

Crude oil and NGL extraction data

Richard Heede
Climate Mitigation Services
File started: 11 January 2005
Last modified: April 2019

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Royal Dutch Shell plc, The Netherlands & United Kingdom

Investor-owned

www.shell.com Den Haag & London

Production / Extraction data Crude Oil & NGL

Year

Company 1	Company 2	Company 3	Company 4	Subtotal	Company 1	Company 2	Company 3	Company 4	Total
Thousand bbl /d	Thousand bbl /d	Thousand bbl /d	Thousand bbl /d	Thousand bbl /d	Million bbl /yr	Million bbl /yr	Million tonnes/yr	Million bbl /yr	Million bbl /yr
Royal Dutch Shell plc	Royal Dutch Shell plc				Royal Dutch Shell plc	Royal Dutch Shell plc	Royal Dutch Company	Shell Union, Shell Oil (US)	Total

- 1890
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- 1944
- 1945
- 1946
- 1947
- 1948

Telaga Said, Dutch million liter /yr	Telaga Said, Dutch thousand bbl/d	Pangkalan Brandan million cases /yr	Pangkalan Brandan thousand bbl/d	Royal Dutch thousand bbl /d	Royal Dutch Million bbl /yr	Royal Dutch Million bbl /yr	Royal Dutch Million tonnes/yr	Shell Union, Shell Oil (US)	Royal Dutch Million bbl /yr
15	0.258			0.26	0.1				0.1
30	0.517	0.24	0.16	0.67	0.2				0.2
76	1.310	0.96	0.63	1.94	0.7				0.7
Howarth data not used	100	1.723	1.34	0.87	2.59				0.9
136	2.344	1.85	1.21	3.55	1.3				1.3
360	6.204	4.57	2.98	9.18	3.4				3.4
0.13	430	7.410	Periak 1900-07 thousand tonnes/yr	Periak thousand bbl /d	7.41	2.7			2.7
2.57	135	2.326			2.33	0.8			0.8
5.00	100	1.723	8	0.15	1.87	0.7			0.7
Telaga Said thousand tonnes/yr	36	0.620	150	3.01	3.63	1.3			1.3
30	0.517	163	3.26	3.78	1.4				1.4
14	0.379	195	3.92	4.30	1.6				2
14	15	0.258	201	4.04	4.30	1.6			2
12			189	3.80	3.80	1.4			1
11		Periak + Roumania	669	13.43	13.43	4.9			5
10		Periak + Roumania	917	18.42	18.42	6.7			7
		Roumania only	710	14.26	14.26	5.2			5
		Roumania only	840	16.87	16.87	6.2			6
		Roumania only	1,070	21.49	21.49	7.8			8
		Roumania only	1,060	21.29	21.29	7.8			8
US operations: million bbl / yr		Royal Dutch Shell	2,337	46.93	46.93	17.1			17
0.72		Royal Dutch Shell	3,780	75.91	75.91	27.7			28
4.70		Roumania only	1,260	25.30	25.30	9.2			9
		Royal Dutch Shell	775	15.57	15.57	5.7			6
total RDS		Royal Dutch Shell	4,734	95.07	95.07	34.7			35
		Royal Dutch Shell	4,822	96.83	96.83	35.3			35
US operations: thousand bb/d					16.9				17
24.70					30.0				30
34.74					43.9				44
44.78					54.4				54
54.82					65.7				66
64.86					107.2				107
273.0					98.1	13.44			98
					94.1	12.89			94
					103.7	14.22			104
					124.1	17.00			124
					161.1	22.06			161
					Above data	24.30			177
					1918-28 from columns AC - AH	23.98			170
						20.53			150
						20.99			153
						21.95			160
						24.08		0.50	176
						26.62			194
						28.17			206
						31.99			234
						29.92			218
						22.14			162
						23.25			170
						24.41			178
						25.63			187
						26.91			196
						28.26			206
						29.59			216
						32.70			239
						40.09			293
						48.03			351



FINANCIAL AND OPERATIONAL HIGHLIGHTS

	2008	2007	2006	2005	2004
Segment earnings (\$ million)					
Exploration & Production	20,235	14,686	14,544	13,577	9,222
Gas & Power	5,208	2,781	2,493	1,278	1,774
Oil Sands	941	682	651	661	301
Total Upstream earnings (\$ million)	26,504	18,049	17,828	15,616	11,397
Upstream net cash from operating activities (A) (\$ million)	35,460	25,832	26,429	22,115	18,978
Crude oil production (thousand b/d)	1,493	1,818	1,948	1,998	2,173
Natural gas production available for sale (million scf/d)	8,569	8,314	8,368	8,253	8,808
Mixed Oil Sands production (thousand b/d)	78	81	82	95	80
Total production (thousand boe/d) [B]	3,248	3,315	3,473	3,518	3,772
Equity (JNG) sales volume (million tonnes)	13.1	13.2	12.1	10.7	10.2
Oil Sands sales volume (thousand b/d)	114	123	123	140	127

Shell (2009) Five-Year Fact Book, page 31.

Annual oil from daily prod'n	230
Annual oil from daily prod'n	275

A	B	C	D	E	F	G	H	I	J	K	L	M	N
76	1949											324	324
77	1950											367	367
78	1951											429	429
79	1952											466	466
80	1953											481	481
81	1954											455	455
82	1955											497	497
83	1956											550	550
84	1957											603	603
85	1958											568	568
86	1959											639	639
87	1960											642	642
88	1961											651	651
89	1962											711	711
90	1963											730	730
91	1964											808	808
92	1965											874	874
93	1966											967	967
94	1967											994	994
95	1968											1,062	1,062
96	1969											1,203	1,203
97	1970											1,338	1,338
98	1971											1,972	1,972
99	1972											2,043	2,043
100	1973											2,149	2,149
101	1974											1,893	1,893
102	1975											1,271	1,271
103	1976											1,212	1,212
104	1977											1,171	1,171
105	1978											1,092	1,092
106	1979											1,039	1,039
107	1980											493	493
108	1981											460	460
109	1982											499	499
110	1983											546	546
111	1984											587	587
112	1985											598	598
113	1986											658	658
114	1987											645	645
115	1988											645	645
116	1989											676	676
117	1990											692	725
118	1991											760	794
119	1992											750	789
120	1993											747	789
121	1994											767	829
122	1995											790	860
123	1996											843	907
124	1997											850	916
125	1998											859	917
126	1999											823	890
127	2000											826	916
128	2001											807	883
129	2002											861	861
130	2003											868	868
131	2004											822	822
132	2005											764	764
133	2006											741	741
134	2007											693	693
135	2008											646	646
136	2009											606	642
137	2010											617	650
138	2011											561	608
139	2012											543	596
140	2013											510	562
141	2014											489	542
142	2015											496	551
143	2016											615	673
144	2017											631	666
145	2018											639	658
146													
147													
148													
	Total		na	na	na	na	na	na	56,638		misc	61,887	

