EOR as a Driver for CCS Projects in Mexico, F Rodríguez de la Garza and V Arana Ortiz (7-8 March 2012) CCS in Mexico: Policy Strategy Options for CCS, available at <<https://www.iea.org/media/workshops/2012/ccsmexico/8Rodriguez.pdf>>

<sup>24</sup> *ibid*

<sup>25</sup> Corruption by Country / Territory, Transparency International, available at <<https://www.transparency.org/country/#RUS>> accessed 3 January 2016

<sup>26</sup> WJP Rule of Law Index 2015, available at <[http://worldjusticeproject.org/sites/default/files/roli\\_2015\\_0.pdf](http://worldjusticeproject.org/sites/default/files/roli_2015_0.pdf)> accessed 3 January 2016

\$100 million on clean-up and would have been required to pay large sums in compensatory damages, both in Mexico and the US where the spill reached, but for the ability to assert sovereign immunity as a state-run company. In 2010 the Deepwater Horizon incident in the US Gulf Coast was a reminder to Mexico of Ixtoc I. Fishing and tourism industries in Tamaulipas, Veracruz, Tabasco, Campeche, Yucatán and Quintana Roo all claimed to be affected by the incident<sup>27</sup> which is partially blamed upon the different HSE processes of the companies involved.<sup>28</sup> More recently in April 2015 an explosion at the Abkatun-A platform led to seven deaths and environmental damage to the surrounding area.<sup>29</sup> As Mexico opens up to private investors companies with a range of different HSE procedures will start to operate in the sector, it is critical that the Mexican government harmonizes procedures to minimize associated risks and provide an accepted level of transparency and accountability.

#### IV. Petroleum Conservation measures taken by Mexico

The summary of the petroleum conservation measures found within the new Hydrocarbons Law is based on three basic pillars of sustainable development –economic, environmental and social. Petroleum conservation measures are spare within the law with no specific framework. A comprehensive definition of conservation like the one provided in the Oil And Gas Conservation Act of Alberta is not included.

##### *Environmental Assessment and Protection*

Based on Article 19 Transitory of the Energy Reform, the National Agency for Industrial Safety and Environmental Protection (*Agencia Nacional de Seguridad Industrial y Protección del Medio Ambiente*) (the “Agency”) for the hydrocarbon sector was created<sup>30</sup>. With a very broad mandate the Agency is expected to act as the HSE regulator for all hydrocarbon activities. Its ample mandate<sup>31</sup> includes: **(a)** authorizations of hydrocarbon operations in natural protected areas; **(b)** standards setting for HSE protection; **(c)** monitoring and enforcement of HSE regulations; and **(d)** oversight of industrial and operational activities, including decommissioning and abandonment of facilities, as well as waste management. Relevant authorities of the Agency include:

- Define guidelines and criteria for best HSE practices
- Provide technical advice to Ministry of Energy and NHC on HSE matters

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<sup>27</sup> BP Plc faces Mexican class action lawsuit over deepwater horizon oil spill (11 December 2015) The Guardian – Reuters, available at <<http://uk.reuters.com/business/quotes/BPGBP.STp/key-developments/article/3311454>> accessed 23 February 2016

<sup>28</sup> Investigation Report Volume 1 Explosion and Fire at the Macondo Well (US Chemical Safety And Hazard Investigation Board 2014), available at <[http://www.csb.gov/assets/1/7/Vol\\_1\\_Final.pdf](http://www.csb.gov/assets/1/7/Vol_1_Final.pdf)> accessed 25 July 2015 and Investigation Report Volume 2 Explosion and Fire at the Macondo Well (US Chemical Safety And Hazard Investigation Board 2014), available at <[http://www.csb.gov/assets/1/7/Vol\\_2\\_Final\\_Version.pdf](http://www.csb.gov/assets/1/7/Vol_2_Final_Version.pdf)> accessed 25 July 2015

<sup>29</sup> Spills and accidents were not reported by Pemex, claim (28 May 2015) Oro Negro, available at <<http://oronegro.mx/2015/05/28/derrames-y-accidentes-no-fueron-comunicados-por-pemex-afirman-en-eu/?lang=en>> accessed 23 February 2016

<sup>30</sup> For further information on the Agency see <<http://www.asea.gob.mx/cms/wp-content/uploads/2014/11/ASEA-ENGLISH-1.2.pdf>>

<sup>31</sup> Articles 5 and 6 of the Agency Law (*Ley de la Agencia Nacional de Seguridad Industrial y de Protección al Medio Ambiente del Sector de Hidrocarburos*).

