

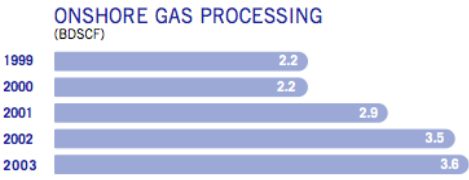


# Abu Dhabi NOC, United Arab Emirates

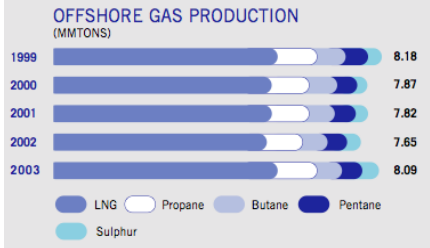
## UAE total oil & gas production

Year	Crude Oil & NGL			Natural Gas		
	Net production	Net production	Net production	Gross production	Gross production	Marketed production
	Thousand bbl /d	Million bbl /yr	Million bbl /yr	Million cf/d	Billion cf/yr	Percent

- 17 1945
- 18 1946
- 19 1947
- 20 1948
- 21 1949
- 22 1950
- 23 1951
- 24 1952
- 25 1953
- 26 1954
- 27 1955
- 28 1956
- 29 1957
- 30 1958
- 31 1959
- 32 1960
- 33 1961
- 34 1962
- 35 1963
- 36 1964
- 37 1965
- 38 1966
- 39 1967
- 40 1968
- 41 1969
- 42 1970
- 43 1971
- 44 1972
- 45 1973
- 46 1974
- 47 1975
- 48 1976
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- 59 1987
- 60 1988
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- 66 1994
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- 68 1996
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- 75 2003
- 76 2004
- 77 2005
- 78 2006
- 79 2007
- 80 2008
- 81 2009
- 82 2010



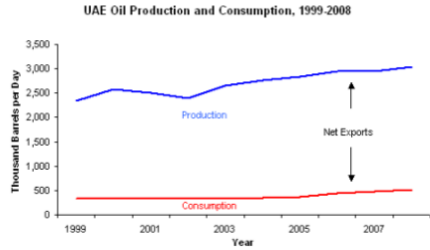
ADNOC (2005) Five Year Achievement Rpt, p. 14.



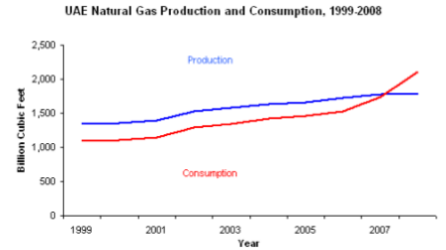
ADNOC (2005) Five Year Achievement Rpt, p. 12.



Year	UAE total prod thousand bbl /day	UAE total prod'n million bbl /yr
1962	10	4
1963	50	18
1964	190	69
1965	280	102
1966	360	131
1967	380	139
1968	500	183
1969	630	230
1970	780	285
1971	1,060	387
1972	1,203	439
1973	1,533	559
1974	1,679	613
1975	1,664	607
1976	1,936	707
1977	1,999	730
1978	1,831	668
1979	1,831	668
1980	1,744	637
1981	1,534	560
1982	1,340	489
1983	1,269	463
1984	1,276	466
1985	1,353	494
1986	1,515	553
1987	1,686	615
1988	1,695	619
1989	1,990	726
1990	2,252	822
1991	2,532	924
1992	2,410	880
1993	2,305	841
1994	2,343	855
1995	2,393	873
1996	2,438	890
1997	2,476	904
1998	2,515	918
1999	2,329	850
2000	2,568	937
2001	2,495	911
2002	2,382	869
2003	2,658	970
2004	2,757	1,006
2005	2,835	1,035
2006	2,936	1,072
2007	2,938	1,072
2008	3,037	1,109
2009	2,786	1,017
2010	2,804	1,023
<b>Total</b>		<b>31,940</b>