	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
1	Natural gas extraction data													
2														
3														
4	Richard Heede													
5	Climate Mitigation Services													
6	File started: 11 January 2005													
7	Last modified: April 2019													
8														
9	Royal Dutch/Shell Group, The Netherlands & United Kingdom													
10	www.shell.com Den Haag & London													
11	Production / Extraction data													
12	Natural Gas													
13	Company 1	Company 2	Company 3	Company 4	Subtotal	Company 1	Company 2	Company 3	Company 4	Total				
14	Million cf/d	Million cf/d	Million cf/d	Million cf/d	Million cf/d	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr	Billion cf/yr				
15	Royal Dutch/Shell Group 1954-					Royal Dutch/Shell Group 1987-2008				Total				
16														
17	1890													
18	1891													
19	1892													
20	1893													
21	1894													
22	1895													
23	1896													
24	1897													
25	1898													
26	1899													
27	1900													
28	1901													
29	1902													
30	1903													
31	1904													
32	1905													
33	1906													
34	1907													
35	1908													
36	1909													
37	1910													
38	1911													
39	1912													
40	1913													
41	1914													
42	1915													
43	1916													
44	1917													
45	1918													
46	1919													
47	1920													
48	1921													
49	1922													
50	1923													
51	1924													
52	1925													
53	1926													
54	1927													
55	1928													
56	1929													
57	1930													
58	1931													
59	1932													
60	1933													
61	1934													
62	1935													
63	1936													
64	1937													
65	1938													
66	1939													
67	1940													
68	1941													
69	1942													
70	1943													
71	1944													
72	1945													
73	1946													
74	1947													
75	1948													

Gas BOE conversion factor	
1 boe:	5,800 scf.
Shell, 20-F 2017, page 20:	

1901, oil:	45.00 thousand tons
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Joint Shell & Royal Dutch production reporting as of agreement, Jun1902?	
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Shell Transport and Royal Dutch "amalgamation" takes effect in Jan1907.	Estimate of wasted gas (equiv Bcf/yr)
	280 cf/bbl

Thermal cracking adopted in 1909	1.7
	2.2
	2.2
	4.8
	7.8
	2.6
	1.6
	9.7
	9.9
	4.7
	8.4
	12.3
	15.2
	18.4
	30.0
	27.5
	26.3
	29.0
	34.7
	45.1
	49.7
	47.7
	42.0
	42.9
	44.9
	49.2
	49.2
Total wasted gas, not added to gas production	570.5

	Royal Dutch
	Bcf/yr
estimated	51
estimated	55
estimated	59
estimated	64
estimated	69
estimated	74
estimated	80
estimated	86
estimated	93
estimated	100
estimated	108
estimated	116
estimated	125
estimated	135
estimated	145
estimated	156
estimated	168
estimated	181
estimated	195

In 1917, Shell Transport director Robt Waley Cohen hired a chemical engineer Harry Ricardo, through whose research on improved fuel (originally for WW1 military tank engines) was told that petrol from Borneo was superior. Yet this fuel's specific gravity was deemed "too high for commercial use" and burned as waste fuel. According to Howarth (p. 142), the quantity was on the order of "scores of thousands of barrels" per year. This was a significant share of Shell's total Bornean production (which CMS has not quantified). The larger significance, of course, is that early oil production involved tremendous waste, spilled fuel, blowouts that total up to a million barrels, gas emissions from thermal cracking units, inefficient equipment, etc. While the project has sought to quantify the amounts of net oil and gas produced, enormous quantities of fossil fuels and emissions of both carbon dioxide and methane were routine and NOT quantified in either this global inventory or in the emissions databases (e.g., ORNL's CDAC fossil fuel emissions 1750-present).

Howarth also discusses another pervasive practice (p. 145): the early thermal cracking units (subjecting crude oil to heat under pressure would improve the yield of the valuable lighter hydrocarbon fractions) would also drive off hydrocarbon gases -- 10 cubic meters per barrel of oil according to Howarth -- only some of which was used in the refinery and the rest burned as waste. 10 m³ = 353.15 cf; assuming that every barrel produced is refined, and 80 percent of the gas is wasted, this means ~280 cf per bbl; with Shell's crude oil production in 1925 equal to 100 million bbl, this means 28 Bcf in combusted waste gas. Clearly, producers would soon start to pay attention to this wasted opportunity to convert waste into a useful product, but not until the oil companies started researching petrochemicals in the late 1920s and 1930s. J.B.A. Kessler, who joined the board of directors of Shell Transport in 1928 and supported Waley Cohen's efforts, pointed out that it seemed "logical that we should turn all this energy that is going to waste at present into something that we can put into packages and sell. If we had a lot of gas in a very thickly populated area we might make electricity and sell it, but what can we do with the waste gas we have in the United States, the East Indies, Venezuela, Romania, and so on? The only thing we can do is to make something we can ship."

Howarth (1997) "A Century in Oil: The Shell Transport and Trading Company 1897-1997," p. 145.

O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	AB
76	1949										estimated	210	
77	1950										estimated	226	
78	1951										estimated	244	
79	1952										estimated	263	
80	1953										estimated	283	
81	1954							1.03		305		305	
82	1955									315		315	
83	1956									336		336	
84	1957									347		347	
85	1958									349		349	
86	1959									384		384	
87	1960									454		454	
88	1961									491		491	
89	1962									578		578	
90	1963		1,786	"natural gas sales"			1,786					652	
91	1964		2,010	"natural gas sales"			2,010					734	
92	1965		2,149	"natural gas sales"			2,149					784	
93	1966		2,462	"natural gas sales"			2,462					899	
94	1967		2,890	"natural gas sales"			2,890					1,055	
95	1968		3,467	"natural gas sales"			3,467					1,265	
96	1969		4,224	"natural gas sales"			4,224					1,542	
97	1970		4,961	"natural gas sales"			4,961					1,811	
98	1971		5,345	"natural gas sales"			5,345					1,951	
99	1972		5,933	"natural gas sales"			5,933					2,166	
100	1973		6,351	"natural gas sales"			6,351					2,318	
101	1974		6,787	"natural gas sales"			6,787					2,477	
102	1975		6,621	"natural gas sales"			6,621					2,417	
103	1976		6,714	"natural gas sales"			6,714					2,451	
104	1977		6,674	"natural gas sales"			6,674					2,436	
105	1978		6,439	"natural gas sales"			6,439					2,350	
106	1979		6,516	"natural gas sales"			6,516					2,378	
107	1980		6,257	interpolated			6,257				interpolated	2,284	
108	1981		5,998	interpolated			5,998				interpolated	2,189	
109	1982		5,739	interpolated			5,739					2,024	
110	1983		5,480				5,480					2,080	
111	1984		5,723				5,723					2,156	
112	1985		6,137				6,137					2,292	
113	1986		6,205				6,205					2,303	
114	1987		6,538				6,538					2,387	
115	1988											2,209	
116	1989											2,142	
117	1990											2,351	
118	1991											2,578	
119	1992											2,391	
120	1993											2,493	
121	1994											2,448	
122	1995											2,532	
123	1996											3,090	
124	1997											2,948	
125	1998											2,872	
126	1999		7,835				7,835					2,927	
127	2000		8,096				8,264					3,016	
128	2001		8,902	167.7			9,083					3,315	
129	2002		9,286	180.8			9,286					3,389	
130	2003		8,849				8,849					3,230	
131	2004		8,808	"gas available for sale"			8,818					3,215	
132	2005		8,263	(excludes own use, flared, vented CO2)			8,274					3,016	
133	2006		8,368				8,380					3,054	
134	2007		8,214	"gas available for sale"			8,227					2,998	
135	2008		8,569	(excludes own use, flared, vented CO2)			8,582					3,128	
136	2009		8,483									3,096	
137	2010		9,305									3,396	
138	2011		8,986									3,280	
139	2012		9,449									3,449	
140	2013		9,616									3,510	
141	2014											3,379	
142	2015											3,059	
143	2016											3,884	
144	2017											3,894	
145	2018											3,944	
146			10,668										
147	Total		na	na	na	na	na	104,972	6,062			148,479	

AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ

Additional data

Richard Heede
 Climate Mitigation Services
 File started: 11 January 2005
 Last modified: October 2014

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Shell production data 1918-1928, 2008-2010, and environmental data

Summing Shell & Royal Dutch crude oil production data
 From Peter Roderick, Aug06, Guildhall Library, London

1918		1918		1919		1919		1920		1920	
tons	bbl	tons	bbl	tons	bbl	tons	bbl	tons	bbl	tons	bbl
1,706,675	12,261,960	2,092,917	15,036,995	2,284,136	16,674,193						
71,366	512,744	84,342	605,973	144,412	1,037,558						
277,300	1,992,319	231,179	1,660,953	148,901	1,069,810						
300,140	2,156,418	238,632	1,714,501	327,891	2,393,604						
		38,869	279,262			US	17,520,000				
			2,888,000			Mexico	4,266,000				
			6,703,295				573,561				
			853,000				355,643				
		42,500	305,350								
Total bbl:		16,923,441		Total bbl:		30,047,330		Total bbl:		43,890,369	

1921		1921		1922		1922		1923		1923	
tons	bbl	tons	bbl	tons	bbl	tons	bbl	tons	bbl	tons	bbl
2,295,538	16,757,427	8,999,345	65,695,219	14,686,031	107,208,026						
199,858	1,435,921										
181,231	1,302,092										
333,645	2,435,609										
		US	17,520,000								
		Mexico	12,863,000								
241,130	1,760,249										
51,970	373,389										
Total bbl:		54,447,687		Total bbl:		65,695,219		Total bbl:		107,208,026	

1924		1924		1925		1925		1926		1926	
tonnes	bbl	tonnes	bbl	tonnes	bbl	tonnes	bbl	tonnes	bbl	tonnes	bbl
13,442,138	98,127,607	12,890,131	94,097,956	2,875,185	20,988,851						
				711,637	5,194,950						
				171,918	1,255,001						
				632,202	4,542,186						
				2,317,006	16,914,144						
				3,475,661	25,372,325						
				851,735	6,217,666						
				1,318,590	9,625,707						
				1,803,789	13,167,660						
				59,638	435,357						
Total bbl:		98,127,607		Total bbl:		94,097,956		Total bbl:		103,713,847	
million tonnes		13.44		million tonnes		12.89		million tonnes		14.22	

	1927	1927	1928	1928
	tonnes	bbl	tonnes	bbl
Dutch East Indies	3,448,116	25,171,247	3,971,045	28,988,629
Sarawak	711,756	5,195,819	751,092	5,482,972
Egypt	183,284	1,337,973	268,461	1,959,765
Romania	593,828	4,334,944	705,854	5,152,734
rox	2,694,312	19,668,478	3,890,767	28,402,599
spc	3,203,719	23,387,149	3,812,233	27,829,301
Mexico	594,753	4,341,697	528,979	3,861,547
Mexico	987,528	7,208,954	893,681	6,523,871
Venezuela	1,535,856	11,211,749		
Venezuela	2,961,857	21,621,556	7,125,339	52,014,975
Trinidad	65,841	480,639	65,187	475,865
Argentina	17,701	129,217	50,773	370,643
Total bbl:	124,089,422	Total bbl:	161,062,900	
million tonnes	17.00	million tonnes	22.06	

OIL AND GAS PRODUCTION (AVAILABLE FOR SALE)

	2013		2012		2011	
	Shell subsidiaries	Shell share of joint ventures and associates	Shell subsidiaries	Shell share of joint ventures and associates	Shell subsidiaries	Shell share of joint ventures and associates
Europe						
Denmark	57	-	73	-	88	-
Italy	33	-	39	-	35	-
Norway	40	-	40	-	37	-
UK	40	-	60	-	71	-
Other [B]	3	5	3	4	3	5
Total Europe	173	5	215	4	234	5
Asia						
Brunei	2	55	2	73	2	76
Iraq	23	-	6	-	4	-
Malaysia	42	-	41	-	40	-
Oman	204	-	205	-	200	-
Russia	69	29	-	104	-	117
United Arab Emirates	-	159	-	145	-	144
Other [B]	68	23	53	23	36	20
Total Asia	408	266	307	345	282	357
Total Oceania	26	13	27	18	30	18
Africa						
Gabon	30	-	38	-	44	-
Nigeria	175	-	240	-	262	-
Other [B]	11	-	12	-	20	-
Total Africa	216	-	290	-	326	-
North America						
USA	237	-	155	67	141	70
Other [B]	21	-	15	-	18	-
Total North America	258	-	170	67	159	70
South America						
Brazil	21	-	34	-	45	-
Other [B]	1	9	1	10	1	9
Total South America	22	9	35	10	46	9
Total	1,103	293	1,044	444	1,077	459

[A] Includes natural gas liquids. Royalty purchases are excluded. Reflects 100% of production attributable to subsidiaries except in respect of PSCs, where the figures shown represent the entitlement of the subsidiaries concerned under these contracts.
 [B] Comprises countries where 2013 production was lower than 20 thousand b/d or where specific disclosures are prohibited.

Royal Dutch Shell AnnRpt and 20-F for 2013, page 36.

KEY STATISTICS	\$ MILLION		
	2010	2009	2008
Revenue (including inter-segment sales)	336,216	250,362	412,813
Segment earnings [A]	2,950	258	5,309
Including:			
Production and manufacturing expenses	10,592	11,829	12,225
Selling, distribution and administrative expenses	13,716	14,505	14,451
Depreciation, depletion and amortisation	4,254	4,399	3,574
Share of earnings of equity-accounted investments [A]	948	661	834
Net capital investment [B]	2,358	6,232	3,104
Refinery availability (%)	92	93	91
Chemical plant availability (%)	94	92	94
Refinery processing intake (thousand b/d)	3,197	3,067	3,388
Oil products sales volumes (thousand b/d)	6,460	6,156	6,568
Chemicals sales volumes (thousand tonnes)	20,653	18,311	20,327

[A] With effect from 2010, Downstream segment earnings are presented on a current cost of supplies basis. See Notes 2 and 7 to the "Consolidated Financial Statements" for further information. Comparative information is consistently presented.
 [B] See Note 7 to the "Consolidated Financial Statements".
 Shell Annual Report Form 20-F 2010, page 36.

