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North American Energy Roundtable: Panel 1

Ricardo Samaniego-Breach  
*Autonomous Technological Institute of Mexico*

Angela Colarusso  
*U.S. Department of Energy*

Jeff Rush  
*TransCanada U.S. Pipelines West*

Len Webber  
*Legislative Assembly of Alberta & Parliamentary Assistant for Energy*

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Ricardo Samaniego-Breach

Autonomous Technological Institute of Mexico

North American Energy Roundtable
University of Nevada, Las Vegas

March 27, 2009
Opening Remarks

1. An overview of Mexico’s oil and gas sector
   - Basic information
   - The fall in production
   - The decrease of reserves
   - Growing gasoline imports
   - Fiscal regime
   - The need for reform

2. Scenarios towards 2025
   - Trend scenario
   - Scenarios with increased investment
   - Scenario with full impact of the reform of 2008
1.1 Overview:
Mexico’s Oil and Gas Sector At A Glance

• *Petroleos Mexicanos* or Pemex is the largest company in Mexico and Latin America and the largest fiscal contributor to the country.

• It is one of the few oil companies in the world that integrates all the productive chains of the industry: upstream, downstream and final product commercialization.
1.1 Overview:
Mexico’s Oil and Gas Sector At A Glance

• During 2008 it recorded total sales of about 121 billion dollars of which
  o Domestic sales of 680 billion pesos (about 62 billion dollars) and
  o Exports of 644 billion pesos (about 59 billion dollars).

• In 2008
  o The daily average oil production was 2.792 million barrels per day and exports of 1.4 million barrels per day
  o Natural gas production was 6,919 million cubic feet per day
  o Gasoline production was 436 thousand barrels per day
  o Diesel and jet fuel production was 408 thousand barrels per day
1.2 Overview:  
Mexico’s Oil and Gas Sector At A Glance

- **PEMEX in the world is:**
  - 3rd in crude oil production
  - 11th integrated oil company
  - 12th in crude oil reserves
  - 15th in natural gas production
  - 13th in refining capacity
1.2 Overview: Mexico’s Oil and Gas Sector At A Glance

• **Total investment in Pemex during 2008 totaled 285 billion pesos (or about 26 billion dollars)**
  
  o **An increase of 21.5% over 2007**
  
  o **Most of the investment is in upstream (95% of all is financed investment in Pemex)**

• **Assets and debt. In 2008:**

  o **Pemex total assets amount to 1,227 billion pesos (about 112 billion dollars)**

  o **Pemex short and long term debt is 587 billion pesos (about 53 billion dollars)**
1.3 Oil production has been falling; most of the reduction comes from the decay of the Cantarell heavy oil field (thousand barrels daily)

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Crude Oil</th>
<th>Natural Gas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total</td>
<td>By type</td>
<td>By region</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Heavy</td>
<td>Light</td>
</tr>
<tr>
<td>2004</td>
<td>3,825</td>
<td>2,458</td>
<td>790</td>
</tr>
<tr>
<td>2005</td>
<td>3,760</td>
<td>2,387</td>
<td>802</td>
</tr>
<tr>
<td>2006</td>
<td>3,683</td>
<td>2,244</td>
<td>831</td>
</tr>
<tr>
<td>2007</td>
<td>3,471</td>
<td>2,039</td>
<td>838</td>
</tr>
<tr>
<td>2008</td>
<td>3,157</td>
<td>2,792</td>
<td>1,766</td>
</tr>
</tbody>
</table>

a. Includes condensates.
b. Adjusted production and corrected by water content.
c. The output volume shows a reduction due to adverse climatological conditions that maintained closed the wells.
1.4 The fall in crude oil production began in 2004 and is 15.4% below its peak.
1.5 The oil recovery factor in Mexico is low by international standards