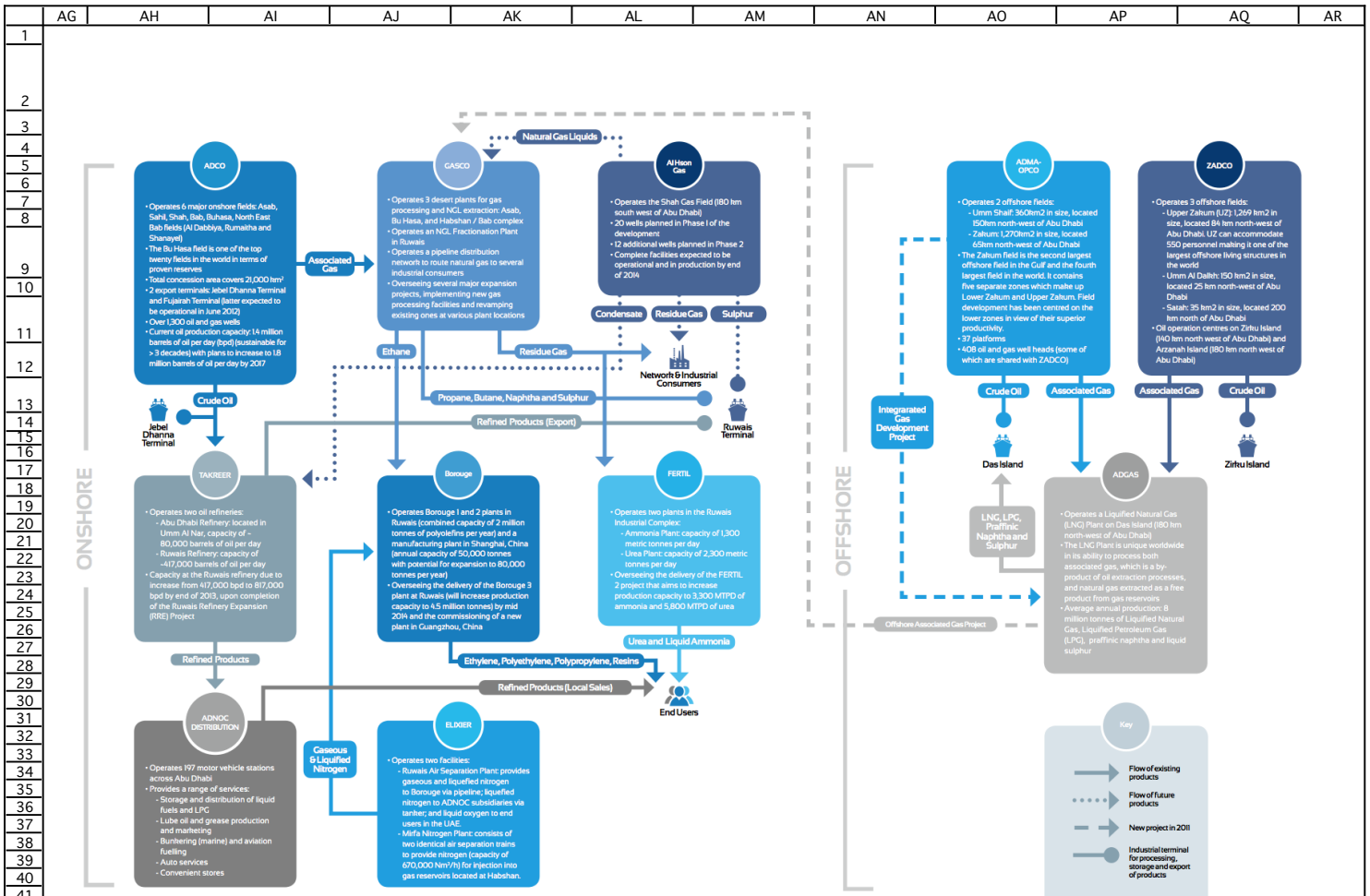


Source: EIA



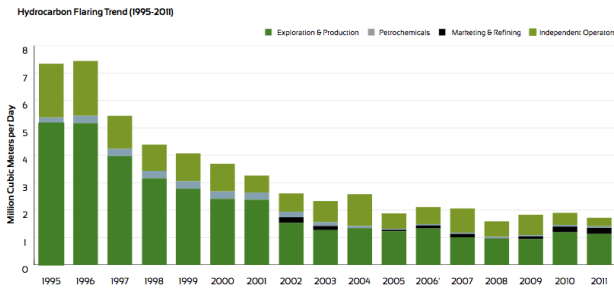
Source: EIA

Year	UAE		UAE		UAE		UAE		UAE	
	Gross NatGas Prod Bcf per year	Prod Market Gas Bcf per year	Reinjected NatGas Bcf per year	%	Vented & Flared Bcf per year	Dry NatGas Prod Bcf per year				
1999	NA	NA	NA	NA	269	200				
2000	NA	NA	NA	NA	152	230				
2001	NA	NA	NA	NA	181	200				
2002	NA	NA	NA	NA	216	270				
2003	NA	NA	NA	NA	236	344				
2004	NA	NA	NA	NA	224	484				
2005	NA	NA	NA	NA	175	537				
2006	NA	NA	NA	NA	82	682				
2007	NA	NA	NA	NA	89	660				
2008	NA	NA	NA	NA	57	812				
2009	1,053	780	127	4%	42	780				
2010	1,163	1,024	120	2%	18	916				
	1,295	1,138	127	2%	30	1,023				
	1,292	1,078	196	1%	18	937				
	1,213	1,047	153	1%	14	912				
	1,443	1,218	212	1%	13	1,106				
	1,622	1,308	301	1%	14	1,194				
	1,698	1,397	247	3%	54	1,282				
	1,730	1,424	253	3%	53	1,309				
	1,776	1,462	263	3%	51	1,343				
	1,784	1,474	265	3%	46	1,355				
	2,084	1,544	516	1%	24	1,390				
	2,254	1,701	537	1%	17	1,532				
	2,305	1,756	516	1%	34	1,582				
	2,402	1,814	558	1%	32	1,635				
	2,410	1,828	551	1%	31	1,659				
	2,561	1,916	611	1%	34	1,723				
	2,649	1,995	623	1%	31	1,778				
	2,827	1,976	817	1%	35	1,774				
	2,678	1,865	779	1%	35	1,724				
	2,817	1,992	791	1%	34	1,811				
	2,911	2,030	847	1%	35	1,847				
<b>Total</b>	<b>43,970</b>	<b>33,766</b>	<b>9,408</b>	<b>1.6%</b>	<b>693</b>	<b>30,613</b>			<b>1990-2011 totals</b>	



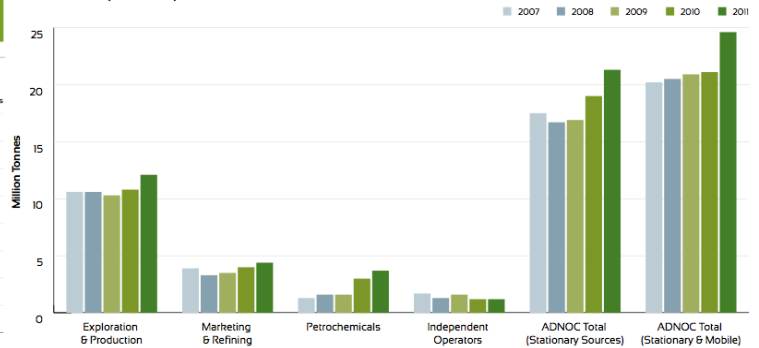
ADNOC (2011) Sustainability Report 2011: Fostering Our Society, Securing Our Future, page 8.