AC AD AE AF AG AH AI AJ AK AL AM AN AO AP AQ

(natural gas continued)

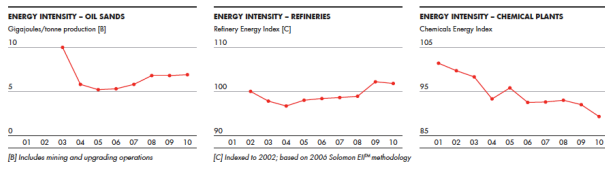
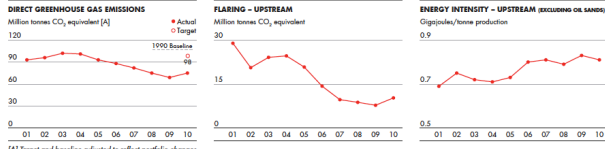
UPSTREAM CONTINUED

ENVIRONMENTAL DATA										
	2010	2009	2008	2007	2006	2005	2004	2003	2002	2001
Direct greenhouse gas emissions (GHG) [A]										
Total GHGs (million tonnes CO ₂ equivalent)	75	69	75	82	88	93	101	102	96	93
Carbon dioxide (CO ₂) (million tonnes)	72	66	72	79	85	89	96	97	92	87
Methane (CH ₄) (thousand tonnes)	136	127	126	119	124	173	192	187	196	261
Nitrous oxide (N ₂ O) (thousand tonnes)	2	2	2	2	2	2	3	4	3	
Hydrofluorocarbons (HFC) (tonnes)	24	23	23	28	24	20	13	9	11	4
Flaring [B]										
Flaring (Upstream) (million tonnes CO ₂ equivalent)	10.3	7.8	8.8	9.7	14.3	20.8	24.6	24.1	20.4	28.9
Flaring (Downstream) (million tonnes hydrocarbon flared)	3.5	2.6	2.8	3.4	4.8	7.0	8.1	6.1	6.8	9.5
Energy intensity										
Upstream excluding Oil Sands (gigajoules per tonne production) [C]	0.81	0.83	0.79	0.81	0.80	0.73	0.71	0.72	0.75	0.69
Oil Sands (gigajoules per tonne production) [D]	6.9	6.8	6.8	5.8	5.3	5.2	5.8	10.0	n/c	n/c

NATURAL GAS [A]	2013			2012			2011		
	Shell subsidiaries	Shell share of joint ventures and associates	Shell share of joint ventures and associates	Shell subsidiaries	Shell share of joint ventures and associates	Shell share of joint ventures and associates	Shell subsidiaries	Shell share of joint ventures and associates	Shell share of joint ventures and associates
Europe									
Denmark	146	-	202	-	256	-			
Germany	200	-	217	-	253	-			
Netherlands	-	1,076	-	1,808	-	1,767			
Norway	703	-	713	-	618	-			
UK	300	-	328	-	403	-			
Other [B]	42	-	43	-	41	-			
Total Europe	1,391	1,076	1,503	1,808	1,571	1,767			
Asia									
Bahrain	51	451	51	512	52	524			
China	164	-	131	-	174	-			
Malaysia	655	-	572	-	763	-			
Russia	12	347	-	374	-	382			
Other [B]	1,036	317	795	317	363	246			
Total Asia	1,918	1,115	1,549	1,203	1,352	1,152			
Oceania									
Australia	344	276	352	243	373	167			
New Zealand	168	-	182	-	175	-			
Total Oceania	512	276	534	243	548	167			
Africa									
Egypt	126	-	141	-	133	-			
Nigeria	552	-	740	-	707	-			
Total Africa	678	-	881	-	840	-			
North America									
USA	1,081	-	1,062	5	961	6			
Canada	635	-	616	-	570	-			
Total North America	1,716	-	1,678	5	1,531	6			
Total South America	33	1	44	1	51	1			
Total	6,248	3,368	6,189	3,262	5,893	3,093			

Comparing Shell Scope 1, Flaring, and Oil & NatGas production emissions			
Source	Production	MtCO ₂ e	Percent of total
Scope 1		75.0	87.9%
Flaring		10.3	12.1%
Oil & NGL product emissions (million)	650	-	0.0%
Natural gas product emissions (Bcf)	3,396	-	0.0%
Total		85.3	100.0%

Oil NGL coefficient	-	MtCO ₂ /million bbl
Gas coefficient	-	MtCO ₂ /Bcf



SYNTHETIC CRUDE OIL	THOUSAND B/D		
	2013	2012	2011
Shell subsidiaries			
North America - Canada	120	125	115

BITUMEN	THOUSAND B/D		
	2013	2012	2011
Shell subsidiaries			
North America - Canada	19	20	15

Royal Dutch Shell AnnRpt and 20-F for 2013, page 36.

	2010	2009	2008
	million SCF/day	million SCF/day	million SCF/day
Shell subsidiaries	6,244	5,957	6,109
Shell equity share	3,061	2,526	2,460
total	9,305	8,483	8,569
total per year (Bc)	3,396	3,096	3,128

Shell CDP 2012	MtCO ₂ e
Scope 1: CO ₂	70,700
Scope 1: CH ₄	2,800
Scope 1: N ₂ O	0,440
Scope 1: HFCs	0,028
Scope 1: total	73,968
Use of products	570,000
Total	643,968
Percent Scope 1	11.5%

Sources of Scope 3 emissions	metric tonnes CO ₂ e
Use of sold products	570,000,000

	2010	2009	2008
	k bbl / day	k bbl / day	k bbl / day
Shell subsidiaries	1,174	1,144	1,259
Shell equity share	445	437	434
Synthetic crude	72	80	78
total	1,691	1,661	1,771
total per year (million bbl)	617.22	606.27	646.42

Royal Dutch Shell submission to Carbon Disclosure Project for 2012, section 15.1: Scope 3 emissions. In tonnes CO₂e.

Cell: K15**Comment:** Rick Heede:

Royal Dutch Petroleum and Shell Transport agreed to an alliance in 1907. Royal Dutch moved its headquarters to Curacao during World War 2. Howarth, Stephen (1997) "A Century in Oil: The Shell Transport and trading Company 1897-1997" does not report on oil production by its sister company Royal Dutch.

Cell: AD16**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Netherlands India, Sarawak, Egypt, and Romania (Astra), respectively in 1918, shown in yellow cells.

Cell: AF16**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Netherlands India, Sarawak, Egypt, Romania (Astra), Romania (Baicoi), North America (Mid-continent), North America (California), Mexico, and Venezuela, respectively, in 1919, shown in yellow cells.

Cell: AH16**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Dutch East Indies, Sarawak, Egypt, Romania (Astra), North America (Mid-continent + California: 35,000 + 13,000 bbl per day totals 17,520,000 bbl/yr), Mexico, Venezuela, and Trinidad, respectively, in 1920 and/or 1921 (the annual reports are not clear about the actual reporting years), shown in yellow cells. The data is reported in differing units (imperial tons, metric tonnes, and barrels); CMS has applied the appropriate conversion factors in each case.

Cell: J17**Comment:** Rick Heede:

Sum of working columns F plus I (thousand bbl per day from Telaga Said (1892-1904) and Pangkalan (1893-1897) / Perlak (1900-1904 / Royal Dutch annual reports for 1912, 1913, and 1917 (data for 1915-1917). All summed to thousand bbl per day in column "I" and in million bbl per year in this column.

Cell: S20**Comment:** Rick Heede:

Howarth, p. 47, "the minimum annual supply had not reached 50,000 tons." CMS assumes 45,000 tons. This equals 330,000 bbl. Since this refers only to East Indies supply contracts, CMS does not use this as a company production statistic.

Cell: D25**Comment:** Rick Heede:

"Royal Dutch wells began to produce ... Shell's Sanga Sanga well began to run dry ... at Balikpapan (Borneo), Mark Abrahams struck oil again, at 750 feet. Production multiplied more than eight-fold, to 130 barrels a day -- equivalent to 200,000 cases annually." Note: 1 case = 2 tins @ 5 gallons. Source: Howarth (1997) A Century in Oil, p. 46.