<table>
<thead>
<tr>
<th>Country</th>
<th>Oil companies</th>
<th>RF 1995</th>
<th>RF 2005</th>
<th>% change</th>
<th>year of reform</th>
</tr>
</thead>
<tbody>
<tr>
<td>Saudi Arabia</td>
<td>15</td>
<td>40</td>
<td>65</td>
<td>63</td>
<td>2001</td>
</tr>
<tr>
<td>Kuwait</td>
<td>12</td>
<td>44</td>
<td>65</td>
<td>48</td>
<td>2002</td>
</tr>
<tr>
<td>Norway</td>
<td>45</td>
<td>46</td>
<td>54</td>
<td>19</td>
<td>1972</td>
</tr>
<tr>
<td>Russia</td>
<td>7</td>
<td>35</td>
<td>51</td>
<td>46</td>
<td>1992</td>
</tr>
<tr>
<td>United States</td>
<td>200+</td>
<td>30</td>
<td>51</td>
<td>70</td>
<td>1979</td>
</tr>
<tr>
<td>Brazil</td>
<td>79</td>
<td>30</td>
<td>50</td>
<td>67</td>
<td>1995</td>
</tr>
<tr>
<td>Great Britain</td>
<td>200+</td>
<td>38</td>
<td>48</td>
<td>26</td>
<td>1977</td>
</tr>
<tr>
<td>Canada</td>
<td>12</td>
<td>27</td>
<td>41</td>
<td>52</td>
<td>1991</td>
</tr>
<tr>
<td>Nigeria</td>
<td>7</td>
<td>30</td>
<td>38</td>
<td>27</td>
<td>2003</td>
</tr>
<tr>
<td>Argentina</td>
<td>8</td>
<td>30</td>
<td>40</td>
<td>33</td>
<td>1991</td>
</tr>
<tr>
<td>Colombia</td>
<td>8</td>
<td>20</td>
<td>30</td>
<td>50</td>
<td>1995</td>
</tr>
<tr>
<td>Mexico</td>
<td>1</td>
<td>29</td>
<td>33</td>
<td>13</td>
<td>2008</td>
</tr>
<tr>
<td>Average (w/o Mexico)</td>
<td>54</td>
<td>33</td>
<td>47</td>
<td>43</td>
<td></td>
</tr>
</tbody>
</table>

Source: “Distribution and Evolution of Recovery Factors”, EIA.
1.4 The fall in oil and gas reserves has been steady since 2002

Evolution of oil and gas reserves 2002-2008
(Billion barrels of crude oil equivalent, Bbcoe)

In 2008 proven reserves fell to 14.3 Bbcoe and 3P reserves to 43.6 Bbcoe
The value of Mexico’s oil exports has doubled but the imports of refined products, natural gas and petrochemicals has increased four-fold since 2004

(million U.S. dollars)

<table>
<thead>
<tr>
<th></th>
<th>Total&lt;sup&gt;a&lt;/sup&gt;</th>
<th>PEMEX</th>
<th>Pemex Exports/Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Exports</td>
<td>Imports</td>
<td>Balance</td>
</tr>
<tr>
<td>2004</td>
<td>101,047</td>
<td>129,067</td>
<td>-28,021</td>
</tr>
<tr>
<td>2005</td>
<td>116,832</td>
<td>146,141</td>
<td>-29,309</td>
</tr>
<tr>
<td>2006</td>
<td>138,410</td>
<td>168,627</td>
<td>-30,217</td>
</tr>
<tr>
<td>2007</td>
<td>271,875</td>
<td>281,949</td>
<td>-10,074</td>
</tr>
<tr>
<td>2008</td>
<td>291,807</td>
<td>308,645</td>
<td>-16,838</td>
</tr>
</tbody>
</table>

<sup>a</sup> Starting from 2007, Banco de México presents exports with products abroad processing included. SOURCE: Banco de México.

<sup>b</sup> Only refined products, natural gas and petrochemicals.
1.6 The volume of imports of gasoline has increased 250% since 2004 and imports of diesel are also increasing sharply

(thousand barrels daily)

<table>
<thead>
<tr>
<th></th>
<th>Total</th>
<th>LPG(^a)</th>
<th>Gasolines(^b)</th>
<th>Diesel</th>
<th>Fuel oil</th>
<th>Others</th>
<th>Natural Gas</th>
<th>Petrochemicals</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>MMcfd</td>
<td>Mt</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>MMcfd</td>
<td>Mt</td>
</tr>
<tr>
<td>2004</td>
<td>234.2</td>
<td></td>
<td>94.9</td>
<td>2.9</td>
<td>17.7</td>
<td>34.0</td>
<td>765.6</td>
<td>104.7</td>
</tr>
<tr>
<td>2005</td>
<td>333.7</td>
<td></td>
<td>169.8</td>
<td>21.4</td>
<td>26.4</td>
<td>43.2</td>
<td>480.4</td>
<td>238.6</td>
</tr>
<tr>
<td>2006</td>
<td>368.9</td>
<td></td>
<td>204.7</td>
<td>40.5</td>
<td>14.3</td>
<td>33.7</td>
<td>450.9</td>
<td>253.8</td>
</tr>
<tr>
<td>2007</td>
<td>494.6</td>
<td></td>
<td>308.1</td>
<td>52.7</td>
<td>17.0</td>
<td>34.0</td>
<td>385.6</td>
<td>270.0</td>
</tr>
<tr>
<td>2008</td>
<td>552.5</td>
<td></td>
<td>340.5</td>
<td>68.0</td>
<td>32.9</td>
<td>22.4</td>
<td>450.4</td>
<td>235.6</td>
</tr>
</tbody>
</table>