**ADNOC strives towards the ultimate elimination of hydrocarbon flaring, reducing emissions, improving energy efficiency and promoting renewable energy**



ADNOC (2011) Sustainability Report 2011, page 23.

**GHG Emissions (5 Year-Trend)\***



ADNOC (2011) Sustainability Report 2011, page 24.

Alternate production estimate for 2008			
	Thousand bbl /d	Million bbl /yr	
2008	1,993	727	3,523 Bcf.yr

Source: Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, *Oil and Governance*. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; www.woodmacresearch.com



**Cell: J9****Comment:** Rick Heede:

ADNOC was built from the the Petroleum Development in Trucal Coast Ltd (PDTC, formed in 1935 by Anglo-Persian, now BP, Shell, CFP, now Total SA, Exxon, and Mobil as partners, and granted a 75-year concession as of 11 January 1939). Abu Dhabi determined in 1951 that the concessions to PDTC did not include offshore areas, which subsequently lead to the creation of Abu Dhabi Marine Areas Ltd (ADMA, in 1954, owned two-thirds by BP and one-third by CFP). Abu Dhabi is the largest emirate in the confederation that became United Arab Emirates when the United Kingdom announced in 1968 (reaffirmed in March 1971 by Prime Minister Edward Heath) that the British-Trucial Sheikdoms Treaty would expire on 1 December 1971. Abu Dhabi and Dubai started the process of forming the United Arab Emirates in mid-1971; five additional smaller sheikdoms joined the confederation of the UAE by February 1972 (Qatar and Bahrain, also under the previous protection of the United Kingdom, were invited to join the UAE but declined).