Cell: D27**Comment:** Rick Heede:

Howarth, p. 55: "By mid-1900 the new wells were producing a respectable 5,000 barrels a day, with production continuing to rise steadily."

Cell: U29**Comment:** Rick Heede:

See Howarth, p. 64. Presumably only linked for purposes of transport and non-competition in Asia ...

Cell: AD30**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Dutch East Indies, Sarawak, Egypt, Romania (Astra), North America (Mid-continent + California: 35,000 + 13,000 bbl per day totals 17,520,000 bbl/yr), Mexico, Venezuela, and Trinidad, respectively, in 1920 and/or 1921 (the annual reports are not clear about the actual reporting years), shown in yellow cells. The data is reported in differing units (imperial tons, metric tonnes, and barrels); CMS has applied the appropriate conversion factors in each case.

Cell: W34**Comment:** Rick Heede:

Howarth, pp. 69-76.

Cell: F35**Comment:** Rick Heede:

Gerretsen, vol 3, p. 129, shows Royal Dutch Shell's crude oil production from its four fields in Roumania (Astra, Romana Americana, Regatul Roman, and Steaua Romana). CMS adds annual production charted from 1906 through 1914, in thousand tonnes per year.

Cell: Y36**Comment:** Rick Heede:

Howarth, p. 145, reports wasted gas from thermal cracking dominant at Shell refineries from 1909 through at least the mid-1930s. CMS assumes 80 percent of the gas produced is not utilized, 10 cubic meters per barrel refined = 10 * 35.3 cf/m³ * 0.8 = 28 cf per bbl.

Cell: G39**Comment:** Rick Heede:

Royal Dutch Shell crude oil production is reported for 1912 and 1913 for its fields in Netherlands India, Russia (four regional companies, e.g., Caspian, Grozny, North Caucasian, New Schibayeff), Egypt, US (Roxanna in Texas, and California Oilfields Ltd), Roumania (Astra Roumana), and Sarawak. Notes from Peter Roderick, Nov06. CMS adds annual production given in tons and bbl per year. 1912 total = 2.336787 million tons (assumed tonnes); 1913 = 3.78043 million tons.

Cell: D40**Comment:** Rick Heede:

Howarth, p. 93: Shell purchased California Oilfield Ltd in 1913; Shell's North American production rose from 723,000 bbl in 1913 to 4.7 million bbl in 1914. No mention of global production between 1900 and at least 1914, except for occasional reference to individual fields. In 1914, Shell finally struck paydirt in Mexico with a gusher producing 100,000 bbl per day. However, a few months later, the U.S. invaded Mexico, President Huerta was expelled from office, the country descended into chaos, and the oil camps were abandoned. Howarth, p. 95.

Cell: AH44**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Dutch East Indies, Sarawak, Egypt, Romania (Astra), North America (Roxana Petrol Corp = 2,317,606 tonnes plus Shell of California = 3,475,661), Mexico, and Venezuela, respectively, in 1926, shown in yellow cells. The data is reported in differing units (imperial tons, metric tonnes); CMS has applied the appropriate conversion factors in each case.

Cell: J45**Comment:** Rick Heede:

Crude oil production for the Shell and Royal Dutch amalgamation from annual reports for 1918 through 1928 (courtesy Peter Roderick, Guildford Library, London, Aug06). Production is reported in various units shown at the right of this worksheet, columns AC through AH, for each year. CMS uses appropriate conversion units for imperial tons metric tonnes for each regional reporting standard. Sums are shown in barrels per year and million tonnes per year.

Cell: E47**Comment:** Rick Heede:

Partial, but the preponderance of US producing properties Shell owned in the US (California's Signal Hill and Roxana in Texas. Other properties were acquired in Oklahoma (1921), no production data reported. Howarth, p. 125. Shows California and Roxana in 1920 (16.5 and 8.2 thousand bbl per day) and 1925 (53.5 and 21.4 thousand bbl per day).

Cell: D52**Comment:** Rick Heede:

Howarth, p. 151, shows production data for 1925 and 1929.

Cell: L53**Comment:** Rick Heede:

Shell Union Oil Corporation (New York), annual reports for 1926 through 1930. Shell Union is assumed here to be accounts for Shell's US operations only. For 1930, in which year we have crude oil production from a Royal Dutch Petroleum annual report, we do NOT add US Shell and Royal Dutch, but instead use the US oil production data as a percentage of Royal Dutch's global production and on the basis of this quantitative relation extrapolate backwards to 1926. Note: For obvious reasons, this is a preliminary estimate in lieu of having global oil production data for both Shell and Royal Dutch Petroleum. No natural gas production is mentioned in the Shell Union reports.

Cell: D57**Comment:** Rick Heede:

While Howarth's history of Shell Transport and Trading offers scant production data, it does (p. 157) give Shell's 1930 production as 466,500 bbl per day (and world production of 3.86 million bbl per day). Howarth, Stephen (1997) "A Century in Oil: The Shell Transport and Trading Company 1897-1997," Weidenfeld & Nicolson, London, 397 pp.

Cell: K57**Comment:** Rick Heede:

Oil production data for 1930-1931 from Royal Dutch Petroleum (1932) Annual Report, p. 12. Note: this report also noted that the company's managing director (August Kessler) "put forward a proposal ... to create along practical lines a sort of international organization to to prevent the various producers from continuing to produce so disjointedly." p. 11. As Yergin notes in "The Prize" (pp. 265-269), this "As Is" memoranda that attempted to restrain and stabilize production ran afoul of antitrust laws and competitive drives and collapsed in the mid-1930s.

Cell: AA57**Comment:** Rick Heede:

Royal Dutch natural gas production data is not publicly available and we assume a 7.17 percent annual growth rate (average rate from 1954-1962) in estimated production from 1930 to 1953. At this rate total natural gas production is nearly equal to the gas wasted in refineries (calculated in column Y). This estimated production or marketed natural gas 1930-1953 will be revised if we locate published production data, or Royal Dutch Shell corrects the estimate with documented production data.

Cell: LS9**Comment:** Rick Heede:

Oil production by subsidiaries of Shell US are shown in Beaton (1957, p. 784). Wolverine Petroleum, for example, totals 496,000 bbl in 1934; the company was "dissolved" in 1938; the company's production in 1924 totaled 1.83 million bbl. Comar Oil Copany, Roxana Petroleum, and Shell Pacific are all detailed in this table. All this production is incorporated in Shell and Royal Dutch for the years covered, 1912-1955.

Cell: AE59**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Dutch East Indies, Sarawak, Egypt, Romania (Astra), North America (Roxana Petrol Corp = 2,694,312 tonnes plus Shell of California = 3,203,719 tonnes), Mexico (Corona and Aguila), Venezuela (Caribbean and Venezuelan concessions), Trinidad, and Argentina, respectively, in 1927, shown in yellow cells. The data is reported in metric tonnes; total in 1927 = 16,998,551 tonnes.

Cell: AG59**Comment:** Rick Heede:

Shell Transport and Royal Dutch crude oil produced in Dutch East Indies, Sarawak, Egypt, Romania (Astra), North America (Shell Petroleum Corp, fmlly Roxana Petrol Corp = 3,890,767 tonnes plus Shell Oil Company, fmlly Shell of California = 3,812,233 tonnes), Mexico (Corona and Aguila), Venezuela (Caribbean and Venezuelan concessions), Trinidad, and Argentina, respectively, in 1927, shown in yellow cells. The data is reported in metric tonnes; total in 1928 = 22,063,411 tonnes.