- Design national and international plans to prevent and respond to emergency situations in the hydrocarbon industry
- Issue with the previous opinion of the Ministry of Energy and NHC guidelines, standards, and other administrative general provisions NOMs (acronym for Mexican official norms) on HSE matters
- Issue HSE technical provisions regarding emergencies and/or critical risks to persons, properties and/or the environment
- Create guidelines for operational HSE management systems
- Issue HSE licenses, authorizations, permits, and oversight records and disclosures

In coordination with the Ministry of Environment and Natural Resources and in order to complement Agency authority, a number of environmental NOMs have recently been issued to provide a holistic approach to environmental assessment and protection. Environmental attributions of the Agency include: **(i)** protection, conservation, and restoration of ecosystems and natural resources, **(ii)** waste characterization and management, **(iii)** pollutant emissions control, and **(iv)** approval of environmental impact and risk assessments. In addition, the Agency will push a regional sustainable development requiring sector activities to be carried out in a manner that will protect, conserve, compensate, and restore ecosystems and wild flora and fauna, and establish standards for environmental goods and services.

As to industrial safety, Agency authority includes: **(w)** compliance of national and international technical standards and practice, **(x)** prevention and control of spills and leaks, **(y)** oversight of physical and operational integrity of facilities, and **(z)** risks analysis, contingency and emergency care plans, as well as related compliance.

### *Social Sustainability*

On social impact, infrastructure projects in the hydrocarbons sector will need to comply with sustainability principles and respect at all times the human rights of the indigenous communities found within the areas to be developed.<sup>32</sup> Prior to the call for a bidding process or execution of a E&P contract, the Ministry of Energy, in coordination with the Ministry of the Interior and other relevant governmental entities and agencies, will perform a social impact study. The results of such study will be public and provided to all participants in the bidding process. In order to secure the rights of indigenous communities, the Ministry of Energy shall highlight the presence of socially vulnerable groups and the necessary actions to be taken by operators.<sup>33</sup> The Ministry of Energy shall carry out the public consultation procedures, in coordination with the Ministry of Interior and other relevant governmental entities. In addition, the parties interested in E&P activities must file before the Ministry of Energy a social impact evaluation that shall include the characterization, prediction, and evaluation of the social impact that may arise from the activities as well as the corresponding mitigation measures to be taken.<sup>34</sup> The Ministry of Energy, with the opinion of the Ministry of Finance and Public Credit, shall determine an expenditure that operators must allocate for the sustainable development of the communities in which the petroleum activities are to be carried out.<sup>35</sup>

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<sup>32</sup> Article 111 of the Hydrocarbons Law.

<sup>33</sup> *ibid* article 112.

<sup>34</sup> *ibid* article 114.

<sup>35</sup> *ibid* article 113.

On transparency and prevention of corruption, the Ministry of Energy will be responsible for providing to the public, on a monthly basis, the number of E&P contracts and permits in force, as well as their terms and conditions, and information on the areas to be bid for the exploration and exploitation activities.<sup>36</sup>

### *Economic Stability*

In addition to the direct E&P assignments to Pemex,<sup>37</sup> upstream investments may be carried out under four types of E&P Contracts: (1) License, (2) Production Sharing Contracts, (3) Profit Sharing Contracts, and (4) Service Contracts.<sup>38</sup> E&P Contracts are awarded through an international bidding process conducted by the NHC. Selection of the preferred operator will be based on technical and economic qualification criteria established by the NHC. In terms of petroleum conservation, E&P Contracts shall at a minimum include development plans in accordance with international operating practices and mechanisms and conditions for the monitoring of effective recovery of the contract area.<sup>39</sup> With the prior opinion of the Ministry of Finance and Public Credit, the Ministry of Energy may instruct the pooling of reservoirs based on the assessments conducted by the NHC. Such authority also applies to transboundary reservoirs in accordance with international treaties.