ADNOC was formed as a state-owned company in 1971, began nationalizing, and acquired a 25 percent interest its existing PDTC concessions following the creation of OPEC on 1 January 1973. This was raised to a 60 percent interest on 1 January 1974. ADNOC continues to invite IOC participation in exploration and production both onshore and offshore Abu Dhabi, and generally retains a 60 percent stake.

See: Rai, Varun, & David G. Victor (2012) *Awakening giant: strategy and performance of the Abu Dhabi National Oil Company (ADNOC)*," in Victor et al, eds, *Oil & Governance*, pp. 478-556. And Yergin, Daniel (1991) *The Prize: The Epic Quest for Oil, Money, and Power*, Simon & Schuster, 899 pp.

**Cell: M9****Comment:** Rick Heede:

World Bank, 2008b, page 520: "ADNOC is fully owned by the government (supervised by The Supreme Petroleum Council). Upstream affiliated companies are minority-owned by foreign companies." World Bank (2008b) *A Citizen's Guide to National Oil Companies, Part B: Data Directory*, World Bank, Washington, & Center for Energy Economics, Bureau of Economic Geology Jackson School of Geosciences University of Texas, Austin, 764 pp.

**Cell: M11****Comment:** Rick Heede:

On this worksheet we report extractive data for each company or state-owned enterprise. Three columns under crude oil and natural gas allow for data reported in one of three formats (e.g., thousand barrels per day, or million barrels per year, or million tonnes per year). Coal is normally reported in short tons or metric tonnes per year.

The subtraction of the fraction typically sequestered in petrochemicals and other non-combusted uses such as road oils, waxes, lubricants, greases, etc. Non-fuel uses are accounted for in the emission factors and applied to each entity in the oil, gas, and coal summary worksheets.

**Cell: F12****Comment:** Rick Heede:

Total net worldwide crude oil plus natural gas liquids produced by each company or state-owned enterprise. Where data is available, we list net production (after royalty production is deducted).

We rely on company annual reports, Form 10-k, or other company data where available. In some cases -- particularly for state-owned oil and gas companies -- we use production data from the *Oil & Gas Journal* in its OGI150 and OGI100.

Crude production includes natural gas liquids (NGL) unless noted.

**Cell: J12****Comment:** Rick Heede:

Natural gas is typically reported as dry gas; natural gas liquids are reported under crude oil.

Carbon dioxide is normally removed from the gas flow at the production site (see "Vented Carbon Dioxide").

"SCM/d" = standard cubic meters per day. "cf/d" = cubic feet per day.

**Cell: D31****Comment:** Rick Heede:

Oil and gas production data is available from Annual Reports provided by the University of Exeter's Arab World Documentation Unit, [www.exeter.ac.uk/awdu/ktlad.htm#5](http://www.exeter.ac.uk/awdu/ktlad.htm#5):

Abu Dhabi National Oil Company (ADNOC)

- Annual reports:\* 1975(report on 1st 5yrs), 1976 - 1985, 1992, 1993, 1994.

- Seventeen years of progress 1971-1988.

**Cell: J31****Comment:** Rick Heede:

We use ADNOC reported gas production for 1962 to 1994, *Oil & Gas Journal* for 1995-2004, and estimated for 2005-2010 on the basis of a constant gas to oil production ratio for 2004 extended to 2005-2010.

ADNOC's ownership of natural gas production is not fully transparent. Rai & Victor (2012, page 489) that "ADNOC owned 51 percent of ADGAS until June 1997, when it increased its holding to 70 percent." ADNOC's two main gas processing subsidiaries -- Abu Dhabi Gas Industries Ltd (GASCO) and Abu Dhabi Gas Liquefaction Company Ltd (ADGAS). GASCO is a joint venture of ADNOC (68 percent), Total (15%), Shell (15%), and Partex (2%) and was formed in 1978.