Cell: K60

Comment: Rick Heede:
Oil production data for 1933-1934 from Royal Dutch Petroleum (1935) Annual Report, p. 9. .

Cell: K62

Comment: Rick Heede:
Oil production data for 1935-1936 from Royal Dutch Petroleum (1937) Annual Report, p. 11.

Cell: K64

Comment: Rick Heede:
Oil production data for 1937-1938 from Royal Dutch Petroleum (1939) Annual Report, p. 9.

Cell: J68

Comment: Rick Heede:
Oil production data for 1944, although very incomplete, is from Royal Dutch Petroleum (1945) Annual Report, pp. 6-10. Royal Dutch producing assets were either substantially destroyed or in enemy hands during the war. But we can piece together an estimate of 1944 production if we (a) use reported production in Iraq (1.212 million tonnes) and restored Roumanian production ("77 percent of pre-war production," or 1.167 million tonnes), and (b) assume that 1939-1944 production in Allied areas remained at 1938 levels: Egypt = 0.226 Mt, Venezuela = 11.31 Mt, US = 7.68 Mt, Argentina = 0.544 Mt. (c) Far Eastern production are assumed destroyed or in Japanese hands, Mexican assets have been appropriated by the Govt, and the minor German Reich production (0.01 Mt) has, of course, been appropriated by the Nazis. Production in Iraq has increased during the war (from 0.978 Mt in 1938 to 1.212 Mt in 1944). Total estimated Royal Dutch oil production for 1939 through 1944: 22.139 million tonnes. The resulting estimated Royal Dutch production in 1944 may be conservative given likely increased production in the US. We add 5 percent growth per year 1940-1944.

Cell: K71

Comment: Rick Heede:
Oil production data for 1944, although very incomplete, is from Royal Dutch Petroleum (1945) Annual Report, pp. 6-10. Royal Dutch producing assets were either substantially destroyed or in enemy hands during the war. But we can piece together an estimate of 1944 production if we (a) use reported production in Iraq (1.212 million tonnes) and restored Roumanian production ("77 percent of pre-war production," or 1.167 million tonnes), and (b) assume that 1939-1944 production in Allied areas remained at 1938 levels: Egypt = 0.226 Mt, Venezuela = 11.31 Mt, US = 7.68 Mt, Argentina = 0.544 Mt. (c) Far Eastern production are assumed destroyed or in Japanese hands, Mexican assets have been appropriated by the Govt, and the minor German Reich production (0.01 Mt) has, of course, been appropriated by the Nazis. Production in Iraq has increased during the war (from 0.978 Mt in 1938 to 1.212 Mt in 1944). Total estimated Royal Dutch oil production for 1939 through 1944: 22.139 million tonnes. The resulting estimated Royal Dutch production in 1944 may be conservative given likely increased production in the US.

Cell: K72

Comment: Rick Heede:
Oil production data for 1945 from Royal Dutch Petroleum (1946) Annual Report, p. 8. Note: The Annual reports for 1939 through 1944.

Cell: L72

Comment: Rick Heede:
Shell Oil Company, Annual report for 1949, with "net crude oil produced" for 1945-1949. CMS has only a copy of the title page and the table of statistics (p.20), and neither makes it clear that this is reporting on US operations only, which we can only surmise since reported quantities are a small fraction of those reported in Royal Dutch Shell annual reports for the same years (see column I). These production quantities are entered here, but assumed to be included in Royal Dutch Shell annual production and are NOT added to "Sum Production" (column M).

Cell: D73

Comment: Rick Heede:
Howarth, A Century in Oil, p. 223.

Cell: K74

Comment: Rick Heede:
Oil production data for 1947 and 1948 is from Royal Dutch Petroleum (1949) Annual Report, p. 9. World production in 1948 totalled 488.97 million tonnes (of which US production was 292.5 Mt, or 59.8 percent); Royal Dutch equalled 9.8 percent of world total; p. 8.

Cell: I76

Comment: Rick Heede:
Oil production data for 1949 and 1950 is from Royal Dutch Petroleum (1951) Annual Report, p. 13. Original data reported in million bbl/yr: "Production of crude oil and natural gasoline, Royal Dutch/Shell Group of Companies, gross production" including 60.1 million bbl (1949) and 87.7 million bbl (1950) of "crude oil received under long-term contracts" which are subtracted from production reported here: 383.7 million bbl (Mbbbl) less 60.1 Mbbbl = 323.6 Mbbbl in 1949; 454.3 Mbbbl less 87.7 Mbbbl = 366.6 million bbl in 1950.

Cell: L77

Comment: Rick Heede:
Shell Oil Company, Annual report for 1954, with "net crude oil produced" for 1950-1954. CMS has only a copy of the title page and the table of statistics (p.26), and neither makes it clear that this reporting on US operations only, which we can only surmise since reported quantities are a small fraction of those reported in Royal Dutch Shell annual reports for the same years (see column I). These production quantities are entered here, but assumed to be included in Royal Dutch Shell annual production and are NOT added to "Sum Production" (column M).

Cell: I78

Comment: Rick Heede:
Oil production data for 1951 and 1952 is from Royal Dutch Petroleum (1953) Annual Report, p. 6-7. We report only gross production of crude oil, not oil received under long-term contracts. 1952 production is taken from the 1954 annual report, since 1952 production was lowered from 471.8 to 465.5 million bbl.

Cell: I80

Comment: Rick Heede:
Oil production data for 1950 to 1953 is from Royal Dutch Petroleum (1955) Annual Report, p. 14.

Cell: E81

Comment: Rick Heede:
Crude oil production (both gross and net are listed here) for 1954 through 1962 from Royal Dutch Petroleum Company (1963) Annual Report 1962, p. 51. Per our protocol, we use data of net crude oil production as raw input to the calculation of carbon combusted into carbon dioxide. Also, Royal Dutch reports significant quantities (100.4 million bbl in 1954 and rising to 233.6 million bbl in 1962) of "quantities received under special supply contracts," which we do NOT include. This presumably refers to Shell's contract with Gulf Oil in which "Gulf would produce, Shell would transport, refine, and market". Howarth, (1997) A Century in Oil, p.224. Oil came from Gulf/Persian Gulf operations at a time when Shell could not fill its own demand. This agreement had been signed in 1948, when Shell's Asian production had not yet been fully restored. Shell, of course, had other producing properties.

Cell: W81

Comment: Rick Heede:
Natural gas SALES for 1954 through 1962 from Royal Dutch Petroleum Company (1963) Annual Report 1962, p. 51. Note: gas production data is unavailable, nor are data on gas purchases reported. Original data in billion cubic feet per year.

Cell: E90

Comment: Rick Heede:
Crude oil production (both gross and net are listed here) for 1963 through 1966 from Royal Dutch Petroleum Company (1967) Annual Report 1966, p. 71. Per our protocol, we use data of net crude oil production as raw input to the calculation of carbon combusted into carbon dioxide. Also, Royal Dutch reports significant quantities (256.2 million bbl in 1963 and rising to 314.3 million bbl in 1966) of "quantities received under special supply contracts," which we do NOT include. See cell note 1954 re: Gulf production agreement and 50:50 profit sharing.

