

Summary

Oil was discovered in Mexico in 1901 and in 1921 it was the second largest producing country in the world with 530 thousand barrels per day (Mbd) of crude oil — behind the United States (US) with 1,294 Mbd. After the dramatic decline that followed, the oil industry in Mexico was nationalized in 1938 and Petroleos Mexicanos (Pemex) was created to operate it.

Discovery of the onshore Samaria field in 1960 was followed by discovery of the Cantarell field in the Bay of Campeche in 1976. Named for the fisherman who complained about oil seeps to Pemex geologists, Cantarell is one of the world's larger fields with an estimated 35 billion barrels of oil originally in place.

Figure 1 presents forecast production of crude oil in Mexico as an extension of history beginning in 1945. By type the history and forecast of total production are as follows:

	Thousand Barrels Per Day (Mbd)			
	Crude Oil		Conden- sate	Gas Liquids
	Offshore	Onshore		
1995	1,945	601	73	341
1996	2,112	641	79	323
1997	2,271	642	83	328
1998	2,296	627	87	335
1999	2,222	587	85	336
2000	2,358	560	85	339
2001	2,463	507	88	332
2002	2,581	469	84	311
2003	2,732	412	86	317
2004	2,795	413	81	335
2005	2,671	426	78	324
2006 E	2,567	428	76	319
		Forecast		
2007	2,458	446	74	315
2008	2,421	522	68	312
2009	2,340	556	63	297
2010	2,276	595	60	288
2011	2,145	633	55	281
2012	2,019	661	49	273
2013	1,918	677	41	267
2014	1,838	723	36	253
2015	1,794	707	30	245

E indicates estimate

It now appears that the resource of crude and condensate (i.e. the volume that will ultimately be recovered) was about 65 billion barrels. Forecast production and ultimate recovery of crude and condensate compare with recent history, as follows:

	Billion Barrels	
	Offshore	Onshore
Ultimate Recovery 12-31-1978	10.01	11.30
<u>Reserve Additions</u>		
1979-1994	12.25	2.78
1995-2004	8.08	1.28
2005-2015	4.66	3.64
Ultimate Recovery 12-31-2015	35.00	19.00
Cumulative Production 12-31-1978	0.01	6.65
1979-1994 Production	9.45	5.21
1995-2004 Production	8.98	2.00
<u>2005-2015 Production</u>		
2005	1.00	0.16
Estimated 2006	0.96	0.16
Forecast 2007-2015	7.17	2.04
Subtotal	9.13	2.36
Cumulative Production 12-31-2015	27.57	16.22
Proved Reserves	7.43	2.78
Ultimate Recovery 12-31-2015	35.00	19.00
of which:		
Crude Oil	34.15	18.94
Condensate	0.85	0.06

Peak production offshore was 1.03 billion barrels in 2004. As of December 31, 2004, cumulative production offshore was 18.44 — which is a little over half our estimated resource of 36 billion barrels.

Peak production onshore was 0.24 billion barrels in 1997. As of December 31, 1997, cumulative production onshore was 12.55 billion barrels. That is about 43 percent of our estimated resource of 29 billion barrels because of Chicontepec.

Chicontepec is an area of about 1,250 square miles on the southwestern flank of the Tampico-Tuxpan Embayment. Discovered in 1926, it features formations with low permeability (0.01 to 100 millidarcies) and high pressure that may have as much as 70 billion barrels and 150 trillion cubic feet (Tcf) in place. With as many as 16,000 wells, up to 11 billion barrels and 27 Tcf may be recovered.

The Burgos and Sabinas basins contain gas in tight reservoirs similar to those of southern Texas. Since 1994 more than 2,000 wells have been completed in the Burgos basin and production has increased by nearly 950 million cubic feet per day (MMcfd).

Prior to the 1938 nationalization, approximately 6,487 wells were completed in Mexico, of which 3,940 (over sixty percent) were dry holes. In 1938-1945 another 237 wells were completed — 124 oil wells, 12 gas wells, and 101 dry holes. Subsequent history, and our forecast to 2015, are as follows:

Summary (Continued)