Rai, Varun, & David G. Victor (2012) "Awakening giant: strategy & performance of the Abu Dhabi National Oil Company (ADNOC)," in Victor et al, eds, *Oil and Governance*, pp. 478-514.

**Cell: F32****Comment:** Rick Heede:

CMS does not have production estimates for ADNOC 1960-1986. CMS attributes 60 percent of total UAE crude oil & NGL production to ADNOC production on the basis of 1988 fraction of known ADNOC to UAE total production. ADNOC annual reports show total production in Abu Dhabi. "According to the Participation Agreement signed in 1974 with the major foreign companies operating in the Emirate, 60% of the production of crude oil is owned by Abu Dhabi, and marketed by ADNOC. The remaining 40% constitute the share of the foreign oil companies." (Quoted from ADNOC Annual Report 1975, p. 12.) CMS reports ADNOC production from *Oil & Gas Journal* OGI100 for 1986-2008, which presumably deducts royalty and IOC production.

Rai & Victor (2012, page 487) detail ADNOC's three operating subsidiaries -- Abu Dhabi Company for Onshore Oil Operations (ADCO), Abu Dhabi Marine Operating Company (ADMA, for onshore ops), and Zakum Development Company (ZADCO, for offshore ops). ADNOC owned 60 percent of ADCO, and the other partners are BP (9.5%), Shell (9.5%), Total (9%), and Partex (2%). ADNOC own 60 percent of ADMA, with BP (14.67%), Total (13.33%), and Japan Oil Development Company (12%).

Rai, Varun, & David G. Victor (2012) "Awakening giant: strategy & performance of the Abu Dhabi National Oil Company (ADNOC)," in Victor et al, eds, *Oil and Governance*, pp. 478-514.

**Cell: L32****Comment:** Rick Heede:

ADNOC annual reports show total production in Abu Dhabi. "the Government of Abu Dhabi promulgated Law Nr. 4 war establishing that all gas resources within the Emirate shall be solely owned by the Emirate. ... ADNOC has been assigned the right to exploit and use all such gas. The company may, if it so desires, undertake the exploitation of the gas in partnership with other parties, provided that it retains a minimum of 51% shareholding in any joint venture." (Quoted from ADNOC Annual Report 1975, p. 12. ADNOC also reports that "a large quantity of gas is still flared off, some 11% of of the natural gas from onshore fields and 39% of that from the offshore fields, is used, principally in pumping stations and power generation in the oil fields." CMS calculates that ADNOC thus flared 406 billion cubic feet of gas of the total 484 Bcf produced in 1976, -- a utilization rate of 20.2 percent.

Note: the utilization rate increased to 40 percent in 1978.

**Cell: V32****Comment:** Rick Heede:

Energy Information Administration *International Energy Annual* 2003, Table G.1 World Production of Crude Oil, NGPL, and Other Liquids, 1980-2003.

Also Table 4.1c World Crude Oil Production (Including Lease Condensate), 1970-1979 (detailed in Columns L and M).

**Cell: G33**

**Comment:** Rick Heede:

ADNOC annual reports show total production in Abu Dhabi. "According to the Participation Agreement signed in 1974 with the major foreign companies operating in the Emirate, 60% of the production of crude oil is owned by Abu Dhabi, and marketed by ADNOC. The remaining 40% constitute the share of the foreign oil companies." (Quoted from ADNOC Annual Report 1975, p. 12. CMS interprets this to mean that the quantity of crude oil production attributable to ADNOC is 60 percent of the total reported production.

ADNOC was built from the the Petroleum Development in Trucal Coast Ltd (PDTC, formed in 1935 by Anglo-Persian, now BP, Shell, CFP, now Total SA, Exxon, and Mobil as partners, and granted a 75-year concession as of 11 January 1939). Abu Dhabi determined in 1951 that the concessions to PDTC did not include offshore areas, which subsequently lead to the creation of Abu Dhabi Marine Areas Ltd (ADMA, in 1954, owned two-thirds by BP and one-third by CFP). Abu Dhabi is the largest emirate in the confederation that became United Arab Emirates when the United Kingdom announced in 1968 (reaffirmed in March 1971 by Prime Minister Edward Heath) that the British-Trucial Sheikdoms Treaty would expire on 1 December 1971. Abu Dhabi and Dubai started the process of forming the United Arab Emirates in mid-1971; five additional smaller sheikdoms joined the confederation of the UAE by February 1972 (Qatar and Bahrain, also under the previous protection of the United Kingdom, were invited to join the UAE but declined).