Cell: R90

Comment: Rick Heede:
Natural gas SALES for 1963 through 1966 from Royal Dutch Petroleum Company (1967) Annual Report 1966, p. 27. Note: neither gas production nor gas purchase data are reported. Original data in million cubic feet per day.

Cell: D94

Comment: Rick Heede:
Crude oil production for 1967 through 1970 from Royal Dutch Petroleum Company (1971) Annual Report 1970, p. 34. Per our protocol, we use data of net crude oil production as raw input to the calculation of carbon combusted into carbon dioxide. However, Royal Dutch does not report net production for 1967 to 1970, and we use gross production. Also, Royal Dutch reports significant quantities (329.2 million bbl in 1967 and rising to 342.0 million bbl in 1970) of "quantities received under special supply contracts," which we do NOT include.

Cell: E94

Comment: Rick Heede:
We have ESTIMATED net production by multiplying reported gross production for 1967-1979 (Shell only reported gross) by the average net of gross for the period 1954-1966 when both net and gross was reported. This factor is 87.31 percent, calculated in cell G89.

Cell: R94

Comment: Rick Heede:
Natural gas SALES for 1967 through 1970 from Royal Dutch (1971) Annual Report, p. 34.

Cell: AE96

Comment: Rick Heede:
Shell SustRpt 2010, page 29: "Greenhouse gas emissions The direct greenhouse gas (GHG) emissions from facilities we operate were 75 million tonnes on a CO2-equivalent basis in 2010, a 9% increase on 2009. The main reason for this rise was increased production across the company, including higher production in Nigeria due to an improved security situation. Around 60% of our GHG emissions came from the refineries and chemical plants in our Downstream business. The production of oil and gas in our Upstream business accounted for around 35% of our GHG emissions, and our shipping activities for the remaining 5%. We continue to work on improving operational performance and energy efficiency to reduce GHG emissions. In 2010, we met the voluntary target we set in 1998 for our direct GHG emissions from facilities we operate to be at least 5% lower than our comparable 1990 level. Shell's GHG emissions in 2010 were around 25% lower than our comparable 1990 level. The indirect GHG emissions from our purchases of energy (electricity, heat and steam) were 10 million tonnes on a CO2-equivalent basis in 2010, 11% higher than in 2009. We estimate that the CO2 emissions from the use of the products we made were around 670 million tonnes in 2010."

Cell: AE97

Comment: Rick Heede:
SustRpt 2010, page 20: "In 2010, the flaring – or burning off – of natural gas in our Upstream business rose by 32% compared to 2009, to 10.3 million tonnes of CO2 equivalent. This was mainly due to increased oil production in Nigeria and the start of our contract in Iraq. Flaring made up nearly 14% of our total direct GHG emissions in 2010. Around 20% was operational flaring for safety reasons and during the start-up of Upstream facilities. We aim to minimise this operational flaring. The remaining 80% was continuous flaring from facilities where there is no infrastructure to capture the gas produced with oil, known as associated gas. Around 80% of this continuous flaring takes place in Nigeria where the security situation and a lack of funding from the government partner has previously slowed progress on projects to capture the associated gas (pages 18–19). Around 10% of the continuous flaring came from the Majnoon field in Iraq where we became the operator in 2010. We expect that flaring in Iraq will rise in future years as production increases and before equipment to capture the associated gas can be installed (page 17). When we acquire or become the operator of an existing facility that is already flaring or venting (releasing gas into the atmosphere) it takes time before these activities can be stopped."

Cell: D98

Comment: Rick Heede:
Crude oil production for 1971 through 1974 from Royal Dutch Petroleum Company (1975) Annual Report 1971, p. 15. Per our protocol, we use data of net crude oil production as raw input to the calculation of carbon combusted into carbon dioxide. However, Royal Dutch does not report net production for 1970 through 1974, and we use gross production. Furthermore, Royal Dutch does NOT report quantities of crude oil or products purchased from other producers or refiners. See 1954 cell note.

Cell: R98

Comment: Rick Heede:

Natural gas SALES for 1971 through 1974 from Royal Dutch (1975) Annual Report, p. 22.

Cell: D102

Comment: Rick Heede:

Crude oil supply, which appears to mean gross supply (both gross production and "local purchases", for 1975 and 1976 from Royal Dutch Petroleum Company (1977) Annual Report 1976, p. 16. Per our protocol, we use data of net crude oil production as raw input to the calculation of carbon combusted into carbon dioxide. However, Royal Dutch does not report net production for 1975-76, and we use gross production minus "local purchases": 291.3 million bbl in 1975 (798 kbb/d) and 339.4 million bbl in 1976 (930 kbb/d).

Cell: D104

Comment: Rick Heede:

Crude oil supply for 1977-1979 from Royal Dutch/Shell Group (1980) Annual Report, five-year operational comparisons, p. 20. Shell does not report net production, and we subtract "local purchases" from total supply:
 1977: 4,847 - 1,171 = 3,676;
 1978: 4,714 - 1,287 = 3,427;
 1979: 4,555 - 1,296 = 3,259 kbb/d.

Note: Oil companies typically report on oil and natural gas reserves, often unaudited. Shell's reserve report for 1979, for example, shows oil production at (426) million barrels plus (76) Mbbl from "group share of developed and undeveloped reserves of associated companies." Total reported crude oil production is thus 502 million bbl. It is not clear why production reported in this table (p. 57) differs from production reported at p. 20: 3,259 kbb/d = 1.190 billion bbl (after subtracting "local purchases"). This 688 million bbl cannot be explained by adding NGL production (which is not detailed in this annual report).

Cell: R104

Comment: Rick Heede:

Natural gas SALES for 1977-1979 from Royal Dutch/Shell Group (1980) Annual Report, five-year operational comparisons, p. 20.

Cell: E107

Comment: Rick Heede:

"Net equity crude oil production" — including natural gas liquids, and excluding royalty purchases — from the reserves of crude oil and natural gas liquids ..., including the Group share of associated companies." Royal Dutch/Shell Group (1985) SEC Form 20-F, p. 14. RDSG annual reports for 1980-1995 appear not to have published crude oil supply data (substituting "production" in their reserve statements, which may underreport actual production). Net equity production as reported here also appear incongruous with previous annual reports and crude oil supplies (production less "local purchases"). See notes under 1970, 1974, 1976, and 1979 for details.

Note 1: the discontinuity between gross production in 1979 (from Shell annual report for 1979) and net production in 1980 (SEC Form 20-F) is very large and is not explained by royalty payments to host governments and other usual differences between gross and net. Net production in the SEC filing also includes natural gas liquids.

Note 2: Shell's reported daily net production on page 14 (SEC Form 20-F) agrees with data in the same report's Reserve table (pp. G29-G30) once group share of associated companies is added in (40 to 44 million bbl/yr).

Cell: W109

Comment: Rick Heede:

Natural gas production from Royal Dutch Petroleum Company (1985) SEC Form 20F for Royal Dutch Shell Group of Companies changes to "proved developed and undeveloped reserves" of natural gas. Group share of associated companies is shown in the next column for the same years.

Cell: E112

Comment: Rick Heede:

"Net equity crude oil production" — including natural gas liquids, and excluding royalty purchases — from the reserves of crude oil and natural gas liquids ..., including the Group share of associated companies." Royal Dutch/Shell Group (1988) SEC Form 20-F, p. 12, includes data for oil, natural gas, and coal from 1983-1987 (we use 1985-1987 here).