Well Completions				Oil Balances in Mexico			
	Oil	Gas	Dry	Million Barrels Per Day (MMbd)			
	Wells	Wells	Holes		1997	2000	2005
1946-1962	3,465	530	1,861	Deliveries	1.90	2.01	2.07
				<u>Supply</u>			
1963-1978	3,531	936	2,491	Maya Crude	1.50	1.73	2.29
				Other Crude	1.41	1.19	0.81
1979-1994	2,000	470	920	Condensate	0.08	0.09	0.08
				Gas Liquids	0.33	0.33	0.32
1995-2004	651	2,219	343	Production	3.32	3.34	3.50
				<u>Imports</u>			
2005	203	448	91	Products	0.32	0.49	0.44
Estimated 2006	107	515	80	<u>Exports</u>			
	Forecast			Maya Crude	(1.02)	(1.18)	(1.59)
2007	380	520	70	Other Crude	(0.70)	(0.53)	(0.30)
2008	795	542	64	Products	(0.02)	(0.11)	(0.02)
2009	1,187	550	60	Processing Gain	0.01	0.03	0.05
2010	1,473	560	50	Supply	1.91	2.04	2.08
2011	1,460	570	45	Stocks Up or			
2012	1,450	580	30	(Down)	0.01	0.03	0.01
2013	1,440	590	25				
2014	1,430	605	20				
2015	1,425	620	15				
2005-2015	11,350	6,100	550				

Since 1994 Pemex has built up to over 40 rigs working in the Burgos basin under service contracts. Up to 100 more rigs may be used to develop Chicontepec.

Pemex's six domestic refineries have nameplate capacity of 1.54 MMbd. They are largely obsolete and rarely operate above 1.30 MMd. To supplement their output 0.40 to 0.50 MMbd of products are imported — 0.25 MMbd of gasoline, 0.08 MMbd of LPG, and 0.07-0.17 MMbd of other products.

By increasing both production and imports of natural gas, Mexico was able to reduce use of residual fuels by nearly 22 percent between 1997 and 2006. Total product deliveries increased by less than 7 percent over that period — from 1.90 MMbd in 1997 to 2.07 MMbd in 2005.

The resulting oil balances were as follows:

In 2004 Shell and Total began construction of a terminal to receive and regasify liquefied natural gas (LNG) north of Tampico on Mexico's eastern coast. It began operating in October 2006 to supply gas to the Federal Electricity Commission (CFE). In 2007 the LNG will enable CFE to reduce consumption of residual fuel oil by about 0.03 MMbd as well as reduce imports of natural gas by pipeline from the US.

Three LNG terminals have been proposed for the Pacific Ocean coast. The most likely to be built is sponsored by CFE and will be sited only 400 miles northwest of Mexico City. Beyond 2010 imports of natural gas are forecast to begin reducing consumption of LPG and heating oil in Mexico as well as continuing to reduce use of residual fuel oils. Figure 2 is a plot of historic and forecast deliveries of major products.

Summary (Continued)

Commercial production from Cantarell and KMZ is "Maya" crude. It is typically 21.5° API gravity with 3.4 percent sulfur by weight. Pemex owns interests in two Spanish refining companies and has a 50 percent interest in a refinery on the Houston Ship Channel operated by Shell. Its other customers for the 1.6 MMbd of Maya crude it exports are refineries in Texas, Louisiana, Netherlands Antilles, and Virgin Islands.

Current production from Chicontepec averages 31° API gravity. As total production declines, Pemex can be expected to maintain exports of Maya and reduce its other exports of crude. After imports of residual fuel and exports of other crudes are eliminated, something else will have to be done. Rather than make large investments in its refineries, Pemex is likely to begin importing crude oil — most probably for the 0.33 MMbd refinery at Saline Cruz on the coast of the Pacific Ocean. The resulting forecast oil balances are as follows:

Forecast Oil Balances in Mexico

Million Barrels Per Day (MMbd)

	Est.		Forecast	
	2006	2007	2010	2015
Deliveries	2.03	2.02	2.00	1.97
<u>Supply</u>				
Maya Crude	2.22	2.21	2.03	1.58
Other Crude	0.77	0.75	0.79	0.87
Condensate	0.08	0.07	0.06	0.03
Gas Liquids	0.32	0.32	0.29	0.25
Production	3.39	3.35	3.17	2.73
<u>Imports</u>				
Products	0.43	0.40	0.41	0.40
Crude	-	-	-	0.31
<u>Exports</u>				
Maya Crude	(1.53)	(1.52)	(1.50)	(1.50)
Other Crude	(0.26)	(0.20)	(0.07)	-
Products	(0.04)	(0.06)	(0.07)	(0.02)
Processing Gain	0.05	0.05	0.06	0.08
Supply	2.04	2.02	2.00	2.00
Stocks Up or (Down)	0.01	-	-	0.03

The other option would be to close one or more of Pemex's refineries and import products from Asia and the Middle East as well as from the US and the Caribbean.