ADNOC was formed as a state-owned company in 1971, began nationalizing, and acquired a 25 percent interest its existing PDTC concessions following the creation of OPEC on 1 January 1973. This was raised to a 60 percent interest on 1 January 1974. ADNOC continues to invite IOC participation in exploration and production both onshore and offshore Abu Dhabi, and generally retains a 60 percent stake.

See: Rai, Varun, & David G. Victor (2012) Awakening giant: strategy and performance of the Abu Dhabi National Oil Company (ADNOC)," in Victor et al, eds, Oil & Governance, pp. 478-556. And Yergin, Daniel (1991) The Prize: The Epic Quest for Oil, Money, and Power, Simon & Schuster, 899 pp.

We therefore attribute a 25 percent interest as of 1Jan73, and a 60 percent interest as of 1Jan74 forward. Further research or detailed information from ADNOC and/or its IOC partners may cause this to be revised, particularly offshore, where ADNOC sometimes holds a 51 percent share. We assume that a ten percent share of production is attributable to ADNOC for years prior to 1973 as royalty production provided by the previous concessions to Petroleum Development in Trucal Coast Ltd (PDTC).

**Cell:** D34**Comment:** Rick Heede:

Abu Dhabi National Oil Company Annual Report 1975, pp. 35-37 (data for 1962-1973 [offshore production] and 1964-1973 [onshore production] are estimated from bar charts; 1974 and 1975 are actuals.

**Cell:** H34**Comment:** Rick Heede:

Abu Dhabi National Oil Company Annual Report 1975, pp. 35-37 (data for 1962-1975 [offshore production] and 1964-1975 [onshore production] are estimated from bar charts.

**Cell:** J34**Comment:** Rick Heede:

Gas production from ADNOC annual reports 1975-1994n (data for 1962-1994).

**Cell:** D47**Comment:** Rick Heede:

Abu Dhabi National Oil Company Annual Report 1976, p. 12.

**Cell:** H47**Comment:** Rick Heede:

Abu Dhabi National Oil Company Annual Report 1976, p. 12.

**Cell:** AD50**Comment:** Rick Heede:

Energy Information Administration (2009) International Energy Statistics, Dry Natural Gas Production, 1980-2011, Bcf.

**Cell:** D51**Comment:** Rick Heede:

ADNOC Annual Report 1980, p. 27-28 (sum of major and minor fields).

**Cell:** H53**Comment:** Rick Heede:

ADNOC Annual Report 1984, p. 41. Includes data on total production and utilization rates for 1980-1984.

**Cell:** D54**Comment:** Rick Heede:

ADNOC Annual Report 1983 shows crude oil production from major fields only (to which CMS adds 100,000 bbl per day [average of 1980-1981]).

**Cell:** D56**Comment:** Rick Heede:

ADNOC Annual Report 1985 shows crude oil production from major fields only (to which CMS adds 50,000 bbl per day [half of the average in 1980-1981]).

**Cell:** L56**Comment:** Rick Heede:

Gas utilization was greatly improved with the ADGAS liquefaction plant at Das Island, which produced 2.03 to 2.12 million tonnes of LNG plus smaller amounts of propane, butane, and pentanes+ in 1980 to 1984, respectively.

**Cell:** F59**Comment:** Rick Heede:

Oil & Gas Journal OGI100 data for ADNOC 1986-2008. CMS assumes that the OGI production data represents ADNOC's equity production, but this is not certain, and cannot be corroborated by ADNOC since the company is "famously secretive" (Rai & Victor, 2012, p. 478) and does not publish regular production data.

**Cell:** H60**Comment:** Rick Heede:

ADNOC Annual Report 1992, p. 17, shows gas production (estimated from a bar chart) and utilization rates for 1988-1992.