MMcfd = Million cubic feet daily
Mt = Thousand tonnes

a. Excludes return of products under processing agreement (values in Mbd): 94.5 of gasolines, 1.2 of isobutane, 10.0 of diesel, 0.9 of jet fuel and 1.2 of fuel oil for 2002; 87.2 of gasolines, 0.9 of isobutane, 5.4 of diesel and 1.6 of fuel oil for 2003; 0.7 of diesel and 79.1 of gasolines for 2004; 3.4 of diesel and 62.4 of gasolines for 2005; 0.7 of diesel and 69.5 of gasolines for 2006; and 2.2 of gasolines for 2007.

b. Includes propane and butane.

c. Includes MTBE.
1.7 Pemex financial losses come from the refining and petrochemical sectors

Pemex net profits (billion 2007 pesos)

*First quarter 2008
1.8 Pemex’s fiscal regime is not abnormally exacting

As a % of profits, Pemex taxes are about the median of other countries

<table>
<thead>
<tr>
<th>Country</th>
<th>Taxes and royalties as a % of profits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Great Britain</td>
<td>40</td>
</tr>
<tr>
<td>New Zealand</td>
<td>41</td>
</tr>
<tr>
<td>South Africa</td>
<td>50</td>
</tr>
<tr>
<td>Australia</td>
<td>59</td>
</tr>
<tr>
<td>Malaysia</td>
<td>66</td>
</tr>
<tr>
<td>Mexico</td>
<td>77</td>
</tr>
<tr>
<td>United Arab Emirates</td>
<td>84</td>
</tr>
<tr>
<td>Indonesia</td>
<td>86</td>
</tr>
<tr>
<td>Libya</td>
<td>86</td>
</tr>
<tr>
<td>Qatar</td>
<td>87</td>
</tr>
<tr>
<td>Iran</td>
<td>95</td>
</tr>
</tbody>
</table>

Source:
Scenarios towards 2025

- Trend scenario
- Scenarios with increased investment
- Scenario with full impact of the reform of 2008
2.1 Production under a “business as usual” scenario

Production with trend investment (thousand barrels per day, tbd)

Source: PEMEX.
2.2 Production under “additional investment” scenario

Production with new investment in the Southeastern region
(thousand barrels a day relative to 2008)

Source: PEMEX.
2.3 Production under “new investments and new fiscal regime” scenario

Oil production with new investments and new fiscal regime for abandoned fields
(thousand barrels per day relative to 2008)

Present fields

Abandoned fields
Southeastern fields
Other fields
Ku-Maloob-Zaap
Cantarell

Source: PEMEX.
2.4 Production under “energy reform and Chicontepec region” scenario

Oil production with new investments and a new fiscal regime for abandoned fields and Chicontepec
(thousand barrels per day relative to 2008)

Source: PEMEX.
The present fall in production does not reflect Mexico’s potential
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• Alberta is the world’s third largest producer and exporter of natural gas, and by far the largest supplier of natural gas to the U.S.
• In 2007, Alberta exported enough natural gas to the U.S. to supply approximately 20 million residential households.
Alberta’s natural gas transportation hub provides access to markets for northern gas.

Alberta natural gas reaches markets from northern California to the eastern seaboard.
Alberta currently produces 1.8 million bbl/d of crude oil, the majority of which goes to the U.S.
• Oil sands will be responsible for future oil production increases in Alberta.
• Unlike tankers, pipelines represent infrastructure largely dedicated to delivering crude oil to the U.S.
Crude Oil – US Sources

2007 U.S. Crude Oil Imports by Place of Origin

Total Imports = 10.0 million bbl/d
Total Demand = 20.7 million bbl/d

- Alberta 13%
- Mexico 14%
- Saudi Arabia 14%
- Venezuela 11%
- Nigeria 11%
- Rest of Canada 6%
- Others 21%
- Angola 5%
- Iraq 5%

Source: U.S. Energy Information Administration
Alberta Energy Resources Conservation Board
• Main element of Alberta’s Climate Change Strategy.
• $2 billion for large-scale CCS projects.
• Funding to accelerate the development of projects and encourage investment from industry to make large-scale CCS projects viable.
• Alberta’s geology ideal for CCS and enhanced oil recovery.