In addition, critical for the promotion of petroleum conservation measures is the role of the NHC to provide efficiency indicators and to enforce best international technical standards to maximize recovery factors.<sup>40</sup> Although it is clear that the new Hydrocarbons Law is focused to avoid resource waste and maximize recovery, more ambitious conservation measures such as mandatory fieldwide unitization,<sup>41</sup> prorationing<sup>42</sup> and energy efficiency in operations<sup>43</sup> are not expressly mentioned.

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<sup>36</sup> *ibid* article 83.

<sup>37</sup> Article 13 of the Hydrocarbons Law. Although a significant percentage of 2p reserves have been directly assigned to Pemex, assignments may be converted to private E&P contracts. To date 83% of the total 2p reserves representing 20.6 mmbpce have been assigned to Pemex. Refer to <<http://www.gob.mx/sener/reformas/avances-de-la-reforma-energetica-ronda-cero>>

<sup>38</sup> According to the Hydrocarbons Income Law State rent vary depending on the type of contract. Operators in license contracts pay an exploration stage fee, royalties, a signing bonus and a percentage over the operating profit and/or the contractual value of the hydrocarbons. In “production sharing” and “profit sharing” contracts, operators pay an exploration stage fee, royalties, and a payment of a percentage over the operating profit. Under service contract consideration is only in cash, payable by the Petroleum Fund from the proceeds of sale of hydrocarbons. The payment and compensation schemes vary for each contract, generally including production payments, net profit arrangements, cost recovery and sliding scales. Although depending on the type of E&P contracts, booking of reserves becomes possible.

<sup>39</sup> Article 20 of the Hydrocarbons Law.

<sup>40</sup> Article 43 of the Hydrocarbons Law.

<sup>41</sup> A fieldwide unit is commonly defined as a considerable area designated by the regulator or the conservation commission with a specified size and shape upon which a number of wells may be drilled by a single operator. See for example, S Rogers, ‘Fieldwide Unitization’ (2014) 68 *Arkansas Law Review* 425.

<sup>42</sup> Prorationing of petroleum occurs when a regulator restricts the amount of oil and gas produced from a pool or pools by determining the market demand for oil and gas within a pipeline or pipelines and by allocating market demand in a reasonable manner among the fields or group of fields supplying the pipeline or pipelines for the purpose of providing each well owner the opportunity of producing or receiving a just and equitable share of the hydrocarbons in the pool or pools. Article 34 (1) of the Oil and Gas Conservation Act of Alberta.

<sup>43</sup> Whilst energy efficiency is often linked to the use of energy by the end user it also applies to upstream oil and gas activities where the choice of equipment used affects the energy used in producing the oil and gas, for example the energy efficiency of motors and pumps used on a platform.

Although it seems that the rights conferred in the E&P Contracts are oriented to fulfil national interests, including energy security, sustainability of the hydrocarbons portfolio and market diversification,<sup>44</sup> the role of good governance, particularly in oversight and enforcement and the implementation of secondary legislation to fully develop the conservation measures included in the Hydrocarbons law are more than necessary to achieve the desired outcome.

## V. Developing Transboundary Hydrocarbon Resources with the US

The Mexico-US Framework Agreement allows oil and gas development over 1.5 million acres that were previously off-limits because of border issues. The extent of the contemplated incremental production will allow Mexico to double its estimated 10.5 billion barrels of proven oil reserves.<sup>45</sup> Unilateral development of cross border reserves is typically considered a breach of international law. Instead “States interested in such a deposit are therefore under an obligation to pursue an alternative, cooperative route to development.”<sup>46</sup> This duty to cooperate has resulted in some governments agreeing to bilateral treaties that establish a legal framework for transboundary hydrocarbon resource (“THRs”) development. Framework Agreements are the latest form of bilateral arrangements seeking to provide legal clarity for the joint development of transboundary resources. Executed in 2012 and coming into force in 2014 the US—Mexico Framework Agreement is the sixth example of such a Framework Agreement, and Framework negotiators had the advantage of learning from the failings of some of the earlier agreements, although the final agreement suggests that the parties may not have actually done so.<sup>47</sup>