Cell: W112

Comment: Rick Heede:

"Natural gas production" for 1985-1987 from Natural Gas Reserves Table in Royal Dutch Petroleum (1988) SEC Form 20F, pp. G29-G31. First column of data lists production by Group companies; second column lists production by associated companies.

Cell: R114

Comment: Rick Heede:

"Natural gas sales from Group companies plus Group share of associated companies' production, plus royalty purchases" for 1983-1987 in Royal Dutch Petroleum (1988) SEC Form 20F, p. 13. Sales data is entered for comparative reasons. We use gas production for 1985-1987 from the Natural Gas Reserves table at pp. G29-G31 (see Bcf column at right).

Cell: W115

Comment: Rick Heede:

The data source for Shell natural gas production has been lost, but is presumably Oil & Gas Journal.

Cell: D126

Comment: Rick Heede:

Production data 1999-2003 from Shell (2004) Financial and Operational Information 1999-2003, p. 44. Note: includes re-stated data from 1999-2002, thus differs somewhat from Oil & Gas Journal Data Book and Energy Intelligence (2003) Top 100 (for which production in 2000 = 2,284 and 2001 = 2,234 kbb/d).

Cell: R126

Comment: Rick Heede:

Production data 1999-2003 from Shell (2004) Financial and Operational Information 1999-2003, p. 44. Note: includes re-stated data from 1999-2002, thus differs somewhat from Oil & Gas Journal Data Book and Energy Intelligence (2003) Top 100 (in which production in 2000 = 8,212 and 2001 = 9,009 million cf/d).

Cell: E127

Comment: Rick Heede:

Cells in light blue are "derived data" in this case from production by an acquired company (Enterprise), for which production data is given in million bbls/yr. Ditto for gas in 2000-2001, gas production in billion cf/yr.

Cell: J127

Comment: Rick Heede:

Oil production data from Oil & Gas Journal (2002) OGJ100, p. 88. Data in million bbl/yr. Note: RDSG acquired Enterprise Oil PLC (UK), with substantial North Sea oil and gas production, in 2002.

Cell: X127

Comment: Rick Heede:

Oil production data from Oil & Gas Journal (2002) OGJ100, p. 88. Data in billion cf/yr. Note: RDSG acquired Enterprise Oil PLC (UK), with substantial North Sea oil and gas production, in 2002.

Cell: D136

Comment: Rick Heede:

AR 2010 pg 31 (pdf pg 33); total crude oil and nat gas liquids, Shell subsidiaries + Shell share of equity-accounted investments; note slightly lower reported production for 2008

Cell: D138

Comment: Rick Heede:

FORM 20-F 2010 PG 32; Shell subsidiaries+Shell share of equity-accounted investments; 2008 values consistent

Cell: E138

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). Note: the carbon content of the extracted resources is adjusted by a number of factors before emissions estimates are made. Most important is the subtraction of the fraction typically sequestered in petrochemicals and other non-combusted uses such as road oils, waxes, lubricants, greases, etc. See the worksheets on non-energy uses and factors for oil and natural gas in SumOil.xls and SumGas.xls

Cell: R138

Comment: Rick Heede:

Royal Dutch Shell AnnRpt and 10-K 2013, page 35. Natural gas, Shell subsidiaries + Shell share of joint ventures and associates, million SCF per day.

Cell: U139

Comment: Rick Heede:

Shell 20-F/AnnRpt 2014, page 37, Sell share of equity LNG sales, million tonnes.

Cell: A139

Comment: Rick Heede:

Shell CDP rpt 2012: Total Scope 1: 74.0 MtCO_{2e}, Scope 2: 10.0 MtCO_{2e}. Scope 1: Downstream: 39.80 MtCO_{2e}, Upstream (other than flaring): 20.60 MtCO_{2e} Upstream flaring: 10.00 MtCO_{2e}, Shipping: 3.20 MtCO_{2e}, Other: 0.30 MtCO_{2e}. CO₂: 70.70 MtCO₂ CH₄: 2.80 MtCO_{2e} N₂O: 0.44 MtCO_{2e}, HCFs: 0.028 MtCO_{2e}. Also 240 TWh of fuel (of which 195.6 TWh of "own fuel"), plus 13.0 TWh of electricity, plus 17.6 TWh of steam. Scope 3 "use of products sold:" 570 MtCO₂. Sum of Scope 1 plus products sold: 644 MtCO_{2e}, of which Scope 1 is 11.49 percent.

Cell: I141

Comment: Rick Heede:

Royal Dutch Shell (2015) Annual Report and Form 20-F for the year ended December 31, 2014. Reserves, page 31; O&G production available for sale, p. 35-36. Crude oil and natural gas liquids: "Shell subsidiaries:" 443.673 Mb, plus "Shell share of joint ventures and associates;" 45.165 Mb.

Cell: J141

Comment: Rick Heede:

Royal Dutch Shell (2015) Annual Report and Form 20-F for the year ended December 31, 2014. Page 36: Synthetic crude, Canada: "Shell subsidiaries:" 46.934 Mb, Bitumen, Canada: 5.779 Mb.

Cell: W141

Comment: Rick Heede:

Royal Dutch Shell (2015) Annual Report and Form 20-F for the year ended December 31, 2014. Reserves, page 31; O&G production available for sale, p. 35-36. Natural gas: "Shell subsidiaries:" 2,309 Bcf, plus "Shell share of joint ventures and associates;" 1070 Bcf.

Cell: D142

Comment: Richard Heede:

Shell 20-F for 2017, page 42, "production available for sale," in thousand bbl per day. Also synthetic oil and bitumen, columns "J" and "K".

Cell: I142

Comment: Rick Heede:

Shell Annual Report 2015, page 34, "Oil Production (Available for sale)" Shell subsidiaries 454.3 Mb, plus Shell share of joint ventures and associates" 41.2 Mb, plus Synthetic crude 49.9 Mb, plus bitumen 5.3 Mb (both in Canada).

Cell: W142

Comment: Rick Heede:
Shell Annual Report 2015, page 35, "Oil Production (Available for sale)" Natural Gas, Shell subsidiaries (2,148 Bcf) plus Shell share of joint ventures 910 Bcf).

Cell: I143

Comment: Rick Heede:
RDS 20-F for 2016, page 38. Shell subsidiaries 576.170 Mb in 2016, plus 38.358 Mb from joint ventures and associates. Plus synthetic crude and bitumen (all JV).

Cell: W143

Comment: Rick Heede:
RDS 20-F for 2016, page 38. Shell subsidiaries 3,037 Bcf in 2016, plus 847 Bcf Mb from joint ventures and associates.

Cell: W144

Comment: Richard Heede:
Shell 20-F for 2017, page 42, "production available for sale," in million scf.

Cell: I145

Comment: Rick Heede:
Royal Dutch Shell (2019) SEC Form 20-F and Annual Report for 2018, Oil & Gas production available for sale, p. 4-fwd. Annual crude oil and NGLs, plus synthetic crude and bitumen, in Mb per yer.

Cell: W145

Comment: Rick Heede:
Royal Dutch Shell (2019) SEC Form 20-F and Annual Report for 2018, Oil & Gas production available for sale, p. 49-fwd. Annual production of natural gas, in Bcf per year.

Cell: AP146

Comment: Rick Heede:

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Cell: AP147

Comment: Rick Heede:

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