**Cell:** H65**Comment:** Rick Heede:

ADNOC Annual Report 1994,

**Cell:** O65**Comment:** Rick Heede:

ADNOC's "ultimate goal" is to eliminate all flaring. ADNOC 2005, page 7. ADNOC (2005) ADNOC's Five Year Achievement Report, 45 pp., [adnoc.ae/publications/AchievementReports/ADNOC\\_Five\\_Year\\_2004.pdf](http://adnoc.ae/publications/AchievementReports/ADNOC_Five_Year_2004.pdf)

**Cell:** L66**Comment:** Rick Heede:

ADNOC Annual Report 1994 shows gas production, average utilization of 93 percent, and 93.7 million cf per day re-injected into onshore reservoirs, plus un-quantified offshore re-injection.

**Cell:** J67**Comment:** Rick Heede:

ADNOC gas production for 1995-2004 from Oil & Gas Journal OGJ100.

**Cell:** AL70**Comment:** Rick Heede:

Pemex "working interest liquids production in 2008" at 3,257 thousand bbl per day.

Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; [www.woodmacresearch.com](http://www.woodmacresearch.com)

**Cell:** A070**Comment:** Rick Heede:

Pemex "working interest natural gas production in 2008" at 3,953 thousand cf per day.

Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; [www.woodmacresearch.com](http://www.woodmacresearch.com)

**Cell:** H72**Comment:** Rick Heede:

ADNOC gas production estimates for 2000 (3.798 billion cf per day = 1.386 Tcf per yr) and 2001 (3.990 billion cf per day = 1.456 Tcf per yr).

**Cell:** F76**Comment:** Rick Heede:

OGJ data for 2004. EIA's Country Study report for UAE lists 2004 crude oil production at 2.76 million bbl per day (1.007 billion bbl per year), with exports totaling 2.33 million bbl per day (0.8505 billion bbl). Thus ADNOC is allocated  $0.7136 / 0.8505 = 0.8388$  of UAE's crude production. (Note: EIA does not provide NGL data; except mentions 300-500 tons per day NGLs plus 35,000-55,000 tons per day condensate at the planned Habshan natural gas project at the Bab oil & gas field. Does not mention LNG, but may be the marketed commodity.)

**Cell:** J76**Comment:** Rick Heede:

EIA Country Study, UAE: "Natural Gas Production (2002E): 1.53 Tcf. Natural Gas Consumption (2002E): 1.28 Tcf. Net Natural Gas Exports (2002E): 0.25 Tcf."

**Cell:** F77**Comment:** Rick Heede (Dec09):

Oil & Gas Journal, 17Sep07, OGJ100, page 41, shows 894.3 million bbl for ADNOC in 2006, and 839.5 million bbl in 2005.

**Cell:** J77**Comment:** Rick Heede (Dec09):

OGJ100 does not report gas production for 2005-2010. CMS assumes that ADNOC produces natural gas 2005-2010 at the same ratio of oil to gas as in 2004 (1 Tcf and 714 million bbl).

ADNOC's Sustainability Report 2010 contains no production data; it does state that ADNOC exported 430.75 million bbl of crude oil and condensate in 2010 (p. 14).

**Cell:** F79**Comment:** Rick Heede (Dec09):

Oil & Gas Journal, 21Sep09, OGJ100, page 39, shows 894.3 million bbl for ADNOC in 2008, and 846.8 million bbl in 2007.

**Cell:** E80**Comment:** Rick Heede:

ADNOC "working interest liquids production in 2008" at 1,993 thousand bbl per day, or 727.4 million bbl for the year. Compare OGJ estimate at right of 889 million bbl.

Victor, Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; [www.woodmacresearch.com](http://www.woodmacresearch.com)

**Cell:** F80**Comment:** Rick Heede:

OGJ100 6Sep2010 pg 69; note 2008 production is reported lower than previous report

**Cell:** I80**Comment:** Rick Heede:

Hults, & Thurber, 2012, Introduction, Table 1.1, page 24, in Victor et al, eds, 2012, Oil and Governance. Table 1.1 is based on information from Wood Mackenzie's Pathfinder Database; [www.woodmacresearch.com](http://www.woodmacresearch.com)

**Cell:** F81**Comment:** Rick Heede:

Oil & Gas Journal, OGJ 100, 30Oct11.