Petroleum conservation principles included within Framework Agreements may cover mandatory unitization provisions, access to existing infrastructure, environmental regulations, field development regulations and decommissioning guidelines. Typically Framework Agreements establish a plenary body which, through the use of subsidiary bodies, develops the detailed regulations and oversees their application whilst the framework agreement provides the macro guidance to the plenary organization. The US – Mexico Framework Agreement follows this approach and creates a Joint Commission to administer the Agreement and establishes that each government shall appoint a representative and an

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<sup>44</sup> Article 42 of the Hydrocarbons Law.

<sup>45</sup> See Agreement between United States of America and Mexico on Transboundary Hydrocarbon Reservoirs in the Gulf of Mexico (adopted 20 February 2012, entered into force 18 July 2014) text registered with the UN No. 52496 (US-Mexico Framework Agreement) Preamble, p 3.

<sup>46</sup> This view was recently confirmed by the Arbitral Tribunal in the *Eritrea-Yemen Arbitration*, Phase II-Maritime Delimitation Case (17 December 1999): “having regard to the maritime boundary established by this Award, the Parties are bound to inform one another and to consult one another on any oil and gas and other mineral resources that may be discovered that straddle the single maritime boundary between them or that lie in its immediate vicinity”. G Triggs, ‘The Timor Sea Treaty and the International Unitization Agreement for Greater Sunrise: Practical Solutions in the Timor Sea’ (2004) 23 *Australian YBIL* 161, 166.

<sup>47</sup> Other Framework Agreements are the Framework Agreement between the United Kingdom and Norway concerning Cross-Boundary Petroleum Co-operation, the Framework Agreement between Canada and the French Republic Relating to the Exploration and Exploitation of Transboundary Hydrocarbon Fields, the Framework Agreement relating to the Unitization of Hydrocarbon Reservoirs that extend across the delimitation line between the Republic of Trinidad and Tobago and the Bolivarian Republic of Venezuela, the Framework Agreement between Iceland and Norway Concerning Transboundary Hydrocarbon Deposits and Framework Treaty between Norway and the Russian Federation concerning Maritime Delimitation and Cooperation in the Barents Sea and Arctic Ocean and its attached Annex II dealing with Transboundary Hydrocarbon Deposits.

alternative representative and may provide assistance from experts, as it deems necessary.<sup>48</sup> Matters which can be referred to the Joint Commission include decisions concerning the existence of cross border reservoirs,<sup>49</sup> the approval of a Unitization Agreement or an amendment thereto,<sup>50</sup> the transboundary hydrocarbon production allocation or revision thereto,<sup>51</sup> and a catch all bucket of disputes or matters referred to it by an Executive Agency.<sup>52</sup> The Agreement accepts that a Joint Commission will not always have the required expertise to review a specific matter and therefore allows the Joint Commission to establish working groups and seek outside advice.<sup>53</sup>

The preamble to the Agreement provides optimism for the inclusion of petroleum conservation principles stating an objective of “desiring to establish a legal framework to achieve safe, efficient, equitable and environmentally responsible exploitation of transboundary hydrocarbon reservoirs.” However, petroleum conservation provisions within the agreement are sparse and not fully developed.

One of the first limitations is the extent of the geographic area to which the treaty applies. It is limited to within 3 statute miles of the Delimitation Line<sup>54</sup> compared to 10 nautical miles (11.5 statute miles) in the France - Canada Framework Agreement.<sup>55</sup> This limited geography creates the possibility that some THRs will not to be covered by the Agreement and will therefore not be developed through a Unitization Agreement.<sup>56</sup>

The agreement is complex and the requirement for a mandatory unitization agreement is poorly drafted. Where the governments agree that a THR exists the agreement states that “Any joint Exploration and/or Exploitation of a Transboundary Reservoir or Unit Area pursuant to the terms of a unitization agreement must be approved by the Parties.”<sup>57</sup> A first reading suggests a unitization agreement is mandatory but the text is poorly drafted failing to stipulate all such activities are pursuant to a unitization agreement and it leaves open the question of what “joint” means and what is the situation if the Exploration and/or Exploitation is not “joint.” Article 7 of the Agreement provides for what should occur in the event a unitization agreement is not agreed upon which is to facilitate the exploitation as a “Transboundary Unit”<sup>58</sup> but the Licensees can decide not to enter into a unitization agreement in which case the governments will respond by requiring a Unit Operating Agreement<sup>59</sup> and by determining the reserves on each side of the delimitation line and the

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<sup>48</sup> US – Mexico Framework Agreement article 14(2).

<sup>49</sup> *ibid* article 5(2).

<sup>50</sup> *ibid* articles 6(4), 6(5), 7(4), 7(5).

<sup>51</sup> *ibid* articles 7(6), 8(3), 9(3).

<sup>52</sup> *ibid* article 14(5).

<sup>53</sup> *ibid* article 14(3).

<sup>54</sup> *ibid* article 4. The Delimitation line is effectively the maritime boundary.

<sup>55</sup> *ibid* article 4 of the explanatory statement.

<sup>56</sup> Oil fields can cover vast areas, for example the world’s largest field is the Ghawar field in Saudi Arabia which covers 160 via 16 miles.

<sup>57</sup> US – Mexico Framework Agreement article 6(1).

<sup>58</sup> *ibid* article 2 “a single geological Hydrocarbon structure or Reservoir which extends across the Delimitation Line the entirety of which is located beyond 9 nautical miles from the coastline, approved by the Executive Agencies for joint Exploration and/or Exploitation pursuant to the terms of a unitization agreement.”

<sup>59</sup> *ibid* defines a Unit Operating Agreement as “an agreement made between the Licensees and the unit operator that, among other things, establishes the rights and obligations of the Licensees and the unit operator including, but not limited to, the allocation of costs and liabilities incurred in and benefits derived from operations in the

associated production allocation.<sup>60</sup> This makes the Agreements wording scarily close to applying the law of capture although an Expert Determination procedure exists in the event of a disagreement.<sup>61</sup> The Unitization Agreement does however require a development plan outlining the number and timing of wells.<sup>62</sup> Whilst nothing is mentioned on the location of those wells it would be expected that an operator would locate the wells considering the reservoir geology so as to maximize production.

The Agreement requires governments to provide access to facilities near the delimitation line.<sup>63</sup> This shows the clear intent of the governments to minimize required investments and minimize environmental impact, two significant elements of petroleum conservation. Concerning safety and environmental provisions the agreement requires the Executive Agencies to develop model Unitization Agreements, which cover the safety and environmental plans of the licensees under the laws of both nations.<sup>64</sup> The incorporation of petroleum conservation principles will therefore depend on both nations' laws and how the Executive Agencies incorporate these into the model agreements, leaving an opportunity open for the inclusion of provisions on decommissioning, which is an important aspect of petroleum conservation affecting society, project costs and the environment. The Agreement also recognizes "international obligations with respect to oil pollution preparedness, response, and cooperation" and requires an appropriate framework.<sup>65</sup>

## VI. Conclusions

Due to the size and historical complexity of the Mexican upstream sector, a need for a coordinated regulatory approach, with a preventive emphasis that weighs efficiency and cost optimization, effectiveness of regulation, alignment of economic, social, and environmental regulations, and accountability, transparency and legal certainty is more apparent than ever. The progressive incorporation and implementation of petroleum conservation principles provide a historic opportunity to enhance Mexico's upstream sector under sustainable practices. Although the Energy Reform provides vast and comprehensive legislation, the filling of gaps and expected updates to the implementing legislation creates a tangible opportunity to strengthen petroleum conservation measures for the benefit of the public interest at large.

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Unit Area" whilst the agreement distinguishes a unitization agreement differently without providing a definition but defining its contents in article 6(2).

<sup>60</sup> *ibid* article 7(2)(b).

<sup>61</sup> *ibid* article 7(3).

<sup>62</sup> *ibid* article 6(2)(d).

<sup>63</sup> *ibid* article 12.

<sup>64</sup> *ibid* article 6(2)(j).

<sup>65</sup> *ibid* article 19(3).